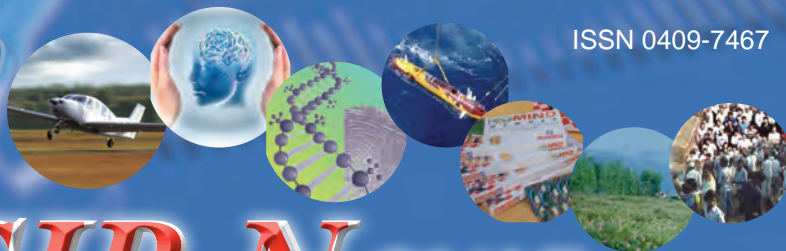




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# CSIR News

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## In The News

### Safe Bio-digester for Disposing Biodegradable Garbage Developed by CSIR-IICT

**SCIENTISTS** of the CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad have developed a biodigester for safe disposal of biodegradable garbage. Dubbed Trash Guard, the CSIR-IICT bio-digester targets an issue increasingly being faced by every small town in the country – managing waste.

An outcome of extensive research funded by the Ministry of New and Renewable Energy, Government of India, Trash Guard is an innovative prefabricated Modular High Rate Digester that is convenient to install in apartments, hotels, resorts and other places of garbage accumulation. It can digest wastes without polluting the



The water purifier developed by CSIR-IICT scientists removes the microbes and other contaminants completely, keeping minerals intact in the water. It consists of hollow membranes with pores as small as 0.001 microns.

environment.

It is fully automatic, generates no odour and occupies minimum space. Waste can be directly dropped into the digester where it gets completely digested by bacteria. Trash Guard can produce enough biogas for two kitchens every day.

Trash guard is based on High Rate Bio Methanation technology that leads to superior process efficiency in terms of percentage solid reduction. Some of the key features of Trash Guard are multi-stage and two-phase digestion;

convenient and self-driven feeding without external pump; intense self-mixing system for digester contents using differential pressure; particle size control without external grinder; capacity to withstand accidental hydraulic shock loads, and high organic loading rate.

While the Kochi Naval Base is installing these bio-digesters, CREDAI (Confederation of Real Estate Developers Association India) is also promoting the CSIR-IICT technology in residential areas.

Trash Guard is priced at Rs. 5 lakh.

## CSIR-IICT's RO Purifier Preserves Minerals

While a Reverse Osmosis (RO) water purifier removes minerals from drinking water, scientists at the CSIR-Indian Institute of Chemical Technology (IICT) based in Hyderabad have now designed hollow membranes which purify drinking water efficiently without causing any decrease in the mineral levels in water. The membranes look like thin plastic wires as they are made of polyethersulphone, a synthetic material.

RO purifiers are suitable for groundwater purification for drinking purpose. But for piped water supply from rivers, RO should not be used, as it removes essential minerals from water.

Piped drinking water consists of minerals like Magnesium, Calcium, Sodium, Potassium and Phosphorous that are essential for the human body to stay fit. Piped water supply has just the right amount of Total Dissolved Solids (TDS) in the acceptable standards. But when purified through reverse osmosis, the TDS levels fall

down to less than 20 mg/litre, a drastic reduction of minerals.

Groundwater has much higher than acceptable limits of TDS for which RO purifier can be used.

While RO purifiers remove essential minerals, UV purifiers kill the microbes whose bodies continue to remain in the water. On the other hand, in water purifiers that use charcoal, microbes are not killed.

The water purifier developed by CSIR-IICT scientists removes the microbes and other contaminants completely, keeping minerals intact in the water. It consists of hollow membranes with pores as small as 0.001 microns. When water passes through this membrane, contaminants like bacteria, virus, suspended solids, and colloidal silica that are larger than the pore size are filtered, thus giving out pure water. The essential minerals dissolved in water are of very small size and they do not get filtered and stay in the water, thus maintaining good levels of TDS.

