



MRSI Newsletter

*A quarterly publication of the Materials Research Society of India
for circulation amongst its members*

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From the Editors' Desk



Global demand for energy is projected to increase from its current value of 13 TW to about 30 TW within the next 50 years. Today we are facing acute energy shortages, resulting in power shedding from 4 to 10 hours every day at different locations in India. In our country major contribution to electrical energy generation is by coal and oil based power generation plants and by hydro and nuclear power generating stations. Renewable energy produces electricity from environmentally friendly sources with almost zero CO₂ emissions and negligible pollution. The energy challenges are apparent and over the last few years, the energy sector has changed drastically. There are two other ways of tackling these challenges: reducing energy demand by changing consumption habits or using energy in a "greener", more diverse and more efficient manner. Plastic solar cells offer promise for lightweight, flexible, printable and most important low-cost technology for trapping renewable energy source. Over the years, the performance of plastic solar cells has steadily improved but not sufficient to compete with silicon solar cells. Professor Alan Heeger & colleague at the University of California, Santa Barbara, describes a method for converting 6.1 % of the energy in sunlight into electricity based on polymer bulk heterojunction concept. This method represents a step towards 10% efficient plastic solar cells required for most of the practical applications. Read this article in *Nature Photonics*, 2009, (3), 297-303.

This issue contains a brief report of the 20th Annual General Meeting of MRSI which was held at Saha Institute of Nuclear Physics, Kolkata during February 10-12, 2009.



**K K Nanda
Satish Patil**
Editors

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

www.igcar.ernet.in/mrsi

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MRSI NEWSLETTER

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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.

C N R Rao	‘Order of Friendship’ Government of Russia (2007)
Vikram Kumar	Fellow, Indian National Academy of Engineering (2009)
N V Ravikumar	Dr. R. L. Thakur Memorial Award, Indian Ceramic Society (2008)
S T Vagge	NACE International Best Ph.D. Thesis award (2007-08)

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, 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 30th 2009.

Announcement

Materials Research Society of India-Mumbai Chapter Travel Award Scheme

Materials Research Society of India-Mumbai Chapter (MRSI-MC) has instituted two travel awards per year starting from year 2009 to support PhD scholars, who have completed at least two years of their research work to participate in any of the MRS meetings abroad. The amount of each award will be Rs. 15,000/- . The general guidelines to apply for this award are given below:

A) Eligibility:

The student should be close to submitting his thesis/submitted thesis (the meeting should be within a year after thesis submission date.

Students should have submitted an abstract - a copy of which should be attached with the application.

Acceptance of the abstract is a necessary prerequisite for availing of the fellowship/award. The fellowship can be used for travel and should be accompanied by a proper receipt.

The award is valid for any of the MRS meetings abroad.

Students should also disclose all sources of funds that they received and expected to receive, should be certified by the guide/head of institution.

B) Due dates:

Applications fulfilling the eligibility conditions along with necessary documents may be sent to Secretary so as to reach between February 1st to August 31st and September 1st to January 31st every year.

The awards will be decided by a standing committee twice in a year. Applications received **between February 1st and August 31st** will be decided in the first week of September and those received **between September 1st and January 31st** will be decided in the 1st week of February.

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REPORT ON THE 20th AGM OF MRSI

The 20th Annual General Meeting (AGM) of the Materials Research Society of India (MRSI) and as an integral part of the program a Theme Symposium on “*New Generation Composites and Hybrid Materials : Concepts to Applications*”, being organized by its Kolkata Chapter was held during 10-12 February, 2009 at Saha Institution of Nuclear Physics (SINP), Kolkata. It was attended by more than 300 registered delegates besides invited speakers and dignitaries from India and abroad.

Following the tradition, the **APAM Meeting** was held at SINP prior to inauguration of AGM on February 9, 2009. This year APAM lectures were delivered by two distinguished scientists, Prof. D.D.Sharma of IISc, Bangalore and Dr. J.V. Yakhmi of BARC, Mumbai, who spoke on “*How to do microscopy without anylateral resolution? An improbable solution – Spectroscopy!*” and *Nano-scale Self-Assembly for Functional Materials and Devices* respectively. The APAM meeting was Chaired by Prof. M.K. Sanyal, Head, Surface Physics Division, SINP, Kolkata and former Chairperson, MRSI, Kolkata Chapter.

On 10th February, MRSI AGM 2009 was inaugurated by Prof. C. N. R. Rao, FRS, Honorary President JNCASR and Founder President of MRSI by lighting the traditional lamp and further released the ‘**Book of Abstracts**’.

Prof. Bikash Sinha, Director, SINP, Kolkata in his welcome address, in the inaugural session, stressed the need for active interaction of materials scientists and engineers to meet the ever increasing demands of engineered materials for the strategic applications. In the introductory remarks Prof. S.B. Krupanidhi, Secretary, MRSI appreciated the organizer to make the AGM 2009 of such magnitude and pointed out the pivotal role being played by MRSI for nearly two decades in promoting the cause of materials science, in general, and enthusiasm among the young researchers of India, in particular. Dr. T. Ramasami, Secretary, DST, Govt. of India and President, MRSI in his presidential address while recalling the foundation of MRSI exactly 20 years back on February 10, 1989, highlighted the importance of this society to cater to the need to face the global competition and challenges to put India in a leading position in terms of scientific achievements.

