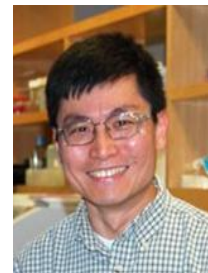


**Title**      **Probing Redox and Photochemistry of Single-wall Carbon Nanotubes for Energy Conversion**

**Speaker**    **Dr. Ming Zheng**  
 Research Chemist  
 National Institute of Standards and Technology  
 USA



**Date & Time**    Friday, March 8, 2013 4:00p.m.

**Place**            I<sup>2</sup>CNER Hall, Ito campus, Kyushu University

**Abstract**

Single-wall carbon nanotubes (SWCNT) are one-dimensional macromolecules with intriguing electronic structures potentially useful for energy conversion applications. However, probing SWCNT chemistry has been hampered by its structural polydispersity problem. In the last decade or so, we have been developing high resolution/high purity separation method to obtain SWCNTs of well-defined chirality and length. The purified SWCNTs allow us to investigate their intrinsic redox and photochemical properties. We have found that facile electron-transfer occurs between SWCNTs and small-molecule redox reagents in aqueous solution, in a way that strongly dependent on the electronic structure of SWCNTs. We have also found that complex formation between SWCNTs and small molecule redox reagents enables new photochemistry involving oxidation of water molecules. Possible applications of these electron transfer processes in energy conversion will be discussed.

**About the Speaker**

Dr. Ming Zheng received a B.S. and a M.S. degree in electronics from Peking University, a M.S. degree in physics from University of Utah, and a Ph.D. degree in chemistry from Princeton University in 1995. He was an American Cancer Society Postdoctoral Fellow at the US National Institutes of Health from 1996 to 2000. From 2000 to 2009, he was a principal investigator at DuPont Central Research and Development. In 2009, Ming Zheng joined the US National Institute of Standards and Technology, where he is now a staff scientist.

Dr. Ming Zheng's research area is at the interface of materials and biochemical sciences. His lab explores interactions between inorganic nanostructures and biomolecules, exploits such interactions to create new hybrid structures and functions on one hand and to discover new biomolecular folding patterns on the other. His lab is among the first to explore separation route for solving the carbon nanotube polydispersity problem (*Nature Materials*, 2003, 2, p338; *Science*, 2003,302, p1545), and has remained at the forefront in the field. Their recent breakthrough in single-chirality nanotube purification (*Nature*, 2009, 460, p250) has enabled many fundamental studies, including chirality controlled carbon nanotube synthesis (*Nature Communications*, 2012, 3, 1199).

**Host: Professor Naotoshi Nakashima**

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