



# CSIR - CGCRI

## NEWS LETTER

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### FOCUS

#### NRDC Meritorious Innovation Award

The "Technology on Manufacturing Specialty Borosilicate Glass Bead for Nuclear Waste Immobilization", developed by CSIR-CGCRI has been selected for NRDC Meritorious Innovation Award for the year 2013. The awardees are: Dr Ranjan Sen, Chief Scientist; Mr Sitendu Mandal, Senior

Principal Scientist; Mr Alok Roy Chowdhury, Technical Officer; Dr Dipali Kundu, Senior Principal Scientist and Mr Prasanta Chaudhuri, Retired Scientist. The award contains a Trophy, Citation and Cash of Rs. 5 Lakhs. The distribution of awards took place on February, 25, 2015 during Innovate India 2015 Programme at PSG College of Technology, Coimbatore.



From Left: Team CSIR-CGCRI: Mr Prasanta Chaudhuri, Mr Alok Roy Chowdhury, Dr Dipali Kundu, Mr Sitendu Mandal and Dr Ranjan Sen receiving awards from Dr V K Saraswat, Member, National Institute for Transforming India (NITI) Ayog

#### Bridge Winner

CSIR-CGCRI emerged as the winner of Bridge Competition in the 46th Shanti Swarup Bhatnagar Memorial Tournament Indoor Finals held during February 26 -28, 2015 at CSIR-National Chemical Laboratory, Pune. The team comprised of Mr Gopal Chandra Das, Sr. Technician; Mr VK Gond, Section Officer; Mr Gopal Debnath, Technical Officer; Mr Sanat Mandal, Assistant (F&A) and Mr Ashwini Mishra, Lab Assistant. Dr M O Garg, Director General, CSIR gave away the prizes.



The victorious CSIR-CGCRI Bridge team with trophies is seen with Dr M O Garg, DG, CSIR standing on extreme left with his wife

### TECHNOLOGY NEWS

#### MoU Signed for Demonstration of Manufacturing Low Melting High Sodium Content Borosilicate Glass Beads

A Memorandum of Understanding (MoU) for demonstration of manufacturing low melting high sodium content borosilicate glass beads has been signed by CSIR-CGCRI on March 20, 2015 with H R Johnson (India), Mumbai. Under the MoU, CSIR-CGCRI would place an order for the demo production of 3 MT of the product to HR at a mutually agreed price. The company would use the CSIR-CGCRI knowhow and demonstrate the production under the direct supervision and guidance of the Institute's representatives.

### WORKSHOP/CONFERENCES

#### International

#### Emerging Materials: Characterization & Applications: EMCA-2014 (December 4-6, 2014)

The Conference was organized jointly with the Centre of Excellence in Advanced Materials, Deptt of Physics, National Institute of Technology, Durgapur. The main objective of this event was to update knowledge about the emerging materials and their applications and characterizations. Prof Ken Durose, Director, Stephenson Institute for Renewable Energy (SIRE), Liverpool, UK was the Chief Guest in the inaugural session.

About 300 participants included students, experts, delegates and eminent speakers made presentations in the technical sessions. About 250 papers

were presented. The Conference concluded with a panel discussion. The panelists suggested the future course of interventions necessary to promote characterizations and use of cutting age materials.



Valedictory Session of EMCA - 2014

## 1<sup>st</sup> International Conference on Alumina and Other Functional Ceramics: AOFC 2015 (March 11-13, 2015)

CSIR-CGCRI joined hands with Indian Ceramic Society to stage this conference. The event was motivated by the current realization that though alumina continues to occupy a unique position for widespread application but other functional ceramics are also catching up fast along with alumina in the domain of various applications. In its wake, the event covered adequately topics such as Alumina particles, Alumina Nanofibres, Coating, Abrasives, Thin films and Nanomaterials: Process and Technology, Biomedical applications, High Temperature Ceramics, Advanced Characterization etc in which CSIR-CGCRI is actively engaged in collaboration with industry and academic institutions.

The event was fourth in series. Endorsed by the International Ceramic Federation, a one day Workshop on Nano-Ceramics: Synthesis and Characterization preceded the inauguration of the main programme.

