Nanochemistry: From Preorganized Molecular Architectures to Functional Materials

Overview

Dates for the course

Maximum No. of Par-

Host Institute

No. of credits

ticipants

Description

Conceptual advancements in the chemistry of nanomaterials in the past two decades has established "Nanochemistry" as an important and integral part of materials science curriculum. This course will present the inherent relationship between synthetic and material chemistry and demonstrate how chemically processed nanoparticles, nanowires and films of different metal oxides open up new vistas of material properties, which can be transformed into advanced material technologies.

This course, suitable for Masters and PhD students, will illustrate that an advanced knowledge of chemistry enables purpose-driven synthesis and modification of functional nanomaterials. Implications of chemistry as an innovation motor are now visible for knowledge leap forward in various sectors such as materials engineering for energy, health and security. In order to provide an indepth and up-to-date account on the interdisciplinary character of nanochemistry research, special emphasis will be given to chemical strategies enabling surface modification of nanostructures and necessity to develop synthetic protocols for conjugation of inorganic and organic components in single nanomaterials.

The major topical areas include (i) targeted development of chemical precursors for nanomaterials synthesis (ii) fabrication of thin-films (chemical and physical vapor and atomic layer deposition techniques) and nano-structures (solgel, microwave, solvothermal and electrospinning methods) and (iii) integration of nanomaterials into devices.



IIT(BHU), Varanasi

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19th December to 23th December 2016





The foremost objective of this course would be to provide a thorough basis for theoretical and experimental concepts for nanomaterials synthesis, functionalization and scaling up. Furthermore, potential applications of nanostructured materials in energy (production and storage) and health sectors will also be discussed.



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Modules	 The foremost objective of this course w provide a thorough basis for theoretical a mental concepts for nanomaterials synth tionalization and scaling up. Furthermore applications of nanostructured materials (production and storage) and health sector be discussed. 1) Introduction to Nanomaterials and chemistry 2) Nanomaterials Synthesis - I 3) Nanomaterials Synthesis - II 4) One Dimensional Materials 5) Technological Applications of Nano Entrepreneurial Approach 7) Interactive Workshop on "Advance als: Current Break Throughs and F velopments" 	ould be to and experi- esis, func- e, potential in energy yrs will also Nano-Image: Comparison of the second secon
Who should attend	 Scientists/Engineers from Industry and ment R&D laboratories, engineering/s partments Students at the levels MSc/MTech/Ph Faculty members from reputed acade technical institutions of India. 	d govern- cience de- D mic and
Course registration fee	The participation fees for taking the could follows:i)Student Participantsii)Faculty Participantsiii)Government Research Organizationsiv)Industry Participantsv)Foreign Participants	INR 1000/- INR 2000/- INR 3000/- INR 5000/- USD 500
Accommodation	The participants may be provided with hos modation, depending on availability, on par sis.	tel accom- yment ba-



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Sanjay Mathur is Director of the Institute of Inorganic Chemistry at the University of Cologne in Germany. He is the Director of the Institute of Renewable Energy Sources at the Xian Jiao Tong University, Xian, China and a World Class University Professor at the Chonbuk University in Korea. He also holds Visiting Professorships at the Central South University, China, Tokyo University of Agriculture and Technology, Japan and National Institute of Science Education and Research (NISER), India. His research interests focus on application of nanomaterials and advanced ceramics for energy technologies. He

holds ten patents and has authored/ co-authored over 400 original research publications and has edited several books. He is a Titular Member of the International Union of Pure and Applied Chemists (IUPAC) and a member of the ISO Technical Committee on Nanotechnologies. He serves as the Editor for *NanoEnergy, Journal of Electroceramics*, and as the Principal Editor of *J. Mater. Research.* He is also an Associate Editor for *International Journal of Applied Ceramics Technology, International Journal of Nanoscience* and *Nanomaterials.* He is also on the Editorial Boards of journals *International Journal of Nanotechnology, Materials, Journal of Ceramic Science and Technology*, and *NanoEnergy*

He is an Academician of the *World Academy of Ceramics*. A *Fellow* of the American Ceramics Society, Mathur also acts as the "*International Ambassador*" of the University of Cologne. He is a recipient of the fellowships of the Alexander von Humboldt Foundation, and stipend of the Federation of German Chemical Industries for excellence in research. He was an ASM International-Indian Institute of Materials (ASM-IIM) visiting lecturer in 2009. He was given the *Global Star Award* of the ECD of American Ceramic Society in 2010. He had organized and chaired over 50 international and national conferences and symposia. He was recently awarded the coveted *Bridge-Building Award* of the American Ceramic Society in 2014. He was recently (2015) honored with the *Lee Hsun Award* of the Chinese Academy of Science, China. He is also the recipient of the 2015 *Surface Innovator Award* (AkzoNobel) of the Society of Surface Protection and Paints. He is the recipient of the 2016 CSIR Presidential Lecture Award of Council of Scientific and Industrial Research, Pretoria, South Africa. He was awarded the *Honorary Doctorate* of the Vilnius University, Lithuania in 2016.



Dr. Indrajit Sinha is Associate Professor at Department of Chemistry in Indian Institute of Technology (Banaras Hindu University), India. He has 13 years of teaching and 15 years of research experience. He has been working in various aspects of liquid phase synthesis of nanoparticles by precipitation techniques and their characterization, applications of such nanoparticles as nanocatalysts using model reactions and also on analysis of toxic heavy metal removal by nanoadsorbents. Furthermore, to augment the understanding of the mechanisms involved he also works on simulating nanoparticle interactions under various conditions. Besides

this, his research interests also include non-equilibrium phase transitions, oscillatory reaction kinetics using kinetic Monte Carlo simulation techniques. The Faculty

For registration visit: http://www.gian.iitkgp.ac. in/GREGN

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