THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

INSTITUTE OF TEXTILES & CLOTHING
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Synthesis and Applications of Novel Two-Dimensional Nanomaterials

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Date: 10 Apr 2018, Tuesday
Time: 10:00 -11:00 a.m
Venue: N001, POLYU

Abstract:

In this talk, I will summarize the recent research on synthesis, characterization and applications 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 first-time synthesized hexagonal-close packed (*hcp*) Au nanosheets (AuSSs) on graphene oxide, surface-induced phase transformation of AuSSs from *hcp* to face-centered cubic (*fcc*) structures, the synthesis of ultrathin *fcc* Au@Pt and Au@Pd rhombic nanoplates through the epitaxial growth of Pt and Pd on the *hcp* AuSSs, respectively, the first-time synthesis of 4H hexagonal phase Au nanoribbons (NRBs) and their phase transformation to *fcc* Au RNBs as well as the epitaxial growth of Ag, Pt and Pd on 4H Au NRBs to form the 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) nanoshees at ambient conditions, single- or few-layer metal dichalcogenide nanosheets and hybrid nanomaterials, the large-amount, uniform, ultrathin metal sulfide and selenide nanocrystals, other 2D nanomaterials, nanodots prepared from 2D nanomaterials, and self-assembled 2D nanosheets and chiral nanofibers from ultrathin low-dimensional nanomaterials. Then I will demonstrate the applications of these novel nanomaterials in chemical and bio-sensors, solar cells, water splitting, hydrogen evolution reaction, electric devices, memory devices, conductive electrodes, other clean energy, etc.

Biography:

Prof. Hua Zhang obtained his B.S. and M.S. degrees at Nanjing University in China in 1992 and 1995, respectively, and completed his Ph.D. with Prof. Zhongfan Liu at Peking University in China in July 1998. He joined Prof. Frans C. De Schryver's group at Katholieke Universiteit Leuven (KULeuven) in Belgium as a Research Associate in January 1999. Then he moved to Prof. Chad A. Mirkin's group at Northwestern University as a Postdoctoral Fellow in July 2001. He started to work at NanoInk Inc. (USA) as a Research Scientist/Chemist in August 2003. After that, he worked as a Senior Research Scientist at Institute of Bioengineering and Nanotechnology in Singapore from November 2005 to July 2006. Then he joined the School of Materials Science and Engineering in Nanyang Technological University (NTU) as an Assistant Professor. He was promoted to a tenured Associate Professor on March 1, 2011, and Full Professor on Sept. 1, 2013. He has published **5** invited book chapters, **71** patent applications (including **8 granted US patents** and **1 Singapore patent**), and over **430** papers, among which **182** papers were published in **IF>10** journals and **88** papers were published in **8<IF<10** journals. Some of his papers have been published in ***Science*** (1), ***Nat. Chem.*** (5), ***Nat. Rev. Mater.*** (2), ***Nat. Commun.*** (7), ***Sci. Adv.*** (1), ***Nat. Protocols*** (1), ***Chem. Rev.*** (1), ***Chem. Soc. Rev.*** (9), ***Acc. Chem. Res.*** (2), ***J. Am. Chem. Soc.*** (14), ***Angew. Chem. Int. Ed.*** (27), ***Adv. Mater.*** (44), ***Energy Environ. Sci*** (12), ***ACS Nano*** (28), ***Nano Lett.*** (14), ***Mater. Today*** (1), ***Adv. Energy Mater.*** (6), ***Adv. Funct. Mater.*** (4), ***Nano Energy*** (4), ***Mat. Horizons*** (2), ***ACS Catal.*** (1), *etc.* Based on *Web of Science* on Feb. 19, 2018, the total citation times of his papers are over **44,500** with H-index of **102**. He has been invited to give more than **300** Plenary, Keynote or Invited Talks in international conferences, universities and institutes, and serve as the Session Chair.

Prof. Zhang's research is highly interdisciplinary. His current research interests focus on the crystal phase engineering of nanomaterials and controlled epitaxial growth of heterostructures, including the synthesis of ultrathin two-dimensional nanomaterials (e.g. metal nanosheets, graphene, metal dichalcogenides, metal-organic frameworks, covalent organic frameworks, etc.), novel metallic and semiconducting nanomaterials and their hybrid composites, for applications in nano- and biosensors, clean energy, (opto-)electronic devices, catalysis, and water remediation, *etc.*

ALL ARE WELCOME!