



# CSIR - CGCRI

## NEWS LETTER

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April – July, 2013

### TECHNOLOGY NEWS

#### CSIR-CGCRI Glass Lining Technology goes into Production

CSIR-CGCRI has developed a suitable composition for glass lining coating material and a process of application of the same on metallic substrates. Glass-lining is a corrosion resistant coating used in chemical or food processing reactors or equipment to enhance product quality and service life of the reactors by prevention of chemical corrosion. A special type of impervious glassy coating was developed for application on metallic reactors or equipment by conventional vitreous enameling technique. On June 29, 2012 an Agreement for Licensing of Know-how was signed by CSIR-CGCRI with Standard Glass Lined Equipments Pvt Ltd Hyderabad.



Section of the production line in the glass lining manufacturing unit based on CSIR-CGCRI technology

Following the agreement, the company initially assimilated the technology on a small scale and established its credibility by supplying vessels/reactors.



Inaugural function: Dr Someshwar Datta and Mr K Dasgupta are seen seated third and fourth respectively from left

Standard Glass Lined Equipments Pvt. Ltd earned an order worth Rupees 70.00 lakhs and subsequently established within a short period of time, a full scale industrial manufacturing unit to manufacture up to 30,000 litres capacity of glass lined vessel/reactors.

The unit was inaugurated by Mr Kamal Dasgupta, Director (Acting), CSIR-CGCRI on May 29, 2013. The Chief Guest on this occasion was Dr Someswar Datta, the inventor of this technology. The entire unit started production with immediate effect.

#### Value Added Ceramic Products from Solid Wastes

CSIR-CGCRI has developed value added ceramic products utilizing solid wastes generated at Visakhapatnam Steel Plant (VSP) of the flagship company Rashtriya Ispat Nigam Limited (RINL) under a project sponsored by RINL. Two major objectives of the project, which has been successfully completed, were: (i) To develop value added ceramic products such as pavement blocks, tiles utilizing solid wastes such as LD slag, BF slag, fly ash generated at VSP for application in construction industries and (ii) To motivate local entrepreneurs at Vishakhapatnam to manufacture such items



Dr Swapan K Das, Chief Scientist showing pavement blocks to Chairman cum MD of RINL Mr A P Choudhary, Shri Umesh Chandra, Director (Operations), RINL-VSP is seen in the middle

by organizing joint workshops.

Speaking at a workshop entitled "Utilization of Solid Industrial Wastes for Ceramic Projects - Scope and Opportunities" held on April 27, 2013 in the Auditorium of Training and Development Centre, Visakhapatnam Steel Plant, Vishakhapatnam, Andhra Pradesh, RINL Chairman-cum-Managing Director, Mr AP Choudhary praised CSIR-CGCRI for developing technology for effective utilization of the solid wastes from Vizag Steel Plant.



## Glass Bead nodules for DAE

CSIR-CGCRI has accomplished, through M/s H R Johnson, Mumbai, a delivery of 10 MT of borosilicate glass beaded nodules to the Department of Atomic Energy. In this connection, a team of experts visited, the tiles and frit manufacturing unit of M/s H R Johnson (HRJ) at Karaikal, near Pondicherry during 17 to 20 January, 2013 and demonstrated Institute's frit melting procedure with 1 ton capacity gas fired rotary kiln.

The entire batch preparation including the processing of the raw materials even mixing, charging of the mixed batch and the discharging of the melted frit was demonstrated. The properties of sample frit and nodules proved satisfactory.

The supply was accorded as per the Technology Licensing Agreement that was signed on May 11, 2013 with the company. The company thanked CSIR-CGCRI for the technology support which proved useful not only for business but also useful for the country's strategic sector. Before the signing of licensing agreement, CSIR-CGCRI had helped HRJ in the production and supply of 3.5 MT nodules to DAE under a Non-Disclosure agreement signed on May 11, 2010.



Demonstration of frit melting at HR Johnson's Tiles and frit manufacturing unit by CSIR-CGCRI team. Mr Sitendu Mandal is seen second from right

## AGREEMENTS SIGNED

### Agreement with RKMV, Belur

**June 10, 2013:** A MoU was signed with Ramakrishna Mission Vidyamandir (RKMV), Belur Math, Howrah District, West Bengal for collaboration in the field of higher education and training of the mission's students.



