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Effect of Areal Density of Polymer Chains on Gold Nanoparticles on Nanoparticle Location in a Block Copolymer Template B.J. KIM, J. BANG, C.J. HAWKER, E.J. KRAMER, UCSB — It is well established that one block of a copolymer can interact preferentially with an inorganic substrate to produce wetting and domain orientation. We take advantage of this preferential interaction to control the location of 2.5 nm diameter Au nanoparticles coated with short thiol-terminated polystyrene (M_n=3.4 kg/mol) chains (PS-SH) in a symmetric poly(styrene-*b*-2 vinyl-pyridine) (PS-b-P2VP) diblock copolymer (M_n=196 kg/mol) by changing the areal density Σ of the PS-SH on the Au. If $\Sigma \geq 1.6$ chains/nm^2, the preferential interaction between the P2VP of the PS-b-P2VP and the Au surface is screened and the Au localizes in the center of the PS domains. If $\Sigma \leq 1.4$ chains/nm^2 , the Au particles are localized at the PS-P2VP interface. Au nanoparticles coated with thiol terminated P2VP (M_n=3 kg/mol) localize in the center of the P2VP domain of the PS-P2VP over the entire range of Σ, demonstrating the localization of the PS coated Au nanoparticles at the interface at low values of Σ is due to the unscreened Au-P2VP interaction.

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