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Self-assembly of nanoparticle/copolymer mixtures JINBO HE, RAVISUBHASH TANGIRALA, KEVIN SILL, TODD EMRICK, THOMAS RUSSELL, Department of Polymer Science & Engineering, University of Massachusetts, Amherst, MA 01003, XUEFA LI, JIN WANG, YAO LIN, Argonne National Laboratory, Argonne, IL 60439, ALEXANDER BOKER, Lehrstuhl fur Physikalische Chemie II, Universitat Bayreuth, 95440 Bayreuth, Germany, ANNA BALAZS, Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania 15261 — Mixtures of polystyrene-*block*-poly (2-vinylpyridine) with tri-*n*-octylphosphine oxide-(TOPO)-covered CdSe nanoparticles were chosen to test the theoretical prediction of synergistic effects between two self-organization systems. Preliminary results confirmed that hierarchical structures were provided, with poly (2-vinylpyridine) cylindrical microdomains oriented normal to the surface and CdSe-TOPO nanoparticles self-assembly at the surface, that balanced the surface tensions of the P2VP with that of PS. Detailed structure evolution was revealed by *in-situ* grazing incidence small angle x-ray scattering (GISAXS) during thermal annealing. Results from these studies indicated that the orientation of the mcrodomains began at the free surface and propagated in the film towards the substrate. This one-step self-orienting, self-assembly process, without the use of external fields, opens a simple route for fabrication of nanostructured materials having hierarchical order, with applications including chemical sensing, separation, catalysis, high-density data storage and photonic materials..

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