

T_CSUH Special Seminar

Texas Center for Superconductivity at the University of Houston

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UH Houston Science Center, Room 102

Carbon nanotubes: arrays, junctions, and fillings

ABSTRACT

Carbon nanotubes have great promise for applications in electronics, optics, materials science, energy storage, and sensor technology due to their interesting electronic and mechanical properties, which are determined by their unique morphologies and structures. In this presentation, synthesis, structure and electrical/electrochemical properties of three types of interesting carbon nanotubes will be discussed:

Radial elasticity and electrochemical properties of horizontally aligned single-walled carbon nanotube arrays: A simple and reliable technique for measuring the radial elasticity of the nanotubes using atomic force microscopy will be first discussed. Then, the use of the nanotube arrays as chemical sensors with high sensitivity, fast response, and high stability will be demonstrated

Structure and electrical properties of multi-walled carbon nanotube junctions: The growth mechanism of the junctions will be briefly described. The electrical transport measurement along the branches and across the junctions using a four-probe STM will be discussed.

The structure of Co₉S₈/Co-filled multi-walled carbon nanotube and its electrochemical lithiation-delithiation when serving as the anode for a lithium ion battery. The results show that the encapsulation of Co₉S₈ within a closed carbon nanotube will improve the cyclability significantly during the lithiation-delithiation cycles.

BIOGRAPHY

Dr. Wenzhi Li received his Ph.D. degree in physics from the Chinese Academy of Sciences in 1997. He was awarded the KC Wong Research Fellowship by the Royal Society of London to conduct research in the Department of Chemistry at Sussex University in England in 1998. From 1999 to 2003, he was a senior research scientist in Physics Department at Boston College. He joined FIU as an assistant professor in 2003 and was promoted to an associate professor in 2009. His research interests are in the fields of physical properties and applications of nanomaterials including carbon nanotubes and metal oxide nanowires and nanoparticles.

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