Prof. N.R. Bandyopadhyay, Chairperson, MRSI AGM 2009 and MRSI Kolkata Chapter proposed the formal vote of thanks and expressed his sincere thanks and gratitude to Prof. C.N.R. Rao for kindly inaugurating the MRSI AGM 2009. He also stated that gracious presence of Prof. Rao, the doyen of Indian Science and Technology, have infused a new dimension to AGM 2009. Further he extended his sincere thanks to Prof. T. Ramasami, President, MRSI, Prof. Bikash Sinha, Director, SINP, Kolkata, Prof. S.B. Krupanidhi, Secretary, MRSI, all the participants, delegates, MRSI Medal winners, distinguished speakers of the theme symposium, competitors of G.C. Jain Memorial award and also all members of the Organising Committee as well as persons behind the scene for their continuous direct/indirect support and co-operation to make the MRSI AGM 2009 a success.

One of the major highlights of the inaugural session was the **International Medal for Materials Science and Technology Lecture** by Prof. C.N.R. Rao. His illuminating lecture on “Graphene: the New Nanocarbon” explained the phenomena that Grapheme is a layer of simple SP² bonded carbon. He further explained the beauty of controlling science and technology behind the subject in a lucid manner. Prof. Raos’ lecture actually set the pace, tune and standard of MRSI AGM that was to follow during the course of the AGM.

Technical sessions (Day I, February 10, 2009)

During first two days (February 10-11, 2009) there were 14 nos. of MRSI Medal Lectures presented by very distinguished scientists and technologist from all over the country covering topics as diverse as soft materials derived from bile salts to multifunctional device based on organic semi conducting materials to bio-medical applications of nano materials.

Besides above on February 10, 2009 afternoon Dr. Beldev Raj, Director, IGCAR, Kalpakkam presented a Distinguished Materials Scientist of the Year award lecture. He gave a fascinating description of the challenges that he came across and achievements made in developing the science and technology of fast reactor materials of India to a position of global respect and recognition.

AGM and MRSI Awards Presentation

The formal Annual General Meeting of MRSI held at the evening on February 10, 2009 at SINP, Kolkata and was addressed by Dr. T. Ramasami, President, MRSI at the zero hour of the meeting further Prof. S. B. Krupanidhi, Secretary, MRSI presented the annual report, budget, name of the members of National Council of MRSI and the distinguished/Hony. Members of the co-opted in the council and other relevant details for the awareness of the members.

Various MRSI Medal Awards as well as Medal Lecture Awards were also presented to the recipients during this session by the President of MRSI.

Technical sessions (Day II February 11, 2009)

On February 11, 2009, **Dr. H. S. Maiti**, Director, Central Glass and Ceramic Research Institute, Kolkata and Prof.C.P.Sharma of SCTIMST, Thiruvananthapuram presented the MRSI-ICSC Superconductivity and Materials Science Annual Prize Lectures on

“Functional oxide ceramics and their applications: A journey towards technology development” and “Blood compatibility of Materials–Surfaces & Nanoparticles” respectively. Dr. Maiti deliberated on the extreme challenges faced by a scientist in his quest for technology development of global order using functional oxide ceramics well known for their complexities and environmental sensitivities. Prof. Sharma presented a detailed picture of the blood compatibility of materials and how that gets affected by the functional properties of engineered, surfaces and nanoparticles. Further MRSI Distinguished Lectureship Award Lecture was presented by Prof. R. P. Singh of Lucknow University. He gave a fascinating description of high technology materials from modified and unmodified polysaccharides.

Poster sessions (Day I & II, February 10-11, 2009)

From among the 114 posters presented during the posters sessions on 10th and 11th February, 2009, ten (10) papers were selected for the Best poster paper award of MRSI AGM 2009 and won by participating delegates from all across the country. In addition GC Jain Memorial Lecture awards presentations for best thesis by young researchers were won by Dr. Rabibrata Mukherjee, Scientist, CGCRI, Kolkata and Dr. Kavita Arora, Scientist, NPL, New Delhi.

Theme symposium (Day III, February 12, 2009)

On February 12, 2009, two plenary and four invited lectures were presented at the Theme Symposium on ‘New Generation Nano Composites and Hybrid Materials: Concepts to Applications’. First plenary lecture on “New Generation Composites and Hybrid Materials” was delivered by Prof. Hans J. Fecht, Ulm University, Germany followed by another plenary lecture on Nano Composites- A New Frontier by Prof. Subrata Ray, IIT, Roorkee.

Prof. A. Ajayaghosh, NIIST, Thiruvananthapuram, Prof. I. Manna, IIT, Kharagpur, Prof. P.P. Chattopadhyay, BESU, Shibpur and Dr. Goutam De, CGCRI, Kolkata delivered the invited lectures. All the lectures in the theme symposium focused on highlighting the basic concepts and applications scenarios for nano-composites and hybrid materials, in general, and avenue for futuristic research in this area.

