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Keynote presentation – 1

Noble Metal Ionic Catalysts for Auto Exhaust Catalysis - Present Status

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and Talent Development Center, IISc Challakere Campus

We have been working on the auto exhaust catalysis since 30 years and in 2000, we have made new and highly efficient catalysts where Pd and Pt ions instead of Pd and Pt metals act as active sites. Pd is found to be far better and cheaper metal ion catalyst which when substituted in TiO2 is the best exhaust catalyst so far. We called them NOBLE METAL IONC CATALYSTS and this idea has received wide acceptance in the catalysis community. We have done extensive work on this idea1-6. Idea is now being used to make the cost efficient exhaust catalysts at low temperature at lowest cost. In this lecture, we will describe this new auto exhaust catalysts.

1. Noble metal ion substituted CeO2 catalysts: Electronic interaction between noble metal ions and CeO2 lattice Hegde, MS ; Bera, P, Catalysis Today, Volume: 253 Pages: 40-50 15 2015

2. Activation of Oxygen in Ce2Zr2O7+x across Pyrochlore to Fluorite Structural Transformation: First-Principles Analysis, Asha Gupta, Anil Kumar, U. V. Waghmare, M. S. Hegde; J. Phys. Chem, C, 121, 1083, 2017

3. Noble metal ions in CeO2 and TiO2: synthesis, structure and catalytic properties, P.Bera and M. S. Hegde, RSC Advances. 2015, p 948949- 94897,

4. Platinum Ion-Doped TiO2: High Catalytic Activity of Pt2+ with Oxide Ion Vacancy in Ti4+1–xPt2+xO2–x Compared to Pt4+ without Oxide Ion Vacancy in Ti4+1–xPt4+xO2; Bhaskar Devu Mukri; Umesh V. Waghmare and M. S. Hegde, Chem. Mater. 2013, 25, 19, 3822-383

5. Activation of Lattice Oxygen of TiO2 by Pd2+ Ion: Correlation of Low-Temperature CO and Hydrocarbon Oxidation with Structure of Ti1–xPdxO2–x (x = 0.01–0.03), Bhaskar Devu Mukri Gargi Dutta†Umesh V. Waghmare and M. S. Hegde, Chem. of Mater., 24, 4491-4502, 2012

6. Noble Metal Ionic Catalysts M. S. HEGDE, GIRIDHAR MADRAS, AND K. C. PATIL§ †Solid State and Structural Chemistry Unit, Chemical Engineering, §Inorganic and Physical Chemistry, Indian Institute of Science Bangalore 560012, India; ACCOUNTS OF CHEMICAL RESEARCH, vol 42, 704-712 June 2009.

Keynote presentation – 2

Sustainable and Green Chemical Manufacturing via Continuous Flow

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Continuous flow process provides a potential alternative to batch synthesis because of its inherent advantages such as very efficient heat exchange, high batch to batch reproducibility, fast mixing, high throughput, safety, and the ability to do multistep telescoping synthesis. Due to these advantages, these processes have been referred to as the most promising "Sustainable and Green Technology". In fact, continuous flow processes are projected to be the "CHEMICAL FACTORIES" of tomorrow. Continuous flow processes also provide an "On-Demand" synthesis with complete control over reproducibility, size, shape and these parameters can be achieved at various scales (lab synthesis to pilot to bulk production) with excellent reproducibility. This opens up the opportunity for synthetic chemists to prepare materials with precise control over critical molecular design parameters. It also enables one to carry out material synthesis at higher temperatures that were outside the domain of an organic synthetic lab. We have been exploring continuous flow processes for the synthesis of conjugated polymers, nanoparticles and nanofibers, catalysis for heterogeneous processes etc. In this presentation, I will review some of the recent advances in these directions and some results from our laboratory.

Invited talk-1

Liquid crystals in photovoltaics: A new generation of organic photovoltaics

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Liquid crystals have recently gained significant importance in organic photovoltaics. Power conversion efficiency up to about 10% has reached in solar cells incorporating liquid crystals. In this talk, I would like to present an overview of the developments in the field of organic photovoltaics with liquid crystals. The talk will also include our recent research work on the preparation of solar cells with discotic liquid crystals. An outlook into the future of this newly emerging, fascinating and exciting field of self-organizing supramolecular liquid crystal photovoltaic research will be provided.

Invited talk-2

Exploring Improved Corrosion Resistance through Friction Stir Processing (FSP)

Dr. A. Gourav Rao, Naval Materials Research Laboratory, Ambernath

Dr. Manjesh Mishra, Bharat Forge Ltd., Pune

Prof. N. Prabhu, Dept. of Metallurgical Engg. & Materials Sci., I. I. T. Bombay

Two materials, hypereutectic Al-30Si alloy and 2507 Super duplex stainless steel, are subjected to multipass friction stir processing (FSP). The microstructure, mechanical properties and corrosion behavior, after processing, were examined. A significant refinement in microstructure was observed in the stir zone resulting in improved yield strength, tensile strength and corrosion resistance. Electrochemical impedance spectroscopy and anodic polarization studies in 3.5 wt% NaCl solution showed nobler corrosion characteristics with increasing number of FSP passes. This was evident from the decrease in corrosion current density, decrease in passive current density and increase in polarization resistance. The homogenization of the microstructure changed the semiconducting nature of the passive film further confirming the improvement in corrosion resistance.

Invited talk-3

Polysaccharide based Hybrid Nanocomposites: Evaluation as Adsorbent Materials for Water Purification

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Polysaccharide based materials are popular as cost effective adsorbent materials for water treatment. Hydrogels obtained by graft polymerization of synthetic monomers on polysaccharide backbone have been extensively studied in our laboratory as adsorbent materials. Adsorbents with significant efficiencies for adsorptive removal of ionic dyes from aqueous solutions have been developed by grafting acrylic monomers such as N, N-dimethylacrylamide, N, N-(dimethylamino) ethyl methacrylate, (2- acrylamido -2-methyl)-1-propane sulfonic acid, (2- methacryloyloxy) ethyl trimethyl ammonium chloride, diallyldimethylammonium chloride on polysaccharides such as Pectin, Locust bean gum, Karaya gum and Gellan gum. Further, the incorporation of inorganic nanoparticles such as ZnO, Ag, Fe_3O_4 and clay particles affected the adsorption behaviour of these materials significantly. The results of the study on modification of Karaya Gum by graft copolymerization with N, N-(dimethylamino) ethyl methacrylate and (2- methacryloyloxy) ethyl trimethyl ammonium chloride for adsorptive removal of ionic dyes from aqueous solutions will be discussed. The graft copolymer gels and the inorganic particle containing hybrid nanocomposites have been made by microwave irradiation technique. They have been characterized by FTIR, TGA, SEM, EDS and XRD techniques. The materials have been evaluated for adsorption towards ionic dyes, using methylene blue and indigo carmine as model ionic dyes. The adsorption data have been analysed to understand the kinetic and thermodynamic aspects of adsorption. A comparison of adsorption efficiencies of different materials has been presented.

Key Words: Polysaccharide; Copolymer; Hydrogel; Adsorption; Ionic dyes.

