



# MRSI Newsletter

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for circulation amongst its members*

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## From the Editors' Desk



### Thermal Conductivity in Polyethylene:

Plastic materials have revolutionized the consumption of durable goods and it has great impact on the development of many fields of modern science and technology. The impact of plastics is derived from their numerous desirable properties for materials used in products ranging from milk jugs to water pipes to microprocessor packages, although plastic materials causes a significant level of environmental concern. The bulk polyethylene is generally regarded as thermal insulators, and typically has thermal conductivities on the order of  $0.1 \text{ Wm}^{-1}\text{K}^{-1}$ . The mixing of metallic nanoparticles or carbon nanotubes with polymers has been practiced for decades to improve the polymer thermal conductivity. It is obvious that properties of these materials are not only the sum of the individual contributions of both phases, but the role of the inner interfaces could be predominant. So, the enhancement in thermal conductivity in polymer composites is limited due to interface resistance between inorganic and organic materials. Recently, scientists at Massachusetts Institute of Technology in Cambridge have shown that fibers of polyethylene can conduct heat at a rate comparable to that of half of the pure metals. The work has been published in *Nature Nanotechnology*, 2010, 5, 251-255. These lightweight, electrically insulating and chemically stable materials may find applications where directional heat conduction is important, such as in heat-exchanger fins, cell-phone casing, and plastic packaging for computer chips.



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*For more details about the activities of MRSI, members are advised to visit the society's website at*

[www.igcar.ernet.in/mrsi](http://www.igcar.ernet.in/mrsi)

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## **MRSI NEWSLETTER**

**Volume B 10, Number 2**

**April 2010**

The MRSI Newsletter is a quarterly update published by the Materials Research Society of India. Members are requested to contribute information of interest to Materials Science community. Members can inform through the Newsletter, recognitions/awards received by them, changes in address, forthcoming events, and any interesting scientific/technological developments in the area of materials. The relevant information should be sent to the following address:

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## Awards & Distinctions Conferred on Members



We are happy to report that the following members of Materials Research Society of India have received awards and distinctions shown against their names. MRSI congratulates them.

<b>Baldev Raj</b>	(i) Elected Member, International Nuclear Energy Academy (INEA) (ii) Pandit Jawaharlal Nehru National Award, Government of Madhya Pradesh (2007)
<b>L N Satapathy</b>	Elected Fellow, Indian Institute of Ceramics, Kolkata
<b>M Nallaperumal</b>	First HEMSI MR KURUP Gold Medal, ISRO
<b>Peter Day</b>	Elected Fellow, International Union of Pure and Applied Chemistry
<b>Bhupendra N Dev</b>	(i) DAE-Raja Ramanna Prize in Physics of JNCASR (2009) (ii) International Alumni Award for Exceptional Achievement, State University of New York (2010)

*P.S: Members are requested to communicate to the Editorial office about the Awards, Honours and Distinctions they have received from various agencies.*

## STUDENTS' PROJECTS

MRSI will partially support upto 10 projects of students (B.Tech, M.Sc, M.Tech, ME, M.Phil, Ph.D) in the area of Materials Science and Technology under the supervision of a MRSI member. Proposals are to be submitted to MRSI on or before **October 30<sup>th</sup> 2010**.