Valedictory sessions

The valedictory session was graced by Dr. S. Banerjee, Director, BARC who in his valedictory address presented a unique picture of microstructure-mechanical properties relationship of advanced nuclear materials in an immaculate fashion which not only enriched the august gathering present over there but also resonated the tune and technical standard set by Prof. Rao at the inaugural session of the AGM 2009.

– **Dr. N.R. Bandyopadhyay**
Chairman, 20th AGM of MRSI

A book by Dr. V V Shah and Dr. A. Basu
Thin Film Technology : A Layman’s Perception

Thin films play an important role in investigations of the fundamental properties of solids as well as in revolutionizing the basic concepts, quality and performance of products of modern electronic, optical and automotive industries, in the harnessing of solar energy, in realizing a multitude of sensors for different physical, chemical and biological parameters, and so on. This book aims to educate and enlighten those who are engaged in the commercial applications of thin films but have inadequate knowledge of the basics of vacuum technology and thin film deposition processes. It also aims to address scientists and technologists in various fields, to whom thin film coatings and multilayer structures appear deceptively simple and who do not appreciate the complexities and sophistication involved in the design and fabrication of thin film coatings for specific user requirements.

About the Authors

Dr. V.V. Shah retired as head of the Thin Film Group at the National Physical Laboratory (N.P.L.), New Delhi, in 1991. He joined N.P.L. in 1962 and pioneered work on thin film coatings, establishing a strong group that achieved several notable successes in the areas of thin film optical coatings and thin film amorphous silicon solar cells. Dr. Shah has authored or co-authored about 25 research papers in reputed international journals and reviewed several books on thin film science and technology. While in NPL and after retirement he has provided technical consultancy services to several films, government and private, in the area of thin film coatings for both scientific and commercial applications.

Dr. A. Basu is a senior scientist in the Division of Electronic Materials, N.P.L. He joined the Thin Film Group headed by Dr. V.V. Shah in 1983 and worked extensively on the computer-aided design, fabrication and development of a wide range of thin film multilayer optical coatings for diverse applications, the technologies for some of which have been transferred to industry. He has also been involved in the characterization of thin film optical coatings by spectrophotometry and ellipsometry. He has authored or co-authored more than 20 research publications in prestigious journals.

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CALENDAR OF EVENTS (JUNE-DEC 2009)

June 28-July 3, 2009, ICMAT 2009 and IUMRS-ICA 2009, for more information, refer to the website: <<http://mrs.org.sg/icmat2009/>>

September 9-11, 2009, The 5th conference of the Asian Consortium on Computational Materials Science, for more details refer to the webpage: <<http://iop.vast.ac.vn/theor/conference/accms5/>>

September 14-16, 2009, The Fourth Asian Particle Technology Symposium (APT 2009), for more details refer to the website <www.ap2009.org>

September 20-25, 2009, ICAM 2009, 11th International Conference on Advanced Materials, Rio de Janiero, Brazil, for more details visit website : <www.icam2009.com>

October 11-14, 2009, International Conference on Sol-Gel Processes for Advanced Ceramics, Dr. T G Srinivasan, Convener, SGPAC-2009, Indira Gandhi Cente for Atomic Research, Kalpakkam, Email: sgpac2009@gmail.com, tgs@igcar.gov.in, vjram@igcar.gov.in, nkumar@barc.gov.in

October 12-15, 2009, Second World Materials Summit on Advanced Materials in Energy Applications and Sustainable Society Development, Suzhou, China, contact: Chinese Materials Research Society, Tel: 86-10-6847-5052, Fax: 86-10-6872-2033, Email: yfhan@buaa.edu.cn, qfeng@ski.ustb.edu.cn, chunrong0625@sina.com.cn

December 15-19, 2009, Fifteenth International Workshop on the Physics of Semiconductor Devices, The Secretary, XV IWPSD, Solid State Physics Laboratory, Lucknow Road, Delhi 110 054, Tel: 011-23903474, Fax: 011-23913609, Email: secretary@iwpsd.net, chairman@iwpsd.net

Members are requested to give information about the conferences/symposia/workshops they are organizing well in advance so that the same can be inserted in the “calendar of events”

Patron Membership

Professional Societies, Research bodies, Laboratories and Companies willing to support activities of MRSI (through a one-time contribution of Rs. 50,000/- are enrolled as Patron members by the Council of the MRSI.

Privileges of Patron Members

- Publication of their names in MRSI Newsletter
 - Bulletin of Materials Science / MRSI Newsletter
 - MRSI Update
- Free supply of all periodicals published by MRSI such as:
 - Symposium proceedings at prices applicable to members
 - Display of Company Literature free of charge at MRSI meetings
 - Discounts on advertisements in Newsletter
 - Advance notification of programmes and Events
 - Free employment Advertisements in the MRSI Newsletter
 - Registration of 2 company representatives in each society meeting at member registration rates.

We appeal to all organizations/laboratories/companies involved in the R&D/Educational activities of Materials Science and Technology to become Patron members.

Request for Patron membership may be made to:

Prof. S B Krupanidhi
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