NATIONAL SEMINAR

On

FRONTIER AREAS OF CHEMISTRY

11-12, February, 2015

Organized by

RESEARCH AND POST GRADUATE

DEPARTMENT OF CHEMISTRY

MES KEVEEYAM COLLEGE, VALANCHERY

MALAPPURAM-KERALA

Sponsored by

University Grants Commission

ABOUT OUR INSTITUTION

MES KEVEEYAM COLLEGE, VALANCHERY started functioning as a junior college in September 1981 with the arrowed objective of providing higher education facilities to the young populations of the largely rural, socially and economically backward region comprising of Valanchery and surrounding villages. The college was upgraded as a degree college in 1991 and the postgraduate course M.Sc polymer chemistry was started in 1998.

The college has a record of consistent performance in curricular and extracurricular activities and unblemished history of trouble free campus. The peaceful campus and distinctly positive atmosphere provides the young scholars with right ambiance for intellectual pursuits. The college is an aided institution run by Muslim Educational Society affiliated to the University of Calicut and included under 2(f) and 12(b) of the UGC act.

ABOUT THE PG DEPARTMENT OF POLYMER CHEMISTRY

The department of polymer chemistry came into existence in the year 1995 with the introduction of B.Sc polymer chemistry. The postgraduate course in polymer chemistry was started in 1998. The Department was elevated as research centre by University of Calicut in 2014 and FIST funding from Department of Science and Technology, Govt. of India sanctioned in the same year.

At present 36 seats are available for B.Sc and 10 seats for M.Sc course. Our college is one of the institutions where the University of Calicut first introduced both UG and PG courses in polymer chemistry. The faculty consists of 10 teaching members and three lab assistants. There are two well-equipped laboratories for M.Sc course and one for B.Sc course.

The Department is publishing a journal ChemY (Journal for Young Researchers in Chemistry) with ISSN 2394-1324.

PREFACE

The Research and Post Graduate Department of Chemistry of MES Keveeyam College, Valanchery organized a two-day National seminar on "**Frontier Areas of Chemistry**" on 11-12 of February 2015. The seminar was intended to give an insight to students and teachers about the major sectors or research in Chemistry. The seminar, which was held at the AV Hall of the college, consisted of five invited lectures. It was attended by 100 students and teachers from different colleges.

We are thankful to University Grants Commission for providing the financial assistance for the seminar. We are extremely grateful to Prof. Sabu Thomas (Director, Centre for Nano Science and Nano Technology, MG Univeristy) who accepted our invitation and inaugurated the seminar. We are also thankful for his lecture on Nano materials. We extend our sincere thanks to Dr. A Manuel Stephen (Senior Scientist,CESRI-CSIR, Karekuddy, Chennai), Dr.Santhosh Babu (Senior Scientist, National Chemical Laboratory, Pune), Dr. Sunil K. Narayanankutty (Professor & Head, Department of Polymer Science and Rubber Technology, CUSAT) and Dr.Parameswaran Pattiyil (Assistant Professor, Department of Chemistry, NIT,Calicut) for their valuable invited lectures in the seminar.

We are thankful to Dr. P. Mohamedali, Principal, M.E.S. Keveeyam College, and Valanchery for giving all the necessary guidance and support.

We extend our thanks to Dr. Hussain K, Secretary and Correspondent, College Management Committee for his support.

We also express our sincere thanks to all the faculty members, non teaching staff and students of the Department of Chemistry who worked as a team to make this seminar a grand success.

Manjula Raman

General Convener

K M Rukkiya

Coordinator

EXECUTIVE SUMMARY

A National seminar on "**Frontier Areas of Chemistry**" was organized under the aegis of Research and PG department of Chemistry, MES Keveeyam College, Valanchery on 11th and 12th of February 2015. The seminar was intended to give an insight to students and teachers about the major areas in chemical research and expose them to the promising developments in chemistry. The seminar witnessed the assembling of eminent scientists, faculty members, research scholars and students, and provided an interactive platform to facilitate the exchange of ideas. It helped the students to dedicate themselves to create high quality research in various meritorious institutions in India and abroad.

Prof. Sabu Thomas (Director, Centre for Nano Science and Nano Technology, MG Univeristy) inaugurated the seminar. The inaugural session was presided over by the Principal Dr. P Mohamedali. The inaugural ceremony was organized in the college auditorium.

Five technical sessions were conducted in the seminar. In the first technical session on day one, Prof. Sabu Thomas delivered a lecture on 'Nano Materials'. Dr. A Manuel Stephen (Senior Scientist,CESRI-CSIR, Karekuddy, Chennai) spoke about 'Lithium sulfur batteries' in the second technical session on the same day. Dr.Santhosh Babu (Senior Scientist, National Chemical Laboratory, Pune) was the invited speaker of the first technical session on day two. The topic of his talk was "Self Assembly vs No Assembly". Dr. Sunil K. Narayanankutty (Professor & Head, Department of Polymer Science and Rubber Technology, CUSAT) talked about 'Bio Polymers' in the second technical session of day two. Dr.Parameswaran Pattiyil (Assistant Professor, Department of Chemistry, NIT,Calicut) was the keynote speaker of the third technical session of the day and he talked about "Computational chemistry".

In the valedictory function, Dr.Parameswaran Pattiyil distributed the certificates for the delegates. Prof. Manjula Raman (Head, Department of Chemistry) presided over the function. Feedback from delegates was taken in the valedictory session.

The technical sessions of the seminar was conducted in the audio visual hall of the college. Faculty members and students from various colleges attended the seminar. The seminar was a success in providing an opportunity for the student and teacher community of our and nearby colleges to interact with eminent academicians and get acquaintance with the latest areas of research in chemistry.

