

Nanopatterns and Nanomaterials: Synthesis, Characterization, Properties and Applications

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Abstract

In this talk, I will summarize the recent research on nanopatterns and nanomaterials which have been done in my group. It includes dip-pen nanolithography-based controlled fabrication of arrays of peptide, enzyme, Au nanoparticles and CNTs on solid substrates, “needle-scratching” method-based fabrication of large-area catalyst patterns used for growth ultralong (0.5 mm) and high density SWCNTs (10 tubes/ μm), and synthesis of anisotropic nanomaterials and graphene-based materials, especially the first-time synthesized hexagonal-close-packed Au nanostructures on graphene oxide, with applications in electrode materials, electric and memory devices, biosensing, solar cells, cell cultures and matrix for MALDI-TOF-MS.

Brief CV

Dr. 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. On March 1, 2011, he was promoted to a tenured Associate Professor.



He has published **3** invited book chapters, **25** patent applications (including **4 granted US patents**), and over **140** papers, among which **115** papers were published in the journals with **IF>3** (including **48** papers published in **IF>7** journals). Some of his papers have been published in *Science*, *Nat. Commun.*, *Chem. Soc. Rev.*, *Angew. Chem. Int. Ed.*, *Nano Lett.*, *J. Am. Chem. Soc.*, *Adv. Mater.*, *ACS Nano*, *Adv. Funct. Mater.*, *Small*, etc. Based on *Web of Science* in Sept. 2011, the total citation of his papers is **over 2,700** with H-index of **28**. He has been invited to give more than **70** Keynote Lectures or Invited Talks in many international conferences or

universities and serve as Session Chair. He has organized several international conferences and served as Symposium Chair. He is an Associate Editor of *International Journal of Nanoscience* (2007-), sits on the Editorial Board of *NANO* (2007-), and is one of the members of the Advisory Committee of *IOP Asia-Pacific* (2010-). His research interests focus on synthesis of 2D materials and carbon materials (graphene and CNTs) and their applications in nano- and biosensing, clean energy, *etc.*; controlled synthesis, characterization and application of novel nano-materials; scanning probe microscopy; lithography-based fabrication of surface structures from micro- to nanometer scale; self-assembly and self-organization of nano- and bio-materials; self-assembled monolayers; *etc.*