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دومین کنفرانس دانشجویی شیمی ایران

رشت ، دانشگاه گیلان
۱۴ الی ۱۶ مهرماه ۹۴

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Synthesis of biscoumarin derivatives using P₄VPy-CuO nanoparticles as a new catalyst

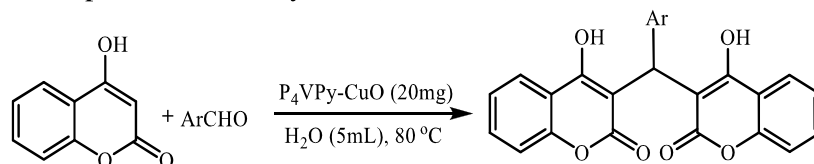
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Abstract:

Nowdays, the development of heterogeneous catalysts have become a major area of research in synthetic organic chemistry. Some potential advantages of these materials over homogeneous systems are: simplified recovery, reusability, enhanced selectivity and reactivity, easy product isolation.¹

CuO is one of the most prominent catalysts and is extensively used in environmental catalysis.² In addition, CuO on various supporters have also been extensively investigated and are known to be highly active.³ On the basis of these studies, this article describe the preparation of P₄VPy-CuO and its applicability in the promotion of the preparation of biscoumarins. P₄VPy-CuO is prepared from the reaction of poly(4-vinylpyridine), as a cheap and commercially available reagent, and copper oxide under ultrasonic conditions. The catalyst was charactrized by FT-IR, XRD, SEM and TEM techniques. After preparation and characterization biscoumarin derivatives were synthesized from the reaction of a variety of aromatic aldehydes and 4-hydroxycoumarin in the presence of this reagent. The reactions were carried out under green conditions. This method have some advantages such as short reaction times, mild reaction condition, easy workup, and excellent yields (Scheme 1).



Scheme 1. Synthesis of 3,3'-(arylmethylene)-bis-(4-hydroxyco-umarin) derivatives in the presence of P₄VPy-CuO-NPs.

Keywords: Biscoumarin, Aldehydes, P₄VPy-CuO, Nanoparticles, Green.

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Preparation three dimensionally honeycomb layered double hydroxide framework as a new stationary phase for extraction and determination of agriculture poison in real samples

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Abstract:

In this Study, we are trying to extraction 2,4-D toxins use the nanostructured layered double hydroxides (LDHs). 2,4D is a hormone, systemic and selective herbicide of plant growth regulators acetic acid (auxin). Binds to the Auxin protein linkage and with accumulate in the meristem, affect plant growth. Considering the excessive use of toxin in agricultural fields and lack of attention to the correct use of it, using 2,4D poison may endanger human health and the environment. Separation of components by conventional liquid–liquid method cause to waste a lot of time and money in the laboratory because of it is multistage which cause loss of a significant amount of analyte during extraction process. For this reason, micro-extraction methods developed in recent years. In this study, for determine of 2,4D poison in water sample has been developed a very sensitive method based on solid phase micro-extraction based on the use of TDH-LDH Nano-structured. The method has a good linear range, repeatability and high sensitivity. The proposed method can use for other studies of 2,4D compounds with low concentration in water. The results show that fiber produced shows high extraction power, High sensitivity, non-use of organic solvents, high selectivity and low detection limits.¹⁻⁴

Keywords: Nanostructures, LDH, Micro-extraction, 2,4D poison.

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Application Fe₃O₄ - MgAl-LDH-PW nanocomposite for solid phase microextraction of phenolic compounds

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Abstract:

In this work we are presenting a new solid-phase microextraction fiber based on the use of a Fe₃O₄-MgAl-LDH- PW nanocomposite. The coating can be easily prepared and is mechanically and thermally stable (up to 275 °C). The fiber was applied to the extraction of several phenolic compounds from aqueous solutions, and the effects of extraction temperature, extraction time, ionic strength, stirring rate, pH and desorption temperature and time were studied. Following thermal desorption at 275 °C, the phenols were quantified by GC-MS. Under optimum conditions, the repeatability for one fiber (for n = 5 and expressed as the relative standard deviation), is between 4.6% and 9.1%. The detection limits are between 5 and 14 pg mL⁻¹. The method is simple rapid, low-cost, and offers improved relative recoveries when compared to conventional methods of extraction.