In all, a keynote, 6 plenary, 30 invited, 14 oral, 15 contributory and 40 posters were presented. The keynote address was delivered by Dr Eng Hidehiro Yoshida, Senior Researcher, National Institute of Materials Science & Visiting Associate Professor, Tokyo University of Science, Japan. Prof Indranil Manna, Director, IIT-Kanpur graced the inaugural session of the event as the Chief Guest while Dr A K Chattopadhyay, Technical Advisor to Chairman, TRL-Krosaki Refractories Ltd acted as the Guest of Honour.



Lighting of lamp during inaugural session of AOFC-2015

## National

### Workshop on Basic Refractory for Metallurgical Industries: Perspective of Indian Raw Material (March 20, 2015)

The event was a part of a recently concluded GAP project sponsored by the Ministry of Mines, Government of India. The purpose of this Workshop was to disseminate the knowledge base generated on characterization of Indian lean grade magnesite ores and improvement of their high temperature properties. Fifty delegates attended the event.

The Indian magnesite like several other refractory reserves contain impurities which require costly beneficiation. Limited literature exists on removal process of silica impurities from ores which tamper high temperature properties. The deliberations touched upon the indigenous possible interventions to develop inexpensive purification techniques.

Chief Guest Dr A K Chattopadhyay, Technical Advisor to Chairman, TRL-Krosaki Refractories Ltd, in his keynote address suggested that a simple approach to circumvent the impurity removal to develop simple beneficiation

processes indigenously. He added that new and newer techniques were essential in view of technological advances in steel making. He cited that the Torpedo cars not merely perform role of containers to transport hot metal from the blast furnace to the steel plant today but are equipped to perform de-phosphorization or de-sulphurization also. He touched upon several issues of refractory import, global business scenario and finally pointed to futuristic ultra high temperature materials. In all there were 10 technical papers presented by experts from industry, research and academia.



Chief Guest being greeted with a floral bouquet

## TRANSDISCIPLINARY R&D

### Natural Marine Sponge Skeleton as a Bone Mimicking Biomaterial

CSIR-CGCRI has identified and characterized natural marine sponges as potential bioscaffolds stand alone in combination with Insulin Like Growth Factor-1 (IGF-1) and Bone Morphogenetic Protein-2 (BMP-2) on the *in vivo* bone healing performance in rabbit model. These natural marine sponges harvested from a beach of Goa proved promising materials for bone repair and augmentations. The IGF-1 impregnated sponge scaffold promoted excellent osseous tissue formation. This trans-disciplinary research was carried out in collaboration with CSIR-NIO, Goa, IIT-Guwahati and West Bengal University of Animal and Fishery Sciences, Kolkata. The results were published in a high impact journal.

S K Nandi, B Kundu, A Mahato, N L Thakur, S N Joardar, B B Mandal: *In vitro* and *in vivo* evaluation of the marine sponge skeleton as a bone mimicking biomaterial, *Integrative Biology* 7 (2) (2015) 250-262 (Impact Factor 3.99).



Glimpse of SEM of bioscaffold converted from marine sponge (*Biemna fortis*) to actual sample (both inset)

## MEETINGS

### 50<sup>th</sup> RC Meeting

The 50<sup>th</sup> Research Council Meeting of CSIR-CGCRI was held on January 14, 2015 at the Institute. The members felt satisfied with the progress of the Institute. The Council opined that CSIR-CGCRI has reasonably strong groups in the areas of Glass Fiber, Sol-Gel/Nanostructured materials, Refractory, Conventional Glasses, Ceramic Membrane, Bioceramics and Traditional Ceramics and each area has assumed great importance. The Chairman, Dr Sri Kumar Banerjee, Homi J Bhabha Chair Professor, Department of Atomic Energy emphasized that the Institute should be catching up with the emerging natural and inclusive scenarios. He addressed the scientists on January 20, 2015 and answered on various issues related to management of R&D to the audience.



## Sensors and Systems: Development, Prototyping & Commercialization (SS-DPC 2015)

This Industry-Sensor Hub Meet was held at the Institute during January 9-10, 2015. Under the umbrella of DST-CSIR Sensor Hub at CSIR-CGCRI, Kolkata, a gamut of diversified technologies has been under development for the last few years. In the Meet, the significant products: Handheld Electronic Nose (HEN) for Quality Monitoring of Tea, Sensor for Detecting Trace Moisture in Transformer Oil, Portable Methanometer and Test Kit for Detection of Arsenic in Drinking Water were showcased. About 20 prospective entrepreneurs attended the Meet.