## Obituary

### Prof. P Ramachandra Rao

Professor P. Ramachandra Rao passed away on 10<sup>th</sup> January 2010 leaving a rich legacy behind him. Born on 21<sup>st</sup> March 1942 at Kavutavaram in Krishna District of Andhra Pradesh, he completed his MSc. degree from Osmania University in 1961. Following this, he studied metallurgy at the Indian Institute of Science, obtaining his bachelor degree in Engineering in 1963. His long association with the Banaras Hindu University (BHU) began soon afterwards when Prof. T.R. Anantharaman inspired him to join the Department of Metallurgical Engineering, BHU to pursue further study for the degree of Master of Science in Engineering, which he successfully completed in 1965. He continued his research under the supervision of Prof. Anantharaman and obtained the PhD degree in 1968. Together with Prof. Anantharaman he established the rapid solidification group at BHU which grew into a major force in this area of research attracting significant international recognition. He served the faculty of BHU from 1964-1992 as lecturer, reader and professor. His services at BHU during this period include the coordinatorship of the School of Materials Science of BHU during its formative years. In 1992, he moved to the National Metallurgical Laboratory as its director. He continued in this position for ten years till he was invited to occupy the position of Vice Chancellor of the Banaras Hindu University in the year 2002, the first student of the University to shoulder this responsibility. In 2005, he moved to the Institute of Armament Technology, Pune with a mandate to transform it to a deemed university for meeting the academic needs of the scientists and cadres engaged in defense related activities. He became the first Vice Chancellor of this transformed Institute which is today known as DIAT. He superannuated from DIAT in 2007 and returned to his native city of Hyderabad. He was a Raja Ramanna Fellow at ARCI, Hyderabad and continued his research till the end. During his long and distinguished research career he had published more than 230 papers and obtained 20 patents.

Professor Ramachandra Rao is known internationally for his contributions to our understanding of metallic glasses, quasicrystals, metastable crystalline materials and biomimetic materials. His creative interpretations and applications of thermodynamic principles have led to solving major problems in the area of undercooled liquids and nonequilibrium phase transformations including solidification. He always believed in chartering new courses in our understanding of nature, designing novel methods for materials processing and unusual but simple experiments to unravel exciting results. His work on biomimetic materials during the later stages of his professional career is a perfect example of his unusually creative approach. Professor Ramachandra Rao has pioneered the microgravity experiments in the country when the experiment, designed by him, was carried out in space by the first Indian astronaut, Mr. Rakesh Sharma in a Soyuz space ship.

Professor Ramachandra Rao was a fellow of all the academies in India as well as a fellow of the Third World Academy. He won several major awards in engineering sciences including the Bhatnagar Prize. Professor Ramachandra Rao was closely associated with the Materials Research Society of India from its inception. He was a Vice President of the Society and served in its council. He received the MRSI-ICSC Super Conductivity and Materials Science Award (Senior) in 2005 and the annual prize in 2002 and the MRSI distinguished lecturer for the years 1999-2000.

A wonderful and simple person, Professor Ramachandra Rao leaves behind a large number of his students (including 14 Ph.D students) and collaborators and colleagues who had benefited by his association and who will continue to admire his achievements.

**K Chattopadhyay**

## **REPORT ON THE 21<sup>st</sup> AGM OF MRSI**

The Twenty First Annual General Meeting (AGM) of the Materials Research Society of India (MRSI) and as an integral part of the Program, a Theme Symposium on “*Advanced Ceramic Materials - Monoliths to Composites*”, was organized by its Gujarat Chapter during 9-11, February, 2010, at the Department of Materials Science, Sardar Patel University, Vallabh Vidyanagar. It was attended by more than 300 delegates, invited speakers and dignitaries from all over the country. Following the tradition, the APAM India chapter meeting was held at Department of Materials Science on February 8, 2010. Before the commencement of the APAM lectures homage was paid by several scientists to late Dr. P. Ramachandra Rao, President of the APAM India Chapter and a one minute silence was observed in his memory. The APAM lectures were delivered by Dr. Vikram Jayram, IISc, Bangalore and Dr. G. Sunderarajan, Director, ARCI, Hyderabad.

