

Abstract Submitted
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Assembly of Magnetite Nanoparticles Grafted with Ion-Containing Diblock Copolymers¹ YANG JIAO, PINAR AKCORA, Stevens Inst of Tech — Polystyrene (PS)-grafted iron oxide nanoparticles are shown to organize into highly ordered anisotropic nanostructures in bulk forms as of microphase separated morphologies of block copolymers. Ordered strings that are of one particle in width are created in composite films. In this work, we design a novel system of ion-containing block copolymer-grafted magnetic nanoparticles and study the effect of phase separation in grafted block copolymer on the aggregation of magnetic nanoparticles in the presence of ionic liquid, [HMIM][TFSI]. Styrene sulfonates neutralized with trioctylammonium are clicked to the thiolated ends of grafted PS through a thiol-ene click reaction. We show that the phase separated copolymer brush lead to stacking of strings of nanoparticles into planar structures. Miscibility of copolymer-grafted nanoparticles is being enhanced by the solvation of sulfonated groups with ionic liquid. Further, we demonstrate that the copolymer-grafted particles can be easily directed under magnetic fields in ionic liquid compared to their uncharged forms. The conductivity results indicate that the good miscibility between sulfonated particles and ionic liquid significantly enhances conductivity.

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Yang Jiao
Stevens Inst of Tech

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