IBS Center for Multidimensional Carbon Materials

Special Guest Seminar

Prof. Haofei Shi

Key Lab. of Multi-scale Manufacturing Tech.,
Institute of Green and Intelligent Technology,
Chinese Academy of Sciences, Chongqing, China

Graphene Film Growth and Its Application in Photodetector

NOV 16
14:00 FRI

Bldg. 101
Seminar Room on the 1st floor

Abstract: Graphene exhibits potential for applications in optics and electronics especially for the development of high performance devices. More importantly, the optical absorption rate of graphene is 2.3% in the visible and infrared region. This broadband absorption characteristic attracted great attention of the research community to exploit the graphene-based broadband photodetectors. However, the efficiency of the photodetectors is limited by the low absorption rate of graphene film. Graphene plasmonics provide a potential solution for enhancing the light graphene interaction. When plasmons were resonant at the structured graphene surface, a strong electric field would be induced which could enhance the generation of electron-hole pairs and absorption in the graphene layer. In this talk, I will show how can we grow high quality graphene film for industry, and design graphene plasmonics devices for photodetectors applications. Finally, the future challenge for optoelectronics devices will be discussed.

Reference:

[1] X. Bai, *et. al.*, Optics Letters 42, 4087 (2017)
[2] J. Shen, *et. al.*, Nanoscale 9, 6020 (2017)
[3] L. Tang, et. al., Optics Express 26, 3709 (2018)

Haofei Shi is a professor of Chongqing Institute of Green and Intelligent Technology, Chi nese Academy of Sciences from 2011, where he serves as the director of Center for Nano fabrication and System Integration. He obtained his PhD degree in optical engineering fr om Institute of Optics and Electronics, Chinese Academy of Sciences in 2009, and was a postdoc of University of Michigan, Ann Arbor from 2009 to 2011. He started up the Cho ngqing Graphene Tech. Co., Ltd. and serves as the chief scientist of the company, where they completed the monolayer graphene film mass production line, and developing the applications of graphene film. His research interests include synthesis of graphene film, f abrication of functional optoelectronics and electronics devices and explore their applicat ions.

You are cordially invited to attend!

IBS Center for Multidimensional Carbon Materials

Special Guest Seminar

Prof. Hua Zhang

School of Materials Science and Engineering
Nanyang Technological University, Singapore

Phase Engineering of Novel Nanomaterials

NOV 16
15:00 FRI

Bldg. 101
Seminar Room on the 1st floor

Abstract: In this talk, I will summarize the recent research on the (crystal-)phase engineering of nanomaterials in my group. It includes the first-time synthesis of hexagonal-close packed (*hcp*) Au nanosheets (AuSSs) on graphene oxide, the first-time synthesis of 4H hexagonal phase Au nanoribbons (NRBs), the synthesis of crystal-phase heterostructured 4H/*fcc* Au nanorods, and the epitaxial growth of metals with novel phases on the aforementioned Au nanostructures. In addition, the first-time synthesis of 1T'-MoS_2 and 1T'-$MoSe_2$ crystals have been achieved. Moreover, the phase transformation of transition metal dichalcogenide nanomaterials during our developed electrochemical Li-intercalation method will also be introduced. Interestingly, the lithiation-induced amorphization of $Pd_3P_2S_8$ is also achieved. Currently, my group focuses on studies of (crystal) phase-based properties and applications in catalysis, surface enhanced Raman scattering, waveguide, photothermal therapy, chemical and biosensing, clean energy etc., which we believe are unique and very important not only in fundamental studies, but also in practical applications. Importantly, the concepts crystal phase heterostructures and hetero-phase nanomaterials are proposed.

Dr. Hua Zhang is a Professor in Nanyang Technological University, Singapore. He has filed 73 patent applications and over 450 papers with 201 published in IF>10 journals including *Science*, *Nat. Chem.*, *Nat. Catal.*, *Nat. Rev. Mater.*, *Nat. Commun.*, *Sci. Adv.*, *Nat. Protocols*, *J. Am. Chem. Soc.*, *Angew. Chem. Int. Ed.*, *Adv. Mater.*, *etc.* Based on *Web of Science* on Oct. 12, 2018, the total citation times of his papers are over 52,200 with H-index of 113. In 2015 -2018, he was listed in the "*Highly Cited Researchers*" in *Chemistry* and *Materials Science* (T homson Reuters). In 2015, he was listed as one of 19 "*Hottest Researchers of Today*" in the world in the *World's Most Influential Scientific Minds 2015* (Thomson Reuters, 2015). In 201 4, he was listed in the "*Highly Cited Researchers 2014*" in *Materials Science*, and also listed as one of 17 "*Hottest Researchers of Today*" and No. 1 in *Materials and More* in the world in the *World's Most Influential Scientific Minds 2014* (Thomson Reuters, 2014). Moreover, h e got the *ACS Nano Lectureship Award* (2015), *World Cultural Council (WCC) Special Recog nition Award* (2013), *SMALL Young Innovator Award* (Wiley-VCH, 2012), etc. His current rese arch interests focus on the (crystal-)phase engineering of nanomaterials and controlled epit axial growth of heterostructures for various applications such as catalysis, clean energy, (op to-)electronic devices, nano- and biosensors, and water remediation.

You are cordially invited to attend!