

Abstract Submitted
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Optical Properties of CdSe Nanocrystalline Photoanodes

AMANDA LESAR, ROHANA GARUTHARA, Hofstra University — Cadmium selenide (CdSe) nanocrystalline photoanodes were prepared by chemical solution deposition, with deposition time varied from 24 hours to 120 hours. Photoluminescence (PL) spectroscopy, reflectance and transmittance spectra, and photoelectric current were measured to optically characterize each sample. Photoelectric current was measured in a liquid junction configuration, with sodium sulfide as the electrolyte and platinum foil as the electrode. The PL, reflectance, and transmittance spectra were measured for each sample from 79 K to room temperature. Chemical solution deposition should lead to quantum size effects, as longer deposition times form larger size nanocrystals. Quantum size effects were observed, as longer depositions times led to a shift towards lower energy in the peak of the PL spectra. The temperature dependence of the PL peak energy position was also analyzed; as the temperature increased, the peak shifted towards higher energy. Using the reflectance and transmittance spectra, the absorption coefficient α was calculated, and the Tauc's plot of $(\alpha h\nu)^2$ versus $(h\nu)$ was graphed. A correlation between the observed absorption edge and the PL spectra was seen, as the absorption edge energy was approximately equal to the PL energy peak.

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