



INSTITUTE SEMINAR

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Emerging Materials for Next Generation Manufacturing

ABSTRACT

Manufacturing products in the future will need new and improved engineering materials. The World Economic Forum lists top ten emerging technologies for 2016, and eight of those depend upon nanomaterials, which are 1-100 nm in size. The power of nanotechnology comes from the unique behavior of solid matter when confined to tiny length scales, which results in unprecedented structural, electronic and functional properties. These, if understood and controlled intelligently, can provide new technologies to enhance manufactured products for all industry sectors: oil & gas, clean energy, food, drugs, bio-medical technologies, electronics/internet, aerospace/ defense, and infrastructure. While such materials provide unprecedented functional advantages, they also bring new challenges of handling, production and environmental safety. Therefore, evidence-based policies are needed to balance benefits with risks throughout the entire supply chain. This talk will provide an overview of the current state of nanotechnology and its vast possibilities in different industry sectors. This will include few specific examples from the speaker's laboratory, where nanomaterials are integrated with larger solid structures. In this hierarchical hybrid material design, functional benefits of nanomaterials can be maximized while environmental risks are minimized. A wide variety of applications, ranging from water purification and energy storage to bio-sensing and tissue regeneration, have been advanced by this design and will be touched upon.

SPEAKER BIO

Dr. Sharmila Mukhopadhyay is a Jefferson Science Fellow (JSF) at the US Department of State, and elected Fellow of the American Ceramic Society. She is also a Professor at Wright State University and the founding Director of The Center for Nanoscale Multifunctional Materials. Her B.S. and M.S. degrees are from Indian Institute of Technology and Ph.D. from Cornell University. Her academic focus has been at the crossroads of nanotechnology and nanobiosciences, with emphasis on safe and sustainable nanomaterials for energy, environment, and biomedical applications. Her work has been featured in media releases such as the Homeland Security News Wire, AzoNano, PhysOrg, Ceramic Bulletin and BizJournal. She has over a hundred publications, and obtained research grants from federal and state sponsors, such as NSF, DOE, AFOSR, AFRL, NASA, EPA, and OBOR, as well as, industrial sponsors. Dr. Mukhopadhyay organizes national and international symposia, serves on editorial boards of journals, review panels of funding agencies, and executive committees of professional societies. In her current role as a Jefferson Science Fellow at the State Department, she is helping to create linkages between academia, industry and governmental entities to promote the use of scientific innovations for societal and economic development.