



**Seminar Topic:
Crystal Phase Engineering of Nanomaterials**

Professor Zhang Hua

Abstract

In this talk, I will summarize recent research on the synthesis, characterization and application of two-dimensional nanomaterials in my group. I will introduce the synthesis and characterization of novel low-dimensional nanomaterials, such as graphene-based composites, including the novel synthesis of hexagonal-close packed (*hcp*) Au nanosheets (AuSSs) on graphene oxide, surface-induced phase transformation of AuSSs from *hcp* to face-centered cubic (*fcc*) structures, synthesis of ultrathin *fcc* Au@Pt and Au@Pd rhombic nanoplates through the epitaxial growth of Pt and Pd on *hcp* AuSSs respectively, novel synthesis of 4H hexagonal phase Au nanoribbons (NRBs) and their phase transformation to *fcc* Au NRBs as well as the epitaxial growth of Ag, Pt and Pd on 4H Au NRBs to form 4H/*fcc* Au@Ag, Au@Pt and Au@Pd core-shell NRBs, and the epitaxial growth of metal and semiconductor nanostructures on solution-processable transition metal dichalcogenide (TMD) nanosheets at ambient conditions, single- or few-layer metal dichalcogenide nanosheets and hybrid nanomaterials, large-amount, uniform, ultrathin metal sulfide and selenide nanocrystals, other 2D nanomaterials, nanodots prepared from 2D nanomaterials, and self-assembled 2D nanosheets and chiral nanofibres from ultrathin low-dimensional nanomaterials. I will then demonstrate the applications of these novel nanomaterials in clean energy.

Biography

Professor Zhang Hua obtained his B.S. and M.S. degrees at Nanjing University in 1992 and 1995 respectively, and completed his Ph.D. with Professor Liu Zhongfan at Peking University in July 1998. After working with Professor Frans C. De Schryver at Katholieke Universiteit Leuven (K.U. Leuven) in Belgium, and with Professor Chad A. Mirkin at Northwestern University as a postdoctoral fellow, NanoInk Inc. (USA), and the Institute of Bioengineering and Nanotechnology in Singapore, he joined the School of Materials Science and Engineering at Nanyang Technological University, Singapore as an Assistant Professor in July 2006.

He was promoted to Associate Professor with tenure on 1 March 2011 and Full Professor on 1 September 2013. To date, he has filed 71 patent applications and published more than 430 journal articles with a total citation of over 43,400, garnering a H-index of 101. In November 2014, he was elected as a Fellow of the Royal Society of Chemistry (FRSC), and in 2015, he was elected as an Academician of the Asia Pacific Academy of Materials (APAM). In addition, he received the 2015 ACS Nano Lectureship Award, World Cultural Council (WCC) Special Recognition Award (2013), SMALL Young Innovator Award (2012) and the Nanyang Award for Research Excellence (2011). In 2016, he was listed as one of the top 300 most cited researchers in the field of Materials Science and Engineering by Elsevier Scopus.

In 2014, he was listed as one of the “Highly Cited Researchers 2014” in Materials Science, and also one of the 17 “Hottest Researchers of Today” and “No. 1 in Materials and More” (please see the World’s Most Influential Scientific Minds 2014 by Thomson Reuters). In 2015, Professor Zhang Hua was listed as one of the 19 “Hottest Researchers of Today” (please see the World’s Most Influential Scientific Minds 2015 by Thomson Reuters), in addition to being one of the “Highly Cited Researchers” in Chemistry and Materials Science. In 2016 and 2017, he was listed in the “Highly Cited Researchers” in Chemistry and Materials Science.

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Hosted by: Associate Professor Xu Zhichuan, Jason