Exchange of documents after agreement

### Agreement for transfer of technology of ceramic membrane for arsenic and iron removal

**July 22, 2013:** An agreement was signed on ceramic membrane based technology for removal of arsenic and iron (including the process for media preparation) with Entech Metals Pvt Ltd, Kolkata. Under this agreement, CSIR-CGCRI has granted license to Entech to utilize process know how up to capacity of 20,000 LPD on non-exclusive basis for a period of 7 years.



Exchange of documents after agreement with Entech Metals Pvt Ltd, Kolkata

## R&D NEWS

### Giant spontaneous exchange bias in a nanocomposite of $\text{BiFeO}_3\text{-Bi}_2\text{Fe}_4\text{O}_9$

Under an Indo-Ireland collaborative program sponsored by the Department of Science and Technology, New Delhi, and the Science Foundation of Ireland, Govt of Ireland, Dr Dipten Bhattacharya, Principal Scientist, Nanostructured Materials Division, CSIR-CGCRI, and his student Ms Sudipta Goswami along with Mr Tuhin Maity and his mentor, Prof S Roy at the Tyndall National Institute, Cork, Ireland, have recently reported in the *Phys. Rev. Lett.* 110, 107201 (2013) that a nanocomposite of coarser  $\text{BiFeO}_3$  (~120 nm) and finer  $\text{Bi}_2\text{Fe}_4\text{O}_9$  (~20 nm) could exhibit giant SEB (300-600 Oe) across a temperature range 5-300°K. This is a novel result. Even more interesting is the discovery that the extent of SEB could be changed by following different protocols of tracing the hysteresis loop – from positive to negative maximum or the opposite. This observation has opened a new vista of tuning the exchange bias just by adopting different measurement protocols.

This protocol-dependent spontaneous exchange bias offers additional tool for tuning the switching or sensing effect in nano-magneto electric systems and thus enormously enhances the functionality of any such device.

## WORKSHOP & MEETINGS

### Workshop on Arsenic Removal Technology jointly organized by CSIR-CSMCRI and CSIR-CGCRI (April 23, 2013)

CSIR-CSMCRI, Bhavnagar, Gujarat joined hands with CSIR-CGCRI to organize the Workshop on April 23, 2013 in Kolkata. The objective of the Workshop was to present the findings at the conclusion of a project sponsored by the Clean Technology Division of the Ministry of Environments and Forests on Arsenic removal from drinking water in areas with high arsenic contamination.

Dr (Ms) Qamar Rahman, Dean Research (S&T), Amity University, Lucknow was the Chairperson of this well attended programme. In addition, Dr M Salahuddin, Director, Ministry of Environment & Forest (Clean Technology),



Dr K M Popat delivering the welcome address



Dr P S Anand, the Project Advisor, Dr K M Popat, the Principal Scientist & Investigator and the other project personnel from both CSIR laboratories were present on the occasion.

In his opening address, Dr Popat thanked each individual member of the project team and warmly welcomed the participants. Dr P S Anand briefly narrated the details of the project since its inception. Dr S K Das, Head, Refractories Division, who was the officiating Director from CSIR-CGCRI congratulated the project team for its great success. Dr M Salahuddin complimented CSIR and other peers for the encouragement and co-operation for the successful completion of the project. Chairperson, Prof Rahman emphasized on the adverse effects of technology on health and environment. She appreciated the installation of small units of arsenic removal plants as deliverable from the project but also stressed on the need for proper maintenance to sustain these. Several others delegates shared details about their success and achievements.

The delegates agreed that it was possible to reduce arsenic from ground water by suitable chemical prescriptions. They also discussed various first hand protocols such as use of chlorine tablets, bleaching powder, ozonation etc. to free water from the effects of biological contaminants. They suggested that the sludge generated during pre-treatment and resin regeneration could be utilized as an input material for brick fabrication along with clay. Such a strategy, the delegates believed, could reduce the possibility of arsenic re-entering into the environment.

