

UNH Materials Science Seminar

13:10-14:00, Wednesday, Dec. 2, 2009

Kingsbury Hall N343

University of New Hampshire

Conjugated Polymer/Carbon Nanotube Supramolecular Structures and Composites

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Carbon nanotubes (CNTs) and conjugated polymers (CPs) have potential applications in nanoelectronics, sensors, energy storage devices, photovoltaics, nanocomposite materials. One of the major challenges to fully realize their extensive applications is efficient dispersion of CNTs with functional materials that leads to composites with desired properties. Through the understanding of molecular interaction between carbon nanotubes and conjugated polymers, we have developed unique approach to disperse CNTs using conjugated polymers and fabricate conjugated polymer supramolecular structures on CNTs. In this presentation, dispersing and functionalizing carbon nanotubes using conjugated polymers, building conjugated polymer supramolecular structures as well as fabricating conjugated polymer/CNT/MnO₂ composites for supercapacitor electrodes will be discussed. Our studies demonstrate that conjugated polymers offer an efficient and non-invasive approach to disperse and functionalize CNTs and the synergistic combination of CNTs, conjugated polymers and MnO₂ nanoparticles has advantages (low resistance and large accessible surface area) over the sum of the individual components, leading to electrodes with higher capacitance and longer life time.

Dr. Lei Zhai is an assistant professor at NanoScience Technology Center, University of Central Florida. He obtained his Ph.D. at Carnegie Mellon University and worked at Massachusetts Institute of Technology as a postdoctoral associate before he joined UCF in 2005. He is an NSF CAREER awardee. His research focuses on conjugated polymer supramolecular structures and composites for energy conversion and storage, and polymer derived ceramics.

Host: Prof. Marshall Ming, ×1446