Invited talk-4

Multidisciplinary Approach in Biomedical Sciences and its Impact on Human Societal Life

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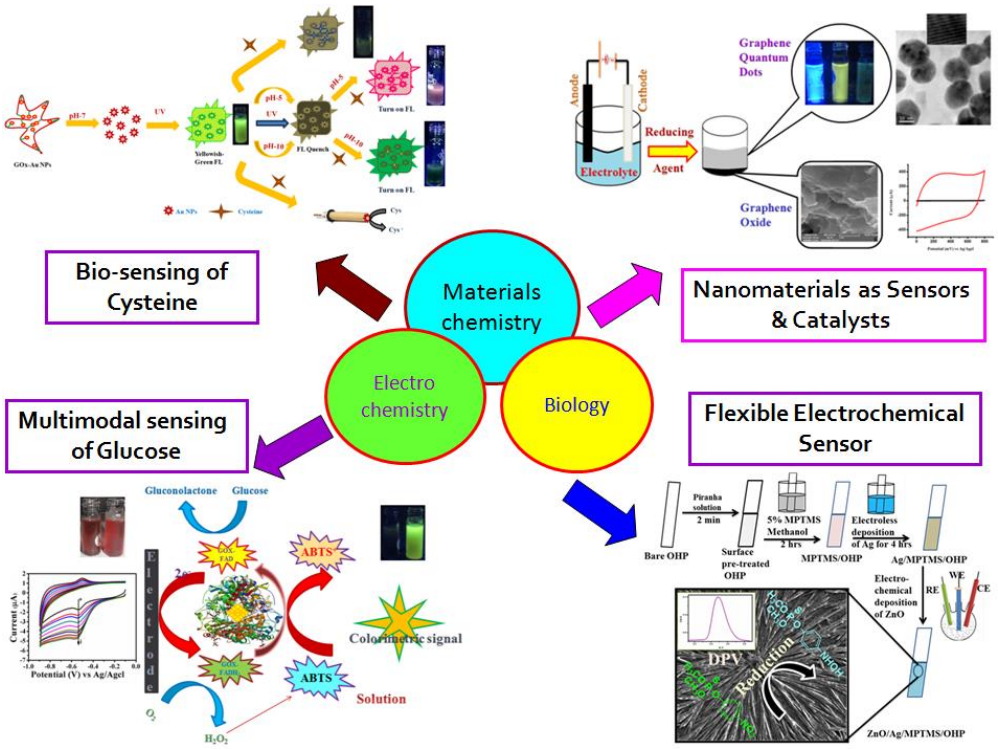
Ever increasing demands for new functional materials along with huge expenses associated with the modern day hospital treatments provide an opportunity for researchers across the globe to find out alternative, affordable yet beneficial materials and methods to solve some of the global issues including energy and health sectors. A successful combination of materials chemistry along with electrochemistry and biology can provide functional and novel platforms that can be used as sensors and biosensors. In general electrochemistry in conjunction with materials chemistry offers a simple, cheap, ease to fabricate devices and provide alternative methodology to engineer the system at either atomic or molecular level to impart (bio)sensing behaviour. In this context, this lecture will highlight the significance of developing exotic and functional materials to be employed as sensing platforms for detection of biomarkers associated with health care diagnostic applications. Particularly the experiments performed in our laboratory (***Scheme 1***) in terms of preparation of fluorescent nanoparticles of Au, carbon and their functionalization with biomolecules utilized for sensing and bio-sensing applications will be discussed. An example each for enzymatic sensing of glucose and hydrogen peroxide as well as amino acid (cysteine) will be presented. Further chemical modification of electrodes results in efficient modulation of electron transfer across the interface that is further exploited for sensing applications. Introduction of nanomaterials such as gold nanoparticles, nanostars and graphene quantum dots (GQDs) onto self-assembled monolayer modified surfaces improves the sensing behaviour in terms of enhancing the sensitivity, signal to noise ratio, linear range and detection limit etc. A simple methodology for simultaneous preparation of GQDs that can emit various colours and reduced graphene oxide (RGO) has been developed and explored further for bio-imaging and supercapacitors applications. Moreover, some of the recent developments made in the area of flexible electrodes will also be discussed. In all these applications materials chemistry along with electrochemistry is demonstrated to be a simple yet powerful technique that offers several advantages

in terms of current, potential and charge to monitor the binding and sensing events as well as the determination of thermodynamic and kinetics parameters associated with the sensors.



Scheme 1: Pictorial representation of the fabrication of fluorescent nanomaterials and biomolecules based novel platforms for sensing and bio-sensing applications.

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Invited talk-5

Novel Drug Delivery: Overview and Case Studies

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Pharmaceutical dosage form is a convenient means through which a drug substance is delivered into the body. The medicines are in the form of tablets, capsules, syrups, injections, etc. The dosage forms can be categorized into 3 generations. Generation 1: Conventional dosage forms (like Tablets, capsules, injections, syrups, etc), Generation 2: Sustained release dosage forms (like sustained release tablets, implants etc) and Generation 3: Targeted dosage forms – Nanotechnology based products. In sustained release formulations, several doses are placed in a single formulation and administered. This will overcome the high frequency of administration of tablets. Sustained release dosage forms can be classified into different systems based on routes of administration (eg. Transdermal drug delivery systems, Oral controlled systems, etc). In first two generations of dosage forms, the drug is distributed throughout the body. This will reduce the amount of the drug required for treating the disease in a particular tissue and it also would produce the adverse effects for other organs or tissues. Hence Targeted drug delivery systems are gaining importance. The drug delivery systems used for targeting a particular tissue/ group of cells are usually nanotechnology based formulations. These include polymeric nanoparticles, liposomes, solid lipid nanoparticles, nanostructured lipid carriers, dendrimers, etc. For active targeting of the drugs, these nanocarriers are generally attached with a ligand which is specific to a particular tissue or cells. These nanocarriers are expected to provide complete treatment for many ailments including cancers.

Invited talk-6

Beautiful world of Thermoelectric Materials for Clean Energy Production

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The global energy demand has been increased drastically due to increase in domestic and industrial usage. Harvesting waste heat energy in to electricity is one of the approaches to meet this global energy demand. Thermoelectric materials can be used in this process as they can convert heat produced from various sources such as industrial heat, automobile exhaust etc. into useful electricity. This talk describes the various advantages of thermoelectric materials and elaborates their applications. The next part of the talk gives descriptions of various types of thermoelectric materials and different techniques to enhance their performance. Among all the thermoelectric materials Cu_2SnSe_3 has been regarded as a potential thermoelectric material by the thermoelectric community owing to its cost effective and non-toxic constituent elements as well as due to its complex crystal structure. The talk mainly focuses on this material. The results shows that the method of preparation plays a key role in determining the applicability. The results show that Spark Plasma Sintering (SPS) is a superior method as compared to solid state sintering process. Doping by Pb, and Sb enhances the figure of merit of this system. The thermoelectric properties of composites using Sn_2Se has been studied and the incorporation of SnSe resulted in significant increase in electrical resistivity and Seebeck coefficient. Concurrently, a high PF of 35.60 $\mu W/mK^2$ is for x = 10% at 375 K. However, due to the increasing thermal conductivity with x, the composites have lower ZT than the pristine. Furthermore, the Vicker's microhardness which is an important measure for mechanical strength of a material has distinctly improved by the addition of SnSe which is a vital parameter for thermoelectric devices.