A sectional view of audience

## PEER RECOGNITION

- **Dr Mrinmay Pal**, Senior Scientist, Fibre Optics and Photonics Division, has been recommended for the prestigious "Raman Research Fellowship Award for the year 2014-15. He has left for University of Southampton, UK to work on fiber laser sources
- **Dr Debdulal Saha**, Scientist, Sensor & Actuator Division won the First prize for his paper "Fast Response Thin Film Nano-Porous Ceramic Sensor for Pulmonary Function Diagnostics for COPD and Asthma Patients" presented at the National Conference on Innovation in Futuristic Materials & Manufacturing Techniques held during December 26-27, 2014 organized by Department of Mechanical Engineering, Manipal University, Jaipur
- **Dr P Sujatha Devi**, Principal Scientist, Nano Structured and Materials Division, has been elected as the Honorary Editor of 'Transactions' of Indian Ceramic Society at the 78<sup>th</sup> Annual Session of the Indian Ceramic Society held during February 2-3, 2015 at Jamshedpur. She has also been elected as the Executive Member of the Council of Materials Research Society of India at the 26<sup>th</sup> AGM of the MRSI held during February 10-12, 2015 at Jaipur

## Oral Award

- **M Bhattacharya, S K Dalui, N Dey, S Bysakh and AK Mukhopadhyay** of Advanced Mechanical and Mechanical Characterization Division won the First prize for their paper entitled "New Dynamic Failure Mechanism of Coarse Grain Alumina at Low Strain Rates" in the Students Session of the International Conference on Alumina and Other Functional Ceramics (AOFC 2015) held at CSIR-CGCRI during March 11-13, 2015

## Poster Awards

- **Aniruddha Samanta** of Advanced Mechanical and Mechanical Characterization Division won the First prize for his poster entitled "Au(Core)/Ag(Shell) nanoparticles decorated polyaniline nanowires for fabrication of optical biosensor" in the Poster Session 2 at the International Conference on Emerging Materials Characterization and Application (EMCA-2014) held during December 4-6, 2014 at CSIR-CGCRI
- **Sayantana Ray, Biswanath Sa, Jui Chakraborty** of Bioceramics & Coating Division won the Best Poster Award for their poster entitled "A New Way of Development of Polymer Encapsulated Ceramic Nanoparticle for Controlled Release Delivery of Methotrexate" in Poster Session 3 at the International Conference on Emerging Materials Characterization and Application (EMCA-2014) held during December 4-6, 2014 at CSIR-CGCRI
- **Debabrata Maiti, Arindam Saha and P Sujatha Devi** of Nanostructured and Materials Division won the Best Poster Award for the presentation entitled "Multifunctional ZnFe<sub>2</sub>O<sub>4</sub> Nanoparticle Based Dual Drug Delivery Platform" at 26<sup>th</sup> AGM of the Materials Research Society of India held during February 10-12, 2015 at Jaipur
- **Partha Pratim Das, Anurag Roy, Shruti A Agarkar and P Sujatha Devi** of Nanostructured and Materials Division received First Prize for their

poster entitled "Zn<sub>2</sub>SnO<sub>4</sub> Nanostructures as Photoanodes for Dye Sensitized Solar Cells" at the 2<sup>nd</sup> International Conference on Nanotechnology and Indo-US Joint Symposium held during February 19-22, 2015 at Haldia Institute of Technology, Haldia, West Bengal

- **Soumita Mukhopadhyay and P Sujatha Devi** of Nanostructured and Materials Division received First Prize for their poster entitled "Enhanced Photocatalytic Activity of Al doped ZnO Nanoparticles" in the Poster Session I of the International Conference on Alumina and Other Functional Ceramics (AOFC 2015) held during March 11-13, 2015 at CSIR-CGCRI