Keywords: Phenolic compounds-Fe₃O₄, MgAl-LDH- PW, Nanocomposite, Solid phase microex-traction, Gas chromatography-mass spectrometry

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Hydrogel nanocomposites for removal pollution: A review

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Abstract:

Hydrogel nanocomposites having three dimensional polymer networks and large amount of functional group, enhanced swelling ability, and improved mechanical and thermal properties were prepared for removal of pollution from wastewater. Hydrogel Nanocomposites are among the most potential adsorbent for removal pollution from aqueous solution due to the strong synergistic effect between the nanofillers and polymer matrix and their superior propertie. In this review, the synthesized hydrogel nanocomposites for removal dyes and heavy metals was studied and then adsorption capacity of this hydrogel nanocomposites was compared with other available adsorbent. The results of comparision, indicated that hydrogel nanocomposites have high adsorbtion capacity. Therefore hydrogel nanocomposites can be an excellent adsorbent for removal pollution.¹⁻⁵

Keywords: Hydrogel, Nanocomposite, Nanofillers, Dyes, Heavy metals.

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Efficient method for synthesis of the derivatives of 5-arylidene barbituric acid catalyzed by modified magnetic nanoparticles

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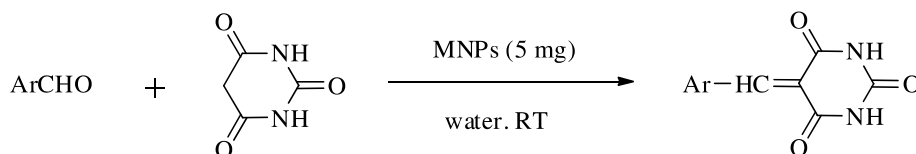
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Abstract:

Magnetic nanoparticles (MNPs) have attracted much attention by researchers in different areas including physics, biomedicine, biotechnology, material science and catalysis, because of the large ratio of surface area to volume, paramagnetic behavior and low toxicity.^{1,2}

The magnetic nature of MNPs allows a convenient method for removing and recycling MNPs supported catalysts by applying an appropriate magnetic field. In contrast to filtration and centrifugation methods, this kind of separation is not time-consuming and prevents the loss of solid catalyst in the process. In addition, the MNPs-supported catalysts show high dispersion and reactivity with a high degree of chemical stability.³

In this work Knoevenagel condensation of aromatic aldehydes with barbituric acid catalyzed by modified magnetic nanoparticles at water as solvent was studied. It could easily represented a good procedure in terms of the high yield, mild reaction condition, and easy workup (Scheme 1).



Scheme 1. Knoevenagel condensation of aromatic aldehydes with barbituric acid

Keywords: Magnetic nanoparticles, Heterogeneous catalyst, 5-Arylidene Barbituric acid, Knoevenagel condensation .

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The First Coordination Polymers with an [O]₂[N]P(S)—Hg Segment

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Abstract:

During the last two decades, design and synthesis of novel coordination polymers are attracting more attention¹. In addition, the coordination chemistry of bidentate ligands has been studied for over thirty years². The bidentate ligands with phosphoryl and thiophosphoryl groups have been used as effective coordinating agents in the different metal chemistry.

In this work two new mercury (II) coordination polymers with thiophosphoryl ligands $\{[C_2H_5O]_2P(S)\}_2X$, $X = NC_4H_8N$ & NHC_6H_4NH are studied: $\{Hg(Cl)(\mu-Cl)_2Hg(Cl)[(S)P(OC_2H_5)_2NC_4H_8NP(OC_2H_5)_2(S)]_n\}$ (1) and $\{Hg(Cl)(\mu-Cl)_2Hg(Cl)[(S)P(OC_2H_5)_2NHC_6H_4NHP(OC_2H_5)_2(S)]_n\}$ (2). The coordination polymers 1 and 2 are the first structural studies of the mercury coordination polymers with the ligands containing an [O]₂P(S)[N] segment. Indeed, any structure with an [O]₂[N]P(S)—Hg segment was not found in the Cambridge Structural Database (CSD, version 5.35, updated in February 2014)³.