A booklet entitled "Effective Removal of Arsenic from Groundwater Covering 24-Parganas (N) Villages by Ion-specific Adsorbents Carrying Sorbed Ferric Hydroxide" authored by Dr P S Anand, Dr M Salahuddin and Dr K M Popat was released by Dr S K Das. Dr Sibdas Bandyopadhyay, Former Head, Ceramic Membrane Division CSIR-CGCRI delivered the Vote of Thanks.

## MEETING WITH PRESS ON BIOCERAMIC TECHNOLOGIES (JULY 10, 2013)

A Press Meet was organized in the Institute on July 10, 2013 in collaboration with IFGL Bioceramics Ltd, Kolkata to make the media aware of the Institute's developments in the field of biomaterials for bone implants. Several participants spoke on this occasion. Dr Vamsi Krishna Balla, Head, Bioceramics & Coating Division, highlighted the research on zinc doped hydroxyapatite being developed jointly with School of Bioscience & Engineering, Jadavpur University, Kolkata.

Dr Abhijit Chanda, the collaborator from Jadavpur University added that the quality of hydroxyapatite powder did not alter with the addition of zinc dopant. He further said that the beta TCP and biphasic calcium phosphate doped with zinc could be utilized for better bone grafting.

Prof Abhijit Chakraborty, Guru Nanak Institute for Dental Science Sodepur, West Bengal, said that calcium phosphate bone graft products, available both in granules and pre-forms, are being used at his Institute regularly. Replying to questions on the possibility of ceramic bio implants as a large



Dr Vamsi Krishna Balla (Inset) answering questions of media sitting on left hand side in the main picture

scale healthcare product, Prof Rupnarain Bhattacharya, RG Kar Hospital and Medical College, Kolkata, said that the bioceramic implants have found good applications in private hospitals but the government hospitals have limited access to these. He, along with Prof Abhijit Chakraborty, and several others stressed on the need for government intervention in the matter since the goal of the research is to provide affordable healthcare products to the masses, especially in the rural areas. Dr Goutam Banerjee, Consultant, IFGL Bioceramics Ltd, impressed upon the media, the need to educate the masses on the advantage of using biomaterial implants and about the critical hurdles, researchers and medical practitioners usually face during technology implementation.

## PEER RECOGNITION



Dr P Sujatha Devi

### Award

Dr P Sujatha Devi, Principal Scientist, Nanostructured Materials has been elected Member of the 2<sup>nd</sup> Executive Council of Society for Materials Chemistry, Bhabha Atomic Research Centre, Mumbai from 2013 to 2016.

## NEWS FROM OUTREACH

### Extramural HRD at Naroda

#### Training Programme for Instructors/Artisans Engaged in Terracotta Pottery (24 June to 03 July 2013)

The Naroda Outreach of CSIR-CGCRI organized the programme under a Grant-in Aid project sponsored by Gujarat Mati Kam Kalakari & Gujarat Mati Kam Rural Technological Institute (GMKRTI), Gandhi Nagar. The objective of the programme was to disseminate scientific knowledge about the terracotta pottery and its usefulness in modern day, with special emphasis on customer's choice, such that rural artisans could get the maximum benefit using modern tools and techniques. Ten participants from various regions within Gujarat were selected by the GMKRTI, Gandhi Nagar.



Master craftsmen demonstrating terracotta pottery making



Dr S N Misra, Scientist-in-Charge showing the decorative terracotta items developed by the artisans to Mr Dilip Singh Chauhan, Deputy Secretary (Cottage Industry), Industries and Mines Department (IMD), Govt of Gujarat

The programme was designed as per the requirement of the artisans and several related topics were discussed and demonstrated. This was followed by hands on training of the participants.

A half day visit to a ceramic industrial unit was also arranged for the participants. To understand the market requirement, and quality awareness, all the participants also visited Kapasi Handicrafts Emporium, Ahmedabad

Mr V Vala (Director – RTIG) the sponsor, expressed full satisfaction about the concept to final delivery of the programme.

