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Supramolecular Assembly of Gold Nanoparticles in PS-b-P2VP Diblock Copolymers via Hydrogen Bonding SE GYU JANG, CRAIG J. HAWKER, EDWARD J. KRAMER, University of California Santa Barbara — We report a simple route to control the spatial distribution of Au nanoparticles (Au-NPs) in PS-*b*-P2VP diblock copolymers using hydrogen bonding between P2VP and the hydroxyl-containing (PI-OH) units in PS-*b*-PIOH thiol-terminated ligands on Au-NP. End-functional thiol ligands of poly(styrene-*b*-1,2&3,4-isoprene-SH) are synthesized by anionic polymerization. After synthesis of Au-NPs, the inner PI block is hydroxylated by hydroboration and the resulting micelle-like Au-NPs consist of a hydrophobic PS outer brush and a hydrophilic inner PI-OH block. The influence of the hydroxyl groups is significant with strong segregation being observed to the PS/P2VP interface and then to the P2VP domain of lamellar-forming PS-b-P2VP diblock copolymers as the length of the PI-OH block is increased. The strong hydrogen bonding between nanoparticle block copolymer ligands and the P2VP block allows the Au-NPs to be incorporated within the P2VP domain to high Au–NP volume fractions $\phi_p$without macrophase separation, driving transitions from lamellar to bicontinuous morphologies as ϕ_p increases.

Se Gyu Jang
University of California Santa Barbara

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