ORGANISING COMMITTEE

Patron	**Dr .Hussain K.** (Secretary and Correspondent, MES Keveeyam College)
Chairman	**Dr .P. Mohamedali** (Principal)
General Convenor	**Prof. Manjula Raman** (Head of the Department)
Coordinator	**Prof. K M Rukkiya** (Associate Professor, Department of Chemistry)
Members	**Prof. P. A. Rasiyabi** (Associate Professor) **Dr. Preethy Alex** (Associate Professor) **Dr.C.Rajesh** (Asst. Professor) **Dr. Jisha VS** (Assistant Professor) **Prof. Minshiya P.** (Assistant Professor) **Prof. Divia P.** (Assistant Professor)

Proceedings Editorial Board

Prof. Manjula Raman (Editor)
Dr. C.Rajesh (Associate Editor)

PROGRAMME

11-02-2015, Wednesday

Inaugural Session (9.30 am -10.30 am)

Venue: College Auditorium

Prayer :

Welcome : Prof. Manjula Raman (Head, Dept. of Chemistry)

Presidential Address : Dr. Mohamedali P (Principal)

Inauguration

Dr. Sabu Thomas

(Professor of Polymer Science & Engineering, School of Chemical Sciences and Director, Centre for Nanoscience and Nanotechnology,Mahatma Gandhi University

Felicitations

- DR. N Mujeeb Rahman (State Secretary, MES Kerala)
- Prof. Kadavanad Mohammed (Chairman, College Standing Committee, MES)
- Dr. Hussain K.(Secretary and Correspondent MES Keveeyam College
- Prof. Thomas K J (Staff Secretary)

Vote of thanks : Prof. K. M. Rukkiya (Co-ordinator)

Session-I

Venue : AV Hall

10.45-12.45 pm : Dr. Sabu Thomas

Professor of Polymer Science & Engineering, School of Chemical Sciences and Director, Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University Kottayam

Topic: Nano Materials

12.45-1.30 pm: **Lunch Break**

Session-II

1.30-3.30 pm : Dr. Manuel Stephan

Senior Scientist,CESRI-CSIR, Karekuddy, Chennai

Topic : *"Lithium-Sulfur batteries"*

3.30-4.00: Paper presentation

12-02-2015, Thursday

Session-III

9.30-11.00 am : Dr.Santhosh Babu

Senior Scientist

National Chemical Laboratory, Pune

Topic : Self Assembly Vs. No Assembly

11.00 -11.15am:Tea Break

Session - IV

11.15-12.45 am : Dr. Sunil K. Narayanankutty,

Professor & Head, Department of Polymer Science

and Rubber Technology, CUSAT

Topic: Biopolymers

Session - V

1.30 – 3.00 pm : Dr.Parameswaran Pattiyil

Assistant Professor,NIT,Calicut

Topic: Computational Chemistry

Valedictory Session

Venue: AV- Hall

Prayer

Welcome : Prof. P. A. Raziyabi

Dept. Of Chemistry

Presidential Address : Prof. Manjula Raman (Head of the Department)

Valedictory address and distribution of certificates:

Dr. Parameswaran

Vote of Thanks: Dr. Preethy Alex

Technical Session I

Prof. Sabu Thomas

(International and Inter University
Centre for Nanoscience and Nanotechnology,
Mahatma Gandhi University,
Kottayam, Kerala, India - 686 560)
Email.sabuchathukulam@yahoo.co.uk

Sabu Thomas is a Professor of Polymer Science and Engineering at the School of Chemical Sciences, as well as the Director of Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University, Kerala, India. He received his Ph.D. in 1987 in Polymer Engineering from the Indian Institute of Technology (IIT), Kharagpur, India.. He is a Fellow of the Royal Society of Chemistry. Prof. Thomas has (co-)authored more than 650 research papers in international peer-reviewed journals in the area of polymer composites,nanocomposites, membrane separation, polymer blends and alloys, polymeric scaffolds for tissue engineering and polymer recycling. Prof. Thomas has been involved in a number of books (45 books), both as author and editor. He has been ranked no. 5 in India with regard to the number of publications (listed in the panel of most productive scientists in the country). He received the coveted Sukumar Maithy Award for the best polymer researcher in the country for the year 2008. The research group of Prof. Thomas has received numerous awards and honors for excellent work in polymer science and engineering. The h index of Prof. Thomas is 70 and he has more than 19,000 citations. Prof. Thomas has 4 patents to his credit. Recently he has been awarded nanotech, CRSI and MRSI medals.. Prof. Tomas has supervised 67 PhD theses and has delivered more than 200 invited /plenary and key note talks over 30 countries.

Chemistry of Nanomaterials and their Polymer Nanocomposites

(Prof. Sabu Thomas)

The historical development of the science and technology of nanomaterials will be presented from the very early stages. The major contributors to the field of nanoscience and nanotechnology will be reviewed. The basic definitions and concepts will be discussed.. The applications of nanomaterials in all the major fields will be presented. The field of polymer nanocomposites is stimulating both fundamental and applied research because these nanoscale materials often exhibit physical and chemical properties that are dramatically different form conventional microcomposites. A large number of nano particles, layered silicates and polymeric whiskers are being used of the preparation of nano composites. Since the Toyota research group's pioneering work on nylon6/layered silicate nanocomposites, polymer nanocomposites containing layered silicates have attracted much attention. The polymer/layered nanocomposites can exhibit increased modulus, decreased thermal expansion coefficient, reduced gas permeability, increased solvent resistance and enhanced ionic conductivity when compared to the polymer alone. In the proposed talk, the different preparation techniques for polymer nanocomposites will be discussed. The role of various surfactants in improving the polymer/filler interaction will be reviewed. The various characterization techniques for nanocomposites will be addressed. In the case of semi crystalline polymers the role of crystallization on the the intercalation and exfoliation will be discussed. The important properties of nanocomposites will also be presented. I will also present recent developments in cellulose nanocomposites and bio-nanocomposites. Finally the new developments in the field of nanomedicne (drug delivery and scaffolds) will be discussed in detail.