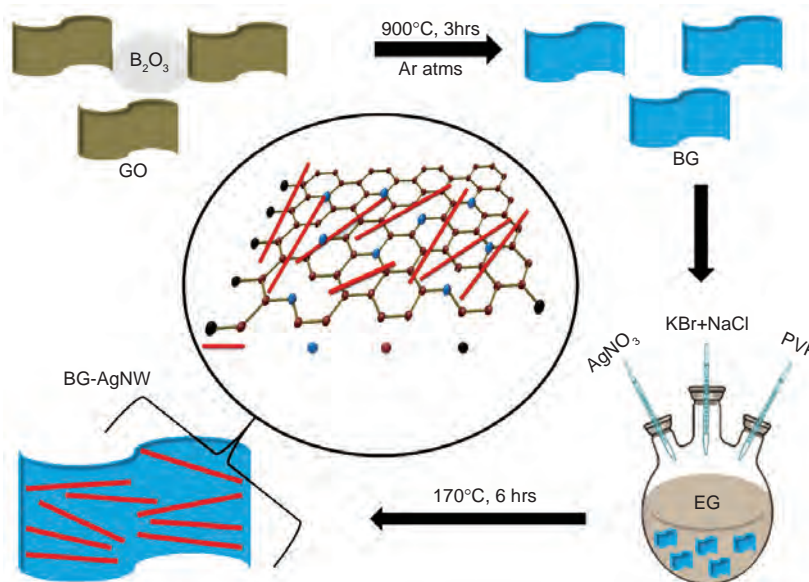
## R&D Highlights

# Integration of Silver Nanowires onto Boron-doped Graphene Nanosheets

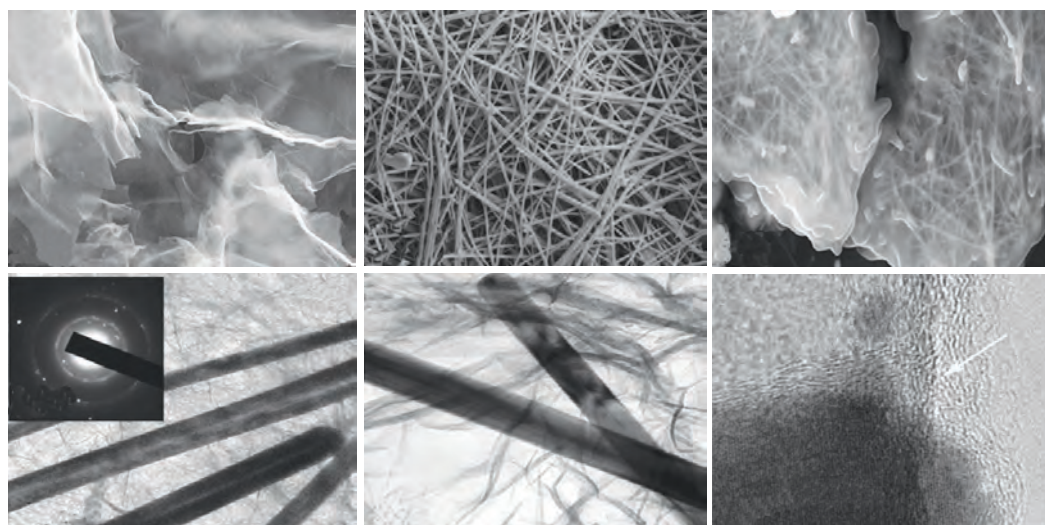
A collaborative effort between Dr. Subbiah Alwarappan, Senior Scientist, CSIR-Central Electrochemical Research Institute (CSIR-CECRI) with researchers from MG University and UNSW Australia reported the integration of silver nanowires (AgNWs) onto the boron-doped graphene nanosheets by a simple two-step process<sup>1</sup>. In this work, the growth of AgNWs is supported by the choice of boron-doped graphene sheets as the template. The strong adsorption and the partial reduction of boron-doped graphene sheets towards metal ions in the solution provided the initial nucleation sites, moreover, it enhances the growth of long metal nanowires and therefore it facilitates the charge transfer<sup>1,2</sup>. This one step process resulted in the formation of interconnected graphene-AgNWs networks without any interfacial problems.

According to the authors, this is the first report on the *in situ* reduction of AgNWs over Boron-doped Graphene (BG) sheets for ORR applications. Furthermore, according to authors, the BG wrapped AgNWs show excellent ORR activity, with very high onset potential and current density and followed four electron transfer mechanism with high methanol tolerance and stability towards

ORR. The results are comparable to the commercially available 20% Pt/C in terms of performance<sup>1,2</sup>.



Schematic representation of the synthesis of BG-AgNWs



FESEM images of (a) Boron-doped Graphene (BG); (b) Silver Nanowires (AgNWs); (c) BG wrapped AgNWs; (d, e) High resolution image of BG wrapped AgNWs; the inset shows selected area electron diffraction pattern of BG wrapped AgNWs; (f) High resolution transmission electron microscopic image of BG wrapped AgNWs

### Reference

- 1 *Scientific Reports* 6, Article number: 37731 (2016) (doi:10.1038/srep37731)
- 2 <http://www.natureasia.com/en/nindia/article/10.1038/nindia.2017.5>



## CSIR-CBRI Develops Indigenous Cathodic Protection System for Steel Reinforced Concrete Structures

Many steel Reinforced Concrete (RC) structures are deteriorating in India due to corrosion of rebar. To protect the steel bars from corrosion various measures are adopted. However, the current measures have certain limitations.

For chloride-affected RC structures, Cathodic Protection (CP) has been found to be the best option. R&D work is in progress at CSIR-Central Building Research Institute, Roorkee, on developing an indigenous CP system.

In this system the steel bars are protected by turning them into a cathode with the help of primary and secondary anodes. For this purpose, the present study aims to develop conductive cementitious (secondary) anodes using conductive fillers such as Carbon Fibre (CF), Graphite Powder (GP), Coke Breeze (CB) and Pyrolytic Carbon Black (PCB). These fillers replace sand in concrete except CF, which is addition by volume of the composite.

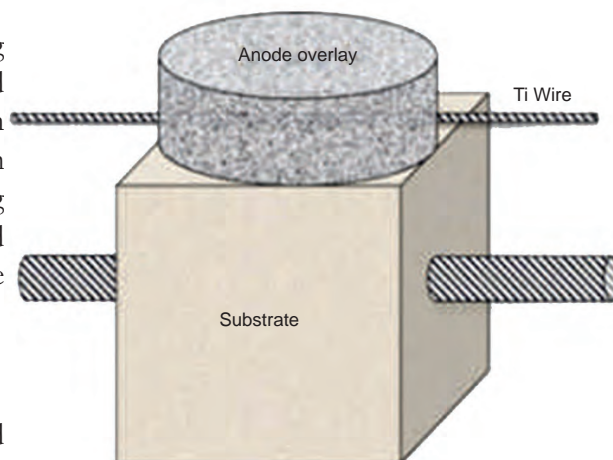
These anodes are being developed for Impressed Current Cathodic Protection (ICCP). The optimum composition has been found by evaluating mechanical, electrical and hydration properties of these cementitious anodes.

### Bond Strength

A review of literature revealed that in current practice the proper bond between the surface applied anodes and uniform current distribution in a reinforced concrete CP system is difficult to achieve due to the complex nature and

varying microstructure of concrete. The evaluation of bond strength between cementitious overlay and substrate is very important as it is the basic property that determines the long-term performance of anode overlay.

The bond strength was evaluated using a pull-out test method, in which the anode overlay is pulled to determine its bond strength with the substrate. For this purpose, mortar substrate in the form of cubes of size  $50 \times 50 \times 50$  mm<sup>3</sup> with a steel bar of 8 mm were cast containing 5% sodium chloride contamination as shown in Fig 1. The substrate was cured for 28 days; the cementitious anode overlay of 50 mm diameter and 20 mm thick was placed on it and cured for 28 days. Sand was replaced by carbon black, graphite powder and coke breeze in the ratio 0.15, 0.20 and 0.15. Carbon fibre concentration used was 0.6% by volume of the composite.