Keyword : Clean energy, Seebeck effect, Electrical conductivity, Thermal conductivity, Figure of Merit

Invited talk - 7

Functional oxide nanoparticles: Swift synthesis and processing to tailor the material properties

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Metal oxides have been in the fore-front of technological applications in the last century [1]. Nanoparticles of them are especially gaining wide research interest owing to their interesting optical, electrical and magnetic properties. Their ceramic nature makes the synthesis processes depend on high temperatures and lengthy processing. The material properties greatly depend on the synthesis and processing conditions. Solution chemical methods have emerged as efficient methods combating the issues of high temperatures, non-stoichiometry and inhomogeneous dopant–distribution. However some of these methods also need elevated temperatures to impart desired functional properties. Swift synthesis and processing methods have been on the look to make the processes simple and faster. In this regard, we have been working on developing microwave assisted synthesis by solution chemical methods for the faster synthesis of various metal oxide nanoparticles[2-3]. Synthesis of Phosphors, semiconductors, magnetic materials and dielectric materials within minutes has been successfully established[4-5]. The processing of these nanoparticles can be carried out in different ways and Rapid Annealing, a fairly recent approach has been found well-suited for this purpose, where the processing times are of the order of minutes[6-7]. The effect of both the synthesis and processing parameters on the various material properties will be discussed.

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OP – 1

Experimental and Theoretical evaluation of anticorrosive performance of Benzyl Isothiocyanate

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The acid corrosion control of stainless steel was carried by using benzyl isothiocyanate. The corrosion and inhibition studies were done by electrochemical techniques such as potentiodynamic polarization (PDP) measurements and electrochemical impedance spectroscopy technique (EIS). Conditions were optimized to get maximum inhibition efficiency by varying the concentration of the inhibitor in the temperature range of 303-318 K. Activation and thermodynamic parameters were evaluated and discussed in detail. Surface characterization was done by SEM and EDX before and after the addition of inhibitor. Results indicated that inhibition efficiency increased with the temperature and inhibitor concentration up to 0.025 gL^{-1} and then decreased. Suitable mechanism was proposed for the inhibition process. Surface morphology studies clearly indicated the adsorption of inhibitor on the metal surface. The density functional theory (DFT) based theoretical studies supported the experimental observations.

Key words: corrosion inhibition; electrochemical studies, surface morphology; adsorption studies; theoretical calculations.

OP – 2

Synthesis and Characterization of PMMA Films Doped by Cyanopyridone - based Blue Emissive Conjugated Small Molecule

Deepak Devadiga and Ahipa T.N.*

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Cyanopyridone-based blue emissive conjugated small molecule (**Cp**) doped poly(methyl methacrylate) polymeric films were prepared with various concentrations of **Cp** ranging from 1 to 6 wt% of **Cp**. Their structure and linear absorption properties were investigated. Both the **Cp** and the polymer dissolved in chloroform and further using solvent-casting technique, thin films were prepared. Structural characterizations were carried out by XRD, and the thin films exhibited an amorphous hump which indicates the non-crystalline structure of examined polymeric composites. Using Spectrophotometer measurements, estimated the spectral absorption measurements of the thin films like absorbance, transmittance followed by the calculations of absorption index (k), and optical energy band gap (Eg) in the wavelength region from 200 to 1100 nm. Results reveal that the optical constants vary with **Cp** doping concentrations. It has been found that optical energy gap (Eg) appearing that, both direct and indirect optical transitions are conceivable for these thin films. Our designed **Cp**/PMMA composites can be applicable in optoelectronic applications.

Keywords: PMMA; Thin Film; Absorption Index; Optical Energy Band Gap.

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OP – 3

Formulation of Poly (o-toluidine) based conductive screen printing ink for thick film flexible electronics applications

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Novel sulphuric acid doped (H_2SO_4) poly (o–toluidine) (POT) based screen printing ink was formulated using polyvinyl pyrrolidone (PVP) as resin and dimethylformamide (DMF) as the solvent. Formulated inks were screen printed on polyethylene terephthalate (PET) substrate. Electrical properties of thick ink films, printed using inks having varying ratios of POT and PVP, were measured using four probe method. The ink, formulated with POT: PVP ratio of 1.0:0.5 exhibited the highest electrical conductivity of 1.3×10^{-3} S/cm. Electrical conductivity exhibited by POT thick ink film was superior to POT samples doped either with acetic acid, oxalic acid or HCl acid. In addition to this, the conductivity was in line with POT samples doped with p-toluene sulphonic acid and copper nanoparticles. The formulated ink can be used for printing conductive polymer layers in the mass production of flexible electronic devices using the screen printing process.

OP – 4

PI3Kδ Selective Inhibitors and its application

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PI3Kδ is implicated in various inflammatory and autoimmune diseases. For the effective treatment of chronic immunological disorders such as rheumatoid arthritis, it is essential to develop isoform selective PI3Kδ inhibitors. Structure guided optimization of an imidazole-quinolinones based PI3K inhibitor (Dactolisib) potent and orally bioavailable PI3Kδ isoform selective inhibitor, with an improved efficacy in the animal models. The aim is to discover novel, potent and orally bioavailable PI3K*δ* selective inhibitors, mainly by favouring the suitable accommodation of designed molecules, in the specificity pocket to achieve PI3Kδ selectivity. Considering imidazoquinolinone moiety as a starting point, appropriate structural modifications were carried out in the Dactolisib, to improve PI3Kδ selectivity. Two set of compounds were designed. Initial modifications on imidazole ring (of Dactolisib) involves positional changes of methyl and phenyl groups. Further, modifications were carried out at the benzyl ring. In the second set, changes were carried on set one compound to improve isoform selectivity and in vivo efficacy. Overall pre-clinical data suggest that the development of a potent and selective PI3Kδ inhibitor could be viable therapeutic option for the effective management of rheumatoid arthritis.

OP – 5

IN-SILICO Evaluation of benzo thiazole substituted 4-thiazolidinones

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In the current scenario, designing of new molecules with clinical application is mainly achieved by variation in the structure of the identified lead molecules. Fundamental aspect of *in-silico* studies are to know about the important "biomolecular events" especially enzyme-ligand interactions. Cancer is one of the emerging diseases associated with the high degree of mortality. In the present work, benzothiazole substituted 4-thiazolidinone has been taken for the anticancer evaluation. In this study, *In-silico* studies were performed by determination of drug likeness and Lipinski's rule of 5, determination of important electronic parameter, evaluation of ADMET properties followed by Molecular docking. Docking studies were performed by taking two different proteins which belonging to VEGFR2 family PDB ID: 2QU5 and 5HS3. VEGFR-2 plays important role as signal transducer mainly for angiogenesis. So, anti-angiogenic therapy for cancer mainly focused and targeted on these receptors. Benzothiazole substituted 4 thiazolidinone derivatives were investigated whether these derivatives binding mode is correlated to VEGFR-2 inhibitors or not by docking against VEGFR-2. For this Pazopanib which is a VEGFR2 inhibitor and 5-FU is a well known anticancer agent are used as standards. Out of 20 compounds 4 compounds has been selected for further Anticancer evaluation based on docking score.