Technical Session II

Dr.A. Manuel Stephan

Manuel Stephan Ph.D
Senior Scientist,
Electrochemical Power Sources Division
Central Electrochemical Research Institute
(CSIR-CECRI, Govt. of India)
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Memberships

- Society for the Advancement of Electrochemical Science and Technology (SAEST), India. Life Active Member.
- Materials Society of India, India, Life Member

Major Fellowships

- **Research Associateship** by Council of scientific and Industrial Research, New Delhi, **India**, October 1996-March 2000
- **Raman Research Fellowship- Italy-** Materials Science and Engineering, Polytechnique of Torino, Torino, Italy. September 2012- January 2013

Lithium – Sulphur Batteries

(Dr. A Manuel Stephen)

The global warming and depletion of fossil fuel resources have accelerated immense research on energy storage devices unquestionably. In response to the modern society it is now essential to develop new, low-cost and environmental friendly energy conversions and storage systems with new advanced materials. Undoubtedly, lithium-ion battery is one of the great successes of modern electrochemistry due to its appealing properties such as high single cell voltage, no-memory effect, long cycle life and high energy density. Hence, it has become an inevitable power source not only for portable electronic devices such as laptop computers, cellular phones, MP3 players, but also find applications in satellites and in medical equipment. Nevertheless, with the existing insertion cathode materials (e.g. $LiCoO_2$, $LiFePO_4$ etc.), lithium-ion batteries have attained a maximum discharge capacity of approximately 250 mAh g^{-1} (corresponding energy density of 800 Wh kg^{-1})which is not sufficient to meet out the demand of key marketssuch as transport and power grid applications. Obviously, intense research has been accelerated to find alternative electrochemical lithium based- power systems across the world. Among the systems known today, both Li-S and Li-O_2 are expected to fulfill the requirements of mankind with enhanced capacity and energy density. However, so many technological and scientific problems remain unsolved in Li_2O systems.The lithium-sulfur batteries have inspired many researchers recently, because sulfur is electrochemically active and can accept up to two electrons per atom approximately at 2.1 V vs Li/Li^+. It has a high theoretical capacity of 1675 mA h g^{-1}, which corresponds to an energy density of 2600 W h kg^{-1} or 2800 Wh l^{-1} based on weight or volume respectively. However, their practical applications are impeded by several major issues.

In the present talk, the working principles of lithium-sulfur batteries, their advantages and limitations will be discussed. Thepreparation and characterization of nanostructured cathode materials and polymer electrolytesfor lithium sulfur batteries will also be discussed.

Technical Session III

Dr. Santhosh Babu Sukumaran
SaBa Lab@NCL,
Organic Chemistry Division,
National Chemical Laboratory (CSIR-NCL),
Pune-411008, India

Dr. Santhosh Babu Sukumaran obtained his Ph.D. degree from University of Kerala (from the group of Dr. A. Ajayaghosh, National Institute for Interdisciplinary Science and Technology (NIIST), Trivandrum) in 2009. After that he worked as postdoctoral researcher in MPI-NIMS International Lab @ Max Planck Institute of Colloids and Interfaces, Germany (Sep. 2009-Oct. 2010), National Institute for Materials Science, Japan (Nov. 2010-Apr. 2012) and University of Namur, Belgium (Sep. 2012-Aug. 2014). In September 2014, he joined CSIR-NCL as a senior scientist. His research interests include Functional π-Assemblies, Organic Field Effect Transistors and Solar Cells, Solvent-free Organic Liquids.

Professional Experience

Sep. 2014- Senior Scientist, Organic Chemistry Division, CSIR-NCL, Pune

2012-2014: Marie Curie-AUL Incoming Postdoctoral Fellow, University of Namur, Belgium. Mentor: Prof. Davide Bonifazi. Research Topic: Application of porphyrin based coassembled nanofibers in organic field effect transistors (OFETs).

2010-2012: NIMS Postdoctoral Fellow, National Institute for Materials Science (NIMS), Japan. Mentor: Dr. Takashi Nakanishi. Research Topic: Room temperature solvent-free functional liquids.

2009-2010: MPI Postdoctoral Fellow, MPI-NIMS International Lab @ Max Planck Institute of Colloids and Interfaces, Germany, Mentors: Prof. Dr. Helmuth Möhwald and Dr. Takashi Nakanishi. Research Topic: Functionalized fullerene (C_{60}) assemblies for OFETs and solar cells (SCs).

2004-2009: Ph. D., National Institute for Interdisciplinary Science and Technology (NIIST), Trivandrum, India. Thesis Supervisor: Dr. A. Ajayaghosh. Thesis Title: "Control on optical and morphological properties of oligo(p-phenylenevinylene) self-assemblies".

Self-assembly Vs No-assembly

(Dr. Santhosh Babu Sukumaran)

Self-assembly is one of the pioneered subjects of research and nowadays achieves much appreciation in the realm of organic electronics and other functional organic systems. The combined effects of several weak noncovalent interactions make it feasible and develop an amazing world of soft materials. The very recent advancements in soft materials chemistry delivered new biomimetic and energy efficient materials that find various applications. The use of new synthetic variants promotes self-assembly from a trivial concept to a more sophisticated and functional one. In the mean time a new research interest has been introduced, organic solventfree liquids. Solvent-free liquids are devoid of all the weak interactions and remain as liquid at room temperature. Due to the peculiar active matrix features, solvent-free liquids emerged as a potential candidate in the last decade. The fluidity imparts a defect-free continuous layer in developing flexible/foldable electronic devices. These two contrasting topics of research have generated much interest in the recent research scenario.