## Invited Talks

- **Dr P Sujatha Devi**, Principal Scientist, Nano Structured and Materials Division delivered invited talks as follows:
  - (i) "New Insights into the Local Structure of Solid Oxide Electrolytes" at the International Conference on Advanced Materials & Energy Technology held during December 17-19, 2014 at IEST, Shibpur, Howrah, West Bengal
  - (ii) "Cerium Based Oxide Ion Conducting Ceramics and New Insights into their Local Structure" at 78<sup>th</sup> Annual Session of the Indian Ceramic Society, held during February 2-3, 2015 at Jamshedpur
- **Dr Sukanya Datta**, Sr Principal Scientist, Director Cell, delivered a talk entitled "Science Fiction: A Dying Art" at the National Science Day Seminar-2015 held on February 28, 2015 at National Science Library, New Delhi

## COLLOQUIUM

The Colloquium was continued over months of December to March with a twin lecture on the day of event: One by a scientist at senior position and the other by a research entrant. The slew of lectures held were:

- **Dr Arup Ghosh**, Chief Scientist & Head Refractories Division: "Glimpse of Refractories Research and their Relevance in User Industry"
- **Mr Rik Chattopadhyay**, CSIR-SRF, "Fiber Optics & Photonics Division: Metal Nanocluster doped Optical Fiber: Possibilities and Challenges"
- **Dr Jayanta Mukhopadhyay**, Scientist, Fuel Cell and Battery Division: "Spray Pyrolysis: A Facile Process Engineering for Synthesis of Morphologically Architected Multicomponent Oxides for use as Functional Electrodes in Solid Oxide Fuel Cell"
- **Ms Malali Ray**, Project Assistant: Ceramic Membrane Division: "Carbon Molecular Sieve Membranes for Gas Separation Applications with Special Reference to H<sub>2</sub> Separation from Refinery Off Gas"
- **Dr Sumana Das**, Scientist, Bioceramics & Coating Division: "Innovative Glass-Ceramic Coatings for Future Generation"
- **Dr Arindam Saha**, CSIR-Nehru Post Doctoral Fellow, Nanostructured Materials Division: "Ultra sensitive and Reproducible Detection of endocrine Disruptors in Water Samples via 'Turn on' Fluorescent Sensor"
- **Dr Sourja Ghosh**, Scientist, Ceramic Membrane Division: "Application of Clay Alumina based Ceramic Membrane in algal photobioreactor for bio-sequestration of CO<sub>2</sub> and biofuel production"

## LECTURES

- **December 12, 2014:** **Dr Manoj Choudhury**, Fellow of American Ceramic Society, Senior Technical Staff at Owens Corning Science and Technology, USA and President-elect, International Commission on Glass (ICG) delivered a lecture entitled "Modelling of Transport Phenomena to Industrial Glassmaking" at CSIR-CGCRI



- **January 22, 2015:** **Dr A Ajayaghosh**, CSIR-Outstanding Scientist, CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST) and Dean, Chemical Sciences Academy of Scientific and Innovative Research (AcSIR) delivered a lecture entitled "Fluorescent Molecules and Assemblies for Sensing and Imaging Applications" at CSIR-CGCRI

- **February 2, 2015:** **Prof. John Irvine**, University of St. Andrews, UK delivered a lecture entitled "High Temperature Fuel Cell Electrodes: New Compositions, Microstructures and Systems for Efficient Utilization of Renewable Fuels" at CSIR-CGCRI

## SCIENCE DAY

The National Science Day Lecture was delivered by Eminent Scientist Prof. Sankar K Pal, FNA, former Director, Indian Statistical Institute, Kolkata. His topic was "Soft Granular Mining: Concepts, Applications and Big Data Issues". The lecture was held on February 25, 2015 since the scheduled date of Science Day was a holiday.



Prof Pal spoke on various aspects of machine intelligence. He highlighted in detail the integration of granular computing with fuzzy sets both in terms of fuzzy granular computing and granular fuzzy computing in handling uncertainty in real life problems. He cited several examples from his diagnostics work done in the area of biomedical imaging utilizing the granular computing tools. He also explained with examples how these concepts could reduce dimension of variables for mining data sets of huge size and dimension. Prof Pal finally projected the utility of such hybrid computing techniques in handling big data issues and other future directions of research.