In both complexes 1 and 2, the two Hg centers are within an [S][Cl]Hg(μ-Cl)₂Hg[Cl][S] segment with a distorted tetrahedral environment for each Hg center. In each structure, the asymmetric unit is composed of half of the monomer related to the other half by a C₂ rotation axis. On the other hand, in complex 1 the NC₄H₈N part adopts a nearly chair conformation and the two P=S groups [bonded to nitrogen atoms] bond vectors in opposite side with respect to each other. In complex 2, the NHC₆H₄NH part is nearly planar considering the heavy atoms and the P=S groups bonded to the nitrogen atoms of the noted part adopt an *anti*-conformation with respect to each other.

In both structures, the weak intermolecular C—H...Cl and C—H...S interactions are observed. The spectroscopic features of ligands and complexes are investigated.

Keywords: Thiophosphoryl, Mercury(II), Crystal structure, Coordination polymer

References

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A new solvated thiophosphoramidate: single crystal X-ray diffraction, NMR study and Hirshfeld surface analysis

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Abstract:

Hirshfeld surfaces and two-dimensional fingerprint plots are used to study short intermolecular contacts in of phosphoramides,¹ and also in organotin (IV)-phosphoramidate complexes.² In this study we present the crystal structure analysis complemented with the investigation of the molecular interactions in this compound.

The asymmetric unit of [(*cyclo* C₆H₁₁)(CH₃)N]P(S)[NC₄H₈O]₂.0.412CH₃OH is composed of two crystallographically independent phosphorothioic triamide molecules with together of methanol solvated molecule. The phosphorus atoms display a distorted tetrahedral environment with the maximum and minimum values of angles at the P atom for one of the N—P=S and one of the N—P—N angles, respectively. The environments at the nitrogen atoms are practically non-planar.

In this structure, the phosphorothioic triamide and methanol molecules are linked by some different intermolecular C—H...S and C—H...O interactions. The intermolecular interactions have been studied by Hirshfeld surface analysis and fingerprint plots, by using the program Crystal Explorer 3.1.³

These analyses reveal that H...H interactions of 78.3% and 77.7% for the two symmetry-independent phosphorothioic triamide molecules. Furthermore, the C—H...O interaction in one of the symmetry independent molecule and the C—H...S=P interaction in the other molecule are the characteristic interactions, appearing as very large red spots in the related Hirshfeld surface maps. The characterization of compound was also performed by ³¹P{¹H}, ¹H and ¹³C NMR and mass spectroscopy.

Keywords: Thiophosphoramidate, Hirshfeld surface, Crystal structure, NMR.

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Immobilization of transition metal complex on functionalized Copper Ferrite magnetic nanoparticles (CuFe_2O_4) and study of their properties

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Abstract:

Copper ferrite (CuFe_2O_4) is one of the very important magnetic materials, which has a lot of excellent physical and chemical properties, such as magnetic property, effective catalytic activity, semiconducting property, high thermal stability and electronic conductivity. It can be used for magnetic fluids, catalysts, sensors, anode materials and biomedicine materials.¹ The CuFe_2O_4 materials can be prepared by a number of methods such as solid-state reaction method,² co-precipitation method,³ the hydrothermal method,⁴ soft route,⁵ and citric acid method.