Technical Session IV

Sunil K. N. Kutty
Professor
Department of Polymer Science and Rubber Technology
Cochin University of Science and Technology
Cochin 22

sncusat@gmail.com

Completed Ph.D from the Indian Institute of Technology, Kharagpur (IIT, KGP) in 1993 under the guidance of Dr. G.B. Nando. The work was to develop low-smoke, fire-resistant, cable sheathing compound based on thermoplastic polyurethane(TPU) and Kevlar. Completed M. Tech (Polymer Technology) with **First Rank** from the Cochin University of Science and Technology in 1987 . Completed M. Sc (Applied Chemistry)) with **First Rank** from the Cochin University of Science and Technology in 1985. He has 112 publications in international journals.

Research Areas

The current research areas are:

- Conducting Polymers
- Nano Composites
- Short Fiber-Elastomer Composites
- Polymer Recycling
- Fracture Mechanics
- Novel Compounding Ingredients
- Low Formaldehyde PF Resins

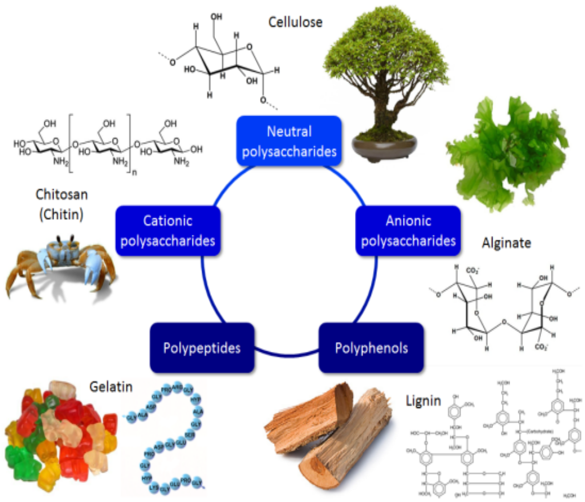
He has guided 11 PhDs so far.

Bio Polymers

(Dr. Sunil Narayanan Kutty)

Polymers produced by living organisms are known as Biopolymers. Some of the very common examples are cellulose, starch and chitin, proteins and peptides, DNA and RNA. The repeat units in these are sugars, amino acids and nucleotides. Biopolymers like DNA, produced relatively in smaller quantities, have very specialized roles in information storage and transfer. Others are produced on a much larger scale and provide structural integrity or protection in the form of hard shells. These ‘structural biopolymers’ represent a diverse range of compositions and chemical functionality and can be broadly classified as polypeptides, polysaccharides or polyphenols. Many of these biopolymers can be extracted from ‘biomass’ and indeed this is often done on a multi-metric ton scale.

Cellulose is both the most common biopolymer and the most common organic compound on Earth. About 33 percent of all plant matter is cellulose (the cellulose content of cotton is 90 percent and that of wood is 50 percent). Some biopolymers are biodegradable. That is, they are broken down by microorganisms into CO_2 and water. Some of thesbiodegradable biopolymers can be put into an industrial composting process and will be broken down by 90% within 6 months. An example of a compostable polymer is polylactic acid film under 20 μm thick. (Films which are thicker than that do not qualify as compostable, even though they are biodegradable.)



Bioplastics or organic plastics are a form of plastics derived from renewable biomass sources, such as vegetable oil, corn starch, pea starch or micro biota. Plants are also becoming factories for the production of plastics. Researchers created a Arabidopis thaliana plant through genetic engineering. The plant contains the enzymes used by bacteria to create plastics. Bacteria create the plastic through the conversion of sunlight into energy. The researchers have transferred the gene that codes for this enzyme into the plant; as a result the plant produces plastic through its cellular processes. The plant is harvested and the plastic is extracted from it using a solvent. The liquid resulting from this process is distilled to separate the solvent from the plastic.

Bioplastics are made from a compound called polyhydroxyalkanoate, or PHA. Bacteria accumulate PHA in the presence of excess carbon source. Poly 3-hydroxy butyric acid (PHB) is the most common microbial PHA. The main process involved in making the biopolymers are detailed below:

Fermentation:

Fermentation is a major route for preparing biopolymers and bioplastics. In lactic acid fermentation, the lactic acid s produced which is converted to polylactic acid using traditional polymerization processes. In bacterial polyester fermentation bacteria produces polyesters. Ralstonia eutropha, Ralstonia eutropha, Bacillus megaterium, Ralstonia spp., Pseudomonas putida, Pseudomonas spp., Bacillus mycoides, Alcanivorax borkumensi, Rhodococcus ruber etc or other suitable bacterial species use the sugar of harvested plants, such as corn, to fuel their cellular processes. The by-product of these cellular processes is the polymer. The polymers are then separated from the bacterial cells.

Cost

With the exception of cellulose, most bioplastic technology is relatively new and is currently not cost competitive with (petroplastics). Bioplastics do not reach the fossil fuel parity on fossil fuel-derived energy for their manufacturing, reducing the cost advantage over petroleum-based plastic.

Advantages

Biodegradable, Eco-friendly synthesis, High processability, Derived from renewable resources, Good mechanical properties

Disadvantages

Despite the fact that bioplastics are a great improvement over fossil-based fuels, they are not yet the perfect solution. Here is why:

Most recycling centers are not set up to handle large amounts of PLA. Presently, PLA products cannot be recycled in conjunction with petroleum-based products, which means sorting is critical, Bioplastics are "compostable," but only under specific conditions Plant-based bioplastics have a low melting point. This means that if you leave a corn-based take-away container in your car on a warm day, when you return you might find that it has melted into a small puddle, poor interactions with fibers, narrow processing window, lack of reactive groups, thermal degradation, brittleness

Some of the companies that manufacture biopolymers are: BASF, Innovia Films, Nature Works LLC CSM, Metabolix, Mitsubishi Inc., Kaneka and Biomer.

