SPECTROSCOPY AND DYNAMICS WITHIN SINGLE CADMIUM SELENIDE QUANTUM WIRES

R. A. LOOMIS and J. J. GLENNON, *Department of Chemistry, Washington University, Saint Louis, Missouri, 63130*.

Room-temperature absorption and photoluminescence (PL) measurements on ensembles of CdSe quantum wires (QWs) indicate that these nanostructures follow quantum-mechanical, particle-in-a-cylinder energetics. The results from PL microscopy studies on single CdSe QWs are also presented. Measurements performed at low temperature reveal discrete excitonic transitions. A dynamic PL signal or intensity blinking is observed on a few percent of the QWs at room temperature. While similar PL blinking has been reported previously for semiconductor quantum dots and rods, the observation of this synchronous blinking spanning the entire length of a quantum wire, with diameters of 5 nm and lengths longer than 4 microns is novel. We propose that a photo-induced, kinetic charge trapping mechanism gives rise to the synchronous PL intensity fluctuations observed in the QWs.