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AGENDA

Abstract

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Plant biomacromolecules, its synthetic monomer, methylated derivative of synthetic analogue and their comparative anticancer efficacy

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This communication discusses a comprehensive review of biomass energy sources, environment and sustainable development. This includes all the biomass energy technologies, energy efficiency systems, energy conservation scenarios, energy savings and other mitigation measures necessary to reduce emissions globally. The current literature is reviewed regarding the ecological, social, cultural and economic impacts of biomass technology. This study gives an overview of present and future use of biomass as an industrial feedstock for production of fuels, chemicals and other materials. However, to be truly competitive in an open market situation, higher value products are required. Results suggest that biomass technology must be encouraged, promoted, invested, implemented, and demonstrated, but especially in remote rural areas.

Sustainable development of bioenergy from agriculture residues and environment

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Tbisili University, Georgia

The high-molecular fractions from the several species of two genera *Symphytum* and *Anchusa* were isolated by ultrafiltration of water-soluble extraction on the membrane filter with cut-off value of 1000 kDa. According to IR, ^{13}C and ^{1}H NMR, 1D NOE, 2D heteronuclear $^{1}H/^{13}C$ HSQC and 2D DOSY esperiments the main structural element of these preparations was found to be a new regular polymeric molecule. The polyoxyethylene chain is the backbone of this biopolymer. 3,4-Dihydroxyphenyl and carboxyl groups are regular substituents at two carbon atoms in the chain. The repeating unit of this regular caffeic acid-derived polyether, is 3-(3,4-dihydroxyphenyl)glyceric acid residue. Thus, the structure of natural polymer under study was found to be poly[oxy-1-carboxy-2-(3,4-dihydroxyphenyl)ethylene] or poly[3-(3,4-dihydroxyphenyl)glyceric acid] (PDPGA). Then the monomer of PDPGA was synthesized. Afterwards the synthesis of methyl derivatives of synthetic analogue of PDPGA was realized. PDPGA is endowed with intriguing pharmacological activities as anticomplementary, antioxidant, anti-inflammatory, burn and wound healing and anticancer properties. PDPGA and its synthetic monomer exerted anticancer activity *in vitro* and *in vivo* against androgen-dependent and -independent human prostate cancer (PCA) cells via targeting androgen receptor, cell cycle arrest and apoptosis without any toxicity, together with a strong decrease in prostate specific antigen level in plasma.

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Biography

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Design and construction of supramolecular precursors for preparing polymeric carbon nitride nanostructures with enhanced photocatalytic performance

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Polymeric carbon nitride (PCN) is an intriguing polymeric semiconductor, which consists of conjugated graphitic planes formed through abundant nitrogen-containing tri-s-triazine repeating moieties[1]. This semiconducting polymer shows wide potential applications in various fields such as photocatalytic water splitting, luminescent devices, electrochemical energy conversion and storage [2-6]. However, pristine PCN are bulky, thereby suffering from low specific surface area, severe charge recombination, and limited surface active sites [3]. Apparently, designing and constructing well-ordered nanostructures is of great significance for PCN, which facilitate overcoming its aforementioned shortcomings, modulating its optical, photoelectrical and luminescent properties, and thus improving its performance in the various application fields. In our group, we have prepared various PCN nanostructures, such as the three-dimensional PCN aggregates of hollow bubbles and the holey PCN nanosheets with high crystalline quality and extended visible light absorption. More significantly, inspired by the various kinds of self-assembly methods for constructing nanostructures of organic conjugated molecules, a liquid-liquid interface self-assembly from single monomer was first explored for synthesizing 1D supramolecular precursors consisting of well-ordered 1D hexagonal pillars. The subsequent thermal pyrolysis made the hexagonal pillars transform into 1D PCN rods composed of dendritic leave-like framework. These as-synthesized PCN materials exhibited enhanced photocatalytic activity for hydrogen evolution or organic pollutant degradation.

Comparative studies of the electrochemical and antibacterial activities of some heterocyclic compounds derived from spiroisoxaline, tetrazole, triazole, and pyrazole

Anouar Alami
Sidi Mohammed Ben Abdellah University

The chemistry of the heterocycles constitutes one of the research themes very studied and developed in organic synthesis. Many heterocyclic derivatives are found to exhibit various biochemical, agro-chemical and electrochemical activities [1]. In continuation of our research interest in heterocyclic compounds and those precursors, we report in this conference the latest research conducted in our Laboratory of Organic Chemistry [2]. The research orientations chosen are the following: Development of some Spiro heterocyclic compounds, study and prediction of their pharmacological activities, Synthesis and evaluation of the antibacterial activity of some heterocycles derived from triazole, tetrazole, pyrazole and tryptophan. Synthesis and study of the inhibition of the corrosion of some derived from tetrazole, triazole, and the pyrazole.