**Fig. 1. Specimen used for Bond**

In the first part of the experiment the bond strength was tested for a current supply of a  $100 \mu\text{A}/\text{cm}^2$  for 30 days. Corrosion current measurements

For chloride-affected RC structures, Cathodic Protection (CP) has been found to be the best option. R&D work is in progress at CSIR-Central Building Research Institute, Roorkee, on developing an indigenous CP system.



**Fig. 2. Experimental setup**

were carried for all specimens until  $15\mu\text{A}/\text{cm}^2$  current density of steel was reached. In the second part the bond strength was checked for different current densities. The current density applied to the specimens was  $10\mu\text{A}/\text{cm}^2$ ,  $40\mu\text{A}/\text{cm}^2$  and  $60\mu\text{A}/\text{cm}^2$  for 15 days. The bond strength was also calculated for specimens not subjected to any current supply.

The accelerated corrosion technique was followed in which steel bar was connected to the positive terminal of the rectifier and the titanium wire was connected to the negative terminal for 15 days. Later the specimens were subjected to cathodic protection where the steel bar was connected to

the negative terminal for 28 days. After the completion of current supply, the specimens were attached to the metallic disc of 50 mm diameter as shown in Fig 2 by using epoxy; it was kept for 24 hours. Bond strength was performed

using the equipment Proceq DYNA Z6 having maximum capacity of 19.62 kN. The pull-off force was manually applied on the disc until the failure of bond was achieved.

When the current is applied in ICCP, the bond between the cementitious anode overlay and substrate is expected to vary because of the presence of chloride ions in the substrate, the anodic reaction involves chlorine gas evolution at high current densities.

The failure patterns are shown in Figures 3 & 4.

In the experiment there were cases where the failure occurred in the substrate whose images are also shown in Figure 4.



PCB



Graphite Powder

**Fig. 3. Overlay-Substrate Interface Failure**



Coke Breeze



Carbon Fibre

**Fig. 4. Substrate Failure**



From the results (Figures 5 & 6), it is evident that the bond strength between cementitious anode overlay and

substrate decreases after the current was applied. One of the possible reasons for this decrement in strength may be that, when the substrate is operated at high current density with chloride ions in the substrate, the anodic reactions involve chlorine gas evolution. The chlorine gas reacts with the substrate pore water solution and forms hydrochloric acid at the cementitious anode-substrate interface. Above certain concentrations, acid build-up can lead to damage at the cementitious anode-substrate interface.

Eventually the interface becomes sufficiently deteriorated such that the contact between the anode and substrate is reduced leading to increased localized resistance. This in turn can result in increase in current flow in other parts of the anode circuit, thus raising the current density in these areas, and in extreme cases it can cause significant damage to the substrate.

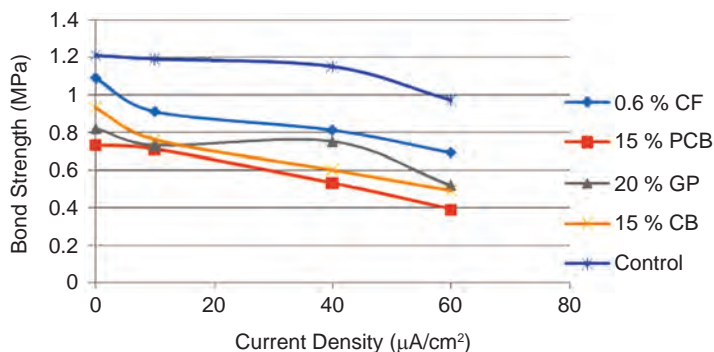


Fig. 5. Bond Strength vs. Corrosion Current

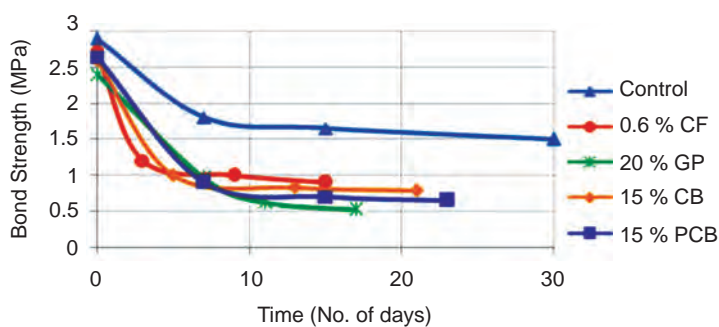


Fig. 6. Bond Strength vs. Time

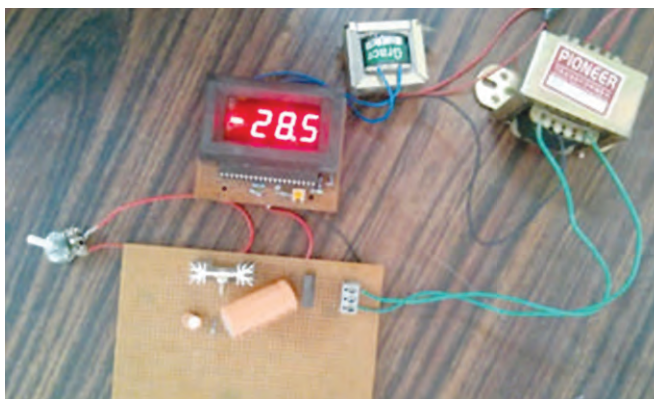


Fig. 7. 0-30V DC Power Supply

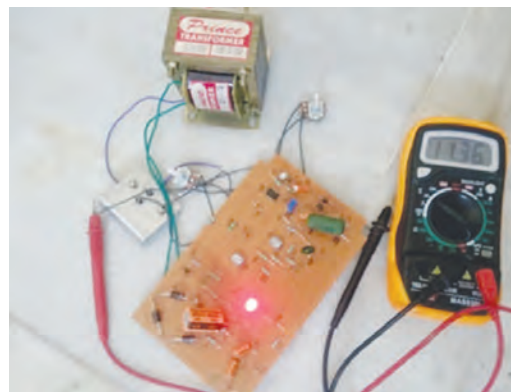
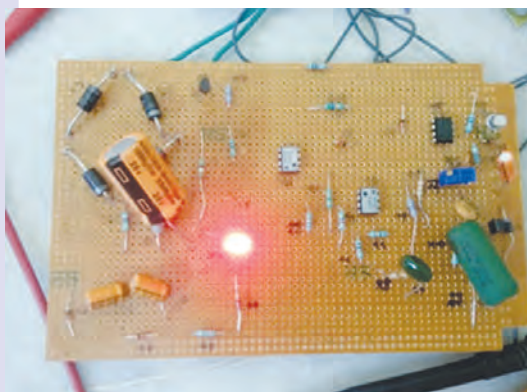