Technical Session V

Pattiyil Parameswaran
Department of Chemistry,
National Institute of Technology Calicut
Kozhikode, Kerala, India - 673 601
Tel: 0091-495-228-5304, Fax: 0091-495-228-7250
param@nitc.ac.in

Ph. D. in Chemistry, School of Chemistry, University of Hyderabad, India.
Thesis Title: "Theoretical Studies on Three Membered Rings and Organometallic Complexes".
Supervisor: Prof. E. D. Jemmis
(March, 2007).

M. Sc. Chemistry, St. Thomas' College, Thrissur, University of Calicut (1998-2000)

B. Sc. Chemistry, St. Thomas' College, Thrissur, University of Calicut (1995-1998)

Research Interests

1. Coordination chemistry at the main-group elements
2. Designing of ligands and catalysts
3. Computational Biomimetic Catalysis
4. Computational nano-materials

27 publications
Fellowships/Honors

- Alexander von Humboldt Alumini Fellowship
- Japan Science and Technology-Postdoctoral Research Fellowship (JST), Fukui Institute for Fundamental Chemistry, Kyoto University (2009-2010)

- Alexander von Humboldt (AvH) Fellowship, Bonn, Germany (2007-2009)
- DST-DAAD Exchange Program Fellowship (2006)
- Junior/Senior Research Fellowship from CSIR
- Qualified Joint CSIR-UGC JRF/Eligibility for Lectureship Examination (December, 1999; June, 2000)
- Qualified Graduate Aptitude Test for Engineering (GATE) (2000)

Chemistry with Computers: What and How?

(Dr. P Parameswaran)

The development of computational chemistry from the classical and quantum mechanical laws as well as the use of computational packages to solve chemical problems will be presented briefly in the first part of the talk. How the data obtained from the computational quantum mechanical calculations are used to predict the electronic structure of 2-adamantylidene and its reactivity will be explained in the second part of the talk. The major results of the latter part of the talk are as follows. The electronic structure of an idealized singlet carbene predicts ambiphilicity viz., it can act as an electrophile due to the presence of a vacant p-orbital as well as a nucleophile due to the presence of a lone-pair. However, in reality, one type of philicity predominates over the other, which is significantly determined by the functional groups attached to the carbene carbon atom. The isolable hetero-atom substituted singlet carbenes such as N-heterocyclic carbenes are nucleophilic. However, the stable singlet dialkylcarbenes are less common. The EDA-NOCV analysis on the 2-adamantylidene shows that it has a singlet ground state and is a foiled-type carbene stabilized by the hyperconjugative interaction of one pair of the vicinal C–C σ-MOs with the empty p-orbital on the carbene carbon atom. The high proton affinity and hydride affinity indicate the ambiphilic nature of 2-adamantylidene.

Paper Presentations

SOLVENT-FREE GREEN SYNTHESIS OF KNOEVENAGEL CONDENSATION PRODUCTS: A CLEAN AND EFFICIENT PROTOCOL USING PINEAPPLE JUICE AS A NATURAL CATALYST

Mohammed Musthafa. T.N.

Department of Chemistry, MES Kalladi College, Mannarkkad, Palakkad, Kerala, 678583

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A series of Knoevenagel condensation products were synthesized in good yields with reduced time through condensation of Benzaldehyde/5-Chloro-3-methyl-1-phenylpyrazole-4-carboxaldehyde with different hetero cyclic active methylene compounds like barbituric acid, and 1,3-dimethyl barbituric acid under solvent-free grinding technique at room temperature employing pineapple juice as natural acid green catalyst. The synthesized compounds were characterized using spectral data (IR, ^{1}H NMR, ^{13}C NMR and Mass spectrometry). *The present solvent-free grinding procedure offers several advantages including mild reaction conditions as well as simple experimental and product isolation procedures, thus, making the current "Green approach" as a useful and attractive methodology for the synthesis of*

substituted alkenes in excellent yields from readily available starting materials. The generated compounds can be used as a template for future development through modification to design potential biologically active products.

DYNAMIC PHOTO-CONTROL OF THE GLIDING MOTILITY OF A MICROTUBULE DRIVEN BY KINESIN ON A PHOTOISOMERIZABLE MONOLAYER SURFACE

M. K. Abdul Rahim, Takashi Kamei and Nobuyuki Tamaoki*

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The motor proteins in our bodies perform several mechanical functions initiated by chemical reactions; for example, the transformation of chemical energy to mechanical energy as seen in muscle tissue, the transportation of vesicles or organelles in cells, and the synthesis of energy molecules (e.g., adenosine triphosphate (ATP). Kinesin is one of the most important linear motor proteins; it transports nanoscale objects along microtubules, rails constructed of tubulins, within cells. If we could apply such a function to an artificial molecular system, then it might be possible to use it to transport nanoscale objects precisely between desired positions. The realization of such artificial regulation of a motor protein might open up a new field in nanotechnology.

Several earlier studies have examined the artificial control of kinesin. The ideal control would be one that provides on/off switching of the motility function of kinesin at any desired time and any desired position in space. Light is one of the most appropriate signals for switching because it allows regulation with sufficiently high temporal and spatial resolution. The switching of kinesin's function from the off state to the on state through the action of light was demonstrated quite a while ago using a caged ATP. In contrast, reverse switching from the on state to the off state was only recently demonstrated using a caged peptide having the same structure as the kinesin's tail, which is known to inhibit the motility of kinesin if it does not bear cargo. In that study, the authors demonstrated an 80% reduction in the initial gliding velocity of microtubules on the kinesin surface after the photochemical deprotection of the o-nitrobenzyl protecting group on the caged peptide. Nevertheless, using light to control the motility of kinesin reversibly, as desired for the complete regulation of the linear motor protein both temporally and spatially, has never previously been demonstrated.

