9th National Seminar of Chemistry and Environment

3 & 4 September 2019

Arak University

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انجمن شیمی ایران

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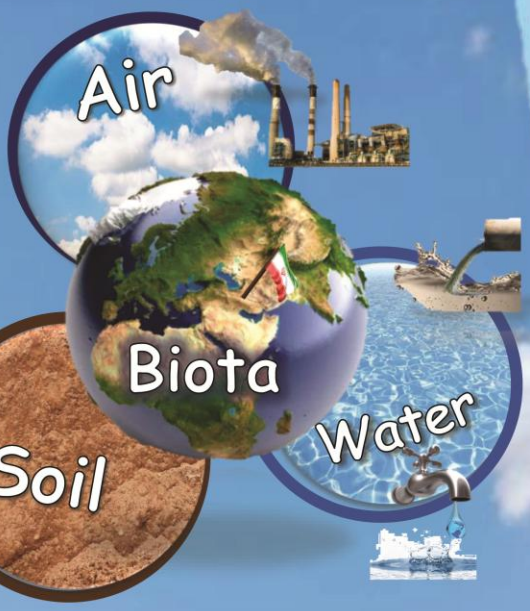
دانشگاه اراک



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In the Name of God

9th National Chemistry and Environment Seminar of Iranian Chemical Society

3 - 4 September, 2019

Department of Chemistry

Faculty of Sciences

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Greeting

It is my pleasure to welcome you for participating in 9th National Chemistry and Environment seminar of Iranian Chemical Society which is held at Arak University from 3-4 September, 2019.

There is no doubt that by increasing the industrial plants and vehicles, we have huge amount of pollutions in environment. So the researchers are motivated to propose new ideas in order to overcome these environmental challenges. This scientific event opens up opportunities for exchanging research activities to promote knowledge for engaging in environmental research projects. Moreover, this is an excellent condition for academics to contribute their investigated results and ideas to industries.

The scientific program includes: speakers, oral, and poster presentations which have been selected from 220 papers.

The scientific and organizing committees would like to take this opportunity to express their appreciation to all authors who promoted the scientific level of this seminar.

As the scientific chairman of the seminar, I would like greatly appreciate to all of the scientific, organizing, executive committees and graduate students of chemistry department of Arak University. My especial thanks go to my Ph.D. student Ms. Dermanaki Farahani for the kindly assistance in this respect.

Best Wishes

Professor Javad Zolgharnein

Seminar Scientific Chairman

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The organizing committee would like to express their sincere thanks to all sponsors who have made the contributions to seminar.

The support for the seminar has been kindly provided by the following:

Invited Speaker

Environmental Challenge of Chemical Industries in Markazi Province

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Abstract: Chemical as a wide range of products & row, intermediate material are in most criteria of human life. Industrial products are very important in Iran that the environmental problems of them should be attention. In addition to the advantages that the Markazi province has for establishing chemical manufactories, Main Oil industries such as Refinery & Petrochemical company of Shazand has to lead to developing and growth of chemical industries in the region. Therefore, it needs more efforts to prevention of environment. In this province, chemical factories are producing in different classes of Oil & Gasoline, Recovery, Celoloses & other types of industries. WAMCO as the first site of management of industrial & hazardous wastes of Markazi Pro. and even the country and trying to manage all wastes in future has to be continued. Other developments such as wastewater treatment plants in large scale industries and Industrial States are reduse water and soil pollution caused by activity of chemical plants. Seven other refineries are currently in operation which result of environmental efforts that have accelerated in recent years. Air pollution is one of the major problems of these industries and issues such as refinery's flare continue to cause severe air pollution so there are still many steps to be taken. But monitoring and control have led to more clean days, and decline in the number of chemical industries in the list of pollutant is evidence of this.

Brine Evolution of Urmia Lake in Wet and Dry Season of 2019

***Razyeh Lak*[1], *Najmeh Davari*[2], *Ali Mohammadi*[1]**

1: Research Institute for Earth Sciences, Geological Survey of Iran
2: Mineral Exploration Department, Geological Survey of Iran

Abstract: This project was carried out aiming at comparing the geochemical changes of the Urmia Lake brine during drought and wet periods. By 2010, the Urmia Lake brine was from Na-Mg-Cl type that is comparable to the Great Salt Lake of Utah (USA). This trend has dramatically changed due to drying up of Lake Urmia and increasing lake evaporation by tens of times, as well as decreasing surface water inputs in recent years. As the evaporation intensifies, magnesium to sodium ratio increases in brines and eventually the brine type changed to Mg-Na-Cl in 2012. Evolution trend of Urmia Lake brine doesn't follow Eugster & Hardie diagram since 2010 and some changes seems necessary to show the situation of Lake Urmia's brine.

In this study, the brine type was investigated during drought and wet season in 2019. It should be noted that the density of sampling network was unique in March 2019 and sampling with this density has not been carried out in Lake Urmia yet.

In order to study the hydrochemistry of Lake Urmia and to determine the brine type, some samples were taken from lake water. Then the results were compared and interpreted. In January 2019, sampling was carried out in the lake up to 30cm depth and 37 brine samples were taken. However, due to the drought, driving boat to the middle parts of the lake was not possible. In March 2010, 75 and 71 samples were taken from surface and deep brines respectively in north of the lake making use of a motor boat in a regular network with 5 km spaces. Density and depth were recorded on site and major cations and anions were analyzed in the laboratory of Khour Potash Complex. Analysis results indicated that the dominant brine type is Mg-Na-Cl in January 2019. However, the brine type is Na-Mg-Cl in March 2019 at both shallow and deep samples that is indicative of improving ecological conditions, increasing sodium to magnesium ratio and occurring conditions similar to 2007 because of salt solution.

Today, potassium is economically exploited from the playas in Australia and USA with similar ratio as SOP (K_2SO_4) that this condition is more valuable in Lake Urmia due to easy access to the surface potassium-rich brines.

Chemistry and Protection of Environment

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Abstract*:* Over the years"we have made significant developments in agriculture"energy"industry and health that have contributed to human well-being. However some of these improvements in our lives have resulted in changes to the environment around us. Many people think that chemistry, as well as chemical industries, are harmful to the environment. However nowadays environment protection has become the most important issues.
Back years ago" many new advances and scientific researches in the field of chemistry were started to develope to invent more environment-friendly applications and objects "while they held keep up with the lifestyle we expect.An example of environment-friendly chemistry is green chemistry.The environment protection agency (EPA)defines green chemistry as the design of chemical products and processes that reduce or completely exterminate the use or generation of hazardous substances.Main researches on green chemistry aim to minimize or eliminate the formation of harmful-products and to maximize the desired products in an environment-friendly way.
Chemically wastewater "polluted soil and air treatment techniques(chemically clean up of environment) are also applied for the removal of heavy metals"oil and greases"suspended matters and emulating organic substances"organic and inorganic substances difficult to decompose" non-polar organic substances"toxic pollutants and high salt concentration from environment.
In this lecture, some examples of green chemistry and also a few of chemically clean up techniques will be presented.

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Health of Aquatic Ecosystems and Environmental Chemistry

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Abstract: The increasing population growth rate, high development of the industries and the irresponsible uses of aquatic resources, have resulted to serious threats. By the middle of the 20th century, the process of aquatic resources degradation was considered. So, the awareness of the health status of aquatic ecosystems has become more necessary. Pollutants may enter the human body through the consumption of fish and thereby create a serious health hazard. The measurement of contaminants in fish and other marine organisms can be useful to assessing potential health risks to humans as¬sociated with the consumption of fish. Health risk assessment is defined by the US Environmen¬tal Protection Agency (USEPA) as the description of the potential adverse health effects of humans as a result of exposure to contaminants (1).

The present work shows the use of indicators such as TRIX, UNTRIX, WQI, and Eutrophication Index for the classification of Persian Gulf and Oman Sea waters. Geochemical indices such as Contamination Factor, Index of Geo-accumulation (Igeo), Contamination Degree and Pollution load index, have also been used to assess the marine sediment contamination status(2). In addition, by using the Ecological Risk Factor, the potential risk of aquatic ecosystems has been estimated. Finally, the risk of aquatic biota consumption has been analyzed using the target hazard quotient (THQ).

The THQ of all tested metals in the studied species and the HI of all three species were less than 1. Therefore, consumption of the studied fish has no health risk for consumers and, the consumption of up to 4 (kg/d) of Thunnus tonggol by adults and up to 2.2 (kg/d) by children does not cause health problems in terms of the tested heavy metals. For Liza klunzingeri, these levels are 7.32 and 4.02 (kg/d), respectively.

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Environmental Metabolomics: A New Era in Environmental Chemistry?

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Abstract: The rapid development of 'omics' technologies has created the possibility of using these approaches to investigate the molecular complexity of biological and/or environmental systems [1]. Environmental metabolomics is one of the recent omics research area which can be defined as the study of the sources, reactions, transport, effects, and fates of chemical species in the air, soil, and water environments; and the effect of human activity and biological activity on these. In other words, this filed aims to study the living systems (e.g., plants) at the molecular level to provide a non-biased characterization of the metabolome of a plant's tissue in response to its environment [2]. Contaminants of emerging concern (CECs), such as pharmaceuticals and personal care products, have been increasingly detected in agricultural irrigation waters which can cause changes in plant morphology and plant metabolomic pathways [3]. On the other hand, as environmental metabolomics is collecting more data (volume) from different instruments such as chromatography and/or spectroscopy (variety), this journey becomes more challenging in terms of using the right data and the right tools to make the right decisions in real time (velocity). Chemometric methods are now filling this gap. Chemometric methods are coming of age as a family of methods that have been proposed for exploring, modelling, and interpreting important patterns in large data sets [4]. Chemometric methods based on multivariate data analysis and in multilinear and non-linear models attempt to explore, model, identify and interpret the most important patterns present in the different metabolomics data arrays by means of new mathematical and software tools. In this contribution, the role of environmental metabolomics in current environmental chemistry studies will be discusses. Additionally, the role of chemometrics in this regard will be examined.

Keywords: Metabolomics; Chemometrics; Big data; Plant metabolomics; Emerging contaminant.

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Improvement of Determination, Adsorption, Degradation and Sensing Processes using Nano-Based Materials

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Abstract: Over the last few years, nanotechnology is increasingly developing in scientific sector, which has attracted a great deal of interest because of its abundant applications in almost all the areas. One of the most important applications of nanomaterials is their use in determination, removal, degradation and sensing area. The global environmental issues, especially the organic pollutants in industrial and household wastewater, have become a great threat to human life and environment in recent decades. An effective solution for confront with these problems is the use of method, which not only can relieve these problems, but also reduce the effluent discharge into the ecosystem. Also, detection and sensing of some compounds due to their effect on human life and environment is vital. Therefore, application of nano-based materials for determination, removal, degradation, and sensing of different organic compounds due to impressive properties of nanomaterial's in terms of high specific surface area, extraordinary mechanical flexibility, chemical stability, superior electrical and thermal conductivities, high surface free energy, sufficient reactive sites, fast dissolution, and various discontinuous properties (e.g. superparamagnetism, localized surface plasmon resonance, and quantum confinement effect) can enhance and improve the efficiency of these methods.

Keywords: Adsorption, Degradation, Sensors, Nano-based Materials

Liquid Fuel Pollutants Harmful to Public Health and the Environmental

Ardeshir Kamkar

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Liquid fuel from out and chemical materials from inside (in-home).

Which are the pollutants of environment?

How they reduce oxygen and because die.

We show with different tables of air pollution, the result of reducing the pressure and percent of oxygen in the air, standard specifications of different gasoline, ambient air quality standard emission standard for different vehicles … ….to prove this is the fuel that pollutes the air.

What are the solutions?

-To teach the people

-…

-Increase the plans

-Produce electrical vehicles

..

Oral Presentation

Use of GIS Maps and Chemometrics to Evaluate Variations in Water Quality

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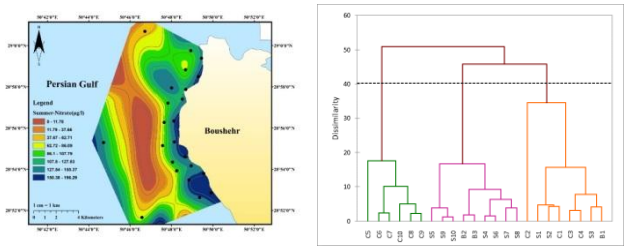

Abstract: A complex data matrix is usually obtained when assessing the water quality [1]. Chemometric tools such as PCA and cluster analysis have been effectively employed to assess the spatial and temporal characteristics of coastal water quality [2]. The purpose of this study is to investigate 11 parameters from the surface of Bushehr coastal waters at 23 stations during dry and wet seasons. The ArcGIS maps of nutrients along with the PCA and cluster analysis were used to assess both the spatial and temporal variations in water quality dataset of the coastal waters. The Grasshoff method was used for samples collection. The nutrients were analyzed by a spectrophotometer according to the MOOPAM method [3]. The concentration of all nutrients decreases from the nearshore to offshore waters, because of terrestrial sources such as sewage (Fig.1). The PCA results show that inorganic nitrogen (NH_4-N, NO_3-N and NO_2-N) makes an important contribution to PC3, PC4 and PC5 which is used as significant parameter for water quality identification. The biplot shows that the monitoring stations are classified into three groups (Fig.2). In general, a very similar results were obtained by PCA and cluster analysis. These results can contribute to socioeconomic development in the Bushehr city.

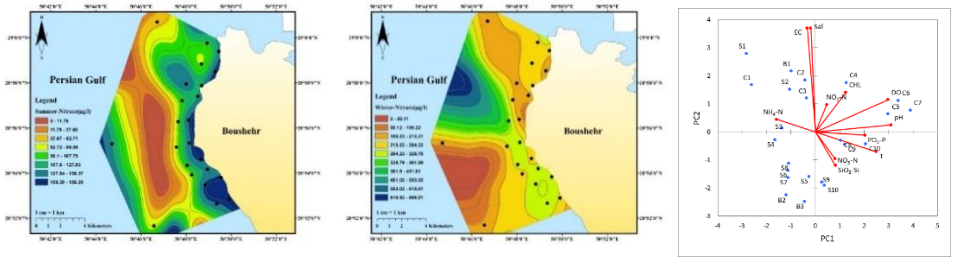

Fig. 1. Nitrate surface distribution in dry and wet seasons, **Fig. 2** Biplot of 11 parameters at 23 monitoring stations.

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Functional Luminescent Zn(II)-Based Metal-Organic Framework Material for Highly Selective and Sensitive Sensing of Metal Ions and Small Molecules

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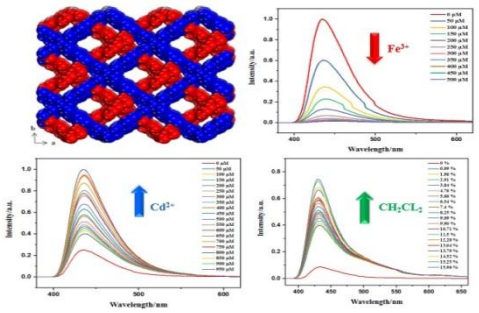

Abstract*:* Recently, very much attention has been taken to the reconnaissance of heavy metal ions due to their prompt diffusion as environmental contaminants to the surroundings. The design and synthesis of sensitive and selective luminescent materials as chemical sensing agents is a fundamental goal in fluorescence assays [1]. Considering high porosity, large surface area, excellent photoluminescence property of metal-organic frameworks (MOFs), luminescent properties of a microporous azine-functionalized MOF, TMU-16, dispersed in different metal ions and solvents have been investigated systematically [2]. The TMU-16 displays superb luminescence emission, and it can detect Fe(III) and Cd(II) ions with high selectivity, excellent sensitivity, and short response time (<1 min). The emission intensities of TMU-16 were quenched upon the addition of Fe^{3+} and increased upon the addition of Cd^{2+}. The detection limits of TMU-16 for Fe^{3+}/Cd^{2+} in DMF are estimated to be 0.2 and 0.5 µM, respectively. The effect of other metal ions on the fluorescence intensity of the MOF was also studied and other metal ions showed low interference response in recognition of Fe^{3+} and Cd^{2+}. Furthermore, TMU-16 exhibits distinct solvent-dependent luminescent spectra with emission intensity significantly enhanced toward dichloromethane. More importantly, this is the first example of MOF-based luminescent sensor as efficient multifunctional fluorescence material which can use for selective sensing of Fe(III) and Cd(II) ions and small molecules such as CH_2Cl_2.

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Application of Stable Isotopes in Environmental Studies

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Abstract: Identification, Tracing and removal of environmental pollutants, especially surface and groundwater, sediment and soil pollutants, are very important. Recently, isotope analysis methods have been widely used to identify and determine the processes of natural degradation of organic pollutants such as insecticides, pesticides, pharmaceutical wastes, petroleum, volatile organic compounds, and solvents, as well as mineral compounds such as nitrates. Also, the isotope ratio analysis is increasingly used to identify and determine the source of organic and inorganic pollutants and to investigate the fate of these pollutants in groundwater and soil. An important feature of this approach is that it allows degradative losses of contaminants to be distinguished from those caused by non-destructive processes such as dilution, dispersion, and sorption. Isotope ratio mass spectrometry allows the determination of the ratio of stable isotopes (such as hydrogen, carbon, nitrogen, oxygen and sulfur) in various environmental pollutants. It should be noted that environmental forensics is considered as a discipline to investigate and determine the factors responsible for the emission of environmental pollution. In environmental forensics, isotope analysis has responded to questions such as the nature of pollutants, especially the oil spill, the source of its release, the amount of weathering and its duration, and how to dispose of the pollutant over time. In fact, the isotopic composition of pollutants can be used as an invisible signature or fingerprint to determine the sources of pollution. In addition, the results of the isotope analysis provide useful information on kinetics and the mechanism of degradation processes of environmental pollutants.

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Study of the Level of Environmental Radioactivity In The South-Eastern Part of The Shazand Refinery Complex

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Abstract: Minerals, including crude oil, contain a small amount of natural radioactive elements. During the refining of crude oil and production of petroleum derivatives, appropriate waste is burnt by burners, and impurities are dispersed in the form of fly ash, which after cooling settles in the surrounding environment [1-3]. This, in turn, is a function of wind flow, ambient temperature, and topography of the region. In this region, 80% of the winds are from the west to the east, and the Rasvand and Sefidlkhani mountains are in the west and southeast of the refinery respectively, causing air stagnation along the mountains. Therefore, to constantly monitor the environment, it is necessary to examine the soil and crops in the environment and determine their radioactivity. In this study to determine the radioactivity in the agriculture lands of Baghbaraftab and Ghadamgah has been carried out for determining the radiation level and to measure the radiation dose exposure to farmers and inhabitants of the studied area**.** The villages of Baghbaraftab and Ghadamgah are located 5 km southeast of the Shazand Refinery Complex. The Shazand Refinery Complex is one of the largest plants in Iran, which lies 30 km west of the Arak metropolis. Twenty-one soil samples have been collected from two different lands. Sampling spots in the each land have been selected for the assessment of specific activities of radionuclides of ^{226}Ra, ^{232}Th, ^{40}K and137Cs using high purity germanium detector set up. Standards IAEA references material RGU, RGTh and RGK were used for quality control and determining efficiency calibration [4]. The specific activities of corresponding radionuclides varied from13.12 to 33.03, 11.3 to 35.86, 257.82 to 605.5 and 1.28 to 13.36 in Bq/kg respectively. The levels of artificial radionuclide ^{137}Cs are consist with other measurements in this region [5]. Radium equivalent value and radiological parameters were calculated for all samples. Results were found to be within the global reported safety limits [6]. Therefore, there is no risk for farmers and residents of this region.

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Hydrogen Sulfide Removal from Biogas using Ion-Exchanged Nanostructured LTA Zeolite for Fueling Solid Oxide Fuel Cells

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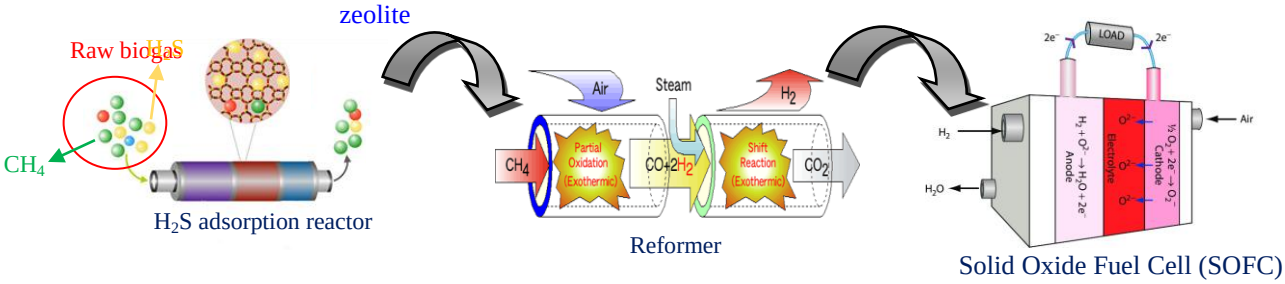

Abstract*:* The aim of this work was investigating the hydrogen sulfide adsorption properties of synthetic and commercial zeolites. The nanostructured LTA zeolite was synthesized using appropriate amounts of sodium silicate solution, aluminum silicate powder and sodium hydroxide scales in ambient pressure and 40 ˚C and characterized by XRD, FT-IR and SEM analysis. The ion-exchange process was applied on as synthesized zeolite to improve its adsorption properties. 2 g of as synthesized zeolite was mixed with 0.1M of silver nitrate solution and stirred for 16 hours in ambient temperature. After that the milky solution was filtered and the obtained solid phase was washed with deionized water and then dried at 120 ˚C overnight. The hydrogen sulfide adsorption properties of these synthetic zeolites were compared to a commercial LTA zeolite using adsorption tests. H_2S adsorption tests were carried out in a laboratory scale plant equipped with stainless still and Teflon pipes and a Pyrex reactor. A gas stream of 15 ppm H_2S in nitrogen matrix was passed through the reactor which was filled with 20 mg of adsorbents with given flow rate and the outlet stream of the reactor was analyzed by a gas chromatograph equipped with a flame photometric detector for H_2S detection. The breakthrough point was defined as a time that 1ppm of H_2S was detected in the reactors outlet (the H_2S tolerance limit for SOFCs) and the adsorption capacity of sorbents were measured at this point. The best adsorption capacity was for ion-exchanged zeolite followed by synthesized zeolite while the commercial zeolite showed the lowest capacity for H_2S.

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Evaluation of Gel Membranes in Electro-membrane Extraction Method with Green Chemistry Approach

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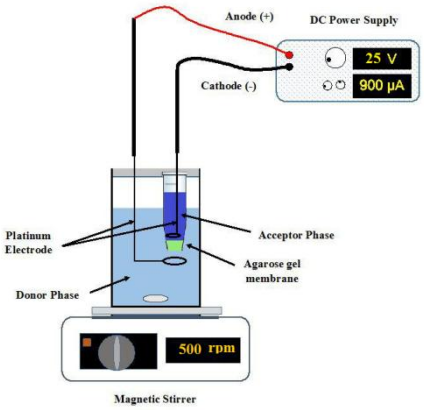

Abstract: Introducing new membranes with green chemistry approach seems to be a great challenge for the development of a practical method in separation science. Very recently, several novel green membranes based on a gel composition were introduced [1, 2]. Prepared from renewable and biodegradable resources, gel membranes are considered as an alternative to petroleum-based materials, opening the new horizons in green sample preparation. However, only a few published papers using this approach in sample preparation have been published so far [1-2]. For this reason, in this study, gel membranes such as agarose gel and polyacrylamide gel were used as novel green membranes in electro-membrane extraction (EME). The results showed that via gel membrane, polar analytes were efficiently extracted without using any reagents in the gel membrane. Different variables for fabrication of gel membrane and extraction condition were evaluated, and under the optimized condition, the extraction recoveries were observed as between 56.6% and 85.0%, and the limits of detections (LODs) were obtained in the acceptable range of 0.3 – 7.5 ng mL^{-1}. Apart from the green features, the fabrication of gel membrane (e.g. agarose gel) is very simple and feasible, as it involves only mixing of agarose and water. Moreover, different thicknesses and shapes of the membrane can be easily achieved. In the other hand, fabrication of the new gel membranes from alginate, chitin, curdlan, chitosan, or xylan, and also investigation and development of flux mechanism of analytes across the gel membrane, could be one of the main research areas in the future. Therefore the authors are optimistic about the future of gel membranes in biological analysis.

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The Role of Green Chemistry in the Realization of the Green University

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Abstract: Green chemistry was obtained to prevent air pollution in early 1990. Green chemistry is the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture, and application of chemical products. The twelve principles of green chemistry are: Prevention, Atom economy, Less hazardous chemical syntheses**.** Designing safer chemicals, Safer solvents, and auxiliaries, Design for energy efficiency, Use of renewable feedstocks**,** Reduce derivatives, Catalysis, Design for degradation, Real-time analysis for pollution prevention, Inherently safer chemistry for accident prevention. Green University, A university in all its activities, including educational and research, and all existing services (administrative, financial, laboratory, workshops, etc.), health, safety, and environmental protection, and the efficient and efficient use of resources and Consumables can move towards the goals of sustainable development. The indicators of Green University are: Improvement of heating and cooling system, Improved educational system, Culture making, Water management, Waste Management, Clean technology, Transportation, The results show that the compatibility of the indices of the Green University with the twelve principles of Green chemistry indicates the important role of green chemistry in the realization of the green University. Universities that are scientifically high are also successful in achieving the green University.

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One-Step Two-Electrode Electrodeposition of Intercalated Layered Double Hydroxide for Effective Uptake of Heavy Metal Ions

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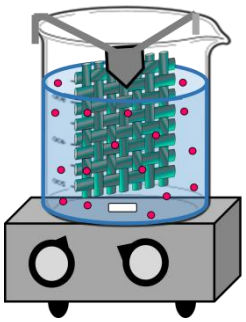

Abstract: In this work, Cu Cr-layered double hydroxide nanosheet (DS-LDH) has been successfully fabricated on a carbon cloth substrate via a facile two-electrode electrodeposition method. The electrodeposition method allows the deposition of well adherent, homogeneous and single phase LDH coatings on electrodes. The resulting DS-LDH was characterized by X–ray diffraction (XRD), Fourier transformed infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), and Energy-dispersive X-ray (EDX) technique. The DS-LDH coated on the carbon cloth was used for the effective uptake of heavy metals and exhibits superior selectivity as well as a higher adsorption capacity for Hg(II) ions even in the presence of high concentration levels of competitive ions. The Sorption isotherm for Hg(II) agrees with the Langmuir model and thus suggests a monolayer adsorption. The DS-LDH coated on the carbon cloth exhibits a high record saturation Hg(II) uptake capacity of over 2500 mg g^{-1} and distribution coefficients of 4.10×10^6 mL g^{-1}, which place it at the top of materials known for the uptake of Hg(II). The sorption kinetics for Hg(II) follows a pseudo-second-order model, suggesting a chemisorption binding. Moreover, we observed efficient Hg(II) removal from tap water, well water, river water, and seawater samples. The excellent efficiency in recycling studies and good stability of the coating are other properties of the adsorbent.

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Toxic Cyanogen Gas Sensing using Bowl-Like B_{30} Nanostructure: A Theoretical Study

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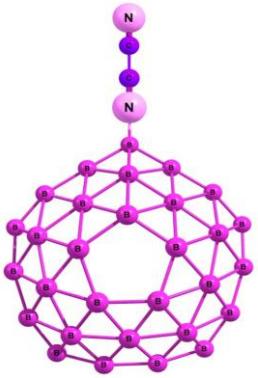

Abstract*:* So far several studies have been reported for the adsorption of cyanogen molecule by different nanostructures [1]. Continuing our recent [2-4] interest to find out promising nanosensor for detection of cyanogen, in this work, an attempt has been made to study sensing performance of bowl-like B_{30} nanostructure toward toxic cyanogen gas using density functional theory (DFT) at B97D/6−31+G (d) computational level. Cyanogen is used as high-energy fuel includes its application in missiles fuel. The design of cyanogen sensors is very important for monitor and control of cyanogen gas in the environment. The results reveal that B_{30} nanostructure is a proper sensor for sense of toxic cyanogen gas. The most favorite adsorption site of B_{30} is the exterior boron atoms that lead to the adsorption energy of -78.48 (kJ/mol). It is well worth to mention that intervention of moistness, oxygen and nitrogen molecules in the air is an essential parameter in the design of proper nanosensor for detection of molecular moieties. Hereupon in the present study, competitive sensing of cyanogen gas in the presence of water and oxygen molecules is also considered. Significant changes in the electronic properties of B_{30} due to adsorption of cyanogen gas enable it to be used in detection of toxic cyanogen gas.

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A New Solvent Extraction Design for the Recovery of Valuable and Environmentally Important Metals from Spent Rechargeable Ni-Cd Batteries

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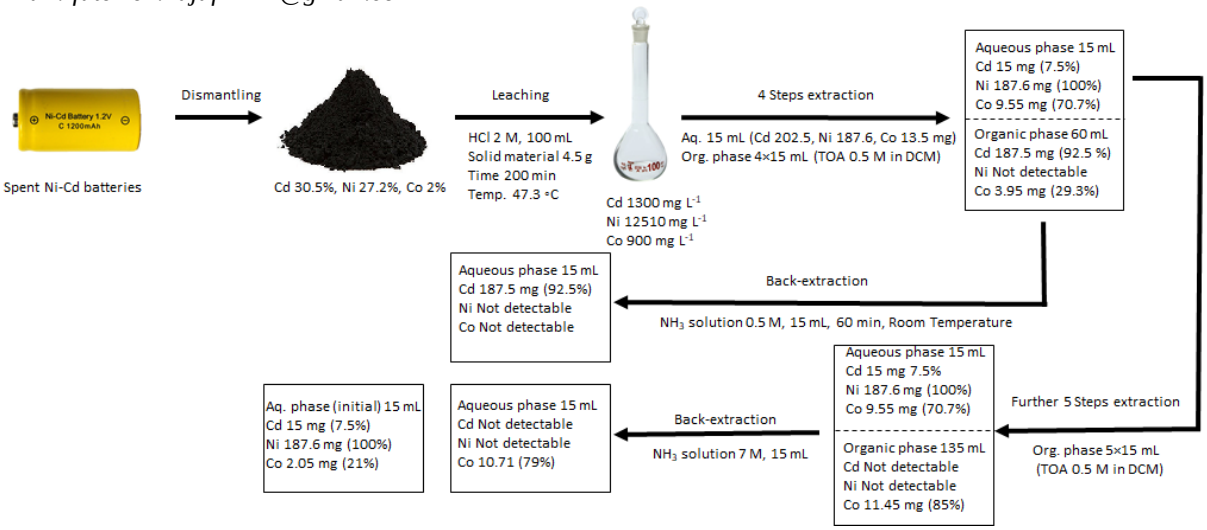

Abstract: The Ni-Cd batteries content hazardous metals Ni, Cd and Co suspected carcinogenic [1]. The demands for metals is increasing, while primary sources are being decreased. This motivates the research on the recycling of the end-of-life products, which is important from both economic and environmental aspects [2]. The present communication describes a new procedure for the recovery of Ni, Cd and Co from the spent Ni-Cd batteries. A series of batteries were cleaved and the solid materials were collected for leaching the metal contents. The leaching process was optimized with respect to the influencing parameters. A multi-step solvent extraction procedure performed by contacting a given volume of the leached solution with an organic phase (tri-*n*-octylamine, TOA in dichloromethane, DCM) allowed to extract quantitatively Cd and Co contents into the organic phase. A selective back-extraction of Cd and Co using NH_3 solution allowed separating these metals. The RSM optimization method reveled that an efficient leaching of Cd, Ni and Co from the solid materials can be achieved by leaching 4.5 g of the materials with 100 mL of HCl (2.7 M) after 200 min, at 47.3 °C. The solid materials contain 30.5, 27.2 and 2 wt% of Cd, Ni, and Co, respectively. An aliquot of 15 mL of the leached solution (202.5, 187.6 and 13.5 of Cd, Ni, and Co) was contacted, in four steps, with 15 mL of the organic phase (0.5 M TOA in DCM). The total transferred Cd and Co into the organic phase was 187.5 and 3.95 mg (92.5 and 29.3% of the initial amounts), respectively. The cadmium contents in the organic phase was totally back-extracted by using a 0.5 M NH_3 solution. Under such condition, the extracted Co remained in the organic phase. In order to the separation of Ni and Co the remained in the source solution, the extraction of this aqueous phase was continued in a further five steps extraction procedure with the same organic solutions. The total extracted cobalt into the organic solutions was raised to 11.48 mg (85% of its initial amount). The back-extraction of Co was succeeded by using a 7 M of NH_3 solution.

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Sewage Effects on Environment and Ways to Treat Them

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Abstract: "Domestic and municipal wastes and sewage sludge are "by far the greatest volume of waste discharged to the marine environment. Huge loads of wastes are generated daily from highly populated cities and are washed out by the drainage systems which generally open into nearby rivers or aquatic systems. As, the industrial areas are mostly highly populated or are usually established near highly populated areas. Higher pollution load from industrial sources is generally accompanied by a higher risk of domestic and sewage pollution". It is hard to imagine raw sewage being dumped into the ocean, but it happens on a regular basis. The oceans are vast and can break down this vile liquid, but it still causes many adverse effects on marine life. Sewage or polluting substances flow through sewage, rivers, or drainages directly into the ocean. This is often how minerals and substances from mining camps find their way into the ocean. The release of other chemical nutrients into the ocean's ecosystem leads to reduction in oxygen levels, the decay of plant life and a severe decline in the quality of the sea water itself. As a result, all levels of oceanic life, plants and animals, are highly affected". Recently Scientists are looking for efficient ways for governments to avoid the water pollution by sewage. One of these most efficient ways is "membrane bioreactor associate with genetically engineered autotrophic nitrifying bacteria" which the results indicated that this process has high-efficiency for advanced treatment of sewage; the other way is "tail water decentralized treatment and drainage system of sewage treatment plant" which is comprising a riparian vegetation buffer zone, a subsurface flow constructed wetland and a riverside protection pile, the riparian vegetation buffer zone comprises an excavation protection slope and an ecological bag paved on the excavation protection slope. By constructing a subsurface flow constructed wetland on the slope of the river bank after repositioning, the vegetation buffer zone and the subsurface flow constructed wetland are skillfully combined, and the tail water of sewage treatment plants is purified and treated through the subsurface flow constructed wetland. It is particularly suitable for changing the condition of single drainage outlet for the sewage treatment plant constructed near the river, with strong practicability. Now days with developing these eco-friendly ways, we hope to prevent and stop destroying our environment and save the organisms that are in risk of extinction because of human activities.

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A Nanocomposite Packed Needle Trap Device for Simultaneous Determination of PAHs and BTEX in Soil Samples and Its Optimization using Box-Behnken Design

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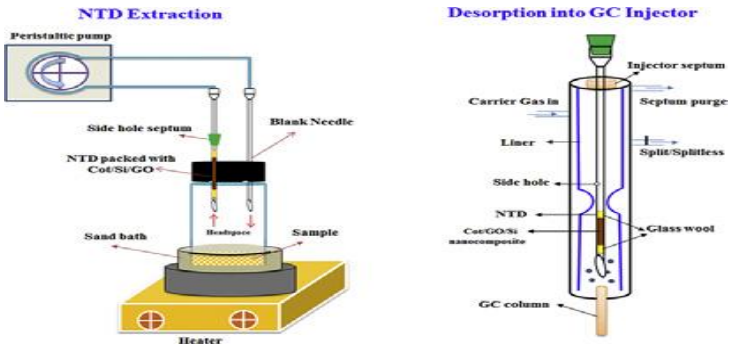

Abstract: Polyaniline silica (Silica/PANI) organic-inorganic nanocomposite was synthesized by combining electrospinning and in-situ polymerization processes. The composite structure was characterized by Fourier Transfer infrared spectrometry (FT-IR) and scanning electron microscopy (SEM). SiO2/PANI nanocomposite was packed inside a stainless-steel needle and evaluated for simultaneous NTD sampling of PAHs and BTEX in polluted soil samples, followed by GC-FID measurement. Response surface methodology (RSM) involving Box-Behnken design (BBD) was implemented to determine the optimized effective factors and describe the experimental conditions. To achieve a quantitative extraction in the shortest time, various influential experimental variables including extraction temperature, flow rate of headspace circulation, sample moisture content, and extraction time were optimized by RSM-BBD. The NTD-GC-FID method suggested in this study was validated by obtaining the analytical figures of merit. Therefore, linear dynamic ranges (LDRs), limits of detection (LODs), and relative standard deviations (RSDs) for the simultaneous headspace extraction of PAHs and BTEX from solid samples were investigated. Under the optimal conditions, good linearity of the calibration curves (R^2 > 0.99) was obtained (LDR, 0.3-3000 ng g^{-1} for BTEX and 0.01-3000 ng g^{-1} PAHs). The limits of detection (LODs, 0.06-0.3 ng g-1for BTEX and 0.001-0.01 ng g^{-1} PAHs), and standard deviations were found to be in the ranges 9.3-18.2% (n = 6). The proposed NTD-GC-FID method was successfully applied for the extraction and determination of PAHs and BTEX in contaminated soil samples.

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Synthesis of Novel AgNPs/Polyamide Composite as Filtration Membranes for Removal of Trihalomethanes in Water Sample by in Tube Microextraction with GC-MS/ P&T

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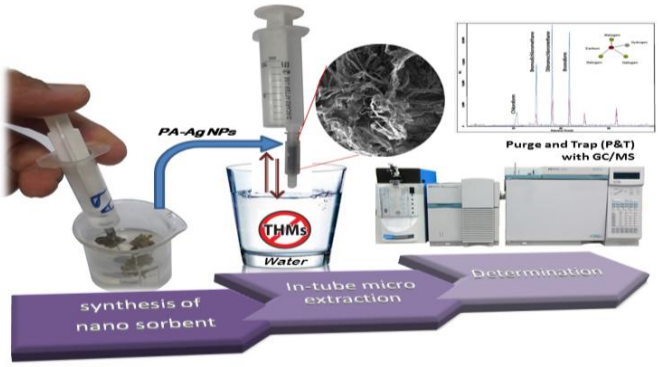

Abstract: A new, rapid, simple and effective removal procedure using in tube micro extraction method (in tube-ME) based on AgNPs /polyamide composite as adsorbent and combined with GC-Mas detector as well as purge and trap technique (GC-MS/P&T) has been developed for the removal of trihalomethanes (THMs). In this study, AgNPs/polyamide composite was prepared based on reducing silver ions on the surface of polyamide without using any reducing agent. The synthesis process was carried out in water containing silver nitrate using the inherently reducing and the stabilizing properties of polyamide chains. Silver ions penetrate into the intermolecular chains of polyamide and reduce to Ag and form AgNPs. The synthesized AgNPs /polyamide composite was characterized using fourier transform infrared (FT-IR) spectroscopy, scanning electron microscopy (SEM) and SEM-energy-dispersive x-ray spectroscopy (SEM-EDS). In this extraction technique, AgNPs/polyamide composite was packed into a Teflon syringe and employed as an extraction device for the removal of THMs including chloroform ($CHCl_3$), bromo dichloromethane ($CHBrCl_2$), dibromochloromethane ($CHBr_2Cl$) and bromoform ($CHBr_3$) from water samples. The effects of various experimental parameters such as the pH of the solution, the adsorbent dosage and the effect of different cycle time periods of the samples in the teflon syringe were investigated and optimized. After optimization, the best experimental conditions were set as initial THMs concentration 10 µg L^{-1}, adsorbent amount 7.0 mg and cycle time periods of 14 , sample solution pH:7. The equilibrium data were fitted to different isotherm models and the results revealed the suitability of the Langmuir model. The maximum sorption capacity calculated from the Langmuir model was 218 mg g^{-1} for THMs. Kinetic data revealed that the adsorption process followed a pseudo-second-order model. The removal efficiency of in waters samples by using AgNPs/polyamide composite was in the range of 93.5-100.2%. Strategy used for preparation AgNPs/polyamide composite and also general picture of the steps microextraction method used in the study, shown in graphical abstract.

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Simultaneous Determination of Hazardous 4-Aminophenol and 2,3-Xylenol in Aqueous Solutions Using The Modified Carbon Paste Electrode

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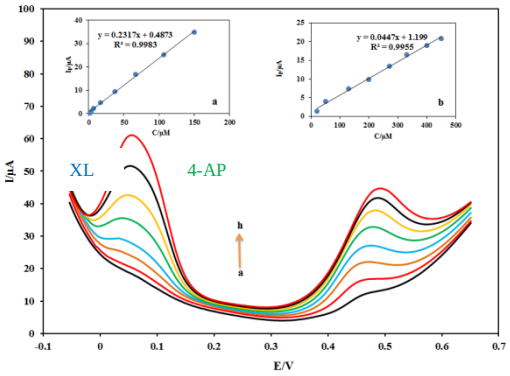

Abstract: Phenolic compounds are carcinogenic, toxic, teratogenic and mutagenic. These materials prevent the growth of microorganisms and 1 mg l^{-1} of phenol would cause significantly affect to aquatic life. Therefore determinations of phenolic compounds in environments are important research area. In this work, graphene oxide (GO) and CuO nano sheets (CuO NSs) were prepared and used for modification of the carbon paste electrode (CPE). The poly-eriochrome black T (PEBT) film was electrodeposited at the surface of the GO/CuONSs/CPE. The modified electrode (PEBT/GO/CuONSs/CPE) was used as an electrochemical sensor for simultaneous determination of 4-Aminophenol (4-AP) and 2, 3-Xylenol (XL). Differential pulse voltammetry method at the optimum conditions showed that the oxidation peak currents were linearly dependent on the 4-AP and XL concentrations in the ranges of 2-150 and 20-450 µM, respectively. The PEBT/GO/CuONSs/CPE offered some advantages such as good stability convenient preparation and high sensitivity towards electrochemical determination of the 4-AP and XL. The applicability of the sensor was also demonstrated for simultaneous determination of 4-AP and XL in real samples with satisfactory results.

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Headspace Solid Phase Microextraction Based on Cu-Based MOFs for Extraction of Polycyclic Aromatic Hydrocarbons (PAHs) in Water Samples by Gas Chromatography

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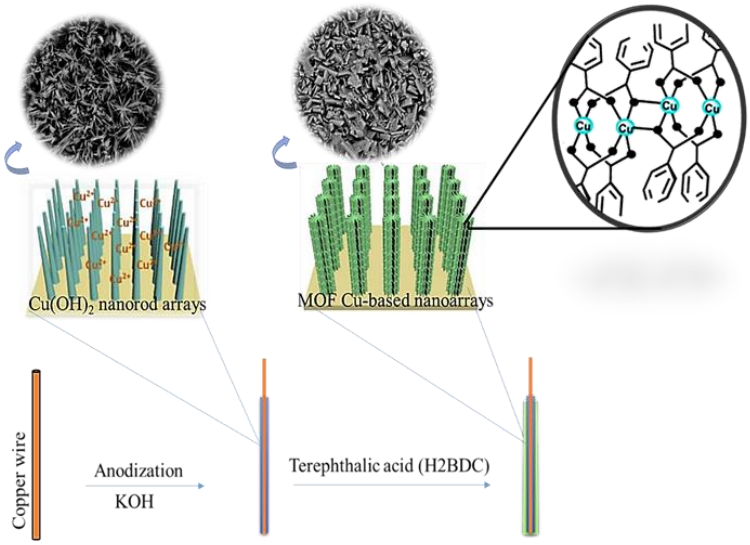

Abstract: In the present work, we report a new kind of fiber coating material for solid-phase microextraction (SPME). For this purpose, $Cu(OH)_2$ nanotube arrays were electrochemically synthesized by anodization of copper wire in an aqueous solution of KOH. The $Cu(OH)_2$ nanotube arrays were used as Cu source that coordinated with an organic ligand to form MOF structure, as well as the substrate to support the growth of Cu-based MOF. The fiber-MOF was characterized by thermogravimetric analysis (TGA), energy dispersive X-ray Spectroscopy (EDS) and scanning electron microscopy (SEM) methods. Cu-based MOF used as a fiber coating for headspace solid-phase microextraction to the preconcentration and extraction of PAHs from water samples. The experimental conditions for microextraction such as stirring rate, pH value, extraction temperature and extraction time were optimized. Following thermal desorption, the PAHs were quantified by GC Technique. Under optimum conditions, the repeatability (%RSD) for one fiber (n = 3) was obtained from 6.3 to 8.6%. The detection limits are between 8 and 12 pg mL^{-1}.

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Synthesis and Characterization of MCM-41 Mesoporous Functionalized with Dipicolinic Acid and Its Application for Preconcentration and Simultaneous Determination of Two Cationic Dyes

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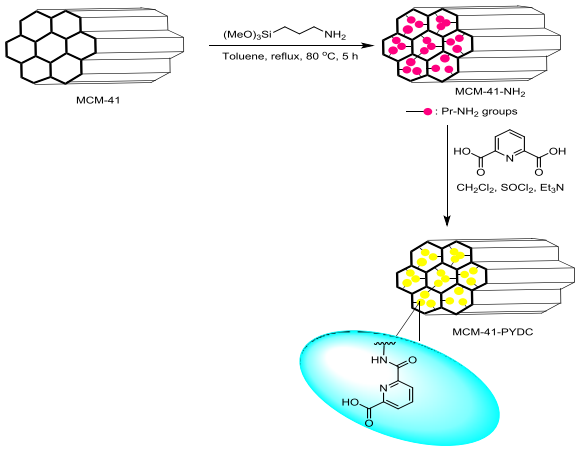

Abstract: Dyes produced by the textile, printing and paper industries can end up in waste waters and are therefore a potential source of pollution of rivers and waterways. Patent blue V used in common food products such as beverages, candies, dairy products, pharmaceuticals and bakery products. Therefore, huge amount of this dye enter and arrive to environment. One of the uses of fuchsin acid is coloration of the cytoplasm and the nucleus and various parts of the tissue in the histology laboratory in order to detect muscle from collagen. It also has important applications in coloring bacteria. The meso-prous silicone material has been considerably appreciated in nano studies due to its ease of preparation and its stable structure. Due to their special structure, these materials easily interact with other groups such as acids, amines, metal nanoparticles, and organic complexes.

In this study, MCM-41 mesoporous functionalized with dipicolinic acid (functionalized non-magnetic MCM-41) was synthesized and used as an efficient adsorbent for simultaneous preconcentration of patent blue V and fuchsin acid dyes by solid phase microextraction method. The analytes were determined by spectrophotometric method. Dimethylformamide and hydrochloric acid 4mol.L^{-1} were chosen as good extraction solvents for patent blue V and fuchsin acid respectively. The effect of effective parameters such as amount of adsorbent, pH, time of stirrer, volume of extraction solvent and ultrasonic bath time according to Taguchi design were investigated and optimized. Under the optimal conditions, the calibration curves were linear at the ranges 0/010 – 0/500 mgL^{-1} and 0/008 – 0/50 mgL^{-1} for patent blue V and fuchsin acid dyes respectively. The preconcentration factor and enrichment factor for patent blue V were obtained 49/80 and 27/04 respectively and 60/0 and 37/92 for fuchsin acid. The detection limits for patent blue V and fuchsin acid were 0/0020 and 0/030 mgL^{-1} respectively. Also the effect of some foreign species such as dye, cation and anions were investigated. The purposed method was applied to determine of mentioned dyes in different water samples including Yasouj tap water, Tang-e Mehrian water, and Tang-e Ganjei water.