Fig. 8. 0-30V Stabilized DC Power Supply with Current Control

Out of all the fillers used for the preparation of secondary anode, carbon fibre showed the highest bond strength.

## Development of Power Supply System for CP

Attempts have been made to develop a power supply for cathodic protection in concrete. For this purpose, two schemes were proposed:

- In the first scheme, as shown in Figure 7, 0-30V dc power supply was developed which provided the

maximum and minimum output voltage of 27.9V and 1.25V.

- In the second scheme, as shown in Figure 8, 0-30V stabilized power supply was developed with a current control of 0.002-3A was drawn but it has certain errors in its output. The maximum output voltage obtained is 11.36V. Work is in progress to develop an efficient current supply system.

**Contributed by S.R. Karade & Team  
CSIR-CBRI, Roorkee**



## MoUs

### CSIR-CLRI Signs MoU with LIDCAP

Aimed at developing leather and affiliated industries in the State, the Leather Industries Development Corporation of AP (LIDCAP) has entered into a Memorandum of Understanding (MoU) with the CSIR-Central Leather Research Institute (CLRI), Chennai.

The MoU was signed by CSIR-CLRI Director Dr. B. Chandrasekaran and LIDCAP Managing Director Mr Sreedhar signed the MoU in the presence of the Andhra Pradesh Social Welfare

Minister Mr Ravela Kishore Babu. Speaking on the occasion, the Minister said despite the State having 10 percent of leather raw materials in the India, 95 percent of them had been shifted to Tamil Nadu because of lack of facilities in the State to produce leather products.

The MoU between LIDCAP and CSIR-CLRI is expected to give the necessary technical support and skill development to the workers in this area.

The MoU between LIDCAP and CSIR-CLRI is expected to give the necessary technical support and skill development to the workers

### CSIR-CSIO Signs MoU for Marketing of Products

The CSIR-Central Scientific Instruments Organisation (CSIO), Chandigarh has tied up with the National Research Development Corporation (NRDC), an enterprise under the Ministry of Science and Technology, for the marketing of its inventions, patents, formulations and technical processes developed.

A memorandum of understanding in this regard was signed by Prof. R.K.

Sinha, Director, CSIR-CSIO and Dr. H. Purushotham, Chairman and Managing Director, NRDC.

Prof. Sinha said CSIO has developed over 40 technologies that were ready to be transferred to the industry and entrepreneurs for commercial production and marketing. He also handed over the details of the technologies developed by CSIO to Dr. Purushotham.

## CSIR-CBRI Organises Student Awareness Programme



Students and faculty attending the Programme

CSIR-Central Building Research Institute, Roorkee, organised a Student Awareness Programme under the CSIR Scheme, “Faculty Training, Motivation & Adoption of Schools & Colleges by CSIR Labs”, on 28 March 2017 to generate scientific thinking in the younger generation and create the foundation of a strong mind contributing to the development of the country.

The programme was attended by more than 100 B. Tech 1st year students of Quantum School of Technology, Roorkee. Dr. Pradeep Bhargava, Professor, Quantum School of Technology and Former Chief Scientist, CSIR along with Dr. Renu Chaudhary, Dr. Ashok Seth, Mrs Gunjan Agarwal, Mr Nadesh and Mr Vipin, accompanied the students.

Dr. Atul Kumar Agarwal, Senior Principal Scientist, CSIR-CBRI, Roorkee and Programme Coordinator welcomed the students and enlightened them about the glorious past of CSIR-CBRI.

The students had a round of the labs of CSIR-CBRI, Roorkee and also had an interactive session with the institute’s scientists.

Mr R.S. Chimote, Chief Scientist, CSIR-CBRI informed the students about the comprehensive R&D work done by the institute in the field of fire research. He explained in detail about the fire hazards in buildings and various fire hazard mitigation techniques developed by the Institute, the fire resistant building elements and passive fire protection systems, fire behaviour of building materials, fire retardant coatings, fire extinguishment, etc.



Students visiting the Heritage & Technology Gallery, CSIR-CBRI, Roorkee



Students visiting the Fire Research Lab, CSIR-CBRI, Roorkee



Students visiting Solar Power Plant, CSIR-CBRI, Roorkee



Mr D.K. Sehgal, Principal Technical Officer, CSIR-CBRI enlightened the students about the Institute's achievements in solar energy and gave them a tour of the Solar Power Plant of the Institute.

Ms Sayantani Lala, Scientist, CSIR-CBRI explained to the students about the various transit shelters for disaster victims, and economical rural and urban building techniques depending upon the varied geographical features and environmental factors,



Students visiting Rural Park, CSIR-CBRI, Roorkee

developed by CSIR-CBRI through live demonstration models in the Rural Park of the Institute.

## CSIR-CBRI Organises Workshop Training-cum-Motivational Programme for Teachers

CSIR-Central Building Research Institute, Roorkee, organised a Workshop-Training-cum-Motivational Programme for Teachers on 27 February 2017. The objective was to motivate science teachers to upgrade their knowledge base in new and emerging areas of science and to provide an opportunity for interaction

and exchange of ideas with the scientific community.