In this study, synthesis of nanoparticles of Copper Ferrite (CuFe_2O_4) by tri-sodium citrate as a surfactant was studied. Silica-coated Copper Ferrite ($\text{CuFe}_2\text{O}_4/\text{SiO}_2$) was synthesized according to the Stober method by hydrolyzing a sol-gel precursor such as tetraethoxysilane (TEOS). Silica-coated Copper ferrite nanoparticles were functionalized with 3-chloropropyltrimethoxysilane (CPTMS), ($\text{CuFe}_2\text{O}_4/\text{SiO}_2/(\text{CH}_2)_3\text{-Cl}$) (Figure 1). Beside an imine ligand with anchoring NH groups was synthesized from salicylaldehyde and diethylenetriamine. Then Cu complex was synthesized of imine ligand. In the last step imine complex with NH group was connected to the functionalized nanoparticles with Cl ($\text{CuFe}_2\text{O}_4/\text{SiO}_2/(\text{CH}_2)_3\text{-O/Cu}(\text{complex})$). The characterization of synthesized nanoparticles was performed by Fourier transform infrared spectroscopy (FTIR), Atomic Absorption Spectrophotometer (AAS), ultraviolet visible (UV-vis) spectrum, X-ray diffraction (XRD), Field Emission Scanning Electron Microscopy (FESEM), Energy Dispersive X-Ray Analysis (EDX), Elemental Mapping Directly from FESEM (MAP), vibrating sample magnetometry (VSM). Finally application of ($\text{CuFe}_2\text{O}_4/\text{SiO}_2/(\text{CH}_2)_3\text{-O/Cu}(\text{complex})$) as a nano-absorbent by ion imprinted method was discussed.

Figure 1. Synthesis of ($\text{CuFe}_2\text{O}_4/\text{SiO}_2/(\text{CH}_2)_3\text{-Cl}$)



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Keywords: Copper Ferrite, Tri-sodium citrate, Magnetism Nanoparticles, Aminopropyltri methoxysilane, Superparamagnetism, Schiff base.

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Surface modification of polypropylene Non-Woven fabrics by plasma activation followed by Glycidyl methacrylate grafting

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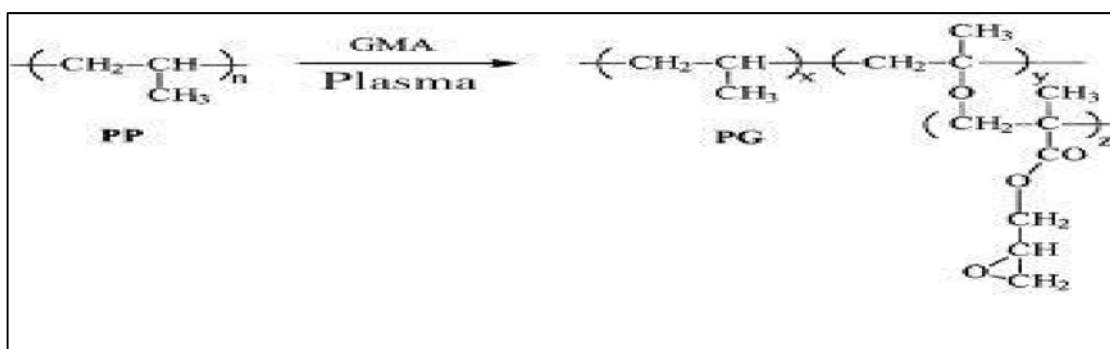
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Abstract:

A conventional method used for imparting the desired permanent hydrophilicity is chemical graft polymerization requiring the use of organic solvents and a catalyst, however, in this project an environmentally alternative to the use of organic solvents which is plasma surface activation of polypropylene non-woven fabrics were used.¹ To finding the optimum condition, three different factors which are the type of gas (Argone, Oxygen and Nitrogen), pressure (1, 2 ,4 Torr) and the time of reactions (30, 60 , 90 , 120 ,150 , 180 sec) were changed. Contact angle, water absorption and the strength loss of treated samples were measured and the optimum condition of the plasma surface modification were choosed (Argon gas, 2 torr pressure and 90 seconds). Then treated samples in optimum condition of plasma modification were grafted by Glycidil methacrylate (Scheme 1) aqueous solution in different concentration (10, 20, 30, 40 v/v). The effect of monomer concentration on the grafting yeild was investigated. The selected volume concentration of the monomer was 30% as the optimum which showed the maximum grafting yeild.² The functional groups and surface properties of the treated samples by plasma and the grafted samples were investigated by fourier transform infrared (FTIR) and scanning electron microscopy (SEM). The FTIR spectra showed that functional groups consisting oxygen such as O-C=O, C=C and C-O established in plasma treated fabrics. Also, SEM images (Figure 1) exibited the creation of activated sites and fuctional groups that are related to the plasma gas and grafting reaction. SEM images also showed that the connection between polymer and the surface of the fiber was successfully made.³



Scheme 1. Glycidyl methacrylate grafting reaction on polypropylene.

