LECTURE PROGRAMME ON FRONTIERS OF CHEMICAL SCIENCES, November 10-12, 2003.
Department of Chemistry,
Sri Sathya Sai Institute of Higher Learning,
Prasanthi Nilayam- 515 134. (A.P.)

Prof. P. Natarajan: (Key note address)

The speaker set the ball rolling by giving the audience a detailed account on the interaction between excited state dyes and TiO$_2$ adsorbed on the surface of the zeolites; he further proceeded to explain sensitization of TiO$_2$ by large molecules and the surface anchoring of TiO$_2$ in zeolites. The speaker then moved over to discuss about light induced redox reactions where heterogeneous catalysts are used as fuels. He ended the discussion by further touching upon light induced reactions of supra molecular systems and applications on new materials.

Prof. S. Chandrasekaran: Green Chemistry

The speaker showed a genuine concern about the environment. He reflected the theme “Green Clean Chemistry through Chemistry” in his well-appreciated effort. Starting with the basic principles of Green Chemistry like atom economy, catalysis etc.; he created a general awareness among the audience about the level of pollution that is created by chemical industry, pharmaceuticals, petrochemicals etc. by employing statistics. He ended his classic presentation by giving a few tips to the audience to practice Green Chemistry in their own small way. He emphasized on designing new methods of synthesis in absence of organic solvents and by intelligent use of new catalysts to increase the atom efficiency. And above all “Prevention is better than cure.”

Thus it is high time chemistry becomes green for it to survive. In his second lecture the respected speaker gave an in-depth account on the applications of Tetrathiomolybdate in Organic Syntheses. Drawing from a wide variety of literature and also quoting from his own work the respected
speaker expanded the horizons of knowledge of the audience and contributed valuably to the lecture programme.

Dr. A. Venkateshwaralu: **Drugs via natural products**.

As the learned speaker was from Dr. Reddy’s Foundation Labs, he dealt with the topic of impact of natural products in Pharmaceutical Industry. He described the modeling of **synthetic antimalarial** drugs from natural products. He described the semi - synthetic analogue of 20(S)camptothecin, which is tested for anti cancer, anti malarial, and anti microbial effect. Then with few examples he described the modifications of Lactam derivatives for moderate anti cancer activity and potent HIV activity.

Prof. B.G. Maiya: **Life in dead matter**.

Prof. Maiya gave an interactive talk where he presented the picture how man is trying to copy nature. He then went on to explain the **complex chemistry involved in photosynthesis**. He also explained the **biomimetics** behind photosynthesis and the importance of solar energy in the process. He also dealt with the problem of fluorosis in Nalgonda district of Andhra Pradesh and the new methods of identifying fluoride in the form of fluoride sensors.

Dr. Jayanthi Krishnamurthy: **Overview of PM$_{2.5}$ speciation**

Dr. Jayanthi also dealt with environmental problem and gave overview of modern nation wide network programme on chemical speciation. He explained the filter type used depending on target analytes. He further enriched the audience on the topics sampling, operations, elemental analysis etc. Then he proceeded to the topic **X-ray fluorescence calibration problems and ion analysis**.

In his second lecture the learned speaker covered the topic on sampling **analysis for semi volatile organic compounds**. In this topic he covered points concerning atmospheric phase distribution, semi volatilized difficulties, preparation of semi volatilized cartridge, calibration of semi volatile samples and sample collection.
Dr. R. Ramraj: Photoelectrochemistry.

Dr. Ramraj’s both lectures were based on topic photoelectrochemistry which dealt with solar energy conversion via chemical routes. In his first lecture he dealt with basic aspects of photochemistry and electrochemistry. He made the audience aware of the developments and achievements in this field. He then explained photogalvanic cells for solar energy conversion. Then he gave a picturesque description of the fuel cells, our future hope for energy. In his second lecture he dealt with advancements in the techniques, the recent developments in photoelectrochemistry. He beautifully illustrated artificial photosynthesis and low energy chemicals to high energy chemicals development.

Dr. Rajiv Kumar Chaturvedi: Catalysis using various micro and macro porous materials.

Dr. Rajiv in his wonderful interactive session dealt upon topic of micro and meso porous materials in which first he introduced metallo and organosilicates. Then he dealt elaborately on micro porous materials namely zeolites and mesoporous materials namely organosilicates. He gave fine description on structure and synthetic aspects of zeolites and he finally touched on the topic of factors affecting synthesis of micro and meso porous solids.

In his second lecture he dealt with the topic catalysis in chemical industries, recent trends and it’s future. In the process he touched upon the aspects of some of the salient features of green chemistry, and green catalysis. Further he described future areas in catalysis, environmental catalysis and interesting illustration of catalysis by nano gold particles.

Dr. Ramasami: Science of human development & Redox chemistry of chromium.

