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Self-assembled chains of polymer-grafted nanorods in homopolymer films CHRISTINA TING, Sandia Natl Labs, BORIS RASIN, RUSSELL COMPOSTO, University of Pennsylvania, AMALIE FRISCHKNECHT, Sandia Natl Labs — An understanding of the self-assembly of nanoparticles in a polymer matrix is needed to utilize their tunable optical and electrical properties. In particular, for anisotropic nanoparticles, the inter-particle distance and orientation are important variables to consider. Using self-consistent field theory (SCFT), we study the self-assembly of polymer-grafted nanorods in homopolymer melts of the same chemistry. The theoretical calculations are performed over a range of parameters for an experimental system of CdSe/CdS nanorods grafted with polystyrene brushes of varying molecular weights. Previously, we have shown that polymer-grafted nanorods were found to transition from dispersed to aligned (side by side) as the matrix chain lengths were increased, depending also on the grafting density and the dimensions of the nanorod. Here, we explore the parameters required for end to end linking, where it has been shown that coupling of localized surface plasmon resonances in a chain of end-linked nanorods can result in a periodic array of enhanced electric fields (hot spots).

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