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# CALL FOR PAPERS

**ABSTRACT DEADLINE: JUNE 21, 2005**

**REMINDER:** In fairness to all potential authors, late abstracts will not be accepted.

## MRS Symposium P: Quantum-Confined Semiconductor Nanostructures— Fabrication, Physical Properties, and Applications

Controlling the structure of matter at the nanoscale opens exciting opportunities for manipulating materials properties with great flexibility and precision. Nanoscale structures made of semiconductors such as epitaxial quantum dots/quantum wires and colloidal nanocrystals/nanorods show unique and potentially useful size- and shape-dependent properties that arise both from effects of quantum confinement and strong influences of surfaces. Recent studies of semiconductor quantum dots and nanorods have significantly advanced our fundamental knowledge of electronic structures, carrier dynamics, and multi-exciton interactions in strongly confined nanoscale materials. Our understanding of interactions between individual nanoscale building blocks in complex assemblies has also significantly advanced over the past several years, leading to the demonstration of efficient charge and exciton transport in engineered nanocrystal assemblies and controlled charge injection into nanoscale particles. Tremendous progress in nanofabrication has also been achieved. Examples include the development of complex colloidal anisotropic and branched nanostructures, binary and ternary quantum dots, nanocrystals doped with magnetic impurities and extra charges, and nanoparticles conjugated to proteins and carbon nanotubes. These fundamental studies have led to the demonstration of the first successful technologies based on nanoscale semiconductors, including quantum-dot biolabeling and biosensing, nanocrystal- and nanorod-based photovoltaics, and quantum-dot optical amplification and lasing. All of these advances have generated an intense interest in the physical, chemical, and material science communities in developing new nanoscale materials and novel nanoscale characterization tools, furthering our understanding of the physics of nanoscale phenomena and applying novel functionalities provided by nanostructured semiconductors to device engineering.

The objective of this symposium is to bring together scientists and engineers working on quantum confined semiconductor nanostructures to discuss the most recent progress in the fabrication of these novel nanoscale materials, the current theoretical and experimental trends regarding the electronic, optical, and magnetic behaviors of these nanostructures, and the potential of these nanomaterials for applications in real-world technologies.

Topics of the symposium will include:

- Fabrication of epitaxial and colloidal semiconductor nanostructures (quantum dots, nanowires, and nanorods)
- Electronic and optical properties of neutral and charged excitons and exciton complexes in quantum-confined semiconductor nanostructures
- Dynamics of photo-excited carriers in semiconductor nanostructures
- Transport properties in assemblies of quantum-confined nanostructures (e.g., stacked quantum dots or nanocrystal solids)
- Electroluminescence and photovoltaic responses of heterostructures employing nanocrystals and nanorods
- Optical gain and lasing in semiconductor nanostructures
- Semiconductor nanostructures coupled to photonic structures
- Hybrid inorganic-organic nanocomposites
- Nanostructures in labeling and sensor technologies
- Nanocrystal bioconjugates and their applications in biological assays (e.g., fluorescence, Förster-energy-transfer, and electrochemical assays)

One or two joint sessions involving symposia addressing overlapping areas are anticipated.

A tutorial complementing this symposium is tentatively planned. Further information will be included in the program that will be available in September.

**Invited speakers** include: **U. Banin** (Hebrew Univ., Jerusalem), **M. Dahan** (Ecole Normale Supérieure, France), **A. Efros** (Naval Research Lab), **J.-M. Gerard** (CEA, Grenoble, France), **T. Itoh** (Osaka Univ., Japan), **K. Karrai** (Ludwig Maximilians Univ., Germany), **C.B. Murray** (IBM Yorktown), **S. Weiss** (Univ. of California-Los Angeles), **F.W. Wise** (Cornell Univ.), **U. Woggon** (Univ. of Dortmund, Germany), **A. Zrenner** (Univ. Paderborn, Germany), and **A. Zunger** (National Renewable Energy Lab). *Additional invited speakers will be selected from the contributed abstracts.*

## Symposium Organizers

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