In his first lecture the learned speaker very interestingly explained the demands of science from an individual, who wants to dedicate himself in its pursuit. He dealt at length on “Science of human development”, and the tools necessary. He urged the audience to start questioning the answers. This is the way to march forward in a career of original scientific research. The speaker concluded his first lecture by dwelling upon the implications of values in scientific research.
In his second lecture the speaker spent his time in broadening the horizons of the knowledge of his audience on the finer details of REDOX chemistry of Chromium, its industrial applications etc. He also explained the challenges faced by the environment due to chromium-based industries. He also gave alternative solutions for tanning, cleaning and recycling processes. He gave a number of solutions against hazardous effects of Cr(VI). He discussed the case of Chromium poisoning by presenting an experimental study of Chromium induced apoptosis.

Prof. P. Natarajan: Valedictory Proceedings.

Prof. Natarajan in his valedictory address described advancement of science in the respect of ultra fast reactions & their detection in units that are equal to $10^{-13}$ seconds. He gave illustrations of ultra fast events in nature like interprotein electron transfer reactions. He further dealt with following topics:

- Rhodopsin isomerizations.
- Light harvesting in the antenna complex of photosynthetic processes.
- Electron transfer reactions in photosynthesis.

Student presentations

P.Harish Kumar: Supramolecular chemistry.

The student gave his talk on the supramolecular chemistry, where he dealt upon the topics - anionic binding and sensing. He went on to explain their non-covalent interactions. Further, he proceeded to explain chelate, macrocyclic and solvent effects on their behaviour. He also elaborately explained molecular recognition, transformation and translocation of supramolecular species.

V.Sai Sudhir: Molecular Electronics.

The student started his presentation by explaining the need for molecular electronics and its promises for the future electronics. He said that the present of the upcoming field lies in synthesizing materials which have electronic properties. He gave recent examples of molecules functioning as
switches, logic gates, rectifier, diodes, shift register, molecular wires etc. He also highlighted about the need for insulating wires. He also dealt with the various disciplines of science which go in to the development of this field. He concluded his talk by quoting the challenges that the people in this field have to face, so that in near future these components are commercialized.

**M. Sairam Swaroop: Nanotechnology**

In his presentation M. Sairam Swaroop gave an introduction to the field of Nanotechnology. He gave an overview of the genesis of the field and then went on to illustrate areas where the applications of the nanotechnology are seen. He discussed the applications of nanotechnology to Energy, Information Technology, Materials Science, Biotechnology, Genetics, and Environmental Issues. He also gave illustrative examples of the future scope of nanotechnology.

**JAI SAI RAM**
LIST OF SPEAKERS/ RESOURCE PERSONS - Duration of lectures delivered

- **Prof. P. Natarajan**,  
  Director, National Centre for Ultra Fast Processes, Chennai.  
  1 hour 40 minutes

- **Professor S. Chandrasekaran**,  
  Indian Institute of Science, Bangalore.  
  1 hour 40 minutes

- **Dr. A. Venkateswarlu**,  
  Director (Research and Development),  
  Dr. Reddy’s Research Foundation, Hyderabad.  
  50 minutes

- **Professor B. G. Maiya**,  
  University of Hyderabad, Hyderabad.  
  1 hour 40 minutes

- **Professor R. Ramaraj**,  
  Madurai Kamaraj University, Madurai.  
  1 hour 40 minutes

- **Dr. Jayanthi Krishnamurthy**,  
  Research Triangle Institute, USA.  
  1 hour 40 minutes

- **Dr. Rajiv Kumar**,  
  Scientist E, National Chemical Laboratory, Pune.  
  1 hour 40 minutes

- **Professor T. Ramasami**,  
  Director, Central Leather Research Institute, Chennai.  
  1 hour 40 minutes

  **P. Harish Kumar**,  
  II M.Sc. Chemistry student, Sri Sathya Sai Institute of Higher Learning, Prasanthinilayam.  
  25 minutes

  **V. Sai Sudhir**,  
  II M.Sc. Chemistry student, Sri Sathya Sai Institute of Higher Learning, Prasanthinilayam.  
  25 minutes

  **M. Sairam Swaroop**,  
  II M.Sc. Chemistry student, Sri Sathya Sai Institute of Higher Learning, Prasanthinilayam.  
  25 minutes

JAI SAI RAM
Om Sri Sai Ram

PROGRAMME SHEET

For the lecture programme organized during 10-12, Nov 2003, under the auspices of Indian Academy of Sciences – Science Panel.

Monday, November 10, 2003:

Inaugural Session: 9.45 to 10.55am

- Invocation

- Welcome Address: Dr. Chelli Janardhana, Head of the Department of Chemistry. Sri Sathya Sai Institute of Higher Learning, Prasanthinilayam.

