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Transport measurements of semiconductor nanocrystals and nanorods using nanoscale devices. CLAUDIA QUERNER, MICHAEL D. FISCHBEIN, MARIJA DRNDIC, University of Pennsylvania — Efficient charge transport through nanocrystal arrays is important for many applications in electronics or optoelectronics. Various parameters can influence the transport in nanocrystals. Beside the material itself, other parameters such as shape (spherical, rod-shaped or branched structures), surface capping (insulating or electroactive surface-ligands), as well as the nanocrystal assembly may affect the observed transport phenomena. We carry out transport measurements of semiconductor nanoparticles using devices made on silicon nitride membranes. This approach enables both transport measurements and device imaging using high-resolution transmission electron microscopy, allowing a direct correlation of the measured transport phenomena with the local structure of the nanomaterial on the device surface. We will discuss the effects that we observe by varying parameters such as shape, size and surface capping of the nanoparticles, in particular CdSe, as well as temperature and photo-excitation. This work was supported by ONR Young Investigator Award (N000140410489), NSF Career Grant (DMR-0449553), NSF NSEC Grant (DMR-0425780), and NSF-IGERT (DGE 022166).

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