The programme was attended by more than 30 faculty members from over 10 schools and colleges of Roorkee including Kendriya Vidyalaya No. 1, Kendriya Vidyalaya No. 2, Shivalik Public Senior Secondary School, Laksar



Participants & scientists attending the programme

Road, Roorkee, Espee Global School, Children's Senior Academy, Roorkee and Children's Senior Academy, Mangalore.

Speaking on this occasion, Dr. A.C. Dwivedy, Programme Director, CSIR-HRDG motivated the teachers to adopt virtues of empathy, optimism, creativity, sense of humour, good body language, effective communication,

efficiency, and effectiveness. In his talk on **“Motivation - A Journey to Excellence”**, he said that demotivation is an infection that should be nipped in the bud. Quoting from Mahabharata and Ramayana, he emphasized that every person has an incredible potential and must believe in himself. He said that the quality of a nation depends on the quality of its citizens, the quality of citizens on their quality of education, the quality of education on the quality of teaching, the quality of teaching and a quality teacher is highly motivated.



Dr. A.C. Dwivedy, Programme Director, CSIR-HRDG, New Delhi addressing the participants

In his Inaugural Address, Dr. Suvir Singh, Chief Scientist, CSIR-CBRI, Roorkee informed that as a pioneer in the building sector, the Institute is dedicated to research, development, and innovation in finding timely, appropriate, and economical solutions to the problems of Building Materials, Health Monitoring and Rehabilitation of Structures, Disaster Mitigation, Fire Safety, Energy Efficient Rural and Urban Housing.



Inaugural address by Dr. Suvir Singh, Chief Scientist, CSIR-CBRI, Roorkee

Earlier, Dr. Atul Kumar Agarwal, Senior Principal Scientist, CSIR-CBRI, Roorkee and Programme Coordinator welcomed the teachers and expressed concern at the lack of scientific approach in young minds today. It is therefore the responsibility of teachers to inspire scientific thinking and passion in students from a young age, he said.



**Technical Lecture by Dr. S. Sarkar, Senior Principal Scientist, CSIR-CBRI, Roorkee**



Dr. S. Sarkar, Senior Principal Scientist, CSIR-CBRI, Roorkee presented an enlightening technical lecture on **“Natural Disasters”** and **“Transit Shelters for Disaster Victims”**. He talked about the Institute’s work in pre- and post-disaster management regarding cyclones, earthquakes, landslides, and tsunamis.

Later, the participants visited the labs of CBRI.



**Participants visiting CBRI, Roorkee Labs**

## **CSIR-NEERI Initiates Scientists-Students Interaction Programme in Mumbai**

The Mumbai Zonal Centre (MZC) of CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) has initiated a scientists-students interaction programme in Mumbai. Various private and government schools of Mumbai will be covered under this programme.

The programme is aimed at enabling the students to interact with the CSIR-NEERI scientists with a view to improve their scientific knowledge and sensitising students to counteract



**Dr. (Mrs) Shalini Tandon briefing about the phytoid technology for sewage treatment**

the environmental problems through S&T intervention. The technologies developed by the CSIR Institutes for

environment protection will be shared with the students through interactive sessions and demonstrations.



Explaining the status of water in the country



The students at the scientists-students interaction programme

The first programme was organised at Ryan Global School, Andheri (West), Mumbai for students studying in 6th-9th standards. The CSIR-NEERI scientists interacted with the students on some critical environmental issues such as the reasons of water pollution and how to mitigate water pollution. The students were also given a complete understanding of water availability, its usage, impacts of its improper use and importance of recycling and reuse through eco-friendly technological interventions. The phytorid technology developed by CSIR-NEERI for sewage treatment was demonstrated.

Dr. (Mrs) Shalini A. Tandon, Scientist, Research and Innovation Center, MZC, CSIR-NEERI is coordinating this programme in Mumbai with the assistance of Ms Megha from the Green Health Foundation.

### Conferences/Seminars

## National Conference on Rural Housing Organised at CSIR-NPL

In keeping with the “Make in India” drive of the government of India the 4th National Conference on Innovations in Indian Science, Engineering & Technology (NCISET 2017) was organised with the central

theme being “Rural Housing”. The Conference was held at CSIR-National Physical Laboratory (CSIR-NPL) on 4-5 March 2017 under the auspices of the Swadeshi Science Movement of India (Vigyan Bharati, Delhi) in collaboration

with CSIR-NPL.

Dr. Bindeshwar Pathak, renowned social reformer & Founder President, Sulabh International was the Chief-Guest in the inaugural function on 4 March 2017 and Prof. K.I. Vasu, Founder National President, SSM was the Guest-of-Honour.

Dr. D.K. Aswal, Director, CSIR-NPL & Patron-NCISET 2017 presided over the function and spoke about the background of the theme of the Conference in which NPL too has prepared a roadmap and a comprehensive programme in the related technologies. NPL has developed a technology for recycling waste plastic bags into tiles and has prepared a prototype toilet module, which has been patented/showcased and is ready for marketing.

A bilingual Souvenir was released on this occasion by Dr. Bindeshwar Pathak, who also released a special joint issue of the *Journal of Environmental Nanotechnology* along with Dr. D.K. Aswal in presence of Drs. S. Karthikeyan, D.P. Bhatt and Harish Pandya.

Prof. K.I. Vasu briefed the delegates about the historic achievements of SSM over the years. The top award of Swadeshi Vigyan Puraskar 2017 was bestowed to Dr. Bindeshwar Pathak for his splendid contributions in the societal sector.

Dr. D.P. Bhatt, National Coordinator and Chief Scientist & Head, IPRM, NPL elaborated on the programme and emphasised the need to bring about sustainable development using Science, Engineering & Technology. He said an effort has been made to deal with various aspects of Rural Housing through this Sangosthi using Hindi as the preferred mode of communication. He said, the need to shift the paradigm of development towards sustainable development arose because most of the development in the

present context relates with the growth based on market driven economics which is often at the cost of nature.

