Scientific Tracks & Sessions
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Mohammad Majibur Rahman, Chemistry and Biomedicine 2018, Volume 8
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Separation of tin from tellurium: Effects of chloride and sulfate interferences

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Quantification of tin isotopes in environmental samples, especially the radioactive 126Sn, is important for processes such as the biomonitoring of organotin species, long-term nuclear waste storage and treatment planning. However, the detection of 126Sn by mass spectrometric methods, like Accelerator Mass Spectrometry (AMS), is hampered by the presence of the stable 126Te. Therefore, separation of tin from tellurium is crucial to minimize isobaric interferences. In the present study, the determination of distribution coefficients (KD, metal adsorbed in solid phase over metal retained in liquid phase) of Sn and Te onto TRU chromatographic resin in presence of Cl^- and SO_4^{2-} solutions were evaluated using ICP-MS technique. The KD values of Sn and Te with real field water (surface and groundwater) samples, and the adsorption-desorption study of Sn and Te with field water spikes were also discussed. Results reveal that the average KD for tin in aqueous hydrochloric acid (HCl) with the Cl^--spike produced an increase of 11%, whereas the mixed-spiked (both Cl^- and SO_4^{2-}) sample faced a reduction by 7% compared to that of the unspiked sample. The KD values of tellurium in the presence of tested anionic species remained unchanged. This observation demonstrates that the distribution coefficients of tin and tellurium onto the solid phase is barely affected by the presence of Cl^- and SO_4^{2-} contaminants (each present at concentrations of 70.0 mg L–1). Moreover, the adsorption of metal in the presence of Cl^- and SSO_4^{2-} spikes on the resin is favored at pH values from 4.0 to 5.0, and the optimum time for the best metal-resin interaction is around 90 minutes. A thorough adsorption-desorption study for tin and tellurium with spiked field water samples (surface and groundwater) show that at least 99% tin is adsorbed, while the adsorption of tellurium can be maintained at a level as low as 60%. Aqueous hydrofluoric acid (HF) can then selectively elute 85% of tin (with a single wash of 100 mg of resin) with tellurium release of less than 10%. Our proposed methodology can be applied successfully for the selective separation of tin from tellurium from surface and groundwater samples contaminated with Cl^- and SO_4^{2-} ions.

Speaker Biography

Mohammad Majibur Rahman has completed his MSc (in Chemistry) from Jahangirnagar University, Bangladesh, and an MSc (in Environmental Science) from Memorial University of Newfoundland, Canada. He has just submitted his PhD thesis in the Department of Earth and Environmental Sciences, University of Ottawa, Canada. He is a professor at the Department of Environmental Sciences at Jahangirnagar University. His research interest focuses on the measurement of radioisotopes, especially 126Sn, using Accelerator Mass Spectrometry (AMS).

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Parmeggiani C, Chemistry and Biomedicine 2018, Volume 8
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The chemistry beyond liquid crystalline elastomeric microdevices

Parmeggiani C
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Smart polymers are artificial materials that can respond to external stimuli. Among these, liquid-crystalline elastomers (LCEs) combine the properties of polymeric elastomers and liquid crystalline orientations, performing dramatic shape change (20-400%) under light/heat stimuli and allow for realization of remotely controlled robots. Moreover, the increasing interest is due to the opportunity to trigger their deformation by irradiation with light, when azobenzene dyes are included in the polymer structure. Important challenges lie in the miniaturization of functional structures. Direct Laser Writing (DLW) has been recently used to fabricate LCE structures with sub-micron resolution, exhibiting deformation under light excitation. The technique was demonstrated to allow for the realization of polymeric microstructures that can be locally controlled both in shape and molecular alignment, with nanometer precision. Implementation of materials to be used with such technique attracted our interest. Acrylate based mesogens, cross-linkers and dye were first studied and used to prepare LCE. Moreover, for the first time, thiol-yne click chemistry was employed to obtain LCEs. This reaction allows for the realization of mixed type "main-chain/side-chain" LCE. The new liquid crystalline networks, which incorporate part of mesogens in the main-chain of the polymer, are able to maximise the coupling between mesogens and the polymer backbone resulting in big deformation under nematic to isotropic transition. In this communication a short excursus on acrylate based mesogens and the new synthetic strategy are presented together with the comparison between the materials obtained.

Speaker Biography

Parmeggiani C has completed her PhD in Chemical Science at the age of 29 years from University of Florence with Prof. A. Goti and she was recently awarded as researcher at the Chemistry Department of the University of Florence. Since 2010 she is associate at the European Laboratory for Non Linear- Spectroscopy and at the National Institute of Optics (CNR). In 2016 she was awarded with the "Organic Chemistry for environment, energy and nanosciences" prize from the Organic Chemistry Division of the SCI and she was a finalists of the European Young Chemist Award. She authored 37 papers, 1 book and 3 patents (h-index 16), on smart materials, stereoselective synthesis of iminosugars and new green oxidation methods that have been cited over 1150 times.

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Assistive device for deaf people

Bouchra Nour El Houda Mezouar
University of AbouBekr Belkaid Tlemcen, Algeria

Help_Me_Hear is a compound device aiming to help people with hearing issues. It is composed of two simple parts: an emitter and a transmitter. This device will make a huge improvement in the biomedical market; it will give a new comprehension for accessible medical devices. our intent is facilitating life for humans and this instrument will be able to aid and facilitate parenthood in raising their neonate in a safe environment. This technology can be provided for everyone who is in need (parents with hearing problems). In fact, statistics show that 5% of the world population suffers from deafness. So this device will be based on detecting specific frequencies for baby noise that will be sent and convert into vibration to a bracelet or even a phone app according to the client order and notify the user that the baby is awake or crying so this will be life changer for these families and life-saver. Adding to that this product is Simple, secured, friendly environment and recyclable.

Speaker Biography

Bouchra Nour El Houda Mezouar has completed her bachelor degree in biomedical engineering from Abou Bekr Belkaid University, Tlemcen, Algeria. Actually, she holds the position of director in the scientific club of the department. An active person in the medical assistance volunteer office and looking to serve the biomedical technology.

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Adsorbent materials of next generation

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Sorption is a physical and chemical process by which one substance becomes attached to another. A specific case of sorption is the adsorption; Adsorption is the adhesion of atoms, ions or molecules from a gas, liquid or dissolved solid to a surface. This process creates a film of the adsorbate on the surface of the adsorbent. Adsorption is considered to be a very promising separation technique especially for the removal of pollutants in liquid-phase (dyes, heavy metals, phenols, etc). However, the economic crisis of the 2000s led researchers to turn their interest in adsorbent materials with some special characteristics: (i) super-adsorbent materials of high capacity; (ii) selective adsorbent materials (Molecular Imprinted Polymers – MIPs). The first class is contains many materials as activated carbons, agricultural wastes, modified polymers, graphenes, etc. The second class contains MIPs which are used for specific binding of highly-added value pollutants as precious metals (silver, gold) or drugs for recovery, etc. In this lecture, a recent summary of this type of works will be presented analyzing in details the next-generation adsorbent materials, discussing many different (maybe in some occasions doubtful) topics such as: (i) adsorption capacity; (ii) kinetic modeling and (iii) desorption/reuse potential.

Speaker Biography

George Z Kyzas was born in Greece in 1980. He obtained his BSc, MSc and PhD degrees at Aristotle University of Thessaloniki (Greece). His current interests include the synthesis of various adsorbent materials for wastewaters treatment (dyes, heavy metals, pharmaceuticals, phenols, etc). He has published significant Scientific Papers (over 90 publications; H-index: 35; Imp. Factor, average: 4.1), Books (as Author and/or Editor), Chapters in Books, Teaching notes and Reports. He was also Guest Editor in Special issues of Journals and presented many works in International Conferences. He has been awarded with honors, grants and fellowships for his research career/profile by (i) Research Committee of Aristotle University of Thessaloniki (2009, 2013), (ii) National State Scholarships Foundation of Greece (2013), (iii) Stavros Niarchos Foundation (2016). Now, he is Associate Professor at the Department of Petroleum, Natural Gas Technology and Mechanical Engineering (Eastern Macedonia and Thrace Institute of Technology, Kavala, Greece).

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Zeolite/nano metal oxide composite catalyst for biomass pyrolysis

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Nowadays energy and nanotechnology are both promising issues all over the world. Considerable attention has been paid to the nanosized metal oxides due to their unique properties and/or potential applications in several areas such as biomedical applications, optic and electronic, sorbents, sensors, catalysis. Only limited works are available on the conversion of biomass by using nanosized metal oxide catalysts.

Due to the financial, environmental and national problems of conventional fossil fuels, biomass is the only sustainable source of carbon that can be used to make renewable fuels and chemicals. Turkey has always been one of the major agricultural countries of the world. The importance of agriculture is increasing due to biomass energy being a major resource of Turkey. Much attention has been focused on new suitable biomass species which can provide high-energy outputs and have serious stocks for the sustainability. Among various agricultural residues, olive oil residue and hazelnut shell are coming into prominence due to their huge stocks.

ZSM-5 is an efficient catalyst to convert oxygenated organic compounds into hydrocarbons. The deoxygenation, decarboxylation, and decarbonylation reactions of the bio-oil components, cracking, alkylation, isomerization, cyclization, oligomerization, and aromatization are catalyzed by acidic sites of the zeolite. H-ZSM-5 that is activated at 500°C has predominantly Brønsted acid sites; however, especially at higher temperatures, Lewis acid sites form, resulting in dehydroxylation reactions. Surface acidity of anatase TiO_2 is the Lewis type. The aim of this study is the investigation of the catalytic effect of ZMS-5/nano TiO_2 composites on the pyrolysis of model and real biomasses. With and without catalysts experiments were conducted to compare the catalytic effect of ZSM-5, nano TiO_2, Degussa P25 and bulk TiO_2

Speaker Biography

Ali Sınag has completed his PhD from Ankara University, Turkey. In 2001 he moved to the Technical University of Karlsruhe (Karlsruhe-Germany), working within the groups of Prof Dr Rainer Raimert with the scholarship of the German Academic Exchange Service (DAAD). In 2003 he joined Prof Dr Eckhard Dinjus's group (Karlsruhe Research Center, Germany) with the scholarship of Forschungszentrum Karlsruhe. He is professor of Ankara University, Turkey. He has over 50 publications that have been cited over 1300 times, 3 patents and his publication H-index is 21 and has been serving as a Vice Chair of Science Park of Ankara University.

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Use of polymer-based nanovectors in the immobilization of drugs

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Recently, the researchers have focused on the synthesis of nanogelles and drugs with the long-term effectiveness. Use of polymers for this purposes plays the main role in the delivery of drugs to the necessary organs among modern methods. In this case, polymers as a matrix keep drugs for a long time and help their gradually separation in the body. Thus, drugs can not be released from the polymer until the polymer macromolecules entering the required cell. In this regard, it is reasonable using synthetic based polymer nanogels as vectors.

In the present work, polymer nanogells with new memory were synthesized based on polyacrylic acid and poly-N-vinylpyrrolidone to immobilize doxorubicin. The sorption abilities of the obtained nanogels were studied and their higher sorption capacity were found. By using such polymers as vector, the therapeutic dose of doxorubicin in experimental treatment of tumor diseases could be significantly reduced.

Time dependence on the release of gel from the immobilized doxorubic in polymer nanogels at 37°C and at different p^H was investigated. It was determined that, the release of doxorubucin from nanogel at 37°C occurs in small portions over a certain period of time and antibiotics keeps its bioactivity for a long time. This is due to the absorption of antibiotics both on the surface and volume of the polymer.

In addition, silver nanoparticles were synthesized in the medium of poly-N-vinylpyrrolidone and the complex of doxorubucin with silver nanocomposite polymer was obtained. It was determined that the distribution of silver nanoparticles depends on their presence in polymer environment. Thus, the poly-N-vinylpyrrolidone /Ag0/ doxorubicin system remains stable at p^H = 5-8 for a long time and due to the protonation of poly-N-vinylpyrrolidone in carbonyl groups at p^H = 1-3 doxorubicin loses its bioactivity regarding the breakdown of chemical bond between Ag0/doxorubicin and poly-N-vinylpyrrolidone.

Speaker Biography

Tagiyev DB is the director/professor of Institute of Catalysis and Inorganic Chemistry, Azerbaijan National Academy of Sciences. He has over 200 articles that have been cited over 470 times, and his publication H-index is 13.

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