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Special Issue Reprint

Semiconductor Quantum Dots

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The aim of this reprint is to collectively explore the broad field of semiconductor quantum dots (QDs), with an emphasis on their synthesis, properties, and diverse applications. Reflecting the ongoing innovation and potential of QD technology—particularly following the 2023 Nobel Prize in Chemistry awarded to pioneers in their discovery and synthesis—the research highlights QDs' unique size-dependent optoelectronic properties. These properties make QDs valuable for applications in solar energy, lighting, displays, detectors, and biomedical imaging, and also demonstrate their potential in emerging fields like quantum information technology and spintronics. This underscores the versatility and future promise of these nanomaterials. The reprint stresses the importance of precisely controlling QD size, composition, and structure to optimize performance for specific applications. The Nobel recognition underscores the significance of QD research and its continued relevance in advancing technological frontiers. Overall, this collection provides a comprehensive overview of the current state and future directions of QD research, highlighting its potential to revolutionize various industries through continued scientific exploration and application development.

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