New heterocyclic compounds from 4-hydroxypyran-2-one: Synthesis, characterization and biological activity evaluation

Lahmidi Sanae
Mohammed V University

The necessity of finding molecules of unlimited potential for generating molecular diversity has always been realized by synthetic organic and medicinal chemists. As part of our program to study the behavior of la 4-hydroxy-pyron-2-one specially Dehydroacetic acid and Triacetic acid lactone towards nucleophilic reagents in order to achieve the synthesis of new heterocycles1,2,3 , we envisioned new protocols for the preparation of new products with an important structural motif present in a variety of natural and unnatural products, possessing significant biological activities (Scheme 1). However, these useful heterocycles include structurally simple compounds such as substituted phenolic derivatives or more complex molecules such as: isocoumarin (1H-isochromenone), pyranopyridine, triazolopyrimidine, pyridopyrimidine and pyranopyrone. These compounds drew our attention not only because they constitute the structural nucleus of many natural products but also because its formation was intriguing from the mechanistic point of view. heterocycles, biologically active molecules.

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Abstract

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Transition metal complexes/organometallic compounds as anticancer/anti HIV drugs or in pharmaceutical industry

Prakash Kinthada
JNTU University

Cancer is a dreadful disease and any practical solution in combating this disease is of paramount importance to public health. Cancer patients have burdened by drug induced toxic side effects, and no turned to seek help from the complementary and alternative medicine hoping for a better cure. Research on Platinum based drugs and Non Platinum based drugs is a Multi-Million Dollar Industry in USA and there is every need to produce safe drugs for the cure of this monstrous disease. Flavonoids have a long history of use in traditional medicines in many cultures. The phytochemical, curcumin is one of the major dietary flavonoid, belonging to a group of flavonol, Curcumin is a natural polyphenol. It is highly potential molecule capable of preventing and treating various cancers. Various dietary chemo preventive agents, turmeric powder or its extract are broadly used as therapeutic preparations in Indian System of medicine. We provide a summarized synthesis and structural determination of Curcumin Oxime, Curcumin Thiosemicarbazone derivative of Gold (III) complex.

Mechanistic insights on the stereospecific ring opening of aziridines using carbenes: A theoretical approach

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cis-2,3-dimethylaziridine undergoes ring cleavage with carbenes to yield corresponding olefins. Stereochemistry of such reactions is determined by the mechanism of the reactions. Potential Energy Surfaces (PES) of such reactions have been modelled and explored with a view to understand the mechanism of the reactions and the factors governing the stereochemistry of these reactions. The proposed mechanisms clearly reveal that the stereochemistry of such reactions i.e., retention or inversion of stereochemistry depends upon the nature of the carbenes. IRC and Wiberg bond order analyses explain the proposed mechanism very well. Substitution at R_3 and R_4 of carbene carbon predict the same trend. The release of the ring strain is explained by the high exothermicity observed. A detailed comparative study of those reactions with the help of the state of art theoretical methods will be presented.

Graphene and its composite for capacitive energy storage device

Lakhya Jyoti Borthakur
Gauhati University

With the advent of human civilization rechargeable energy-storage devices has acquired immense attention due to the decreasing reserves of fossil fuels and environmental pollution. As a result super capacitors, because of its remarkable properties such as high power density, wide operating temperature range and quick charge-discharge rates with an ultra-long cycle life has gained wide range of interest in many power devices. Graphene oxide (GO), has recently attracted resurgent interests because of its superior properties such as large surface area, high mechanical stability, tunable electrical and optical properties. As the surface of graphene oxide contains oxygen functionalities like hydroxyl epoxy and hydroxyl group it is an excellent candidate for anchoring with other material or molecules. Owing to the expanded diversity and improved overall properties, graphene oxide and its composite holds great promise for versatile applications in energy storage devices. However, graphene still have some drawbacks in order to apply it in the practical field. Due to the poor dispersion, structural imperfection, restacking and multilayer thickness etc, the high surface area and the electrical properties of graphene based materials can be disturbed. In this work our emphasis is laid on the development of a graphene based composite for highly efficient supercapacitors electrode. GO-functionalized carbon nanotube (carbon nanotubes functionalized with –COOH, $-NH_2$, and $-SO_3H$ group) composite were synthesized by one-step in situ technique and their electrochemical properties were evaluated by performing cyclic voltametric.