Key words: *in-silico* studies, benzothiazole substituted 4-thiazolidinone, docking, VEGFR2.

OP – 6

Laser scribed Graphene for next generation for next-generation integrated dye sensitized solar cells and supercapacitors

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The current trend not only aims at the generation of energy from solar but also stores it in an appropriate manner for further use. Dye sensitized solar cell (DSSC) and supercapacitors (SC) are devices used for energy storage. DSSC captures the solar energy and SC stores the captured energy. DSSCs has been fabricated with a naturally occurring anthocyanin dye extracted from the kokum fruit. A conventional microwave technique used to prepare Tin Oxide (SnO2), which acts as a promising electrode material for DSSC. The solid polymer electrolyte prepared using solution casting technique. Polyvinyl pyrrolidone (PVP) and polyvinyl alcohol (PVA) blend with varying concentrations of Potassium Iodide using iodine as a dopant is the electrolyte composition. The dielectric studies and conductivity of these polymer electrolyte blends studied by electrochemical impedance spectroscopy (EIS). One step synthesis technique - Laser engraved method used for few layers' graphene synthesis. Graphene has been used as the counter electrode material for DSSC and graphene-graphene based SC. DSSC-SC device fabricated and characterized using various analytical and microscopy techniques. The integrated device showed the fill factor of 11.4% and efficiency of 0.85 %. The discharge time increased by three times for integrated DSSC-SC cell.

OP – 7

Inhibition Effect of Thiazole derivative on the corrosion of 6061AA Aluminium in Hydrochloric Acid

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The inhibition efficiency of thiazole derivative, Ethyl-2-amino-4-methyl-1,3-thiazole-5-carboxylate on 6061AA Aluminium in 0.05M HCl solution was tested by potentiodynamic polarization (PDP) and electrochemical impedance spectroscopy (EIS) methods. The effect of temperature, concentration of the acidic medium and change in the concentration of the inhibitor were studied. Maximum inhibition efficiency of 90% is obtained with 100 ppm of the inhibitor. The inhibition efficiency is increased with increase in concentration. Thermodynamic adsorption functions (ΔG°ads, ΔH°ads and ΔS°ads) and the activation parameters (E*a, ΔH*, ΔS*) were calculated. PDP measurements indicated that the inhibitor is mixed type. Adsorption of inhibitor was found to obey Langmuir adsorption isotherm. By scanning electron microscopy was used to detect the surface morphology of uncorroded and corroded coupons. From the mechanism of corrosion inhibition, it is possible to deduce the formation of coordination bond between the inhibitor and the metal surface.

OP – 8

Synthesis, molecular docking and anticonvulsant activity of 1,3,4-oxadiazole derivatives

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2-oxo-2H-chromene-3-carbohydrazide **(1)** reacts with various aromatic aldehydes to give corresponding 2-oxo-2H-chromene-3-carbohydrazide arylidene hydrazides **(SB1-8)**. Oxidative cyclization of **(SB1-8)** with mercuric oxide and iodine in DMF medium furnishes the title compounds 3-(5-aryl-1,3,4-oxadiazol-2-yl)-2H-chromen-2-ones **(2a-h).** All the synthesized compounds were assigned on the basis of IR, 1H-NMR and Mass spectral data. The physicochemical properties, Lipinski's RO5 and ADMET properties have been calculated for the synthesized compounds by using Qikprop application in Schrodinger software. The synthesized compounds were then docked onto the active sites of GABA-A (PDBID: 4COF) for anticonvulsant activity. Some of the selected compounds were evaluated for *In-vivo* anticonvulsant activity by MES and PTZ models.

The synthesized compound obeys the Lipinski's rule of five. The synthesized compounds were docked in the groove of binding site in 4COF. The synthesized compounds are having a binding free energy in the range of -3.523 to -1.526 kcal/mol. The ADMET studies of the synthesized compounds helped in concluding that all the compounds have good BBB penetration as that of the standard.

Among the synthesized 1,3,4-oxadiazole derivatives four compounds were selected and screened for anticonvulsant activity by two models MES and PTZ induced convulsions. In both models latency, and duration are the important parameters which asses the anticonvulsant property. Compounds **2h** has shown a decrease in the flexion phase, **2e** and **2d** have shown a decrease in extension phase and compound **2c** have shown a decrease in stupor phase and in total compound 2c shows convulsion duration time closer to that of standard drug.

OP – 9

Synthesis, Characterization and molecular docking studies of pyrazolines

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Pyrazolines are well known nitrogen containing five-membered heterocyclic compounds which possess wide range of pharmacological applications. These are commonly used as synthons in organic chemistry. Structural modification to these pyrazoline moiety develop highly efficient drugs with possible applications in the treatment of infectious diseases and cancer. Pyrazoline derivatives possess the biological activities like, anticonvulsant, antimicrobial, antidepressant, and antitumor activity. Herein, we report the synthesis of a new series of pyrazolines. The reaction of 4-hydroxy acetophenone and substituted aromatic aldehydes resulted in chalcones which further underwent intramolecular cyclisation in the presence of hydrazine hydrate to give pyrazolines. These pyrazolines were treated with benzyl chloride to yield pyrazolines in good yield. Synthesized compounds were characterized using spectral techniques. Molecular docking studies were carried out for the synthesized compounds using cytochrome P450 14α-sterol demethylases (CYP51) enzyme which play an important role in sterol biosynthesis in eukaryotes to study their antimicrobial properties. Synthesized compounds showed good docking score compared to the standard drug. The results suggest that these pyrazolines could be a potent lead in the treatment of microbial infections.

Keywords: Pyrazolines, In silico study, antimicrobial activity.

OP – 10

Andrographis ceylanica —A key to antidiabetic

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Andrographis ceylanica is an endangered medicinal plant found in Eastern ghats and western ghats. More than 32 species belonging to the *Adrographis* family has been explored phytochemically. No literature was found to describe the phytoconstituents or the medicinal values of this species yet. The present study deals with the identification of the active phytochemical present in the plant *Andrographis ceylanica* which fight against diabetic by *invitro* method. The plant parts collected from western ghat, were shade dried, extracted with petroleum ether, ethyl acetate, chloroform followed by ethanol. The extracts were column chomatographed. Few of the phytochemical constituents were isolated and identified by means of spectral analysis (IR, 1D, 2D, Mass spectra). The phytoconstituent C1P2 from the petroleum ether extract, isolated at 99:1 (PE: EA) was subjected to *invitro* α-amylase and α-glucosidase inhibitory assays. Based on the results obtained the constituent C1P2 was studied for the *invivo* cell line studies. The results recognize C1P2 as a potent antidiabetic drug. The activity of C1P2 is comparable with that of standard drug Acarbose. The results offer a promising platform for more detailed *invivo* experiments on the isolated compound C1P2.