Inaugural function of 21st MRSI AGM 2010 was held at the Auditorium of GCET on 9<sup>th</sup> February 2010. Prof. L.M. Manocha, Head, Department of Materials Science, Sardar Patel University & Chairman, MRSI (Gujarat Chapter) welcomed the dignitaries and the delegates. In the introductory remarks Prof. S.B.Krupanidhi, Vice President-General Secretary, MRSI pointed out the immense role the MRSI is playing in promoting scientific career and enthusiasm among the young researchers of India. Prof. T. Ramasami, Secretary, DST, Govt. of India and President, MRSI presented the statistical position of India in terms of education, technology and development and stressed the urgency for conducting world class research in the country and applauded the role played by MRSI in doing the same.

Dr. C.L. Patel, Chairman, Charotar Vidya Mandal, inaugurated the AGM accompanied by the Vice Chancellor, Dr. B.G.Patel, MRSI President, Dr. T. Ramasami, Vice President-General Secretary, Prof. S.B.Krupanidhi, Prof. L.M.Manocha and the convener, Prof. (Mrs.) S.Manocha lighting the traditional lamp. In his inaugural address Dr. Patel stressed upon the dire need for better infrastructure in higher education. Dr. B. G. Patel, Vice Chancellor, Sardar Patel University in his Presidential remarks offered words of encouragement to the budding young researchers for putting up with the global competition in the field of science and technology. Prof. (Mrs.) S. Manocha, Convener, presented formal vote of thanks. She expressed sincere gratitude and thanks to all the dignitaries, participants, delegates, MRSI Medal winners, distinguished speakers of the theme symposium, competitors of G.C. Jain Memorial award, the sponsors and everybody who was a part and parcel of the AGM MRSI 2010 for their great enthusiasm, kind presence and active participation.

The technical session of the day started off with the Distinguished Materials Scientist of the Year Award Lecture by Prof. S. K. Joshi, NPL, New Delhi. He fascinated the audience by his lecture ‘My Journey in the World of Materials’. Prof. S. B. Krupanidhi, IISc, Bangalore, presented the CNR Rao Prize Lecture in Advanced Materials. He held the audience spell bound with his lecture “III-V Compound Semiconductor based Quantum Structures for IR Detection”. Other Award and Medal lectures were presented by very distinguished scientists and technologist from all over the country covering topics such as ferromagnetic shape alloys, development of ceramic gas sensors, catalytic hydrogen generation and storage. The next day was a concoction of the remaining medal lectures award lectures, poster sessions and the GC Jain Memorial Lectures.

The MRSI-ICSC Superconductivity and Materials Science Annual Prize Lectures were presented by Dr. N. Kumar, Defence Lab, Jodhpur and Prof. O.N. Srivastava, BHU, Varanasi. While, Dr. N. Kumar talked about his experiments and application of conducting polymers & nanomaterials for specific defence applications, Prof. O. N. Srivastava journeyed through the synthesis and applications on the nanomaterials.

From among the 70 posters presented during the posters sessions on 9<sup>th</sup> and 10<sup>th</sup> February , 2010, five posters were selected for the best poster paper award of MRSI AGM 2010, which were won by Macwan Dhawani, NIRMA University, Rajesh Pande, Department of Materials Science, Sardar Patel University, Chanchal Ghosh, IGCAR, Kalpakkam, S S Mali, BARC, Mumbai and Y A Sorb, IGCAR, Kalpakkam. The GC Jain Memorial Lecture Awards for best thesis by young researchers were jointly won by Manu Jaiswal, National University of Singapore and Sarika Mishra, NFTDC, Hyderabad.

On February 10<sup>th</sup>, 2010 the Theme Symposium on 'Advanced Ceramic Materials-Monoliths to Composites' was inaugurated by the invited lecture of Dr. H S Maiti, CGCRI, Kolkata on Nanophosphors in Solid State Lightening, Dr. L. Montagne, University of Lille, France on Solid State NMR as a Characterization Tool for Advanced Glass Applications, This was followed by the lectures of Dr. G. P.Kothiyal, BARC, Mumbai on Ferromagnetic Bio Glass Ceramics and Dr. Anil Kumar, ASL, Hyderabad on High temperature materials for Defence application.

