



# CSIR-CGCRI

## NEWS LETTER



Volume 5 | No. 2

August–November, 2014

### Confocal Microscopy Launched

On October 7, 2014, Dr Jitendra Singh, the then Union Minister of Science & Technology and Earth Sciences and Vice-President, CSIR launched the confocal microscopy product in New Delhi. The Minister hailed the development as a humble beginning towards Prime Minister's 'Made in India and Reach Global strategy'. The product has been developed in a public – private partnership mode under CSIR-NMITLI project in collaboration with industrial partner Vinvish Technologies Pvt Ltd, Thiruvananthapuram. CSIR-CGCRI developed the Non-linear Photonic Crystal Fiber (NPCF) while the Vinvish Technologies utilized its optoelectronics and product design expertise to design and develop reflective type optical configuration for the Confocal Microscopy as well as the Supercontinuum Source and their complex integration. When an intense laser pulse is passed through PCF medium, white light or supercontinuum of stabilized high output power is generated. The NMITLI project has contributed to the country's first supercontinuum source and confocal microscope which may find potential



Dr Jitendra Singh (Second from right) launching the confocal Microscopy product.  
(Courtsey : Press Internal Bureau, MoST, GoI)

applications in the areas of biomedical Imaging and analysis, spectroscopic finger printing of samples with microscopic details, structural analysis and resonant scanning. Dr K Vijayraghwan, Secretary, Department of Science & Technology, New Delhi who was also present on the occasion viewed the development of the device as an inception of India's expertise in scientific innovations. The vote of thanks was given by Dr P S Ahuja, DG, CSIR.

### TECHNOLOGY NEWS

#### CSIR at 'Synergy Howrah 2014'

CSIR participated at the Synergy Howrah 2014 (July 31 to August 2, 2014) organized by the Department of Micro, Small and Medium Enterprise and Textiles, Govt of West Bengal. The District Administration, Howrah and Howrah Chamber of Commerce & Industry were the other collaborators in the event.

Synergy Howrah was the third event after the 'Synergy MSME 2013' at Kolkata and the 'Synergy Siliguri' organized in February 2014. The theme of CSIR Pavilion in the event was "Adopting Clean Processes" as the industries in Howrah face major waste disposal problem which needs scientific intervention. Accordingly the CSIR Pavilion was divided into four broad thematic clinics namely (i) Clean Fuels and Clean Energy, (ii) Clean Metallurgical Processes and Applications, (iii) Clean Processes for Ornamental Glass Making and (iv) Clean Environment through Effective Effluent Management. The CSIR labs which participated in the event were CSIR-NML (Jamshedpur), CSIR-IMMT (Bhubaneswar) and CSIR-CGCRI (Kolkata and Khurja outreaches).

#### CSIR-CGCRI vets DPR of Refractory Cluster at Asansol

The Institute vetted on September 25, 2014 the Detailed Project Report (DPR) of the Bangabhumii Cluster of Refractories Association at Asansol for creation of a Common Facility Centre (CFC). CSIR-CGCRI will play the role of technical guide in the project by scientific interventions on matters related to the suitability of local raw materials, training of human resource for refractory testing in the CFC, technology upgradation and diversification of other ceramic products. The project is estimated to cost Rs. 11.32 crores. Major sponsor of the project is Ministry of Micro Small Medium Enterprises, New Delhi.



Handing over the DPR after vetting



Scientists from CSIR-CGCRI had earlier visited the plants of Burnpur Ceramics, which is under the said cluster. In the aftermath of the visit, a training programme for MSME members of Bangabumi Cluster of Refractories Association was staged on August 25, 2014 at the Institute. There were technical presentations by scientists and demonstration of testing as well as refractory practices. During the deliberations, the participants voiced CSIR-CGCRI's intervention in few specific areas that could produce economic benefit to the cluster. Mr B P Biyani, President of Bangabumi Refractory Cluster and Dr Mou Sen, General Manager, District Industry Centre (DIC), Durgapur, West Bengal also spoke on the occasion. The participants of the training programme were finally exposed to the state-of-the-art characterization facility at the Institute.

## AGREEMENT SIGNED

### Memorandum of Understanding for Development of Seven Component Borosilicate Glass Beads

On July 22, 2014 CSIR-CGCRI signed MoU with Nuclear Research Board(NRB) BARC, Department of Atomic Energy for the development of the seven component borosilicate glass beads to improve melter life and absorb fluctuations of sodium and iron in the high level radioactive liquid waste for its vitrification. Under the MoU, a centrod composition will be developed based on which four different compositions will be selected to establish the process technology for glass bead production. NRB/BARC will place a separate order to the Institute for production and supply of 500kg of glass beads with the selected composition for the purpose of verification in the Joule Melter by NRB. CSIR-CGCRI will also optimize the process parameters and carry out material characterization of the beads for bulk production and transfer technology whenever necessary.