He said, keeping in mind that the gap between the supply and demand in housing is bound to increase every year due to population explosion, rapid industrialisation and urbanisation, migration of rural people to urban centres, breakup of joint families, general lack of housing standards throughout the country, etc., there is a need to improve existing villages, adopt appropriate and cost effective technologies in construction, adopt modular co-ordination leading to standardisation of building components and adopt prefabrication techniques in mass housing schemes providing better





quality and safer buildings at a faster rate.

Dr. Pathak in his inaugural address talked about the success stories of Sulabh International where 1.3 million domestic and 54 million government toilet constructions were achieved benefiting 2.5 billion people. He also mentioned about the two-pit-compost-toilet technology and clean drinking water being made available in West Bengal.

Welcome Address of the Valedictory Function was delivered by Dr. S.C. Garg, Working President, SSMD which followed felicitations to Dr. N Gopalakrishnan, Director, CSIR-CBRI who presided over the function. Valedictory address of the Conference was delivered by Goswami Sushil ji

Maharaj, a renowned choreographer, theaterist, spiritual Guru and the Founder of Maharshi Bhrgu Foundation.

Arya Bhatt Puraskar for Science writers/Researchers who have had the distinction of reaching out to the common public through their scientific approach at the popular level were bestowed to Dr. Rashmi Sharma (Ajmer) and Dr. Vikas Srivastava (Allahabad) and the Arya Bhatt Samman was given to six top best paper/product presentations by Dinesh Kumar, Omkar Singh, V.C. Goyal; Ambikesh Singh, Mohd. Irfan, Atul, Vikas Srivastava; N. Gopalkrishnan, S.K. Negi, Ashish Pippal, Dharamraju; Bukasa Tshinkunku, Idris Mukhtar Kadi, Jemimah Ngulube, Mikwari Jean De Dieu, Pema Wangmo, Lalpithang Gangte, Neeta Awasthy; Ridham Dhawan, S.K. Dhawan and Shipra Jain, Garima Kotnala, R.K. Kotnala.

Appreciation certificates and SSMD membership certificates were also given away during the function by Dr. J.C. Sharma, Officiating President, SSMD. Dr. S.K. Dhawan, Emeritus Scientist, CSIR expressed his gratitude to CSIR, MOES, SERB, CBRI, JENT and other resource persons for their support and for their critical intellectual creativity in the deliberations towards the grand success of the conference.



## Visits

# DG-CSIR Inaugurates Centre for Innovation and Translational Research at CSIR-IITR



Dr. Girish Sahni, Director General, Council of Scientific and Industrial Research (CSIR), visited the CSIR-Indian Institute of Toxicology Research (IITR), Lucknow, on 6 February 2017 where he inaugurated the Centre for Innovation and Translational Research (CITAR) in the presence of Professor Alok Dhawan, Director, CSIR-IITR.



**DG-CSIR Dr. Girish Sahni being welcomed by Professor Alok Dhawan, Director, CSIR-IITR, Lucknow**

The centre provides researchers from multidisciplinary backgrounds an opportunity to innovate, develop, probe, and translate the most important technological challenges related to health and the environment with a vision to encourage impactful societal and industrial research, enable startups and foster collaborations with researchers to fast track technological solutions. The facility is equipped with state-of-the-art instrumentation, laboratories, and computational resources.

Dr. Sahni also dedicated to the nation a Computational Toxicology Facility (high performance computing for toxicology cheminformatics and Bioinformatics – the only facility for toxicology in India), Translational Research Facility and the Cell and Molecular Biology Facility and Industrial Labs. These facilities will leverage the institute's capabilities by providing researchers, innovators, and entrepreneurs from academia and industry access to state-of-the-art platform technologies and mentorship in a multidisciplinary collaborative environment.



**Dr. Girish Sahni, DG-CSIR inaugurating the Centre for Innovation & Translational Research (CITAR) at CSIR-IITR**



**DG-CSIR inaugurating the Translation Research Facility and Computational Toxicology Facility at CSIR-IITR**

DG-CSIR appreciated the infrastructure being created at CSIR-IITR through CITAR which will help to establish an ecosystem for nurturing innovative technology-based solutions for startups and industries.

Professor Alok Dhawan, Director, CSIR-IITR briefed the DG-CSIR about the new programmes initiated by the CSIR-IITR for the benefit of the country and in taking forward the institution and CSIR's mandate of linking research to the market space. These programmes were launched to ensure mobilisation and optimisation of

the resource base in order to create an enabling infrastructure and high quality science that will be the harbinger of future technologies.

DG-CSIR visited the skill development smart class room and

interacted with the students/research scholars of CSIR-IITR enrolled/registered with the Academy of Scientific and Innovative Research (AcSIR). He also visited an exhibition showcasing technologies developed and licensed by CSIR-IITR.

While addressing the scientists of the institute, DG-CSIR emphasised on identifying the immediate needs of the society and delivering technological solutions to the nation in a time-bound manner. He also stressed on strategic target/networking with industrial partnerships and partnerships with various stakeholders in the society for developing translational projects, mission mode programmes and skill development initiatives.

Dr. Sahni said that team work is the key and it is every scientist's responsibility to work towards the collective success of the team. Later addressing the CSIR-IITR staff, Dr. Sahni highlighted the words of Mahatma Gandhi and urged every individual to think of the common citizen of this great nation and work selflessly for their cause. He said that the future scope is limitless and it is up to each one in the CSIR family to seize the opportunity and deliver the goods.



**Professor Alok Dhawan presenting a book "The Comet Assay in Toxicology" edited by him to DG-CSIR**



**CSIR-IITR scientists and research scholars with DG-CSIR**

## Events

# CSIR-NISCAIR Celebrates World Health Day



A lecture on the occasion of the World Health Day was organised at CSIR-National Institute of Science Communication And Information Resources (CSIR-NISCAIR), New Delhi, on 12 April 2017. The World Health Day is a global health awareness day celebrated all across the world every year on 7th of April, initiated under the flagship of the World Health Organisation since 1950, to draw worldwide attention to a subject of major importance, targeting the global health issues and make the masses aware about the importance of healthy living.

