Abstract Submitted
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Organization of Gold Nanorods in Cylinder-Forming Block Copolymer Films[1] GUOQUIAN JIAN, ROBERT RIGGLEMAN, RUSSELL COMPOSTO, University of Pennsylvania — The addition of gold nanorods (AuNRs) to copolymer films can impart unique optical and electrical properties. To take full advantage of this system, the AuNRs must be dispersed in a self-organizing copolymer that directs the orientation of the anisotropic particle. In the present work, AuNRs with aspect ratio 3.6 (8 nm x 29 nm) are grafted with poly(2-vinyl pyridine) (P2VP) brushes and dispersed in a cylindrical forming diblock copolymer of polystyrene-b-P2VP (180K-b-77K, 29.6 wt% P2VP). Films are spun cast and solvent annealed in chloroform to produce a perpendicular cylindrical morphology at the surface. Using TEM and UV-ozone etching combined with AFM, the AuNRs are well dispersed and co-locate (top down view) with the P2VP cylinders, ∼50nm diameter. However, the AuNRs mainly lie parallel to the surface indicating that they likely locate at the junction created at the intersection between P2VP cylinders and P2VP brush layer adjacent to the silicon oxide surface. Self-consistent field calculations of the Au:PS-b-P2VP morphology as well as the effect of adding P2VP homopolymer to the nanocomposite will be discussed.

[1]NSF Polymer and MRSEC programs

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