## EVENTS

### Internal

### The Research Scholars' Day: Third Annual Workshop (August 20, 2012)

The Third Research Scholars' Day was held at the Institute. The Chief Guest in the inaugural session was Prof Ajoy K Ray, Director of Indian Institute of Engineering Science & Technology (IEST) Shibpur, Howrah. There were 12 orals and 46 posters presentations spread over one oral and three poster sessions which were categorized in the areas of Advanced and Functional Glasses & Coatings, Advanced and Functional Ceramics and Advanced Engineering Structural Ceramics respectively to accommodate maximum possible number of research entrants. A total of 163 research students took part in the programme.

The workshop concluded after Panel Discussion and Vote of Thanks. The presentations by students in different subject areas were judged by external judges. The winners were awarded in both poster and oral categories on CSIR-CGCRI Foundation Day. A book of abstracts carrying the abstracts was also published on the occasion.



Inaugural session.: Chief Guest Prof Ajoy K Ray is seen in the middle

## 11th Atma Ram Memorial Lecture

Dr Sourav Pal, Director CSIR-NCL( Pune) delivered the 11th Atma Ram Memorial(ARM) lecture on August 26, 2014,. This is the day on which CSIR-CGCRI entered into the 65th year of its glorious journey. The title of the talk was Chemical Science in Shaping Functional Materials and Technologies of the Future. Dr H S Maiti, former Director, CSIR-CGCRI chaired the lecture session.

In his talk, Dr Pal spoke of chemistry from medieval to the modern age. He viewed that the importance of chemistry has been undisputed at all times. To strengthen his remark, he cited chemistry can offer clean energy that is now pursued globally. He listed important areas where chemistry could provide serious intervention. This included: Affordable Drugs, Carbon Sequestration, Management of N-cycle, Clean Water Technologies, Fuel from Bio-resources, Hydrogen Storage, Engineering of Simulation tools to Perfection, Chemicals for Clean Environment, New Carbon-based Electronics Materials etc. In this context he touched upon the achievements of the CSIR laboratories in the aforementioned areas.

In his discourse on smart materials, Dr Pal pointed to the areas of Food Packaging, Aerospace, Civil Engineering etc where smart materials can contribute greatly. He said that the drivers of Green Chemistry and future applications seem like a dream now but there is no doubt the advances in chemistry will make the dream come true. The climax of Prof Pal's lecture was his contribution to computational chemistry. He lauded the role of computation in chemistry and highlighted how techniques of professional mathematics can be utilized to discern chemical processes at molecular level which lies at the root of the branch of computational chemistry.

He concluded by sharing some details of the work done in his laboratory on computational chemistry. Mr Kamal Dasgupta, Acting Director, CSIR-CGCRI presented the speaker with a silver plaque.



Speaker Dr Sourav Pal holds aloft the ARM lecture plaque as Dr H S Maiti and Mr K Dasgupta applaud

## 72<sup>nd</sup> CSIR Foundation Day

The 72nd CSIR Foundation Day was celebrated with usual verve and zeal. Mr G S Rautela, Director General, National Council of Science Museum(NCSM), Kolkata was Chief Guest while Mr Samarendra Kumar, Director, National Council of Science Museum(Headquarters) Kolkata was Guest of Honour. The Chief Guest delivered the Foundation Day Lecture entitled "Science, Science Literacy and Communication" in which he explained the vibrant role played by his organization NCSM in science & technology communication with the masses. He said there was cultural shift in the public perception of museum exhibits; the viewers no longer look upon the exhibits as passive objects but want to perceive them in their totality. The science communication must therefore be human faced so that the viewer can rapidly identify with the communicator's theme.

On this occasion 20 retirees were felicitated with certificate, shawl and wrist watches while 3 employees who completed 25 years of service were presented wrist watches. Three wards of staff were awarded for securing in science subjects 90% and above marks in Board exams. The staff and wards who emerged winners in various cultural competitions were also awarded. Around 90 students from city's schools visited the Institute and went round the labs as part of Open Day programme.





Mr G S Rautela delivering Foundation Day lecture

## HINDI WEEK

CSIR-CGCRI celebrated Hindi Week during September 10-16, 2014. A Workshop was also organized in which 31 employees of Institute were trained in official language. On the concluding day of the programme, Chief Guest Prof Shri Bhagwan Roy, eminent anthropologist and formerly professor, IIT-Kharagpur delivered the 3rd Diamond Jubilee Lecture entitled "Vigyan aur Samaj". In his lecture, the speaker lucidly explained the age old bond between science and society and their interdependence that is essential to sustain mankind. Prizes were given to the winners of competitions in Hindi Noting and Drafting, Poetry Recitation and Quiz organized in official language.



