

**FALL 2004 SEMINAR SERIES****NEW SYNTHESIS CONCEPTS FOR INORGANIC NANOWIRES AND
CARBON MICRO/NANO TUBULAR STRUCTURES**

Professor Mahendra K. Sunkara
Department of Chemical Engineering
University of Louisville, Louisville, KY 40292

Inorganic nanowires, if available in bulk quantities, could enable the bottom-up assembly of next generation devices, sensors, thin films, composites and systems. Similarly, carbon tubular structures with controllable morphologies and large internal diameters are promising for a variety of microfluidic and electrochemical applications. However, the ability to synthesize nanostructures with desired characteristics still remains a challenge towards realizing several of the promising applications. In order to overcome the limitations associated with the current state-of-the-art processes, we developed several new concepts for synthesizing both nanowires and carbon tubular structures. Our group has demonstrated a concept in which multiple nucleation and growth of one-dimensional structures occur out of quasi-immiscible low-melting-point molten metal solvents such as gallium. The use of low-melting metals as solvents not only allows us to bulk produce nanowires but also provides us with the necessary factors to control the diameters and growth directions of nanowires. By controlling the process parameters we extended this simple growth concept to produce nanowires networks (nanoweb) as thin coatings over large areas. Similarly, by a simple variation in the growth concept, we used carbon deposition onto Ga droplets to engineer the internal diameters and conical angles of the resulting tubular structures termed as carbon microtubes. In this presentation, the progress over the last several years on process development for nanowire and carbon tube synthesis will be given and some of the present work on application development using nanostructures will be highlighted.

BIO: Mahendra Sunkara, received his B.Tech, M.S. and Ph.D. degrees in Chemical Engineering from Andhra University (India), Clarkson University and Case Western Reserve University, respectively. He joined UofL in 1996 as an Assistant Professor. He was awarded Ralph E. Powe Junior Faculty in Engineering award in 1999 and received CAREER grant from the National Science Foundation in 1999. He has published over 60 articles in refereed journals/proceedings and holds three U.S. Patents with several additional ones pending. Dr. Sunkara actively pursues statewide collaborative activities and initiated an annual state-wide workshop on the themes of Advanced Materials & Nanotechnology (<http://www.kynanomat.org>). In 2002, the Louisville Magazine placed him in the list of top 25 young guns in the city of Louisville.

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Refreshments and pastries will be available before the seminar starts.

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