In this study, we achieved the repeated regulation of the function of kinesin by the reversible photoisomerization of the underlying monolayer using light of two different wavelengths. For the photoresponsive component, we employed a derivative of azobenzene, one of the most studied photochromic compounds. Using this approach, the gliding velocity of the microtubules, driven by kinesin immobilized on a monolayer of the lysine decorated azobenzene, could be controlled repeatedly between fast and slow modes (with a 15% difference in velocity) upon irradiation with UV and visible light, respectively.

POLYMER MODIFIED RICE BRAN OIL AS A LUBRICANT

Subair Kayyalakka*l, Dr. M. K. Abdul Rahim and Dr. G. Unnikrishnan

*National Institute of Technology, Calicut, Kerala

The use of lubricants that are based on vegetable oils is increasing rapidly due to their biodegradability, low eco-toxicity and excellent tribological properties. Bio-based lubricants have lower coefficient of friction, improved wear characteristics, a higher viscosity index, and lower volatility and flash points than mineral based oils. Polymerized vegetable oils have found their way into many industrial applications such as inks, polymers, and hydraulic fluids. The initial objective of this thesis is to formulate a bio-based lubricant from thermally polymerized vegetable oils. The increasing concern for environmental protection, in addition to the continuous increase in the price of crude oil, has encouraged the development of newer bio-based lubricants, which cause much less contamination and involve the use of carbon chains from renewable sources.

Vegetable oils have, by now, emerged as potential sources for developing lubricants with impressive technical features. However, they possess disadvantages such as less oxidation stability, high acid value, low temperature stability etc. By the addition of suitable polymers in to the vegetable oil these disadvantages can be significantly reduced. No systematic effort has yet been carried out to develop new lubricants from rice bran oil by the addition of the polymer ethylene vinyl acetate

(EVA). Therefore, a systematic approach has been designed to examine the features of EVA modified rice bran oil through this work.

A NEW TYPE OF LMC-BASED MATERIAL; MOS$_2$ NANOSCROLLS

C. N. R. Rao, K. M. Suhada. International Center for Material Sciences
JNCASR, Bangalore.
kmsuhada591989@gmail.com

There has been a sustained academic interest and technical development effort directed at layered metal chalcogenides (LMCs) and their intercalation compounds. Graphene sheets (GSs) have attracted considerable interest in recent years because of their remarkable electronics, mechanical, and thermal properties. Recently, a new type of grapheme-based material, called carbon nanoscrolls (CNS), has become very interesting. A nanoscroll is formed by rolling a 2D sheet to form a scroll structure, with hybrid structures between that of 2D sheets and 1D nanotubes. Our target is to synthesize nanoscrolls of layered metal chalcogenides with the expectation that they have properties differing from layered MoS_2. We found a simple way for fabricating nanoscrolls of MoS_2 and from bulk MoS_2. Transmission electron microscopy and scanning electron microscopy studies reveal that this nanoscrolls have a tube like structure.

HYDROPHOBIC BIOPOLYMERS FROM FOOD WASTES

Anju.CK
MES Keveeyam College Valanchery

The production and use of biopolymers increases continuously with a very high rate thus all information on these materials is very important. In recent years, much attention has been focused on research to replace petroleum-based commodity plastics, in a cost-effective manner, with biodegradable materials offering competitive mechanical properties. Biopolymers have been considered as the most promising materials for this purpose. The aim of this review is to reveal the most relevant biopolymers, which are used and have great potential applications.

A REVIEW ON GRAPHENES

Baneesha VP
(MES Keveeyam College Valanchery)

Graphene is the latest form of Nano carbon. It inspiring intensive research efforts in its own right.Graphene possesses electronic ,optical, magnetic, thermal & mechanical properties, which make graphene an exciting material in a variety of important applications. In this review I present the current advances in the field of graphene electro analytical chemistry , including graphene production &graphene functionalization and discuss potential progress for their applications in electro analytical chemistry.

POLYMER HYDROGELS

Farisa V
(MES Keveeyam College Valanchery)

Hydrogels are the crosslinked structured biomaterial and it has an ability to absorbwater.On absorbing water hydrogels are swelling and resembles the living tissue. Due to this properties hydrogels has a wide range applications in biomedical field. In 1960s Wichetrle and Lim synthesize the first polymer hydrogel poly (2-hydroxyethyl methacrylate),and has been applied in the production of contact lensesand dressings, and for drug delivery and tissue engineering purposes. After that many modified hydrogels are synthesized with improved properties and widely used in the drug delivery system. Now the hydrogel is the interesting area for new researchers. The recently developed hydrogels are used in tissue engineering and regeneration. The aim of this review is point out the properties, classifications and developments of polymeric hydrogel.

BIOMASS CONVERSION OF POLYSACCHARIDES

Minsila M
(MES Keveeyam College Valanchery)

Biomass is organic plant materials, such as corn leaves or stalks, which do not directly go into foods or consumer products. These plant materials contain a complex mixture of organic materials, commonly known as carbohydrates, fats, and proteins. The amounts of these organic components vary with the type of biomass used in the process. The carbohydrates, known as cellulose and hemicellulose fibers, are polysaccharides which provide strength to the plant structure. Cellulose contains the six-carbon sugar monomer glucose. Hemicellulose contains both five and six carbon sugar monomers that include glucose, xylose, mannose, galactose, and arabinose. In this review we have to study about conversions of polysaccharides into small organic molecules under acidic, basic, oxidative, reductive and catalytic conditions have been reported, and a remarkable breadth of compounds have been produced. Such us ethanol formation in differen way, production of biofules by treatment with lignocellulitic material and hydrolysis of hemicelulose and cellulose, and algal starch, we discussed about important result in metal catalyzed oxidative degradation of cellulose materials and production of small compounds in acid canalized process by glucose, that have been obtained in particularly high yield. These mini reviews cover transformations of polysaccharides into small organic molecules and focused to convert biomass to biofuels and produced renewable energy sources.