The concluding session was chaired by Dr. G.P. Kothiyal. Among others on the dias were Prof. E.S. Rajagopal, Dr. L. Montagne, Dr. N. Kumar, Prof. L.M. Manocha and Prof. (Mrs.) S. Manocha. The deliberations held during the three days were summarised. The delegates presented their views about the XXI AGM and general presentations. It was opined that more time slot be given for poster presentations.

**L M Manocha**  
**Chairman, LOC, 21<sup>st</sup> AGM of MRSI**

### Minutes of the 21<sup>st</sup> Annual General Meeting of MRSI

The Twenty First Annual General Body Meeting of the Materials Research Society of India was held on Tuesday, the 9<sup>th</sup> February 2010 between 18.00-19.00 hrs at GCET Auditorium, Sardar Patel University, Gujarat.

Prof. S B Krupanidhi, Vice President-General Secretary presented the Annual report of MRSI for the year 2009. Some aspects of the report are given below:

- The APAM India Chapter held its meeting at Materials Science Department, Sardar Patel University, Gujarat on 8<sup>th</sup> February, 2010.
- The paper entitled “Low temperature synthesis of nanosized  $Mn_{1-x}Zn_xFe_2O_4$  ferrites and their characterizations” by Rajesh Iyer, Rucha Desai and R V Upadhyay has been adjudged as the best paper published in the BMS, Volume (32), No. 2, April 2009, pp. 141-147.
- The statement of accounts for the year 2008-09 and the Provisional statement as on 31.12.2009 were presented at the AGM.
- MRSI will partially support upto 10 projects of students (B.Tech, M.Sc, M.Tech, ME, M.Phil, Ph.D) in the area of materials science and technology under the supervision of a MRSI member. Proposals are to be submitted to MRSI on or before *October 30<sup>th</sup> 2010*.
- The following scientists have been elected as Honorary Members of MRSI for the year 2010.

Prof. Y. Bando (NIMS, Japan)

Prof. O.K. Andersen (Max-Planck Institute, Germany)

- The 22<sup>nd</sup> Annual General Meeting of MRSI will be held at Bhopal during February 2011. This would be organized jointly by MRSI Bhopal chapter and AMPRI, Bhopal.

#### New Chapters of MRSI

A new chapter of MRSI was inaugurated at Allahabad recently. Proposals are under consideration for opening of new chapters at Patiala and Vishakapatnam.

#### Chapter News

C-MET, Pune in association with MRSI chapters of Pune, Mumbai, Kolkata and Gujarat is organizing an “International Workshop and Symposium on Synthesis and Characterization of Glass/Glass-Ceramics” during 7-10 July 2010. For more details refer to the website: [www.cmet.gov.in](http://www.cmet.gov.in)

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Enrolled between January 1 and March 31, 2010

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## CALENDAR OF EVENTS (June 2010-January 2011)

**June 7-10, 2010**, The 9<sup>th</sup> Asia Pacific Conference on Materials Processing, for further details refer to the website <http://apcmp2010.unsw.edu.au/>

**July 7-10, 2010**, International Workshop and Symposium on Synthesis and Characterization of Glass/Glass-Ceramics, for more details refer to website: [www.cmet.gov.in](http://www.cmet.gov.in)

**November 11-13, 2010**, 15th International Metallurgy & Materials Congress (IMMC15), for more details refer website: <http://www.metalurji.org.tr/congress>

**January 10-12, 2011**, International Conference on Research into Design ICoRD'11, Amaresh Chakrabarti, Programme Chair, ICoRD'11, Centre for Product Design and Manufacturing, Indian Institute of Science, Bangalore, India; Tel: +91 80 2293 2922; Fax: +91 80 2360 1975; Email: [ac123@cpdm.iisc.ernet.in](mailto:ac123@cpdm.iisc.ernet.in), Website: <http://cpdm.iisc.ernet.in/icord'11>

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