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Symposium on 'Frontiers in Pure and Applied Chemistry'

18 FEB 2017 @ BRINDAVAN CAMPUS

Department of CHEMISTRY

SSSIHL 2016/17

The Symposium on **Frontiers in Pure and Applied Chemistry**, 18 February 2017, started with the Sarva Dharma Prayer and invocatory vedam chanting. This was followed by the lighting of lamp by **Sri G S Srirangarajan**, Director, Brindavan Campus, **Prof. Eshwara Moorthy** and **Dr. Malladi Srinivas**.

The welcome address was delivered by **Dr. T Ravikumar**, Associate Professor, Dept. of Chemistry, SSSIHL. He underlined the relevance of the symposium as a means to expose the students of the undergraduate course to the latest trends in the subject. He said that since the talks were being delivered by those with their fingers on the pulse of the research work in the country, it would give a 'real-time' feel to the students.

The keynote speaker of the day was **Dr. M. Eswaramoorthy**, Professor, Chemistry and Physics of Materials Unit, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore. He spoke on the topic, **Drug Delivery through Carbon and Silica based Nano Structures**. At the outset, the learned speaker explained the foundations of the Nano field and gave a bird's eye view of how versatile these nano particles were and their utility spanning various fields from catalysis to drug delivery. He Underlined the basic concept that the increase in surface to bulk ratio of a nano particle enhances the catalysis of a reaction. As he spoke on how carbon spheres are made from glucose, he drew everyone's attention towards the drug administration through these nano structures. He then went on to show how drug administration through nano technology is better than the traditional way of drug administration. He also showed how the zeta potential plays a crucial role in the drug delivery. He then went deep into the topic showing how carbon spheres are more efficient than carbon tubes, spindle or oval shaped nano particles. He also showed how these nano structures

are used in techniques such as gene therapy. The talk was highly appreciated by the audience.

The second speaker was **Prof. N Munichandraiah** from the Dept. of Physical and Inorganic Chemistry, Indian Institute of Science, Bangalore. He spoke on **Electrochemistry and its Applications**. Since a majority of the students were undergraduates, he traced electrochemistry from its inception in very simple terms, making it easy to grasp for those who were just being introduced to it. He then went on to explain how the principles of electrochemistry were used in day to day appliances. He highlighted how these very same principles are used industrially, citing the example of the preparation of chlorine. The learned speaker then spoke on the burgeoning demand for energy He spoke about the ongoing research on batteries, how the attempt is to produce more and more efficient batteries and means of storage of energy. He also gave the audience a peep into the future this field of research and the prospect it holds for mankind, since production and storage of energy would become a problem with the depletion in fossil fuels and increase in environmental issues. At the end of his lecture, he left the students seriously contemplating on research in energy storage devices.

Dr. Vinayak Sinha, Convener of Earth & Environmental Sciences Dept. and an Associate Professor in the Dept. of Earth & Environmental Sciences, Indian Institute of Science Education & Research, Mohali and an alumnus of SSSIHL, started his talk with the **Basic Environmental Chemistry**. **Later, he spoke in much detail about the 'Ozone Chemistry' and its impact on the biosphere**. Having given a sound foundation, he plunged into his topic, **An overview of the Earth's atmospheric chemistry and a case study of organic emissions from agricultural waste burning in Punjab**. He spoke in detail about the smog which has





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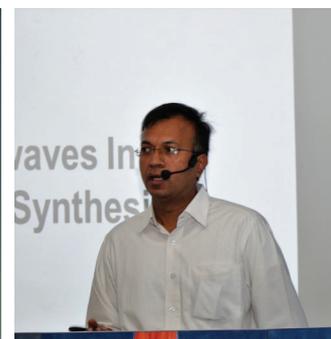
paralyzed life in New Delhi recently. The facts and findings which he presented before us were stunning. He spoke about the organic nature of our existence and how activities at one location can have a bearing on the life in some other region. He concluded his talk stressing on the need to adopt a Green chemistry approach to the way we do research.