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Modified Eu doped Y_2O_3 Nanoparticles As Turn-on Luminescent Nanoprobe For The Sensitive Recognition of Methamphetamine

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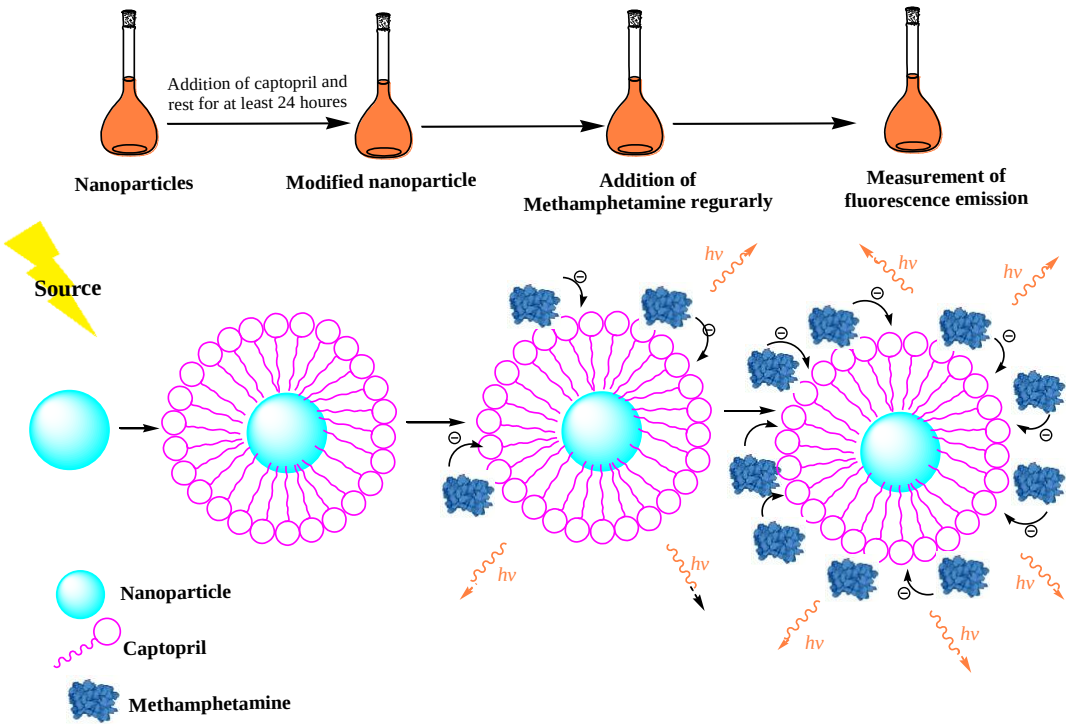

Abstract: Luminescence spectrophotometry is widely used in various areas relevant to physical, chemical, biological and medical sciences [1]. Due to the high surface to volume ratio of NPs, this feature significantly enhanced the luminescence intensity of them. Lanthanides nanoparticles display characteristic luminescence properties of the central lanthanide ion due to energy transfer processes. Rare earth ions show strong, narrow, long lifetime emissions in all the wavelength ranges because of their inner 4f-4f transition characteristics [2]. The features of lanthanide-based nanoparticles such as large Stoke shift, sharp luminescence, high chemical stability, and thermal durability and nontoxicity nature make them suitable for biosensors. In this article, a new spectrophotometric method for the determination of methamphetamine based on the luminescence response of captopril-modified Y_2O_3 nanoparticles (Y_2O_3 NPs) was developed. The fluorescence of Y_2O_3 NPs sat 612 nm was increased in the presence of methamphetamine. Based on this, an appropriate method for sensitive assay of methamphetamine was described. After optimization, the change of fluorescence intensity is linearly proportional to the concentration of methamphetamine in the range of 0.2–30 μM, and the detection limit is 1.44 μM. All the measurements were completed in biological pH at the room temperature under ambient conditions. The sensing mechanism was suggested to arise from fluorescence enhancement induced by the interaction between modified NPs and analyte.

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Poster Presentation

Electrodeposited Terephthalic Acid/Layered Double Hydroxide Nanosheets Coating for In-Tube Solid Phase Microextraction of Phthalate Esters from Beverages

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Abstract*:* In this work, a CuCr-layered double hydroxide nanosheet intercalated with terephthalic acid (TPA/LDH) coating was introduced in the on-line in-tube solid phase microextraction (IT-SPME) method. The TPA/LDH coating has been successfully fabricated on the inner surface of a stainless steel tube by a facile two-electrode electrodeposition method. The characteristics of the sorbent were investigated by X-ray diffraction (XRD), scanning electronic microscope (SEM), and Fourier transform infrared spectroscopy (FT-IR) and the sorbent thickness was obtained by an optical microscope and it was about 40 micro meter. The TPA/LDH coating, compared to NO3-LDH coatings, exhibited enhanced extraction efficiency, long lifetime, good mechanical stability and a large specific surface area. The IT-SPME method followed by HPLC-UV was used for the extraction and preconcentration of some phthalate esters (PEs) such as dimethyl phthalate (DMP), dibutyl phthalate (DBP), diallyl phthalate (DAP) and diethyl-hexyl phthalate (DEHP). Several important factors affecting extraction efficiency such as effects of pH, salt concentration, extraction and desorption conditions, and alcohol effect were investigated and optimized. Under the optimal conditions, the response for PEs was linear in the concentration range from 0.005 to 1000 μg L^{-1} with coefficients of determination better than 0.9958 and the limits of detection (at S/N=3) were obtained in the range of 0.01 to 0.1 μg L^{-1}. The inter- and intra-assay precisions (RSD%, n = 3) were in the range of 3.8-6.8% and 3.5-5.7%, respectively. Finally, the method was successfully applied for the determination of four phthalate esters in the difference beverage samples and good results were obtained.

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Use of Absorbent Filters (absorbent materials) to Clean the Water from Leakage of Petroleum Products

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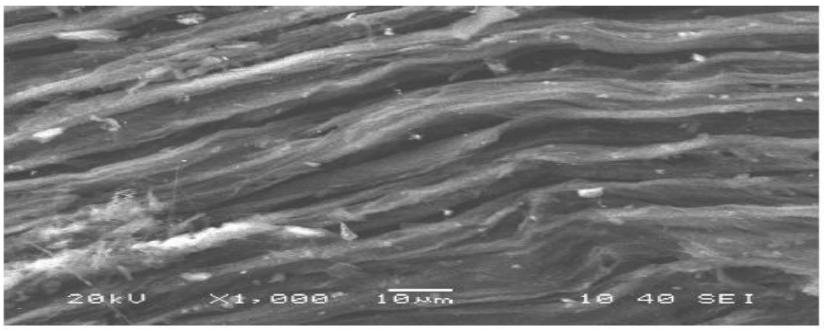

Figure 1: SEM image of a fiber structure of a type of crude luff

Abstract : Petroleum spray is one of the biggest challenges facing the offshore industries of oil companies and the preservation of the environment, especially on the shores of the sea and aquatic life, and considering its economic and environmental impact, it is a global concern that the need to consider this issue and the way to deal Proper and scientific with this problem is necessary to reduce its destructive environmental effects. The basis of the research is the purification of oil spots using natural absorbents, which are subcategories of environmental physical chemistry methods and are the least costly cleaning methods, and have less adverse effects on the sea than other methods. In this study, by examining and comparing a variety of methods and types of adsorbents, the advantage and advantage of using natural sorbents in oil purification were expressed. Also, in this paper, the absorption capacity of raw loofah fibers was investigated for the purification of different types of petroleum products. Research has shown that fiber yields depend on the surface properties of fibers, oil concentration, fiber content, and crude oil temperature to remove crude from seawater. Results highlighted the high yield of Luffa fibers for different types of petroleum products. Also, the hydrophobicity and reusability of Lufa fibers were investigated. Since after three cycles of use, reducing the absorption efficiency by no more than 50% of the initial value, this absorbent showed a great deal of resilience. Petroleum products found in contaminated water can be fats, lubricants, heavy hydrocarbons such as bitumen, grease, crude and light hydrocarbons such as petroleum, fuel, and gasoline. The main industrial sources of oil waste are oil refineries, manufacturers and manufacturers of metal materials, and oil resources in municipal wastewater are human and kitchen waste.

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Microwave-Assisted Synthesis of $CuFe_2O_4$ Magnetic Nanoparticles: A Novel Effective Catalyst for Reduction of Nitrobenzene Derivatives

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Abstract*:* As a matter of fact using microwave technic for preparation of nanoparticles is one of the most significant methods among all. This is because of simplicity of manner and attainment to smaller scales in nanoparticles size. Nanoparticles have gained much attention for catalysis in recent years because of their high surface-to-volume ratios and unique electronic and surface properties. In recent years $CuFe_2O_4$ magnetic nanoparticles (MNP) have enticed a bunch of scientists' research concentrations due to their diverse applications. In this paper, a novel microwave-assisted manner for synthesis of $CuFe_2O_4$ MNP was presented. The process is a comfortable, eco-friendly, low-cost and efficient preparation method for the $CuFe_2O_4$ MNP. Researches have indicated that they can be very effective in some reactions such as phenol degradation, selective oxidation of fluorine and reduction of nitrobenzene. The destination of this project will be evaluating effectiveness of $CuFe_2O_4$ MNP in reduction reaction of nitrobenzene derivatives. $CuFe_2O_4$ MNPs exhibited several advantages such as stability, mono-dispersity, low-cost, simplicity and rapid separation performance over other catalysts for the reduction of nitrobenzene derivatives. The separation of nano-catalysts from the reaction mixture is an important issue. In order to solve this problem, many researchers have worked on the preparation of nanocomposites which combine the noble metal with magnetic materials. The catalyst was magnetically separated and reused 3-5 times without significant loss of catalytic activity. Characterization of catalyst was done by XRD and SEM analyzes. Results have exposed that catalyst was synthesized correctly in the desirable morphological structure.

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Multivariate Optimization of Removal of Pb(II) Ions from Aqueous Solution by a New Metal–Organic Framework

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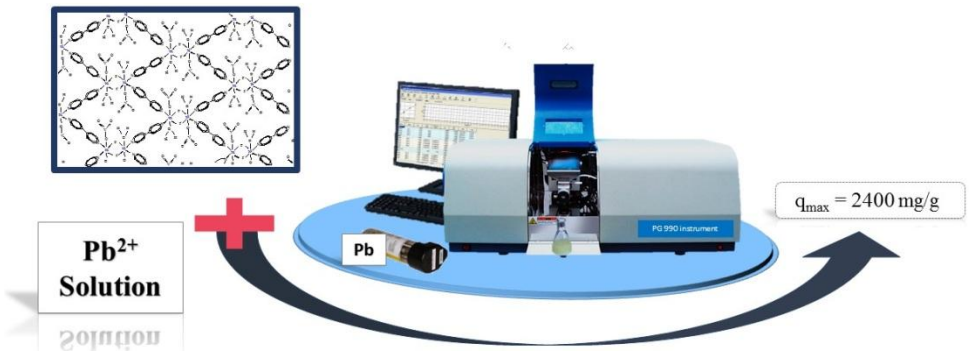

Abstract: Heavy metals, as an important groups of pollutants of water resources, can cause serious ailments such as nausea, skin rashes, dehydration, stomach ache, vomiting, eye irritation, lung irritation, and liver damage. Lead(II), as a heavy metal, exists in many wastewaters and real samples. Metal-organic frameworks (MOFs) are a new class of nanoporous materials and consist of two main components, bridging organic ligands and metal ions or clusters of metal ions. In among methods of the synthesis of MOFs, sonochemical method is an effective and fast approach for the synthesis of smaller size MOFs. In this study, a new Ni-based metal-organic framework including bipyridine ligands, vanadate and fluoride inorganic units, was prepared using sonochemically to obtain a new highly efficient adsorbent for removal of lead ions from aqueous solution. The elemental analysis (C, H, and N), FT-IR spectroscopy, field emission scanning electron microscopy (FE-SEM), energy-dispersive X-ray (EDX), and thermogravimetric analysis (TGA) were explored to identify of adsorbent structure. The Face centered composite design (FCCD) was employed to obtain the simultaneous optimal conditions of adsorption capacity (q) and removal percent (R%) of Pb(II) (adsorbent dosage = 0.0012 g, Pb(II) concentration = 390 mg/L, and pH = 5). The isotherm and kinetics studies of the adsorption process showed that Langmuir isotherm, with q_{max} = 2400.712 mg/g, and pseudo-second-order model describe the experimental data well. Furthermore, the adsorption process of lead is independent of temperature changes.

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Spatio-Temporal Variability of Hydrochemistry of Bushehr Coastal Waters

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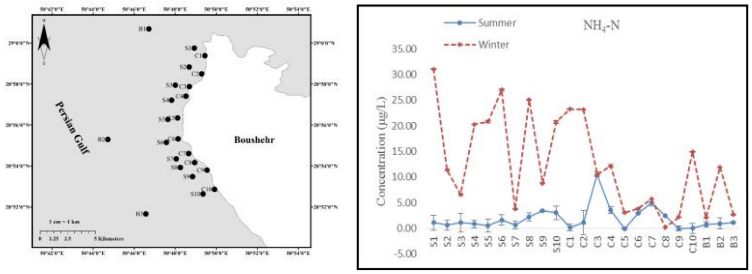

Abstract*:* Coastal regions impact many economic and social activities, e.g. commercial fisheries and tourism with an annual impact with a value of billions of dollars on the global economy [1]. Here, the spatio-temporal variability of hydrochemistry, with regard to sensitive zones such as swimming and entrances of sewages, at 23 stations of coastal waters of Bushehr city were investigated in hot (September, 2017) and cold (January, 2018) seasons. The Grasshoff method was used for samples collection. The nutrients were analyzed by a spectrophotometer according to the MOOPAM method [2]. The results show that the dissolved oxygen and pH values were high in some coastal areas. Macroalgae were extensively observed at these areas. Nitrate and silicate have higher percentage than other nutrients in both hot and cold seasons (Fig. 1). The nitrate and ammonium concentrations were higher in clod season (were 324.79 µg/l and 12.66 µg/l, respectively) than in hot season (were 123.43 µg/l and 1.91 µg/l, respectively). Using a water quality index, it can be said that the nutrients and chlorophyll a status of Bushehr coastal water is not in a dangerous situation. The results of this study can be used by local decision makers in the health, environmental, and tourism sections.

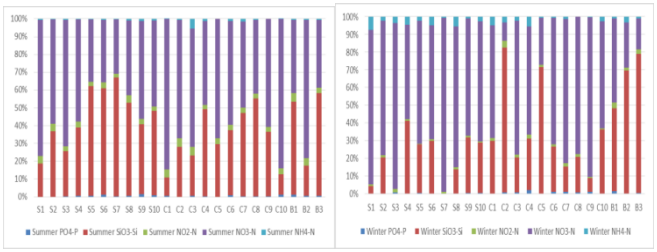

Fig. 1. The concentration percentage plots of nutrients at two seasons.

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Copper Nanoparticles on Graphitic Carbon Nitride as an Efficient Catalyst for Reduction of Nitroaromatics

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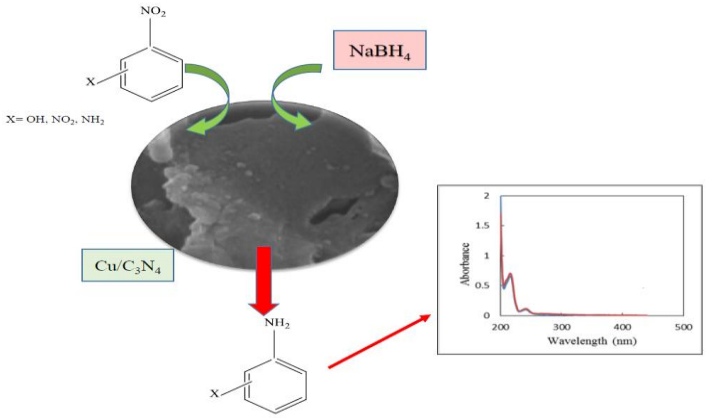

Abstract*:* Nitroaromatic compounds are subject of many industries in the fields of pharmaceuticals, pigments, dyes, plastics and pesticides. However, these compounds have the harmful effects such as toxicity, mutagenesis and carcinogenesis [1]. Catalytic reduction of nitroaromatic compounds is an effective and ecofriendly method for the treatment of these organic pollutants. On the other hand, the reduction products (their related amines) are important intermediates in the synthesis of pharmaceuticals, agrochemicals and dyes [2]. In the present study, graphitic carbon nitride sheets containing copper nanoparticles (C_3N_4/Cu) was prepared as an efficient nanocatalyst for reduction of the nitroaromatics via a simple method by using inexpensive precursors. The catalyst was characterized by scanning electron microscopy (SEM), EDX-mapping analysis, X-ray diffraction (XRD) and Fourier-transform infrared spectroscopy (FT-IR). The catalytic activity of C_3N_4/Cu catalyst was investigated for reducing of some nitroaromatic compounds in excess $NaBH_4$ as the reducing agent in aqueous media at room temperature. The process of this reaction was monitored by using the UV–Vis spectroscopy and high performance liquid chromatography. The catalytic efficiency of C_3N_4/Cu on the reduction of 2-nitrophenol, 4-nitrophenol, 2-nitroaniline and 4-nitroaniline by using $NaBH_4$ was investigated. $NaBH_4$ and C_3N_4 have very little effects on the reduction of the nitoaromatics even after 30 min. When $NaBH_4$ was used in the presence of C_3N_4/Cu, a tremendous reaction rates for the reductions were observed. The reduction of nitroaromatic compounds by C_3N_4/Cu followed the pseudo-first-order kinetics. The rate constants were found to be 1.09×10^{-2}, 1.30×10^{-3}, 4.60×10^{-3} and 1.04×10^{-3} s^{-1} for the catalytic reduction of 4-nitrophenol, 2-nitrophenol, 4-nitroaniline and 2-nitroaniline, respectively. As well, reduction of 1, 2-dinitrobenzene and 1, 4-dinitrobenze were followed by the system. The results showed that reduction of the compounds to their diamine derivatives is performed in a fast manner.

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Synthesis of Graphitic Carbon Nitride/ Hematite Nanocomposite and Application in Magenta Removal

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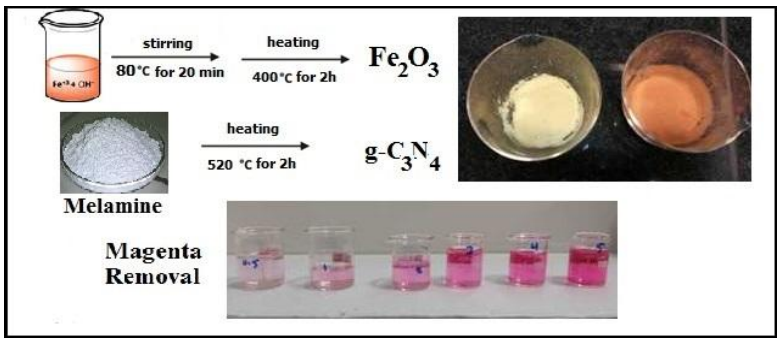

Abstract: In this study, synthesis of graphitic carbon nitride/ hematite nanocomposite (g-C_3N_4@Fe_2O_3) was prepared successfully using simple direct heating and hydrothermal methods. The efficiency of the prepared g-C_3N_4@Fe_2O_3 nanocomposite as an adsorbent was examined for the removal of magenta, the most used dye in various industries including textile, plastic, paper and cosmetic industries. The presence of dyes in the wastewater is hazardous, since they threat the ecosystem, and create problems for human health. Therefore removal of dyes from the industrial waste water is important for the safety of the environment. The most used procedures were first to obtain the graphitic carbon nitride nanoparticles, followed by hematite coating. The g-C_3N_4 was synthesized by direct heating of the low-cost melamine and hematite nanoparticles based on the hydrothermal method from the Fe^{3+} ionic solution in the presence of ammonia. Then the prepared g-C_3N_4 and Fe_2O_3 nanoparticles were dispersed into methanol by ultrasonic irradiation. After drying the dark yellow solid nanocomposite was obtained.

The g-C_3N_4@Fe_2O_3 nanocomposite was characterized by FT-IR, XRD and SEM techniques. Then the affecting parameters on the efficiency of adsorbent in the removal of the Magenta, such as solution pH, adsorbent dosage, contact time, concentration of dye were investigated and optimized. The results showed the nanocompsite was an effective adsorbent for removal of Magenta from aqueous solutions and five times repeated use of the recycled nanocomposite did not affect its adsorption efficiency significantly. The synthesized g-C_3N_4@Fe_2O_3 nanocomposite being a biocompatible, environment-friendly and low cost adsorbent is expected to find potential applications in various fields, particularly in environmental applications.

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Electrochemical Determination of Orange II after Enrichment by Magnetic Solid Phase Extraction

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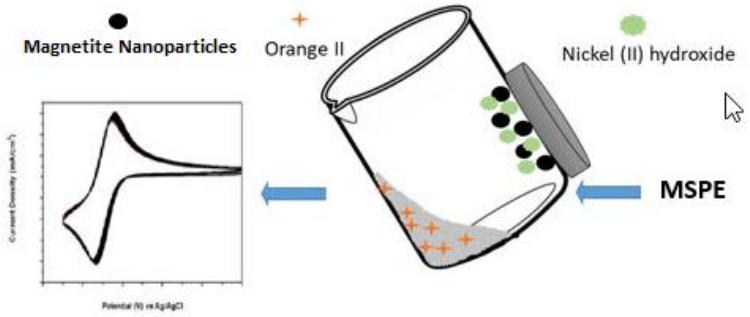

Abstract: Orange II (sodium4-[2-(2-oxonaphthalen-1-ylidene)hydrazinyl]benzenesulfonate) is an azo dye which has many applications in light emitting diodes (OLEDs), inks, soaps, wood preservation, textile and leather industry, hair dyeing, cosmetics, and foodstuffs [1]. Many countries, however, have regulated the use of Orange II in foodstuffs because it poses a risk to human health as carcinogenic, and reduces the number of red blood cells, accompanied by the lowering of hemoglobin and packed cell volume [2]. Hence, the determination of low concentrations of Orange II is a primary need.

In this work, a new magnetic sorbent, magnetite/nickel hydroxide is introduced for a typical enrichment-electrochemical determination. After sorption of Orange II, the nickel hydroxide content of the sorbent (containing Orange II) was dissolved in a low volume of acetic acid/acetate buffer (pH equal to 3.6) and then was analyzed by differential pulse voltammetry (DPV) when Orange II is electrochemically oxidized on MWCNT-COOH modified platinum disk microelectrode. The magnetic sorbent and surface of the modified electrode were characterized by different methods including XPS, SEM, VSM, EDX and XRD. Under optimum condition of enrichment and detection, calibration curve was constructed that showed two linear ranges of 0.5-10 and 60-300 nmol L^{-1}. The relative standard deviation and recovery for determination of Orange II (5 nmol L^{-1}) were 4.1 and 105.0 as percent, respectively. Limit of detection for the Orange II determination method was also evaluated (0.3 nmol L^{-1}). The method was applied for the determination of Orange II in various environmental water samples. This approach showed advantages on simplicity, sensitivity and selectivity of Orange II determination when was compared with the other analytical methods.

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Voltammetric Determination of Orange II by Using Carboxyl Functionalized Multi-walled Carbon Nanotubes Modified Platinum Disk Microelectrode

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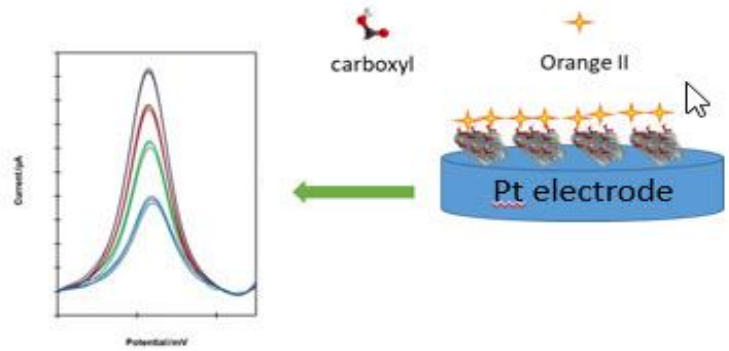

Abstract: Orange II is one of the azo dyes, which is widely used as coloring agent in a variety of products, such as textile, paper, foodstuffs, hair dye and leather. Many countries have regulated the use of some of azo dyes in foodstuffs because they pose a potential risk to human health and are even carcinogenic [1, 2].

In this work, a method for electrochemical determination of low concentration of Orange II is described. Thereby motivated, the electrochemical behavior of Orange II was evaluated in this study by using a carboxyl functionalized multi-walled carbon nanotubes on platinum disk microelectrode (MWCNTs-COOH/Pt). Orange II analyzed by differential pulse voltammetry (DPV) when Orange II is electrochemically oxidized on MWCNTs-COOH/Pt. Optimization of condition was performed to attain the maximum sensitivity for the determination of Orange II. Compared to the bare platinum disk microelectrode, the electrochemical responses of Orange II was greatly increased by MWCNTs-COOH/Pt. The surface of the modified electrode was characterized by different methods including XPS, XRD and SEM. Calibration curves were constructed that showed two linear ranges of 0.02-0.3 and 2-10 µmol L^{-1}. The relative standard deviation and recovery for determination of Orange II (0.1 µmol L^{-1}) were 4.3 and 105.0 as percent, respectively. Limit of detection for Orange II determination was also evaluated (0.014 µmol L^{-1}). The method was applied for the determination of Orange II in various environmental water samples. This approach showed advantages on simplicity, sensitivity and selectivity of Orange II determination when was compared with the other related analytical methods.

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Removal of Cr(VI) from Contaminated Water by Raw and Modified Crataegus Pontica Kernel as Green Organic Adsorbent

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Abstract

The contamination of water resources due to chromium(VI) is one of the serious environmental hazards. The industrial effluents from paints and pigments, leather and chrome plating industries are major contamination sources. There are several ways to remove or reduce the chromium(VI) of the wastewater which have some advantages and disadvantages. The application of low-cost adsorbents obtained from plant wastes as a replacement for costly conventional methods of removing Cr (VI) ions from wastewater is necessary.

In this study row and modified Crataegus pontica kernel, an agricultural waste is used for Cr(VI) removal as a green, natural and inexpensive valuable resource and environmentally benign adsorbent. Brunauer-Emmett-Teller (BET), Field emission scanning electron microscopy (FESEM), Elemental mapping, Energy Dispersive X-ray Spectroscopy (EDS) and Fourier transform infrared spectroscopy (FTIR) were used to characterize the row and modified Crataegus pontica kernel. This study reveals that modified Crataegus pontica kernel with Cetyl trimethyl ammonium bromide (CTAB) is an efficient and cost effective adsorbent for Cr(VI) removal and it can be a solution for Cr(VI) discharging industries. Also, adsorption behavior of chromium(VI) was evaluated by the Langmuir and Freundlich isotherm models. In addition, Crataegus pontica kernel can be recovered and reused several times with no significant loss of its activity.

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Green Synthesis of Pinus Cone Supported Silver Nanoparticles *using Achillea Millefolium* L. Extract: Application of the Nanoparticles for Catalytic Reduction of 4-Nitro Phenol

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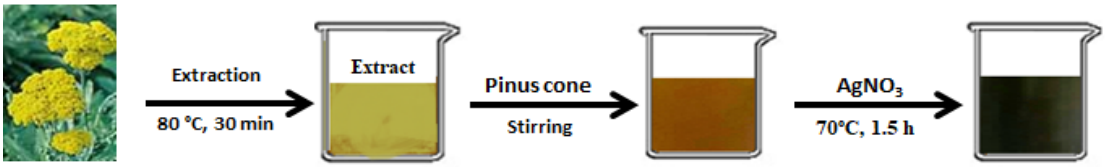

Abstract: In past decade, one of the most refractory pollutants in wastewaters is 4-nitrophenol (4-NP), which conventional wastewater treatment methods cannot be sufficient and effective in the degradation of this compound. Recently, the metal nano particles (MNPs) such as silver NPs have received much attention from researchers as catalyst for chemical reduction of 4- NP. However, the agglomeration of the M NPs is a major drawback, which can be overcome with the use of an ideal support.

In the present research, silver nanoparticles (Ag NPs) are synthesized using *Achillea millefolium* L. extract as an economic, conventional, and effective reducing and stabilizing agent and pinus cone as a natural and inexpensive valuable resource and environmentally benign support. FT-IR spectroscopy, UV-Vis spectroscopy, X-ray Diffraction (XRD), Field emission scanning electron microscopy (FESEM), Energy Dispersive X-ray Spectroscopy (EDS), Elemental mapping, and Transmission Electron Microscopy (TEM) were used to characterize pine cone, Ag NPs, and Ag NPs/pine cone. The catalytic activity of the Ag NPs/ pinus cone was investigated for the reduction of 4-nitrophenol (4-NP). Results revealed that Ag NPs/pine cone had the high catalytic activity. In addition, Ag NPs/ pinus cone can be recovered and reused several times with no significant loss of its catalytic activity.

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Magnetic Absorbent for Removing Industrial Dyes from the Environment

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Abstract: Nanotechnology is a discipline of applied science and technology that covers widespread science. Nanotechnology today has many applications in many areas, including food, the environment, medicine, medicine, communications, transportation, energy, aerospace**.** Water is indispensable in environmental processes. Textile and dyeing industries are one of the most important sewage contaminants. Industrial water treatment is used in various industries such as drinking, agriculture, pharmaceuticals, dairy, food and mines, and its main purpose is to reduce salinity, salts, contamination and other pollutants from water. Commercial dyes due to their complex structure and high solubility in water are toxic and non-degradable, and are therefore considered as harmful organic compounds for the environment and public health. Researchers are looking for new and inexpensive adsorbents, and there is a lot of research to develop efficient, low-cost efficient adsorbents to remove pollutants from wastewater. Here, tin sulfide composite was investigated as a magnetic and efficient absorbent for removing dyes Cationic Janus Green B (JG B) and Crystal Violet (CV) from industrial wastewaters. This magnetic absorbent has a high ability for removal in a short time and with a low amount of absorbent. Composite structure was investigated by analyzing IR, XRD, SEM, VSM and removing color with UV.

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Investigating the Optimal Use of Wastewater Treatment Plant in Zanjan

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Abstract: With considering to water crisis in Iran, one of the useable water resources is the wastewater of municipal treatment plant [1]. Water quality indices can be used to figure water threats out and also help to better water resources management [2]. The wastewater quality in out of Zanjan's treatment plant, purification potential of Zanjanrood River and treated wastewater feasibility for agriculture plan has been investigated. In addition, the water quality of the river was evaluated based on the National Water Quality Index (NSFWQI) and Iranian Surface Water Quality Index (IRWQIsc). Sampling from Zanjanrood River (1398-1398) was seasonally carried and 16 physical, chemical, and biological parameters were measured in 5 stations. The results showed the mean of water quality is Moderate and Poor class based on the NSFWQI and IRWQIsc index, respectively, in this area. In addition, the average values of measured parameters have compared with their standards and the result showed the treated wastewater can be used as a good source for irrigation plans. The second station had the least of water quality because of treatment wastewater plant site. It is noticeable, the coliform, BOD and nutrient parameters (P, N) were measured in springer and summer more than autumn and winter and this result can be easily showed the impact of human activities on water quality while TDS and COD were vice versa because of flood and erosion in the upstream.

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A Flourcent Prob Based on Carbon Dots for Selective and Sensitive Detection of Bismuth(III) in Various Water Samples

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Sucrose **CDs**

Abstract: Fluorescent carbon dots (CDs) have attracted tremendous attention because of their ease of preparation, good water solubility, low toxicity, satisfactory fluorescent performance, and resistance to photobleaching, as well as their potential applications in sensing, biological labeling, photocatalysis, and so on [1]. The metallic ions are readily absorbed into human bodies and get accumulated because of their non-biodegradable and bio-accumulative property. This can result in a variety of damages to the human brain, the heart and the kidneys and even permanent damage to the central nervous system and the other organs [2]. In this study CDs was synthesized from sucrose and applied as a sensitive fluorescence probe for detection of bismuth ions (Bi^{3+}) [3]. To examine the most important parameters including volume of CDs, pH of the solution, ulterasonic time and concentration of salt and their interactions on the fluorescence intensity, a four factor central composite design (CCD) combined with response surface modeling (RSM) was implemented [4]. Finally, the proposed fluorescence prob based on CDs was successfully applied for the sensitive and selective detection of Bi (III) in various water samples. Must importantly, the suggested prob was enviormentaly friendly and showed good figures of merit for determination of Bi (III).

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Determination of Nitrite Ion in Water Samples using a Copper (II) Schiff-base Optical Sensor Immobilized on Triacetylcellulose Membrane

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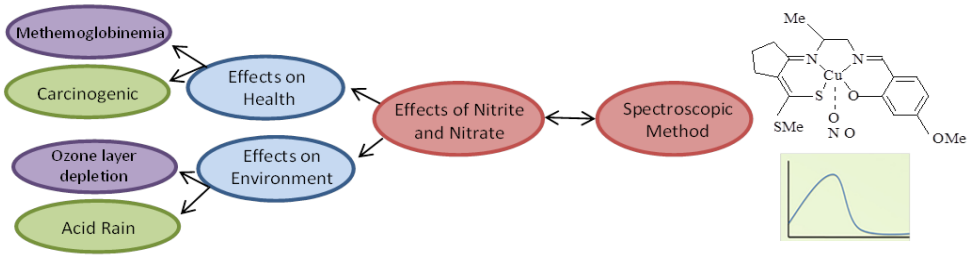

Abstract: Recently, greener analytical methods which minimize the use of toxic chemicals and/or eliminate the generation of toxic wastes are strongly demanded, in order to prevent the environmental pollution. Nitrate is an important pollutant found in environmental samples. Nitrate and nitrite pose various environmental as well as health hazards [1]. Different methods of determining nitrite in various environmental samples developed during previous years include spectrophotometric, chemiluminescence, electrochemical detection, chromatographic, capillary electrophoretic, spectrofluorimetric methods [2]. The synthesis and structure of polydentate Schiff bases and their metal complexes is fascinating, because it reveals a great richness of structural, physico-chemical and catalytic properties. Given the simplicity and ease of access to multidentate Schiff bases and their metal complexes, investigation of such compounds is essential to precise and understand structure–property relationships in order to optimize and improve their use in a wide range of fields, including catalysis, supramolecular chemistry, magnetism, electrochemistry, nanoscience, energy materials, and biological applications [3].

In this research, method based on spectroscopic detection of nitrite has been discussed, due to its easy availability, high sensitivity, low detection limit, economical and facile nature. A copper(II) Schiff base, methyl-2-{[1-methyl-2-(4-methoxy-phenolate)mehylidynenitrilo]ethyl}amino-1-cyclopentene dithiocarboxylate copper(II),[Cu(cd4OMeSalMeen)], was incorporated into triacetylcellulose membrane and applied as ionophore in order to develop an anion-selective optical sensor for the analysis of nitrite by absorption spectrophotometry. At optimum pH 3.0, a linear calibration curve was observed for nitrite in the range of 0.50 to 7.00 mg L^{-1}) with a detection limit of 0.04 mg L^{-1}. The response time of the optode ($t_{95\%}$) was found to be 8–10 min, depending on the nitrite ion concentration. The proposed sensor was fully recovered in nitric acid solution (0.1 M) and had acceptable reproducibility. Several samples of water were collected at different locations around Shiraz. The application of the sensor for determination of nitrite content in water samples was quiet successful.

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Design and Optimization of Parameters Effective in Electrocoagulation Process for Removing Cadmium from Leachate and Simulated Wastewater: Using Solar Cells as Power Supply

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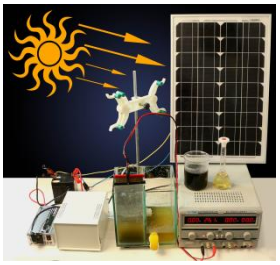

Abstract*:* Most industrial wastewaters are polluted with heavy metal species. Due to their toxicity, if these species are released into the environment, they can have a severe impact as a result of bioaccumulation and even a slight amount of them can be extremely toxic. Electrocoagulation (EC) is an electrochemical technique for removal of different contaminants particularly metal cations from wastewater or groundwater. Recently, much attention has been paid to EC, as a versatile and environmentally-compatible technique, in treating industrial effluent treatment. In this work, EC performance is investigated in cadmium (II) removal from leachate and synthetic wastewater using stainless steel and aluminum electrodes. The main objective of this study was to find the best approaches for reducing the cadmium content existing in raw leachate and synthetic wastewater. Influence of key parameters is evaluated. The surfaces of the electrodes were investigated by SEM before and after using for removal processing. The optimum operating conditions include applied current 6 A/m^2, operating time 40 min, support electrolyte 2000 mg NaCl, the distance between the electrodes 0.5 cm and initial pH= 8.5. The results revealed that 99% of Cd was removed from the leachate in all experiments, while Cd (II) was removed totally from the simulated wastewater. Using solar cells as the power supply is an advantage compared to other counterparts.

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Synthesis of a New Mesoporous Material as a Photocatalyst for Degradation of an Organophosphorus Pesticide

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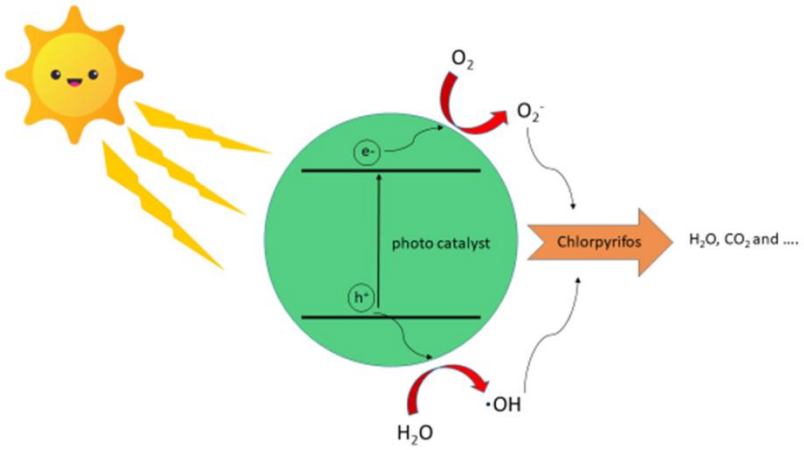

Abstract: The removal of persistent organic chemicals from water is a pressing ecological problem. Persistent contaminants include pesticides, solvents, detergents and a variety of industrial chemicals due to resistance to biodegradation are capable of penetrating deep into the soil and of reaching groundwater [1]. Because of the development of the agrochemical industry, the problem of pesticide pollution is increasing day by day. Chlorpyrifos is one of the world's most widely used organophosphorus insecticide in agriculture. It shows a wide spectrum of biological activity also it is used to control range and forage insect pests as well as soil-dwelling grubs, rootworms, borers and subterranean termites. [1] The greatest use of chlorpyrifos is in cotton, rice, corn, tobacco, almonds, beans, maize and fruit trees including oranges, bananas, apples, and vegetables. Symptoms of acute poisoning include headache, nausea, muscle twitching and convulsions and in some extreme cases even death [2]. Because of their health effects, it is necessary to use alternative technologies to remove pesticides from water. Among the latest technologies, photocatalysis is one of the most advanced and developed technology to eliminate pollutants from the environment [3]. In this study, Photocatalytic degradation of chlorpyrifos in aqueous media by using KIT-6/Fe_3O_4/WS_2 nanocomposite under visible light irradiation was investigated. At the first, WS_2 nanoparticles were dispersed on KIT-6 (three-dimensional mesoporous silica) by employing a hydrothermal method and then combined with Fe_3O_4 for easy separation after water treatment by applying an appropriate magnetic field. The synthesized nanocomposite was successfully characterized by transmission electron microscopy (TEM), X-ray diffraction (XRD), scanning electron microscopy (SEM), and Fourier transform infrared (FTIR). The effect of several parameters such as photocatalyst amount, pesticide concentration, pH, radiation time, and temperature on the percentage of chlorpyrifos degradation were investigated and optimized. The degradation percent of chlorpyrifos was carried out using UV-Vis spectrophotometer. The results indicated that the synthesized nanocomposite exhibited a high efficient photocatalytic activity on the photodegradation of chlorpyrifos.

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Synthesis of a New Nanocomposite Based on Tungsten for Degradation of an Organochloride Pesticide

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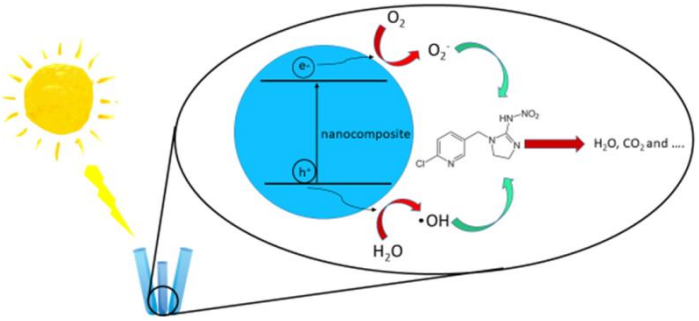

Abstract: Nowadays, huge industrialization and uncontrolled growth of population have tremendously caused environmental contamination. Additionally, clean water resources are scarce. Thus, effective treatment of wastewater and its recycling is highly important. Pesticides play a key role in water–food nexus. Incorrect pest management approaches result in water pollution. Imidacloprid (IMI) is an emerging contaminant used as an alternative to carcinogenic organochloride insecticides such as DDT. The wide range of possible applications of IMI in crop pest control, anti-parasitic treatments, and vector control for dengue mosquitoes resulted in the extensive use of this insecticide. Imidacloprid has a great risk for groundwater resources because of its high water solubility (0.58 g/L) and water stability of >30 days (at pH 5-7). [1] There are various methods available for treating contaminated water, semiconductor-based photocatalysis method is recognized as one of the green technique and as fascinated immense consideration due to its potential utilization of solar energy. [2] In these work, Ternary photocatalysts with visible-light photocatalytic performances, were fabricated for the first time through integration of $CoMoO_4$ and polyaniline (PANI) with WO_3. WO_3 is recognized to be an important n-type semiconductor photocatalyst with a band-gap varied from 2.4 to 2.8 eV. It is also one of the most promising materials reported so far for the photodegradation of organic pollutants. Cobalt molybdate ($CoMoO_4$), as one of the metal molybdates, has a narrow band gap of 1.94 eV. This p- type semiconductor has been used in various fields of sensors, catalysts, and supercapacitors. Polyaniline (PANI), as a conducting polymer, has been widely used in photocatalytic processes, owing to unique e^-/h^+ transportation properties, low band gap, availability of facile synthesis routes, and good chemical stability. This study presents the preparation of tungsten trioxide (WO_3) nanoparticles by acidic precipitation using sodium tungstate as a precursor and couples it with small energy gap semiconductors of $CoMoO_4$ and PANI to improve photocatalytic activity. Synthesized nanocomposites were successfully characterized by transmission electron infrared (FTIR) and microscopy (TEM), X-ray diffraction (XRD), scanning electron microscopy (SEM), and Fourier transform and different parameters such as photocatalyst amount (80 mg), pesticide concentration (6 ppm), pH (6), radiation time (80 min), and temperature (40 °C) on the percentage of IMI degradation were investigated and optimized. The degradation percent of IMI was carried out using UV-Vis spectrophotometer. The results revealed that nanocomposite successfully prepared and can be applied in remediation reactions.

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Synthesis High-Efficiency Photocatalyst for Degrading Organophosphorus Pesticide: Visible Light Driven Bi_2S_3 Based Nanocomposite

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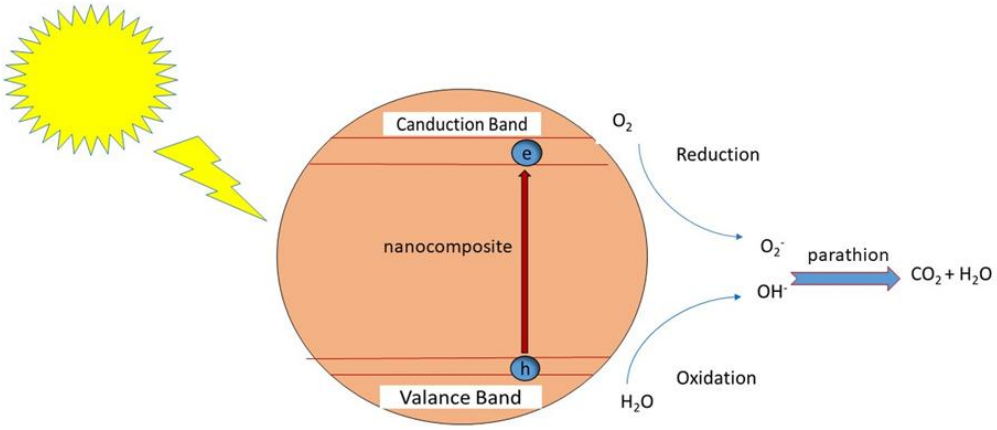

Abstract: Global food demands are projected to double during the next 50 years. The use of pesticides in agriculture has enormously enhanced the food production by controlling numerous pests at various stages of crop production and storage, but at the same time, it has led to severe pollution of soil and groundwater[1].

Parathion is a deep brown to yellow liquid with a faint odor of garlic. It is an organic phosphate pesticide which acts as an inhibitor of cholinesterase, and as such, it is highly toxic by all routes of exposure. It may be found as a liquid or as a dry mixture where the liquid is absorbed onto a dry carrier.

A number of methods have been developed to remove the pollutants from the waters and wastewaters including adsorption, filtration, chemical oxidation and photocatalyst. Photocatalysis is a practical, low-cost method for organic pollutant degradation, water splitting, CO_2 reduction and various organic reactions in milder conditions

The degradation of parathion in water by KIT5/Bi_2S_3-Fe_3O_4 nanocomposite with photocatalytic processes under visible irradiation has been rarely studied for an effective technique for the removal of recalcitrant contaminants. Therefore, in the present study, we have investigated the photocatalytic degradation of parathion in aqueous solution with KIT5/Bi_2S_3-Fe_3O_4 composite under visible irradiation.

The nanocomposites were characterized by Scanning electron microscope (SEM), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Transmission electron microscopy (TEM).

In this study some parameters were investigated such as time of visible irradiation, pH of medium, pesticide concentration and amount of nanocomposite. The results of the study revealed the photodegradation process of parathion by KIT5/Bi_2S_3-Fe_3O_4 composite was efficient.

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Bimetallic Nanostructures as Electrocatalysts for Ethylene Glycol Oxidation Process

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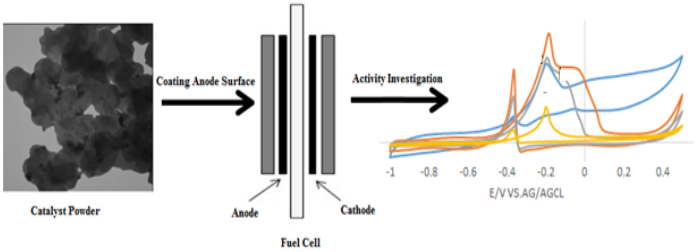

Abstract: Nowadays, the increasing worldwide energy demand and environment concerns lead to extensive research into power sources with low pollution and high energy conversion efficiency. Direct alcohol fuel cells (DAFCs) are considered as one of the studied fields in this regard due to their unique properties, including high energy density and relatively eco-friendly by-products. The commercialization of fuel cells depends on several factors, such as membrane, anodic and cathodic catalysts. However, the slow kinetic of alcohols oxidation on anodic catalysts due the need to break C-C bond for complete oxidation to CO_2 is basic challenges in the development of DAFCs. To overcome this problem as well as increasing the activity, durability, and decreasing the cost of fuel cells, the development of new electrocatalysts is necessary. In this study, palladium-iridium (Pd_xIr) nanostructures were synthesized in different atomic ratio with solvothermal method in the presence of oleylamine as solvent, surfactant, and reducing agent. Carbon Vulcan XC-72R was used as a substrate in order to synthesize bimetallic nanocatalysts with the best distribution and particle size. This activated carbon has the highest electrical conductivity at low loading levels and has the advantage of higher dispersion in the selected medium compared to carbon compounds. The prepared electrocatalysts were characterized by XRD, TEM and FESEM-EDX. The performance of as-prepared nanocatalysts was evaluated for the reactions of ethylene glycol (EG) electro-oxidation in alkaline media by cyclic voltammetry, linear sweep voltammetry, and chronoamperometric measurements. The results demonstrate that the introduction of Ir in Pd structure can obviously promote the EG oxidation performance in the alkaline medium. Compared with single component catalysts (Pd and Ir), the as-prepared Pd_xIr/VC electrocatalysts exhibit higher activity and better stability for the electrooxidation of EG with good resistance to CO.

