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**Nanoparticle Encapsulation in Diblock Copolymer/Homopolymer Blend Thin Film Mixtures**

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— We investigated the organization of low concentrations of poly (2-vinylpyridine) (P2VP) grafted gold nanoparticles within a diblock copolymer polystyrene-b-poly (2-vinylpyridine) (PS-b-P2VP)/homopolymer polystyrene (PS) blend thin film. The PS-b-P2VP copolymers formed micelles, composed of inner cores of P2VP block and outer coronae of PS blocks, throughout the homopolymer PS. All nanoparticles were encapsulated within micelle cores and each micelle contained one or no nanoparticle, on average. When the host PS chains are much longer than corona chains, micelles tended to self-organize at the interfaces. Otherwise, they were dispersed throughout the PS host. In comparison to the neat PS-b-P2VP/PS blend, the nanoparticles/PS-b-P2VP/PS system had a higher density of smaller micelles, influenced largely by the number of nanoparticles in the system. The behavior of this system is understood in terms of the maximization of the nanoparticle/micelle core interactions and of the translational entropies of the micelles and the nanoparticles.

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