Key words: antidiabetic drug, Acarbose

OP – 11

Colorimetric influence of overprinting varnish on printability of paperboards

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The quality and consistency of colorimetric print quality is extremely essential for printed packaging product. The color quality and its consistency are frequently measured and controlled during the paperboard package printing process. The number of finishing operations such as varnishing, lamination, embossing and variety of coatings are also performed to improve the aesthetics and end use performance of the printed package. It becomes very important to carry out required finishing operations without effecting the quality of previously printed packaging boards. The colorimetric measurements, optical and physical properties of the printed packaging board may change after the application of overprinting varnishes or coatings. The main objective of applying overprinting varnish is to improve the end use performance of printed board without effecting the colorimetric measurements of the printed image. This paper evaluates the colorimetric performances of aqueous and blister sealing coating solutions applied in three different thicknesses (5 μm, 10 μm and 15 μm) on three types of printed paperboards (grey back, cyber excel and art gloss paperboards) using Zehntner Zua 2000 coater. The three types of paper boards were printed on HP Indigo 5500 Digital Offset machine. The working condition of HP Indigo 5500 Digital Offset machine was standardized by printing Linearization test charts. The color differences and color gamut of the printed image before and after applying overprinting varnishes have been measured using X-rite i1 Pro Spectrophotometer and compared by applying standard color management methods. Both aqueous and blister sealing coating have shown good colorimetric performance on selected paperboards. The color gamut has been improved after the application of overprinting varnishes in most of the cases. The color differences have also not been significant after the application of overprinting varnish.

OP – 12

Synthesis and Characterization of *N*-substituted Thiazolidine 2,4-Diones

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Thiazolidine 2,4-Dione is the most common heterocyclic compound in heterocyclic chemistry and in drug design. Presence of several reaction sites in the Thiazolidine 2,4-Dione moiety extends its range of applications and leads to new solutions for challenges in medicinal chemistry. Thiazolidine-2,4-diones are commonly used as antidiabetic, anticancer, antimicrobial drug, and they are accepted as the most effective group of drug for type 2 diabetes. Presence of the thiazolidine 2,4-dione in many drugs such as troglitazone, rosiglitazone, pioglitazone and englitazone motivate the chemists to design new thiazolidine 2,4-dione scaffolds. Encouraged by the diverse biological applications of thiazolidine-2,4-diones, a series of *N*-substituted thiazolidine 2,4-diones were synthesized by the Knoevenagel condensation reaction of thiazolidine-2,4-dione with aromatic aldehydes followed by *N*-condensation reaction with aryl halide or alkyl halide. Synthesized compounds were characterized using spectral techniques such as FT-IR, ^{1}H NMR and ^{13}C NMR.

Keywords: Thiazolidine 2,4-diones, FT-IR, ^{1}H NMR, ^{13}C NMR.

PP-1

Fouling studies in simulated sea water for optimizing the process parameters

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Fouling is a major problem faced by many industries worldwide. It is one of the major flow assurance problems in the water treatment and oil sector. Scale build up results in reduced water flow through pipes, reduced heat transfer in boilers and condensers. It can decrease the mechanical resistance of the equipment in contact with water. The objective of the study is to investigate fouling propensity at various operating conditions. A newly designed test rig was used for the purpose. The operating parameters used were temperature, flowrate and time. The fouling propensity was measured in terms of weight gain. Fouling propensity was the highest at the lowest flowrate. Ageing effect on fouling propensity was observed with the variation in the exposure time. With the increase in the exposure time weight gain increased indicating the increased rate of fouling.

PP-2

Structural, photophysical, electrochemical and theoretical investigation of Fluorescent Azines for optoelectronic applications

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The establishment of high-tech products relying on organic optoelectronics is focused towards latest strategies for improving the processability and performance. Particularly organic small molecules which emits in solid state due are widely utilized in device applications. In the present study, synthesis of two azine derivatives - Ethyl (2-{(E)-[(2E)-(2-hydroxybenzylidene)hydrazinylidene]methyl}phenoxy)acetate (SAE-F) and Diethyl 2,2'-((((1E,1'E)-hydrazine-1,2-diylidenebis(methanylylidene))bis(2,1-phenylene))bis(oxy))diacetate (SAE-NF) and investigation of their photophysical, thermal, electrochemical and morphological characteristics are presented. The structural characterization of these azines were confirmed by FT-IR, NMR, UV and mass spectrometry. Interestingly, SAE-F showed aggregation induced emission due to restriction in intermolecular rotation (RIR) as demonstrated by solution thickening studies. DSC and TGA showed that the compound possesses high stability to withstand temperature upto 200 0C with melting point of 150 0C. Cyclic voltammetry was used to estimate the HOMO and LUMO energy levels which were found to be -5.46 eV and -3.05 eV with a band gap of 2.41 eV. The p-type conductivity of SAE-F was confirmed by hot probe technique. The electronic and photophysical data based on Density Functional Theory and Time Dependent-DFT calculations were in agreement with the experimental results. A diode was constructed using SAE-F as the hole transporting layer and the current-voltage characteristics were measured.

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PP-3

Synthesis and characterization of nitroreductase responsive probe for tumor hypoxia detection

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Hypoxia is a pathological condition found in solid tumours with lower level of O2 due to poor adapted vascularization and improper blood flow. This condition is an indicator to the process of cancer progression towards metastasis and resistance to the treatment. Two new nitro naphthalimide containing aldehyde derivatives: (4a) and (4b) were designed. Based on the docking score generated using Schrodinger Maestro software, probe 4a was synthesized using Suzuki coupling between formyl phenyl boronic acid and bromo derivative of the nitronaphthalimide. The structure of the molecule was characterized using IR, UV and NMR spectroscopic techniques. The hypoxia detection mechanism is based on the nitroreductase-catalyzed reduction of the nitro group of probe to amino group, accompanied by a large fluorescence enhancement at a wavelength of 550 nm.Their evaluation for imaging tumor hypoxia was carried out biologically using nitroreductase (NTR) and nicotinamide adenine dinucleotide (NADH) and fluorescence image analysis showed that the compound could be used as potential marker for hypoxic microenvironment of tumor. The cytotoxicity of the probe was studied using MTT assay in breast cancer MCF-7 cell lines. An *in vitro* study has been carried out to assess the hypoxia selectivity of the probe. All the results demonstrate the use of probe 4a as a promising candidate for imaging tumor hypoxia.

