Journal of Nanomaterials

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Special Issue on

Semiconductor Quantum Dots and Hybrid Nanowires: Synthesis and Applications

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Low dimensional semiconductor and metal nanostructures exhibit exceptional optical and electronic properties as compared to their bulk counterparts. For example, both the spontaneous optical emission profiles of semiconductor quantum dots and the intensity and frequency of optical absorption by metal nanostructures can be controlled by adjusting the size, composition, and geometry of the nanoscale objects. Moreover, hybrid architectures containing both semiconducting and metallic nanostructures offer exciting opportunities: they can be used as subwavelength nanoantennas to enhance light collection and emission within semiconductors by transferring energy via localized surface plasmons. Besides enabling many fundamental discoveries in optics and photonics, low-dimensional nanomaterials and hybrid nanostructures composed of metals, polymers, and oxides have emerged as promising building blocks in important technological areas such as photovoltaics and biological imaging.

Reflecting the surge of interest in the field of low-dimensional materials within the last few decades, the purpose of this special issue is to publish original, high-quality research papers as well as review articles addressing recent advances in the synthesis, characterization, study of energy transfer, and application within devices of zero- and one-dimensional nanomaterials. We expect to highlight research that provides a deeper understanding of the chemical and physical properties of low-dimensional nanomaterials and that identifies promising potential applications of these materials in technology.

We are particularly interested in contributions describing advanced synthesis of low-dimensional nanomaterials along with fundamental studies focused on optical and nonradiative energy transfer processes, and optoelectronic device applications.

Potential topics include, but are not limited to:

- Advances in synthesis and assembly of zero- and one-dimensional nanomaterials with unique architectures and chemical properties
- Nonradiative energy transfer studies based on quantum dots
- Plasmon-enhanced photocatalysis based on hybrid nanowire architectures
- Optoelectronic, bioimaging, and spectroscopic device applications with quantum dot or nanowire integrated systems
- Plasmon-exciton interaction studies focusing on materials and structures exhibiting enhanced light harvesting or modified spontaneous emission profiles

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