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Photocatalytic Degradation of Imidacloprid by a Novel ZnO Based Nanocomposite: Synthesis Process and Degradation Pathways

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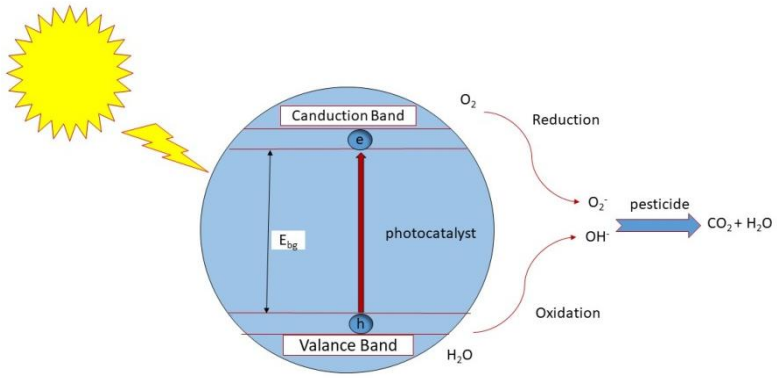

Abstract: Many kinds of pesticides released into the environment as a result of runoff from agricultural and urban areas cause pollution of soil, air, surface water, and groundwater and are harmful to human health [1]. Imidacloprid is a chloronicotinyl pesticide, commonly used in agriculture, arboriculture and in residential areas to control a variety of crop-damaging insects, termites, cane beetles, carpenter ants, flees and cockroaches. It acts as a neurotoxin. That is why; it is efficient even at very low concentrations. Its water solubility (0.61 g/L) is high as compared to other pesticides. Its photolysis t1/2 in water is 3-5 hours, and on the soil surface, the $t_{1/2}$ is 39 days. However, because of its high solubility, it readily enters from water to soil where it is resistant to degradation. Its tolerance in food ranges from 0.02 - 3.0 mg/kg [2]. During the present study, the concentration of imidacloprid was determined by using a wavelength of 270 nm, where its most intense absorption was noted. A number of methods have been developed to remove the pollutants from the waters and wastewaters including adsorption, filtration, chemical oxidation and photocatalyst. The present study focused on synthesize of ZnO/$CoMoO_4$/Poly Aniline nanocomposite and investigated the photodegradation of imidacloprid using this nanocomposite in aqueous solution under visible irradiation. The prepared nanocomposites were characterized by Scanning electron microscope (SEM), X-ray diffraction (XRD) measurements. Parameters such as time of visible irradiation (90 min), pH (9), pesticide concentration (10 ppm) and amount of nanocomposite (100 mg) were investigated. The results of the study revealed an increase in photodegradation of imidacloprid by ZnO/$CoMoO_4$/Poly Aniline nanocomposites than simple ZnO. This nanocomposite was effective for imidacloprid degradation.*:*

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Preparation and Application of a Magnetic Graphene-Based Nanocomposite for Pesticides Removal

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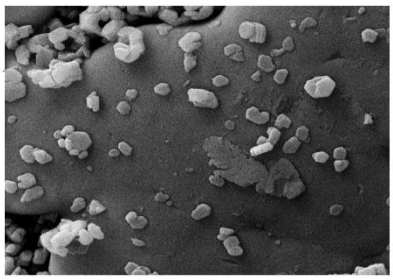
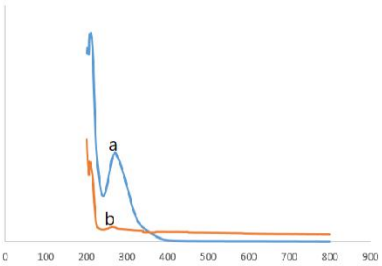


Magnetic nanocomposit as adsorbent for MSPE process



UV-Vis spectra of fenitrothion solution: a) befor and b) after MSPE process

Abstract: Pollution of water by pesticides and industrial wastes has been recognized as a primary health hazard for human and animals. The effective removal of the toxic pollutants with the economic and environmental advantages is necessary. The toxic pollutants removal by adsorption on metal oxides has shown enormous potential. The nanoscale metal oxides with large surface area, porous structures, large number of active sites, easy recovery, and low toxicity have excellent performance for the adsorption and remediation of contaminants. This work reports the preparation of a magnetic graphene-based nanocomposite containing oxide nanoparticles of molybdenum disulfide and cerium oxide (GO-Fe_3O_4/MoS_2/CeO_2). The synthesized nanostructure was characterized by XRD and FESEM-EDX. This nanostructure was investigated as an adsorbent in a magnetic solid phase extraction (MSPE) process for the removal of organophosphorus pesticide (OPPs) of fenitrothion from aqueous media. Batch mode adsorption studies were performed to evaluate the adsorption kinetics and adsorption isotherms. The proposed adsorbent combines the advantages of superior adsorption capability and magnetic separability to easy isolation from sample solutions. The effective experimental parameters on the extraction recovery of fenitrothion including extraction time, pH, adsorbent amount, pesticides concentration, and desorption conditions were investigated and optimized. Under the optimal conditions, Fast magnetic separation of nanoparticles from sample solution (< 1min), optimized pH (at neutral pH) and low extraction time (about 5 min) are the merits of the prepared adsorbent. These results indicated that the proposed nanostructures had the great adsorptive ability and can be applied in a fast, simple and efficient MSPE technique for OPPs extraction in different matrices.

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Sulfur removal enhancement by nano cobalt based metal-organic framework

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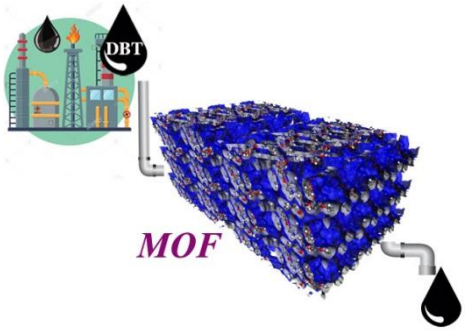

Abstract:Sulfur compounds in oil or gas products cause poison the refining catalysts and corrode parts of internal combustion engines as well as production of SO_x as the precursor of the acid rain. Therefore, sulfur compound removal is very important and necessary for both industrial and environmental reasons [1]. Metal organic frameworks (MOFs) as a new class of crystalline porous materials have received great attention in the past decade due to their intriguing structures. Some advantages of them are: high surface area, uniform structured nanoscale cavities, controllable particle dimensions and morphology, specific adsorption affinities, and the availability of in-pore functionality and outer-surface modification. Additionally, synthesis of nanoscale MOFs can enhance many properties of them [2].

Synthesis of a nano porous cobalt based MOF, $[Co_6(oba)_6(CH_3O)_4(O)_2]_n \cdot 3DMF$ has been carried out to introduce a new and highly efficient adsorbent of dibenzothiophene (DBT). This compound has been synthesized by sonochemical method using a nonlinear dicarboxylate ligand. Adsorption capacity of this MOF has been investigated in presence of dibenzothiophene (DBT) as a refractory poly-aromatic sulfur compound. We choose this MOF with oba oxygen donor ligand (H_2oba = 4,4′-oxybisbenzoic acid) and one unsaturated coordination number around Co metal as the active site with the maximum adsorption value of DBT at around 825 mg/g [3]. An increase at about 2 times in the maximum adsorption value of DBT was observed in presence of this MOF nanostructure as an effective adsorbent.

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A Novel Cooling/Heating Assisted Switchable Solvent Based Microextraction Process: Application for Determination of Phthalate Esters in Water Samples

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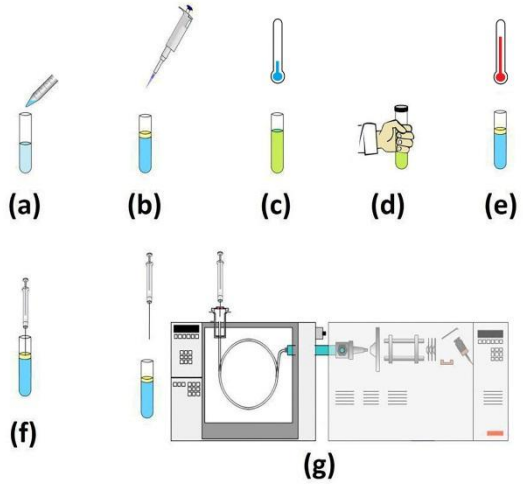

Graphical Abstract

Abstract: A Switchable hydrophilicity Solvent (SHS) is a solvent that can reversibly switch between one forms that is miscible with water to another that forms a biphasic mixture with water. In this work, A novel temperature controlled SHS based microextraction method has been developed for the extraction and preconcentration of four phthalate esters (PAEs) from water samples prior to GC-MS analysis. For the first time, the effect of temperature in the switching of extracting solvent has been studied and the application of cooling/heating processes instead of addition of chemicals in the switchable solvent based microextraction has been used for PAEs extraction. Several parameters including solvent type, solvent volume, temperature of dissolution, temperature of separation, and salt addition are optimized. A theoretical study also has been provided to reveal the effect of cooling/heating effects on the homogenization and separation of phases. The proposed method provided some advantages such as simplicity, using low volumes of inexpensive and less hazardous reagents, rapid extraction and reduced analysis time. For the developed method, LODs and LOQs were obtained in the ranges of 0.03-0.06 and 0.1-0.2 μgL−1 respectively. Also, calibration curves were linear within the range of 0.2-100 μgL−1 for dimethyl phthalate and dibutyl phthalate, and 0.1-100 μgL−1 for diethyl phthalate and dioctyl phthalate. Enrichment factors (EFs) were found to be in the range of 110.9-116.3. The proposed method was applied for the analysis of PAEs in real water samples.

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Removal of Lead and Arsenic from Water/Wastewater by Rice Husk and Optimization by Box–Behnken

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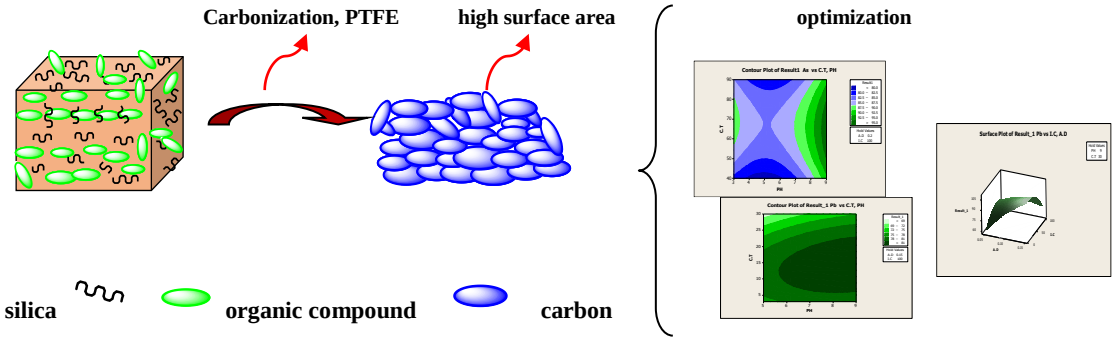

Abstract*:* The presence of large amounts of contaminants such as organic compounds and heavy metals in aquatic systems, is a major problem which has created many concerns for the health of human societies. adsorption and the use of Affordable adsorbents is attracted much attention. The purpose of this study is removal of lead and arsenic from aqueous solutions by rice husk and optimization the method by using the response surface method (RSM) based on Box-Behnken Desine. Rice husk and polytetrafluoroethylene carbonized at 600-900 °C in nitrogen, and the silica is removed in situ. Morphological and structural properties of absorbent surface were determined by FESEM and XRD and Pb and As concentrations were measured by ICPE. the effect of independent variables including pH, contact time, adsorbent amount and initial concentration of heavy metal on removal of Pb and As by carbonized rice husk was investigated. analysis of variance was performed to data analysis and finding the removal equation. The results showed that efficiency of removal increased with increasing independent variables in wide range of Pb, As concentrations, but removal of Pb was done at lower times. In optimal pH, the efficiency is high, even at low concentrations of absorbent. Also, based on the findings, it can be concluded that the experimental design method is an effective method for reducing costs and experiments, and examining the interactions of variables can help us to better understand the effects of independent variables on dependent variables. The Maximum and minimum percentages of removal is 97%, 30% in Pb and 85%, 30% in As. as a result carbonized rice husk can be used for removal of Pb and As from aqueous solutions, and the response surface method Can be effective to optimize removal.

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Mechanism of carbonyl sulfide (COS) fixation by Carbonic anhydrase from thermodynamic and kinetic point of view: DFT study

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Abstract: Carbonyl sulfide is the most stable reduced sulfur compound in the troposphere, which plays a key role in the global distribution of sulfur. In this context, COS can surly be regarded as a natural substrate for carbonic anhydrase (CA) enzyme that catalyzes irreversible hydration according to equation 1.

$$COS + H_2O \longrightarrow CO_2 + H_2S \qquad (1)$$

The reaction follows the same principle as the carbon dioxide reaction. However there is no experimental and theoretical studies which use the native enzyme contains histidin residues on COS fixation. In addition, despite the numerous studies in this field, many questions are still open [1-4].

In this study our attention focus on several mechanistic aspects: (1) the details of nucleophilic attack of the zinc-bond hydroxide ion on COS, (2) study of different transition state trough the reaction path. According to our calculated results, the nucleophilic attack of the zinc bound hydroxide at the C=S bond and results in a four-center transition state is formed and then a zinc bound thiocarbonate is formed. Interestingly, in the course of this reaction, the active form of the catalyst [Zn(II) $(his)_3(OH)$] is converted to its hydrosulfide form [Zn(II) $(his)_3(SH)$] and a water molecule helps to reproduce the active form of the catalyst.

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Ag/TiO_2 binary nanocomposite embedded in poly(methyl methacrylate) PMMA-Ag/TiO_2 for enhanced photodegradation effectiveness of pollutants

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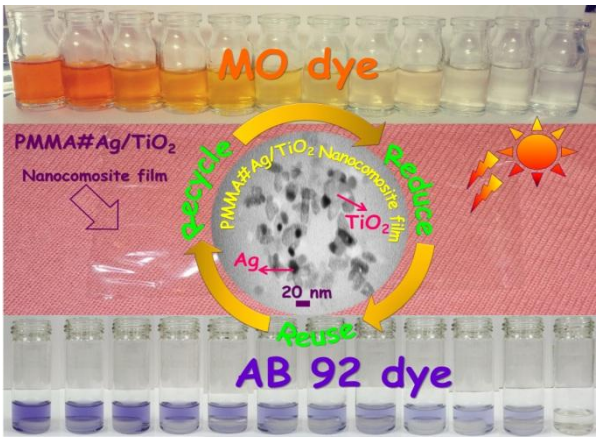
Abstract: A unique combination of poly(methyl methacrylate) and Ag/TiO_2 binary nanoparticles as an eco-friendly photocatalysis system have gained high attention owing to its extensive applications such as wastewater treatment. This report signifies the preparation of a new type of PMMA-Ag/TiO_2 binary nanocomposite *via* microemulsion method at a low dosage of nanoparticles for the first time. Various molar ratio of $Ag:TiO_2$ nanoparticles were embedded into the nanocomposite films by using microemulsion method. The resulted nanocomposites were characterized by DRS, TEM, and XPS techniques. The characterization results indicated well monodispersity of Ag/TiO_2 nanoparticles in the nanocomposite films with an average particle size of about 15 nm. The formation of Ag decorated on the large surface of TiO_2 nanoparticles that can be acted as both a plasmonic sensitizer and an electron trap verified with XPS analysis. The visible light photocatalytic performance of the prepared film nanocomposites for degradation of acid blue 92 (AB92) and methyl orange (MO) dyes, as representative pollutant models, were studied. The highest photodegradation efficiency was found on the film nanocomposite with 1:0.5 molar ratio of $Ag:TiO_2$ at the natural pH. It is also verified that the nanocomposite was still stable after six cycles in the photodegradation process.



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Application of Chitosan Nanocomposite / Multiwall Nanotube/ Iron Oxides to Removal Amaranth from Wastewater

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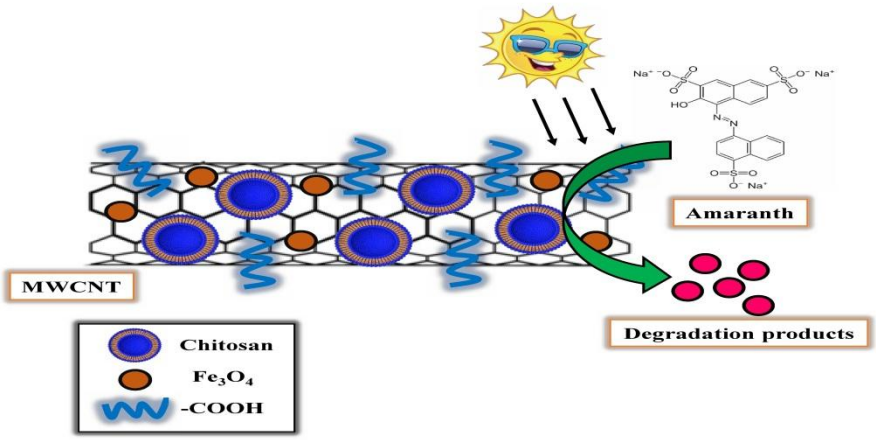

Abstract: Azo paints make up more than 70% of the chemical and artificial colors produced in the world. It is widely used in textile, paper, food, medicine, cosmetics and hygiene industries. Azo compounds are carcinogenic and harmful and are resistant to biological degradation due to its complex structure. The best solution is to remove these compounds from factory wastewaters before entering the environment [1]. In this research, we used nanocomposite chitosan / iron oxide / carbon nanotubes in a few walls to remove amaranth from Azo group colors [2]. Initially, the synthesis of the nanocomposite was carried out by the Hummer method and was used to remove the amaranth after synthesis [3]. In this work, parameters such as PH = 2, absorbance value m = .011gr, temperature and time T = 25 and t = 7min were investigated. In optimal conditions and concentration of 15 ppm, removal of 95% of amaranth color was observed. In order to investigate the synthesis of the IR spectrum and the XRD pattern, as well as analyzes such as BET-BJH, SEM-EDX, VSM, all analyzes showed the correctness of the synthesis performed and the composition as an adsorbent to remove the azo compounds Wastewater was used.

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Graphitic Carbon Nitride Nanosheet as an Excellent Compound for Adsorption of Phenol

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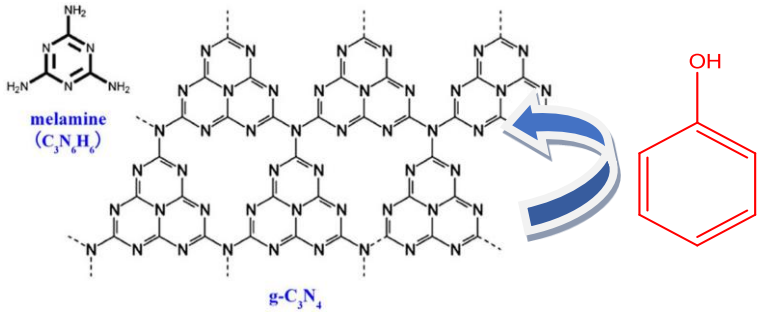

Abstract: Removal of phenol and its derivatives are studied using ultrathin graphitic carbon nitride nanosheets. They were characterized by powder X-ray diffraction (XRD), Fourier Translation infrared spectroscopy(FT-IR), field emission scanning electron microscopy (FESEM), transmission electron microscopy. Phenol is a type of organic compound. While toxic to consume on its own, it's in many household products like mouthwash and spray cleaners. In its pure form, it may be colorless or white.

It is a white crystalline solid that is volatile. It has a mildly sugary scent that might remind you of somewhere that's sterile, such as a hospital room. In limited quantities, it's available for several medical and health-related uses. The present work analyzed adsorption kinetic of phenols from aqueous solution by using graphitic carbon nitride nanosheet in batch culture methods. The effect of pH, phenol concentration, temperature, equilibrium time and adsorbent mass was tested. The process of phenol adsorption followed pseudo second-order rate expression and obeyed the Langmuir's model. Desorption studies with water indicate that the adsorbent could successfully retain phenol, even after five cycles. Results of experimental analysed showed that the adsorption of phenol on the surface of graphitic carbon nitride nanosheet has high yield, easy treatment, eco-friendly and nonexpensive.

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Removal of Congo Red dye by a New Metal–Organic Framework (MOF): Multivariate Optimization and Adsorption Characterization

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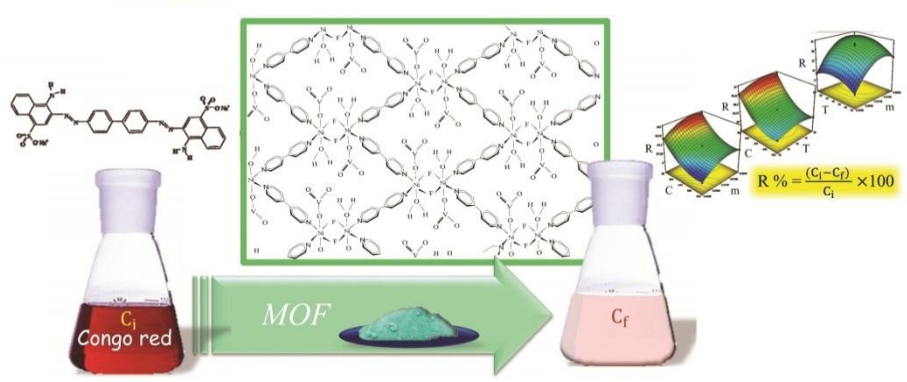

Abstract: Congo red (CR), an anionic diazo dye, is known as a human carcinogen, which is very difficult to remove because of optical, physico-chemical, and thermal stability due to its aromatic structure. Metal-organic frameworks (MOFs) are a new class of nanoporous materials and consist of two main components, bridging organic ligands and metal ions or clusters of metal ions. In among methods of the synthesis of MOFs, sonochemical method is an effective and fast approach for the synthesis of smaller size MOFs. In this study, the new metal-organic framework of $[Ni_2(F)_2(bipy)_2(H_2O)_2](VO_3)_2.10H_2O$ was prepared using sonochemically method to obtain a new adsorbent for removal of Congo red from aqueous solution. The elemental analysis (C, H, and N), FT-IR spectroscopy, field emission scanning electron microscopy (FE-SEM), energy-dispersive X-ray (EDX), and thermogravimetric analysis (TGA) were explored to identify of adsorbent structure. The Box-Behnken design (BBD) was employed to obtain the optimal conditions of CR removal (sorbent dosage = 0.0107 g, CR concentration = 50 mg/L, and temperature = 45 ℃). The isotherm and kinetics studies of the adsorption process showed that Langmuir isotherm, with q_{max} = 242.1 mg/g, and pseudo-second-order model describe the experimental data well. According to the results of thermodynamic investigate, the adsorption process of CR is endothermic and spontaneous.

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Hydroxyapatite/graphene oxide nano-composite as a new adsorbent for removal of thiocyanate from aqueous solution; Multivariate optimization and adsorption characterization

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Abstract: Metallurgical operations, e.g., gold/silver leaching and metal finishing, often produce effluents containing cyanide and cyanide-related compounds such as thiocyanate (SCN^-). These industrial effluents can pose an environmental threat due to the toxic characteristics of cyanide species. Thiocyanate is potentially toxic for humans and aquatic organisms due to its low biodegradability and intrinsic toxicity. In humans, thiocyanate ions are neurotoxic, and high blood thiocyanate concentrations may provoke the inhibition of the activity of the various enzyme. In this study, the removal of thiocyanate from aqueous solutions by precipitation in the presence of the hydroxyapatite/graphene oxide nanocomposite was studied. The synthesized nanocomposite was characterized by FT-IR, FESEM, EDS, and XRD analyses. A Box-Behnken design (BBD) was employed for optimization of effective variables on the removal percent of thiocyanate and found as: dosage of the hydroxyapatite/graphene oxide nanocomposite = 0.04 g, initial thiocyanate concentration = 50 mg/L, pH = 5.54, and temperature = 25 °C. The suggested model adequacy was checked by analysis of variance (ANOVA) and other statistical tests. Langmuir, Freundlich, and Dubinin-Raduskovich isotherms were studied. The monolayer adsorption capacity of thiocyanate onto adsorbent is 123.2 mg/g. Adsorption kinetics was studied with the pseudo-first-order, pseudo-second order, and intraparticle diffusion models. The adsorption process followed Langmuir isotherm and pseudo-second order kinetics model. The thermodynamic studies indicate that the thiocyanate adsorption on the adsorbent is an endothermic and spontaneous process. According to the desorption of thiocyanate investigations, acetone was selected as a suitable solvent.

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Reduce Contamination In Waste Dyeing Process With the help of Nanotechnology

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Figur 1: Flower Bougainvillea

Abstract *:* In this article, we intend to extract, for the first time, the use of nanotechnology and the effect of electrical induction on a variety of plants in the nature of the pigments found in plants.

The important thing in this process is that the environment is minimally damaged

Waste from the process of dyeing fibers and yarns and fabrics will damage the environment.

But with the help of nanotechnology, and especially the electrical induction effect of plants such as rose flowers, orchids and orchid flowers, it is easy to get pregnant pigment molecules in plants, and, by induction, the process of polarization in molecules A pigment is created

On the other hand, pigment molecules in plants undergo phototoxic radiation in a polarization device significantly more than the real value.

The smaller the molecules, the greater the contact surface of these pigments with fibers, yarns or fabrics, as a result of increased color absorption.

As a result, the amount of pigment molecule decreases in the waste from the dyeing process of fiber, yarn or fabric.

The site of this project is in Mazandaran province .We tested flower Bougainvillea from flowers in Mazandaran province . And we separated the pigment in the flower with nanoscale technology

So, after the introduction of nanotechnology and the effect of electrical induction and the process of plasticization in different experiments, the amount of pigment molecule in the waste was reduced by about 37%

Especially harmful compounds such as nitrobenzene, toluene and xylene

Keywords :

Nanotechnology, Natural X-rays, Environment, Flower Bougainvillea , Polarization

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Adsorptive Study on a Sample Fly Ash Composited by Rhamnolipid Biosurfactants

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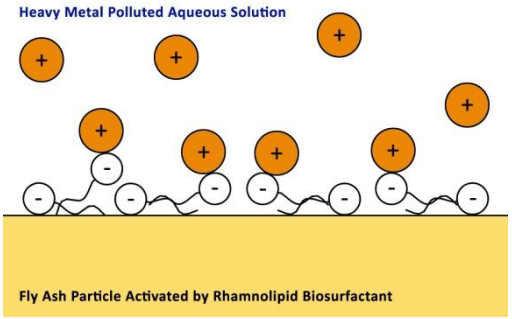

Abstract: A sample fly ash obtained from reject product of a drying furnace was activated by rhamnolipid biosurfactant from *Pseudomonas aeruginosa* MA01 strain and used as an efficient adsorbent for the removal of cadmium from aqueous solution. The absorbent was characterized by X-ray diffraction (XRD), X-ray fluorescence (XRF), and scanning electron microscope (SEM) methods. The effects of three factors, namely, initial solution pH, absorbent to lead ratio, initial metal concentration and contact time, on cadmium removal were studied and optimized using a fractional factorial design. The adsorption rates were analyzed by using atomic adsorption spectrometer (AAS). Statistical analyses showed that all factors significantly affect the cadmium removal. Process optimization resulted in maximum cadmium removal of 99.38% at initial solution pH of 10, absorbent to metal ratio of 40 and 120 min equilibrium contact time, and 99.08% removal after about 20 min. Kinetic studies revealed that cadmium adsorption follows the first order model with the rate constant of 548.57 h^{-1}. The cadmium adsorption on activated coal tailings was also found to follows the Langmuir isotherm model compared with Freundlich, Temkin and Jovanoic models. The Langmuir isotherm shows that the metal adsorbs onto a homogenous surface as a monolayer. The model assumes that distribution of adsorption energies over the adsorbent surface is uniform. The maximum adsorption capacity (q_{max}) of absorbent for cadmium adsorption was 48.08 mg/g at ambient temperature. This study demonstrates that rhamnolipid-fly ash composite could be considered as a promising efficient, low-cost, and easily available adsorbent for the treatment of heavy metal polluted wastewaters.

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Application of the MoS_2/Graphitic Carbon Nitride Nanocomposite for Removing of Organic Pollutants

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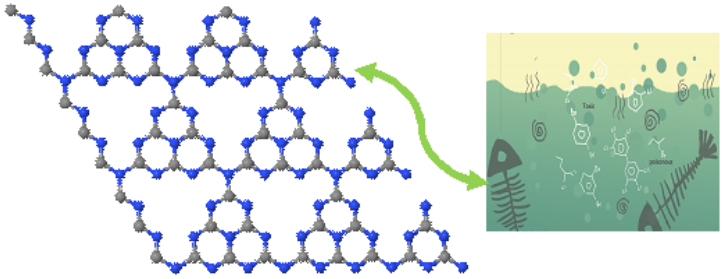

MoS_2/S-g-C_3N_4

Abstract*:* The MoS_2/Graphitic carbon nitride nanocomposite were prepared by sonication of graphitic carbon nitride and MoS_2 respectively. Their comparative performance was investigated for adsorption of Methylene blue as an organic toxic pollutant. Methylene blue was first prepared in 1876 by Heinrich Caro. It is on the World Health Organization's List of Essential Medicines, the most effective and safe medicines needed in a health system. Common side effects include headache, vomiting, confusion, shortness of breath, and high blood pressure. Other side effects include serotonin syndrome, red blood cell breakdown, and allergic reactions. Use often turns the urine, sweat, and stool blue to green in color. While use during pregnancy may harm the baby, not using it in methemoglobinemia is likely more dangerous. The crystal structure, morphology, microscopic components and properties of the synthesized samples were characterized by XRD, TEM, FT-IR, BET, Two simplified kinetic models, pseudo-first-order and pseudo-second order were applied to predict the adsorption rate constants. Adsorption isotherms and equilibrium adsorption capacities were established by three well-known isotherm models including Langmuir, Freundlich and Dubinin-Radushkevich (D-R). Samples were investigated for underlining the reaction mechanism during the process and then can be assigned to the overall reaction. It is worth mentioning that the optimum operating condition can be obtained by orthogonal experiments.

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Dispersive micro-solid phase extraction using magnetic multi-walled carbon nanotubes coupled with spectrofluorimetry for sensitive determination of furazolidone in biological samples

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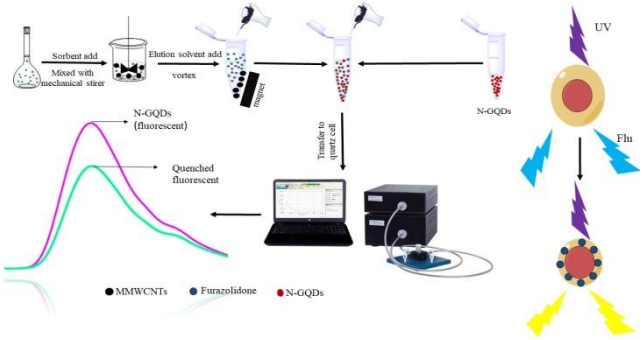

Abstract*:* Furazolidone Antibiotics (FZD) is a feed additive for animals and poultry which is still being used illegally despite its prohibition. Therefore, development of highly sensitive, fast and reliable analytical methods for its determination at trace level is of great importance. In this study, multi-walled carbon nanotubes were oxidized and magnetized to provide a proper sorbent for the extraction and preconcentration of furazolidone from real samples. The concentrated and separated furazolidone was determined based on its quenching effect on fluorescence intensity of quantum dots. The influence of the effective parameters on this procedure such as pH, the volume of sample solution, the amount of the sorbent, type and volume of eluent and extraction time was investigated and optimized by single-variable or multivariate method of central composite design. The sorbent was characterized by Fourier transform infrared (FT-IR) spectroscopy, scanning electron microscopy (SEM) and X-ray diffraction (XRD). Under the optimized conditions, for separation and preconcentration of furazolidone from 100 mL of the samples, the calibration graph was linear (R^2 = 0.9987) in the range of 20-300 µg L^{-1} of furazolidone, with the limits of detection (LOD) and quantification (LOQ) were 9 and 18 µg L^{-1}, respectively. The standard deviation (RSD) at the concentration level of 60 µg L^{-1} furazolidone (n = 6) was 2.8%. The method was successfully applied to the determination of furazolidone in poultry tissues as well as water samples.

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Study of heavy metals concentration (Hg, Ca, Zn and Ar) and risk assessment in Anchovies fishes by Atomic Absorption Spectroscopy in the Persian Gulf and Oman Sea

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Abstract: The current research, in winter of 2018, was done in order to determine the concentration of heavy metals of Mercury, Cadmium, Arsenic and Zinc in Anchovies fishes. After sampling and biometry the aquatic (60 samples) were transferred to laboratory for measuring the concentration of heavy metals in fresh and dried types. Measuring the metals in body of fishes was done by using of Atomic Absorption Spectroscopy (AAS). Data analyzing was done by using of SPSS software (version 24). For comparing the concentration of considered heavy metals t-test method were done. The results of this research show that there is positive and significant correlation in under study with regions, also dried and fresh types, so that, concentration of Mercury non detected in any concentration but in another metals concentration had different in each regions ($P<0.05$). The results of this study by t-test method for average concentration showed that in the body of the species studied in the regions, fresh and dried type, except for mercury , in all other metals, there was a significant and positive correlation ($p<0.05$). Also, by comparing the average concentration of metals found in the body of the species with the reference dose (RfD) of the EPA organization, only the concentration of Arsenic metal in the dried types of the Oman Sea and the Persian Gulf regions was higher than the limit and the concentrations of mercury, cadmium and zinc metals are lower than the specified value.

Also the result of THQ and HI for a 70 kg person shows that, the Potential Danger of Mercury, Cadmium and Zinc in all studied samples, was less than one, that shows the daily absorption of these metals by consumers is less than which has harmful effects on their health during their lifetime. But for dried specimens of the studied regions, THQ and HI for Arsenic were more than one, indicating that there is a risk of food intake in this amount.

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A New Approach and Efficient Solvent Extraction/Recovery of Gold and Copper from Waste Electrical Equipment Using Tri-*n*-Octylamine as Extractant

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Abstract: By extensive exploitation of gold and copper from their resources, the obtaining of these precious metals from the corresponding ores has begun to be exhausted. This is because of the insufficient amount of raw materials to afford the increasing need to these metals of electric and electronic industries. Moreover, the continuous production of waste electrical and electronic equipment results in severe environmental issues as it is disposed in landfills, because of their precarious and harmful content [1]. These economic and environmental aspects motivated many research groups around the world to be focused on the recovery of gold and copper from the mentioned wastes [2].

The metallic parts of electronic circuits (80 g) were demounted and were dissolved in aqua-regia (1000 mL) to analysis the metallic contents (Au, Cu, Ni, Al, Cd, Co, Cr, Fe, Pb and Zn), by using inductively coupled plasma. The selective extraction of the gold and copper contents from the leached solution was studied by optimization of the parameters affecting the process included the initial aqueous gold (copper contents were varies with the gold concentration) concentration, extractant and hydrochloric acid concentration and aqueous to organic phases, and contact time using the RSM. The selection of the organic diluent performed via a univariate optimization process. This was the same optimization used for the optimization of the back-extraction process. The back-extraction of the gold and copper extracted to the organic phase were stripped with a solution of sodium hydroxide [3].

Under the optimized extraction conditions, i.e. aqueous phase 5 mL (90 mg L^{-1} Au, 32600 mg L^{-1} Cu) adjusted to 4 M HCl, 10 mL organic phase (0.048 M tri-*n*-octylamine in *o*-xylene), and contact time 15 min, the mount of the extracted gold and copper into the organic phase were ~90 and ~2400 mg L^{-1}, respectively. A quantitative back-extraction of copper and gold was realized by using a solution of 0.1 M NaOH. The copper was precipitated in its hydroxide form, and chloro-complex of gold was found in the aqueous phase. This study showed that the gold in the leached solutions of spent electronic circuits can quantitatively and selectively recovered by using a solvent extraction method based on tri-n-octylamine extractant, followed by applying a back-extraction step with sodium hydroxide. The co-extraction of copper with gold did not interfere for the recovery of gold. Moreover, the co-extracted copper was completely separated from the gold content by a selective back-extraction process by sodium hydroxide.

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In Silico Bioinsecticidal Activity of Essential oils of Myrtus communis

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Abstract: In recent years, the use of essential oils (EOs) derived from aromatic plants as low-risk insecticides have increased considerably owing to their popularity with organic growers and environmentally conscious consumers. EOs are easily produced by steam distillation of plant material and contain many volatile, low-molecular-weight terpenes and phenolics. The major plants families from which EOs are extracted include Myrtaceae, Lauraceae, Lamiaceae, and Asteraceae. EOs have repellent, insecticidal, and growth-reducing effects on a variety of insects. They have been used effectively as insect repellents for biting flies and for home and garden insects. The compounds exert their activities on insects through neurotoxic effects involving several mechanisms, notably through GABA, octopamine synapses, and the inhibition of acetylcholinesterase. With a few exceptions, their mammalian toxicity is low and environmental persistence is short [1]. *Myrtus communis* L., belongs to the Myrtaceae family, is a medicinal plant endemic to the Mediterranean area and it has been used by locals for its culinary and medicinal properties since antiquity [2]. The chemical composition of the *Myrtus communis* oil was examined by gas chromatography-mass spectrometry. The major oil components were α-pinene, α- terpineol, linalool, 1, 8-cineole, geranyl butyrate and geraniol [3].

This study was conducted to determine the insecticidal activity and mode of action of three major components of *Myrtus communis* oil (α-pinene, α- terpineol and linalool) on the acetylcholinesterase of malaria mosquito. The crystal structure of acetylcholinesterase (PDB entry 5X61) was obtained from the Protein Data Bank (http://www.rcsb.org./pdb). Molecular docking technique was performed to investigate the interactions. B3lyp/6-31g method was used to determine docking data such as binding energy (K_b) and inhibition constant (K_i) values. The results confirmed that essential oil of *Myrtus communis* L. could be used as a potential biocontrol agent for the repellent of insects.

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Selective Removal of Lead by Magnetic Imprinted Polymers Synthesized from Chitosan-Stabilized Pickering Emulsion in environmental water and vegetable samples

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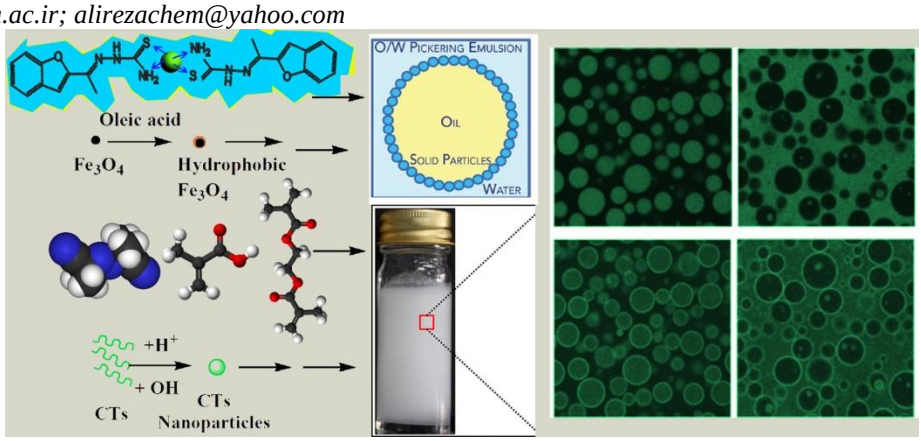

Abstract*:* Lead (Pb) is known to be a toxic metal that accumulates in the human body throughout the lifetime [1]. The U.S. Environmental Protection Agency (EPA) has classified lead as a Group B2 human carcinogen [2]. The World Health Organization (WHO) has established the maximum allowable limit of 10 g L^{-1} for lead in drinking water [3]. Therefore, highly sensitive determination methods of trace Pb in environmental samples need to be established. In order to determine trace levels of Pb, a separation and enrichment step prior to the determinations may be beneficial. Solid-phase extraction (SPE) as a popular technique for achieving separation and preconcentration of metal ions in environmental samples has been developed and widely used because of its simplicity, rapidity, minimal cost, low consumption of reagents and the ability to combine with different detection techniques [4]. Adsorption was the effective method to remove the environmental pollutants and among the many sorbents, ionic imprinted polymers (IIPs) were attracting more attention and had been widely applied in selective recognition and elimination of target pollutants. IIPs were usually synthesized in organic solutions because most of monomers, cross-linking agents and causing agents had good solubility in organic solvents. Thus, it was a good way to fabricate MIPs in an oil/water (O/W) emulsion on account of reducing the use of organic solvents. Pickering emulsion polymerization has been employed for the µ-Solid phase extraction (µ-SPE) of ultra trace lead species by a new magnetic ion imprinted polymer (MIIP) prior to hydride generation atomic absorption spectrometry. In second step, the nanoparticles and polymers were characterized and the analytical parameters such as pH, amount of polymer and contact time were selected and optimozed by Plackett–Burman and Box–Behnken designs respectively. Linear dynamic range, detection limit and relative standard deviation were 0.01- 90.00 µg L^{-1}, 0.003 µg.L^{-1}, and 4.11%, respectively. The proposed preconcentration procedure was successfully applied to the determination of lead ion in a wide range of environmental water and vegetable samples.

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Preparation and antibacterial effects of PVA linked quaternary ammonium salt

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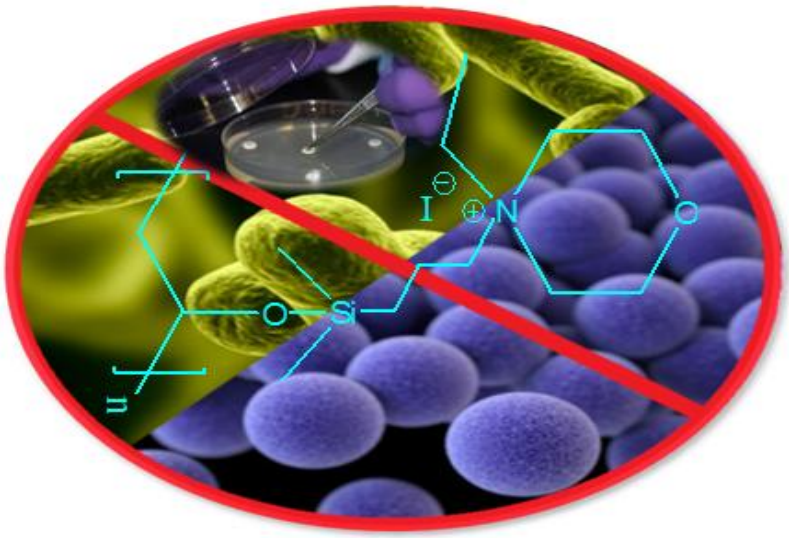

Abstract *:* Microbes are living organisms such as bacteria which are the critical sources of infections. They threaten the safety and well-being of human life and the environment. In this way, antimicrobial polymers with various applications in this field are solutions to these risks. so that, polyvinyl alcohol is our choice as suitable substrate in this synthesis [1]. Polyvinyl alcohol used as an injection moulding of soluble containers for active release of detergents, eyes drop, surface coating, protective chemical-resistant gloves and different hard contact lens solution as a lubricant, and other industrial and medical, food, pharmaceutical market, packaging and textile industries and it has no odor and toxic properties. [2]. Therefore, we added quaternary ammonium salt [3]composed of morpholine and ethyl iodide to the PVA. adsorption of the positively charged quaternary ammonium compound on the negatively charged bacteria surface , disruption of the bacterial membrane by a lipophilic chain on the quaternary ammonium compound, and diffusion through the membrane leading to bacteria death.The influence of quaternary ammonium on the properties of PVA matrix was investigated by differential scanning infrared spectroscopy FT-IR,TGA, XRD, and DDM test . It was found that a structure of new polymer had an excellent antibacterial ability against of both gram negative (E.coli) and gram positive (S. aureus) bacteria.

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Selective preconcentration of trace amount of Lead using a novel surface imprinting polymer based on graphene oxide-mesoporous silica nanosheets in Fish samples

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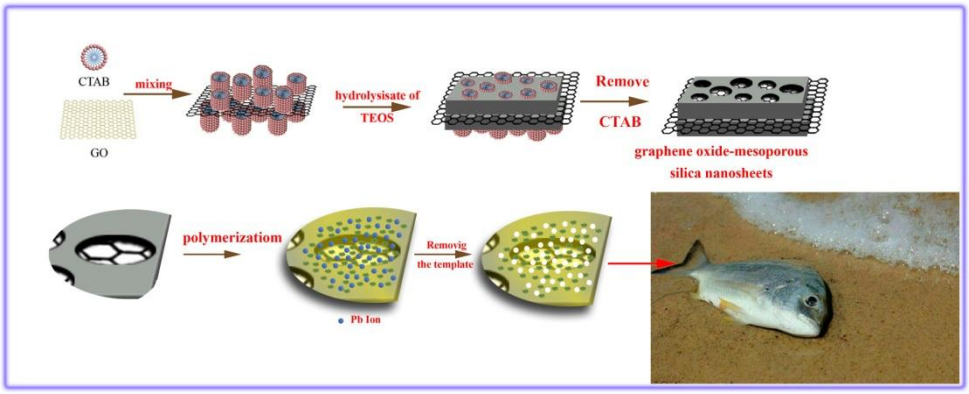

Abstract: The safe concentration levels of toxic heavy metals in the environment have been seriously increased during the last decades due to human and industrial activities [1]. The long term exposure of heavy metals has a severe detrimental affect on human health [2]. Lead is one of the most toxic elements and possesses bio-accumulative effect, that's why it is called environmental priority pollutants. Hence it is very important to monitor the levels of lead in environments [3]. Sol-gel process is considered as a promising technique, which consists of the hydrolysis and co-condensation of organosilanes. Mesoporous hybrid functionalized solids can be obtained by adding cross-linker into sol-gel process [4]. Adsorbents prepared by sol-gel process show some advantages, such as high mechanical strength, excellent chemical and thermal stabilities, rigid pore structure and high adsorption capacity, owing to large internal surface area and volume. It is very urgent to develop a preparation method of adsorbent with not only high adsorption performance but also green and environmentally friendly synthesis procedure. In this work, a new and green Pb(II) ion-imprinted polymer was prepared by sol-gel process for removal of Pb(II) ions from aqueous solution. In this research, nanosheets of graphene oxide on mesoprose silica with aminoimide ligand were used for trace separating and preconcentrating of lead. For synthesis of this nano-adsorbent, an amine-imide ligand was synthesized, and certain amount of the ligand and lead nitrate dissolved in a mixture of water / methanol (4: 1) and in the presence of ammonium sulfate as a primer and EGDMA as a cross linker. Prepared polymers were characterized by Fourier transform infrared spectroscopy (FT-IR), X-ray photoelectron spectroscopy (XPS), scanning electron microscope (SEM), and Brunauer, Emmett and Teller (BET). Some main factor such as the interaction time, pH, and amount of adsorbent were selected and their optimum conditions were determined by the experimental design. The optimum condition obtained when 14.46 mg of adsorbent was used at pH value of 6.9 for 32 min. Using a new conventional polymer, measurements of lead II levels in fish samples such as salmon, sardines, yolk fish and tuna fish have been successfully evaluated using a flame atomic absorption spectroscopy.

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Development of Ultrasonic Assisted Modified Mixed Cloud Point Extraction (UA– MMCP) by Dispersion of ZnO Nanoparticles for Preconcentration and separation of Ni, Co, Cd in Environmental Sample

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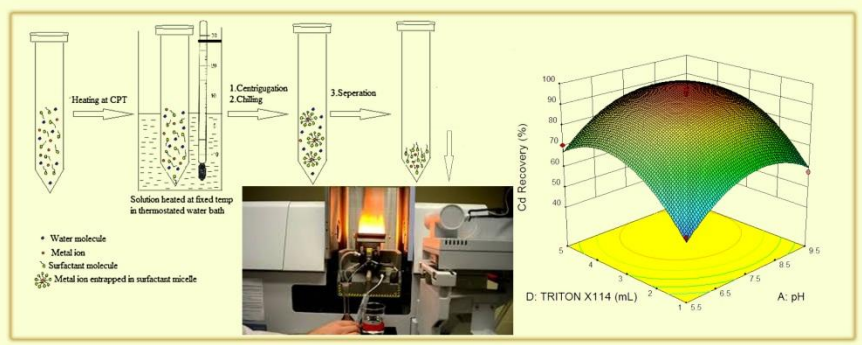

Abstract*:* Contamination of water, soil and plants by heavy metal ions is of great concern due to their associated ecological and health toxic effects even at very low concentrations. Among them, Ni, Co, Cd are most toxic metals owing to their accumulative toxicity for the human body [1]. SPE is one of the pre-treatment methods for the preconcentration of trace analytes from a sample. The major advantages of solid phase extraction are the high selectivity and high enrichment factor that could be achieved with this technique. This method gives a higher concentration ratio of analytes than other separation methods [2]. Nowadays, nanomaterials have been shown to be one of the most promising adsorbents for preconcentration of the metal ions [3]. One of the specific properties of nanomaterials is their high surface areas, which could strongly chemisorb many substances and present very high adsorption capacities towards metal ions. Cloud point extraction (CPE) using micelle is a well-known methodology for designing new analytical procedures for different analytes. CPE is a safe and green methodology, which uses small amounts of surfactant that limit environmental pollution [4]. Their suggested method has illustrated that CPE can be used for concentration and recycling of NPs in aqueous media. In this research, a new method was purposed for cloud-point extraction along with scattering of modified ZnO nanoparticles with ligand and measuring the nickel, cobalt and cadmium in environmental samples. In this project, 2- benzofuran thiosemicarbazone and triton X-114 were used as complexing agent and surfactants respectively. The main factors, such as pH, ultrasonic time, temperature and nanoparticles size, that have a significant effect on the extraction, were determined and optimized using experimental design (Box- Behnken Design). In optimal conditions, the calibration graphs for cadmium, cobalt and nickel are obtained as in the ranges of 60-0.003 mg.L^{-1}, 55-0.003 mg.L^{-1} and 45-0.005 mg.L^{-1} respectively. This method has been successfully obtained in the extraction in water samples.

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Remediation of Polycyclic Aromatic Hydrocarbons (PAHs) Contaminated Soils using nanomagnetite in Modified Fenton Process

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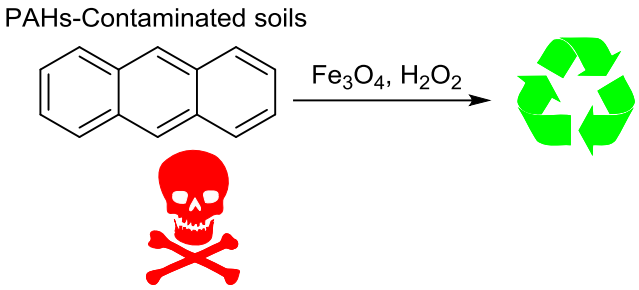

Abstract: In this study, the Anthracene is removed from contaminated soils by a modified Fenton oxidation method at neutral PH using nanomagnetite as an efficient oxidation promoter catalyst. The efficiency of removal of Anthracene at an initial concentration of 2500 mg/kg was 98% at the following reaction condition: H_2O_2 (0.2ml) and nanomagnetite catalyst (8 mg), PH= 7 during 60 min of reaction followed up by Uv-Vis spectroscopy.

Polycyclic aromatic hydrocarbons (PAHs) are toxic organic contaminants. Owing to the persistence of PAHs in soil and sediments and their toxic, mutagenic and carcinogenic effects, the remediation of PAH-contaminated sites is an important environmental issue. Various remediation techniques have been explored for the removal of persistent PAHs from complex matrices like soils or sediments. The degradation of PAHs has been reported by Fenton-like reaction catalyzed by various Fe oxides (1-3). Herein, we used magnetite (Fe_3O_4) as efficient catalyst in modified Fenton process to removal of PAHs from contaminated soils.