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PP-4

Advancement and Validation of stability indicating HPLC based simultaneous estimation of Apremilast and Betamethasone Dipropionate in a microsponge topical formulation with the aid of Design-of-Experiments

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The present study involves the development of a stability-Indicating RP-HPLC method for the simultaneous estimation of Apremilast (APL) and Betamethasone Dipropionate (BD). An advanced isocratic HPLC method was validated for its accuracy, precision, and robustness testing. The separation was carried out chromatographically on Phenomenex C 18 Luna column with a mixture of potassium dihydrogen orthophosphate buffer with 0.1% triethylamine having pH 6.1 and acetonitrile in a ratio of 60:40 as mobile phase at 233 nm. The retention time values were 7.4 and 13.5 min for both BD and APL, respectively. The calibration curves were found to be linear with appreciable limit of detection and limit of quantification. The peak area RSD and recovery of both the drugs were found to be <2.0% and 99–100% in bulk drug solution and <2.0% and 99–103% in microsponge formulation, respectively. The method was successfully optimized by DoE using Central Composite Design. One Factor at a Time design, with five various elements was adopted for robustness testing. The developed simultaneous estimation method was successfully satisfied the determination of APL and BD in microsponge formulation. The developed isocratic HPLC method for the determination of APL and BD was precisely and accurately performed and it is recommended for efficient assays in routine work.

PP-5

Synthesis and Characterization of β-Nitrostyrene Derivatives

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The thermo stable substituted trans-β-nitrostyrene is used as electrophile because of presence of electron withdrawing nitro group [1]. The biological activity of β-nitrostyrene stated that it had determental effect on sects and on the growth of fungi & it could be used for the protective treatment of textiles, leather & other organic materials [2]. The present work summarises the synthesis of β-nitrostyrene and its halogenations. β-nitrostyrene was synthesized by condensation of substituted benzaldehyde with nitroalkane in presence of aq.NaOH and methanol as solvent [3]. Halogenated β-nitrostyrenes were obtained by the reaction of iodobenzene dichloride and potassium iodide with β-nitrostyrene. The compounds obtained were recrystallized from ethanol. The purity of the compounds formed was checked by HPLC and characterised by Infrared spectroscopic method.

Key words: Benzaldehyde, β-nitrostyrene and halogenation

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PP-6

Exploring the supramolecular architectures of pharmaceutical cocrystals of zidovudine and 1-methyl piperazine with picric acid via computational studies

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Cocrystallization continues to gain interest in the modern-day due to its ability to modify the physical properties of solid-state materials, particularly pharmaceuticals. A cocrystal refers to two or more than two molecules combined into the same crystal lattice via intermolecular interactions with a fixed stoichiometric ratio, which forms a special multicomponent supramolecular crystal structure. By making cocrystal of an active pharmaceutical ingredient (API), its pharmacokinetic and pharmacodynamic properties are altered. Therefore, our focus has been to see how pharmaceutically active components like Zidovudine (AZT) and 1-Methyl Piperazine (MP) allows Picric acid (PA) a known cocrystal former into its supramolecular architecture. It is well understood that PA is a known π acceptor and hence forms charge transfer complexes. However, the recent approaches showed that cocrystal formation had been rationalized by considering other noncovalent interactions such as hydrogen bonding, van der Waals forces and π-π stacking. So herein, we report stoichiometrically synthesized cocrystals of AZT-PA and MP-PA. The process is carried out by solvent assisted grinding techniques with slow evaporation crystallization methods. These cocrystals are structurally assessed for parameters like single crystal X-ray diffraction, powder XRD, thermal analysis, FTIR and Hirshfeld surface computational studies. The current study has primarily focused on hydrogen bonding, which is the driving force for the formation of cocrystal. Hirshfeld surface analysis employing 3D molecular surface contours and 2D fingerprint plots have been used to analyze intermolecular interactions present in the solid-state of the crystals.

AZT-PA cocrystal is stabilized by C-H--O, N-H--O interactions and MP-PA cocrystal by N-H-O noncovalent interactions. These contribute to the crystal packing leading to the formation and strengthening of the supramolecular architecture. It was evident from the Hirshfeld surface analysis that there exist 38.2% and 64.2 % of -O--H bonding, which was the major contributor in the crystal packings of AZT-PA and MP-PA respectively. Hence the results presented herein are a step towards a better understanding of noncovalent intermolecular interactions via cocrystallization which results in supramolecular assembly.

PP-7

Synthesis and antiprolifirative activity study of novel 3,5-dihydro- 4*H*-imidazol-4-one derivatives

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Novel method for the synthesis of the imidazolone derivatives is evolved from easily accessible starting materials glycine, thiophene aldehyde and benzoyl chloride. The synthesis of target molecules is achieved in four steps. steps *via* formation of an intermediate 4,2-disubstituted 1,3-oxazol-5(4*H*)-ones which undergoes ring opening on reaction with hydrazine hydrate and subsequent cyclization with aldehydes in presence of acid catalyst. Characterization of the synthesized compounds was carried out using spectral data. The primary objective of this study was to develop a new method to synthesize imidazalone derivatives which are evaluated for *in vitro* antiprolifirative activity**.** All Imidazolone compounds were evaluated for their *in* antiprolifirative activity using against tumor cell line MCF-7 and non tumor cell line HEK by MTT assay method. Compounds **5b** (IC50 value= 123.8 µg/ml) and **5c** (IC50 value= 128 µg/ml) possess less IC50 values in MCF7 cell lines and display less cytotoxicity against non tumoral HEK cell lines. This outcome suggests that the compounds **5b** and **5c** have more selective cytotoxic activity. In general, the results indicates that the, cytotoxic tendency of the compounds were decreased in normal human cells, indicating more selective behavior in tumor cell lines.

PP-8

Phthalocyanine Pendented Polyaniline via Amide Linkage for an Electrochemical Sensing of H_2O_2

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Phthalocyanine is an aromatic macrocyclic molecule having 18 π electrons in their conjugated double bond system mainly known for their plenty of technological applications. Here we synthesized phthalocyanine pendented polyaniline via amide linkage for electrochemical sensing of one of the commodity chemical H2O2. The tetra carboxy cobalt centered phthalocyanine was synthesized in the first step of synthesis was treated with thionyl chloride to make acid chloride substituted phthalocyanine which is further amide linked with conducting polyaniline to make phthalocyanine pendented polyaniline structure. The synthesized molecule was characterized by fourier transmission infrared spectroscopy (FTIR), UV-Visible spectroscopy, X-ray diffraction studies (XRD), Raman spectroscopy, Field emission scanning electron microscopy (FESEM), and energy dispersive X-ray spectroscopy (EDX). The electrochemical activity of the synthesized molecule for the detection of H2O2 was investigated using cyclic voltammetry and chronoamperometric technique by fabricating the synthesized molecule on the glassy carbon electrode. The modified electrode exhibited a linear response over the concentration range from 0.2-100 μM with excellent sensitivity of 0.2749 μAμM-1cm-2 and very low detection limit of 0.1549 μM in 0.1 M phosphate buffer of pH of 7. The outstanding catalytic activity of the synthesized molecule is mite be due to the macrocyclic phthalocyanine molecule having redox active central cobalt metal atom and the amide linking of phthalocyanine molecule with the conducting polyaniline.