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Cerium dioxide as an efficient hydroxyl radical generator for pollutant

Aniruddha Gogoi
Gauhati University

In this work, the synthesis of β-cyclodextrin (β-CD) coated CeO_2 and magnetically separable Fe_3O_4-CeO_2 metal oxide nanocomposite are reported for the generation of hydroxyl radicals in a Fenton- type reaction for pollutant degradation. The β-CD is coated over CeO_2 nanoparticles to increase its surface activity whereas the doping of Fe_3O_4 onto CeO_2 was made to make the composite magnetic and to enhance the Fenton activity by generating a Fe-Ce synergy system. The materials were prepared as a heterogeneous catalyst and the activities of the catalysts were tasted for the degradation of organic dyes in a Fenton-type oxidation reaction in aqueous solution at room temperature. The degradation of methylene blue and catechol was studied for the catalytic activity measurement in the presence of H_2O_2 without light irradiation. The degradation of catechol and methylene blue was monitored by UV-Vis spectrophotometer and the formations of degraded products were identified with the help of Liquid Chromatography Mass spectrometry (LC-MS) studies. Both the catalysts showed remarkable stability for five consecutive cycles with excellent catalytic activity.

Fe-metal frameworks: Fenton activities toward organic pollutant remediation

Parikshit Gogoi
Gauhati University

Catalyst development for chemical processes is a fundamental driver of economic and environmental validity in global chemical industry. The heterogeneous Fenton and Fenton-like processes are one of the most promising approaches to generate reactive hydroxyl radicals to treat with the ever-increasing environmental pollution. However, developing advanced catalysts with acceptable activity and stability is still a long-term objective for practical application. Recently, various studies were reported with transition metal-based materials and their composites as Fenton-like catalysts for degradation of dyes and organic contaminants. Unfortunately, most of the catalyst system suffer from the problems of stability issues in solution and low catalytic activities. Development of low cost catalyst system with long lasting activities for treating pollutants is one of our current research agenda. Herein, we presented a simple method for the preparation of Fe_3O_4 and its composites with fullerene, carbon, graphene and biochar etccy is attributed mainly to the formation of active hydroxyl radicals on the surface of the catalyst, which are generated by the active decomposition of H_2O_2 by the solid heterogeneous catalyst. In the magnetic environment of Fe_3O_4 nanoparticles, the carbon sources have a crucial role to enhance the activity by increasing the stability with nominal iron leaching. In order to derive more stable catalysts, the composites of Fe and Ce with carbon sources appear to be feasible from green chemistry considerations which could be widely applied in practice.

Metal free one pot multi-component synthesis of 4H-thiopyran

Pranab Ghosh
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In past few decades, green and sustainable chemistry demand the development of new synthetic protocols that reduce waste and environmental hazardous compound[1]. In organic synthesis, solvents play an imperative role and often lead to environmental hazards. In recent times, glycerol, a major by-product of biodiesel industry and a promising green solvent for organic reactions, has received attention owing to its greener properties like non-toxicity, bio-compatibility, bio-degradability, reusability and decent polarity comparable to DMF and DMSO. In addition, glycerol can be employed as catalyst in many organic transformations. Although, water can also used as a greener solvent in many organic reactions but the main drawback is the hydrophobic nature of organic compounds.[2] Keeping these views in mind we report herein the use of glycerol, a greener, bio-degradable, environment benign solvent, as a highly efficient catalyst for the synthesis of vast range of highly functionalized heterocyclic molecule 4*H*-thiopyran via one pot multi-component synthesis. Among the sulfur containing heterocycles, the thiopyran structure has a high significance as a versatile scaffold in biological and medicinal chemistry although the application of it is still remain unexplored than other analogues. anticancer,[4] analgesic and anti-inflammatory activities.

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Metakaolin-based inorganic polymer synthesis using cotton shell ash as sole alkaline activator

Achille Madi Balo
University of Yaounde

Inorganic polymers were synthesised using metakaolin and cotton shell ash as activator. In this way the negative envinonmental impact of sodium or potassium silicate solutions can be eliminated. Phase transformations investigated by FTIR suggested the formation of inorganic polymers through the shift of the most intense band from 1031 cm^{-1} in metakaolin to around 973 cm^{-1} in the final product and the absence of the band at 789 cm^{-1} in the latter. XRD results revealed the presence of kalsilite and zeolite K-F, which appear as hexagonal and elongated crystals in SEM. A maximum compressive strength of 36.7 MPa was obtained. Compressive strength values increased with increasing K/Al ratios and with the reduction of pore densities due to the formation of the amorphous inorganic polymer matrix as observed on the SEM micrographs. Cotton shell ash can be used as an alternative activator.

