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Nanoparticle order through soft patterned confinement XIAOTENG WANG, Univ of Akron, REN ZHANG, Boston University, SONAL BHADAURIYA, ANDREY DOBRYNIN, Univ of Akron, MICHAEL BOCKSTALLER, Carnegie Mellon University, ALAMGIR KARIM, Univ of Akron — As has been proposed in colloidal science, visual order transitions can be achieved with entropy contributions alone. We compare "athermal" NP/polymer blends in which the NPs are densely grafted with a polymer brush of the same chemical composition as the polymer matrix with chemically repulsive interactive ones. Visual order of the NPs is induced by geometrically soft confining the thin film blends with topographic patterns. When the residual layer thickness of the patterned blend films approaches the nanoparticle dimension, exclusive segregation of NPs to less confining imprinted mesa region occurs, defined by partition coefficient K, the particle density ratio in confined residual layer to mesa region. The associated free energy change is calculated to explain NP segregation preference. Particle aggregation and anisotropy effects are examined.

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