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Determination of Volume and Physico-Chemical Properties of Wastewater Produced at Solid Waste Transfer Stations in Shiraz

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Abstract: Solid Waste transfer stations are one of the important components in the process of waste collection and transfer. Carrying out of various activities such as washing and car washes of machinery and station area in this place leads to the production of wastewater. Therefore, due to the importance of the information about the physical and chemical properties of wastewater generated at the transfer stations for their proper management, the purpose of this study is Determination of the volume and physic - chemical properties of wastewater produced at waste transfer stations in Shiraz. This research was carried out on two waste transfer stations in Shiraz, in October 2013. For this purpose, 9 samples from Transfer Station No. 1 (Pirnia) and 18 samples were taken at Transfer station No. 2 (Adelabad) during three consecutive weeks. Also, to determine the amount of effluent produced by considering the existence of storage ponds at Adelabad Transfer Station during a week, the volume of effluent was estimated by recording the height of leachate within the ponds. The average amount of wastewater produced at the Adel Abad transfer station (Number 2) was 8.6 cubic meters per day. The results showed that in general, the values of the parameters studied at the transfer station of Pirnia (Number 1) are more than AdelAbad station. The results also showed that there is a significant difference between the parameters of TDS, TSS and COD in two transfer stations (P-value <0/05). Pearson test results also showed a significant correlation between the TSS parameters with TDS, COD with TDS and EC with COD. In general, the results of the study showed that the values of the parameters in the Pirnia transfer station are more than AdelAbad station. So, the wastewater of the station No. 1, due to similar its characteristics to leachate, should be transported to the evaporation ponds. However, the wastewater from the carwash and repair pond at the No. 2 transmission station can be sent to the refinery system.

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Removal of Lead (II) Ions From Water Samples Using Nickel Zinc Ferrite Nanoparticles

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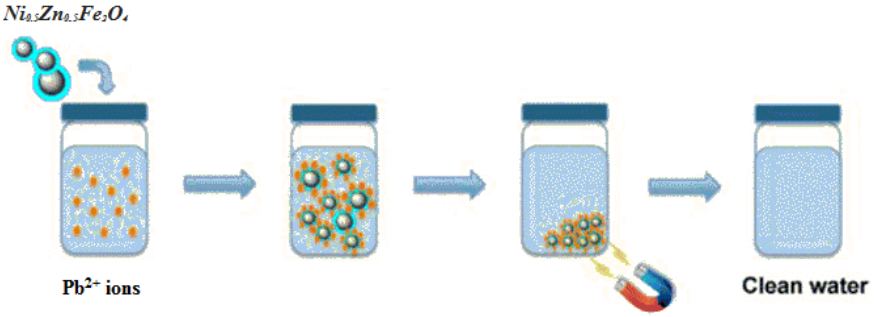

Abstract*:* Lead is a substance commonly found in the environment and has been recognized as a toxic element for human health, arising from industrial wastewater, food, drinking water, soil, and paint sources. The toxicity of lead could result in irreversible health effects to the central nervous, hepatic, circulatory, cardiovascular, reproductive and renal systems.

In this work, nickel zinc ferrite ($Ni_{0.5}Zn_{0.5}Fe_2O_4$) nanoparticles was employed for removal of Lead (II) ions from real samples. Nickel zinc ferrite nanoparticles is a good candidate for the adsorption of the pollutant materials from aqueous solutions due to its high surface area, high surface-to-volume, magnetic property and reusability. $Ni_{0.5}Zn_{0.5}Fe_2O_4$ nanoparticles was easily synthesized by co-precipitation method and characterized using X-ray diffraction (XRD) and scanning electron microscope (SEM) techniques. The crystallite size of the prepared $Ni_{0.5}Zn_{0.5}Fe_2O_4$ is in around 10.58 nm, which was calculated according to Scherrer equation. The effect of various parameters such as pH, amount of the adsorbent and contact time on the adsorption efficiency of Lead (II) ions on the adsorbent was studied. Equilibrium isotherm studies were carried out with different initial concentrations of Lead (II) ions and the experimental data were analyzed by the Langmuir adsorption model. The adsorption capacity for Lead (II) ions was obtained as 65.5 mg/g.

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Process modeling for Removal of Acid Dye from Environmental Samples by a New Nanocomposite Based on Graphene-Periodic Mesoporous Silica

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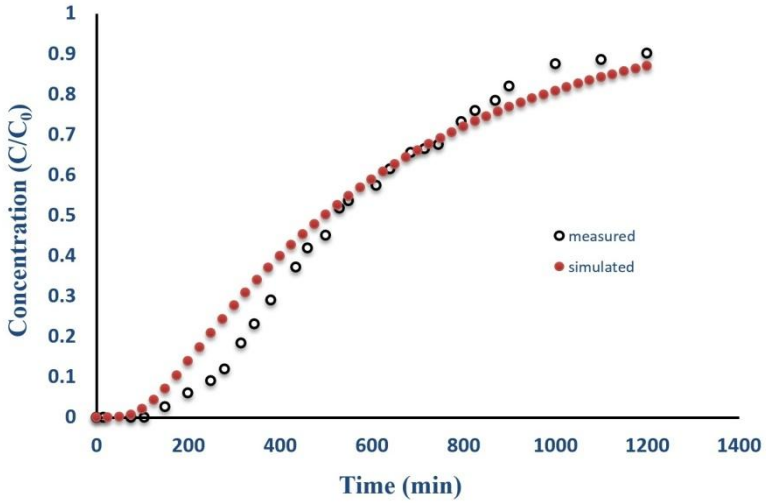

Abstract:

These days, introducing a new type of sorbents seems to be a great challenge and this issue has become an interesting topic in the field of sample preparation techniques [1]. In this regard, for the first time, a sandwich structure of graphene-periodic mesoporous silica (G-PMS) was synthesized as a novel sorbent. The feasibility of this sorbent in acid blue removal from wastewater samples was investigated through static and column mode studies. The effect of different factors on the dye adsorption in batch experiments, including the amount of sorbent, sorption time, and dye concentration were optimized by response surface methodology (RSM) using Box–Behnken design (BBD). The adsorption isotherm could be well fitted by the Freundlich model with acceptable adsorption capacity of 21 mg g^{-1}. Moreover, G-PMS showed higher removal efficiency (R = 89.5%) compared to graphene (R = 62%). Furthermore, a flow-based (column) mode was also performed to study analyte removal using a fixed-bed column. Numerical simulation, using COMSOL Multiphysics, was applied to predict the breakthrough curves. An objective framework was suggested by this model to interpret the efficiency of the developed adsorption system. Also, the obtained results of this model can help to predict the possibility for up scaling and designing of adsorption process at the pilot plant scale level.

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Sensing Ammonia (NH_3) By Graphyne and Graphyne Oxide

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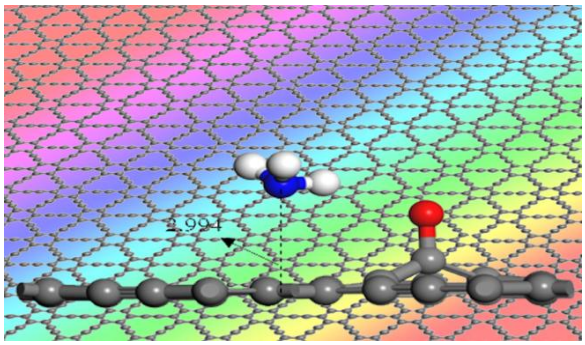

Abstract: According to previous researches about graphyne and graphene oxide derivatives toward sensors applications, in this study, we investigated the interaction of NH_3 on graphyne (GY) and graphyne oxide contains an oxygen (GYO) or two oxygen atoms (GYO_2) by density functional theory (DFT) calculations. We examined the effect of introduction of oxygen atom in GY structure on the adsorption of NH_3. NH_3 affects on human health, adversely and pollutes the environment. Thus, some effective methods should be designed in order to detect and control NH_3 molecule (by capturing and separating technologies). In 1987, various types of GY were suggested by Baughman and co-workers and the most stable of them is γ-GY that was investigated in this work. We put NH_3 in different sites of GY, GYO and GYO_2 from various orientations and distances respect to carbon sheets and the most stable states were determined. Results show that insertion of one or two oxygen atoms forms very stable oxides with much larger binding energies than graphene. Oxygen trends to join to sp-hybridized carbon atoms and forms carbonyl and epoxy groups that carbonyl is more stable. The highest adsorption energies (E_{ads}) of NH_3 on GY, GYO and GYO_2 are -0.270, -0.382 and -0.294 eV, respectively, that show physisorption mechanisms. So, one can be said that insertion of the first O atom increases the adsorption energy, while insertion of the second O atom has inverse treatment. Altering the oxygen coverage through changing the number of oxygen atom in a supercell can tune the electronic properties and decreases band gap value of GY.

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Titanium Decorated Graphyne As Sensor of Sarin: A DFT-D study

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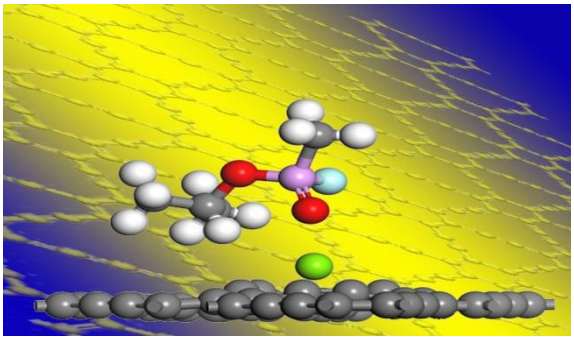

Abstract: Sarin ($C_4H_{10}FO_2P$/ isopropyl methyl phosphonofluoridate) is an organo-phosphorus compound, toxic and deadly, which is used in the production of chemical warfare agents (CWAs). It is dangerous in both vapor and liquid states. Finding of the materials for using as sensing, capturing and adsorption of hazardous compounds such as sarin is one of the aims of researchers. Graphyne (GY) is an interesting two dimensional (2D) periodic structure of the carbon allotropes. GY is a planar honeycomb networks contains acetylenic linkages. In this work, the effect of Ti single atom on the structural and electronic properties of GY toward sarin adsorption was studied by density functional theory (DFT) calculations. Seven sites of the GY and different distances of the metal from GY plane were investigated to gain the best structure of Ti-decorated GY. Then, adsorption of sarin on this structure as well as the pristine GY was considered. We examined various directions of sarin molecule onto pristine and Ti-decorated GY. The results showed that H1 (center of 12-membered ring) is the best site for Ti decoration and sarin adsorption. Also, decoration with Ti improves adsorption energy of sarin on GY up to 4.5 times (From –0.500 to –2.228 eV). Among six examined sites of sarin for joining to Ti -decorated GY, oxygen of carbonyl group is the best site. In these systems, charge transfer happens from sarin and metal atom to GY sheet. Finally, our investigation shows that Ti-decorated GY can be used as a promising candidate for sensing and capturing applications of CWAs such as Sarin.

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Application of L–cysteine modified silver nanoparticles as a colorimetric sensor for the determination of Barium ions

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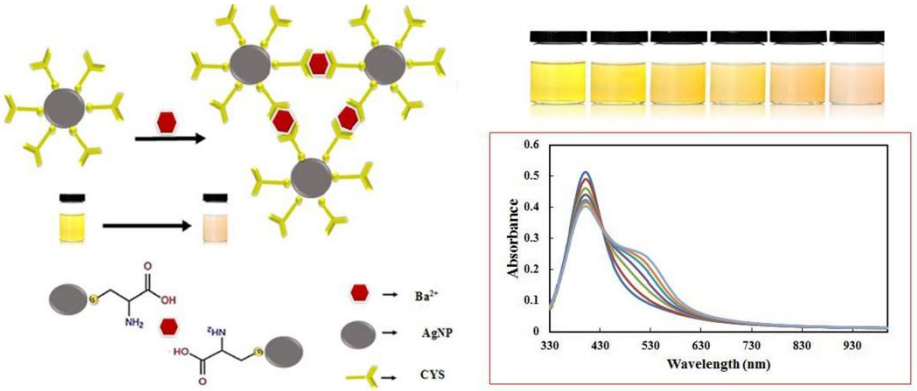

Abstract: The identification and quantification of the mineral elements play a significant role in environmental and biological sciences. According to the reports, barium (Ba^{2+}) is considered to be an accompanying element to calcium, which is essential at trace levels. However, at higher concentrations, barium compounds exhibit serious taxological effects on various living systems, and is considered as a physiological antagonist of K^+ ion. According to the recent opinion, Ba^{2+} ion can block K^+ ion channels of the Na – K pump in the membranes of cells, increasing active influx and inhibiting passive efflux of K^+ ions. It acts as a muscle poison that causes cardiac and gastrointestinal irregularities, and paralysis. In view of this, several research groups have been explored analytical protocols for the detection of Ba^{2+} ion in environmental samples using various analytical techniques such as graphite furnace atomic absorption spectrometry, UV-visible spectrometry, ion-chromatography, inductively coupled plasma-mass spectrometric, inductively coupled plasma atomic emission spectrometry. Unfortunately, most of these methods are rather expensive, complicated and time-consuming. Considering the attractive features of nanotechnology, development of new nanoparticles-based sensors has been one of the most important issues in various fields of science and technology in recent years. Hence a colorimetric method based on the shift in the maximum of plasmon resonance band of AgNPs is proposed as an alternative approach for the determination of Barium levels in engine oil samples. The strategy used in this work was based on three main steps, (a) preparation of AgNp Sol, (b) modification of silver nanoparticles with cysteine, and (c) Study of the effect of the barium cations on the L – cysteine modified silver nanoparticles. Aggregation of nanoparticles would be the final result, which could be used as a colorimetric sensor for selective determination of Barium ions. In the presence of cysteine molecules, color of the AgNp solution was changed from yellow to pink on the addition of certain amounts of Ba^{2+}. Effective parameters including time, L – cysteine concentration and pH of solution were studied. Calibration curve obtained by this method at 530nm has a linear range of 20 – 70 with 8µM detection limit for barium. The probable interferences in the measurement process due to the presence of other species present in real samples were studied. the effect of the studied interferences could be overcome by addition of appropriate amounts of EDTA at pH =7.

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Investigation and the Effect of Cerium Dioxide on the Removal of Methylene Blue Contaminants from Water

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Abstract: Nowadays Nano Photocatalyst has the ability to treat water contaminated with organic matter because of their photocatalytic properties. One of the organic materials that is widely used in industrial plants is Methylene Blue. Due to its toxicity it also has irreparable effect on the environment. Cerium Dioxide has been widely considered in the field of photocatalytic activity by in incorporating excellent properties such as high corrosion resistance in a variety of corrosive environments photocatalytic properties etc. The popularity of Cerium Dioxide or Ceria is increasing in catalyst applications and in some cases has become a substitute substance. Reducing the size of Ceria particles in nanoscale dimensions has a tremendous effect on its catalytic behavior. In this study Cerium Dioxide nanoparticles were synthesized by hydrothermal method and after taking XRD test and X-Pert program to determine the type of phases formed nanoparticles were formed without any impurities. Subsequently the particle morphology was investigated by SEM test and the photos taken from Cerium Dioxide nanoparticles showed cubic particles. The size of microfibers was measured by the SEM test and the Debye-Scherrer relationship of about 28 nm. Then Cerium Dioxide nanoparticles were used to remove Methylene Blue contaminants and optimum time concentration Methylene Blue and catalyst content were investigated and in each parameter the optimal value was determined in this study.

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Fabrication of functionalized Porous Nanofibers Using Electrospinning Method

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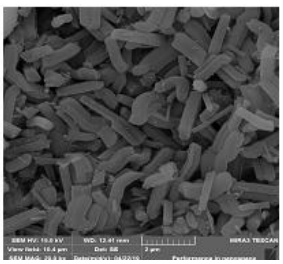
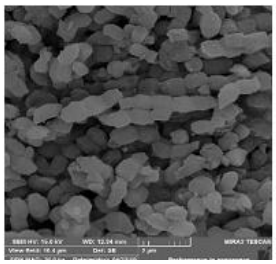
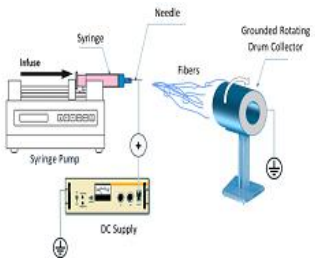

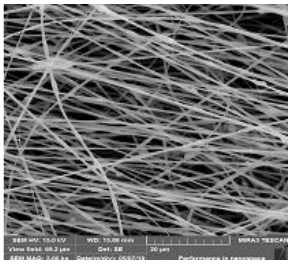

Abstract: The importance of nanotechnology has gained new and widely fields for the application of nanomaterials in chemistry. As part of Nano science, Electrospinning is a useful and efficient technique to produce ultrafine polymeric fibers. It has been a process of great scientific and industrial interest due to its versatility. Electrospinning has many advantages, such as high surface area to volume ratio, wide variety of polymers and materials have been used to form nanofibers, ease of fiber functionalization and material combination, flexible method and nanofibers with diameters down to tens of nanometers. In this research, for the first time, nanofibers was designed and fabricated based on functionalized porous carbon and silica nanostructures. Polyvinylpyrrolidone and Polyacrylonitrile polymers were selected as the most suitable polymers for the preparation of nanofibers; The effective parameters for synthesis of nanofibers, such as precursor and adsorbent concentration, solvent type, molecular mass of polymers, type and amount of additives, electrospinning distance, feed rate and voltage were optimized. The nanofibers were characterized using scanning electron microscopy (SEM), Thermo Gravimetric-Differential Thermal Analysis (TG/DTA), FT-IR, EDX and XRD analysis. This novel nanofibers has made with high strength and good flexibility. The results of the analysis of nanofibers, presence of porous nanostructures, porosity and fiber uniformity and the presence of functional groups were showed. Finally, Eco-friendly nanofibers were synthesized at the optimum conditions with the best morphology and minimum diameter.

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Decoration of $Bi_4O_5I_2$ Nanoparticles on Zinc Oxide: Novel Visible-Light-Driven Photocatalysts for Efficiently Degradation of Dye

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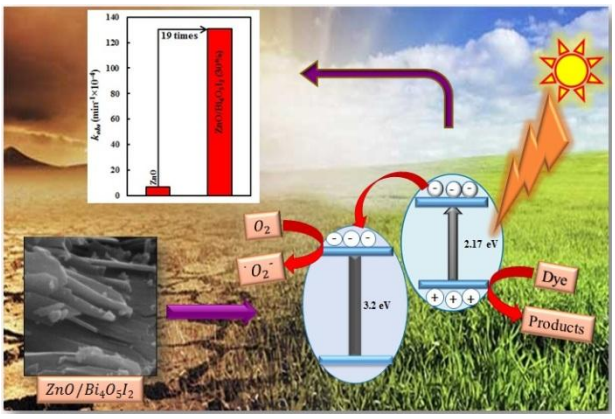

Abstract: Nowadays, removal of organic dyes from wastewaters is an importance issue [1]. Among various techniques, heterogeneous photocatalysis has been considered as a promising green technology to address different challenges facing human beings [2]. ZnO is a semiconductor photocatalyst that possesses favorable electrical, mechanical and optical properties [3]. Photocatalytic efficiency of this photocatalyst has some drawbacks such as high recombination rate of e^-/h^+ pairs and stimulate only with UV light. Developing the visible-light-induced photocatalysts has become an important research topic. Bismuth oxyiodides ($Bi_4O_5I_2$) due to features such as suitable band gap, stability, and excellent photocatalytic activity under visible light has attracted much attention [4]. This research synthesizes $ZnO/Bi_4O_5I_2$ nanocomposite and studies their photoactivity for eliminating RhB as a typical azo dye under visible-light irradiation. Morphology of nanocomposite was studied by SEM analysis. The $ZnO/Bi_4O_5I_2$ (30%) sample displayed high ability for degradation of RhB, which was almost 19 times as high as the bare ZnO. The photocatalytic ability of the $ZnO/Bi_4O_5I_2$ (30%) can be attributed to the rapid separation of photogenerated charges due to the construction of heterojunction between two semiconductors.

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Soncatalytic degradation of organics dyes using cadmium sulfide nanorod molybden disulfide

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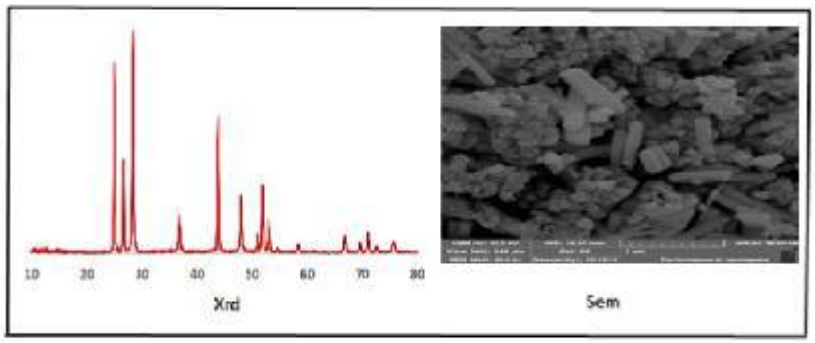

Abstract: Fast expansion of nanostructures' synthesis methods caused the emergence of different types of developed nanoscale semiconductors. Among the photocatalytic materials used for filtering the organic and inorganic pollutions, we can pinpoint ZnO, Fe_2O_3, WO_3, MoS_2, TiO_2, and CdS. Nowadays, unique properties of nanoparticles such as high surface to volume ratio and quantum effects have been caused to the increase in the important role of them in some realms, like environment, smell control, sterilization, and renewable energies [1]. MoS_2, an important transition-metal dichalcogenide and new emerging excellent adsorbent which composed of three stacked atomic layers (S-Mo-S) held together by Van der Waals force, exhibited unique optical, electronic and chemical properties [2]. In this study CdS/MoS_2 nanocomposit was fabricated by sodium molybdate (Na_2MoO_4), thiourea (S_2N_4CH) and cadmium nitrate at 200 °C by hydrothermal method. The structure and morphology of the synthesized nanocomposite was characterized by FT–IR, XRD and FE-SEM analysis. The sonocatalytic activity of the synthesized nanocomposite was studied in the presence of H_2O_2 for degradation of organic pollutants such as Methylene blue (MB), Rhodamine B (RhB) and Methyl orange (MO). Sonocatalytic degradation of all three dyes completely done 20 min.

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Synthesis and Application of a Novel Magnetic SBA-15/GO@dual-Template Imprinted Polymer for Soild Phase Micro Extraction and Determination of Nortriptilyne and Amitriptyline in the Blood of Rat Plasma

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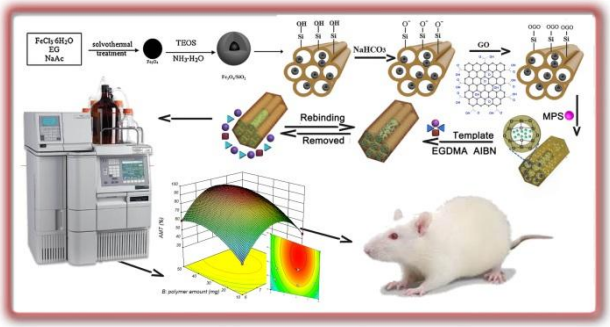

Abstract*:* Tricyclic antidepressant drugs (TCAs) have unique ability for treatment depressive states and other psychiatric disorders [1]. Therapeutic drug monitoring is highly recommended to achieve best therapeutic concentration with at least overdose and adverse problems. In SPE, nano-scale based sorbent lead to more improvement in method characteristics performance, due to their advantages such as higher surface area and number of reactive sites [2]. Chemometrics is a discipline within Chemistry, which allows extracting chemically relevant information via experiment optimization, data processing, calibration, quality control and organisation of the analytical process. Statistical design of experiments (*DOE*) is commonly seen as an essential part of chemometrics. However, it is often overlooked in chemometric practice [3]. The purpose of DOE is to provide a systematic and intelligent action plan in order to obtain the maximum possible information from the minimum experiments. Among the experimental designs, Box- Behnken Design (BBD) is one of the most effective and most practical designs [4]. In this present study, a novel dual-templated molecularly imprinted polymer (DMIP) was prepared using magnetic mesoporous silica SBA-15 modified with graphene Oxide (GO), as carrier for selective recognition and preconcentrated of trace amount of nortriptyline (NOR) and amitriptyline (AMT) in the blood of rat plasma. The resulting polymers were characterized by SEM, TEM, FT-IR, XRD, TGA, VSM and BET techniques. The results suggested a highly ordered mesoporous nanostructure anchoring of Fe_3O_4 nanoparticles and that the imprinted polymer was coated on the Fe_3O_4@SBA-15/GO surface. In this research, multivariate optimization techniques are used and influence of parameters and their interaction in extractions and sensitive determination of drugs were explored in detail through Response Surface Methodology (RSM) based on the Box–Behnken design. This technique provides a low cost and effective path to find the best laboratory conditions. Fe_3O_4@SBA-15/GO/MIP was successfully used as the solid-phase micro extraction (SPME) sorbent coupled with HPLC technique. Under the optimized conditions, the limits of detection (LODs) and quantitation (LOQs) of the proposed method for NOR and AMT were in the range of 0.63-0.75 ng·mL¹ and 2.1-2.5 ng·mL¹, respectively. The recoveries of NOR and AMT were obtained between 93.4% and 104.3% with relative standard deviations (RSDs) in the range of 3.3-4.2%. These resluts highlighted the good application prospect of the multi/dual-template imprinting strategy could be used as an efficient SPME adsorbent for enrichment of NOR and AMT in the blood of rat plasma.

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Using Porous Nanofilters for Removal of Environmental Pollutants

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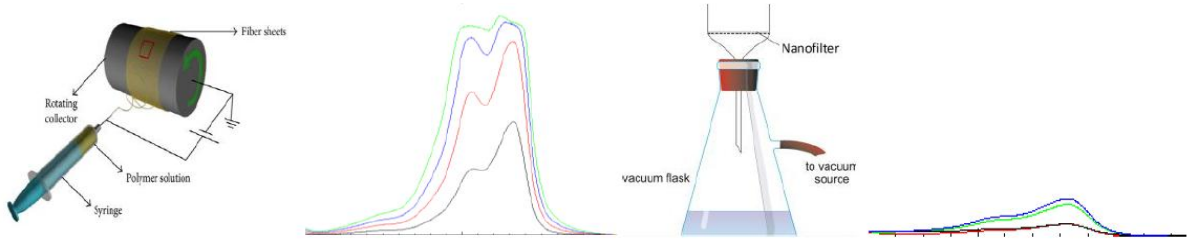

Abstract: Electrospinning is the most clear-cut and flexible method for 1D nanostructure production compared to other techniques. The most prominent feature of this method is formation of nanofibers with diameters down to tens of nanometers. In electrospinning method compared with other methods, due to the formation of very thin nanofibers, the surface-to-volume ratio of adsorbent increases greatly. In this study, high performance nanofilters were fabricated based on functionalized porous nanostructures with polyacrylonitrile (PAN) and polyvinylpyrrolidone (PVP) polymers using electrospinning method and theirs applications for removal dyes and metallic ions were investigated in aqueous solutions. Various parameters for the synthesis of nanofilters, such as precursor and adsorbent concentration, molecular mass of polymers, type and amount of additives, pH of solution, electrospinning distance, feed rate and voltage were optimized. The influence of effective factors on the filtration process, such as initial concentrations of dye and metallic ion, pH solutions and the amount of nanofilters were investigated. The nanofilters were characterized using scanning electron microscopy (SEM), Thermo Gravimetric-Differential Thermal Analysis (TG/DTA), FTIR, EDX and XRD analysis. Also UV-VIS spectrophotometer for investigating of dyes removing and Flame atomic absorption spectroscopy (Flame-AAS) for metallic ions removing were used. The results showed nanofilters had antibacterial properties and could minimize the dye pollutions associated with potassium permanganate and methylene blue; nanofilters recycling also indicate more than 90% removal of dyes. By investigating the filtration heavy metals in aqueous solutions, these nanofilters were able to remove more than 90% of heavy metals pollution. Filtration advantages with these nanofilters in comparison to other methods are: high speed in responsiveness, reproducibility, scalability, and high power of elimination of pollutions.

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Evaluation of electro membrane extraction based on green chemistry for determination of glyphosate in water samples

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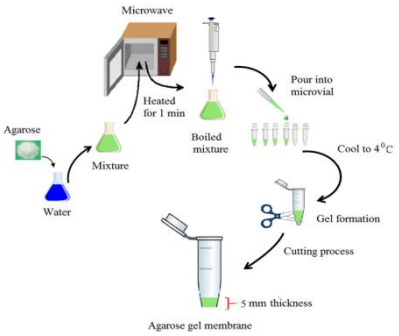

Abstract: Glyphosate (N-(phosphonomethyl)glycine) is a non-selective post emergent herbicide for the control of weeds (Figure 1), it is perhaps the most widely used herbicide in the world (Gill et al., 2017). Glyphosate is generally considered as safe (Duke and Powles, 2008). however, its wide application and its persistence worry environmentalists and medical doctors, in particular its possible association with non-Hodgkin's lymphoma (Schinasi and Leon, 2014). They seem not pose any major health threats, however, due to their persistence and the large quantities applied worldwide, they have become a source of concern.

Materials and methods:Thus determination and quantification of this herbicide is very important. Glyphosate cannot be directly detected by UV-Vis spectrophotometry, which complicates their determination. Their high solubility in water also complicates strategies involving the extraction with other solvents. Hence, one can find in literature several analytical methodologies that make use of derivatizing agents (per example, heptafluorobutanol and trifluoroacetic acid anhydride), with a wide variety of applied instrumental techniques of detection and/or separation (Seralii and *et. al.*,).

Whereas the amount of this herbicide in environmental samples is very low, thus developing an efficient microextraction technique is necessary.

Result and discussion: In this study, for the first time, electromembrane extaction combined with HPLC was used for determination of glyphosate in aqueous samples. During past decade, EME have been applied for the extraction of acidic drugs, basic drugs, and metal ions. But best of our knowledge, this is first report for extraction of glyphosate with EME procedure. Also in this study, gel agarose as green membrane was used and no organ solvents were applied. The results showed that limit of detection for glyphosate was 1.5 µg ml^{-1}, and relative standard deviation for proposed method was lower than 5.8% which it means this method has acceptable repeatability. Whereas the fabrication and setup of this method is very easy with low price, this new type of membrane opens new horizons in other applications.

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Design and manufacture of modified carbon base electrodes for measuring thallium in the environment

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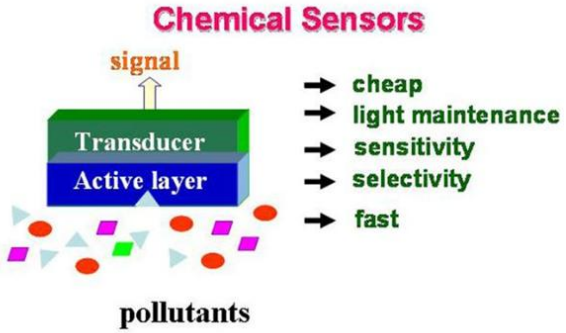

Abstract: Thallium industrial applications are very high and often work in certain electron equipmentgoes. Thallium is used as an activator in most gamma-ray and infrared radiation detection devices. The combination of thallium oxides as high-temperature superconductors is used in filters for wireless communications. Thallium Crystal, Arsenic and Selenium are essential for light diffusion in optical measuring instruments. Thallium and mercury are also used to measure low temperatures [1].

Biologically, thallium monohydric compounds such as thallium sulfate, nitrate, acetate and carbonate are very toxic and easily absorbed through the skin through the skin. The lethal dose of thallium in humans is 12-8 µg / g. In addition, thallium can replace K^+ in the activation of certain enzymes, such as adenosine triphosphate. Thallium can also cause mitochondrial damage to the cell. Thallium toxicity for the biosphere is even greater than the Hg, Cd, Pb and Cu elements [۲].

A high-selectivity voltammetric method was introduced for determining Thallium using Fe_3O_4 graphene, as a generic agent. This electrochemical method is based on the accumulation of thallium ions on a carbon modified paste with crown ether, and then measured by a voltammetric differential pulse bifurcation. The factors that were effective in determining the thallium by voltammetric method of differential pulse hyphenation such as electrolyte concentration (20ml), recovery potential (-1) and duration of recovery potential (400 s) were optimized. Under optimum conditions, the electrode response ranges from -0.4 to -0.8 ng / ml. The detection limit of the procedure was 0.86 ng / ml. This method was used to determine thallium in water and hair samples.

The results determined that the superior selectivity of the method and the velocity of the voltmeter of the closed-circuit were combined and selective, sensitive and fast electrodes were designed to measure thallium ions.

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Improvement of phase change materials loading on kaolin for temperature control of a co-axial cable surface

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Keywords: PCM, loading, kaolin, stearic acid

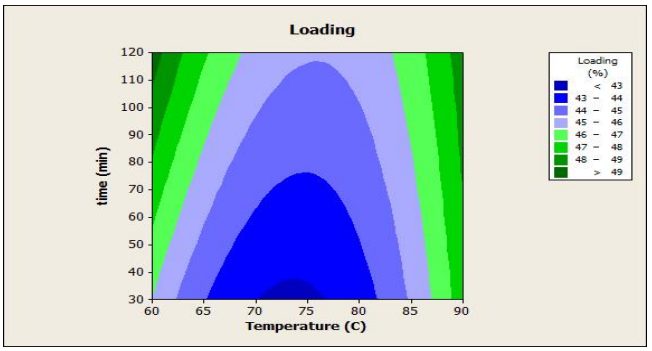

Fig.1. Loading rate of stearic acid in kaolin

Abstract*:* Renewable energy sources are best alternatives of fossil fuels. Latent heat thermal energy storage (LHTES), as a significant renewable energy source, is one of the promising methods to enhance the efforts against energy crisis since it could storage high density of energy, depending on the melting point of phase change material (PCM). Paraffin wax, free fatty acids, etc. as the organic PCM have lots of advantages including large range of availability, chemical stability, non-corrosivity, no or little super-cooling, etc. leakage is one of the main disadvantages of PCMs that limits the applications of them. To overcome the leakage issue, form-stable phase change materials (FSPCM) have attracted lots of attentions in the past few years. Kaolin, a kind of clay-based mineral, is a supporting material with distinguished peruse structure, cost effective, high specific surface area. Losses in electrical cables appears as heat in them that results in temperature increment of conductor therefore the current carrying capacity of a cable will be limited. So cable cooling is a crucial object that must be reached.In this study, a number of experimental samples using stearic acid (SA)/kaolin were prepared as a form of stable composite phase change materials (FSCPCMs) via melt impregnation method. The leakage of impregnated PCMs was tested using solution method. About 2 g of made-up composites were placed in 20 ml of n-hexane solution and were mixed about 4 minutes in 35°C. Then the treated composites were placed into the drying oven in 70°C for 2h. Fig.1. shows the results of the leakage test, as can be seen from fig.1 the maximum loading of SA in kaolin was about 50% indicating that the impregnation process was successfully done. The prepared composites could be mixed with the outer jacket (commonly PVC) to keep the cable surface temperature in comfort range.

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Design and preparation of solid phase microextraction based on molecular organic framework for use in bioanalysis

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Abstract: Due to the nontoxic and highly porosity, MOFs based on iron(III) was applied as sorbent. The $Fe_3O[C_6H_4(CO_2)_2]_3.nH_2O$ is constructed from oxygen-centered iron(III) carboxylate trimer molecular building blocks, which are linked together through terephthalic acid and was prepared with hydrothermal method[1]. Resulted Nanorods coating is as sorbent phase on the fused silica fiber as novel solid phase microextraction. The SEM images with scanning electron microscopy conforms the formation nanorods (100-200 nm diameter) with high surface area[2]. The headspace solid phase microextraction (HS-SPME) method was applied for pre-concentration and analysis some cancer biomarkers included 1,2,4-trimethyl benzene, phenol, 2-pentanon from urine samples for testing the selectivity of the prepared fiber[3]. The variables affected on the extraction efficiency were optimized by experimental design method. The variables are extraction temperature and time, pH, salt% (w/v) and desorption time [4]. The calibration curves were obtained in the concentration range from 10-350 ppb for all targets. The limits of detection and limit of quantitation values were achieved 1 µg l^{-1} and 10 µg l^{-1} for 1,2,4-trimethyl benzene same as 2-pentanon and 5 µg l^{-1} and 50 µg l^{-1} for phenol, respectively. The relative standard deviations was calculated for one fiber and fiber to fiber in the range 3-15%. Finally the results obtained suggested $Fe_3O[C_6H_4(CO_2)_2]_3.nH_2O$ SPME fiber can be used for extraction of biomarkers from urine samples in the use of analysis cancer diagnostic and environmental compounds.

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Modification of thermal properties for a composite of stearic acid/kaolin used as a phase change material by infrared camera analysis approaches

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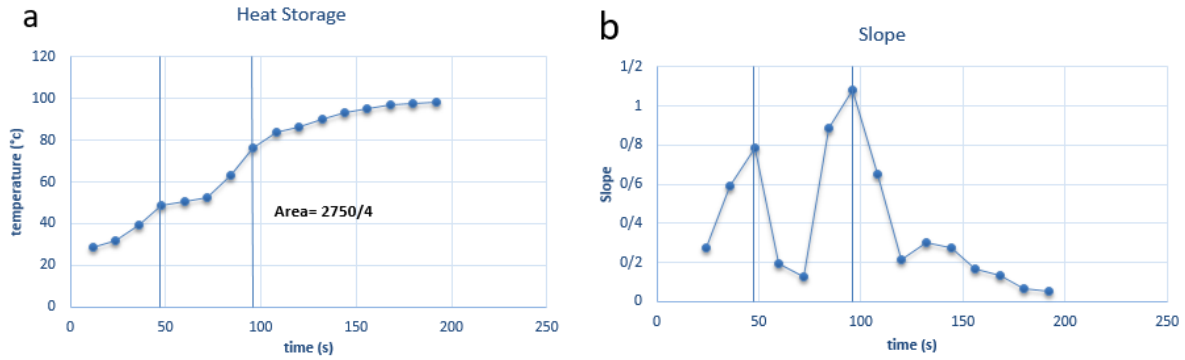

Fig.1. a) the infrared camera curve of FSPCM. b) The slope of heating trend of FSPCM.

Abstract:

In order to overcome the energy crisis and environmental issues, many types of research have been done. Thermal energy storage (TES) is a cost-effective method for maintaining thermal equilibrium and ban wasting energy. Phase change materials (PCMs) can save large amounts of thermal energy from the surrounding by changing the phase from solid to liquid depending on the phase change temperature of the employed PCM, and release the absorbed energy in a vice versa process. Organic materials such as paraffin waxes, fatty acids, etc. are widely used PCMs in the past few years that have some significant properties including available in a large range, inflammable, non-reactive, etc. Clay minerals, such as kaolinite, diatomite, perlite, etc. widely have been investigated as supporting material to limit the PCM from leakage and prepare form-stable phase change material (FSPCM). PCMs could be embedded in a supporting material via various methods such as melt and vacuum impregnation, micro and macro encapsulation and so on.

In this study stearic acid (SA) impregnated into the kaolin with a mass fraction of 50%. The heat storage behavior of the obtained composites is determined by using an infrared camera. Figure 1 demonstrates the heating trend of FSCPCM and also the slope of the trend was computed to find the area that composite absorbs energy. In Fig. 1a, the infrared camera curves indicate that FSPCM melts at around 52 °C that has a good agreement with the melting point of raw stearic acid and can save energy as phase changing happens. The peaks specified in Fig. 1b indicating the thermal energy saving area in Fig. 1a that is computed about 2750.4 by Trapezoidal integration method.

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Study of Heavy Metals Concentration (Fe, Pb And Ar) and Risk Assessment in Anchovies Fishes by Atomic Absorption Spectroscopy in the Persian Gulf and Oman Sea

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Abstract: The current research, in winter of 2018, was done in order to determine the concentration of heavy metals of Lead, Iron and Arsenic in Anchovies fishes in Persian Gulf and Oman Sea. After sampling and biometry the aquatic (60 samples) were transferred to laboratory for measuring the concentration of heavy metals in fresh and dried types. Measuring the metals in fish body was done by using of Atomic Absorption Spectroscopy (AAS). Data analyzing was done by using of SPSS software (version 24). For comparing the concentration of considered heavy metals was done by t-test method. The results of this research show that there is positive and significant correlation in under study with regions, also dried and fresh types, so that, concentration of Lead not detected in any type but in another metals concentration had different in each regions ($P<0.05$). Also, by comparing the average concentration of metals found in the body of the species with the reference dose (RfD) of the EPA organization, only the concentration of Arsenic metal in the dried types of the Oman Sea and the Persian Gulf regions was higher than the limit and the concentrations of Lead and Iron metals were lower than the specified value.

Also the result of THQ and HI for a 70 kg person shows that, the Potential Danger of Lead, and Iron in all studied samples, was less than one, that shows the daily absorption of these metals by consumers is less than which has harmful effects on their health during their lifetime. But for dried specimens of the studied regions, THQ and HI for Arsenic metal was more than one, indicating that there is a risk of food intake in this amount.

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The effects of magnetic nanoparticles in nanofiltration membranes

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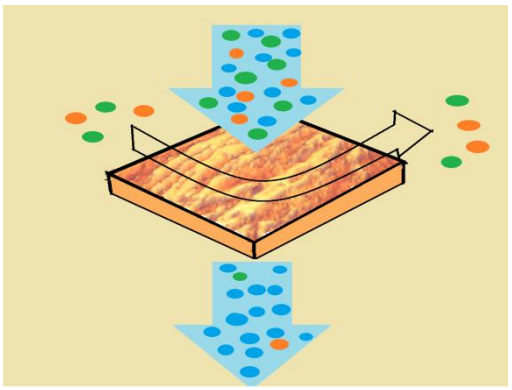

Abstract: Fouling is one of the major challenges in nanofiltration membranes that lead to poor separation performance due to the presence of pollutants on the membrane surface. For overcoming this challenge, several methods including coating, additives blending, physically and chemically surface modification, and grafting have been used. Among these methods, organic and inorganic nanomaterials such as graphene oxide, metal oxides, zeolites, silica, carbon nanotubes, etc. are attractive for the production of high-performance polymeric nanofiltration membranes. In recent years, the use of magnetic nanoparticles has been considered because of the high ability for adsorption of heavy metals. Magnetic nanoparticles as hydrophilic materials respond to an external field. Therefore, by adsorption or repulsion mechanisms have a significant effect on the removal of heavy metals. Moreover, magnetic nanoparticles, due to their high hydrophilicity, enhance the membrane hydrophilicity properties and reduce membrane fouling, which has been confirmed by many studies. The used magnetic materials in membrane processes include cobalt nanoparticles, iron nanoparticles, magnetic oxides, and other fabricated magnetic nanoparticles. Iron oxide as a metal oxide nanoparticle has been widely used as an additive to optimize the nanofiltration membranes and has a special effect on the membrane separation performance among metal oxide nanoparticles.

In this study, it was tried to investigate the effect of iron oxide nanoparticles on physicochemical properties and separation performance, and antifouling properties of nanofiltration membranes.

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Improvement of hydrophilicity of nano-filtration membrane based on polyethersulfone using chitosan / carbon nanofiber coating

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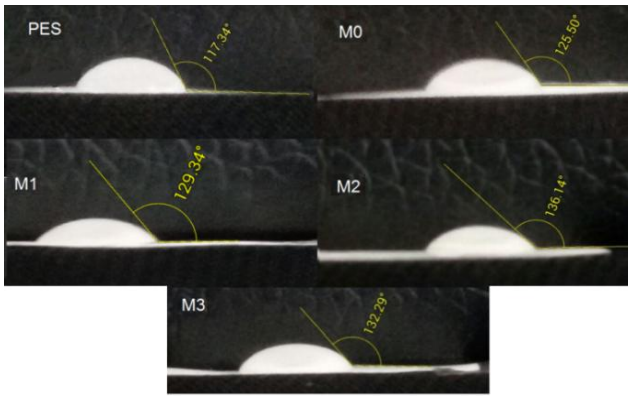
Abstract: In this research, the polymeric NF membrane based on polyethersulfone (PES) was prepared using polyvinylpyrrolidone as cavitation and dimethylacetamide as a solvent by phase inversion method. The combination of chitosan with various ratios of carbon nanofibers was placed on the membrane surface using the immersion method. The effect of surface modification on the hydrophilic behavior of prepared membranes was studied. More hydrophilicity of the membrane surface improves the flux and antifouling performance. The results show that with the surface modification, the contact angle for all membranes decreased relative to the base membrane. The base membrane has the largest contact angle (62.66), indicating the nature of the PES hydrophobic. The water contact angle for M2 membrane remarkably decreases. Chitosan is a chitin product and is a hydrophilic polymer. Chitosan has hydroxyl (–OH) and amine (–NH2) groups. Chitosan is widely used as a material for membrane applications due to its hydrophilic nature [1-2]. Deposition of the chitosan on the membrane surface increases the number of hydrophilic functional groups (–OH and – NH2). So, the hydrophilic nanoparticles enhance water absorption in the top surface of the membrane. Also, carbon nanofibers, by filling the cavities on the surface of the membrane, create a smooth surface, which also increases the hydrophilic of the membrane surface. In sample M3, the water contact angle increased again. However, although water absorption increases by increasing the nanoparticles concentration, an excessive amount of nanoparticles can fill the free volumes of the top surface, leading to an increase of the water contact angle (47.71).



Sample	PES	M0	M1	M2	M3
Contact Angle (^{o})	62.66	54.5	50.66	43.86	47.71

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Determination and Evaluation of Heavy Metals Pollution in Surface Sediments in the City of Minab

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Abstract:

Background and Objectives: Sediments are an inseparable part of marine ecosystems, which like the historical archives, record the trend of heavy metals accumulations [1]. This paper aims to determine the concentrations of heavy metals (lead and cadmium) in the regions (Kuhestak, Kargan and Kolahi) in Minab city - Hormozgan province and compare them in different stations and seasons from summer and winter of 1397.

Materials and Methods: The positions of the samples was determined by GPS and sampling of surface sediments (tidal area) was carried out in 30 stations in the studied areas during the two time periods (summer and winter). To determine the concentrations of heavy metals, atomic absorption method was used and then, SPSS version 21 was used to compare the amounts of metals contaminations.

Results: The mean concentrations of lead and cadmium in all sampling stations showed a significant difference (p-value <0.05). So that kolahi area had higher levels of contaminations (lead: 27.93 and cadmium: 1.89 micrograms per gram) than Kuhestak area (lead: 25.55 and cadmium: 1.15 micrograms per gram) and kargan (lead: 18.75 and Cadmium: 0.63 µg / g). Also, in all studied regions, the concentrations of lead and cadmium in summer was higher than in winter.

Conclusion: Generally, according to the results, it can be admitted that although the sediments of the studied areas are not contaminated significantly with heavy metals, the arrival of urban and industrial sewage, the establishment of fish farming centers and export and import companies including heavy metals near the study areas , Can lead to pollution and non-compensatory consequences in the long run.

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Investigating the recycling of intermediate metals from thespent catalysts used in the hydroprocessing process

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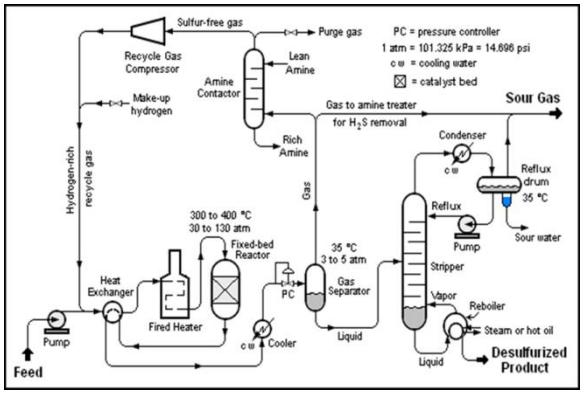
Abstract:. Petroleum refineries must pay attention to spent hydroprocessing catalysts particularly since they arehazardous toxic wastes. This review focuses on the progress in metal reclamation and disposal methodsused for dealing with the environmental problem ofspent hydroprocessing catalysts. Studies have beenconducted with the aim either to increase the efficiency of metals recovery using established methodsor to develop novelmethods. Leaching studies used inorganic agents such as solutions of strongacidsandbases, alumina containing compounds and water soluble organic acids.The extracted metals were impregnated on recovered alumina to synthesize fresh catalyst. Structural analysis of spentcatalyst, recovered support material, and synthesized catalyst from extracted metals suggested successful recovery and recycling ofmetals. This work offers an incentive to the industrial practice for waste minimization, recycling of the extracted metals, and thenoncorrosive, ecofriendly approach for metal extraction from spent catalyst.Hydro desulphurisation is a non-homogeneous catalytic reaction. Sulfide-based metals have been proven to be base. Molybdenum and tungsten sulfide Both HDS catalysts are the best catalysts for reactive reactivity for hydro-desulphurisation. Molybdenum is often used as a catalyst in sulfur removal processes.



Hydro-desulphurisation process at the refinery.

