Alternative Materials and Nanotechnology for Solar Energy Harvesting in Indian Setting

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Overview

Solar energy harvesting is one of the most promising technologies that can be used on a large scale for producing clean energy and meets the growing energy requirements of the world. Solar energy to electricity (Solar cells) and solar driven fuel (solar to hydrogen generation) are the leading approaches to harvest solar energy. Crystalline-silicon (c-Si) is most stable element and also the most dominant technology for PV, however, this technology is material intensive owing to its poor absorption, which acts as a bottle-neck for further reduction in cost. Thus, it is crucial to look for alternative materials and technologies. **This course is designed in three modules as below:**

Module A will cover the status of silicon photovoltaic technology and the challenges regarding the silicon PV technology. This module is focused on materials and processes for PV technology in Indian context.

Module B will discuss solar driven hydrogen generation through water splitting. Large scale deployment and stability of the materials in the electrolyte solution are main concerns for solar hydrogen generation.

Module C will focus on the energy savings windows for residential building application. Here it will be shown that by developing heat mirror coating on glass we can significantly reduce the heat transmission into the building, as a result, there is less requirement of air conditioner (for hot climate) and heater (for cold climate). Through the material selection and design of the coating, it is possible to develop low cost heat mirrors.

Modules	**A: Solar to Electricity (Photovoltaic technology): November 30 - December 03, 2016** **B: Solar to Hydrogen generation (Fuel cells) : December 05 - December 07, 2016** **C: Solar Coating: Transparent heat mirror : December 08 - December 10, 2016** **Number of participants for the course will be limited to 50 (fifty).**
You Should Attend If…	▪ **If you have an interest in solar energy technologies and you belong to one of the following categories:** ▪ a scientist, engineer or researcher in industry/academia and R&D laboratories ▪ You are a student at B.Tech./M.Sc./M.Tech./Ph.D. level ▪ You are a faculty member in educational/academic institute
Fees	The participation fees for taking the course is as follows: **Participants from abroad : US $100** **Industry/ Research Organizations: INR 5000/-** **UG/PG students: INR 2000/-** **Ph.D. students or above: INR 3000/-** The above fee includes all instructional materials. The participants may be provided with budget accommodation on payment basis upon advance request.

The Faculty

Dr. Goutam Kumar Dalapati has been working in Institute of Materials Research and Engineering (IMRE), A*STAR, (Agency for Science, Technology and Research) Singapore, as a scientist, since 2007.Dr. G. K. Dalapati received his Ph.D. degree from Jadavpur University, Kolkata in 2005. He worked as a Project Assistant in Indian Institute Technology Kharagpur, India during June 2001 to December 2003 and as Research Associate at the School of Electrical, Electronics, and Computer Engineering, University of Newcastle-upon-Tyne, U.K. during January 2004 to June 2005. He then joined the Silicon Nano Device Laboratory, Department of Electrical and Computer Engineering, National University of Singapore, Singapore as Post-doctoral scientist before joining IMRE in 2007.

He is specialized in area of semiconductor physics and technology, for advanced electronic and optical device applications. He is currently engaged in the research of thin film solar cells using earth abundant and non-toxic materials (iron silicide, copper oxides, copper-zinc-tin-sulfide etc.), solar hydrogen production for renewable energy application, copper based heat rejection coating for energy saving window application, and integration of III-V/Ge for logic, memory and optical application. His research work also includes advanced electronic devices using strained-Si, GaAs, and SiGe based high mobility semiconductors. He has authored or coauthored more than 90 scientific artides in prestigious international journals.

Dr. Amit K. Chakraborty is an Associate Professor of Physics and the Associate Dean (Research) at National Institute of Technology, Durgapur, India. He received his PhD from University of Nottingham (U.K.) in 2005. He then worked as Research Associate at Durham University during 2005-2008, and at Empa, Swiss Federal laboratories for Materials Science & Technology, Duebendorf, Switzerland during 2008-2010 before joining NIT Durgapur as Associate Professor in 2010. His research interest is carbon based nanostructures (graphene, carbon Nanotubes) and their composites with metal oxides, polymers, etc. for applications in solar photovoltaics, supercapacitors, and others.

Course Co-ordinator

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(Under Events section)

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