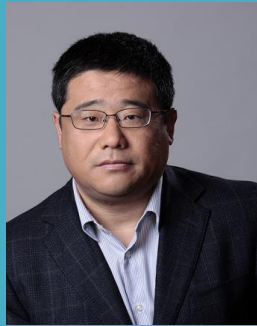


# MSE-Colloquium@NTU

1 February 2019, 2:30 pm

Lecture Theatre 7, Nanyang Technological University, Singapore



## Two-Dimensional Metal Chalcogenides And Device Applications

*Professor He Jun*

Professor of Laboratory for Nanodevices  
National Center for Nanoscience and Technology

### Abstract

When scaling the dimension(s) of semiconductors down to the nanoscale, novel properties, such as ultrahigh specific surfaces and strong electrostatic tunability, will emerge. Among the various low dimensional structures, two-dimensional (2D) semiconductors may lead the next generation of electronics and optoelectronics due to their compatibility with traditional micro-fabrication techniques and flexible substrates. Currently, both layered and non-layered materials have been demonstrated to be present in 2D geometry. For the former, even though breakthroughs, especially on transition metal dichalcogenides (TMDCs), have been made, more systematic and deeper studies are needed. In addition, inspired by the success of 2D layered materials and the fact that many materials with significant functions have non-layered crystal structures, 2D non-layered materials have attracted increasing attention. Based on the above challenges and motivation, our research focuses on the design, synthesis and applications of low dimensional metal chalcogenides semiconductors.

In this talk, I will present our recent progress on the following 2 aspects:

- (1) 2D layered metal chalcogenide semiconductors: controllable synthesis, properties, electronic and optoelectronic applications
- (2) Van der Waals epitaxial growth, electronic and optoelectronic properties of 2D non-layered materials, such as CdTe, PbS and  $\text{Pb}_{1-x}\text{Sn}_x\text{Se}$  nanosheets

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## Biography

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Dr He received his PhD in Semiconductor Physics from the Institute of Semiconductors, Chinese Academy of Sciences (CAS), in 2003. Thereafter, he joined the Department of Applied Physics in Technische Universiteit Eindhoven, Netherlands, as a postdoctoral fellow, followed by the Materials Department at the University of California, Santa Barbara, from 2005 to 2007.

From 2007 to 2010, he worked at the California NanoSystems Institute (CNSI) at the University of California, Los Angeles as a research scientist. He joined the “100-Talent” Programme of CAS in November 2010 and became a Full Professor at the National Centre for Nanoscience and Technology since then. He is mainly engaged in research on low dimensional semiconductor materials and device application.

Dr He’s awards include the National Science Fund for Distinguished Young Scholars and the title of “Young and Middle-Aged Leading Scientists, Engineers and Innovators” from the Ministry of Science and Technology in 2016. He received the National Special Support Programme for High-level Talent by the Organisation Department of the Communist Party of the China Central Committee (Ten-Thousand Talent Programme) in 2018. To date, he is the author/co-author of more than 140 papers and is an Associate Editor of Science Bulletin and Materials Today Chemistry. In addition, he is an editorial board member of FlatChem, npj 2D Materials and Applications, Nanotechnology and Nano Futures.



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