

Nanotechnology with colloidal nanoparticles

Overview

These lectures will overview the historical developments and recent advances in the colloidal syntheses of metal and semiconductor nanoparticles being in focus of interest for modern science and nanotechnology. The methodologies for precise controlling of nanoparticle composition, size, size-distribution and physico-chemical properties will be systematically introduced. Special attention will be paid to the surface design of the functional nanoparticles and the analytics of the surface composition.

The assembly of colloidal nanoparticles will be described as a way bridging their synthesis with their potential applications. The assembly can be performed on flat, porous and spherical surfaces, thus being important for thin-film technologies, doping of mesoporous materials, modification of pre-patterned substrates, creation of microshells and cavities, supported catalysts, etc. Self-assembly approaches or the use of removable templates make possible the formation of nanowires, 2D films, porous or ordered 3D materials created solely from the assembled nanoparticles. Hierarchical assembling and assembling of nanocrystals with other organic or inorganic entities open up a possibility to achieve composites with literally unlimited functionalities.

The understanding and governing of the assembly processes are the key points in their efficient utilization for novel types of applications, including optoelectronic, photovoltaic and photonic devices, optical sensors, heterogeneous- and electro-catalysts. The overview of the recent examples of successful applications will summarize this lecture course.

Modules	A: Colloidal nanoparticles : March 5 – March 9 Number of participants for the course will be limited to fifty.
You Should Attend If...	<ul style="list-style-type: none">▪ you are executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories.▪ you are students at all levels (BTech/MSc/MTech/PhD) from reputed academic institutions and technical institutions.▪ you are faculty from academic institution interested in learning how to do research on nanomaterials, in particular colloidal nanoparticles.
Fees	The participation fees for taking the course is as follows: Research Scholars/Students : INR 5,000 Faculty: INR 10,000 Working Professionals: INR 15,000 The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty



Prof. Nikolai Gaponik hails from the laboratory of one of the pioneers of nanoscience and has over two decades experience working with nanomaterials with over 200 publications.



Dr. Sameer Sapra works on energy harvesting applications using colloidal nanomaterials that includes synthesis, structural characterization and device fabrication.

Course Co-ordinator

Prof. Sameer Sapra

Phone: +91 11 2659 1561

E-mail: sapra@chemistry.iitd.ac.in

web.iitd.ac.in/~sapra

<http://www.gian.iitkgp.ac.in/GREGN>