SEMINAR INVITATION

Purification and Enrichment of Single-Walled Carbon Nanotubes (SWCNTs) for Macroelectronic Applications

Presented by
Dr Li Wei
School of Chemical and Biomolecular Engineering
The University of Sydney

Date: Thursday 8 September 2016
Time: 11.00 am – 12.00 pm
Venue: Common Room, Room 407, J01 Chemical Engineering Building, School of Chemical & Biomolecular Engineering

Speaker Details:
Dr Li Wei obtained his B.S. in Chemical Engineering at Tsinghua University (China) in 2006 and completed his PhD with Prof Yuan Chen at Nanyang Technological University (Singapore) in 2010. He took a research fellow position afterwards and joined School of Chemical and Biomolecular Engineering (SCBE) at The University of Sydney as a postdoc researcher since 2016. His research interests cover: (i) structure selective enrichment of single-walled carbon nanotubes for macroelectronic applications; (ii) novel chiral selective synthesis of single-walled carbon nanotubes; and (iii) novel carbon/metal nanomaterials for electrochemical storage, conversion and utilization of renewable energy. He has authored and co-authored nearly 60 journal publications and 2 book chapters with 1378 citations (ISI) and an H-index of 20 (ISI).

Seminar Details:
Single-walled carbon nanotubes (SWCNTs) are a new class of carbon materials that hold promises in novel and revolutionary applications owing to their extraordinary electronic, thermal and mechanical properties. However, these properties rely on their unique nanoscale structures and the lack of structure monodispersed nanotube samples severely delays the realization of practical nanotube applications. Two research topics will be discussed in this talk. First, the establishment of a preparative and evaluative protocol towards high quality, purified and individualized nanotube dispersions by means of ultracentrifugation and photoluminescence excitation spectroscopy, will be discussed. In the second part of this talk, using nanotube dispersions obtained from this developed protocol as ideal starting materials, structure discriminative enrichment of nanotubes will be practiced following several methods I have developed, including cosurfactant extraction, agarose gel selective adsorption and aqueous two-phase extraction. The selectively enriched nanotube samples are integrated into various macroelectronic devices to demonstrate their capability as novel functional materials for macroelectronic application. I will further describe a facile method to assess the semiconducting purity of an enriched nanotube sample.

Additionally, I will also share my research in developing novel nanomaterials for renewable energy storage and utilization.