The theme of the year 2017 is “**Depression: Let’s Talk**”. Prof. Dr. K.K. Aggarwal was the guest invitee to deliver the talk highlighting the WHO’s motto to help people suffering with depression. Prof. Aggarwal is the honorary recipient of Padma Shri and

Dr. B.C. Roy National Award. He is the president of the Heart Care Foundation of India and National Senior Vice President of the Indian Medical Association (IMA).

Talking about depression, Dr. Aggarwal said that we all feel sad, low or moody from time to time. Everybody experiences some degree of depression at certain phases of his/her life. Depression is the state of low mood, aversion to daily activities and change in eating and sleeping habits, causing impairment in routine life. It affects a person’s thoughts, behaviour, feelings and state of well being. The best way to cure depression is “Let’s Talk”, he said.

The first principle of let’s talk is – Listen. A good listener, may it be your friend, your family or your psychotherapist – can help you to cope with feelings that are disturbing you.

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It is very important to talk about the problems that lead to your illness/ depression so that they can be reasoned and worked towards a solution. Share your thoughts, express your worries, and confess the things that are haunting you, either to yourself or to any other person whom you trust, to detoxify your mind and soul, Dr. Aggarwal said.

He said that our brain analyses the thoughts that come to our mind leading to desire, action and then addiction. If our desires are not fulfilled, it will cause anger and disappointment and then depression. We should control our anger with a cool mind, positive

thoughts, keeping our ego in control and resolve it by talking about it. We should avoid making any generalised perception about anybody. Be polite while communicating to anyone, greet everybody with a smile. Close

body postures while interacting help in controlling anger. We should be less judgemental in our talks and our talk should be more evidence-based and rational, he said.

Dr. Aggarwal also talked about Cognitive Behavioural Therapy (CBT) which involves examining the factors leading to change in our emotions and how we should change our reaction to the challenging situation. Stress is the reaction of the body to the interpretation of a known situation. We should try to either change the situation that is bothering us or we should change the approach to tackle it and prepare our body in a way such that depression may not harm us. CBT suggests a cure for depression by thinking differently, changing our interpretation, boosting the power of discrimination, not getting upset with failures, and controlling our attachments, desires and greed.

Referencing examples from mythology and ancient Indian Vedas, Dr. Aggarwal emphasised that talking is the best method to cure depression. We should talk again and again about our problems so that they are completely flushed out from our mind. If we do not have anyone to talk to, talk to yourself, pen down your feelings, listen to



your inner voice and analyse the roots of depression. Talking to yourself leads to autosuggestion and boosts confidence.

He also explained about the autonomic nervous system which has two parts: Parasympathetic and Sympathetic. Both the systems are responsible for instinctive and reflexive functions in the body. When we are in stress, our heart rate increases and muscles contract causing the body to speed up thus leading to anxiety. On the contrary, the parasympathetic system is responsible for a relaxed state of mind. It balances and maintains the body system, the heart rate is slow, and digestion improves, conserving energy and restoring the body to a state of calm

thus leading to long term healthy life.

Dr. Aggarwal also suggested that light exercises, engaging in a hobby, yoga, meditation, and deep breathing (rate of breathing around 4-5 per minute) are some of the ways to activate the parasympathetic nervous system and elevate the serotonin level in the body. Activation of parasympathetic system leads to reduce depression.

Dr. Aggarwal also talked about the CPR 10 Mantra – “within 10 minutes of death, earlier the better; at least for the next 10 minutes, longer the better; compress the centre of the chest of the dead person continuously and effectively with a speed of 10x10 i.e. 100 per minute.”



## CSIR-CBRI Organises Science Exhibition

CSIR-Central Building Research Institute, Roorkee, organised a Science Exhibition for students on its Foundation Day, 10 February 2017, to provide students with the opportunity to apply and display their scientific knowledge through live

models and determine their scientific merit through interactive sessions with scientists.

On the occasion, students from various schools of Roorkee and adjoining areas displayed their understanding of scientific principles through live



Participants & Scientists attending the Programme

demonstrations. Prof. Ajeet Kumar Chaturvedi, Director, Indian Institute of Technology, Roorkee, graced the occasion as the Chief Guest and reviewed the presentations by the students.

Prof. Prem Krishna, Former Chairman, Research Council, CSIR-CBRI, Roorkee, graced the occasion as the Guest of Honour and encouraged the students. Dr. N. Gopalakrishnan, Director, CSIR-CBRI, Roorkee and other scientists and experts talked to the students, suggested shortcomings, discussed alternatives, and provided encouragement for further research.

Arpit Kumar from Shivalik Public School presented a demonstration of a “Matchbox Microphone” that uses sound signals for security purposes. He explained that in case of a forced entry on any check post, the security guards

can use this matchbox microphone to covertly send an immediate sound signal to the main security centre for an emergency backup.

Dhruv Mishra exhibited a live model displaying “Types of Sensors”. Emphasising the need for applying the technology in residential buildings for increased safety, he discussed the use of light sensors for protection against theft, smoke sensors for detecting smoke and fire sensors for fire safety.

Through a working model of “Hydraulic J.C.B.”, Firdaus Hayat explained the need for environment friendly alternatives in construction equipment and machinery. She gave a detailed description of the working process of various pistons in lifting heavy load using hydraulic power.

Aman Kumar presented a working model of “D.C. Generator” and



Models by students from Shivalik Public School



Models by students from Doon Public School



**Model by student from  
Aanand Swaroop Arya Saraswati Vidya Mandir**

explained the science involved in a very simple and effective way. Kamal Kant displayed a demonstration on “Water Level Indicator” and explained how it can be used to monitor the water level and be used to assess the risk of flood or drought.

Divyansh from Aanand Swaroop Arya Saraswati Vidya Mandir presented his model on “Reusable Resources”, emphasising the need for green living and explained the concept of hydroelectricity production from dams using a working model.

Chahhat and Sunny from the Doon Public School presented a working model of “J.C.B.” and gave a detailed explanation on its working process. Shaleen Shameem and Vishakha Dhimaan created a mini city model to explain the concept of “Air Pollution” and its negative impact on the ozone layer.