Prof Shri Bhagwan Roy delivering 3rd Diamond Jubilee lecture

## VISIT OF DR P S AHUJA, DG-CSIR

Dr P S Ahuja, Director General, CSIR visited the Institute on September 19, 2014. He addressed the staff and touched upon several scientific, technical and administrative issues currently faced by CSIR. Dr Ahuja highlighted the uniqueness of CSIR as an organization and spoke in detail of its performance metrics. He said CSIR's mission transcends mere academic excellence but the main purpose was to align with Industry, Society, Environment to help the country achieve inclusive growth. Dr Ahuja



Address by DG, CSIR

explained how CSIR is repositioning itself with the changing global scenario of science & technology. He requested scientists to keep focusing on need-based research and motivated them to work in team. He also highlighted the importance of technical and administrative cadres and impressed upon the need for inducting young staff into the system.

DG, CSIR emphasized on exercising judicious choice of screening criteria and other matters during the staff recruitment so that the laboratories can remain young and dynamic. Dr Ahuja was happy to receive a memento made out of strategic glass developed by CSIR-CGCRI.



Mr Kamal Dasgupta presenting a memento to DG, CSIR

## CLEANLINESS CAMPAIGN

As a part of Prime Minister's national cleanliness campaign, CSIR-CGCRI actively implemented the drive by cleaning the campuses of the Headquarters in Kolkata and the ones at outreaches at Khurja and Naroda. Posters of cleanliness campaign were displayed at several spots. A cleaning awareness meeting was held on September 29, 2014 followed by the Swachhta Shapath (Pledge) that was administered on October 2, 2014 on the staff at CSIR-CGCRI, Headquarters, Kolkata and Naroda and Khurja Outreaches besides the CSIR GPA Maintenance Division, Kolkata



Staff being administered Swachhta Shapath

## PEER RECOGNITIONS

### External

Staff of CSIR-CGCRI received recognition in various external and internal forums of innovation and excellence which is as follows:

Dr R N Basu, Chief Scientist and Head, Fuel Cell and Battery Division of CSIR-CGCRI:

- (i) Elected as a Fellow of the Indian Institute of Metals (IIM) with effect from April 1, 2014. The IIM Fellowship Plaque was presented to him on November 14, 2014 in IIM Award giving ceremony held during the 'ATM-NMD 2014' at Pune Engineering College, Pune.
- (ii) Acted as one of the judges of a distinguished panel of Third Times NIE Science Project Competition on November 15, 2014 held at NSHM Knowledge Campus, Kolkata.

Sayantan Ray, Biswanath Sa and Jui Chakraborty of Bioceramics & Coating Division received Best Oral presentation award for their paper "A New Way to Deliver the Versatile Antineoplastic Agent Methotrexate" at the

International Conference on Emerging Trends in Chemical and Pharmaceutical Sciences and Pharma Chem Expo-2014 during October 15-17, 2014 at CSIR-ICT, Hyderabad.



Dr R N Basu receiving the prestigious IIM Fellowship from Dr R N Patra, President, IIM. Prof Indranil Manna, Vice President, IIM is seen on the right extreme

## Internal

### RESEARCH SCHLORS' DAY AWARDS

#### a) Oral Presentation:

1. **Partha Pratim Das** – Nanostructured Materials Division (St/O Dr P Sujatha Devi) "Development of ZnO-SnO<sub>2</sub> Based Photoanodes for Dye Sensitized Solar Cells"
2. **Maitreyee Saha** – Fibre Optics and Photonics Division (St/O Dr Ranjan Sen) "Highly Efficient Yb-doped Laser Fiber Synthesized by Vapor Phase Doping Technique"
3. **Quazi Arif Islam** – Fuel Cell and Battery Division (St/O Dr R N Basu) "Ca-doped Lanthanum Zirconate: A Hydrogen Separation Membrane"

#### b) Poster Presentation:

Group-I: Advanced and Functional Glasses and Coatings:

1. **Rik Chattopadhyay** - Fibre Optics and Photonics Division (St/O Dr S K Bhadra) "Effect of Plasmonic Nanostructures on Light Propagation in Optical Waveguides"
2. **Debarati Ghosh** - Glass Division/Glass Science and Technology Section (St/O Dr K Annapurna) "Highly Quantum Efficient Eu<sup>3+</sup> and Tb<sup>3+</sup> doped Alkali-free-Ba-Al-Metaphosphate Glass: Ce<sup>3+</sup> Sensitization and Role of Host Matrix"

Group-II: Advanced and Functional Ceramics:

1. **Sourav Ghosh** - Sol-Gel Division (St/O Dr Milan K Naskar) "Morphologically Tuned Mesoporous Copper Oxide"
2. **Saswati Sarkar** - Sol-Gel Division (St/O Dr Sunirmal Jana) "Nano gold coated mesoscale silica-titania 2D patterned sol-gel thin film by lithography"
3. **Sayantana Ray** - Bioceramic and Coating Division (St/O Dr Jui Chakrabarty) "Novel Nanoceramic based Tablet Formulation of Methotrexate Drug: A New Age Treatment Procedure for Rheumatoid Arthritis"
4. **Shreyashi Chattopadhyay** - Nanostructured Materials Division (St/O Dr G De) "Electrospun Titania Nanofibers with Cubic Ordered Mesoporosity"

Group-III: Advanced Engineering and Structural Ceramics:

1. **Ankita Bose** - Ceramic Membrane Division (St/O Dr Nandini Das) "Modified DDR Zeolite Membrane for Enhanced Gas Separation"
2. **Manjima Bhattacharya** - Advanced Mechanical and Materials Characterization Division (St/O Dr Anoop K Mukhopadhyay) "Strain Rate Effect of a Dense Coarse Grain Alumina from Micro to Macro Scale"
3. **Manali Ray** - Ceramic Membrane Division (St/O Dr Sandeep Sarkar) "Carbon Molecular Sieve Membranes for Enrichment of Hydrogen from Refinery Tail Gas"

## INNOVATION AWARDS 2013

### 1. Best paper:

#### (a) Glass/Ceramics:

S Ghosh and M K Naskar, "Understanding the Role of Triblock

Copolymers for the Synthesis of Mesoporous Alumina and Its Adsorption Efficiency for Congo Red", Journal of the American Ceramic Society, 2014, Vol.97, Iss.1, pp.100–106; Sol-Gel Division

### (b) Materials Science and others:

- (i) Jony Saha and Goutam De, "Highly Ordered Cubic Mesoporous Electrospun SiO<sub>2</sub> Nanofibers", Chemical Communications, 2013, Vol.49, pp.6322-6324; Nano-Structured Materials Division
- (ii) Kaushik Bhowmik, A Mukherjee, M K Mishra and Goutam De "Stable Ni nanoparticle- Reduced Graphene Oxide Composites for the Reduction of Highly Toxic Aqueous Cr(VI) at Room Temperature", Langmuir, 2014, Vol. 30, pp. 3209-3216; Nano-Structured Materials Division

## 2. Best Technologies:

- (i) Ceramic Membrane based technology for removal of arsenic (including the process for media preparation) and iron from ground water:

**Winners:** Mr Swachchha Majumdar, Mr Sudhendu Sensarma, Mr Khokan Das, Subhendu Sarkar and Dr G C Sahoo

**Transferred to:** M/s Entech Metals Pvt Ltd, Apartment-1B, 50 Jatin Das Road, Kolkata, West Bengal

- (ii) Technology of Manufacturing Low Sodium Glass beads (SiBn – 9.5) for Nuclear Waste Immobilization:

**Winners:** Sitendu Mandal, Alok Roy Chowdhury, Dipali Kundu and Ranjan Sen under Technology License Agreement with M/s H&R Johnson, Mumbai

## 3. Best Project:

Nanomechanical characterization of Human Hair: Project No. SSP 0219, Sponsored by Cavin Kare Research Center, Chennai

**Project Leader:** Dr Anoop Kumar Mukhopadhyay, Advanced Mechanical and Materials Characterization Division

## 4. Best supporting section:

BILL SECTION

## 5. Best employee:

Mr Amar Bhattacharya, Senior Stenographer, Directors Cell

## COLLOQUIUM

The Institute colloquium was resumed in November, 2014 with a twin lecture:

1. Ms Manjima Bhattacharya, CSIR-SRF, Advanced Mechanical and Material Characterization Division, "Contact: When does it hurt a brittle solid?"
2. Dr Atiar Rehman Molla, Senior Scientist, Glass Division "The Fascinating World of Glass-Ceramics: Applications in Cutting Edge Technologies"



## OBITUARY

Mr Madhusudan Gayen, Sr Tech-(2), Glass Division of CSIR-CGCRI breathed his last on August 6, 2014. The Publication committee deeply mourns his untimely demise.

## Forthcoming Events

- **December 4-6, 2014** : International Conference on Emerging Materials; Characterization and Applications (EMCA-2014) in collaboration with National Institute of Technology, Durgapur, West Bengal at CSIR-CGCRI
- **December 15-19, 2014** : Training programme for Assistants and Senior Stenographers by HRDC, Ghaziabad at CSIR-CGCRI
- **December 21, 2014** : Joint CSIR-UGC NET Exam for Junior Research Fellow/ Lectureship
- **January 9-10** : Industry-Sensor Hub Meet at CSIR-CGCRI, Kolkata
- **January 14, 2015** : 50<sup>th</sup> Research Council Meeting of CSIR-CGCRI at CSIR-CGCRI