NOVEL ANTIMICROBIAL POLYMERS- A REVIEW

Reshma AK
(MES Keveeyam College Valanchery)

The review report advances in antimicrobial polymers. These polymeric biocides have attracted both nanotechnology, medical devices & other fields ,because they exhibit dramatic improvement in many fields such as Medical, Food packaging ,Water purification systems ,Hospital equipments, nanotechnology and coatings etc…Herein the structure, uses , Applications, and properties of Antimicrobial polymers are discussed in general. Many examples are included.

CONDUCTING POLYMERS

Shajitha
(MES Keveeyam College Valanchery)

Conductive polymers are a new class of materials which exhibit highly reversible redox beha- viour and the unusual combination of properties of metal and plastics. The prospective utility of con- ductive polymers with a potent application in number of growing technologies in biomolecular electronics, telecommunication, display devices and electrochemical storage systems, etc. has further enhanced the interest of researchers in this novel area. An effort has been made in this article to present an updated review on the various aspects of conductive polymers, viz. synthesis of conductive polymers, doping, structure analysis and proposed utility for further study of the future scienti®c and technologi- cal developments in the ®eld of conductive polymers.

BIO PLASTICS-A REVIEW

Shanisha
(MES Keveeyam College Valanchery)

In this modern we can live, without plastics. the plastics are devived from fossil fuels, are one of the important materials for the society but they created with a process which is harmful to the environment and create pollution. We have to reducethis pollution,the new material has been developed known as bioplastic. Bioplastic are long chain of monomer of joined with each other by ester bond; these plastics are thus considered as polyesters.Bioplastics are classified in to variety of types. Out of all the most common is PHA (Polyhydroxyalkanoate), which remains as a carbon and/or energy storage material in various microorganisms under the condition of deficient nutritional element. There are variety of bioplastic applications to the society and industries. This review paper is intended to provide information about bioplastics.

POLYMER SOLAR CELLS

Sheena PT
(MES Keveeyam College Valanchery)

Polymer solar cells (also known as aka plastic solar cells) are a relatively new type of organic solar cell actively researched around the world. Polymer is a low-cost plastic commonly used for packaging. Conventional silicon PV cells (made from silicon crystal) are quite costly and complex to produce, which has resulted in attempts to create alternative photovoltaic cells. In comparison to silicon solar cells, polymer cells are inexpensive to fabricate, lightweight, flexible, disposable, and yet more environmentally friendly. The disadvantages of plastic polymer cells are their short lifespan and lower efficiency.Polymer solar cells employ two active materials: electron donor material (polymer) and electron acceptor material (fullerene), rather than a uniform layer of a semi-conductor with negatively and positively charged sides. We review current state-of-the-art techniques for making efficient polymer-based PV devices. We discuss the basic device operation,materials requirements, and current technical challenges in making more efficient solar cells .

PHOTO GALLARY


National Seminar
Frontier Areas of Chemistry
Dr. Hussain K


National Seminar
Frontier Areas of Chemistry
Research & PG Department of Chemistry
MES KEVEEYAM COLLEGE VALANCHERY
Malappuram - Kerala
Dr. Hussain K


Frontier Areas of Chemistry
Research & PG Department of Chemistry
MES KEVEEYAM COLLEGE VALANCHERY
Malappuram - Kerala

Dear Sir/ Madam,

We proudly invite you for a two day national seminar on 'Frontier Areas Of Chemistry' which is scheduled to be organized on 11 and12 February 2015 by the Research and Post Graduate Department of Chemistry, MES Keveeyam College, Valanchery. We solicit the presence of the members of the faculty and post graduate students of your esteemed institution.

Thanking you,

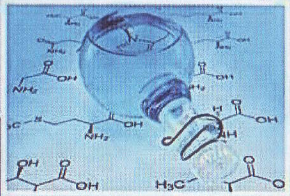
Sincerely,

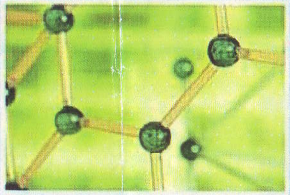
Dr. Mohamedali P.
Principal

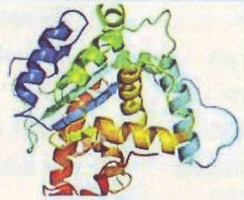
Prof.Manjula Raman
Head of the Department

About our institution

MES Keveeyam College, Valanchery started functioning as a junior college in September 1981 and was upgraded as a Degree College in 1991. The College is affiliated to University of Calicut and included under 2(f) and 12(b) of the UGC act. The postgraduate programme in Polymer Chemistry was started in 1998. Department upgraded as Research Centre by University of Calicut in 2014. The College is situated in the eastern part of Valanchery town in Malappuram district.







Objectives of the seminar

The seminar is intended to give an insight to students and teachers about the frontier areas of chemical research. It may help students to dedicate themselves to create high quality research in various meritorious institutions in India and abroad. The seminar provides a platform for students to interact with eminent academicians and scientists. Faculty members need to be exposed to the recent developments in various fields of Chemistry to motivate and orient their students.