## WOMEN'S DAY

March 8, 2014 being Sunday, the Institute organized a talk to mark the occasion of International Women's Day the day after. Dr Swati Bhattacharjee, Fulbright Fellow and Chief Reporter - District, Ananda Bazar Patrika delivered the talk entitled "50 Shades of Pink: Gender Inequality in South Asia". She dilated on several women issues and lamented that adequate healthcare and education facilities have remained paramount for women. She concluded that the women empowerment and equality should level the issues of Inheritance Rights, Freedom from violence,



Greater access to higher education, Equal opportunity at the workplace and Non-patriarchal system practiced down ages.

## HUMAN RESOURCE DEVELOPMENT

### T&D programme

### Physico Chemical Analysis of Ceramic Raw Materials (February 23-27, 2015)

The 5-D programme was held for the benefit of ceramic and allied industries at the Naroda Outreach of CSIR-CGCRI. In all 14 representatives from industry participated. The participants went through interactive lectures and discussion sessions as well as hands on exercise of different physical and chemical tests required to evaluate ceramic raw materials. The event was concluded by valedictory function in which Mr D Chandrashekar, Director,



MSME Development Institute, Ahmedabad, presided as the Chief Guest. The Naroda Outreach also participated in the 10<sup>th</sup> Annual Leading Trade Fair *Indian Ceramics 2015*, held during January, 21-23, 2015 at Gujarat University Exhibition Center, Ahmedabad. Earlier the Outreach supported the international exhibition, *Ceramics Asia-2014* as an event partner alongwith Indian Ceramic and Tiles Association held during December 4-6, 2014 at the same venue.

## CSIR-HRDC Programme

### Skill Development Programme for Assistants & Stenographers (December, 15-19, 2014)

The training programme was hosted for Assistants in all wings of the Administration and all the Stenographers of both CSIR-CGCRI and CSIR-IICB, Kolkata. It was organized by CSIR-HRDC, Ghaziabad during

December 15-19, 2014 at CSIR-CGCRI. 70 participants were nominated for the event. It was first of such endeavors made in eastern India by CSIR.

The faculty included eminent personalities like Dr G Anupama, JS (A), Mr J Unnikrishnan, LA-CSIR, Mr R L Sharma, Dy FA-CSIR, Mr Ram Swarup, DS, CSIR-RAB, Dr Manu Saxena, Scientist-in-Charge, CSIR-HRDC, Mr Chiranjeevi, CoSP, CSIR-NAL, Mr U S Das, CoSP, CSIR-IICB, Mr Siddhartha Dey, SO, CSIR-IICB, Mr P K Ray, AO, CSIR-IMMT, Mr T K Bahtacharya, CoFA, CSIR-CGCRI, Mr T K Chakraborty, AO, CSIR-CGCRI. Mr L R Meena, Sr CoSP, CSIR-HRDC was the Programme Coordinator. Ms Sumana Majumdar, SO, CSIR-CGCRI assisted the team locally for successful organization of the programme.



Address by the Programme Coordinator

## Fire Fighting Training

The training programmes (February 16-18, 2015 and March 4, 2015) were internally arranged in two sessions. In all 82 staff were trained by staff of Workshop and Security sections.

## FOREIGN VISITOR

Dr Khondaker M Asaduzzaman, Secretary, Ministry of Science & Technology, Govt of Bangladesh visited the Institute on March 2, 2015. He discussed with Director and ATM of institute the possibilities of joint collaborative research programme in glass and ceramics materials.



Dr Asaduzzaman (2<sup>nd</sup> from left) at CSIR-CGCRI

## Act of Kindness



Dr Pranab Chowdhury, Senior Scientist, Nanostructured Materials Division who superannuated on December 31, 2014, donated Rs 72 Lakh, almost all of his savings of entire service life to Bharat Seva Ashram. It is an extraordinary act of kindness and humanity which deserves a mention. We wish him a happy, healthy and peaceful retired life.

## Forthcoming Events

- June 25-27, 2015: Indian Innovations in Materials Research to be organized jointly with IAPQR at CSIR-CGCRI, Kolkata
- Summer Internship Programme-2015 for Engineering (3rd/4th year BE/BTech, 1st/2nd Year ME/MTech and 2nd Year MSc) students from May 19 to July 18, 2015 (Dates tentative).
- June 21, 2015: Joint CSIR-UGC NET Exam for Junior Research Fellow/Lectureship