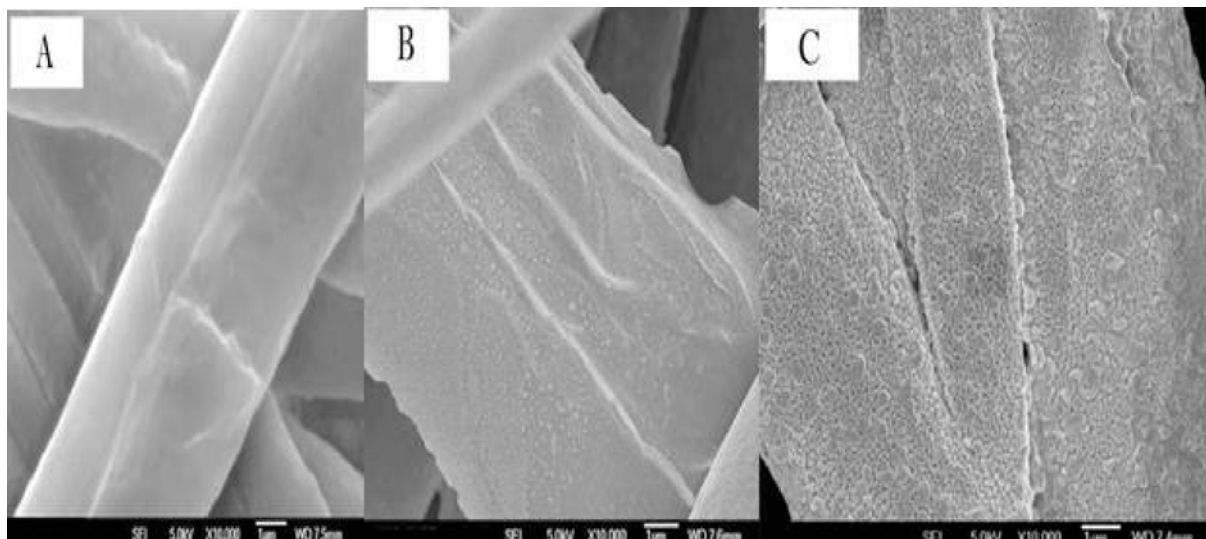


Figure 1. SEM image of: A) Untreated PP, B) Plasma Treated PP and C) PG (PP Grafted by GMA)

It can be seen; SEM images exhibited the creation of activated sites and functional groups that are related to the plasma gas and grafting reaction.

Keywords: Plasma, Surface modification, Grafting, Polypropylene.

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Synthesis, characterization and study structural properties some new cobalt nano coordination polymer

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Abstract:

The nano-structures of Cobalt coordination polymer $[\text{Co}(\text{HCOO})_2(4,4'\text{-bpy})\cdot n\text{H}_2\text{O}]$ have been synthesized by a sonochemical method and characterized by scanning electron microscopy (SEM) elemental analyses, X-ray powder diffraction (XRD) and IR spectroscopy.

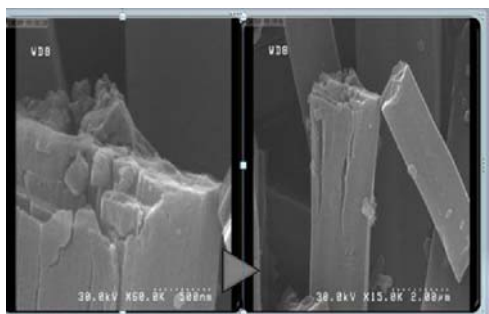


Fig 1. SEM image of $[\text{Co}(\text{HCOO})_2(4,4'\text{-bpy})\cdot n\text{H}_2\text{O}]$