- Inaugural Address: Sri S.V Giri, Vice- Chancellor, Sri Sathya Sai Institute of Higher Learning, Prasanthinilayam.

- Keynote Address: Prof. P. Natarajan, Director, National Centre for Ultra Fast Processes, Chennai. Topic: Chemistry of photochemical processes

Tea Break: 10.55 to 11.20am

Session I:

- Professor S. Chandrasekaran, Indian Institute of Science, Bangalore.
  Topic: Principles of Green Chemistry (11.20 to 12.10pm)

- Dr. A. Venkateswarlu, Director (Research and Development), Dr.Reddy’s Research Foundation, Hyderabad.
  Topic: Impact of Natural Products in Drug Discovery (12.10 to 1.00 pm)

- Professor S. Chandrasekaran, Indian Institute of Science, Bangalore.
  Topic: Chemistry of Tetrathiomolybdate: Applications in Organic Chemistry (1.00 to 1.50 pm)
Session II:
- **Professor B. G. Maiya,**
  University of Hyderabad, Hyderabad.

  Topic: *“Life” in “dead” matter: Bioinorganic Chemistry – I* (5.30 to 6.20pm)

- **Professor B. G. Maiya,**
  University of Hyderabad, Hyderabad.

  Topic: *“Life” in “dead” matter: Bioinorganic Chemistry – II* (6.25 to 7.15pm)

- **Professor R. Ramaraj,**
  Madurai Kamaraj University, Madurai.

  Topic: *PhotoelectroChemistry* (7.15 to 8.05pm)

**Tuesday, November 11, 2003:**

- **Dr. Jayanthy Krishnamurthy,**
  Research Triangle Institute, USA.

  Topic: *Overview of PM 2.5 Chemical Speciation Nationwide Network program and its challenges* (8.30 to 9.20am)

- **Dr Rajiv Kumar,**
  Scientist E, National Chemical Laboratory, Pune.

  Topic: *Natural and Nature inspired preparation of fascinating porous solids.* (9.20 to 10.10 am)

- **Student Presentation:**
  P. Harish Kumar (II M.Sc.)

  Topic: *Supramolecular Chemistry – Anion Recognition and Sensing* (10.10 to 10.35 am)

Break: 10.35 to 11.00 am

**SESSION II:**
- **Professor R. Ramaraj,**
  Madurai Kamaraj University, Madurai.

  Topic: *PhotoelectroChemistry-I* (11.00 to 11.50am)
- **Dr. Jayanthy Krishnamurthy**,  
  Research Triangle Institute, USA

  Topic: *Determination of Aldehydes and ketones in the atmosphere*  
  (11.50 to 12.40 pm)

**SESSION: III**

- **Student presentation**  
  V. Sai Sudhir (II M.Sc.)

  Topic: *Molecular Electronics*  
  (6.00 to 6.25 pm)

- **Student Presentation:**  
  M. Sairam Swaroop (II M.Sc.)

  Topic: *Nanotechnology*  
  (6.25 to 6.50 pm)

- **Dr Rajiv Kumar**  
  National Chemical Laboratory, Pune

  Topic: *Role of catalysis in chemical industry: Recent trends and future directions*  
  (6.50 to 7.40 pm)

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**Wednesday, November 12, 2003:**

- **Professor T.Ramasami,**  
  Director, Central Leather Research Institute, Chennai

  Topic: *Science of human development*  
  (10.00 to 10.50 am)

**Break**: 10.50 to 11.10 am

- **Professor T.Ramasami,**  
  Director, Central Leather Research Institute, Chennai

  Topic: *Redox chemistry of chromium in industrial chemistry and implications.*  
  (11.10 to 12.00 noon)
Valedictory Address:
Professor P. Natarajan
Director, National Center for Ultra Fast Processes, Chennai
(12.00 noon to 12.50 pm)

Rapporteur presentation:
Dr. K. Anil Kumar
(12.50 to 1.05 pm)

Vote of Thanks
(1.05 pm-1.15 pm)

List of participants:

Faculty members of

(i) Department of chemistry, Sri Sathya Sai Institute of Higher Learning Prashanthi Nilayam Campus, Prashanthi Nilayam.
(ii) Department of chemistry, Sri Sathya Sai Institute of Higher Learning Anantapur Campus, Anantapur.
(iii) Department of chemistry, Sri Sathya Sai Institute of Higher Learning Brindavan Campus, Bangalore.

Students of

Department of chemistry, Sri Sathya Sai Institute of Higher Learning Prashanthi Nilayam Campus.
Department of chemistry, Sri Sathya Sai Institute of Higher Learning Brindavan Campus, Bangalore.

Some of the students and faculty members of departments of Physics and Biosciences of our Institute.

Jai Sai Ram