

Title **Controlled Synthesis of Single-Walled Carbon Nanotubes**

Speaker Prof. Yan Li
 College of Chemistry and Molecular Engineering
 Peking University
 China



Date & Time Friday, January 19, 2018 4:00 p.m.

Place I²CNER Hall, Ito campus, Kyushu University

Abstract

Single-walled carbon nanotubes (SWNTs) present outstanding properties essentially depending on their helical structures, which are described with the chiral index of (n, m). The chirality-specific synthesis of SWNTs is of great importance. We have been working on the catalyst design and orientation and conductivity controlled synthesis of SWNTs. Recently, we developed a new family of catalyst, tungsten-based intermetallic nanocrystals, to grow SWNTs with specified chiral structures. Such intermetallic nanocrystals present unique structure and atomic arrangements, which are distinctly different from the normal alloy nanoparticles or simple metal nanocrystals, therefore can act as the template to grow SWNTs with designed (n, m) structures. Using W₆Co₇ catalysts, we realized the selective growth of (12, 6), (16, 0), (14, 4) and other chiralities. By the cooperation of thermodynamic and kinetic factors, SWNTs with high chirality purity can be obtained.

Key words: single-walled carbon nanotubes, chirality, catalysts, intermetallic compounds

About the Speaker

Prof. Yan Li graduated from Shandong University with a Bachelor's degree in chemistry in 1987 then received her Ph.D in inorganic chemistry from Peking University in 1993. After two years' postdoctoral research, she joined the faculty of Chemistry Peking University in 1995. From 1999 to 2001, she was a visiting Associate Professor at Duke University. She has been the full professor of chemistry at Peking University since 2002. She won National Outstanding Youth Fund of China in 2011 and was awarded as Chang Jiang Scholar by Chinese Ministry of Education in 2014. She is also appointed as distinguished visiting professor in The University of Tokyo since 2016. She is a fellow of Royal Society of Chemistry. Her research is focused on carbon nanomaterials, especially the preparation, modification, characterization and application of carbon nanotubes. She has published more than 140 papers in peer-reviewed journals. Her research on chirality-specified growth of single-walled carbon nanotubes was listed as Top 10 Chemical Research in 2014 by Chemical & Engineering News. Currently, she is also serving as the associated editor for ACS Nano and on the advisory boards or editorial board of Materials Horizons, Journal of Materials Chemistry A, and Nano Research.

Host: Prof. Naotoshi Nakashima

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Contact: Research Support and International Affairs division
 International Institute for Carbon-Neutral Energy Research
 Tel:092-802-6934 Email:wpikenkyu@jimu.kyushu-u.ac.jp