Riya and Tanishq exhibited a working model of “Barrier Crossing” and gave an in depth explanation of the technology of motion sensors and their use in development of an automated railway barrier. Hrittik and Rishi through their model on “Communication Systems” demonstrated the scientific concept of different kinds of signal waves used for communication.

Mariyam and Stuti exhibited a working model of a “Sewage Treatment

Plant” and gave a detailed explanation on the various stages involved in purifying rain water and making it consumable for humans.

Junaid and Anaas through their innovative concept of “Electricity Generation by Speed Breakers”, gave an intriguing concept to use the kinetic energy of the vehicles passing over the speed breakers to generate electricity.

Mrs Prem Krishna and Mrs Gopalakrishnan also graced the occasion and applauded the students’ efforts.

Dr. Atul Kumar Agarwal, Senior Principal Scientist, CSIR-CBRI, Roorkee



**Students visiting Rural Park at  
CSIR-CBRI**

and Programme Coordinator welcomed the students and motivated them. He assured that to spark interest among students and spread awareness about

CBRI technologies and achievements, public lectures, quiz, and public speaking competitions will also be organised for students.

### Honours & Awards

## ACD Receives '7th National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry'



The Advanced Composites Division of the CSIR-National Aerospace Laboratories (CSIR-NAL), Bengaluru, was awarded the '7th National Award for Technology Innovation in Petrochemicals and Downstream Plastic Processing Industry', 2016-17 for research in the field of Polymer Science and Technology by the Ministry of Chemicals and Fertilizers, Govt. of India. The award was given for the development of co-infused and cocured fully integral wing interspar box using the VERITY process.

The award was received by Dr. Ramesh Sundaram, on behalf of the division, from Shri Ananth Kumar, Hon'ble Minister of Chemicals & Fertilizers and Parliamentary Affairs, Government of India.

It is to be acknowledged that the award is the result of excellent contributions of a large group from the areas of design and analysis, tool design, processing, NDE, testing, QA and flow monitoring.

## Chinese Award to CSIR-NGRI Scientist

Dr. G. Parthasarathy, Chief Scientist of CSIR-National Geophysical Research Institute (CSIR-NGRI) has been awarded the prestigious Best Referee Award for the Year 2015 from *Geoscience Frontiers*, an international journal of the China University of Geosciences (Beijing), China.

This is the first time that this Award has come to India. The award is in recognition of Dr. Parthasarathy's outstanding contributions in the field of Geosciences and most efficient peer-reviewing scientific papers. He also delivered a keynote address on "Phyllosilicates and Martian Near Subsurface Processes" in Beijing while receiving the Award.

Dr. Parthasarathy has been working for CSIR-NGRI since two decades. He is also the Executive Council member of the Telangana Academy of Sciences and Fellow of Indian National Science Academy. Professor G. Parthasarathy is an Alexander von Humboldt Fellow, Germany 1987-88, and Visiting Faculty, Cornell University, Ithaca NY, USA

during 1989-90. He was a faculty at the Indian Institute of Science, Bangalore during 1984-89.

Since 1990 he has been working at CSIR-NGRI, Hyderabad where he



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To

Dr. G. Parthasarathy, FNA, FRSC  
Chief Scientist, Professor  
CSIR- National Geophysical Research Institute,  
Hyderabad- 500 007  
India

October 15, 2016

TO WHOM IT MAY CONCERN

"Geoscience Frontiers", international geosciences journal of the China University of Geosciences (Beijing) China [with publication hosting by Elsevier] is highly pleased to present the Best Reviewer Award to Professor G. Parthasarathy, Chief Scientist of CSIR-National Geophysical Research Institute, India, for the Year 2015, in recognition of his outstanding contributions towards the most efficient and professional peer-reviewing of the manuscripts published in Geoscience Frontiers.

Dr. Parthasarathy has also delivered a keynote talk on "Phyllosilicates and Martian Near subsurface processes" during the annual convention of the Geoscience Frontiers held in Beijing during October 13-15, 2016.

Fei Gao  
Dr. Fei Gao

Geoscience Frontiers Editorial Headquarters



initiated new research programmes like “Mineral Physics”, “Nanogeoscience” and “Environmental Mineralogy”.

Presently he is working on the terrestrial analogs of Martian and Lunar surface materials and origin and evolution of early life on the Earth and extraterrestrial environment. He has published more than 230 research papers in peer reviewed SCI Journals.

He is a recipient of the PRL Award of the Physical Research Laboratory, 2003; National Mineral Award from

Ministry of Mines, Govt of India, 2003; MR Srinivasa Rao Award of the Geological Society of India 2008 for experimental Mineralogy and Petrology; MRSI Medal from the Materials Research Society of India, 2007 for contributions to the understanding of the Earth and Planetary materials, 2007; Andhra Pradesh Scientist Award from APCOST, for the year 2007; Decennial Gold Medal of the Indian Geophysical Union for the year 2009.

## Nominations are invited for

### G N Ramachandran Gold Medal for Excellence in Biological Sciences and Technology 2017

The Council of Scientific & Industrial Research (CSIR) invites nominations for the **G N Ramachandran Gold Medal for Excellence in Biological Sciences and Technology for the year 2017**. The award is bestowed every year to an outstanding Indian scientist, who has made conspicuously important contributions, applied or fundamental, in the inter-disciplinary subject/field of Biological Sciences and Technology. The award would be given for the work done primarily in India during ten years preceding the year of the award.

Nominations addressed to **Scientist Incharge, SSB YSA Unit, Human Resource Development Group, CSIR Complex, Library Avenue, Pusa, New Delhi 110 012** should be sent as per prescribed proforma (Original + one copy) along with reprints of five most significant publications of the last 10-year's period by **31 May 2017**. The details of the award and the prescribed proforma for nomination may be downloaded from the website [www.csirhrdg.res.in](http://www.csirhrdg.res.in)

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