Special Issue

Quantum Dots: Fabrication, Devices and Applications

Message from the Guest Editor

This Special Issue, “Quantum Dots: Fabrication, Devices and Applications”, focuses on the synthesis, assembly, and integration of quantum dots (QDs) enabled by bottom-up fabrication strategies. Such approaches offer unique advantages in material customizability, structural precision, and scalability, which are essential for next-generation optoelectronic systems. A central challenge across QD-based technologies—including light-emitting diodes, photodetectors and photovoltaic devices—is achieving long operational stability and long lifetime. Addressing this requires a deep understanding of strain and defect engineering at the nanoscale, as lattice distortions and defect states critically influence charge transport, interfacial behavior, and device degradation. This Issue invites contributions that explore the entire chain from QD synthesis and bottom-up assembly (e.g., superlattices, ordered arrays) to device physics and reliability. We aim to bring together mechanistic studies, advanced characterization, and scalable fabrication approaches to establish design principles that bridge materials science, device engineering, and long-term stability.

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Deadline for manuscript submissions

10 November 2026

Micromachines

an Open Access Journal by MDPI

Impact Factor 3.0
CiteScore 7.1
Indexed in PubMed

mdpi.com/si/276788

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Indexed in PubMed

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Message from the Editor-in-Chief

Micromachines (ISSN 2072-666X) is a forum for cutting-edge interdisciplinary research on micro and nanoscale science and technology. We emphasise the practical, real-world value of micro and nanotechnologies that will place *Micromachines* in a leading position among engineering and technology journals.

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