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**Suppressed Carrier Scattering in CdS-encapsulated PbS Nanocrystal Films** UPENDRA RIJAL, MIKHAIL ZAMKOV, Bowling Green State Univ — One of the key challenges facing the realization of functional nanocrystal devices concerns the development of techniques for depositing colloidal nanocrystals into electrically coupled nanoparticle solids. This work compares several alternative strategies for the assembly of such film using an all optical approach to the characterization of electron transport phenomenon. By measuring excited carrier lifetimes in either ligand-linked or matrix encapsulated PbS nanocrystal films containing a tunable fraction of insulating ZnS domains, we uniquely distinguish the dynamics of charge scattering on defects other process of exciton dissocition. The measured times are subsequently used to estimate the diffusion length and the carrier mobility for each film type within the hoping transport regime. It is demonstrated that nanocrystal films encapsulated into semiconductor matrices exhibit a lower probability of charge scattering than that of nanocrystal solids crossed-linked with either 3-mercaptopropionic acid or 1,2-ethanedithiol molecular linkers. The suppression of carrier scattering in matrix-encapsulated nanocrystal films is attributed to a relatively low density of surface defects at nanocrystal/matrix interface.

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