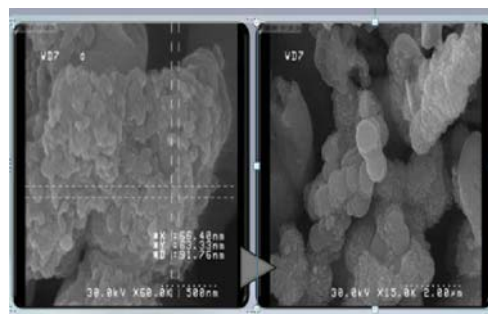


Fig 2. SEM image of $[\text{Co}(\text{HCOO})_2(4,4'\text{-bpy})\cdot n\text{H}_2\text{O}]$

Co_3O_4 nano-particles can be obtained from the precursor in above step. A mount of nano particles of Co for calcination of nano particles Co were heated at $450\text{ }^\circ\text{C}$ for 4 hour, and then air dried. The morphology and size of the as-prepared nano particles Co_3O_4 . sample were further investigated using Scanning Electron Microscopy (SEM) and X-ray diffraction (XRD). XRD pattern of synthesized samples is also consistant with the XRD pattern of reference samples was determined that the Co_3O_4 oxide nanoparticles are synthesized. The size of calcinated compound is 50 nm according to sherer equation.

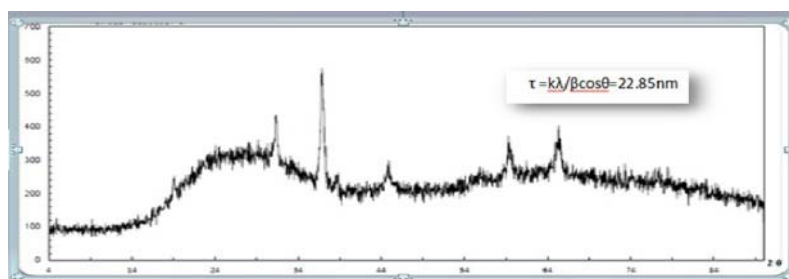


Figure 3. XRD Co_3O_4

Keywords: coordination, synthesized, Cobalt, Characterization



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An investigation nanostructures of carbon nanofibers *via* electrospinning process control and optimization

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Abstract:

Electrospinning affords a simple and reconcilable way to produce nanofibres on a large scale. This technique has inclined great attention in current decades because of the nearly simple, easy and low cost way it provides to produce polymer nanofibers.¹ Schematic diagram of electrospinning showing in Figure 1.

Carbon nanofibers whit 1D nanostructure and high specific surface area has quickly found their applications in energy conversion and storage, lithium-ion batteries, super capacitors, dye-sensitized solar cells, catalysis, sensor, filtration, composites, adsorption and biomedical applications.^{2,3} Morphological control of electrospun nanofibers including superficial porousness and diagonal helps to control its physical properties, absorbency and versatility with different industrial functions.⁴ Therefore, spinning process control and achieve optimal conditions is important. In addition to the necessity of fundamental study of spinning process and ruling physics on the production process of nanofibers in order to control and prefigure the internal structure of final nanofiber like diagonal and porousness of fibers is demonstrated. During the recent years, some attempts have been made to optimize the uncontrollable electrospinning process in order to create more uniform nanofibers. Modeling and simulation are suitable methods to obtain this approach.⁵

In this paper, activated carbon nanofibers were produced during electrospinning of polyacrylonitrile solution, stabilization, carbonization and activation of electrospun nanofibers in optimized conditions, (Figures 2 and 3 show the various conditions to optimize), and afterwards physical properties and nanostructures examined.⁶ Then mathematical modeling of electrospinning process has been conducted by focusing on governing equations of electrified fluid jet motion. Experimental and theoretical results were compared with each other in order to estimate the accuracy of the model.⁷ The simulation can provide the possibility of predicting essential parameters which affect the electrospinning process.

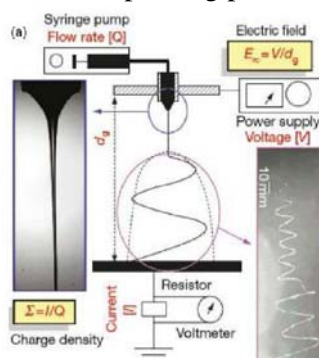


Figure 1. Schematic diagram of electrospinning showing details of the jetting processes, the whipping instability, as well as the fiber morphologies that can be obtained. The flow rate (Q), the voltage (V) and the distance between the electrodes (dg) are set

and the current (I) flowing through the jet is measured. The electric field strength is calculated as $E_{\infty} = V/dg$. The quantity $\Sigma = I/Q$ is the volumetric charge density. The photograph on the left hand side shows the straight section of the steady jet immediately after it ejects from the conical meniscus. The photograph on the right shows the whipping instability, where the centerline of the jet bends at a characteristic wavelength.

