

# Design of Semiconductor Nanostructures for Next-Generation Electronic, Sensor and Energy-Harvesting Devices

Johnny C. Ho (何頌賢)

Department of Materials Science and Engineering, City University of Hong Kong, Tat Chee Avenue, Kowloon Tong, Kowloon, Hong Kong SAR

Email: johnnyho@cityu.edu.hk

Due to the advent of nanotechnology, materials can be readily fabricated into nanoscale configurations with different dimensionalities and widely tunable properties for technological applications. In this presentation, we would summarize and discuss the recent progress in our research group, emphasizing the development of various one-dimensional (1D) semiconductor nanowires (NWs), such as high-mobility III-V compound semiconductors, for high-performance nanoelectronics as well as two-dimensional (2D) layered nanosheets, including WS<sub>2</sub>, perovskite and others, for highly sensitive photodetectors. Also, utilizing simple chemical synthesis techniques, we have achieved several non-noble hierarchical three-dimensional (3D) nanostructures (*e.g.* NiMo, NiFe oxides and hydroxides, *etc*) as electrocatalysts for efficient hydrogen evolution and water oxidation with the impressive performance data in overpotential values, Tafel slopes and electrochemical stability. All these findings evidently indicate their potencies and deliver important insights into the design of different nanomaterials for next-generation electronic, sensor and energy-harvesting devices.

## Author Short Biography

Dr. Johnny C. Ho received his B.S. degree with high honors in Chemical Engineering, and M.S. and Ph.D. degrees in Materials Science and Engineering from the University of California, Berkeley, in 2002, 2005 and 2009, respectively. From 2009 to 2010, he worked as a post-doctoral researcher in the Nanoscale Synthesis and Characterization group (Materials Science Division) at Lawrence Livermore National Laboratory, California. At present, he is an Associate Professor in the department of Materials Science and Engineering at City University of Hong Kong. Over the years, he has won a number of awards, including Intel Foundation Ph.D. Fellowship, Finalist for the Croucher Innovation Awards, Second Class Award of Shandong Province Science and Technology Prize, President's Awards, City University of Hong Kong, and elected to be a Founding Member in the Young Academy of Sciences of Hong Kong under the Academy of Sciences of Hong Kong, *etc*. His current research interests focus on the synthesis, characterization, integration and device applications of nanoscale materials for various technological utilizations, including electronic, sensor and energy harvesting devices ([http://www.phy.cityu.edu.hk/personal-website/johnny/site\\_flash/index.html](http://www.phy.cityu.edu.hk/personal-website/johnny/site_flash/index.html)). He has published more than 120 papers with more than 6,400 citations and an H-index of 37.