The theory of the origin of water, or the great phenomenon of the origin of the water in the magma and the earth atmosphere

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In the theory created, objective and legitimate causes of the origin of the solar system and the mechanism of the origin of the resources of the Earth's atmosphere and hydrosphere and the formation of its structure by the reaction of methane and ammonia with oxygen are described during the first stage. A new phenomenon is discovered: in the Earth's core there is a constant generation of organogenic chemical elements - hydrogen, carbon, nitrogen and oxygen as a result of controlled thermonuclear fusion from helium, which explains the mechanism of the formation of methane, ammonia, carbon dioxide and water in magma during its existence and at present time and what also proves the reason for the non-dehydration of the planet. The existence of high pressure and temperature in the Earth's atmosphere is justified, which are directly dependent on the amount of a powerful hydrogen shell at the first stage of its formation, unlike other terrestrial planets, which is the reason for the absence of water and the biosphere of these planets. It was theoretically proved that the cause of cooling and the appearance of the "basalt" crust of the Earth in solid form is the occurrence of a successively restorative methane-ammonia and oxidation-aqueous medium in the Earth's atmosphere. There is constructed the thermodynamic basis of the origin of life on the Earth of the origin of water simultaneously in its primary atmosphere and in the oxidation-aqueous medium with the ozone layer of the atmosphere, and as a result of the chemical-biological evolution of amino acids and proteins, on the basis of successively sequenced organogenic elements, hydrogen, carbon in the form of carbon dioxide, nitrogen, oxygen, as well as methane and ammonia.

Application of polymeric carbon nitride and its composites as metal-free catalysts for the selective hydrogenation of phenylacetylene to styrene

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The most part of chemical processes in industry occur on the catalysts containing metals. Recently it has been demonstrated that polymeric carbon nitrides are capable of catalyzing many practically important processes, such as oxidation, alkylation, oligomerization, etc. without the participation of metals. Due to special semiconductor properties, they can also act as a heterogeneous photo-catalyst in water decomposition reactions and activation of carbon dioxide in the absence of any metal. The carbon nitrides possessing the functions of Bronsted and Lewis bases, rich in electronic centers and easily forming the hydrogen bonds, tolerating the functional groups in the reaction medium and therefore, can be considered as an environmentally friendly multifunctional green catalyst for the implementation of many important chemical synthesis. This paper presents an advance for designing and developing the efficient heterogeneous organic catalysts based on polymeric carbon nitride,,which can also replace metals for hydrogenation of phenylacetylene to styrene. Our study revealed for the first time that polymeric carbon nitrides are capable to provide selective hydrogenation of phenenylacetene to styrene in the gas phase and atmospheric pressure. And at the same time, they, unlike the metal-containing catalysts, cannot convert styrene.

In this presentation, the experimental results on synthesis of polymer carbon nitrides of graphitic and mesoporous morphology and their composites with different additives, such as graphene oxide, S, NaOH, KOH, Al_2O_3 and their application as selective hydrogenation of phenylacetylene are discussed.

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The most important branch of chemistry is the organic chemistry which are the major industry for the reduction of global poverty and hunger in the developing countries of the world like south asia particularly in Pakistan

Muhammad Usman
University of Tehran

The aim of presentation consist of chemistry, organic chemistry, industry, global poverty and hunger were studied and reported that The most important branch of chemistry is the organic chemistry which are the major industry for the reduction of global poverty and hunger in the developing countries of the world like South Asia particularly in Pakistan. The study reported that chemistry is the science of composition, structure, properties and reaction of mater, especially of atomic and molecules systems. In a very simple words, it is the composition, properties and reaction of esbstance. The different branches of chemistry each of which has the different area of study consist of i. analytical chemistry ii. Physical chemistry iii. Organic chemistry iv. Inorganic chemistry v. biochemistry vi. Food chemistry vii. environmental chemistry viii. Agricultural chemistry ix. Chemical engineering x. geo chemistry xi. Nuclear chemistry and xii. Clinical chemistry the most important branch of chemistry are organic and inorganic chemistry which are the major industry. The study reported that organic chemistry specifically studies compounds that contain the element carbon. Carbon has many unique roperties that allow it to form complex chemical bonds and very large molecules. Organic chemistry is known as the “chemistry of life” because all of the molecules that make up living tissue have carbon as part of their makeup. The study further reported that organic chemistry is definitely one of a typical most significant in chemistry.

Purification of rare earth solutions using a new phosphonium-based ionic liquid

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In this study, after a comprehensive research on choosing the best IL, eventually, "Trihexyltetradecylphosphonium Decanoat" was introduced as the best ionic liquid for extraction of Lanthanum from aqueous solution. The influence of four parameters on the separation process such as pH, temperature, IL concentration in organic solution and Lanthanum concentration in aqueous solution was investigated. A software based experimental designed was applied in this study. Results expressed high effect of pH, concentration of ionic liquid in the organic phase, and the interaction of this concentration with pH as well. Optimum condition for extraction was obtained in pH 6, 40°C temperature, IL concentration in organic solution 150 g/L and Lanthanum concentration in aqueous solution 1000 mg/L. Under these conditions, the percentage of extraction was 99.12%. The FTIR analysis was performed to detect the extraction mechanism; Results showed that the Lanthanum was extracted by bidentate mechanism. Mc Cabe-Thiele diagram was used to determine the stages of separation in which it was determined that two stages is necessary for stripping of organic solution.

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