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Photoluminescence and Dynamics Measurements of Individual CdSe Quantum Wires JOHN GLENNON, RUI TANG, WILLIAM BUHRO, RICHARD LOOMIS, Department of Chemistry and Center for Materials Innovation Washington University in St. Louis — The photoluminescence (PL) spectroscopy of highly monodispersed colloidal CdSe quantum wires (QWs) are investigated in the single nanocrystal environment using confocal fluorescence microscopy and are compared to similar studies preformed on three dimensionally confined CdSe quantum dots (QDs). The PL intensity of the QWs is observed to increase and then to decrease at room temperature ambient conditions with continued irradiation at moderate to high laser powers (>10 kW*cm^{-2}) at much slower rates than similar processes in QDs. The energy of the peak intensity of the PL is monitored throughout the experiments and does not shift for the QWs. This is in contrast to the blue-shift observed for QDs as the PL intensity decays. For the QWs, it is shown that the change in PL intensity is localized to the diffraction limit irradiation spot and is not delocalized along the length of the QW. Differences in exposed crystalline facets and surface coverage between QWs and QDs are explored in context of the experimental observations. These phenomena are studied under different atmospheres and surface environments in order to elucidate the optical properties of these quantum-confined semiconductors.

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