Dr. Malladi Srinivas, a chief scientific officer, Research & Development, LGC-Promochem India Pvt. Ltd., Bangalore, initiated his talk displaying highlighting the interesting trends going on his field of research. He then spoke about Pharmaceutical Industries and its increasing commercialization. The erudite speaker spoke in great detail about the **Drug Recombination** through which new patented drugs for the endemic disease like 'Ebola,' HIV-AIDS', etc. are being attempted. In conclusion, he spoke about the Pharmaceutical impurities, very stringent regulations governing its presence and the vast scope for research in Pharmaceutical industries.

Dr. Lakshminath, a Principal Scientist at GMK Research Laboratories and also an alumnus of SSSIHL, spoke on the **Microwave in Organic Synthesis**. He drew a parallel with the Arrhenius equation which states that with every 10 degree rise in temperature, the reaction rate essentially doubles. This means that reactions that would otherwise take days to complete would be over in just a few minutes with the use of a microwave. One scope is the trimerisation reactions of alkynes to give cyclic trialkene compounds. Dr. Lakshminath's work included the synthesis of

cyclic derivatives of lead compounds essential in pharmaceutical industries. One such application was the synthesis of different phenanthrines by reactions of dialkynes and alkynes. He also demonstrated the use of ingenuity in obtaining stereochemically specific products. An idea about optimization of the reaction to obtain ideal products was also given. He left the students highly motivated about the role of pure organic chemists in industry, academics and medicine.

Dr. Sai Pramod, an alumnus of SSSIHL, spoke on the topic, **Surface Engineering – from thin films to coating**. Drawing heavily from his research work on surface engineering he took the audience through the exciting trails that deals with modifying surfaces of materials and the properties of the surface which are significantly different than that of the bulk. Changing either the physical or chemical properties of the surface provides a wide avenue in the improvement of material for specific use in industry. Some examples are anti-reflecting coatings on optics and gold titanium nitride coating on watches. He also demonstrated the various method of depositing particles on the surface of materials like vacuum deposition and sputtering. He also talked of methods of testing the properties of coatings like hardness, thermal resistance and metallic luster. The different physical properties depended on the arrangement of molecules in the coating which further depended on the composition of coatings. As a whole the talk was very invigorating and gave the students a wide knowledge base on surface chemistry.





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Dr. Manohar Rao, an alumnus of SSSIHL, who is presently Product Head, India Material Characterization – Perkin Elmer spoke on the topic, **FTIR Spectroscopy and Imaging for Polymer Analysis**. His talk was very informative and interesting. The topic was appreciated by the students as they are also learning the basics of Spectroscopy techniques in the present semester. He then showed different types of absorption peaks for different functional groups and uniqueness of each peak was discussed beautifully. He also spoke of ATR and its utility as a sampling technique. He enlightened the students about the power of FTIR spectroscopy in a plethora of fields.

Sri Raghav Krishna is an alumnus of SSSIHL. He is presently in Quality Control Dept., Hindustan Petroleum. He is also NABL Auditor for NABL accredited petroleum lab under HPCL. He was instrumental in launching India's First 99 octane Gasoline for high end vehicles. He addressed the gathering on the topic **Chemical Modes of delaying the Auto ignition of Gasoline Based Fuels**. The way he approached his topic was very interesting. He spoke of what exactly happens in the engine when we are driving any automobile and what are the technical problems that decrease the efficiency of the engine. He spoke of the carbon count in various grades of petrol and the differences

between petrol and diesel. He also elaborated how their research group came up with Octane 99 fuel which increases the efficiency of engine by decreasing the knocking. He finally concluded by explaining about his laboratory and inviting the students to pay a visit and see for themselves the work being done there.

The concluding address was given by **Dr. C N Sundaresan**, Associate Head, Dept. of Chemistry, Brindavan Campus, SSSIHL. He summarized the talks which had been given the whole day. He underlined the need to use the knowledge gained for the welfare of the Society.

The programme concluded with Mangala Arati to Bhagawan Baba.