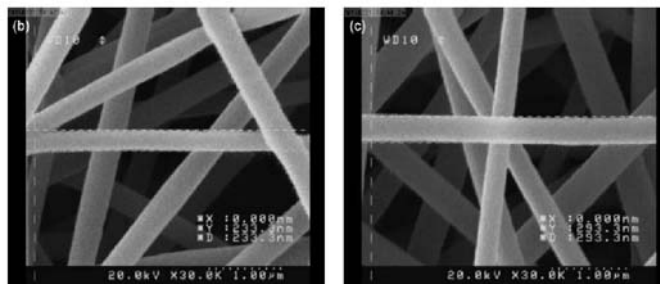


Figure 1 and 3. Show the micrographs of electrospun polyacrylonitrile nanofibers in optimized conditions (in different voltages).
(b): concentration (11 wt %), pumping rate (8 µl/min), spinning distance (12 cm), voltage (18 kV)
(c): concentration (11 wt %), pumping rate (8 µl/min), spinning distance (12 cm), voltage (16 kV)

Keywords: Electrospinning, Electrospinning modeling, Carbon nanofiber, Nanostructure.

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گروه تولیدی صامت تک خزر با هدف ایرانی کردن دانش تولید اسانس های طبیعی خوراکی و فرهنگ سازی استفاده از محصولات بهداشتی یکبار مصرف در سال ۱۳۸۲ در شهر صنعتی رشت پایه گذاری شد و در سال ۱۳۸۴ فعالیت خود را در زمینه تولید ساشه های بهداشتی یکبار مصرف با پروانه ساخت از وزارت بهداشت ، گواهینامه استاندارد خود اظهاری و همچنین گواهینامه سیستم مدیریت کیفیت ISO 9001:2008 از DQS آلمان آغاز نمود . هدف گروه تولیدی صامت تک خزر تولید محصولاتی با کیفیت بالا با به روز کردن مداوم سیستم تولید و ماشین آلات می باشد که این مهم از طریق به خدمت گرفتن تکنیک های روز، ما را قادر ساخته تا کیفیت محصولات خود را تضمین نماییم و رضایت مشتریان خود را با در نظر گرفتن ویژگی ها و نیازمندی آنها تامین نماییم.

هم اکنون گروه تولیدی صامت تک خزر که محصولات آن با نام آشنای **نیوساد** تولید می شود در تمامی استان ها نماینده و عامل توزیع فعال دارد. شایان ذکر است نیوساد یک کلمه فارسی به معنی "بی زوال و فنا ناپذیر" می باشد.

واحد R&D گروه تولیدی صامت تک خزر با توجه به امکانات گسترده تحقیقاتی و فنی خود در زمینه تولید محصولات آرایشی و بهداشتی با پایه طبیعی و عدم استفاده از نگهدارنده های پارابنی در خدمت مصرف کنندگان محترم می باشد.

افتخارات ما :

۱۳۹۳ دریافت تندیس برنذ برتر در سومین همایش برنذ برتر ، کیفیت برتر
 ۱۳۹۳ دریافت نشان رضایت مندی مشتری در اجلاس رضایت مندی مشتری
 ۱۳۹۳ واحد نمونه صنعتی سازمان صنعت و معدن و تجارت
 ۱۳۹۳ کار آفرین برتر ملی

۱۳۸۵ آزمایشگاه نمونه همکار غیردولتی استان گیلان
 ۱۳۸۹ واحد نمونه صنعتی سازمان صنایع و معادن استان گیلان
 ۱۳۸۹ واحد نمونه و تولید کننده برتر استاندارد
 ۱۳۹۲ واحد نمونه صنعتی سازمان صنعت و معدن و تجارت