PP-9

Synthesis of tosyl substituted pyrimidinethione derivatives as antimicrobial agents

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Tosyloxy chalcones were synthesized by the substitution of tosyl group on hydroxyacetophenone or hydroxyl benzaldehyde and their subsequent condensation. These compounds were used for the synthesis of pyrimidinethione derivatives. The synthesized compounds were characterized by spectroscopic technique. These compounds were studied for their antibacterial activity using zone of inhibition method against microorganism viz *Mycobacterium smegmatis, Staphylococus aureus, E coli* and antifungal activity against *Candida albicans*. The present study is to stress the importance of pyrimidinethione derivatives and synthesis of active compounds, and evaluate their biological activities. The initial screening by zone of inhibition showed that some of these compounds are moderately active against gram positive microorganisms and have antifungal activity. But they failed to produce any zone of inhibition against gram negative bacteria. Keywords: Tosyloxy chalcones derivatives, Antibacterial activity, Antifungal activity.

PP-10

Theoretical analysis on dye-sensitized nano-composite doped polymer films for optical limiting

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Nanophotonics is an emerging area where nanotechnology is used to change the physical and chemical properties of photonic materials or the effectiveness of photonic processes that have major applications in optical communication and optical computation. Though many photonic devices are developed using the nonlinear optical materials, the efforts are still going on to increase their efficiency towards 100 % and other device characteristics towards their optimum level. In order to improve the efficiency of the third harmonic process further, we have a plan to use dye-sensitized metal nanoparticles doped in PMMA films. It is expected that the ability of nanotechnology in tailoring the physio-chemical properties of the materials will give rise to the optimum nonlinear devices to be used in nanophotonics. A considerable improvement in both nonlinear optical susceptibility and laser damage threshold is expected based on the results published in the case of dye-sensitized metal nanoparticle doped solar cells. Such a research may contribute the efficient nanophotonic devices such as all optical switches which are the basic building blocks of the final dream of realizing all optical computers. In this paper, a theoretical study is carried out on the effect of sensitization of some well-known nanocomposites TiO_2/Au and ZnS/PVA by nonlinear DASPB dye-doped PMMA-MA polymer matrix in order to change the dielectric and nonlinear susceptibility. This is achieved by the systematic study of the size of nanoparticles used for sensitization study, various donor-acceptor combinations, and concentration of dyes & nanoparticles in the sample films. The nonlinear absorption coefficient for each case and the theoretical optical limiting curve is drawn based on the estimation of nonlinear susceptibility using Type 1, Type 2, and Type 3 Z-scan configurations.

PP-11

Synthesis and characterisation of schiff bases derived from p-toluenesulfonamide

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Schiff bases are a topic of considerable interest, owing to their versatile metal chelating properties, inherent biological activities and flexibility to modify the structure to fine tune it for a particular biological application. The biological importance of various Schiff base derivatives has urged the researchers for designing of novel heterocyclic/aryl Schiff bases for development of new drugs. Schiff bases { 4-[(E)-2-(4-hydroxy-3-methoxyphenyl)ethenyl] benzenesulfonamide and 4-[(E)-2-(2-nitrophenyl)ethenyl]benzenesulfonamide were prepared by reacting p-Toluenesulfonamide with o-vanillin and 2- Nitrobenzaldehyde respectively in ethanol and glacial acetic acid acting as a catalysts. The synthesized Schiff bases were then characterized using UV, FTIR, ^{1}HNMR and GC-MS.

Keywords: p-Toluenesulfonamide, Schiff base.

PP-12

Inhibition effect of 1-[(4-methylpiperazin-1-yl)(phenyl)methyl]thiourea on mild steel corrosion in hydrochloric acid medium

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1-[(4-methylpiperazin-1-yl)(phenyl)methyl]thiourea was synthesized by cost effective green method and was characterized using spectroscopic techniques(infrared and nuclear magnetic resonance).The corrosion inhibition process of mild steel in 0.5M HCl by 1-[(4-methylpiperazin-1-yl)(phenyl)methyl]thiourea has been investigated using electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization measurements. The results showed that synthesized compound is a good corrosion inhibitor and the inhibition efficiency increases with increase in concentration of the inhibitor. Potentiodynamic polarization measurements showed that the inhibitor is a mixed type inhibitor. The effect of temperature on corrosion behaviour of mild steel in the presence of inhibitor was studied in the temperature range of 30–60°C. Temperature studies revealed that inhibition efficiency increased up to 50°C and beyond which inhibitor efficiency decreased due to desorption of inhibitor. The values of thermodynamic and activation parameters were calculated and discussed. The adsorption of inhibitor on mild steel surface is an endothermic reaction and is best described by the Langmuir adsorption isotherm. The calculated $\Delta G°_{ads}$ value showed that the corrosion inhibition of the mild steel in 0.5 M HCl is mainly controlled by a chemisorption process. To inspect the surface morphology of inhibitor film on the mild steel surface, scanning electron microscopy (SEM) was used before and after immersion in 0.5 M HCl.

Key words: Mild steel, Corrosion, Polarization, Inhibitor, Electrochemical impedance.

P-13

Corrosion inhibition studies of mild steel using *Burma Creeper* flower extract in hydrochloric acid medium

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The study investigates corrosion inhibition of mild steel in 1M HCl solution using the flower extracts of Burma Creeper (B. Creeper). Gravimetric (weight loss), electrochemical impedance spectroscopy (EIS), potentiodynamic polarization method was used for corrosion studies. Characterization of the flower extract of B. Creeper was carried out using Fourier Transform Infrared spectroscopy (FTIR). The effect of temperature on the corrosion behavior of mild steel in 1M HCl with different concentration of flower extract of B. Creeper was also studied. From the experimental analysis, the inhibition was found to be mainly due to the adsorption of inhibitor molecules on the surface of the mild steel electrode. The inhibitor molecules are adsorbed according to Langmuir isotherm. Calculation of both kinetic and thermodynamic parameters also indicates the strong interaction between inhibitor molecules and the surface of the mild steel. It has been noted from the electrochemical studies that flower extract of B. Creepr is of mixed type inhibitor. The inhibition efficiency was found to increase with increase in concentration of inhibitor molecules on the mild steel surface. Experimental results showed that B. Creeper's floral extract was a good corrosion inhibitor for mild steel in 1M HCl.

PP-14

A novel bisphenol based red-emitting fluorescent probe for selective detection of hydrogen sulphide: application in bio imaging

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The design of fluorescent probe for H2S is mainly based on specific chemical reactions by taking advantage of reducing or nucleophilic properties. The probe **BPCN** was applied for the recognition of hydrogen sulphide over other competitive anions in physiological medium through fluorescence enhancing mechanism. A novel fluorescent probe **BPCN** was synthesized and the compound was characterised by using analytical and spectral (UV-Vis, 1HNMR and mass) methods. Moreover, the sensor is effectively used to detect hydrogen sulphide up to the concentration of 2.2nM. Due to the admirable properties such as high specificity, suitable sensitivity and high compatibility the probe **BPCN** has been applied for monitoring and imaging of hydrogen sulphide in HeLa cells under physiological conditions.

Key Words : **BPCN** Probes, HeLa cell lines, Hydrogen Sulphide, Fluoresence imaging.

