

Joint CQSE and CASTS Seminar

Weekly Seminar
May 16, 2014 (Friday)

TIME May 16, 14:30 ~ 15:30
TITLE Photon Management in Optoelectronic Devices
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Abstract

It is of current interest to develop the photon management with nanostructures since the ability to suppress the reflection and light trapping over a broad range of wavelengths and incident angles plays an important role in the performance of optoelectronic devices, such as photodetectors, light-emitting diodes, optical components, or photovoltaic systems. Superior light-trapping characteristics of nanowires, including polarization-insensitivity, omnidirectionality, and broadband working ranges are demonstrated in this study. These advantages are mainly attributed to the subwavelength dimensions of the nanowires, which makes the nanostructures behave like an effective homogeneous medium with continuous gradient of refraction index, significantly reducing the reflection through destructive interferences. The relation between the geometrical configurations of nanostructures and the light-trapping characteristics is discussed. We also demonstrated their applications in solar cells and photodetectors. This report paves the way to optimize the nanostructured optoelectronic devices with efficient light management by controlling structure profile of nanostructures.

Keywords: solar cells, photodetectors, light-emission diodes, nanowires, nanorods