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The Effect of Sewage Chemical Compositions on the Ecosystem Changes in the Meighan Wetland in Arak

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Abstract: The forbidden hunting area of Meighan wetland in central Iran is an important habitat for birds and habitats of desert and salt-resistant plants. This study was conducted by comparing and interpreting satellite imagery and sampling of wastewater and plants in the area. Results show, In the past due to the specific chemical composition and high salinity of the soil and water in the reservoir of the lake, no plant was able to be established. And the dominant vegetation type is the south-western margin of the salt-loving saline (Halocnemum-Salsola). And for aquatic birds it has been a temporary habitat. However, in recent years, with the entry of wastewater from the chemical compounds of Arak city sewage from the southwest to the Meighan wetland, the chemical quality of water and soil in this part of the wetland has changed. Therefore, the type of land cover and plant species of (Phragmites-Cyperus) from aquatic plants have replaced the salty and salty vegetarian type (Halocnemum-Salsola). As a result, the straw variety of (Phragmites-Cyperus) has changed 527 hectares of saline lake type and 225 hectares of rangelands with the (Halocnemum-Salsola) types. And has become a permanent habitat for aquatic plants and birds.

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Sol-gel thin film as a matrix for cyanide sensing

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Abstract: A highly selective optical sensor for CN^- ions was developed based on entrapment of a sensitive and selective reagent, ninhydrin, in a silica sol–gel thin film coated on a glass substrate. The influence of sol-gel parameters on sensing behavior of the fabricated sensor was also investigated. It is highly desirable to obtain sensors with no reagent leaching which have the capabilities to be used for a long period of time without changes in sensitivity and response time. The thin films fabricated based on tetraethoxysilane (TEOS) as precursor, water:alkoxide ratio of 4:1 and ninhydrin concentration of 0.112 mol L^{-1}. It also showed reproducible results with relative standard deviation of 3.33 and 2.10% for 10and 100 ngmL^{-1} of CN^-, respectively, along with a fast response time of ~5 second. Interference studies showed a good selectivity for CN^- with trapping ninhydrin into sol–gel matrix and appropriately adjusting the structure of doped sol-gel. The sensor was compared with other sensors and was applied to determine cyanide in different water samples with good results.

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Adsorption of Congo Red on the Surface of Filter Paper in Aqueous 1-Propanol and 2-Propanol Solutions

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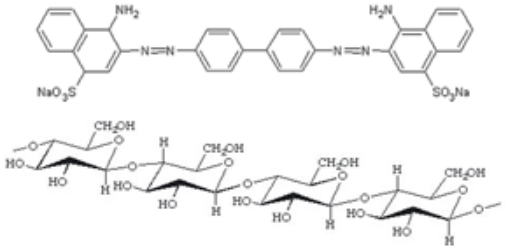

Abstract: Synthetic dyes are used for dyeing in many industries and the treatment of their wastewater is highly challenging. A large number of these dyes exert detrimental effects on human health and are difficult to degrade. There are different techniques for treatment of effluents produced by industries. Among them, adsorption is an efficient and costly-economic method. On the other hand, in many cases, substances are painted through adsorption of dyes on their surface. Congo red (CR), disodium (4-amino-3-[4-[4-(1-amino-4-sulfonato-naphthalen-2-yl) diazenylphenyl] phenyl]diazinyl -naphthalene-1 -sulfonate), is an anionic dye and has many applications. In this work, adsorption of CR on the surface of filter paper was investigated in the presence of aqueous in different percentages of 1-propanol and 2-propanol solutions (structural isomerism) at 308, 318 and 328 K. Here, results were analyzed by the four-region ARIAN model. The ARIAN model is an abbreviation for "adsorption isotherm regional analysis model" and means Iranian. Analysis of isotherms showed that the adsorption process was a two -region one. CR molecules, in the region I were adsorbed ideally and obeyed the Henry law and, in the region II submitted the Temkin isotherm. During the process, sulfonate groups of CR molecules interacted with -OH groups of cellulose surface. Also, equilibrium binding constants (K) obtained from the Henry and Temkin isotherms were used to calculate the thermodynamic parameters of the process. The equilibrium binding constants (K) and maximum experimental adsorption capacities ($q_{e,\max}$) of filter paper for CR molecules decreased both with an increase in the concentration of the used alcohols in a certain temperature and increase in temperature in a certain alcohol concentration and adsorption in the presence of 1-propanol and 2-propanol was exothermic. Finally, in the same alcohol percentages, $q_{e,\max}$ values of 1-propanol solutions were a little more than those observed for 2-propanol solutions and thus structural isomerism did not have an effect on the $q_{e,\max}$ values of the process.

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Fluorescent Sensing of Pb^{2+} in Environmental samples by N-doped Carbon Dots: Application of Response Surface Methodology and Doehlert Design

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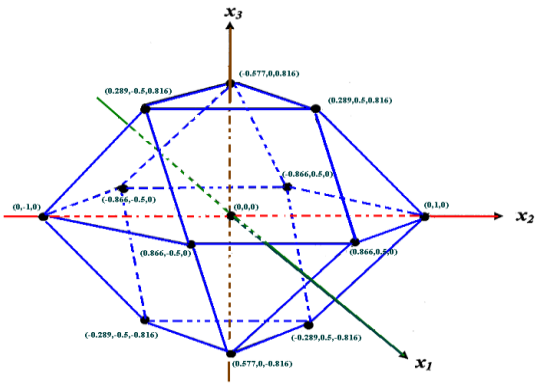
Graphical Abstract



Abstract: Lead is one of the important heavy metal that use in cosmetics, batteries, ceramics, pipes and smelting. Today, contamination with lead is an important challenge. Both children and adults are at risk of lead poisoning. After breathing in lead-containing dust, lead passes through the lungs into the blood [1]. In this work, a cheap, simple, selective and sensitive turn off fluorescent sensor was presented for Pb^{2+} determination. N-doped carbon dots (N-CDs) were synthesized by microwave assisted method. Characterization of N-CDs was performed by high resolution transmission electron microscopy and Fourier transform infrared spectroscopy. The important parameter (pH, concentration of carbon dots: C_{CDs} and time) were optimized with Doehlert experimental design and response surface methodology. Optimum condition for maximum turn off was pH 3, C_{CDs} 8 mg mL^{-1} and 5 min. Limit of detection (LOD) and linear range was 20 nM and 50-25000 nM. Tap, river and mineral water samples were spiked with different concentration of Pb^{2+} and analyzed by proposed sensor. Suitable recoveries show that the proposed sensor had great capability for analysis of Pb^{2+} ions in real samples.

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Capacity of Phytoremediation, Bioremediation and Their Combined Application to Remove Petroleum Pollution from Soil

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Abstract: Petroleum hydrocarbons have become a global problem for the environment. These compounds are highly resistant to the environment and are harmful to human health. The purpose of this experiment was to Comparison of phytoremediation, bioremediation and bioaugmented phytoremediation efficiency to remove crude oil from soil. For this purpose, a factorial experiment was conducted in a completely randomized design with three replications. The treatments consisted of 3 levels of soil pollution to oil (0, 4 and 8% oil), 4 treatments of plant (no plant, bermudagrass, sorghum and barely) and 3 treatments of bacteria (no bacteria, *Psudomonas putida* and *Azosprillum brasilense*). Soils were polluted with different amounts of crude oil and after 6 weeks, soils were inoculated with *Pseudomonas putida* and *Azospirillium brasilense* bacteria, then three gramineae species were planted. Ninty days after planting, plants were harvested.

The results showed that removal percentage of crude oil by phytoremediation alone, bioremediation alone and combined application of plant and bacteria significantly increased compared to control. Plants were more effective than bacteria in removal oil pollution and plant increased bacteria function significantly so that, there were significant difference among treatments of plant, bacteria and plant+ bacteria. The highest removal percentage was observed in combined application of plant and bacteria [1]. At all treatments of soil inoculation with bacteria, with increasing levels of oil pollution, dry weight of plants decreased but, at each level of crude oil pollution, inoculation of soil with bacteria, the dry weight of shoot increased. Incubated soil with bacteria improved dry weight of shoot through removal of oil pollution in soil [2]. With increasing level of crude oil pollution, activities of arylsulfatase and dehydrogenase in soil increased compared to control significantly. However at the highest level of crude oil (8%), activities of these enzymes in soil decreased compare to 4% crude oil. Activity of these enzymes in soil were significantly increased by incubation of soil with bacteria alone, plant cultivation alone and combined application of plant and bacteria compared to control [3]. The highest activity of enzymes in the treatment of 4% crude oil pollution and inoculation with *Pseudomonas putida* and planting sorghum were measured. Establishment of plant with microorganisms can be considered as a key component of the strategy to remove hydrocarbons. Consequently, these bacterial and plant species can be used for the biodegradation of soils contaminated with crude oil.

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Comparison of Homogeneous and Heterogeneous Fenton and Sono-Fenton Decolorization of Titan Yellow: Optimization and Synergic Effects Study

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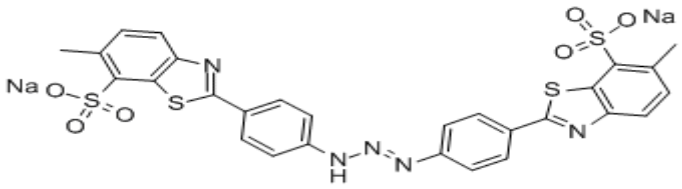

Chemical structure of titan yellow

Abstract: Azo dyes because of their easy and cost effective synthesis have the most applications in industries. Due to their good solubility, they are common water pollutants. Wastewaters containing azo dyes absorb strongly sunlight, reduce photosynthesis of aquatic plants, reduce transparency and responsible for different human diseases. Therefore, removal of dyes from wastewaters has great environmental significance and commercial importance [1]. In this work, four Fenton processes such as homogeneous Fenton, homogeneous Sono-Fenton, heterogeneous Fenton and heterogeneous Sono-Fenton were used for decolorization of titan yellow. Experimental conditions such as H_2O_2 concentration, pH, time, zero valent iron dose and Fe^{2+} concentration were optimized by Doehlert experimental design and response surface models. In absent of ultrasonic waves, application of zero valent iron (heterogeneous Fenton) had intense effect on decolorization percent (18% → 95%) with respect to classical Fenton. Although, in this process iron consumption was higher but lower oxidant was used and decolorization time was reduced from 47 to 10 minutes. Both homogeneous and heterogeneous Sono-Fenton processes reached to decolorization percent of 100%. Optimum pH was 2.5 for two processes. In homogeneous Sono-Fenton process, iron consumption is lower but decolorization time is 30 minutes but in the heterogeneous Sono-Fenton process, consumption of H_2O_2 is lower and decolorization time is 10 minutes. Finally, heterogeneous Sono-Fenton process reached to 100% decolorization at better economic condition and shorter time.

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Quantity-Quality Monitoring of Water and Wastewater Samples Assessment from Different Units of Pars Paper Plant to Reduce Water Consumption

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Abstract*:* The paper industry is one of the most important and strategic products in the country's infrastructure industry, which pays millions of dollars annually to buy this valuable product. The pulp and paper industries, in comparison with other cellulosic industries, due to the diversity of papers and high utilization of water in production, have led the industry, along with the automotive, oil, petrochemical and steel industries, to become the largest water consumption industry which is naturally a wastewater producer's existing industries. The amount of water need for cellulose, wood and paper industries is about % 5.25 of the total industries in the world, which is ranked seventh in terms of volume of water harvesting, but in terms of water content (water consumption per unit of production product) are in the second category. The intensity of the water flow consumed by the pulp and paper industry is such attracts the attention of the scientific community and the implementation of the world's experts to make the principle of purification and recycling of water. The purpose of this study was to identify and investigate the water flow rate of the paper-making plant to mass balance of different units. It is caused to provide solutions tailored to the volume of operations to control, recycle and re-circulate wastewater and sewage which is caused by the activities of this plant. All of these helped to optimization and reduction water is consumed. The results indicated the possibility of purification, recovery and re-circulation of waters from some paper factory units to consume in other units by making water storage tanks and construction of a well-equipped water treatment plant, as well as leakage control in the water circulation network, separating water circulation circuits with establishing the Water Working Group, close cooperation and collaboration of all producing personnel to better management of water and removal of pollutants with high organic matter in the wastewater of the Pars Paper Company.

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Design a new system of separation based on Magnetic Solid Phase Microextraction for Simultaneous separation and Preconcentration of Cadmium(II) and Chromium (III)

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Abstract: In this paper, we report a new simple, Simultaneously, low cost, selective and sensitive methods based on nanoMagnetic Fe_3O_4 for Simultaneous separation and preconcentration Cr (III) and Cd (II) befor determination with Graphite Furnace Atomic Absorption Spectrometry. In this method two nono magnetic particles each covered by ligand Cadion for formation of a specific complex with cadmium ion and ligand Ferron for Formation of a specific complex with chromium ion acting as a selective sorbent is held by magnet in two part of a loop. Then, the sample solution is passed through the loop causing selective extraction and preconcentration of analytes on each sorbent. Finally, the two section of the loop separated and each analyte were eluted by proper sorbent and quantified. The major parameters affecting the extraction efficiency were investigated, including the sample pH, sample flow rate, sorbent amount, sample volume, eluent concentration, and eluent volume. The optimum conditions were pH 6.0, a flow rate of 2 mL min^{-1}, 40 mg of magnetic nanoparticles, a sample volume of 40 mL, an eluent concentration of 3 mol L^{-1} HCL, and an eluent volume of 500 µL. the preconcentration factor was approximately 80. The method was successfully applied to the determination of the analytes in natural water samples.

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Melilotus officinalis Extract as Green Corrosion Inhibitor for Carbon Steel in Hydrochloric Acid Solution

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Abstract: Natural inhibitors are considered because of the absence of harmful environmental effects. Melilotus officinalis is a member of the Fabaceae family. It is a biennial herb, native in Europe and Asia. Melilotus officinalis contains coumarinand related compounds such as melilotic acid and o-coumaric acid, flavones, volatile oils, resins and tannins. When dry they have a bitter taste and hay like smell due to coumarin. Since these compounds have anticorrosive properties, melilotus officinalis Extract (MOE), was investigated as a green corrosion inhibitor for carbon steel in 0.5 M HCl solution using weight loss, potentiodynamic polarization, electrochemical impedance spectroscopy (EIS). Observed results showed a decrease in cathodic and anodic reactions rate in Tafel plots. Also, EIS data showed charge transfer resistance was increase. Polarization curves reveal that the investigated extract is a mixed type inhibitor. The inhibition efficiency was found to increase with increase in the investigated extract concentration. Our electrochemical results showed that concentration of 800 ppm of MOE can achieved to high inhibition efficiency in 0.5 M HCl.

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Effect of Bentonite on phytoremediation of selected PCBs congeners from a transformer oil contaminated soil

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Abstract : Bioremediation technique for the removal of soil polychlorinated biphenyls (PCBs) contamination has been proven by many researchers, however no comprehensive studies on effect of bentonite to improve phytoremediation of PCBs was carried out. In this study, the removal of selected PCB_s congeners was assessed in a transformer oil contaminated soil. Bentonite powder was applied to the soil at the rates: 0, 2 and 4 %. Maize (*Zea mays* L.) were planted in pots. Controls for each treatment were also included in the experiment. Treatments were arranged in a factorial manner in a completely randomized design with three replicates. Plants were harvested after 35 and 70 days. Under planting of maize, concentration of residual PCBs has been decreased significantly with addition of bentonite. Bentonte (4%) increase the average PCBs removal 20.95% in pot experiment after 70 days. Based on the results; initial soil PCBs concentration, and bentonite level could be effective on removal of PCBs from the transformer oil contaminated soil. Effect of bentonite on reduction of residual soil PCBs can be attributed to positive effect on plant growth. Kátai et al. (2008) demonstrated positive effect of bentonite on bacterial population. It has been found that the addition of adequate amount of clay to sandy soil can greatly improve its agricultural value. Bentonites possess high cation-exchange capacities and surface area. These special properties make them perfect materials to carry out combinations of any chemical, physical and biological remediation (Huang et al., 2013). The importance of plants in ensuring that contaminants are removed from soil is illustrated by Leigh et al. (2002). The results suggest that combined application of rhizostimulation and bentonite addition is an effective technique to remove PCBs and remediate transformer oil-contaminated soils.

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Synthesis and Characterization of ZnO/Zein/Calcium Alginate Nanocomposite Beads as the Heterogeneous Photocatalyst for Degradation of an Azo Dye in Polluted Water

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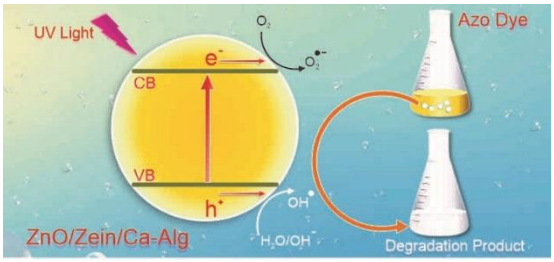

Abstract: Zein is a hydrophobic biopolymer widely used for its biocompatibility and biodegradability applications. Alginate is a polysaccharide broadly applied for encapsulating and surrounding materials lead to excellent mechanical properties. Zinc oxide (ZnO) nanoparticles, were applied for the photocatalytic degradation of dyes in water because of unique features. Azo dyes are known as a very significant group of water pollutants that appear in the effluents of different industries. In this study, ZnO/Zein/Calcium alginate nanocomposite beads were synthesized and, investigated for the decomposition of tartrazine dye in water pollutant. The factors affecting the degree of photocatalytic degradation, including different concentrations of dye, different quantities of catalyst and various pHs were investigated based on radiation of UV-C light. Finally, maximum photodegradation (80%) of tartrazine obtained using the prepared nanocomposites and, the photocatalysts can be used several times in the degradation process via favorable separation. The samples were characterized by field emission scanning electron microscopy (FE-SEM), energy-dispersive spectroscopy (EDS), X-ray diffraction (XRD), and Fourier transform infrared spectroscopy. ZnO nanoparticles were observed with the average particle size in the range of 25-80 nm that dispersed on the surface of zein/Ca-Alg uniformly. Irregular and mesoporous structure of zein microspheres can influence ZnO immobilization. Our results indicate that photocatalytic activity of ZnO/zein/Ca-Alg nanocomposites dependant on the mass ratio of ZnO amount loading and weight percent of substrates for the most optimal photocatalytic degradation for removal of the organic azo dye. These findings are relevant to the focus of the environmental chemistry including advanced oxidation processes, control of environmental pollution problems, removal dyes in wastewater.

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Investigation of the Pressure Effects in the Preparation of Macro Encapsulated Phase Change Materials for High Temperature Energy Storage Systems

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Abstract: Encapsulated phase change materials (PCM) are interesting high energy density solutions to store thermal energy, though there has been little investigation for PCMs at high temperature. The aim of this work is to create a PCM with high durability at high temperature with capsuling the PCM. It is a substance which melts and solidifies at an early constant temperature, and is capable of storing and releasing large amounts of energy when undergoes phase change.

KNO3 served as a PCM for high thermal energy storage, while diatomite acted as the carrier matrix to provide the structural strength and prevent of its leakage. It was found that KNO3 could be retained 65 wt. % into pores and on surfaces of diatomite without the leakage of melted KNO3 from the shape stabilized –composite (SS-C) PCM. The green circular sheet with the diameter of 26 mm and the height of 4.5 mm was obtained at 45 MPa via a hydraulic machine. Diatomite was used as supporting material to prepare the phase change diatomite with different operating temperatures.

As the articles shown there are only one pressure worked on. By changing of the pressure, we could find the best pressure point for building a KNO3/diatomite PCM.

In this study KNO3/diatomite PCM with 65 wt. % of KNO3 was chosen by the article and the effect of different type of pressures such as 100, 200 and 300 bar on the 15 mm pellet with the width 5mm was seen with an Infrared camera. Analysis of the results show that the pressure plays key rule and has significant effect on PCM performance.

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Investigation of the mesh Analysis Approaches in the Preparation of Macro Encapsulated Phase Change Materials for High Temperature Energy Storage Systems

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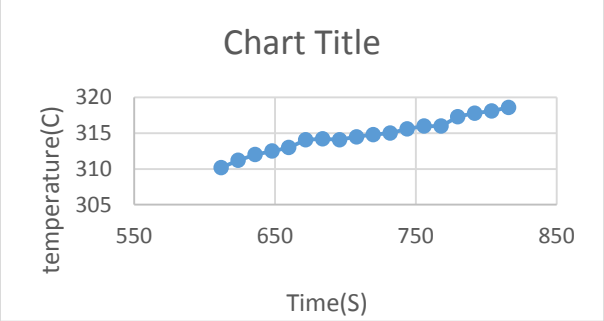

Fig.1. the infrared camera curve of CPCM by using 50-mesh

Abstract: Capsulated phase change materials (CPCM) are interesting high energy density solutions to store thermal energy, though there has been little investigation for CPCMs at high temperature. The aim is to create a CPCM with high durability in high temperature with capsuling the PCM. The capsulation can be made by physical or chemical methods. CPCM actually carries out thermal energy storage during melting. The encapsulation of the material prevents its immersion in the environment.

KNO3 served as the phase change material (PCM) for thermal energy storage, while diatomite acted as the carrier matrix to provide the structural strength and prevent the leakage of PCM. It was found that KNO3 could be retained 65 wt. % into pores and on surfaces of diatomite without the leakage of melted KNO3 from the SS-CPCM. The green circular sheet with the diameter of 26 mm and the height of 4.5 mm was obtained at 45 MPa via a hydraulic machine.

Based on what has been reported by various researchers, by changing the meshes we could find the best usage of mesh point for building a KNO3/diatomite PCM with 65 wt. % of KNO3.

In this study KNO3/diatomite PCM with 65 wt.% of KNO3 was chosen by the article and the effect of different type of meshes such as 50, 80, 100 mesh, and not using any meshes for preparation of diatomite on the 15 mm pellet with the width 5mm was seen with an Infrared camera.

Figure 1 clearly shows the performance of a CPCM of the synthesized material when the temperature rises. In this graph, the vertical axis represents variations in temperature and the horizontal axis represents time differences. It is observed that when the temperature increases in the near-melting area, the behavior of the material changes. This behavior coincides with the detectable changes in the gradient of the graph. Entering this area with a different slope means starting the energy storage of the material by matter. In this paper, the effect of particle size using mesh coating on the ability to store energy at high temperatures has been investigated. It has also been found that a mesh size of 50 has the most ability to store energy in CPCM.

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Preconcentration and spectrophotometric determination of aluminum and beryllium ions using ion imprinted polymer coated magnetite nanoparticles

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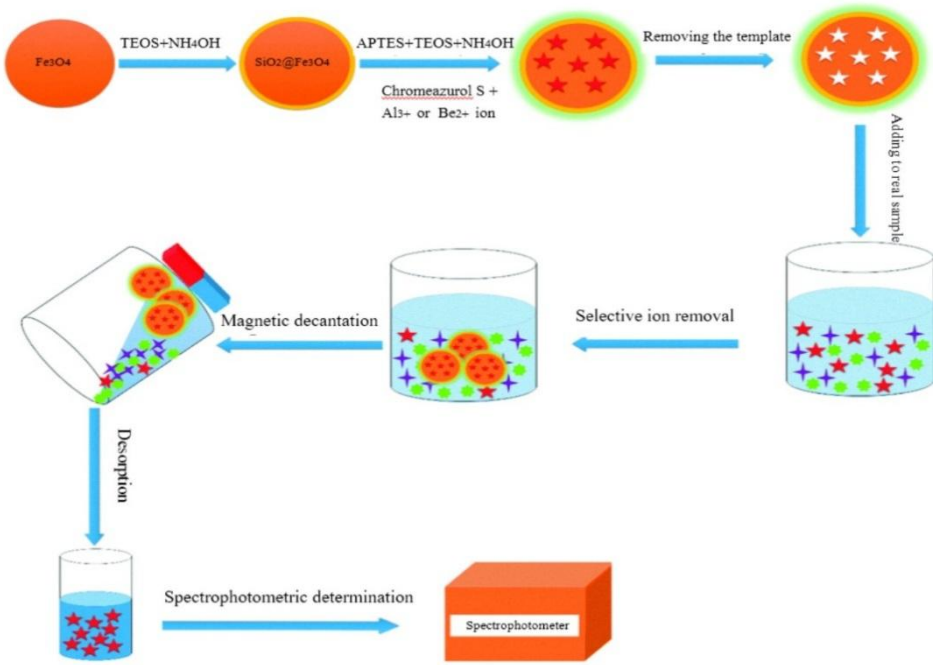

Abstract: Al^{3+} and Be^{2+} ions were extracted from water samples using solid phase extraction (SPE) based on ion imprinted polymer coated SiO_2@ Fe_3O_4 (IIP@SiO_2@ Fe_3O_4) nanoparticles and detected with UV-Vis spectrophotometery. The synthesized nanosorbents have been characterized using FT-IR, XRD and TEM measurements. The effects of pH, amount of adsorbent, contact time, desorption solvent, desorption time and initial sample volume were investigated and optimized as effective parameters in SPE method. The calibration curves were linear in the range of 1.0–50.0 ng mL^{-1} for both ions. Detection limit for Al^{3+} and Be^{2+} was obtained as 0.54 and 0.39 ng mL^{-1}, respectively. The repeatability (n =5) expressed as the relative standard deviation (RSD%) for Al^{3+} and Be^{2+} was found to be 1.68% and 1.93%, respectively. The relative recoveries were 91-98% and 93-101% for Al^{3+} and Be^{2+}, respectively. At the end, the proposed method was successfully applied to the determination of Al^{3+} and Be^{2+} in various water samples. The proposed method is precise, selective and sensitive analytical method for the determination of Al^{3+} and Be^{2+} in real samples.

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Evaluation of removal ability of Daylily(Hemero Callis) as solid adsorbent for cadmium ions

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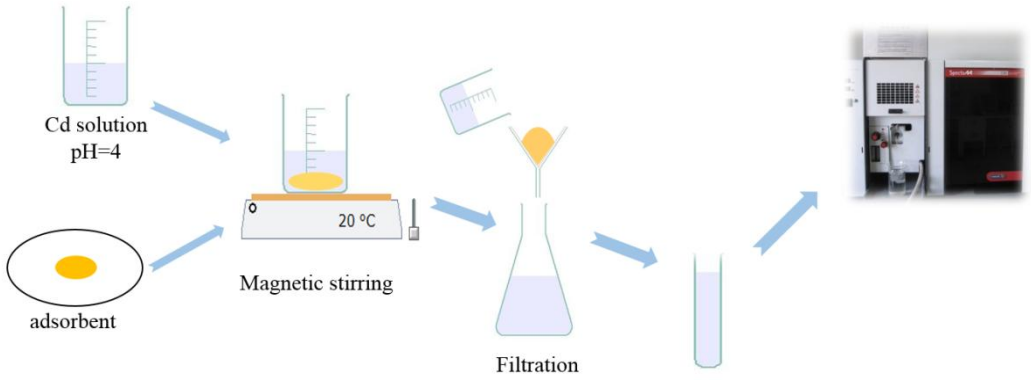

Abstract: Heavy metal pollution is one of the major environmental problems today that threatens human health and ecological systems. One of the most dangerous heavy metals is Cd with high level of toxicity and stability [1]. Heavy metals present in wastewaters are normally removed by different treatments, including chemical precipitation, reverse osmosis, electro dialysis, ion exchange and biosorption [2]. The biosorption process involves a solid phase (biological material) and a liquid phase containing dissolved species to be adsorbed due to higher affinity of biosorbents for the adsorbate species [3]. Daylily is a flowering plant in the genus Hemero Callis. The presented method is based on the sorption of dissolved cadmium ions from aqueous solution by Daylily investigated as function of initial pH, agitation rate, initial concentration of dissolved Cd(II), amount of adsorbent and contact time. The optimum conditions for the preconcentration were obtained as 10 mg of adsorbent, pH of 4, agitation rate of 300 rpm, concentration of Cd(II) solution is 1 mg L^{-1}, contact time 30 min, The extracted cadmium was determined by flame atomic absorption spectrometry. Under the optimum conditions The relative standard deviation (RSD) was obtained as 0.69.

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A novel one step synthesis of tragacanth coated $SiO_2@Fe_3O_4$ magnetic nanoparticles and their use for drug delivery applications

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Abstract: Gum tragacanth is a viscous, odorless, tasteless, water-soluble mixture of polysaccharides obtained from sap that is drained from the root of the plant and dried[1]. In this work a novel method for one step synthesis of magnetic $SiO_2@Fe_3O_4$ nanoparticles coated with tragacanth has been developed. The core–shell Fe3O4@SiO2 nanocomposites were prepared using a modified method from Stöber et al. [2]. The tragacanth coating was obtained by performing the co-precipitation of Fe^{2+} and Fe^{3+} with ammonium hydroxide and silica in a solution of tragacanth. The obtained tragacanth coated $SiO_2@Fe_3O_4$ particles were characterized by scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX) and Fourier transform infrared spectroscopy (FT-IR). The nanomagnetic particles were functionalized by ammonium hydroxide. The functionalized nanoparticles were loaded with a drug (metformin) and the drug release was investigated spectrophotometrically at physiological pH (7). The functionalized tragacanth coated displayed good adsorption and in-vitro drug release in phosphate buffer saline (pH=5). The tragacanth loaded magnetic nanoparticles were succesfuly synthesized and the results indicate that they can be used in separation and drug delivery applications.

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Adsorptive Removal of Phthalocyanine Using Nano-$CoFe_2O_4$ as a Sorbent from Aqueous Solution

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Abstract: Phthalocyanine dyes (PCs) are colors that are resistant to bacterial decomposition. Phthalocyanine reactive dyes are metal complexes used to produce shades of blue and blue-green. Due to the presence of metals such as copper, Nickle, and cobalt, they are potentially mutagenic and of particular concern for toxicity. Phthalocyanine dyes are highly water-soluble, resist biological aerobic degradation and its inefficient removal by biomass in wastewater treatment systems, leads to the formation of colored effluents. These high-risk colored wastewaters need to be purified before being released in nature. In the present study, magnetic cobalt ferrite nanoparticles are synthesized in an alkaline media through a co-precipitation method of cobalt chloride and ferric chloride. The acquired Cobalt Ferrite nanocomposite was characterized by FT-IR, FE-SEM, EDX, and XRD analyses. The ability of cobalt ferrite nanoparticles (CFNs) for the adsorption of PC has been investigated. The effects of pH, adsorbent dosage, contact time and initial dye concentration on the PC removal percentage were investigated. Absorption isotherms can be used to calculate the absorption capacity at equilibrium state for each adsorbent; therefore, the Langmuir, and Freundlich models were applied to describe the adsorption of PC on to $CoFe_2O_4$. The adsorption isotherm experiments were conducted at the optimum adsorbent mass, optimum pH. Langmuir isotherm successfully describe the equilibrium behavior of Cobalt Phthalocyanine by nano-$CoFe_2O_4$ adsorbent. To investigate the adsorption of Cobalt Phthalocyanine on the $CoFe_2O_4$ surface various kinetic models have been proposed to examine the controlling mechanism of adsorption process. In this study, the adsorption kinetics of dye onto $CoFe_2O_4$ was examined by two models of pseudo-first-order, and pseudo-second-order, at the optimum condition. The data did not fit well to the first-order equation in the entire region of Cobalt Phthalocyanine concentration used in this work, but it did fit very well with the pseudo-second-order model and the computed q_e values also consistent well with the experimental data. These results indicate that the overall rate of the Cobalt Phthalocyanine adsorption process appears to be controlled by the chemical adsorption or chemisorption process.

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Adsorption Studies Of Toluidin Blue Dye Removal Using SiO2 Nanoparticles From Aqueous Waters:Application Of DOE For Multivariate Optimization

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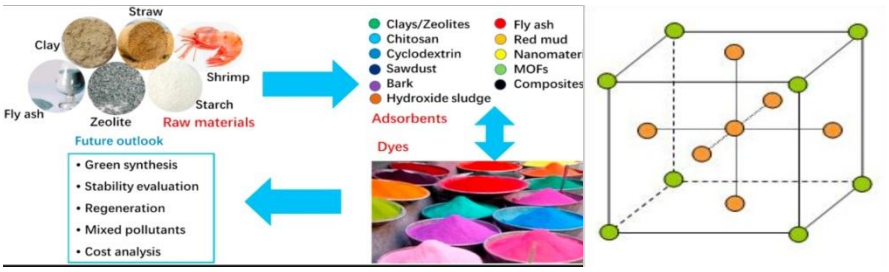

Faced Central composite Design(FCCD)

Abstract : Dyeing wastewaters are toxic and carcinogenic to both aquatic life and human beings. Adsorption technology, as a facile and effective method, has been extensively used for removing dyes from aqueous solutions for decades. Toluidine Blue also known as Tolonium Chloride is an acidophilic metachromatic dye which selectively stains acidic tissue components (sulfates, carboxylates, and phosphate radicals).It is a member of the thiazine group and is partially soluble in both water and alcohol. Toluidine blue has been known for various medical applications. In this study, adsorption of Toluidine Blue, on SiO2 nanoparticles was investigated using a batch adsorption technique. In order to reach a maximum removal efficiency (R%), optimum conditions were explored by means of experimental design approach. The experimental factors were considered such as: pH, contact time, sorbent dosage and dye concentration in the solution. Response surface methodology (RSM) including faced central composite design (FCCD) was employed to optimize the removal conditions and to propose an appropriate regression models along with related surface plots. Second-order kinetic model described well the dynamic behavior of the current adsorption process. The desorption efficiencies with HCl, HNO3, CH3COOH and NaOH were low. Also it was found that presence of Na+, K+,Ca2+ and Mg2+ ion have no significant interference on adsorption efficiency. FT-IR analysis identified that the functional groups of sorbent were involved in the adsorption process.

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Multivariate Optimization of Adsorption Parameters For Removal of Zn(II) From Waters By MgO Nanoparticles

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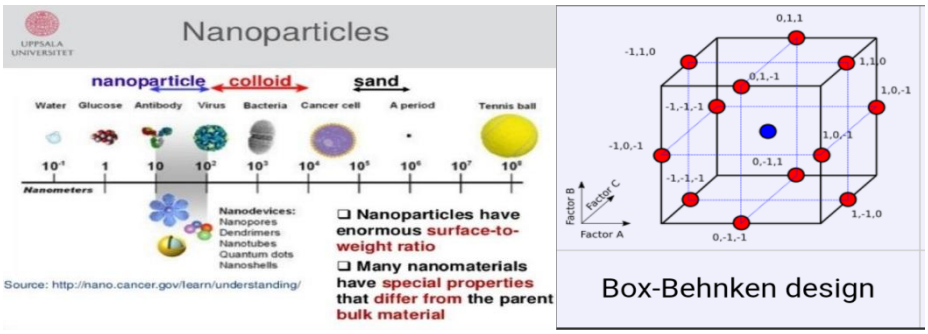

Abstract : In 1978, the United States environmental protection agency (USEPA) prepared a list of 129 organic and inorganic pollutants found in wastewater that constitute serious health hazards. This list, known as the Priority Pollutants List, includes the following thirteen metals:

antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium,

silver, thallium, and zinc [1]. Unlike organic compounds, metals are non-biodegradable and,

therefore, must be removed from wastewater .Zinc is present in the air, soil, water and almost all food. Zinc is naturally released into the environment, although industrial activities are mostly responsible for zinc . In this study , MgO nanoparticles were used for removal of Zn(II) in a batch system. The main effective variables on removal efficiency (R%) and capacity uptake (q) such as: contact time (t), sorbent dosage (m) and initial concentration of Zn(II) at two low and high levels was investigated. Response surface methodology (RSM) involving Box-Behnken design (BBD) was employed to optimize the removal efficiency percent (R%) and capacity uptake (q) of Zn(II). The kinetic and thermodynamic studies of Zn (II) adsorption onto the nano-sorbent were carried out. Second-order kinetic model showed more favourability for dynamic behaviour of current adsorption process. The presence of Na+, K+,Ca2+ and Mg2+ ion have been shown no significant interference on adsorption efficiency. FT-IR analysis identified that the functional group of sorbent were involved in the adsorption process.

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Investigation of PVA coated nanocomposite membrane performance for removal of toxic metal ions from aqueous solutions

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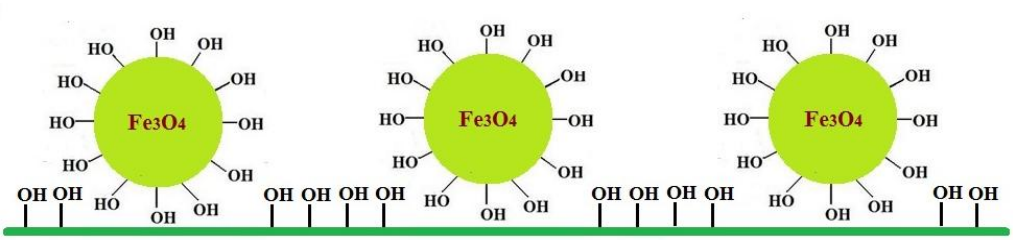

Abstract: Recently, membrane adsorption has appeared as an applicable technique for removal of heavy metal ions from aqueous solutions. Compared to the conventional methods for separation of heavy metals e.g. ion exchange, chemical precipitation and adsorption columns, adsorptive membranes present several advantages such as higher flow rate, excellent removal efficiency, lower pressure drop, reusability, faster kinetic and facility of scale up. In this study, a series of nanocomposite membranes was fabricated by coating a porous polyvinylidene fluoride / polyethersulfone support containing a complexing agent with PVA/Fe_3O_4 nanocomposite solution. Nanocomposite solutions were prepared via in-situ formation of magnetite nanoparticles in a polymeric solution containing PVA by a simple chemical method. The prepared membranes were applied for removal of Pb(II) and Zn(II) ions from water. The effects of membrane modification, filler loadings and initial feed concentration on the membranes performance for removal of metal ions were investigated. The results indicated that presence of complexing agent and magnetite nanoparticles in the membrane structure enhanced the ions rejection. The prepared samples were characterized by several techniques including scanning electron microscopy, Fourier transform infrared spectroscopy, X-ray diffraction, overall porosity and water contact angle measurements. SEM images indicated appropriate distribution of nanoparticles in the polymeric matrix. Sequential filtration/regeneration experiments confirmed that the modified membranes can be readily regenerated and reused.

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In-situ formation of FeOOH nanoparticles as filler in preparation of ion-exchange nanocomposite membrane

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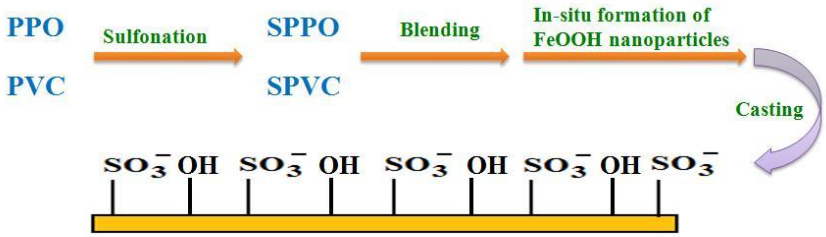

Abstract: Ion-exchange membranes are one of the most advanced membranes, which have been used in various industrial separation processes. In this study, a simple one-step chemical method was used to prepare a new type of cation-exchange nanocomposite membranes by in-situ formation of FeOOH nanoparticles in a blend containing sulfonated poly (2,6-dimethyl-1,4-phenylene oxide) and sulfonated polyvinylchloride. Prepared nanocomposite membranes were characterized using scanning electron microscopy, Fourier transform infrared spectroscopy and X-ray diffraction. The SEM images showed that FeOOH nanoparticles were uniformly dispersed throughout the polymeric matrices. The effect of additive loading on physicochemical and electrochemical properties of prepared cation-exchange nanocomposite membranes was studied. Various characterizations showed that the incorporation of different amounts of FeOOH nanoparticles into the basic membrane structure had a significant influence on the membrane performance and could improve the electrochemical properties. Furthermore, all modified membranes containing nanoparticles exhibited lower specific electrical resistance compared to pristine membrane. This work introduces the cation-exchange nanocomposite membrane containing 3 wt% additive loading, with suitable IEC, FIC, transport number, permselectivity, ionic flux, permeability, current efficiency, oxidative stability and low specific electrical resistance as a new superior and applicable membrane.

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Investigation the Responses of Barnacles' Larvae to Increasing Temperature of Oceans

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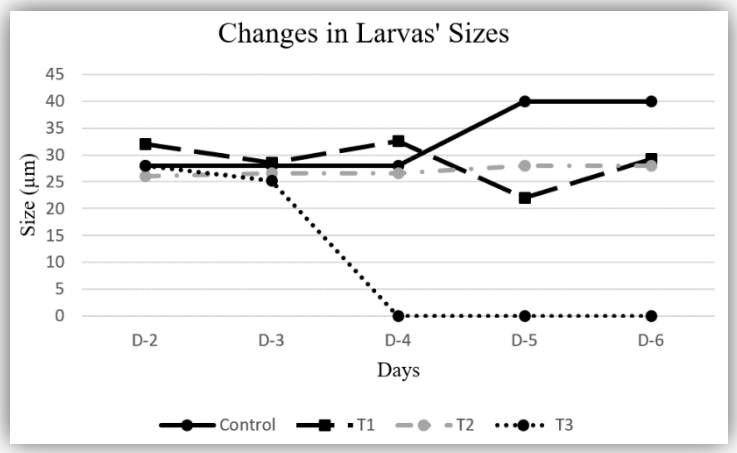

Abstract: Climate change is driving changes in the physical and chemical properties of the ocean that have consequences for marine ecosystems and subsequently for marine organisms in every aspects of their lives specially when they are in the most vulnerable stages of their lives. To examine the impacts of this rising temperature on marine organisms we chose barnacle as our experimental models. After the adults acclimated to laboratory situations we collect the larvae and divided them into four Aquariums with different temperatures: The first aquarium as the Control with the same temperature of the Laboratory (which in that temperature, the adult ones breed (27°C aerated fresh sea water)). The second one that we called it "treatment A" with 34°C aerated fresh sea water and the third and fourth aquariums respectively named as "Treatment B" and "Treatment C" with 29 and 38°C sea water. After transporting the larvae to our treated aquariums we fed them with Chaetoceros Algae every day. From Day-2 we collected three larvae from each aquariums and measured their lengths; Changes in the larvas' sizes showed in diagram that we've brought in the top of this page. Larvae of the treatment 3 all died after Day-4 and the other groups of larvae in other Treatments showed less growth than the Control. These results may indicate that in higher temperatures for fighting the cost of using more energy that they need for their metabolisms they decreased their growth or the whole energy used in metabolisms for survival of the animal instead of using in growing processes.

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Oxidation of Ketoconazole in Aqueous Media via UV/TiO_2 and UV/H_2O_2 Processes

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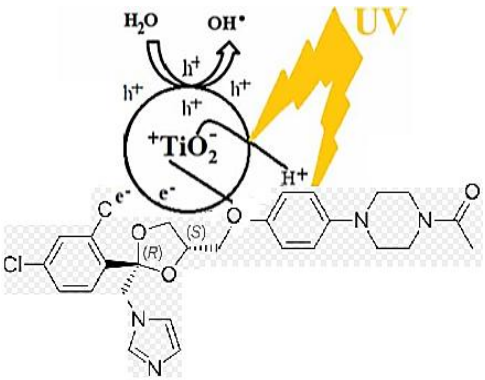

Abstract*:* ketoconazole is an antifungal medication used to treat a number of fungal infections, residual amounts of this have potential adverse effects on ecological health. In this study, for the first time, advanced oxidation process using UV light together with TiO_2 and H_2O_2 was evaluated for the degradation of ketoconazole (KNZ). A direct imposed irradiation photo reactor with a 250-W mercury lamp with the maximum emission of 365 nm was used. For optimizing of the photocatalytic processes, the method of OFAT was used. The influence of various parameters including concentrations of KNZ, dosages of TiO_2 and pH on the performance has been investigated. Under the optimum conditions of [KNZ] = 20 mg/L, [TiO_2] = 1600 mg/L, pH = 3.5 and during 80 min, about 86% degradation was achieved. Under the mentioned condition and at presence of 50 mg/L of H_2O_2 the obtained degradation efficiencies exceed 84% after 55 min. Moreover, the rate of degradation via the processes were formulated adequately well on the base of pseudo-first-order kinetic model. In addition the electrical energy consumption are obtained at optimum condition and compared with the pervious similar processes.

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Pomegranate Fruit Bark Extract an Efficient Reducing Source for Synthesized of Fe_3O_4/Ag Nanocomposite and Photocatalytic Activity

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Abstract: In this work, facile and green synthesis of Fe_3O_4/Ag Nanocomposite (NCs), is studied using pomegranate fruit bark extract as a natural reducing and capping agent. The properties of the synthesized Fe_3O_4/Ag NCs were characterized by advance techniques. For example; the high crystallinity and spherical shape with average size around 30 nm were confirmed by X-Ray powder Diffraction (XRD) and Scanning Electron Microscopy (SEM) techniques, respectively, as well as vibrating sample magnetometer (VSM) analysis shows high magnetism potential with saturation magnetization of 35 emu/g using. As a practical application the photocatalytic activity of synthesized NCs was evaluated on degradation of metronidazole (MNZ) in aqueous solution. The effect of three parameter including; conditions of MNZ, Fe_3O_4 /Ag NCs dosage and pH on degradation efficiency, were optimized. At the optimum condition the removal efficiency, degradation and COD, were achieved of 79.6% and 50.3%, respectively. In addition, the degradation kinetic and energy consumption was investigated and was also revealed in comparison to the similar photocatalytic degradation of MNZ reported.

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Investigation of behavior magnetic activated carbon prepared Iris paint for removal of cadmium ions

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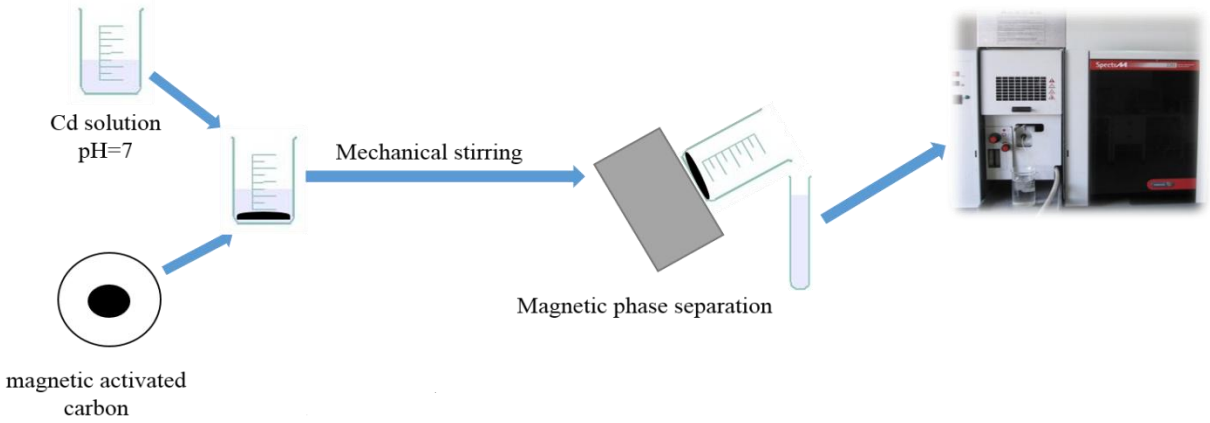

Abstract: Heavy metal contamination is a widespread environmental problem because they are non-biodegradable and have the potential to accumulate in human and animal bodies [1]. Cadmium as a common contaminant; cause dysfunction of the kidneys, liver, and lungs [2]. In order to remove the toxic heavy metals from waters and wastewaters, searching for new technologies has directed attention to biosorption based on metal-binding capacities of various biological materials [2]. Analytical techniques such as electrothermal atomic absorption spectrometry (ETAAS) and inductively coupled plasma mass spectrometry (ICP-MS) are the techniques available for direct determination of trace metals with sufficient sensitivity. Flame atomic absorption spectrometry (FAAS) is a more readily accessible technique and has wide applications for determination of metal ions in solutions, because of its speed and availability in most routine laboratories [3]. In this work, we consider the sorption of dissolved cadmium from aqueous solution by magnetic activated carbon prepared Iris paint. The optimum conditions for the determination and preconcentration of cadmium are obtained as 10 mg of adsorbent, pH of 7.0, agitation rate of 520 rpm, concentration of cadmium solution is 0.5 mg L^{-1}, contact time 45 min. Under the optimal conditions the relative standard deviation (RSD) was obtained as 0.59.

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Water quality assessment of inlet water and effluent shrimp farms by applying the scale trophic index (TRIX) and unscaled trophic index (UNTRIX)

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Summarized

The level of Level of eutrophication status in the first and second stations (Inlet water to shrimp farms) medium to high and the Fourth and fifth stations (effluent water) was very high. Also, the State of water quality was good at station1 (the first inlet water), moderate at station 2(the second Inlet water) and Poor and degraded at stations 4 and 5(effluent water).

Abstract

One of the most important issues in environmental management of coastal water is Evaluation of Eutrophication [4]. The aim of this study was to determine water quality input and output shrimp farms in TIAB Area. Water samples were collected at 4 stations during the 6 months at inlet water (at stations 1 and 2) and effluent from shrimp farms (at stations 1 and 2) in Tiab Area, Hormozgan province, during in 2018. In this study, after the review and development of trophic index, were evaluated the state of water quality and the level of trophic status by Scale (TRIXCS) and unscaled Trix index (UNTRIXCS). The TRIX index integrates chlorophyll-a (mg/m^3), oxygen saturation (the percentage of oxygen deficiency is from saturated oxygen), dissolved inorganic nitrogen (µg/l) and reactive phosphate (µg/l). The TRIX index is scaled from 0 to 10, covering a range of four state water quality (High-quality, good, moderate, poor and degraded) and four level of eutrophication trophic statuses including: Low medium, high and elevated [1,2,3 and 4]. In this study were that TRIXCS value fall within a range from 4.9±0.1 to 6.7±0.2 and UNTRIXCS value fall from 3.4±0.1 to 5.2, respectively.The results showed that, based on the value trix index, the level of trophic status in the first and second stations (Inlet water) medium to high and the Fourth and fifth (effluent) was very high. Also, the State of water quality was good at station 1(the first inlet), moderate at station 2(the second input) and Poor and degraded at stations 4 and 5(effluent water). In this study, based on untrix index, in the first and second stations are without risk and high-risk at effluent water (3 and 4), respectively.