PP-15

Synthesis, charactarisation and photophysical studies on the Platinum (iv) complexes of (salicylidene hydrazino) quinoline ligands

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A new series of Platinum (IV) complexes **1a, 1b,** were synthesised using substituted quinoline Schiff base ligands. The quinoline Schiff base ligandsL1 = 4,6-dimethyl-2-(Salicylidenehydrazino)quinoline, L2 = 4-methyl-6-chloro-2-(Salicylidene hydrazino)quinoline, were prepared by the condensation of substituted 2-hydrazinoquinoline (R= -CH3 and R= -Cl for **(L1**& **L2))** with salicyaldehyde. The synthesised ligands and the metal complexes were characterized by spectral analysis. The UV absorption at higher wavelength was assigned to spin forbidden transitions. From the data obtained, it was concluded that the complex might formed through NNC mode of coordination with octahedral geometry. The powder XRD of the complexes **1a** and **2a** revealed that the compounds are orthorhombic crystalline in nature. The cyclic voltammetry studies revealed that the complex is irreversible in nature. From the spectral studies it is confirmed that the non-participation of nitrogen atom of quinoline and participation of carbon atom of the quinoline ring. Photophysical studies are also carried out for the synthesised compounds.

Key words: cyclic voltammetry, 4-methyl-6-chloro-2-(Salicylidene hydrazino)quinoline, powder XRD.

PP-16

Synthesis, characterization and biological studies of some quinoline-thiazoles

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A new series of Ethyl 2-{(*E*)-[(2-chloro-quinolin-3-yl)methylidene]amino}-4-methyl-1,3-thiazole-5-carboxylate / (*E*)-1-(2-chloroquinolin-3-yl)-*N*-(5-nitro-1,3-thiazol-2-yl)methanimine / (*E*)-*N*-(1,3-benzothiazol-2-yl)-1-(2-chloroquinolin-3-yl)methanimine were synthesised by the condensation of 6/8 Substituted-2-chloro-3-formyl quinolones and ethylamino-methyl-thiazole-carboxylate / nitrothiazol-amine / benzothiazol-amine. The novel quinoline-thiadiazole derivatives were confirmed by Mass, NMR and IR spectroscopy. These newly formed quinoline-thiazole derivatives shows antibacterial and antifungal activities. Among them few of the novel compounds showed biological activities comparable with that of standard drug.

Keywords: Quinoline, Thiazole, Antibacterial, Anifungal.

PP-17

Synthesis, antidiabetic and insilico computational studies of thiazolidine-4-one derivatives

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To synthesize and characterize substituted thiazolidinediones and to carry out their computational study and evaluation for their *In-Vitro* antidiabetic activity. A novel series of thiazolidin-4-one **(T1-10)** were synthesized by the reaction of Schiff"s base **(1)** and thioglycolic acid in dioxane **(2)** in the presence of Zinc Chloride as a catalyst. Schiff"s base **(1)** was synthesized by reacting 0.01M benzhydrazide and 0.01M substituted aldehyde in the presence drops glacial acetic acid using ethanol as the solvent. All the synthesized derivatives were analysed by FT-IR, ^{1}H-NMR, and Mass spectral data and studied for *In-Vitro* antidiabetic activity. In-silico analysis was carried out using Schrodinger 2018-3 suite device Maestro 11.7.012. The synthesized compounds were docked in the groove of the binding site present in the 6DHA. In the antidiabetic activity, all the novel synthesized derivatives were assessed by α-amylase and also by α-glucosidase inhibition methods. Most of the synthesized derivatives showed promising antidiabetic activity. Molecular docking studies and *In vitro* evaluation showed that the most active analog was **T5**, with the highest affinity, as well as the binding energy of -3.089 kcal/mol,which showed potent antidiabetic activity. Compound **T7** showed moderate antidiabetic potential in comparison to acarbose, which was taken as the standard.This work indicates that the presence of the -OH group attached to the ring may be responsible for the activity.

PP-18

Functionalized poly(styrene-co- 2-acrylamido-2-methylpropane sulfonic acid) copolymer as dispersant for the thermal conductivity of ZnO nanofluids

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In this work, the effect of poly (styrene-co- 2-Acrylamido-2-methylpropane sulfonic acid) (STY-co-AMPS) copolymer as dispersants on the thermal conductivity of Zinc oxide (ZnO) - water based nanofluids was studied. Poly (STY-co-AMPS) copolymer is synthesized by free radical polymerisation technique and ZnO nanoparticles (Nps) were prepared by microwave irradiation method. Prepared ZnO Nps, nanofluids and copolymers were characterized by UV, FESEM, XRD, DLS, IR. NMR and TGA. The grafted copolymer was used to enhance the dispersibility of ZnO nanofluids. The effect of poly (STY-co-AMPS) copolymer on thermal conductivity of suspension was investigated in different weight concentration (2 wt % - 10 wt %) and solid volume fractions of ZnO Nps (φ = 1 - 3.0 %). The suspension with 6 wt % dispersant showed improved stabilization at higher particle concentration. Whereas, the thermal conductivity of ZnO nanofluids increases with increasing particle volume concentration and decreases with increases in dispersant concentration. An optimize concentration of dispersant exhibits enhanced thermal conductivity as compared with that of base fluids. This is supported by zeta potential value
higher the zeta potential better the stability.

PP-19

Synthesis and characterisation of schiff base derived from o-phenylenediamine

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Schiff bases are a topic of considerable interest owing to their versatile metal chelating properties and inherent biological activities. Schiff bases are also used in development of new drugs. This work deals with the synthesis of Schiff bases from o-Phenylenediamine by reacting with veratraldehyde, 4- Hydroxyl benzaldehyde and 5-Nitro salicylaldehyde in ethanol and glacial acetic acid acting as a catalyst. The characterisation of these Schiff bases was done by UV, FTIR and HNMR.

Keywords: o-Phenylenediamine, Schiff base.

PP-20

Synthesis and characterisation of mannich bases derived from schiff bases of isoniazid

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Schiff bases were prepared by reacting Isoniazid with 4-Hydroxybenzaldehyde and 5- as beta-amino ketone carrying compounds. This work reports the synthesis of Mannich bases by reacting the synthesized Schiff bases with piperidine and formaldehyde. The synthesized Schiff bases and their respective Mannich bases were characterized using UV, FTIR and ^{1}HNMR.

Keywords: *Isoniazid, Schiff base, Mannich base*

PP-21

Synthesis of 4-{(E)-[(3-methyl-5-sulfonyl-4H-1,2,4-triazol-4- yl)imino]methyl} benzaldehyde-3-methylcyclopentane thiol(Schiff base) and its complexes of Co(II) and Cu(II) and their characterisation

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Synthesis of 4-{(E)-[(3-methyl-5-sulfonyl-4H-1,2,4-triazol-4yl)imino]methyl}benzaldehyde-3-methylcyclopentane thiol (Schiff base) was done by reflux method. A new metal complex of Schiff base with Co(II) and Cu(II) have been successfully synthesized in alcoholic medium and the complex obtained is characterised qualitatively by FTIR spectroscopy, UV-Visible spectroscopy.

Keywords: Schiff base, metal complex, FTIRspectroscopy, UV-Visible spectroscopy.