Best Paper Contest

An oral contest for young researchers has also been planned. Soft copy of papers in MS Word, Times New Roman, Font size 12, double spaced under subheadings, Objective, Introduction, Methodology, Results, Discussion and Conclusions (4-6 Pages) may be sent to the convenor on or before 5/2/2015 via email to ***pgdchem@gmail.com*** Prizes will be awarded for the best papers. Presented papers will be published in the upcoming issue of Journal ChemY (ISSN 2394-1324)

Registration starts at 9.00 am on 11th February

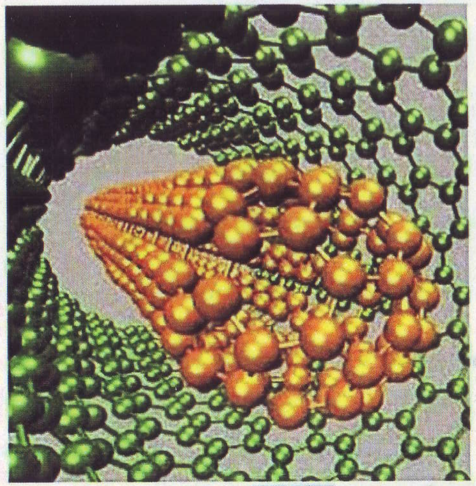
PROGRAMME

11thFebruary 2015, Wednesday

Inaugural Session (9.30 am -10.30 am)

Venue : College Auditorium

Prayer	:
Welcome	: Prof. Manjula Raman (Head, Dept. of Chemistry)
Fresidential Address	: Dr. Mohamedali P. (Principal)
Inaguration&Keynote Adddress	: **Dr. Sabu Thomas** Professor of Polymer Science & Engineering, School of Chemical Sciences and Director, Centre for Nanoscience and Nanotechnology,Mahatma Gandhi University
Felicitations	: Dr. N. Mujeeb Rahman (State Secretary MES Kerala & Treasurer, College Management Committee)
	Prof. Kadavanad Mohamed (Chairman, Standing Committee on MES Colleges)
	Dr. Hussain K. (Secretary and Correspondent, MES Keveeyam College)
	Mr. V.P.M. Swalih (Vice President, PTA)
	Prof. Thomas K J (Staff Secretary)
Vote of thanks	: Prof. K. M. Rukkiya (Co-ordinator)



Session-I - Venue : AV Hall

10.45-12.45 pm	: **Dr. Sabu Thomas**
Topic	: ***Nano Materials***
12.45-1.30 pm	: Lunch Break

Session-II

1.30-3.30 pm	: **Dr. Manuel Stephan** Senior Scientist,CECRI-CSIR, Karekuddy, Chennai
Topic	: ***Lithium-Sulfur batteries***
3.30-4.30	: Paper presentations

12th February 2015, Wednesday
Session-III - Venue AV Hall

9.30-11.00 am	: **Dr.Santhosh Babu** (Senior Scientist, National Chemical Laboratory, Pune
Topic	: ***Self Assembly Vs No Assembly***
11.00 -11.15am	: Tea Break

Session - IV

11.15-12.45 am	: **Dr. Sunil K. Narayanankutty** Professor & Head, Department of Polymer Science and Rubber Technology
Topic	: ***Biopolymers***
12.45 - 1.30 pm	: Lunch Break

Session - V

1.30 – 3.00 pm	: **Dr.Parameswaran. P** Assistant Professor, NIT, Calicut
Topic	: ***Computational Chemistry***
3.15 pm	: **Valedictory Session**
Prayer	
Welcome	: Prof. P. A. Raziyabi (Dept. Of Chemistry)
Presidential Address	: Dr. Mohamedali P (Principal)
Valedictory address and distribution of certificates	: **Dr.Parameswaran. P** Assistant Professor, NIT, Calicut
Felicitations	: N. Abdul Jabbar (President, MES Malappuram District Committee) Prof. K.P. Hassan (Joint Secretary,College Management Committee)
Vote of Thanks	: Dr. Preethy Alex (Dept. Of Chemistry)

Faculty memebers are eligible for duty leave as per order no: P_1/41437/04/coll.Edn dated 20/11/2004

Organising Committee

Patron	: Dr.Hussain K. (Secretary and Correspondent, MES Keveeyam College)
Chairman	: Dr. Mohamedali P (Principal)
General Convener	: Prof. Manjula Raman (HOD, Chemistry)
Co-ordinator	: Prof. K.M Rukkiya
Executive Committee	: Prof. P. A. Raziyabi Dr. Preethy Alex Dr. C. Rajesh Ms. Minshiya P. Dr. Jisha V. S Ms. Divia P.

Contact Phone Numbers :-
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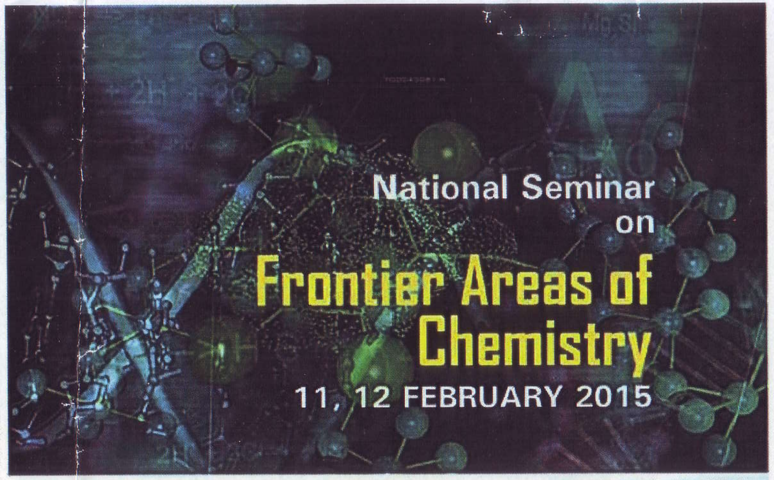
Prof. K. M. Rukkiya, Mob: 9447336822
Dr. C. Rajesh Mob. 9446768376
Dr. Jisha V. S. Mob. 9539386099
E-mail: pgdchem@gmail.com



ज्ञान-विज्ञानं विमुक्तये

Aswathy
Sheena
Shanisha

Nushhath
Jasreen

Research and Post Graduate Department of Chemistry
(FIST Funded)

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