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Plasmon-enhanced optoelectronic devices based on metal nanostructures

L Jiang
Soochow University, China

Plasmonics confine the light into nanoscale dimensions much beyond the diffraction limit by coupling the light with the surface collective oscillation of free electrons at the interface of the metal structure and the dielectric. The resonant collective oscillations give rise to an enhanced electron-magnetic field correlate with high density optical states. It modifies the light-matter interaction which results in enhanced absorption, emission or energy transfer. Hence, this photo-response mechanism makes the plasmonic structures to be an attractive study candidate to enhance the function of the optoelectronic devices, such as photodetector, solar cell, and light emitting diodes (LEDs). So far, it is still desirable to develop more unique plasmonic structures and explore their plasmon effects on devices performance to develop new-generated optoelectronic devices. Herein we introduced the research results of plasmon enhanced optoelectronic devices (photo detector, organic light emitting diode, sensors, etc.) by incorporation with different plasmonic nanostructures (zero-dimension, one-dimension or two-dimensional multiplexed plasmopnic nanostructures) and revealed the involved effective photon-management enhancement mechanism. The remarkable performance enhancement of the devices will guide the potential applications of plasmonic structures in next high-speed and high-density integrated optoelectronics and other plasmon assisted advanced devices.

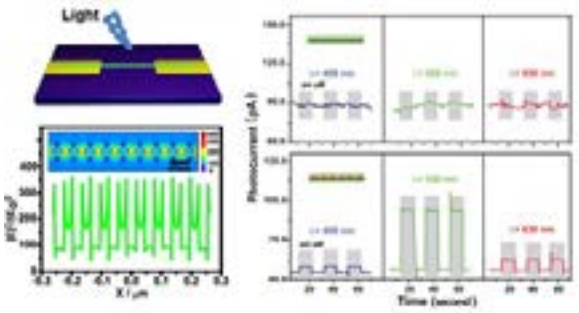

Fig1. The schematic diagram of optoelectronic device based on PPy nanowire embedded with a 1D Au nanoparticle.

Biography

L Jiang received her BSc and PhD degrees in Chemistry from Jilin University, Jilin, China, in 2000 and 2005, respectively. She was awarded the Alexander von Humboldt Research Fellowship in 2006 and worked at Physical Institute of Muenster University in Germany from 2006 to 2009. Then, she became a Senior Research Fellow in 2009 at the School of Materials Science and Engineering in Nanyang Technological University, Singapore. Currently, she is a Professor at Institute of Functional Nano & Soft Materials (FUNSOM), Soochow University, China, since 2012. She is mainly focused on the self-assembly of novel nano-structured materials, and optoelectronic complex devices. She has published over 50 SCI papers in high quality journals, such as *Acc. Chem. Res., Adv. Mater., Energy enviyon. Sci., ACS Nano, Adv. Funct. Mater.*, etc..

ljiang@suda.edu.cn