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Single and double heterojunction nanorods for optoelectronics

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SINGLE AND DOUBLE HETEROJUNCTION NANORODS FOR OPTOELECTRONICS

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Understanding charge separation and recombination processes and developing materials that can efficiently direct charge carriers with nanoscale precision are of fundamental importance in advancing next-generation electronics, optoelectronics and energy technologies. As semiconductor heterostructures have enabled today's electronics and optoelectronics, the introduction of active heterojunctions can impart new and improved capabilities that will facilitate integration of colloidal quantum dots into high performance devices. With anisotropic shapes that can be exploited for assembly, charge carrier manipulation and optical anisotropy, incorporating heterojunctions in colloidal semiconductor nanorods presents a promising direction. Various motifs of epitaxial heterojunctions introduced in nanorods through solution chemistry will be presented along with unusual properties and prospects arising from the formation of heterointerfaces. Assembly into thin films and integration into photovoltaics and light-emitting diodes will also be discussed.