## Felicitation at Khurja

Mr Yad Ram, Principal Technical Officer was felicitated by the National Commission for Safai Karmacharis, Ministry of Social Justice & Empowerment, for his contribution towards self employment generation through Glass Beads and Glass Beaded Jewellery making during a programme on Role of Women in the Rural Development organized jointly on June 8, 2013 by All India Radio, New Delhi and Media Association, Meerut (UP) at CSIR-CGCRI Khurja Outreach.



Mr Yad Ram being felicitated at CSIR-CGCRI Outreach, Khurja

## NEW PROJECT

The Rural Technology Action Group (RuTAG) at the Indian Institute of Technology Madras, Chennai, has funded a Grant-in-Aid project entitled Development of a technology package for manufacturing microwave oven compatible red clay products (GAP 0911) to CSIR-CGCRI, Kolkata, for the duration of about one year. The objective of the project is to develop low cost innovative red clay based glazed containers for rural use during heating in microwave ovens.

## 12<sup>th</sup> FYP PARTNER PROJECTS

The Institute received the financial clearance from CSIR Head Quarters for 10 out of the 11 partnered projects in which the Institute is collaborating as participating laboratory under the 12<sup>th</sup> Five Year Plan (FYP).

## VISITORS

Mr Rajiva Sinha, IAS, Principal Secretary, Department of Micro & Small Scale Enterprises and Textiles under Directorate of Micro and Small Scale Enterprises of Government of West Bengal visited CSIR-CGCRI on July 31, 2013 in connection with the proposed "MSME Business Conclave" to be held during 12 to 16 September in Kolkata. He held discussions with senior scientists and CSIR's representatives connected with the Innovation complex in Kolkata. In a prelude to this meeting, Mr Sinha also conferred with Prof Samir K Brahmachari, DG- CSIR over video from CSIR-CGCRI and apprised him of the plan and programmes of MSME&T towards industrial revival in West Bengal.

## MEETING WITH RC Chairman

**July 8, 2013:** Dr Srikumar Banerjee reviewed the initial status of the three ambitious 12<sup>th</sup> FYP projects of CSIR-CGCRI in the areas of specialty glass, specialty fiber and laser devices, novel health technology and advanced materials for energy and strategic applications in which the Institute is nodal Institution. He also took stock of the 11 partnered projects with other CSIR labs as nodal Institutions. He later addressed the Group IV scientists upto the level of Sr Principal Scientists and interacted on several scientific and technological issues confronted by them.

## LECTURE

### 12<sup>th</sup> Swarna Jayanti Lecture in Hindi

**May 31, 2013:** Dr D D Ojha, renowned science writer delivered the Golden Jubilee Lecture entitled *Jal aur Jeevan* in Hindi in the A P C Ray Seminar Hall in the Institute.



Dr D D Ojha delivering the Golden Jubilee lecture in Hindi at CSIR-CGCRI

## OTHERS

**April 5, 2013:** Dr Subroto Mukherjee, Associate Dean-Academics & Chairman-Academic Committee, Head, FCIPT Division, Institute of Plasma Research, A10-B, GIDC, Gandhinagar, delivered a lecture on "Plasma processing of materials" at CSIR-CGCRI.

**July 5, 2013:** Dr Chacko Jacob, Materials Science Centre, IIT, Kharagpur, delivered a lecture on "Carbon-based nanostructures" at CSIR-CGCRI

## FORTHCOMING EVENTS

**August, 20, 2013:** Second Research Students Day —An internal seminar of CSIR-CGCRI's research interns.

**August 26, 2013:** 10<sup>th</sup> Atmaram Memorial Lecture

**September 2-6, 2013:** Training & Demonstration (T&D) Program on Physico-chemical Analysis of Ceramic Raw Materials at CSIR-CGCRI Naroda Outreach

**November 12-13, 2013:** National Seminar on Refractory Raw Materials and Monolithics

## CORRIGENDUM

In the Issue 3 / Volume 4 of CSIR-CGCRI News Letter, under topic ALUMINAS-2013, in the line 6 of Para 1, 7 speakers should have been 11 speakers. The inadvertent error is deeply regretted.