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Prof. Zhiyong Fan is received his B. S. and M. S. degrees in Materials Science from Fudan University, Shanghai, China, in 1998 and 2001. He received Ph.D. degree from University of California, Irvine in 2006 in Materials Science as well. From 2007 to 2010, he worked at University of California, Berkeley as a postdoctoral fellow in department of Electrical Engineering and Computer Sciences, with a joint appointment with Lawrence Berkeley National Laboratory. In May 2010, he joined The Hong Kong University of Science and Technology (HKUST) and currently he is an associate professor in department of Electronic and Computer Engineering. Dr. Fan has won a number of awards including, UC Berkeley BSAC Outstanding Research Presentation Award, HKUST Young Investigator Award and HKUST President's Award and Innovation Award, etc. His research interest focuses on fabrication and characterization of nanomaterials and nanostructures, their applications for electronics and energy harvesting. He has published more than150 referred papers with around 14,000 citations and H-index of 56. He is a Fellow of Royal Society of Chemistry and currently he is serving as an Associate Editor *Nanoscale Research Letters*.

Nanostructures and Materials for Energy Conversion and Efficiency Devices

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Materials made of nano/micro-structures have unique physical properties, such as fast carrier transport, high surface-to-volume ratio, mechanical flexibility, sub-wavelength optical waveguiding, *etc*. These intriguing properties can be harnessed for a variety of applications in electronics and photonics. In the past, we have fabricated an assortment of arrayed nanostructures consist of nanowires, nanopillars, nanocones, etc., using a variety of materials from inorganic semiconductors to organometal perovskite materials. The optical and electrical properties of these nanostructures have been systematically investigated and a number of device application including solar cells, light emitting diodes and sensors have been explored. Particularly for photovoltaic applications, these nanostructures have shown unique light trapping property that can be harnessed for improve solar energy conversion efficiency. In addition, solar cell surface property modification with nanostructures can also been achieved. A hydrophobic solar panel surface has been engineered to mitigate dust accumulation and efficiency loss. However, proper structural optimization is not trivial. Besides photovoltaic applications, we have also explored smart nanostructures to enhance LED light extraction efficiency and low power environmental sensors. Overall, the nanostructure integration methodology that we developed may enable many applications on electronics and optoelectronics in the future.