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Facile and Green Synthesis of Zeolite Imidazolate Framework for Preconcentration and Determination of Folic Acid in Various Food Samples

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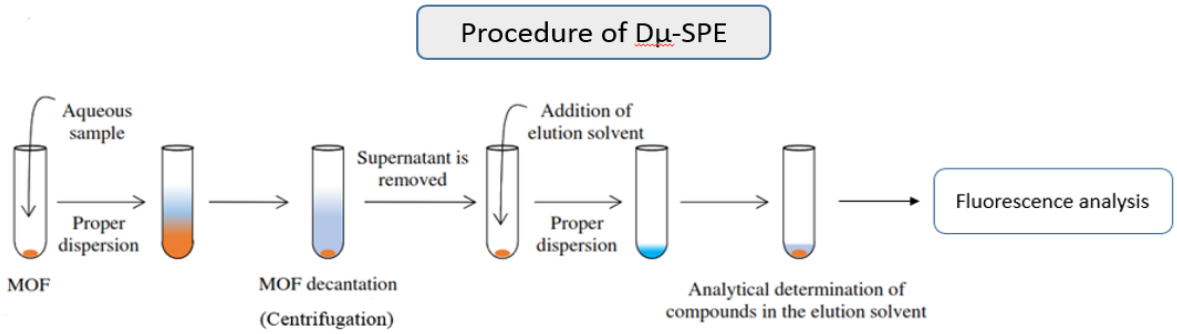

Abstract:

In this work, a nano porous zeolitic imidazolate frameworks-8 (ZIF-8) was successfully fabricated as a selective and green adsorbent for dispersive micro–solid phase extraction (Dμ-SPE) to extraction and preconcentration of folic acid [1,2]. Zeolitic imidazolate frameworks (ZIFs) consist of metal nodes connected to imidazolate linkers, having both the properties of metal-organic frameworks (MOFs) and inorganic zeolites, such as controllable pore sizes, high porosity and surface areas, as well as exceptional thermal and chemical stability, thereby making them a class of attractive materials for diverse analytical applications [3]. The properties of the synthesized ZIF-8 were characterized by Fourier-transform infrared (FT-IR) spectroscopy and X-ray diffraction (XRD). The main effective parameters on the Dμ-SPE, including solution pH, dose of adsorbent, adsorption time, and desorption time were investigated, and optimized by using a central composite design (CCD) combined with response surface methodology (RSM) [4]. The linear dynamic rang (LDR) and detection limit (LOD) for determination of FA were 8.0-300.0 ng mL^{-1} and 2.2 ng mL^{-1} respectively and the relative standard deviation (RSD %) was 2.91 (n=3). Finally the proposed method was successfully applied to monitoring and quantification of folic acid in various food samples.

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Acid Sludge Recycling Process in Oil Refining Industry and Convert It to Bitumen

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Abstract: Thousands ton of acidic sludge is produced daily as by product in the used motor oil refining industries. The acidic sludge contains unsaturated compounds which are non-polar and asphaltene. The objective of this study was performance improvement of acidic sludge by using additives (kaolin, Styrene Butadiene Styrene (SBS), Calcium carbonate hydrate) so that recovery to bitumen.

SBS is one of the elastomer thermoplastic kaolin due to the chemical structure as filler, stabilizer and agent concentration and calcium carbonate is used to decreasing acidity rate of acidic sludge and promoting the role of the kaolin stability in bitumen was mixed with acidic sludge of industry and their effect on the acidic sludge was investigated.

environmental and health hazards of acidic sludge will be decrease by treatment and neutralization. Also obtained products can be used in building and road constructions according to its specific bitumen criteria and characteristics.

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Micro Solid Phase Extraction of Some NSAIDs from Environmental and Biological Samples Using Porphyrin-Functionalized Graphene Sheets as an Efficient Sorbent Followed by HPLC-UV

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Abstract: Non-steroidal anti-inflammatory drugs are used in the treatment of rheumatoid arthritis, inflammation, infectious and other painful musculoskeletal disorders [1]. Despite these therapeutic advantages, long-term and excessive exposure causes adverse side effects including kidney problems, intestinal ulceration, renal failure and even coma and death [2]. In addition, they can enter to the urban water system and threat the environment and ecosystem [3]. So, to monitor the trace concentration of these drugs in biological and environmental matrices, developing of sensitive, reliable, convenient, fast, eco-friendly and economical sample preparation methods is essentially needed. With this purpose, in this work, a porphyrin-functionalized graphene nanosheet was synthesized and employed as an efficient sorbent. The synthesized sorbent was utilized for micro solid phase extraction of some non-steroidal anti-inflammatory drugs (ketorolac, meloxicam, diclofenac and mefenamic acid) followed by high performance liquid chromatography. Optimization of the experimental factors of adsorption and desorption including sorbent amount, sample pH, sample and eluent flowrates, eluent volume and number of desorption cycles was performed with the aid of the response surface methodology with central composite design. Under the optimal conditions, the calibration curves were linear within the range of 2.0-600 ng mL^{-1} and limits of detection were found between 0.5-2.0 ng mL^{-1}. Intra- and inter-day RSD% (n = 3) of the spiked urine samples at three level concentrations of 25, 100 and 300 ng mL^{-1} were less than 10%. The relative recoveries of the real samples were calculated in the range of 85.2 to 98.6%. Eventually, the method exhibits proper sensitivity, good repeatability, high reusability and acceptable precision and accuracy.

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Fabrication Of N-doped $TiO_2/SnFe_2O_4$/PANI Nanocomposites With Enhanced Photocatalytic Performances For Removal Of Organic Pollutants Under Visible Light

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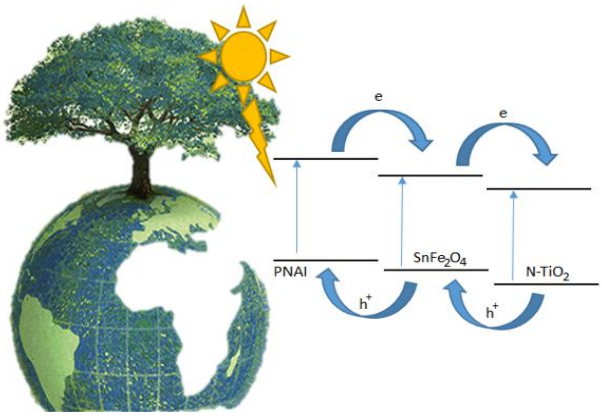

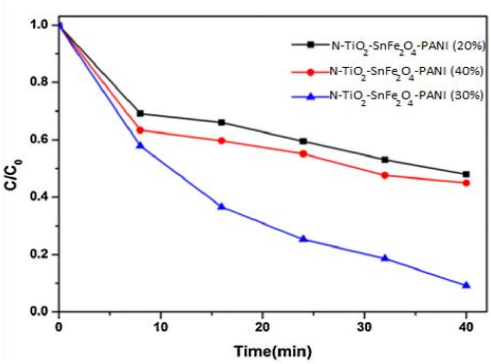

Abstract: Nowadays, huge industrialization and uncontrolled growth of population have tremendously caused environmental contamination. Additionally, clean water resources are scarce[1]. Photocatalytic processes using semiconductors have caught eyes from a large number of researches as fascinating technology to endow environmental crisis [2]. For the first time, novel paramagnetic heterojunction photocatalyst N-TiO2-SnFe2O4-PANI with different PANI;TiO2 raitos were synthesized. This innovative photocartalyst merit from its high absorption of visible light and magnetic response that enable us to utilize much more spectra of radiation for more energy source and separate the catalyst from the media more easily. The catalytic activity of the as-prepared N-TiO2-SnFe2O4-PANI nanocomposite is investigated by the degradation of MO under visible light irradiation. As expected, the as prepared N-TiO2-SnFe2O4-PANI photocatalyst exhibit highly enhanced photocatalytic activity owing to fast separation of photo-generated electron-hole pairs and decompose MO up to 91.5% in 40 minutes. Significantly, no change in stability and degradation efficiency in separated catalyst from media has observed after 6 cycles uses.

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Prediction of Thermodynamic Properties of Chlorine Gas as an Environmental Pollutant

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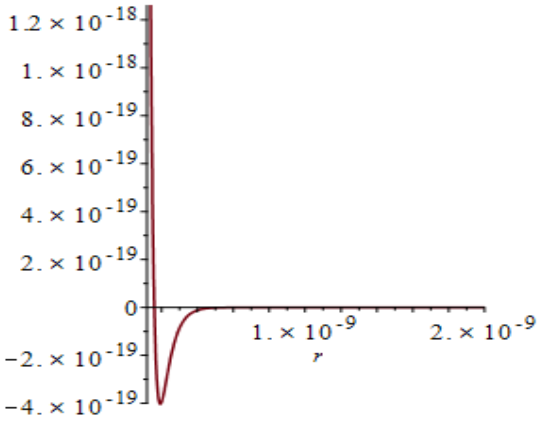

Plot of the Manning- Rosen potential model versus molecular distance.

Abstract: Chlorine has been known as one of the most common toxic inhalants and respiratory tract irritant. Chlorine is a yellow-green gas at room temperature, moderately water-soluble, and more than twice as heavy as air [1]. Exposure to higher concentrations of chlorine may lead to in the development of pulmonary edema, pneumonitis, respiratory failure, and death [2,3]. The aim of the present study was to investigate of thermodynamic properties of the reaction of chlorine with hydrogen to produce hydrochloric acid in gas phase as $Cl_2(g) + H_2(g) \rightarrow 2HCl(g)$. In this regard, we used the improved Manning-Rosen potential model for the vibrational function of diatomic molecules [4]. Some thermodynamic properties such as enthalpy, free energy, and entropy for Cl2 and HCl gases were calculated in wide range of temperature. The results obtained showed that enthalpy and free energy values increased uniformly with increasing temperature. Although the special vibrating heat increased with increasing temperature first, and then it decreased where the temperature reached to the maximum. The observed behavior is in agreement with experimental data.

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Biochemical Studies of New Schiff Base Ligand and It's Complex in Water

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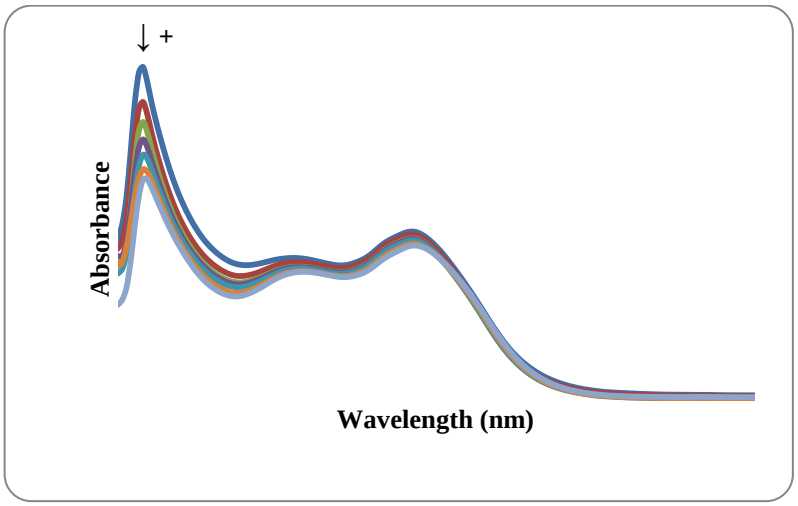

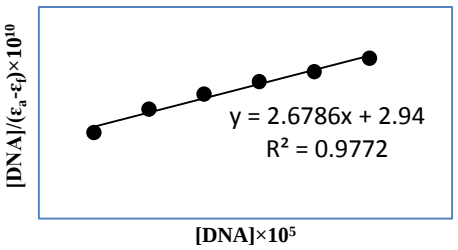

Abstract: In the area of bioinorganic chemistry, the Schiff base complexes have been considered as synthetic models for the metal containing sites in metalloproteins and metalloenzymes. Many transition metal ions in living systems can work as enzymes or carriers in a macrocyclic ligand environment. Thus, during the last decade, great attention has been focused on the area of Schiff base complexes [1]. This attention is still growing, so that a considerable research effort is today devoted to the synthesis of new Schiff base complexes with transition and main group metal ions [2]. In this work, UV-Vis, fluorescence and viscometry techniques was used to the investigation of DNA interaction with the synthesized Schiff base ligand and its nickel complex in water. The results revealed hypochromism effects which generally indicate the intercalative binding nature of the interaction. The K_b and K_f were calculated. The binding constants (K_b) for Schiff base ligand and its nickel complex were obtained 9.11×10^4 and 2.46×10^4, respectively.

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Fabrication Of A Nanocomposite Based On ZnO Semiconductor And Study Of Its Photocatalytic Activity And Kinetics For The Degradation Of Methylene Blue Pigment

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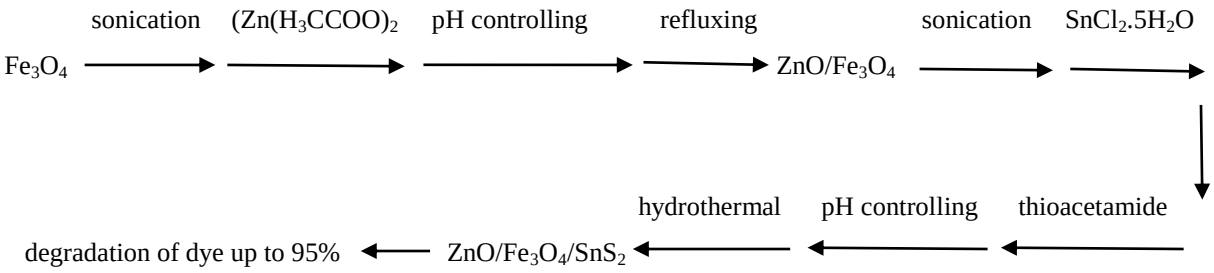

Abstract: Water is a precious source that is important to every living things throughout the world. Water covered almost 70 percent on the earth but only 2.5% is indicated as clean water.
The minor amount of clean water is used, recycled, and then treated. Increased amount of water usage would generate increased amount of wastewater. Nowadays, various kinds of materials have been employed to remove the contaminants from wastewater, including catalyst (homogenous and heterogenous), adsorbents, membrane from organic and inorganic materials, ozone, etc. Advanced oxidation processes (AOPs) is a recently discovered wastewater treatment technology which treats pollutants by generating hydroxyl radicals which are responsible for organic degradation. Due to their strong unselective oxidative power, the hydroxyl radicals oxidize and mineralize almost any organic molecule, yielding CO2 and inorganic ions as final products. Among AOPs, photocatalysis is an interesting alternative process that can remove the emerging contaminants at ambient temperature and pressure by oxidation. Water remediation using sunlight is one of the most promising and cost-effective approaches to mitigate environmental hazards significantly related to the industrial development. In the present work, we report the synthesis of a nanocomposite based On ZnO semiconductor via hydrothermal and facile refluxing approaches for the photocatalytic degradation of methylene blue. XRD analysis verified the crystal structure, phase purity and successful synthesis of the nanocomposite. Moreover, the morphology and elemental composition of the photocatalysts were studied using scanning electron microscopy (SEM) and electron dispersive X-ray spectroscopy (EDX). The alignment of energy levels for the synthesized heterostructured photocatalysts was also drawn while using UV-visible diffuse reflectance spectroscopy (DRS). PL, FT-IR and BET were employed to determine the optical, structure and surface properties of the nanocomposite. Finally, the as-synthesized heterostructures were employed as efficient photocatalysts for the degradation of methylene blue under the illumination of UV-visible light. My result indicated that ZnO based nanocomposite can efficiently degrade up to 95 % of dye.

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Application of immobilized ionic liquids on inorganic nanostructures in microextraction methods for determination of pasticide in river water samples

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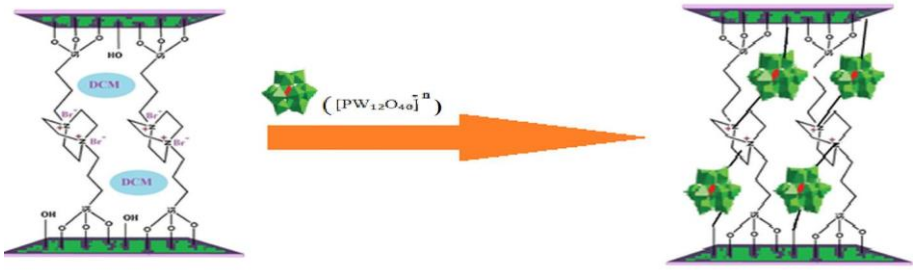
shows the satisfactory results obtained for the real samples



Abstract

Fungicides are a group of pesticides which are widely used and have negative effects on human health and the environment; Pesticide residues resulted from applying fungicides is a very important issue due to environmental pollution and human health risk and should be seriously considered. In order to achieve such insight summing up the dangers of pesticides is necessary so that attributes to predict social costs and benefits and monitor new policies applied. In this study, the possibility of extracting triazoles, organophosphors and pyrethroids a fungicide was evaluated by utilizing nanostructures, LDH/DABCO/PW, using solid phase microextraction methods. triazoles, organophosphors and pyrethroids pesticides is one of the most important pesticides with worldwide use for the protection of a variety of vegetables, fruits and grains and the destruction of many fungal pathogens because of its broad-spectrum and systemic properties. In this study, a new synthetic microextraction is used in which the LDH/DABCO/PW with nano-holes is applied for extraction and identification triazoles, organophosphors and pyrethroids; the high specific surface area, selectivity, shape and size are the main characteristics of these compounds leading to numerous catalytic applications, filtration, separation and extraction of pesticides. Under the optimized conditions, the linear response for the analytes was observed in the range from 0.001 to 100 μg L^{-1} with the Correlation coefficients (R2) ranging from 0.965 to 0.999 and the limits of detection (LOD) between 0.002 and 0.03 μgL^{-1}. The proposed fiber was successfully used for the determination of agriculture pesticides in spiked river water samples and RSD% values were obtaine in the range of 4.9% - 11.1%. Also, the correlation coefficient was high (0.999) and linear range was broad (0.001 to 200 ng/ml).

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The Effects of Industrial Solvents in the Environment

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Abstract: Environmental contamination and the contribution of chemical reactions to these contaminants have led the researchers to develop non-polluting chemical methods. Today, refineries release millions of pounds of airborne pollutants that pose a serious risk to human health and the environment and the quality of life of the industrial societies adjacent persons is seriously damaged. Solvents are an important part of the environmental performance of processes in the chemical industry. In order to reduce pollutants in the environment, reduce waste from chemical reactions, toxic solvents, hazardous and flammable, the green solvent idea by minimizing the environmental effects of the use of solvents and the replacement of organic solvents in the production of materials Chemical is considered. Green chemistry has the potential to prevent or reduce pollution, and plays an important role in achieving sustainable development. Due to the importance of the subject and in keeping with the technologies of the day, researchers have succeeded in making ionic liquids green Solvents and so on. Ionic liquids are a new category of solvents that can be used in a wide range of industries. Low vapor pressure, non-toxicity and non-flammability of them can be considered as their strengths. Today, using these fluids that are easily recyclable and reused, It can be of great help to the environment and human health. There is a comprehensive framework for environmental assessment of the solvent effects in chemical production, which also covers health and safety issues. Today, green chemistry-based technology is considered as a new approach, which this paper examines the most important ways of developing green solvents.

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Fabrication Of A Novel Poly Ether Sulfone Based Nanofiltration Membrane To Improve Membrane Mechanical Tensile Strength

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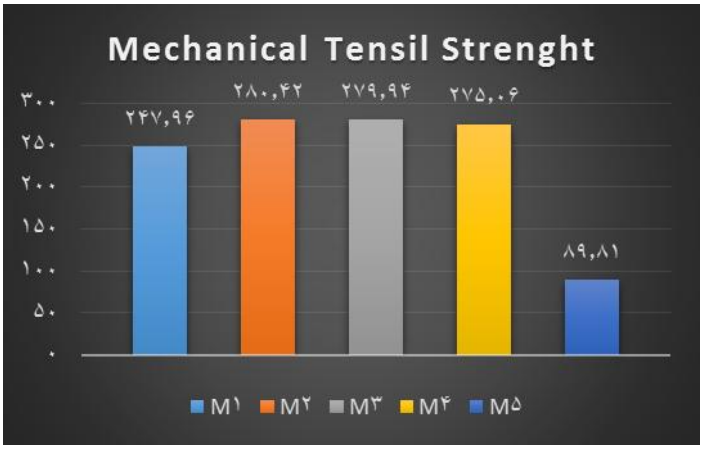

Abstract*:* A novel asymmetric poly ether sulfone (PES) nanocomposite nanofiltration membrane were prepared using phase inversion technique with Polyvinylpyrrolidone (PVP) as pore former and Dimethylacetamide (DMAc) as solvent and carbon nanofiber as modifier. The tear resistance as a mechanical property of the prepared membranes was tested according to ASTM1922-03. The results showed that the mechanical strength of modified membrane M2, M3, M4 was increased obviously by using carbon nanofibers into the casting solution compared unmodified membrane M1 (bare PES one) and modified membranes M2 and M3 have the highest mechanical strength, such that mechanical strength of M2 and M3 are 280.42 (kpa) and 279.94 (kpa), respectively. In fact, Formation of strong interfacial bonding between polymer and nanoparticles can lead to the improvement of the mechanical strength. The results revealed that incorporation of carbon nanofiber nanoparticles into the PES matrix can act as a physical cross-linkages in membrane structure that enhance internal membrane connections and leading to an increase of rigidity. In the following ,The mechanical strength of membrane M5 reached 89.81 (kpa). A decrease of mechanical tensile strength in M5 compared other samples may be related to agglomeration and accumulation of additive particles in the high loading range of nanoparticle. Also, this reduction can be also due to the increase of voids/cavities (porosity) and channel's size of M5, which leads to an unstable and loose structure for the membrane and declines the membrane tensile strength.

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The Effect of Graphene Oxide Nano Sheets In Nanofiltration Membranes

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Abstract: Today, filtration is considered as one of the most effective means of separation processes and purification in the world. Nanofiltration attracted scientist to it selfish because its best performance seen separation. But it has some deficiency too and for improve its characterizes against fouling, hydrophilicity/hydrophobicity, low flux and etc. Many research has been take occur. it seems addition nanoparticle (such as Fe2O3, Fe3O4, TiO2, ZnO, GO and etc.) to membrane is a good way for improve nanofiltration operation. Graphene oxide is one the nanoparticles used into the membrane. The structure of GO nanosheets consists of basal planes decorated mainly with hydroxyl functional groups as well as nanosheet edges containing carboxylic acids. The potential of GO membranes is linked to its abundant functional groups, including epoxide, carboxyl and hydroxyl, which provide specific reactive sites and hydrophilic properties. This functional group of the graphene oxide react with the basic polymer of membrane and it make membrane with higher performance. There are some reports about the grafting of transition metal Schiff base complexes on the surface of graphene nanosheets as efficient catalysts for organic reactions. However, when GO membranes are placed in an aqueous solution, the spacing between the GO sheets increases up to 1.3 nm due to the effect of hydration. To solve this issue, works has been done to narrow the interlayer spacing for ion passage either by physical confinement or chemical decoration. In this study explains more about the graphene oxide and the characterizes that the graphene oxide gives to nanofiltration membrane and how it prefers membranes performances.

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Investigation of climate pollution from chlorine gas in industrial units of Zanjan

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Abstract: Chlorine is one of the important impurities of the zinc industry by hydrometallurgy, which is introduced into the solution of zinc sulfate through water (low concentration) and feed into the factory and negative effects, such as corrosion of steel equipment, tubes, lead anodes, reduction in cathode zinc quality, increased power consumption, and also chlorine gas, cause environmental pollution. Chlorine suspended particles in the air are also contaminating materials that can cause lung, gastric and digestive diseases. Therefore, due to the negative effects of chlorine gas on the health of human communities and equipment of factories in the last decade, the attention of environmental experts and researchers has been focused on reducing this contamination. The factories of the Iranian zinc manufacturing industry are among the industries that can produce a lot of chlorine gas if it does not control its amount, which depends on the location and atmospheric conditions of that point. There are currently 85 industrial units in the city of Zanjan, a study of the pollution of the climate from the existing industry based on the UNEP guide. In this paper, in order to assess the environmental impacts of chlorine gas, Zanjan industrial units have used a matrix structure that consists of effective factors and environmental components of the dimensions of this matrix. The expert opinions of skilled people have been used to collect the initial data and score all the parameters. By quantifying the qualitative views, the overall impact on each environmental component was determined. According to the results, the percentage of environmental damage for components of air quality, human health and safety and groundwater was higher than other items. Therefore, environmental considerations should be considered for this issues.

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Synthesis, Characterization and Application of GO/LDH in the Wastewater Treatment

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Abstract: In this study, graphene oxide-Layered Double Hydroxide nanocomposite (GO-LDH) as adsorbent were synthesized by a hydrothermal method and was applied to removal the 4-Nitrophenol from the aqueous wastewater under different conditions of main influential parameters, (i.e. adsorbent dose, initial nitrophenol concentration, sonication time, and temperature). The phase, morphology, composition and thermal properties of the obtained nanocomposite were determined by XRD, EDX, SEM, IR and TGA. In this research, a general regression neural network (GRNN) and an adaptive neuro-fuzzy inference system (ANFIS) have been employed to the prediction of removal of 4-Nitrophenol from aqueous solution. The result reveals that GRNN and ANFIS models as a promising predicting technique would be effectively used for adsorption process. Furthermore, the detailed kinetic, isotherm, thermodynamic, reusability cycles and optimization (by GA and DF) studies were conducted to evaluate the behavior and adsorption mechanism of nitrophenol on the surface of GO-LDH nanocomposite.

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A New Sensor for Determination of Paracetamol Using Nanocomposite of Multi-Wall Carbon Nanotubes / Zinc Oxide Nanoparticles Green Synthesized

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Abstract*:* Today, one of the major goals in nanotechnology is the development of environmentally friendly products. The use of plants and fruits to synthesize nanoparticles is one of the most environmentally friendly methods for not using pollutants and toxic substances. In this work, the synthesis of zinc oxide (ZnO) nanoparticles is green and were synthesized according to a literature method [1,2] using apple juice. The combination of zinc oxide nanoparticles with multi-wall carbon nanotubes was used to modify the surface of the electrode and construct a new sensor for determination of Paracetamol (PAR). PAR is a long-established substance being one of the most extensively employed drugs in the world [3].

The experimental results suggest that a new electrode (MWCNTs/ZONPs), accelerates the electron transfer reactions of Paracetamol. The DPV data showed that the obtained anodic peak currents were linearly dependent on the Paracetamol concentrations in the range of 0.5–478 mol L^{-1} in 0.1M phosphate buffer solution at pH 7 with a correlation coefficient of 0.9911.

The interfering study of some species showed no significant interference with determination of PAR a wide linear range, low detection limit, high stability and good reproducibility suggest that this electrode will be an attractive candidate for practical applications.

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Seed Polymer coating, a method to increase crop yield and reduce environmental pollution

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Fig 1. Seed polymer coating with copolymer synthesized (a) sugar beet, (b) corn and (c) alfalfa seed

Abstract: Young seedlings are subjected to different pest and diseases during the early growing season. Most of the seedlings are damaged before establishment and as a result plant canopy followed by crop yield will reduce. Seed is considered as an important input in agriculture and the goal of seed coating is to achieve this potential. The material used for coating is adhesive and harmless which stick to the outer layer of the seed. Today, natural or synthetic polymers are widely used in the agricultural and food industries. Seed polymer coating increases the control of insects and pathogenic fungi, the addition of useful microorganisms to the soil as well as coping with water scarcity. Seedlings emerge from these seeds do not need spraying until 4-8 leaf stage which is essential in terms of environment, growers' health and economic reasons. The present study was conducted to synthesize acrylate-styrene copolymer. A acrylate- styrene copolymer was prepared by aqueous emulsion polymerization in the presence of Potassium Per Sulfate (KPS) initiator at 80°C and at 1hours. The copolymer evaluated its feasibility for coating three different crops seed such as sugar beet, corn and alfalfa with fungicide Tiram and insecticide Gaouchu and color(Fig 1.), along with seed coated with foreign commercial polymer and uncoated seed as controls. The study was performed in Sugar Beet Seed Institute in Karaj, within two years. Results of the FT-IR, Particle Size, DSC, and stretch film of copolymer acrylate-styrene were similar to foreign commercial polymer. Also, results of seed quality characteristics showed no deleterious effect on germination and seed establishment. In general, it was shown that acrylate-styrene synthesized copolymer can be used instead of foreign commercial polymer which may prevent foreign material import. Furthermore, toxic Tyram widespread in environment, which may retain for years, may be reduced and finally brings economic benefit for growers**.**

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Modeling and Optimization Adsorption of MB Dye by Fe_3O_4-CS-GO Nanocomposite from Aqueous solution using of ANN and GRNN

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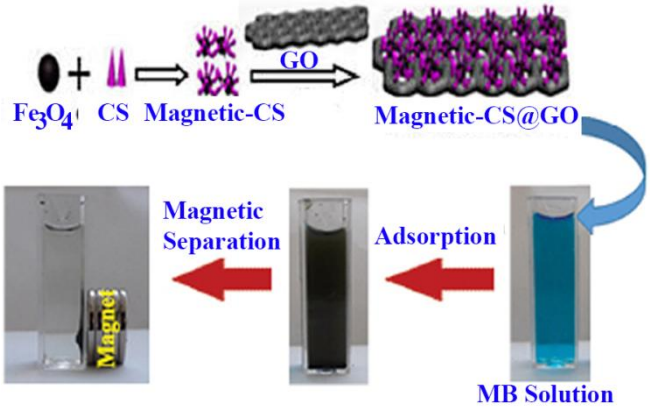
Graphical Abstract



Abstract: In this work, the magnetic biopolymer loaded on the graphene oxide (Fe_3O_4-CS-GOnanocomposite) was used for the removal of methylene blue from aqueous water. Artificial Neural network (ANN) and general regression neural network (GRNN) was used for modeling the central composite design (CCD) experimental system and predicting the optimal input values including, adsorbent dosage, initial dye concentration, pH, and sonication time. Experiments were performed under laboratory batch conditions. The outcomes of suggested ANN and GRNN modeling were then compared to a response surface methodology, which was utilized to assess the effect of four factors on the adsorption of methylene blue in aqueous solution. According to this result, the determination coefficient for ANN and GRNN were obtained 0.99 and 0.98, respectively. Also, in RSM model R^2 was calculated 0.90 for mentioned dye. Furthermore, the detailed kinetic, isotherm, thermodynamic, reusability cycles and optimization (by GA and DF) studies were conducted to evaluate the behavior and adsorption mechanism of methylene blue on the surface of Fe_3O_4-CS-GO nanocomposite.

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Removal of Heavy Metal Ions, Pb^{2+} and Cd^{2+}, from Water by Use of Lanthanide-Coordination Polymer as Sorbent.

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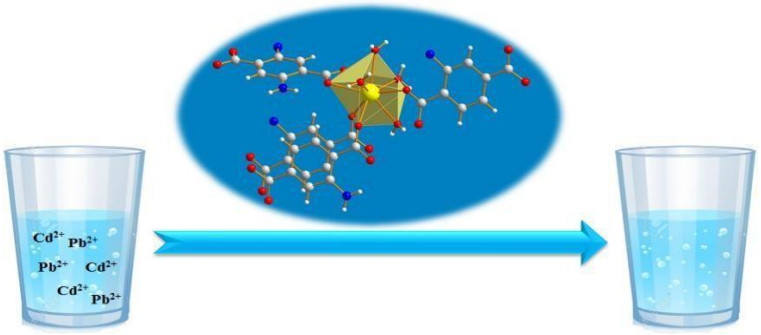

Abstract: The removal of Cd^{2+} and Pb^{2+} from water under room conditions was done by employing Ce (III), $[Ce_2(\mu_3\text{-atp})_2(\mu_2\text{-atp})(H_2O)_8].4H_2O$ (1) (atp=2-aminoterephthalate) as a sorbent. Lanthanide-coordination polymer 1 is a new two-dimensional coordination polymer synthesized by solvent diffusion approach. This was characterized by X-ray single crystal diffraction, powder X-ray diffraction (PXRD), Fourier transformation infrared (FT-IR)

spectroscopy and thermal analysis (TGA). After the adsorption the amount of metal ions in water was determined by atomic absorption spectroscopy and the removal efficiency was calculated. The effect of contact time on the adsorption of single solutions of these heavy metal ions at optical pH 7 shown that maximum removal efficiencies was achieved within 30 min with 94% and 87% of Pb^{2+} and Cd^{2+} respectively. To evaluate the competitive adsorption properties of the coordination polymer, it was introduced into a solution containing equal amounts of binary metal ions Ni^{2+}, Mg^{2+}, Ca^{2+} and Fe^{3+} with Cd^{2+} or Pb^{2+}. The results show that polymer 1 uptake Cd^{2+} and Pb^{2+} from the solution with high selectively. About 90% of both Cd^{2+} and Pb^{2+} were removed from water after half an hour. The result of desorption of the metal ions from the sorbent showed that 96.5% of the metal ions desorbed from the sorbent. The reusability of the recovered sorbent show that the sorbent could be simply recovered, then reused without observable loss in the removal efficiency and with structural stability.

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Colorimetric determination of copper in water and food samples based on its effect on cloud point extraction of curcumin nanoparticles

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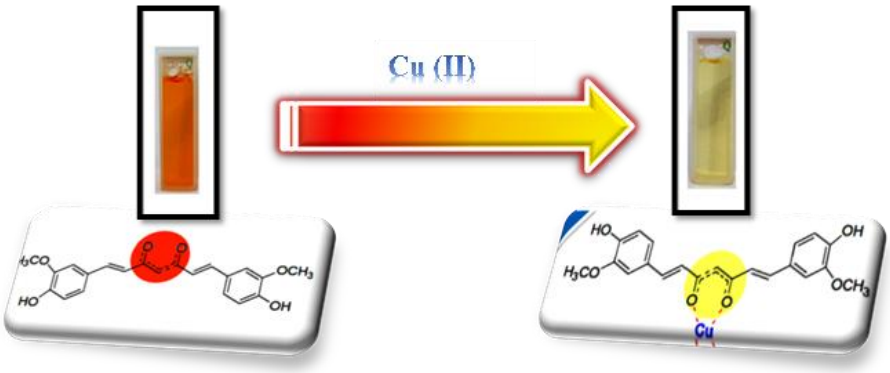

Abstract Copper is an essential bio-element which is present in plants and animals but it is toxic at high concentration levels. It could be accumulated in different organs such as liver and cause health problems [1]. Therefore, its determination in environmental samples is important from analytical chemistry point of view. However direct determination of trace elements has some drawbacks because the detection limits of most analytical techniques is not enough for their determination and a sample pretreatment and preconcentration is required. In this research a cloud point extraction method using curcumin nanoparticles is reported for copper enrichment. Curcumin is a hydrophobic polyphenol compound which has been recognized as the active principle of turmeric and could be extracted from the dried root of the rhizome of Curcuma Longa. Curcumin nanoparticles are extracted into Triton X-100 as a nonionic surfactant and show an absorption band with maximum wavelength of 436 nm. When Cu(II) is present the absorbance of the surfactant rich phase is decreased. The decrease in the absorbance the presence of Cu(II) was used as an analytical signal (ΔA) for the determination of Cu(II). The influence of chemical variables such as pH of the sample solution, ionic strength, and concentration of the curcumin on the cloud point extraction was investigated. Under the optimum conditions two linear calibration curves in the range in the range of 0.5-15 and 3-45 ng mL^{-1} using different concentrations of curcumin nanoparticles was obtained. The detection limit was 0.39 ng mL^{-1} and relative standard deviation of ten replicate measurements of 25 and 40 ng mL^{-1} of Cu(II) was 4.6% and 1.7%, respectively. The proposed method was successfully applied to the determination of Cu(II) in water and food samples with satisfactory results.

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Study of NOx Dispersion in Arak City

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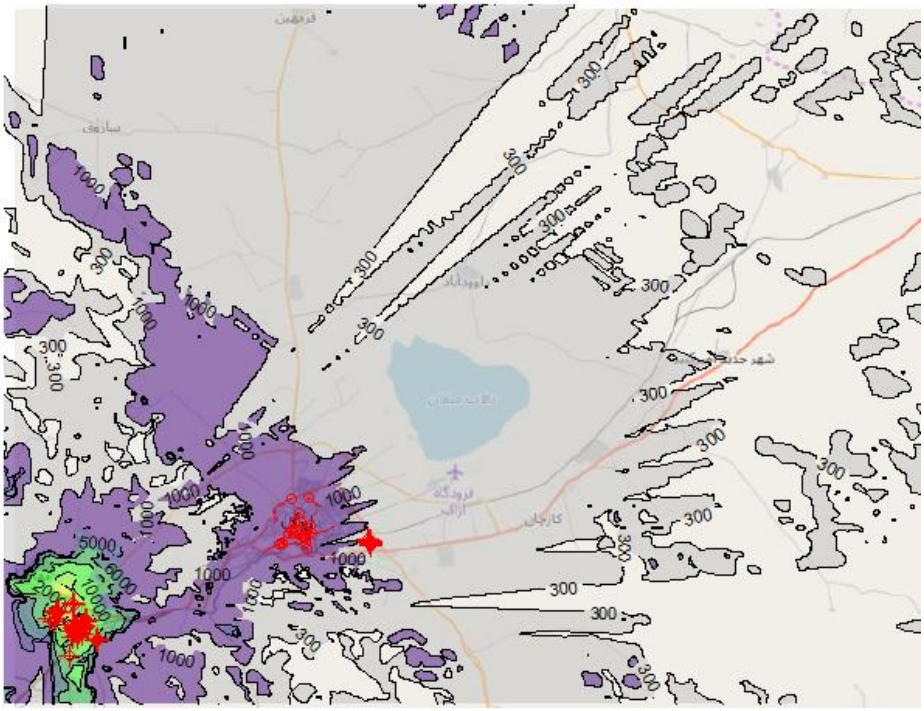

Abstract: Air pollution is the most important issue in industrial and large cities. Arak city has a very complicated situation as it is mountainous, its industries are near the city and its urban causes traffic load. In this study air pollution has been modeled to find how NOx changes in Arak & Mohajeran cities annually. In this research, all of the important industrial factory (Power plant, Vagon pars Co, Mashin Sazi Co, Azarab Co, refinery, petrochemical factory) and dynamic source (vehicle, truck...) has been included to show their effect and to find the appropriate control strategy. AERMOD software has been applied to model in which synoptic data, upper data, topography maps and dynamic vehicle source is used. The area is assumed 50km × 30 km., reference point is (353076.27, 3758168.73) in zone 39. Finally, against common opinion, investigation yielded that the biggest source of pollution in Arak is dynamic source (vehicle, bus…) which is approximately about 90% in arak and the companies have their own 10 %.

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Investigation of Vehicles Air Pollution of NO_x in Arak City

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Abstract: The purpose of the paper is modeling and determining motor vehicle participation in NOX emission in Arak. Arak that faces traffic congestion due to old urban structure as well as too many cars, is one of extremely industrialized and densely populated cities in Iran.

In this research, busy streets have been modeled at the most congested hours. Additionally, the amount of NOX emission released by cars are investigated according to various weather conditions within one year to cure air pollution crisis by providing solutions such as traffic flow plan, change in urban structure, and the prevention of passing polluting fossil fuel vehicles.

In the paper, synoptic meteorological data, the data of over the atmosphere(upper data), topographic maps and information about vehicles have been employed simultaneously in Aermod software.

IVE model has been applied to investigate the volume of vehicles emissions that the type and number of vehicles and the quality of traffic in corresponding street have been considered.

The results revealed that the annual average of NOX is about 1690 µg/m3 in downtown and some congested points such as Piroozi Street, by contrast, It is more than 8 times of the global standard of 200 µg/m3. In consequence, endeavor to surmount the crisis is vital.

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Determination of the Effected Area of Refinery, Petrochemicals and Power Plants Air Pollution, Case Study of NOx

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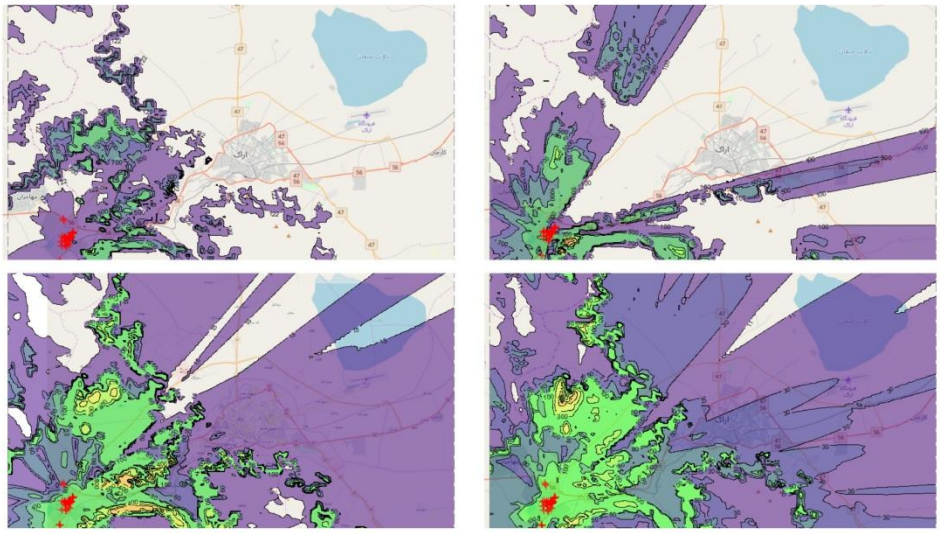

Abstract: Arak city is considered as one of the most polluted cities in Iran due to the presence of various polluting industries, including refinery, petrochemical and power plant. These pollutants have devastating effects on humans and its reduction is especially important.

In this paper, the effect of pollutant Nox released by these industries on Arak city has been analyzed and also the extent of this pollution.

The modeling has been done in ermod software which is the state-of-the-science, steady-state Gaussian air dispersion model that is approved by United States Environmental Protection Agency for most refined modeling scenarios. A steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

Finally, according to the results, the amount of this pollutant only affected the winter and autumn seasons on the city of Arak and in other seasons it has a little impact on the city.

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Determination of methylene blue dye degradation by photocatalytic and sonocatalytic methods

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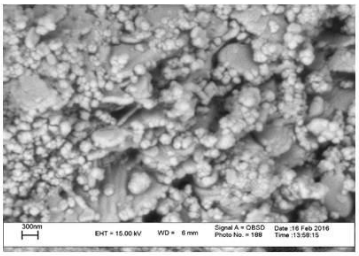

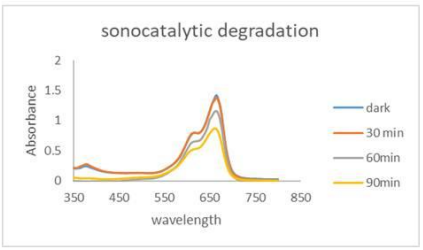

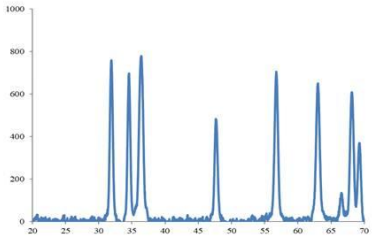

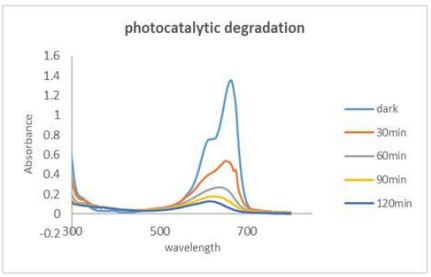

bstract*:* Coloured wastewater generated by various industeries such as paper, textile, rubber and plastic if discharged into the environment without any treatment cause many problems. Existence of small amounts of dye affects the optical properties of water and just the first pollutant that is visible in water. It is necessary to remove waste water due to the complex structure and toxicity and carcinogenic nature. In recent years, many techniques have been developed to remove these contaminants from water. In this study, zinc oxide nanoparticles were first synthesized by sol-gel method. XRD and SEM analyzes are performed on nanoparticles. In the next step, the efficiency of ZnO as a photocatalyst was investigated to remove the methylene blue MB dye from a 10 ppm constant aqueous solution with a volume of 50 ml with UV light (15 watts). The results of the experiment were evaluated for three value of catalysts 0.03, 0.05 and 0.07 gr, and three value of Ph 4, 7.5 and 11. The best photocatalytic degradation was at PH = 11 and 0.77 gr at 91%, indicating an increase in photocatalytic activity in alkaline phases with higher ZnO catalyst contents. Also, the effect of methylene blue degradation was evaluated optimally by sonocatalytic method. Thus, the effect of ultrasound on dye degradation with ZnO catalyst with powers of 150,250 and 350 in 3 times intervals of 30, 60 and 90 minutes was investigated. The results showed the best dye degradation at 350 and 90 minutes, with 38%. The analysis of the results shows that with increased power of ultrasound and increasing time, a higher degradation occurs. Comparing two degradation methods in terms of time intervals and identical testing conditions, the Photocatalytic method shows a higher efficiency compared to the Sonocatalyst method

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Synthesis and characterization of nanoparticles core@shell Fe3O4- ZnO for photodegredation Eosin B

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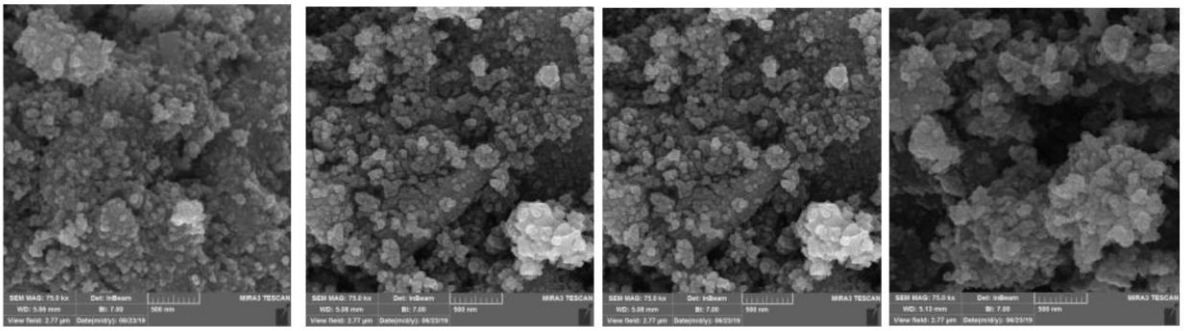

Abstract*:* In this study, the photocatalytic properties of the Fe_3O_4@ZnO core / shell nanoparticles have been investigated. The production of these nanoparticles in order to degradation of the chemical contaminants in the effect Light radiation is possible. For this purpose, nanoparticles of pure ZnO and magnetic nanoparticles of Fe_3O_4 @ ZnO core / shell were synthesized in a sedimentary method. The structure, morphology and photocatalytic performance of these nanoparticles were investigated by X-ray, X-ray diffraction scanning electron microscopy (SEM) and spectrophotometer (UV-Vis), respectively. The reduction in the size of the ZnO particles, which, as a n-type semiconductor with a width of 3.2eV, does not only increase the reactive level to absorb light, but also increases the physical, chemical and optical properties. In order to reuse zinc oxide and due to the difficulty of separating it in order to degrade the photocatalytic colors, we decided to apply magnetic properties to restore this valuable material, because Fe_3O_4 nanoparticles have extraordinary magnetic properties. And it catalyzes the catalyst and restores it. After making various molar percentages of 1: 4 _1: 5 _1: 8_ 1: 10 1: 15, from Fe_3O_4 @ ZnO nanoparticles , the molar ratio of 1:15 was selected as the optimum percentage. Because in addition to maintaining its magnetic properties, it increased the photocatalytic properties of nanoparticles of zinc oxide. After performing the experiments under the same conditions and continuing the experiments with this optimal percentage, we achieved a maximum degradation value of 98% in 90 min, which is compared to the pure nanoparticles of ZnO under identical conditions, 60 per cent showed a favorable trend in testing.

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Feasibility of corona discharge ion mobility spectrometry for direct analysis of malathion extracted by switchable hydrophilicity solvent-based homogenous liquid-liquid microextraction

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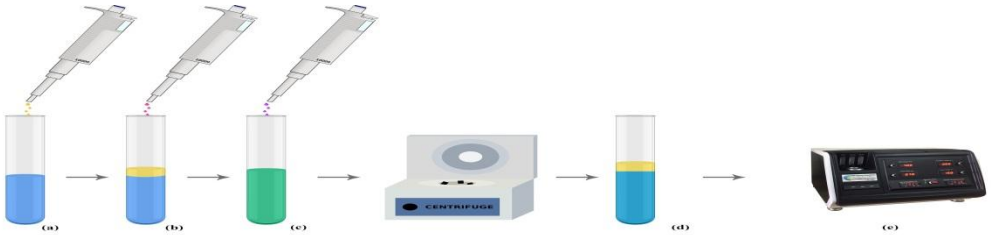

Abstract: Nowadays, developing new methods for analysis of Organophosphorus pesticides as the major classes of the pesticides, which are widely used in agricultural lands due to their low price and board biological activities, has fascinated great interest. According to the importance of this issue**,** the capability of corona discharge ionization ion mobility spectrometry (CD-IMS) for direct detection and quantification of the malathion extracted by switchable hydrophilicity solvent-based homogenous liquid-liquid microextraction (SHS-HLLME) was investigated and evaluated in apple juice for the first time. The substantial factors of SHS-HLLME are optimized. These factors are classified as volume of acceptor solution, sulfuric acid and base, percentage of salt. The introduced technique exhibited good linearity with coefficient of R^2 =0.983 and the acceptable linear range of 5.0-1000.0 ng/mL. Accordingly, the limit of detection (S/N = 3) for all the analyte was 1.5 ng/mL. The corresponding repeatability was 8.7% (n = 3). The high enrichment factor was obtained 195. Our developed SHS-HLLME/CD-IMS technique have some advantages such as, high-efficient extraction, using a small volume of organic solvent, reducing the cost and analyzing time of method compared previous works by using the CD-IMS which presents an economic, fast, and sensitive instrument for pesticides analysis.

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Photocatalytic removal of acid blue from aqueous solutions by G/ZnO composites under visible light radiation

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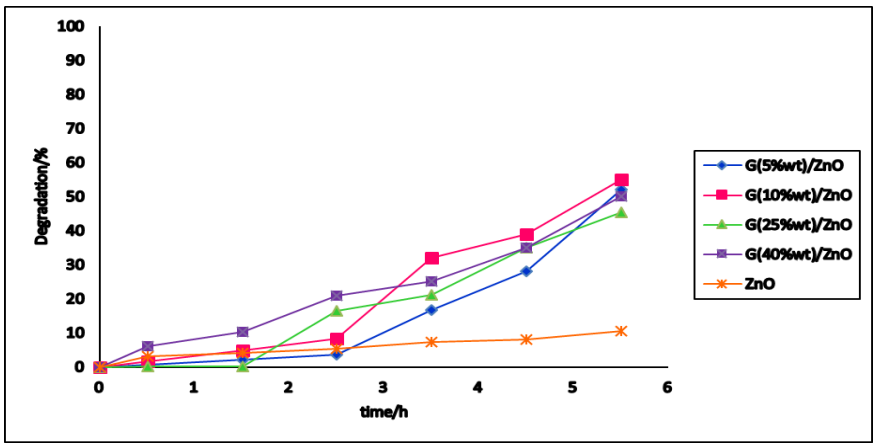

Photocatalytic degradation of acid blue by ZnO and G/ZnO composites under the visible light radiation

Abstract: Azo dyes are widely used in industrial processes and the effluents from these industries contain remaining dyes that affect water quality and become a threat to public health, since azo dyes or their metabolites (e.g., aromatic amines) are highly toxic and potentially carcinogenic. The photocatalytic oxidation is a promising method for decomposition of organic dyes. In this paper, in order to enhance the photocatalytic activity of ZnO, graphene (G) was loaded on ZnO to modify. The G/ZnO composites were prepared by an impregnation method and the photocatalytic activity of composites was evaluated by photodegradation of acid blue under visible light irradiation. The removal of acid blue was carried out in a glass beaker containing 100 mL acid blue aqueous (15 ppm) and 300 ppm of photocatalyst. The acid blue concentration in the solution was determined using a UV-Visible spectrophotometer. The degree of decolorization of acid blue solution by ZnO and G/ZnO composites with different mass ratio of graphene is shown in Graphical Abstract. It is clear that all of the photocatalysts modified by graphene exhibited higher photocatalytic activity than those of pure ZnO and G(10%wt)/ZnO showed the highest activity (photodegradation 55%). The introduction of graphene could increase light absorption, accelerate the absorption of the dye and inhibit the recombination of photoinduced electron–hole pairs and hence, improve the photocatalytic efficiency.

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investigation of quality and quantitive charectetristics sewage of municipal housetreatment in the performance municipal housetreatment(case study:housetreatment Eyvan city)

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Abstract: Today, due to the problem of water scarcity and droughts in the country, in many wastewater projects in the country, reuse of wastewater for irrigation and agricultural use and discharge to surface water are among the main objectives of these projects. In general, sewage Refined as an unconventional water source, a water source is safe even under drought conditions. In the present study, the performance of urban wastewater treatment plant,Eyvan County, was investigated over a period of 6 months. In order to measure pollution indices such as:T, coliform, turbidity, cations including(Na^+,Ca^{2+},Mg^{2+}), anions(F^-,Cl^-,NO_2^-,NO_3^-,Br^-,PO_4^{3-},SO_4^{2}), Heavy metals (Zn, Ni, Cr, Cu,Pb,Cd and Co), pH, COD, BOD_5, TSS, TDS, DO were periodically collected from wastewater, Then, the data were analyzed with the standards of the Iranian Environmental Protection Agency and its reuse for agricultural use and irrigation and discharge to surface water. The results of this study indicate that the measured values of operational parameters such as:Na^+,Ca^{2+},Mg^{2+},F^-,Cl^-,NO_2^-,NO_3^-,Br^-,PO_4^{3-},SO_4^{2-}, heavy metals (Zn, Ni, Cr, Cu,Pb,Co and Cd), pH, COD, BOD5, TSS, TDS ,T,turbidity, total coliform and Egg parasites , With an average of:150/3,79/56,88/49,./16, 48/79,2/16, 18/12, ./081,./95, 73/49,(./152, ≤./015, ≤./015, ./016, ≤./015, ≤./015,and ≤./015),7/76, 13/1,9/12,8/51,412/39,16/76,1/92, 3 and 0. The measured parameters correspond to the environmental organization standards for reuse in agriculture and irrigation, as well as for entering the surface waters. Finally, the performance of the city's water purifier is appropriate.

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Preparation and Characterization of Furo[3,2-*c*]coumarins in presence of nano-CuO/ZnO@GQDs-PrNH$_2$ under reflux condition

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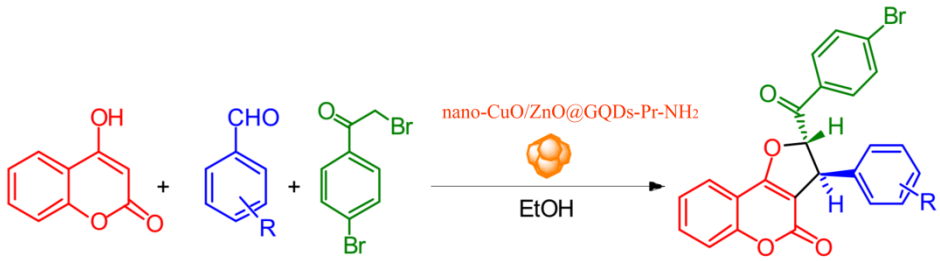

Abstract: N-doped Graphene Quantum Dots (N-GQDs) as new carbon nanomaterials is designed and useful for designing metal oxide nanocomposites**.** Unlike previous reports, we focused on the facile method and green synthesis of N-GQDs from citric acid and ethylene diamine in simple conditions. ZnO based nanocomposites are veryinteresting for photocatalytic degradation for its advantagessuch as direct band gap, anisotropic growth, high electronmobility and simple controlling of its morphology and on the other hand, CuO nanostructures for their uniqueproperties have been found many applications in catalyst, sensor and ceramic feld. Till now many studies have been reported to investigate ZnO/CuO nanostructures and nano composite. ZnO/CuO@N-GQDs-PrNH$_2$ nanoparticles have been used as an efficient and magnetically recoverable catalyst for the preparation *trans*-3-aryl-2-(4-bromobenzoyl) -2,3-dihydro-4*H*-furo[3,2-*c*]chromen-4-ones by multicomponent reaction in ethanol under reflux condition. Prepared furo[3,2-*c*]chromen and nano catalysts are characterized by X-ray diffraction analysis, ^{1}H NMR, IR spectroscopy and single crystal analysis that the obtained furo[3,2-*c*]coumarins were the *trans*-isomers.

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Synthesis of metal sulfides and their photocatalytic performance for aniline removal

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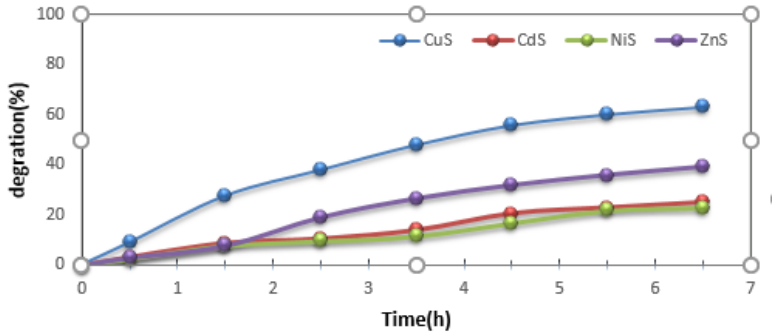

Photocatalytic degradation of anilin by metal sulfides under the visible light radiation

Abstract*:* Aromatic amines such as anilin are widely used in the manufacture of pesticides, rubber chemicals, pharmaceuticals, photographic chemicals and as intermediates in many chemical syntheses. Because of the potential carcinogenic of aromatic amines, many methods have been recently applied to eliminate them. The photocatalytic oxidation is a promising method for degradation of aniline. In this paper, we synthesized metal sulfides such as CuS, ZnS, CdS and NiS by hydrothermal method. In the typical reaction procedure, metal precursors were dissolved in distilled water and then thioacetamide was added. The mixture was transfered into Teflon-lined autoclave and was kept at high temperature for 12 h. Subsequently, the precipitates were filtered and dried in an oven. The photocatalytic activity of the prepared metal sulfides was investigated by the degradation of aniline under visible light irradiation. The removal of aniline solution was carried out in a glass beaker containing 100 mL aniline aqueous (15 ppm) and 500 ppm of photocatalyst. The aniline concentration in the solution was determined using a UV-Visible spectrophotometer. The results (Graphical Abstract) showed that prepared metal sulfides have photocatalytic activity under the visible light radiation and the CuS exhibited the highest degradation percentage of aniline (65 %). As a consequence, kind of metal is an important factor in photocatalytic performance of metal sulfides because it affects band gap energy of photocatalyst.

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Investigation Effect of Modified Graphene Oxide on The Hydrogel Properties use in Forward Osmosis Process

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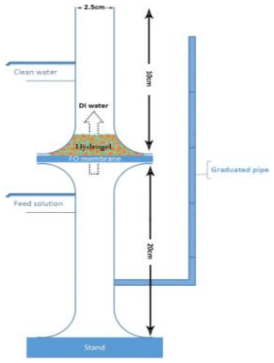

Figure1: Schematic illustration of the homemade FO set-up

Abstract*:* In recent years, one of the main important challenges faced by human societies is fulfilling the increased request for drinking water[1]. FO is a membrane-based separation process which spreads osmotic pressure gradient to be the driving force for water penetration[2]. A typical FO separation includes a feed solution, a semipermeable membrane as a separator and a solution with higher osmotic pressuere than the feed side as draw solution[3]. Due to the difference in osmotic pressure, water molecules get transferred from the feed side to the draw side, while the salt ions get rejected by the membrane[4]. One of the major challenges in the FO process is the inadequate choice of efficient draw agent. Moreover, selected draw agent is required to encounter basic criteria i.e high water penetration rate, high osmotic pressure, and suitable with membrane surface[5]. Recently, scientists are concentrating on polymer hydrogels as a draw agent in the FO process[6]. Polymer hydrogels due to the developed high osmotic pressure can prepare an adequate driving force to draw water from high salinity seawater across the membrane. Cross-linked polymer chains that are composed of three-dimensional network structures is the characteristic of polymer hydrogels[7]. ammonium, carboxyl, and sulphonic acid) in the structure of polymer hydrogel, is the reason why polymer hydrogels absorb a large amount of water[4]. The attendance and dissociation of various ionic species in the polymer hydrogel are the cause to swelling and higher internal osmotic pressure creation.

In this study,first grapheme oxide was modified with silane[3-Trimethoxysilyl propyl methacrylate](EGO),this material was used as a crosslinker agent for the preparation of hydrogel.The nanoparticles were then used to modified the acrylic acid(AA) and acrylamide(AAm) hydrogel properties in the forward osmosis processS.ubsequently,It was evaluated by XRD,FTIR,TGA and scanning electron microscopy tests.The result of the swelling test showed that the nanocomposite hydrogel obtained whit a more polar functional groups,more porous structure,have higher swelling and water absorption capacity than the pure polymer hydrogel.The EGO hydrogel also has significantly higher water flux than the pure polymer hydrogel.

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Sampling And Analysis Of Methyl Tert-Butyl Ether In Soil Samples Using A Solid-Phase Microextraction Fiber Prepared With In Situ Method By Metal−Organic Framework@Conductive Polymer Nanocomposite

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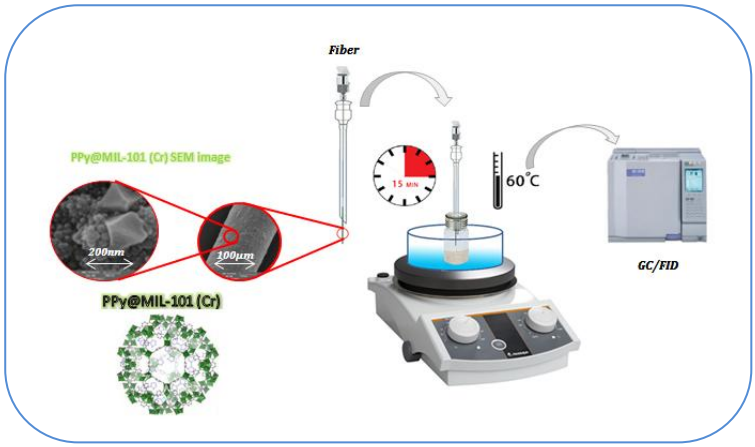

Abstract: The abundant use of Methyl tert-butyl Ether (MTBE) as an oxygen additive to gasoline can cause environmental pollution. So, to monitoring amount and provide applications for removal from environment, require practical methods to quantifying concentrations MTBE.

In this work, a simple, fast and efficient method for sampling and analysis a major volatile pollutant in soil has been introduced. We used the HS-SPME-GC-FID method to sampleing, extraction and determination of MTBE in soil, and, by introducing a new absorbet, we promoted the performance of the method. The MIL-101(Cr) (as a Metal−Organic Framework) and pyrrol (as a conductive polymer) were used to coated the surface of a stainless steel fiber by the new nanocomposite as PPy @ MIL-101 (Cr) via an in-situ electropolymerization. The properties nanocomposite were characterized by SEM and FTIR analysis. The optimal extraction conditions, i.e., extraction temperature, extraction time, desorption time, and desorption temperature were determined. Under the optimal experimental conditions, the method showed good analytical efficiency for extraction and concentration of the analyte from soil matrix. The calibration curve was linear over the range of (5–40000) ng g^{-1}, R^2>0.994). The LOD and LOQ were obtained 0.01ng g^{-1} and 0.4 ng g^{-1} respectively. Also, the fiber repeatability and reproducibility were determined. The method for extracting and measuring MTBE was tested in 6 real soil samples. Comparison of experimental results fiber with the commercial types, demonstrated the superiority of the proposed fiber for measuring MTBE. Experimental results showed the PPy@MIL-101(Cr) nanocomposite can be an appropriate coating with good sensitivity for analysis of MTBE as a volatile organic component (VOC) in environment.

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Effects of oxides of nitrogen on the production of ozone in the troposphere (noxious ozone)

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Abstract: Two types of ozone occur on planet Earth, the good ozone in the upper levels of the atmosphere and the bad ozone in the troposphere or simply at ground levels. Ozone is one of the main components of the photochemical oxidants that is produced by the action of nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Photochemical oxidants also act as secondary pollutants. Ozone in troposphere is produced either as free radicals or chain structure. The main source for oxides of nitrogen in the troposphere is the burning of the fossil fuels. Nitrogen dioxide (NO_2) is a major contributor for production of tropospheric ozone. In the presence of more than 10 ppt of NO_2 several oxidants such as nitric acid (HNO_3), per oxy-acetyl nitrate, ozone, etc. are produced. In the troposphere NO_2 can undergo photolysis with light waves in the range of 300-400 nm. In the polluted troposphere they react with NO producing organic oxy-radicals and NO2..NO2 subsequently photolyses leading to O3 formation.

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Ethanol Production From Waste Fruit Juices

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Abstract**:** Tropical countries, have the possibility of using agricultural lands for growing biomass to produce biofuels such as biodiesel and ethanol. This study applies Production of ethanol from juices with no expiration date and compare quality with ethanol from molasses. Quality of ethanol produced checked for the presence of impurities such as methanol, ethanol, aldehydes, heavy alcohols , esters and also optimal sugar. optimal sugar is 5-6%, also methanol, ethanol, aldehydes, heavy alcohols , esters with Spectrophotometer Milton Roy in Wave Length 540-580 (nm) is normal. The ethanol produced from fruit juice was also 96 degrees to produce that our goal was the same amount of ethanol. Due to reduced molasses in the second half of the year as well as being high cost of alcohol production from molasses, the existence of alternative substances for economical reasons and the closure of the factories is essential. According this results, fruit juices can be used as a substitute molasses in the production of ethanol and is also used to reduce costs and other advantages of fruit juices is the deramatic reduction in the use of water in the production process and one of the most important problems to use molasses is reducing the waste generated by wastewater that is very important for the environment and ground water. In this study production problem were known and almost all of them were eliminated or reduced to a minimum and the production time is minimized by optimizing the conditions and preventing the waste of millions of tons of suger.

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Survey on the effluent of Ilam City Wastewater Treatment Plant

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Abstract*:* According to discharge outlet waste of ilam city wastewater treatment plant to godarkhosh river and agricultural uses in downstream, in the current study in timespan 8 months, quality indicators of outlet waste contains PH, BOD_5, COD, DO, Turbidity, EC,TDS, TSS, Cl^-, NO_3^-, PO_4^{3-}, Ca^{2+}, Mg^{2+}, TH, Fecal coliform, Total coliform measured. All the experiments were conducted to the standard method for the examination of water and wastewater reference and the results were analysed by Excel . Then results were compared to standars of environmental protection agency sewage discharge to surface waters and irrigation of agricultural product .According to the information obtained, because of population growth and increased production volum of sewage need to develop and construction the second phase and Shold be corrective actions in reducing parameters such as BOD, COD, TSS, Turbidity, microbial done, and the effluent not ability to evacuate to surface waters and agricultural uses.

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Using nano-CuO/CeO_2@GQDs-PrNH_2 in the One-Pot Synthesis of 2-Amino-2-Chromenes under reflux condition

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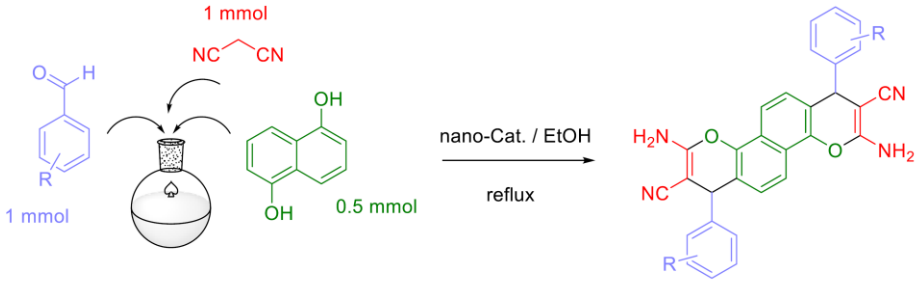

Abstract

CuO nanostructures for their unique properties have been found many applications in catalyst, sensor and ceramic field and on the other hand, CeO 2 nanoparticles (NPs) have shown promising results as therapeutic agents in biology and medical sciences. In the present work, we focused on nanostructured CuO/CeO_2 composites are green recyclable catalysts and successfully synthesized using facile condition such as hydrothermal. In addition, many studies have been assigned to investigate N-doped Graphene quantum dots (N-GQDs) as new carbon nanomaterials are well-known for its potential applications for biosensor, drug carrier and also well characteristic of catalytic activity in chemical reactions. Nano-CuO/CeO@ N-GQDs-Pr-NH_2 as novel catalyst have been used for the synthesis of 2-Amino-2-Chromenes by multicomponent reactions of malononitrile, 1,5-naphtalenediol and aromatic aldehydes under reflux conditions. 2-Amino-chromenes are an important class of heterocycles as they are the main constituents of many natural products. They are widely used as cosmetics, pigments, and potential biodegradable agrochemicals. Fused chromenes are biologically active compounds with a wide range of activities such as antimicrobial, mutagenicitical, antiviral, sexpheromonal, antitumoral, and central nervous system activities. Thus, the synthesis of 2-amino-2-chromenes is very important for organic chemists. Prepared 2-amino-2-chromenes and nano catalysts are characterized by X-ray diffraction analysis, ^{1}H NMR, IR spectroscopy.

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Application of ZnS-Cu Nanoparticles Loaded on Active Carbon for Removal of Malachite Green Dye and Its Optimomization

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Abstract: Environment contamination through variety of sources poses serious environmental problems due to their persistence and recalcitrance in nature. The presence of dyes in waterways is easily detectable even at very low concentrations. Among the various types of processes for dye removal (physical, chemical, biological methods, electrochemical oxidation and adsorption methods), the adsorption process is one of the most efficient.

In this study, ZnS-Cu nanoparticles loaded on activated carbon (AC) applied as adsorbent for the removal of malachite green dye of wastewater. The structure properties of ZnS-Cu nanoparticles, AC and ZnS-Cu-AC were identified by XRD and SEM. Response surface methodology was applied to evaluate for interactive effects of adsorption variable and optimize the adsorption process. The effects of adsorbent dosage, pH value, contact time and initial dye concentration were studied by batch method. The optimal parameter of adsorption process is adsorbent dosage 0.0215g, pH value 6.0, contact time 3.681 min and concentration of 8.482 mg L^{-1}. Isotherm modeling revealed that the Langmuir equation could better describe the adsorption of dye onto the ZnS-Cu as compared to other models. Kinetic data were appropriately fitted with the pseudo-second order adsorption rates for ZnS-Cu–AC.

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A low-cost and simple low-pressure solid-phase microextraction device for sampling of volatiles organic compounds in complex solid matrices

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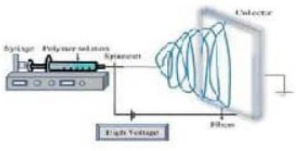
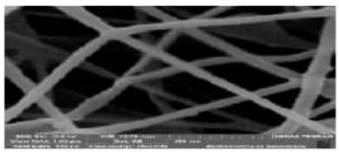
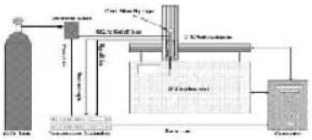

Abstract: A simple, low-cost, reliable vacuum assisted headspace solid-phase microextraction (VA-HS SPME) device was fabricated and evaluated. It was coupled with gas chromatography flame ionization detection (GC-FID) and applied for direct extraction and determination of polycyclic aromatic hydrocarbons (PAHs) in polluted soil samples, without any sample preparation step. The nanostructured octadecyl silica/polyvinyl alcohol (NS-ODS/PVA) was synthesized and coated on a stainless-steel fiber by electrospinning method, as the sorbent. The nanocomposite structure was characterized by Fourier Transfer infrared spectrometry (FT-IR) and scanning electron microscopy (SEM). Parameters affecting the performance of the developed method, including extraction temperature and time, vacuum level, volumes of vacuum chamber and sample vial, and desorption conditions, were investigated and optimized. This sampling strategy enables low LODs and provides a powerful and reliable ultrasensitive method for analysis of PAHs in contaminated solid samples. Under the optimal conditions, good linearity of the calibration curves ($R2 > 0.99$) was obtained over the concentration range of 0.01-1.0 µg g^{-1}. The limits of detection, limits of quantification and relative standard deviations were found to be in the ranges of 0.05-0.17 ng. g^{-1}, 0.2-0.6 ng g^{-1} and 9.7-15.4% (n = 6), respectively. For further evaluation, the analytical performances of the proposed method were compared with some of the previously reported methods. The results showed wider LDRs and lower LODs for the developed procedure, compared with the published reports. Finally, the proposed VA-HS SPME method was successfully applied for the extraction and determination of PAHs in contaminated soil samples.

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Solvent free method for determination and analysis of volatile components from Stachys lavandulifolia with Periodic mesoporous organosilica based on alkylimidazolium ionic liquid

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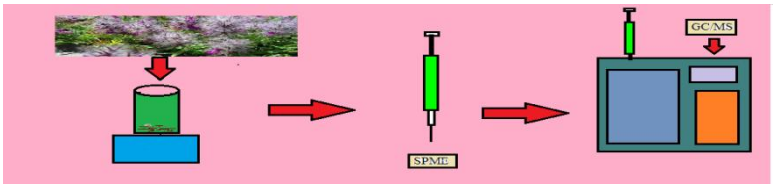

Abstract*:* A microwave-assisted headspace solid phase microextraction (MA-HS-SPME) method with a periodic mesoporous organosilica based on alkylimidazolium ionic liquid (PMO-IL) was prepared and used as a highly porous fiber coating material was successfully applied to the study of the essential oil composition of Stachys lavandulifolia. The sample was irradiated by microwave radiation and its volatile components were collected by the fiber from the sample headspace and directly injected into a GC-MS injection port for analysis. A simplex method was used for optimization of three different parameters affecting the efficiency of the extraction. Under the optimized conditions (i. e. sample weight, 2 g, extraction time, 2.0 min and microwave power 350 W), the PMO-IL nanonporous fiber could efficiently adsorb volatile components of Stachys lavandulifolia. The suggested technique, relative to HD can equally be used to monitor all the sample components easily, but it will require less sample quantity and duration. A few experiments based on the simplex method proved it to be a fast while efficient method that can be used to optimize micro-extraction conditions.

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Fast analysis volatile compounds from *Artemisia absinthium* with nanoporous aluminum wire without using the chemical solvents

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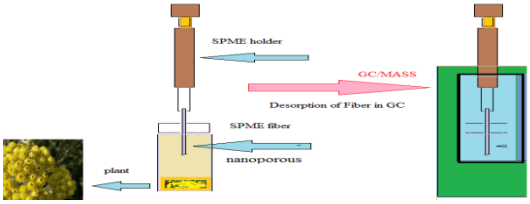

Abstract*:* In this study, the efficiency of nanoporous on aluminum wires as fibers for headspace solid-phase microextraction (HS-SPME) of volatile compounds from *Artemisia absinthium* were investigated and compared with two anodized methods. Solid-phase microextraction (SPME) is based on the distribution of analytes between sample solution and a fiber coated with a stationary phase. Commercially available SPME fibers have a number of drawbacks including relatively low operating temperature (generally in the range of 240–280◦C), mechanical fragility, low stability in acidic or alkaline samples, less selectivity and swelling in organic solvents. The prepared fibers are durable with very good chemical and thermal stability which can be coupled to GC and GC/MS. A one at-a-time optimization strategy was applied for optimizing the important extraction parameters such as extraction temperature, extraction time, sample mass and added water. Compared with hydrodistillation(HD), HS-SPME, provide the advantages of a small amount of sample, timesaving, simplicity and cheapness. In this method determination the volatile compounds without used the chemical solvents. The proposed methods are environmentally friendly, because no toxic solvent is used. Low cost, high-temperature resistance, firmness, and long durability are the main advantages of these fibers that were used for analysis of volatile compounds of *Artemisia absinthium.* Compared with conventional HD method, HS-SPME/GC–MS is a simple, rapid, solvent-free and efficient method for the analysis of essential oils in *Artemisia absinthium* with low sample amount.

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Synthesis of new modified magnetic nanocomposite and it's application for effective removal of metallic ions

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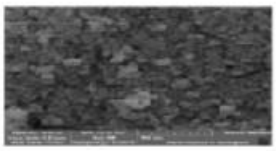

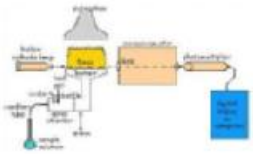

Abstract: Heavy metal pollution has become a serious threat to human health. Development of analytical methods and Synthesis powerfull sorbents for pollution determination has been Effective. In this research, a simple and inexpensive method for the synthesis of a magnetic mesoporous nanocomposite sorbents using agarose gel as a template was developed. The prepared adsorbent was immobilized with a Schiff's base of sulfonyl derivatives as a ligand. The synthesized sorbent was characterized by Fourier transform infrared (FT-IR), scanning electron microscopy (SEM), X-ray diffraction (XRD) and Flame atomic absorption spectroscopy (AAS) for metallic ions removing were used. The applicability of the new nanoporous material was examined as an extracting medium to isolate heavy metals from aqueous samples. The influence of three parameters pH, temperature and contact time on the removal of metallic ions by a Central Composite Design (CCD) under Response Surface Methodology (RSM), were optimized. Under these optimize conditions maximum metallic ions removal efficiency was obtained about 99.66%. The sorbent could be easily regenerated by a 0.۱ mol.L^{-1} HCl solution and it's recycling also show more than ۹۵% removal of heavy metals.

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Synthesis and characterization of new nano-structured molecularly imprinted polymer coated magnetic multiwalled carbon nanotubes for selective separation of ketoconazole from aqueous solutions

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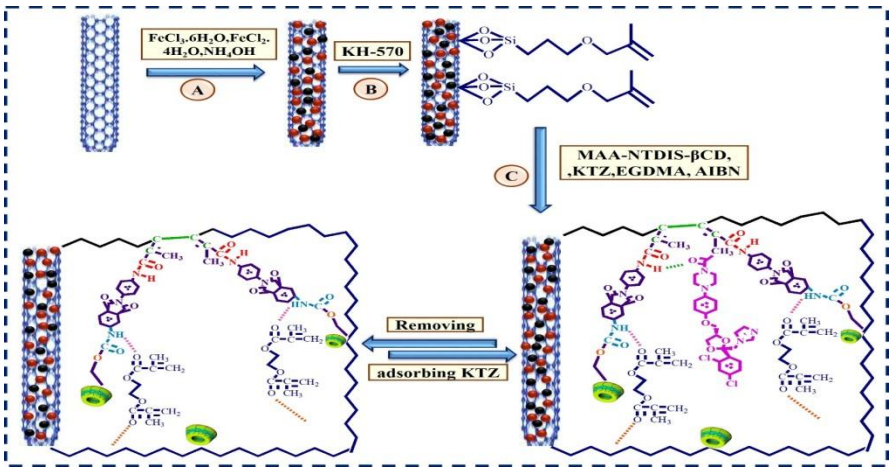

Abstract

In this work, new magnetic molecularly imprinted polymers based on multiwalled carbon nanotubes (MMWNTs-MIPs) were synthesized with specific selectivity to ketoconazole (KTZ) as antifungal drug. Firstly, N-(4-carboxy Phenyl) trimellitimide diisosyanate (NTDI), was prepared from reaction of Trimellitic anhydride (1), 4-amino benzoic acid (2) in two steps. Then, methacrylic acid was functionalized by β-cyclodextrin and diisosyanate (MAA-NTDIS-β-CD). MAA- NTDIS-β-CD were used as a functional monomer, ketoconazole as a template, ethylene glycol dimethacrylate (EGDMA) as cross–linking agent and 2,2´- azobisisobu-tyronitrile (AIBN) as initiator. The synthetic compound was characterized by Field Emission Scanning Electron Microscopy (FESEM) techniques, X-ray diffraction (XRD), vibrating sample magnetometer (VSM), Brunauer-Emmett-Teller (BET) and Fourier transform infrared spectroscopy (FTIR). The effect of parameters such as solution pH, contact time, temperature and initial concentrations in controlled release of ketoconazole using MMWCNTs-MIP have been estimated. Batch mode adsorption experiment was carried out to investigate the specific adsorption kinetics of the MMWCNTs-MIP. The MMWCNTs-MIP shown good affinity with a maximum adsorption capacity of 49.26 mol $g^{-1}$and exceptional selectivity toward KTZ.

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Synthetic Of New Polyester Networks Containing β-cyclodextrin Cavities For Removal Of Paraben Derivatives From Water Resources By Inclusion Complexes

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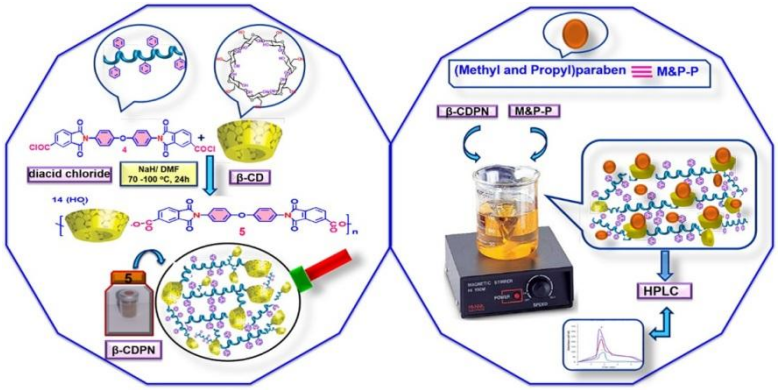

Abstract: The aim of this work was developed, new thermally stable synthetic polyester network containing β-cyclodextrin (β-CD) cavities with good absorbent behavior to remove organic pollutants such as parabens derivatives (methyl and propyl parabens) into aqueous solution. β-Cyclodextrin polyester network (β-CDPN) (6) was synthesized by reaction of β-CD (5) with N,N´-(4,4´-diphenylether) bis trimellitimide diacid chloride (4) as cross linker agent in the presence of sodium hydride. Diimide acid chloride (3) as synthetic cross linker agent prepared by two-step reactions. The sorbent process optimized by four different parameters such as pH, temperature of the solution, contact time, β-CDPN ratio and data measure by using HPLC technique. Results show the high absorbent capacity of parabens (about 99%) by β-CDPN cavities. On the other hand, the results of adsorption kinetics and equilibrium isotherms (Langmuir, Freundlich models) shown high correlation coefficient (closer to a unit) for the pseudo-second-order and great fitted the adsorption data with the Langmuir isotherm model. The adsorption ability of β-CDPN (6) kept nearly unchanged after five filtration-regeneration cycles, also TGA and DTG experiments show β-CDPN (6) has good thermal stability and able to use in a wide range of temperatures.

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Synthesis of iron oxide magnetic nanoparticles modified with silica based molecularly imprinted polymer for the extraction and preconcentration of phenazopyridine

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Abstract: When modified with a specific functional polymer, for example, the molecularly imprinted polymer (MIP), these magnetic nanoparticles coated MIP could be used to separate and concentrate chemicals more conveniently with the help of an external magnetic field. In this study, we focused on the development of a new methodology for preparing MNPs attached functional moieties of specific recognition with tailor-made properties through molecular imprinting technique. Fe_3O_4 MNPs were synthesized by modifying the procedure as reported by Kanget et al. [1]. For the synthesis of the MIP@Fe_3O_4 composite, first, 20 mL of cyclohexane, 3.6 mL of Triton X-100, 4.4 mL of butanol and 1.0 mL of distilled water were stirred for 5 min. The Fe_3O_4 (0.1 g) was added to the above solution, then stirring 30 min in room temperature. Second, 200 µL of TEOS and 100 µL of NH3·H2O were added to the above reaction solution. The mixture was stirred for 10 h so that the Fe_3O_4 was successfully encapsulated with silicon. Third, 0.1 g of phenazopyridine (dispersed in 20 mL of ethanol) and 250 µL of APTES were added to the system with stirring for 1 h. Afterwards, 500 µL of TEOS and 1 mL of $NH_3 \cdot H_2O$ were added in the microemulsion and stirred for 12 h. The silica coating MNPs Fe_3O_4@SiO_2 reacted with phenazopyridine to produce silica surface functionalized with MIPs. The prepared adsorbent was characterized by scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX) and Fourier transform infrared spectroscopy (FT-IR). In conclusion, we explored synthesis of phenazopyridine-imprinted polymer coated Fe_3O_4 magnetic nanoparticles that exhibit a much higher specific recognition and saturation magnetization.

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Preparation of Nanocomposites Based on Hydroxyapatite and Study on Photocatalytic Degradation of Pharmaceutical Pollution in Aqueous Media

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Abstract: Application of photocatalysis as a remedy to the environmental problems has progressed remarkably in recent years. Heterogeneous photocatalysis by use of semiconductor materials has emerged as an attractive advanced green technology in the environmental field such as water purification and air clean-up. It has high efficiency for decomposing a wide range of dyes, bacteria, detergents, pesticides, and volatile organic and inorganic compounds into carbon dioxide, water and mineral acids. If these compounds enter the environment, they will have adverse effects on non-target organisms.

Hydroxyapatite (HAP) is a well-known biomaterial widely used for several biomedical applications like tissue engineering scaffolds, bone implantations, inorganic support and, as a catalyst. It has high importance in material research and pharmaceutical applications because of its excellent biocompatibility, bioactivity, absorbability, stability, reusability, performance, mechanical and, rich surface properties. Silver vanadate as an n-type semiconductor is very attractive because it has a narrow band gap (2.2 eV) and high photocatalytic activity. It can absorb most of the visible light and reduce energy consumption.

In this investigation, we have prepared nanocomposites based on hydroxyapatite, including silver vanadate nanoparticles via a facile precipitation method which used to degrade a digestive anti-inflammatory drug in aqueous solutions under visible light irradiation to find the optimized condition. The synthesized products were characterized by field emission scanning electron microscopy (FE-SEM), energy-dispersive spectroscopy (EDS), mapping analysis, X-ray diffraction (XRD), and Fourier transform infrared spectroscopy. Silver vanadate nanoparticles were observed with the average particle size in the range of 25-70 nm that dispersed on the surface of hydroxyapatite uniformly. Furthermore, The factors affecting the degree of photocatalytic degradation, such as different concentrations of the drug, different quantities of catalyst and various pHs were studied. These conclusions are relevant to the focus of the environmental chemistry including control of environmental pollution problems, removal Pharmaceuticals in water and wastewater, advanced oxidation processes, developments in water management technologies.

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A New Approach in Advanced Wound Care by Replacement of Chemical Antibacterial Agents With Natural Herbal Drug Extracts in a Nano Wound Dressing

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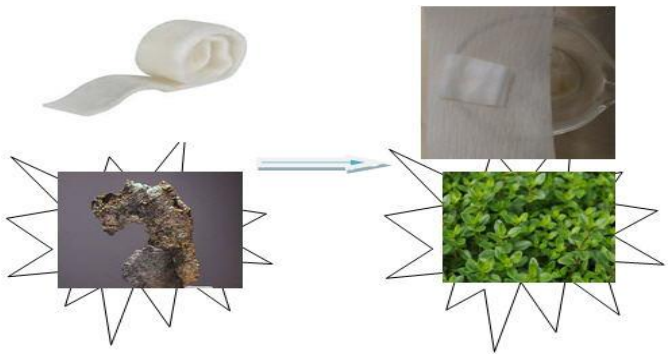

Abstract : Wounds are one of the most important issues in wound treatment that negatively affects the quality of life and their proper treatment has been very much considered. Delay in wound healing, especially wounds caused by diseases such as diabetes, obesity and cancer, is one of the key issues that are currently being addressed by scientific researches. As the protective layers of skin during the injury get damaged the microbial and bacterial agents invade the wound area and it became infected. For resolving this problem chemical antibacterial agents such as Silver, Iodine, Tetracycline Hydrochloride and other chemical agents are loaded into the matrix of wound dressings. But these chemicals have side effects and environmentally are not healthy and show some poisonous effects. The purpose of this study was to evaluate antibacterial activity of natural antibacterial agents such as herbal drug extracts by loading them into matrix of wound dressing.To do this, a typical nano wound dressing is made by electrospinning of a FDA approved material like Cellulose Acetate. Therefore different concentrations of this compound were tested to achieve an electrospinable solution and then regarding the total volume of solution a partial volume of a typical antimicrobial herbal drug extract like Thyme was added into the solution and the final solution was electrospun. Antibacterial test and other invitro analysis showed that this new wound dressing had a proper antibacterial activity against the common bacteria's like Staphylococcus aureus and Escherichia coli. morphological analysis showed that this fiber wound dressing had a nano structure. Therefore this can be concluded that loading antibacterial herbal drug extract into the matrix of wound dressing can be a good substitution for chemical compounds.

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Investigating The Effect of Extraction Solvent Kind on the preconcentration of Co(Ⅱ) By Single Drop Microextraction

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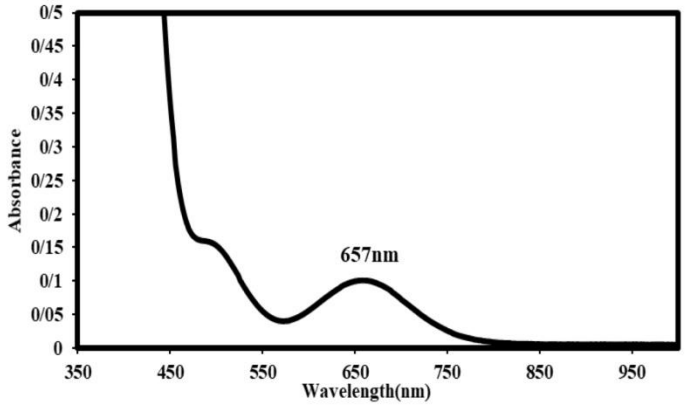

The spectrum obtained from the cobalt (II) complex in optimal conditions

Extraction solvent	Calibration curve	Limit of detection	correlation coefficient	RSD	Enrichment factor
Ionic liquid	0.4-6 mg/L	0.08 mg/L	0.997	1.4%	25.95
Carbon tetrachloride	0.5-12 mg/L	0.04 mg/L	0.9976	3%	19.17

Abstract: Since cobalt is a natural element in the environment, the measurement of its trace amounts in water is very important. This investigation was done to develop a method which is accurate with green chemistry principles and according to simple, effective, and low cost environment for measuring cobalt. In this work, the effect of extraction solvent kind, ionic liquid 1-octyl-3-methylimidazolium hexafluorophosphate [$\mathbf{C_8}$ MIM][PF_6] or carbon tetrachloride CCl_4 was investigated to measure the trace amounts of cobalt in aqueous solution using single-drop microextraction. In microextraction, the volume of the extractor phase is a minimum amount relative to the sample volume [1]. The achieved results under optimum conditions such as pH of test solution (pH=6), amount of chelating agent (2.4% m/v), the volume of micro drop (20 µl), microextraction time (30 min) and stirring rate (300rpm) were shown in Table.

The enrichment factor has been increased by using ionic liquid Because CCl_4 has a higher vapor pressure than ionic liquid, an amount of it may be evaporated during the extraction process, so the repeatability in the drop volume decreases, which reduced the repeatability of the amount of extraction.

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Reduction of Hospital Infectious Disposal Wastes by Production of a Biocompatible and Antibacterial Wound Dressing

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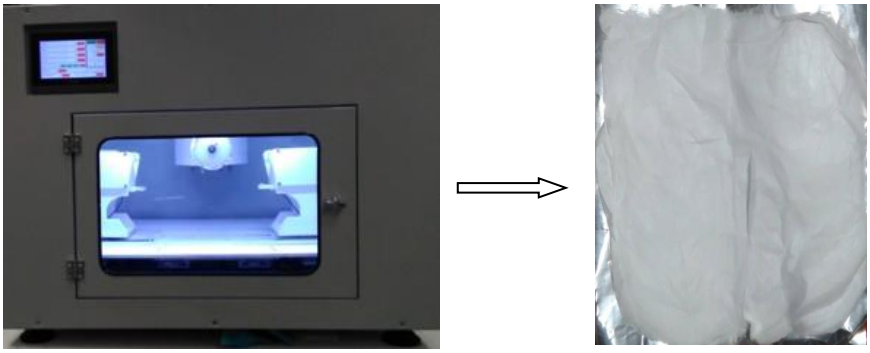

Abstract: The aim of this study is to synthesize a biocompatible and antibacterial nanofiber wound dressing Containing Gelatin and Thyme essential oil as antibacterial agent by electrospinning technique. Gelatin has a potential capability in migration of fibroblast cells and growth factors to the wound area and Thyme essential oil take an important role in strengthening antibacterial activity of wound dressing. As a result the nanofiber obtained will accelerate the healing of wounds and during the healing process the less amount of Hospital disposal wastes are produced. On the other hand traditional wound dressings take long time for wound healing and a large amount of hospital infectious wastes are produced. To do this, solutions with different ratio of Cellulose Acetate to Gelatin were prepared to achieve smooth and beadless fibers with small diameter of fibers and a porous structure. Regarding the above mentioned factors the best ratio was chosen and invitro analysis was taken out. The invitro evaluation tests showed that this new wound dressing would be a promising candidate as an effective wound dressing by having a considerable effect on healing of wounds. So by using these wound dressing a large amount of hospital infectious wastes containing disposed wound dressings can be reduced and it also decreases the cost and time of wound healing process.

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Synthesis of Magnetic MCM-41 Mesoporous Functionalized with Dipicolinic Acid for Preconcentration and Determination of Some Cationic Dyes in Water Samples

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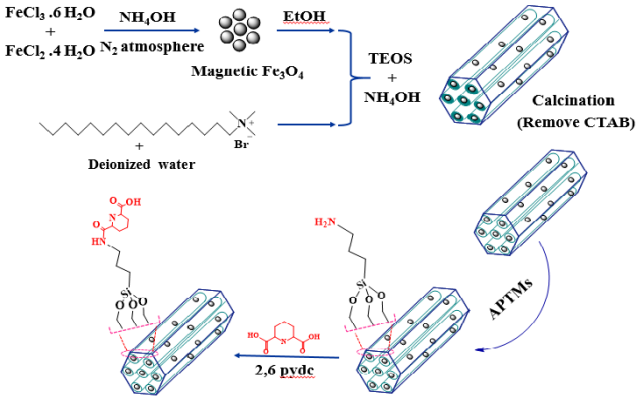

Abstract: The process of discharge of wastewater containing different amounts of dyes in the rivers, seas and oceans causes environmental problems because of the difficulty of disposing of them because of their non-biodegradable nature. As a result, their survival has harmful health effects on humans such as carcinogenicity, respiratory poisoning and fertility reduction .Depending on their chemical composition, dyes can be classified into anionic and positive dyes. Due to the presence of sulfonate groups of anionic dyes in its aqueous solution, it can show negative charge while due to the presence of amino or Sulphur containing groups of the cationic dyes in aqueous solution which show a positive charge .Numerous procedures were applied for the determination of dyes in different matrix, such as ion polarography, capillary electrophoresis, chromatography, and strip in Voltammetry, were suggested spectrophotometric technique for determination of various synthetic dyes. Solid phase micro extraction with usage of nanoparticles based adsorbent extensively applied for determination of dyes. In this study, the magnetic nanoparticle Fe3O4 protected with MCM-41 functionalized with dipicolinic acid or functionalized magnetic MCM-41, was synthesized and characterized as a new sorbent. Various techniques including fourier fransform infrared spectroscopy (FT-IR), X-Ray Diffraction (XRD), energy dispersive X-ray (EDS), Thermogravimetric Analysis (TGA), Derivative Thermogravimetry (DTG), Differential Thermal Analysis (DTA) and BET were used for characterization of mesopprous. The magnetic properties of synthesized nanoparticles was investigated by vibrating sample magnetometer (VSM). This magnetic mesoporous, as a new solid phase was used for preconcentration of Methyl green dye in microextraction method. The preconcentrated dye was determined by spectrophotometric method. The effective parameters on the extraction efficiency including, adsorbent dose, pH, contact time, volume of eluent and ultrasonic bath time according to Taguchi design were investigated and optimized. Then, in the optimal conditions, the calibration curve of method was plotted and it was linear at the range of 0.008 – 0.750 mgL^{-1}. The preconcentration factor and the detection limit were 40.44 and 0.003 mgL^{-1} respectively. The effect of some external species including dye, cation and anions were investigated. The method was successfully applied to determined methyl green dye in several water samples including Yasouj tap water, Cheshmeh Mishi water and Bahrambieghi waterfall water.

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Simultaneous Removal of 9-Aminoacridine and Orange Acridine Dyes by Mesopor MCM-41@NH_2@pydc

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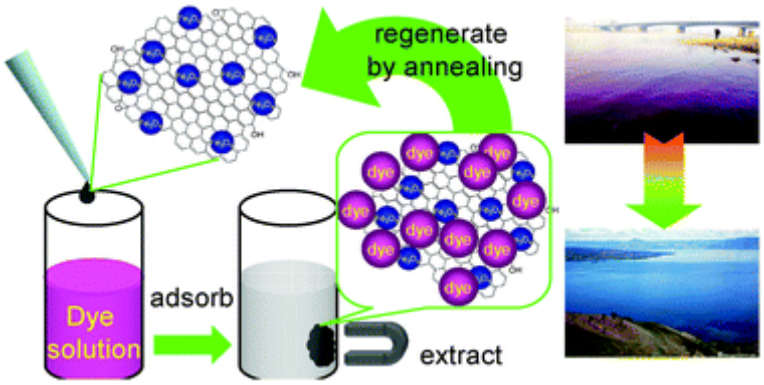

Abstract : The dye stuff lost in the textile industry poses a major problem to wastewater sources. Indeed, textile industry produces high levels of dye and floating solid materials. It is estimated that 5000 tons of dyeing materials are discharged into the environment every year. These poisonous materials absorb the oxygen of the water. This has risen much as it threatens human life and the environment. Industrial wastewaters contain various kinds of toxic substances such as cyanides, alkaline cleaning agents, degreasing solvents, oil, fat, and metals. Common ways of wastewater treatment include adsorption, sedimentation, chemical analysis, chemicoagulation, biological methods, and advanced oxidation procedures. However, these approaches are not without their disadvantages. Biological methods, for example, take much time and cannot degrade complicated dyes. Acridine and its derivatives, well known as DNA intercalates, have been widely studied from a variety of viewpoints, such as synthesis, physiochemical properties structural requirements and biological activities Acridine was first developed as dyes and during the early 20th century and its pharmacological properties were evaluated.

At first mesopor MCM-41 @ NH_2 @ pydc was synthesized and characterized for used as a new adsorbent to simultaneous removal of 9-aminocartidine and orange acaridine. Various techniques including fourier transform infrared spectroscopy (FT-IR), X-Ray Diffraction (XRD), energy dispersive X-ray (EDS), Thermogravimetric Analysis (TGA) and BET were used for characterization of mesopprous. The magnetic properties of synthesized nanoparticles were investigated by vibrating sample magnetometer (VSM). This magnetic mesoporous, as a new solid phase was used for removal of 9-aminoacridine and orange acridine. The removal of this dye was determined by spectrophotometric method. The effective parameters on the removal process including, adsorbent dose, pH, contact time according to Taguchi design were investigated and optimized.

The isotherm models such as Langmuir, Freundlich, and Temkin were evaluated and the equilibrium data were best described by the Langmuir model. The small amount of this adsorbent (0.06 g) is applicable for removal of high amount of 9-aminocartidine and orange acridine (>90%) in reasonable time (30 min).

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Headspace single drop microextraction based on deep eutectic solvent for extraction of triazole pesticides in water samples by gas chromatography

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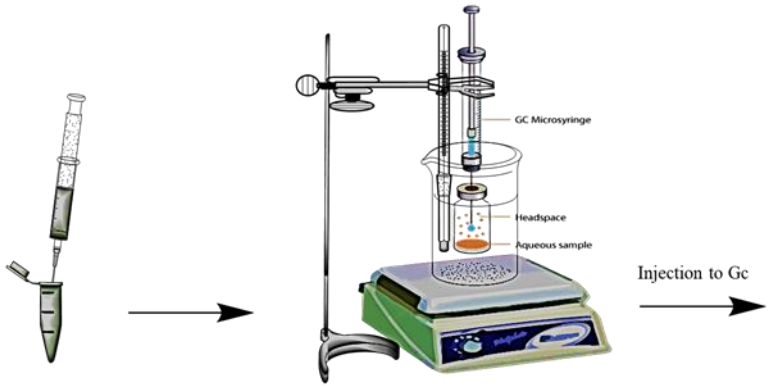

Abstract: In the present work, a new class of solvents in the name of deep eutectic solvent were prepared and used as an extraction solvent in a headspace single drop microextraction method for the preconcentration and extraction of triazole pesticides from real sample by gas chromatography method. Three different deep eutectic solvents were prepared by a mixing of choline chloride as a hydrogen bond acceptor and 4-chlorophenol, ethylene glycol and phenol as a hydrogen bond donor. The significant parameters in headspace solvent microextraction process such as type of solvent, drop volume, stirring speed, extraction temperature, extraction time and pH were optimized. Synthesized Choline chloride: 4-chlorophenol deep eutectic solvent is the highest extraction efficiencies for the target analytes among the tested deep eutectic solvents. The limit of detection calculated between 0.01 and 100 mgL-1 with the relative standard deviation ranging from 3.9 to 6.2. In the optimum conditions suggested headspace solvent microextraction was successfully used for the determination of triazole pesticides in vegetables and fruit juice samples.

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Optimization, extraction and functionalization of chitosan derived from southern shrimp shell

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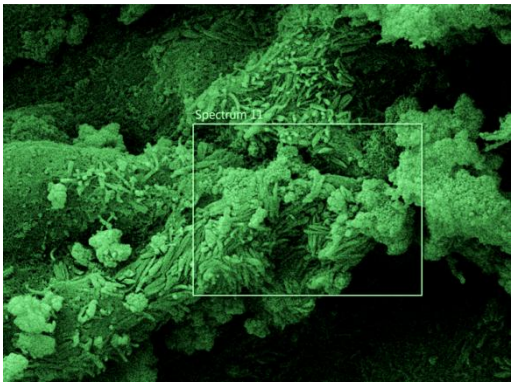

Abstract: Regarding environmental contamination the use of biodegradable polymers is necessary. Chitin and chitosan , as the most abundant polysaccharide in nature and possessing characteristics such as high biocompatibility and low toxicity and biodegradability and acceptable antimicrobial properties , high potential for the preparation of raw materials and useful materials is one of the most suitable option . The present study aims to optimize the extraction of chitin and chitosan with the aim of saving time and raw materials , as well as the functionalization of chitosan with magnetic iron oxide nanoparticles for use as filler .

Analysis Method: According to the previous studies [1-25], in this study , the pretreatment method was selected by changing the temperature range and reducing the consumed raw materials and high efficiency as the optimal method for extracting chitin and chitosan . In this method, the dried shrimp crust was used at room temperature .After the milling of the crust ,the powder was added to the powder for deproteinization and dehydration of 0.68% molar acydcholoride. The residue was washed and after several hours immersion in water , sodium hydroxide 0.62% molar was added. The resulting sample was dried in an oven and chitin was obtained .

Conclusion: chitosan is known as one of the best absorbents and fillers due to the hydroxyl and amine groups. When magnetic nanoparticles are coated with chitosan , they not only protect against oxidation , but also reduce toxicity ,reduce accumulation and increase stability magnetic fillers cause magnetic induction in composites.

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Water Permeation through Aquaporin 1 (1FQY) Membrane Protein with Steered Molecular Dynamics Simulation

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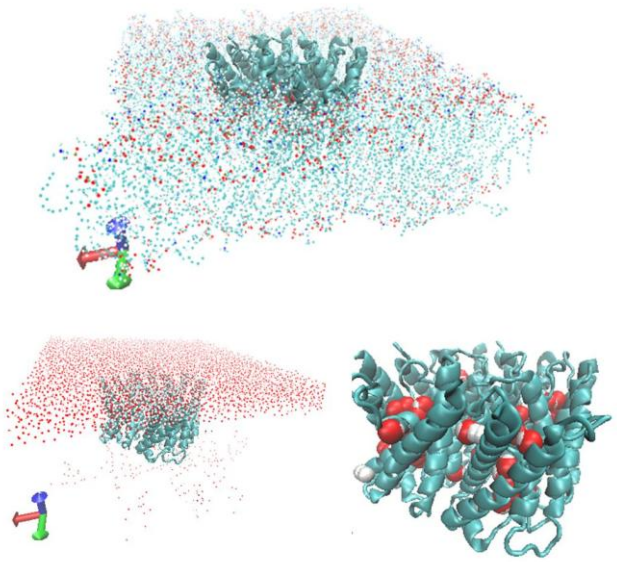

Abstract*:* Nowadays, many countries in the world suffer from the lack of sufficient fresh water resources. In these areas salty water desalination can be a solution for water scarcity. Advanced protein membranes, aquaporins, with spectacular ability to allow water to pass through are commonly studied. In this paper water permeation capability of Aquaporin 1 embedded in a POPC lipid bi-layer is studied using a Steered Molecular Dynamics simulation. First protein was embedded in a lipid bi-layer and then they both solvated by water. After minimization and running four nanoseconds of equilibrium layer of the water was forced downward to investigate the capacity of nano pores of the protein in permeating water molecules. Results show acceptable correlation with reported experimental values. This study also accentuates the importance of boundary conditioning of the aquaporin in order to achieve accurate results.

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3- Molecular dynamics simulation of proteins under high pressure: Structure, function and thermodynamics Hiroaki Hata, Masayoshi Nishiyama, Akio Kitao, Biochimica et Biophysica Acta (BBA) - General Subjects, Available online 11 July 2019

Optimization of Ti/MoS_2/N-TiO_2 electrode preparation to use in visible light photocatalytic ozonation process

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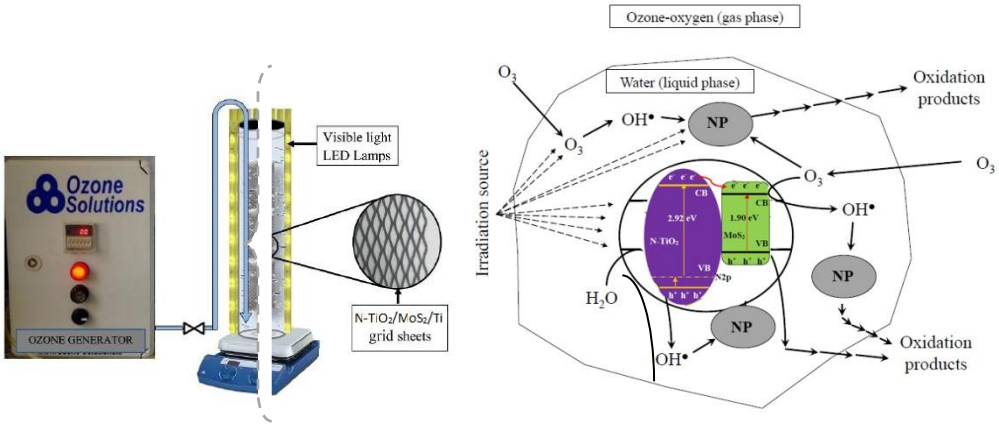

Abstract: Photocatalytic ozonation is one of the most promising methods for elimination of pharmaceuticals from water due to its several advantages [1]. However, the effective photocatalysts such as TiO_2 and ZnO are commonly excited with ultraviolet light and used in the suspension form, which is difficult to separate them from the treated water [2]. In this work N-TiO_2 and MoS_2 particles was synthesized. The particles were simultaneously immobilized on the surface of titanium plates by electrophoretic deposition method [3]. Effect of MoS_2:N-TiO_2 mass ratio was investigated to prepare effective immobilized visible light photocatalyst. The prepared Ti/MoS_2/N-TiO_2 electrode was characterized by SEM, XRD and DRS analysis.

Ability of the prepared Ti/MoS_2/N-TiO_2 electrode in the degradation of naproxen by visible light photocatalytic ozonation process was investigated. Effect of visible light power, ozone flow rate and pH on the naproxen degradation efficiency was investigated. According to the obtained result, the naproxen degradation efficiency was increased with visible light power and ozone flow rate. This study shows the synergistic effect between photocatalysis and ozonation process. The prepared Ti/MoS_2/N-TiO_2 electrode has good mechanical and chemical stability during the photocatalytic ozonation degradation processes through recycling after several times.

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Process Efficiency in Advanced Membrane-based Water Desalination Processes

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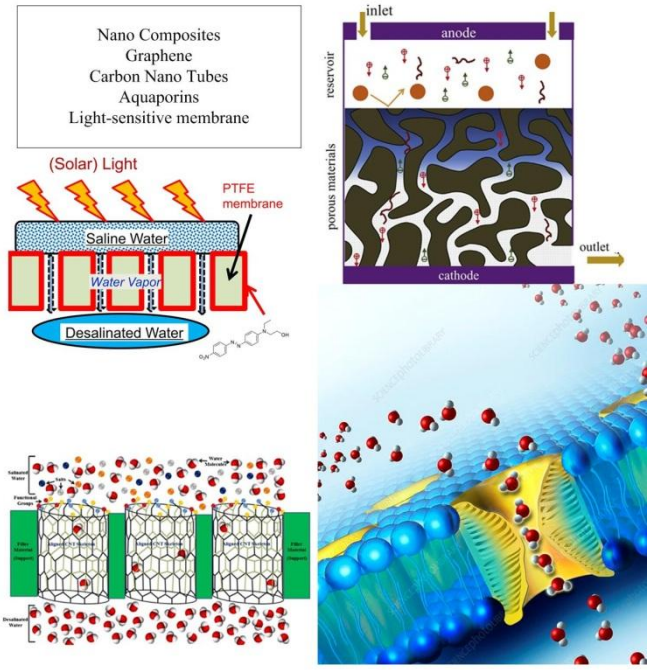

Abstract: By the advent of promising developments in membrane technology, now, arid areas of the world is hoping to apply novel membranes in sea and brackish water desalination process in industrial scales. There are conventional processes for desalination like thermal processes which can wreck havoc on the environment by their inverse carbon footprints. On the other hand membrane-based processes use cleaner energy and have no thermal impact. In this study, focusing on membrane- based methods, first different crucial process parameters are defined. Then, different membrane technologies, including Composite membranes, Graphene, Carbon Nano tubes, Aquaporins, Light-sensitive membranes, Shock electrodialysis membranes, etc. are compared in terms of industrial-scale availability, process efficiency and energy usage. in each case the advantage and disadvantage are discussed and statistics related to their industrial implications is provided. Finally, current active research scope pertained to advanced membrane technology and its implication on water desalination in both industrial and laboratory scales is presented.

Keywords: Membrane, Graphene, Carbon Nano tubes, Aquaporins, process efficiency

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Spectrophotometric Determination of Brilliant blue in Wastewater Following Preconcentration by Solid Phase Microextraction on the Nanoparticles MCM-41 Modified with Schiff base

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Abstract: Colors are the first known contaminants in wastewaters. There are over 100,000 types of dye in the world, such that 7×10^5 tons of these dyes are produced by textile industries every year. Chemical and biological treatment of wastewaters containing these substances is difficult due to low level of adsorption and also chemical stability of dyes. For treatment of dye-containing wastewaters, nonconventional methods are usually used, including adsorption of these compounds by different adsorbents . Brilliant blue FCF used as food dyes in many different products including juices, ice cream, yogurt, jelly and candy. This dye is the synthetic food additives which authorized in very countries. The acceptable daily intake (ADI) values of brilliant blue on milligram per kilogram of body weight per day is 10 . Many methods such as capillary electrophoresis (CE) , differential pulse polarography (DPP) , high-performance ion chromatography (HPIC) ,high-performance liquid chromatography (HPLC) mass spectrometry (MS) spectrophotometry and spectrofluorimetry. were suggested microextraction method for determination of various synthetic dyes.

In this study, the magnetic nanoparticle MCM-41 fuctionalized with Schiff base, was synthesized and characterized as a new sorbent. Various techniques including fourier transform infrared spectroscopy (FT-IR), X-Ray Diffraction (XRD) and BET were used for characterization of mesopprous. . This magnetic mesoporous, as a new solid phase was used for preconcentration of brilliant blue dye in microextraction method. The preconcentrated dye was determined by spectrophotometric method. The effective parameters on the extraction efficiency including, adsorbent dose, pH, contact time and volume of eluant according to central composite design (CCD) were investigated and optimized. Then, in the optimal conditions, the calibration curve of method was plotted and it was linear at the range of 10 – 0.750 n$gL{-}1$. The preconcentration factor including preconcentration factor and the detection limit were 67 and 0.753 n$gL{-}1$ respectively. The effect of some external species including dye, cation and anions were investigated. The method was successfully applied to determined Methyl green dye in several water samples including Yasouj tap water and Cheshmeh Mishi water.

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Synthesis and characterization of Fe_3O_4@SiO_2@L-Arginine@Cu as a new, recoverable and heterogeneous nanocatalyst for the selective and mild oxidation of sulfides and oxidative coupling of thiols

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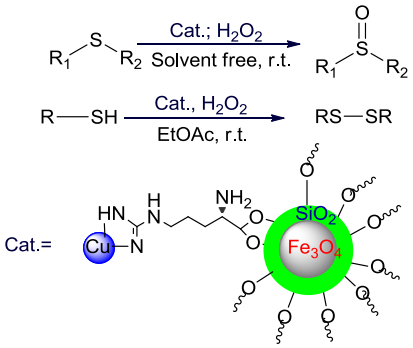

Abstract : In this paper, we report fabrication and characterization of a stable heterogeneous nanostructure catalyst, Cu immobilized on Fe_3O_4@SiO_2@L-Arginine, for the oxidation of sulfides and oxidative coupling of thiols. These nanoparticles were effective catalyst for selective oxidation of sulfides and oxidative coupling of thiols using 30% H_2O_2. The prepared catalyst has been characterized by Fourier transform infrared spectroscopy (FT-IR), X-ray diffraction spectroscopy (XRD), N_2 adsorption/desorption isotherms (BET), scanning electron microscopy (SEM), thermogravimetric analysis (TGA) and inductively coupled plasma (ICP) analysis. The suggested method offers several prominent advantages such: mild condition, use of magnetically reusable catalyst, simple work up procedure, and great selectivity. The significant features of this newly developed procedure are easy separation of the catalyst from reaction mixture using an external magnet and its reusability, operational simplicity, applicability to various substrates and high yields of products. The catalytic activity of the catalyst remains unaltered after five consecutive cycles**.**

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Optimization *of Toluidine Blue* removal from aqueous solution by iron terephthalate metal-organic framework

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Abstract*:* Dyes are one of the larger group of pollutants discharged into the water bodies, making it unsuitable for drinking, irrigation, and industrial usages. Toluidine blue dye (TB), a cationic thiazine dye, is widely used as a colorant in textile industry, medical science and biotechnology. It has harmful effects on living organisms and environment. Hence, removing the dye contents from effluents before disposal is essential. In the current work, the removal of TB dye was investigated by the stable iron terephthalate metal-organic framework (MOF-235). Metal-organic framework (MOF), a highly crystalline organic- inorganic hybrid solid material, due to large surface area, tunable pore size, and excellent chemical stability is showing great promise for adsorption of different water pollutants. MOF-235 was synthesized hydrothermally and used for removing TB dye from aqueous solution. Resulting sample was characterized by X-ray diffraction (XRD), scanning electron microscope (SEM) and FT-IR analysis. A Box–Behnken design was used to identify the effective factors on the removal efficiency of TB (R%). Experimental results indicated that MOF-235 can remove more than 98 % of TB under optimum conditions of a dosage of 0.0125 g MOF-235, pH 4.5, initial dye concentration of 150 mg L^{-1}). The adsorption data was analyzed by using the Langmuir, Freundlich and Dubinin-Radushkevich isotherm models and was found to give better results with respect to Langmuir equation. The maximum monolayer adsorption amount (q_{max}) was about 180.44 mg g^{-1}. Moreover, the adsorption kinetic data were analyzed according to the first and second-order models. kinetic studies show that adsorption of TB onto MOF-235 was fitted to the second-order adsorption model with two-step diffusion process.

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Removal Fast Green from Wastewater by Nanoparticles MCM-41 Modified with Schiff base Usig Experimental Design

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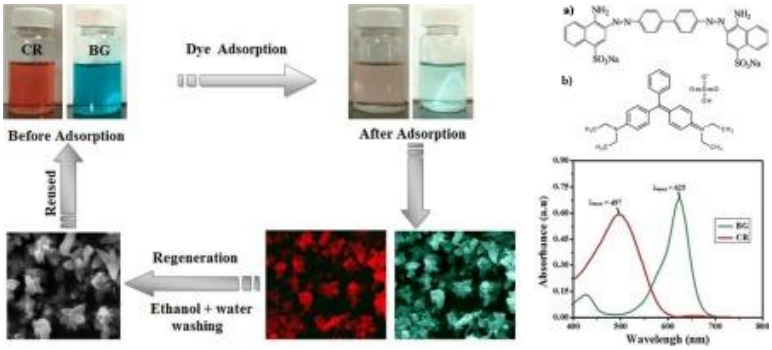

Abstract: Environmental pollution due to industrial effluent is a major concern because of its toxicity and threats for human beings. The environmental pollution control is one of the prime concerns of the society in today's context. Most of the dyes used for industrial purposes are highly toxic to aquatic life. Adsorption is an affordable and effective technique for the removal of dyes and colored pollutants from wastewater. Removal of hazardous, carcinogenic compounds from industrial wastewater is one of the growing needs in the present time. Many dyes and pigments are toxic in nature, with carcinogenic and mutagenic effects. The production of waste from many industrial processes leads to environmental pollution. Increasing use of dye in industrial processes . results in severe pollution of the environment nanoparticles MCM-41 modified with schiff base a new adsorbent is developed for efficient removal of Fast Green from Wastewater and aqueous solution. The porous NH_2-MCM-41 Nano-particles formed a uniform hydrophilic and adsorptive layer on the thin-film which endowed the composite membrane with affinity Removal Fast Green from Wastewater.

nanoparticle MCM-41 factionalized with Schiff base, a promising adsorbent for Imipramine removal. The modified mesoporous was characterized by X-ray diffraction (XRD), Fourier transform infrared (FTIR) and scanning electron microscopy (SEM). The effect of various parameters on the removal efficiency of dye. The influence of variables such as pH, amount of adsorbent and sonication time on removal percentage were optimized and their main effect on removal percentage was investigated. Among various kinetic model such as pseudo first and second order, elovich and interparticle diffusion model, the pseudo second order with high correlation coefficient is applicable for explanation of experimental data. Also Isotherms studies via Langmuir adsorption, Freundlich and Temkin model show that Langmuir and Freundlich with high correlation coefficient is applicable for explanation of experimental data. A good agreement between experimental and predicted data was achieved that efficiency of this model for prediction of real optimum point. Among the well-known previously isotherm models, the experimental equilibrium data efficiently can be represented by the Langmuir model, while the rate of adsorption. Kinetic data efficiently can be interpreted by combination of pseudo-second order as well as intraparticle diffusion models. The small amount of this adsorbent (0.022 g) is applicable for removal of high amount of Fast Green (>95%) in reasonable time (3.5 min).

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Preparation of g-C_3N_4/Ce-ZnO/Ti electrode to use in visible light photo-electrocatalysis process

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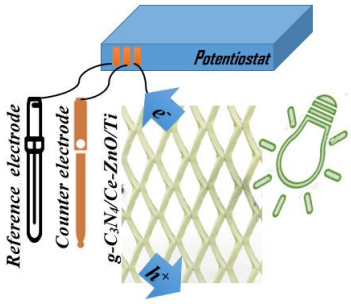

$h^+ + H_2O \rightarrow {}^{\bullet}OH + OH^-$
${}^{\bullet}OH + pollutant \rightarrow degradation$

Abstract*:* Photo-ectrocatalysis (EPC) process is considered as a promising and innovative method for wastewater treatment [1]. This process as a combination of photocatalysis and external electric field, has been shown to exhibit very high treatment efficacy for the removal of organic compounds [2].

In this study, g-C_3N_4 and Ce-ZnO particles were prepared and simultaneously immobilized on the surface of titanium plate with electrophoretic deposition method [3]. Characterizations of the prepared g-C_3N_4/Ce-ZnO/Ti electrode were performed using DRS, XRD and SEM analyses. Visible light photo-electrocatalytic degradation of an antibiotic using the g-C_3N_4/Ce-ZnO/Ti electrode was studied. The effect of operating variables i.e. applied bias potential, catalyst electrode number(s), and pH on the antibiotic degradation efficiency was investigated. Using optimum conditions of pH =7, applied bias potential of 0.9 V and in the present of two catalyst electrodes, 80% degradation efficiency was obtained. The catalyst electrode was enough stable to be used in successive treatment experiments.

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Application of immobilized ionic liquids on inorganic nanostructures in microextraction methods for determination of PAHs in river water samples

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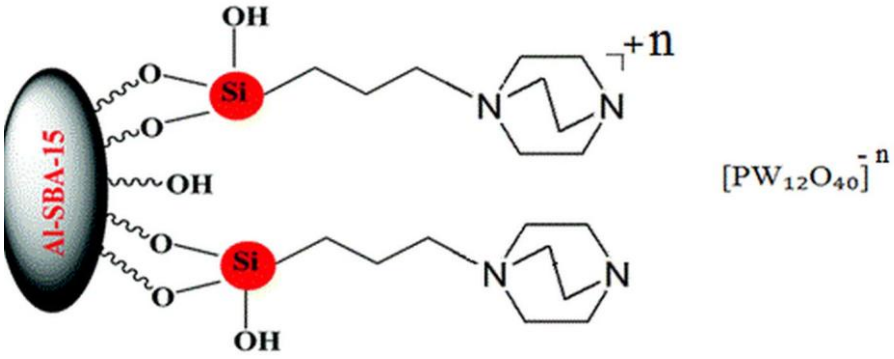

The final stage of synthesis

Abstract: The feasibility of headspace (HS) SPME for the determination of high-ring polycyclic aromatic hydrocarbons (PAHs) in water samples is studied. In this study, the possibility of extracting PAHs by utilizing nanostructures, PW/SBA-15/DABCO, using new synthetic solid phase microextraction methods. Parameters affecting the sorption of PAHs into the fiber such as sampling time, sampling volume, and temperature are also evaluated. The extraction efficiency decreases with the increasing molecular weights of PAHs. For HS-SPME, the extraction efficiency of PAHs decrease when the headspace volume of the sampling system increases. All high-ring PAHs can be detected in a water sample by increasing the temperature to 80°C. In this study, a new synthetic solid phase microextraction is used in which the PW/SBA-15/DABCO with nanocomposite is applied for extraction and identification PAHs; the high specific surface area, selectivity, shape and size are the main characteristics of these compounds leading to numerous fibers applications, filtration, separation and extraction of PAHs. The optimization conditions for this process include the extraction temperature: 80° C, extraction duration: 30 minutes, desorption temperature: 270 C, desorption duration: 2 minutes. Also, the correlation coefficient was high (0.997) and linear range was broad (…… to …. ng/ml).

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Experimental and Theoretical Investigation of Gamma Radiation Shielding Properties of Polymer/Metal Oxide Nanocomposites

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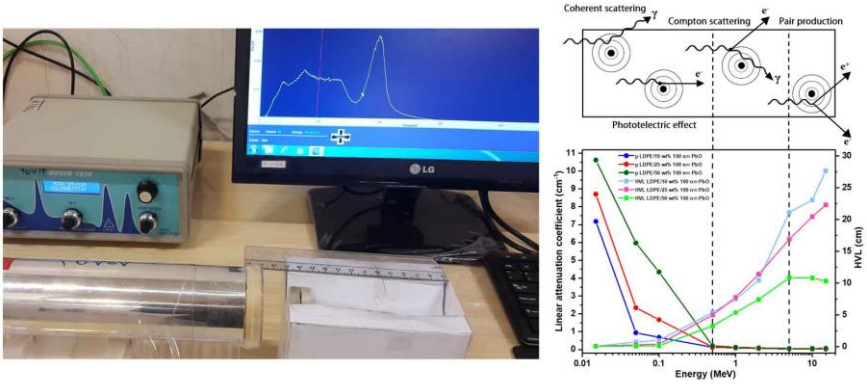

Abstract*:* There is a danger from being exposed to any amount of ionizing radiation in a great number of fields. In order to protect people and the environment from such hazardous radiations, design or select an effective, appropriate shielding material is mandatory. Metal polymer composites (MPCs) are new category of advanced materials whose effectiveness in the field of radiation protection has been confirmed experimentally and theoretically. In present study, three common metal oxide nanoparticles including PbO, ZnO, and TiO_2 have been used to strength the epoxy resin polymeric matrix. Metal oxide/epoxy composites were prepared in different weight percent of metal oxides powder. Moreover, a theoretical study has been performed through Monte Carlo method. The results confirmed the superior gamma attenuation capability of nanocomposites than pure epoxy matrix (up to 70%) which was comparable with bulk Pb ability. Besides, it was found that attenuation performance of the epoxy/metal oxide nanocomposites is significant in the low energy range (<0.5MeV). Furthermore, a great agreement between experimental and Monte Carlo study has been confirmed.

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Contamination evaluation of Pb, Ni and Zn heavy metals in coast surface sediment of Bushehr county

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Abstract: Due to the toxicity and sustainability in environment, heavy metals are very important. Therefore, in this research, contamination of surface sediments of Bushehr County to Pb, Ni and Zn metals was evaluated. For this purpose, in the end of 2018, surface sediment samples were collected from five stations including Imam Ali Roud, Gaddeh –ye - Saheli, Bandargaah, Del Aram and Ameri Port with 5 replications from depth of 0 to 5 cm. After drying the specimens in oven, the samples were digested with a mixture of nitric acid, perchloric acid and hydrofluoric acid for 8 hours at 200 ° C in PTFE digester. Finally, heavy metals concentrations were analyzed by the GBC Xploraa atomic absorption spectrometer. The I_{geo} index and contamination factor (CF) were used to assess the contamination of sediment samples to these metals. The results showed that the total average concentrations of Pb, Ni and Zn in the study area were 10.67, 11.77 and 98.41 mg /kg, respectively; indicating Zn concentration is higher than two other metals concentrations. According to the average concentration of Pb in the sediment, the descending trend of Gaddeh –ye - Saheli > Imam Ali Roud > Ameri Port > Bandargaah > Del Aram and according to the Ni average concentration, the descending trend of Imam Ali Roud > Gaddeh –ye - Saheli > Ameri Port > Del Aram > Bandargaah and considering the Zn average concentration in sediment, the decreasing trend of the Gaddeh –ye - Saheli > Del Aram > Ameri Port > Imam Ali Roud > Bandargaah were observed. The results of I_{geo} index showed the descending trend of Zn > Ni / Pb with average values of -2.86, -1.65 and -1.56, respectively. The contamination factor index showed that sediment samples were moderately contaminated with Pb, Ni and Zn metals.

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Contamination of Southern Iran's Sea waters with Microplastics (Case Study: Seawater of the Coastal Sea of Bushehr)

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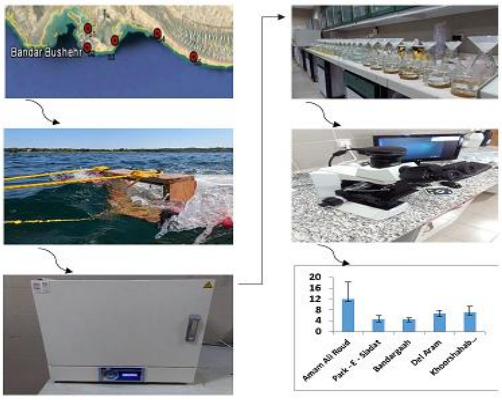

Abstract: Plastics are one of the most important emerging pollutants in aqueous media that has recently attracted the attention of global researchers. The low rate of decomposition, sustainability and prolonged presence of plastics in aqueous solutions are the most important reasons for concern about these contaminants, especially microplastics. Therefore, the presence of microplastics (plastics less than 5 mm in size) was investigated in five Bushehr seaboard stations, including Imam Ali Roud Station, Park –E- Siadat, Bandargaah, Del Aram and Khoorshahab village. For this purpose, at each station, using the Manta Tour (The size of the holes is 333 microns) with 5 replications and for 20 minutes surface water of the sea, were harvested and after digestion of the organic material in the specimens using Hydrogen Peroxide 35%, samples were filtered using filter paper and then microplastics were detected using optical microscopy and visual interpretation. In general, 175 microplastic particles were detected in samples with a frequency of 154 fibers, 11 film plastic particles and 10 fragments. Also color analysis of microplastics showed that the colors of black, red, brown, white, blue and other colors were the most abundant. Although, the results of one-way analysis of variance showed that there was no significant difference between the frequency of identified microplastics at different stations (p-value = 0.49), but considering mean frequency, the descending trend of Imam Ali Roud > Khoorshahab village > Del Aram > Bandargaah = Park –E- Siadat were observed with average values of 12, 7.2, 6.6, 6.6 and 6.6 respectively. Therefore according to the results the most polluted station was Imam Ali Roud.

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Chemical and Physical Analysis of Municipal Solid Waste in the City of Mahshahr

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Abstract: One of the most important issues in environmental surveys is the recycling of municipal solid waste (MSW). Accordingly, the aim of this research is the quantitative and qualitative study of MSW in Mahshahr city, from July 2016 to September 2017. The major components of municipal waste include food waste, glass, metals, can, debris, bricks, boards, leaves, paper, dirt, and ashes [1]. According to the prior researches and chemical composition of solid waste, it was cleared that the solid wastes had high moisture content, high ash, and inorganic contents and comparatively low nitrogen, phosphorus and potassium [2]. Mahshahr city was divided into four regions namely: high, middle, low income and trading area. In this research 50 samples were collected and analyzed seasonally and 3 days per week. In the next step, the percentage of MSW composition, density, moisture content, waste per capita generation and chemical characteristics such as carbon to nitrogen ratio, phosphorus, and heavy metals content were measured according to the standard methods. The highest percentage of MSW's components is its "organic matter" with an average of 72.17%, 68.34%, 75.82 % for winter, spring, and summer, respectively. These components have a high potential for recycling and good economic return. The best and most economical method for disposal of municipal waste is suggested as composting of organic matter and recycling of plastic, paper, and cardboard.

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Evaluation of a phyto-coagulant in removal of Acid Red 252

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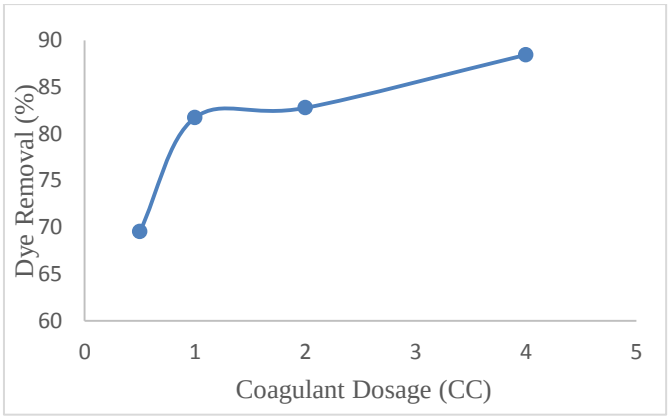

Figure 1: Effect of dosage of plant extract on dye removal efficiency

Abstract: Dyes are an important category of organic pollutants, with their harmful effects known in aquatic life, and in particular humans. Textile industries are one of the largest consumers of dyes. These industries are considered to be the largest wastewater producers, and their effluent contains significant amounts of dye organic compounds. The presence of organic dyestuffs in industrial effluents, due to the prevention of light penetration into the water, photosynthesis disruptions, and their toxic effects, cause great harm to the environment. Therefore, in order to prevent the spread of harmful damage to human health, other living organisms and environmental protection, the treatment of textile wastewater is inevitable. Various methods have been used for removal of dyes from wastewaters. Each of these methods has disadvantages and advantages. The coagulation and flocculation using plant extracts is an economical and environmentally-friendly method. This study was carried out to remove red dye 252 (AR 252) by coagulation with Carpobrotus edulis extract. The results of the study showed that the highest removal efficiency was obtained at pH = 4 using 4 cc of the plant extract and was around 88%. Therefore, the process of coagulation and flocculation with the use of herbal extracts of Carpobrotus edulis can be considered as a method of economic justification and in order to protect the environment.

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Application of Carpobrotus edulis extract in removal of a cationic dye

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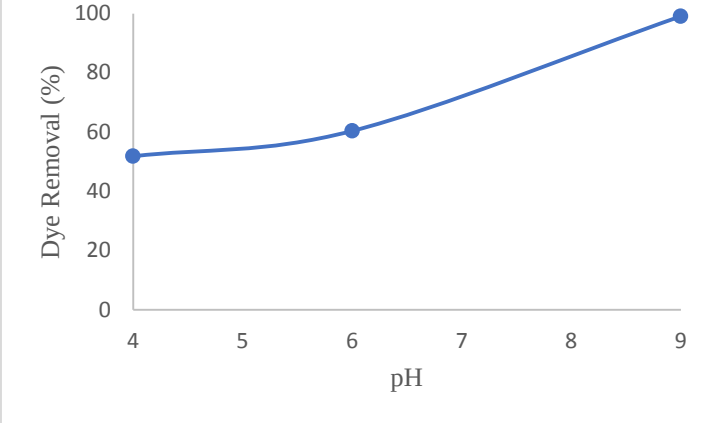

Figure 1: Effect of pH on dye removal efficiency

Abstract: Water pollution is one of the challenging problems in the world. Textile wastewaters contain high amounts of dye combinations. It is seriously dangerous to the environment and human beings. Most of the dyes that are used are usually stable and hard to decompose, and they are highly resistant to microbial, physical, and chemical decomposition methods, so, it is difficult to eliminate them. The presence of organic dyes in wastewater prevents the penetration of light into the water, disruption of photosynthesis, reducing the toxic effects of oxygen and water, irreparable damage to the environment brought. Therefore, it is essential for the textile industry to treat wastewater before they discharge to the environment. There are various methods for treating wastewaters containing dyes. The coagulation and flocculation using plant extracts is one of the methods to be economically viable and environmentally friendly. The purpose of this study was to evaluate the efficiency of Carpobrotus edulis extract in textile wastewater treatment. For this purpose, the effect of pH on dye removal was investigated. In this study, plant extract of C. edulis was used as coagulant to remove methylene blue as a model cationic dye from water at different pH values. The results showed that the highest removal efficiency of this dye was in the alkaline pH (PH = 9) and 99% of the initial dyes was removed from 50 cc of a dye solution with concentration of 50 mg/L.

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Removal of Endosulfan pesticide using Nanofiltration membranes modified by SiO_2/ZnO nanoparticles

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Abstract*:* Today, Nanofiltration technology has expanded rapidly due to low energy consumption, high rejection, and easy operation to separate various compounds. Also the presence of organic micro pollutants in water resources has become very disturbing[1]. Endosulfan pesticide with extensive application in agriculture is an organic micro pollutant which causes environmental contamination. Endosulfan in the various conditions can be highly toxic because of lipophilic properties and accumulation in body tissues with high biological resistance. The purpose of this study was to separate Endosulfan using nanofiltration membranes modified with ZnO/SiO_2 nanoparticles[2,3].

Exprimental: Nanoparticles were synthesized by sol-gel method and were used to prepare nanofiltration membranes using casting, solvent evaporation and immersion in non-solvent. The flux and water content of the prepared membranes were evaluated. In the next step Endosulfan solutions were prepared in methanol and distilled water. For evaluation of membranes performance the flux and rejection of prepared membranes was examined.

Results: Various factors can affect the properties and function of the membranes. One of these factors is the interaction of the sample with the surface of the membranes. The results showed that in the pure membrane, the flow decreased over time. This can be due to the clogging of the pores and the appearance of fouling on the membranes. By using of ZnO/SiO_2 nanoparticles the hydrophilicity of the membranes was improved due to the hydrophilic properties of the nanoparticles with a high surface area. However due to the unique properties of these nanoparticles, the rejection and flux of the membranes were improved.

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Environmental Friendly Synthesis of 3-(1*H*-Tetrazol-5-yl) Coumarins (3-(1*H*-Tetrazol-5-yl)-2*H*-1-benzopyran-2-ones) Employing a Heterogeneous Catalyst in Solvent-free Conditions

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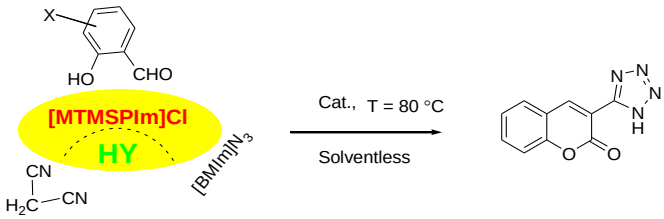

Cat. : [MTMSPIm]Cl = Methyltrimethoxysilanimidazoliumchloride

X = R, Ar

Abstract: Coumarins are extensively found in the field of biology, medicine, and polymer sciences. The most well-known and important coumarin is "Warfarin", which is prescribed in low doses as a blood thinner. Numerous coumarins are used as a drug in contemporary and recent medicine. Tetrazoles are among important heterocyclic systems. Several tetrazole derivatives illustrate various biological potencies, such as antibacterial, antiinflammatory, antifungal, antiviral, antitubercolous, cyclo-oxygenase inhibitors, antinociceptive, hypoglycemic and anticancer activities.

A multi-component, one-pot and environmentally friendly synthesis of 3-(1*H*-Tetrazol-5-yl)coumarins(3-(1*H*-Tetrazol-5-yl)-2*H*-1-benzopyran-2-ones) was successfully synthesized *via* domino Knoevenagel condensation, Pinner reaction, and 1,3-dipolar cycloaddition of substituted salicylaldehydes (2-hydroxybenzaldehydes), malononitrile (propanedinitrile), and $[BMIm]N_3$ (as the relatively green source in organic synthesis and reactions, especially those based on imidazolium cations) in condition of solvent-free. This reaction is catalyzed by ionic liquid which functionalized on HY-Zeolite and characterized by different methods such as: FT-IR, XRD, SEM, EDX. In conclusion, an efficient, plain, and convenient method for the preparation of new 3-(1*H*-tetrazol-5-yl) coumarins in condition of solvent-free is reported. The FT-IR data of Ionic liquid/HY zeolite compound indicate an intense band about ca. 1050 cm^{-1} attributable to the asymmetric stretching of Al–O–Si chain of zeolite. The symmetric stretching and bending frequency bands of Al–O–Si framework of zeolite appear at ca.751 and 455 cm^{-1}, respectively. The FT-IR data of coumarin-tetrazole compound indicate absorption bands for the N-H and C=O groups at 3346 and 1710 cm^{-1}, respectively.

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Photocatalytic properties of ternary magnetic carbon nitride polyoxometalate nanocomposite and its application in reduce removal degradation of dyes pollutants

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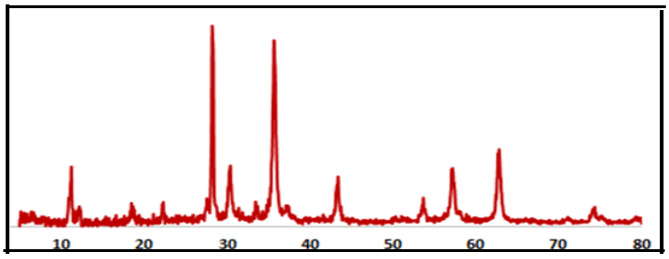

Abstract: Graphitic carbon nitride has been considered a very promising semiconductor material , having been intensively studied during the last decade [1]. Graphitic carbon nitride (g-C_3N_4) has gained remarkable acceptance as a visible-light-driven photocatalyst with a distinctive 2D structure and great stability. Owing to its superior features, g-C_3N_4 has been engaged in various scientific activities for environmental pollution abatement, production and storage of energy, and gas sensors [2-3]. In this study, ternary magnetic carbon nitride polyoxometalate nanocomposite was synthesized and its photocatalytic activity for degradation of organic pollutants were investigated. In this synthetic process, g-C_3N_4 was obtained with urea by a thermal treatment and subsequent modified with magnetic composite and polyoxometalate. The surface morphology and chemical structure of the nanocomposite were characterized by FTIR, VSM, XRD and SEM. The resulting nanocomposite exhibited high photocatalytic activity for degradation of organic pollutants such as Methylene blue (MB), Rhodamine B (RhB)and Methyl orange (MO). Moreover, this nanocomposite as photocatalyst shows recyclable adsorption and stable performance after being used several times.

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Determination of Cd and Pb in Environmental Samples by Syringe to Syringe Dispersive Liquid Phase Microextration-Solidified Floating Organic Drop Combined Electrothermal Vaporization-Inductively Coupled Plasma Mass Spectrometry

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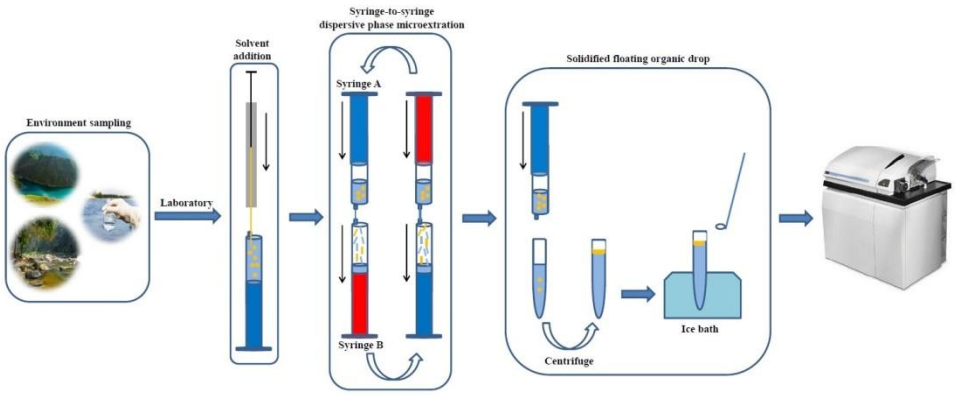

Abstract*:* A syringe to syringe dispersive liquid phase microextraction-solidified floating organic drop was induced and used for the ultra-trace simultaneous determination of cadmium and lead after extraction from environmental water samples. The extracted analytes were determined by electrothermal vaporization (ETV)-inductively coupled plasma mass spectrometry (ICP-MS). The analytical parameters affecting the microextraction efficiency including the nature and volume of the extraction solvent, sample volume, pH, ionic strength, concentration of reagents and the cycles of extraction were optimized. The calibration curves were linear in the ranges of 0.01-22.00 ng L^{-1} and 0.02-25.00 ng L^{-1} with determination coefficients of 0.9975 and 0.9983 for Cd and Pb, respectively. The limits of detection (LOD) of this method were 0.0017 ng L^{-1} and 0.00219 ng L^{-1}, and the enhancement factors were estimated to be 342 and 351 for Cd and Pb, and, repeatability (intra-day) and reproducibility (inter-day) were obtained 0.11 and 0.19% for Cd, 0.09 and 0.15% for Pb, respectively. The developed method was successfully applied to determine lead and cadmium in different water samples.

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Multi-Pesticide Residue Analysis in Tomato using In-Syringe Dispersive Liquid-Phase Microextraction Technique Coupled with Gas Chromatography-Mass Spectrometry by Assisting Experimental Design

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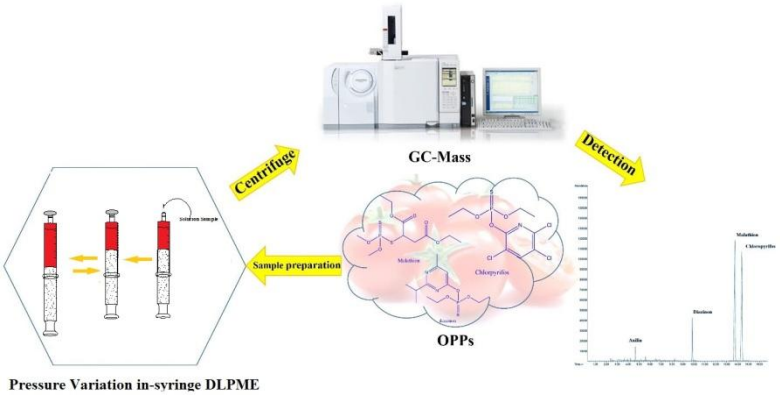

Abstract*:* In this study, an analytical procedure based on a pressure variation in-syringe dispersive liquid–phase microextraction method coupled with gas chromatography-mass spectrometry by using experimental design methods is introduced for determining diazinon, malathion and chloropyrifos in tomato samples. In the proposed method, chloroform is selected as an extraction solvent. The screening strategy is done by using Plackett-Burman design. Based on the analysis of variance the volume of extraction solvent, ionic strength, extraction time and pH are statistically significant. Developing Box–Behnken design, optimal conditions for these variables were determined. The calibration curves were linear in the range of 10-200 µg Kg^{-1}, 10-100 µg Kg^{-1}, and 10-50 µg Kg^{-1}, with determination coefficients of 0.9999, 0.9993 and 0.996 for diazinon, malathion and chloropyrifos respectively. The detection limits were found to be 6.3 µg Kg^{-1} for diazinon, 7.1 µg Kg^{-1} for malathion and 4.8 µg $Kg^{-1}$for chlorpyrifos. The inter-day and intra-day precision were 2.88 and 8.66% for diazinon, 0.92 and 4.45% for malathion and 3.63 and 5.78% for chloropyrifos (n = 5, concentration = 50 µg Kg^{-1}). The pressure variation in-syringe -DLLME method was used to determine OPPs for the first time in this study.

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The Treatment of petrochemical wast salty water for the optimization of recycling and reusing in the cooling towers with combination application of the promethee and decisionlab software

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Abstract : With the growing trend of industrial development and use of renewable and non-renewable resources in our country, concerns about the environment and its preservation is evident in the national. Development on the one hand and the other hand with the industry to date and efficient destruction of our precious environmental resources, including surface water and groundwater is interconnected And more attention to all the experts and big industrialists requires further**.** The aim of this study is to find an appropriate solution to the problem of saline wastewater is shazand Petrochemical Company**,** Due to the high amount of salt there is the possibility of reusing**.** The daily volume of complex m³/ hr 150 effluent EC µs/cm 4000, and is produced TDS mg/lit2500 Currently no purification will be sent directly to the evaporation ponds. n this study, the saline wastewater collection and analysis of data, including EC, TDS, SS, TOC, PH, TH, and COND is. And evaluate and compare the data with standard water cooling towers, water treatment methods RO ، MED ، EDR ، RO&MED ,RO&EDR Examined And best practices with regard to the initial cost of the device, the device useful life, capacity, allowable inlet water, product quality EC 50-100 µs/cm and TDS mg/lit500 less than 75% can be recovered using reverse osmosis for wastewater treatment were verified.

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