

Abstract Submitted
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Self-assembly of silicon quantum dot clusters in polymer nanocomposites AUSTIN R. VAN SICKLE, JOSEPH B. MILLER, North Dakota State University, REBECCA R. ANTHONY, UWE R. KORTHSHAGEN, University of Minnesota, DANIEL M. KROLL, ERIK K. HOBBIE, North Dakota State University — We measure the influence of polymer-driven silicon nanocrystal (SiNC) self-assembly on the photoluminescent stability of SiNC clusters. Coexisting phases of varying nanoparticle density are identified in annealed SiNC-polymer nanocomposites, and the local photobleaching kinetics are measured under varied exposure to atmospheric oxygen. Increased particle packing and decreased oxygen exposure both contribute to improvements in cluster photostability, with Monte Carlo simulations of ensemble photobleaching clarifying the critical role of nanoparticle packing. The simulations further demonstrate the potential importance of nanoparticle interactions in dictating the photo-response of the self-assembled SiNC clusters.

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