

Nanomaterials and Nanotechnology

October 29-30, 2018 | London, UK

Hybrid nanomaterials for the next generation energy efficient spintronics

Yongbing Xu

Nanjing University, China

The discovery of novel materials has often propelled progress and breakthroughs in IT industries, which change our everyday lives. Since the discovery of giant magnetoresistance (GMR) effect in metallic nanoscale multilayers (Nobel Prize in Physics, 2007), the first-generation spintronics has already generated huge impact to the mass data storage industries. The next-generation spintronics, on the other hand, focuses on the integration of the magnetic and semiconductor materials and so to add new capabilities to the future energy efficient and fast microelectronics/nanoelectronics. In this talk, I will report recent progresses of the research on a selection of hybrid nanomaterials including those based on ferromagnetic metal (FM) and alloys, half-metallic materials and two-dimensional (2D) materials. FM and alloys have spontaneous magnetization and usually high Curie temperature (T_c), half-metallic materials possess high spin polarization near the Fermi level (EF), and the 2D materials have unique band structures such as the Fermi Dirac cone and valley degree of freedom of the charge carriers. Enormous progress has been achieved in terms of synthesizing the epitaxial hybrid spintronic materials and revealing their new structures and properties emerging from the atomic dimensions

and the hetero-interfaces. Apart from the group-IV, III-V and II-VI semiconductors and their nanostructures, spin injection and detection with 2D nanomaterials such as graphene, transition-metal dichalcogenides (TMDs) and topological insulators (TIs) has become a new trend and a particularly interesting topic due to either the long spin lifetime or strong spin-orbit coupling induced spin-momentum locking, which potentially leads to dissipationless electronic transport.

Speaker Biography

Yongbing Xu, director of the Nanjing-York Joint Center in Spintronics and Nano Engineering, Nanjing University, China; chair in Nanotechnology, also heads the Spintronics and Nanodevice Laboratory, The University of York. He was an EPSRC advanced research fellow in Cavendish Laboratory, Cambridge University. His research interests are in the areas of nanomaterials, spintronics and nanofabrication. He has published more than 300 refereed papers in leading academic journals including physical review letters, nature communications, nano letter, advanced materials, ACS nano, scientific reports, applied physics letters and IEEE journals and given many invited talks/seminars at major international conferences including MRS, WUNSPIN, EMN and Intermag. He was editor-in-Chief of "Handbook of Spintronics" by Springer and edited the very first spintronics book "Spintronic Materials and Technology" by CRC Press. He had interviews with BBC News24 and new scientists.

e: yongbing.xuyork@gmail.com



Notes: