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**Hierarchical Organization of Nanoparticle Composites through Nano-Imprinting** AZAR ALIZADEH, CHRIS KEIMEL, KENNETH CONWAY, ANDREA PETERS, GE Global Research, Niskayuna, NY 12309 — Formation of highly ordered and morphologically controlled nanoparticle/polymeric assemblies is highly desirable in a variety of applications including optoelectronics, sensing, photonics and catalysis. Structure-guiding polymer matrices, such as block copolymers, have demonstrated to be an effective means for controlling the composite morphology as well as localizing particles in nanoscale domains. Yet, fabrication of polymer/nanoparticle composites with precise control over final morphology and particle location is still a major challenge. In this paper, we will show the use of nano-imprint lithography to pattern polystyrene/gold composites at different length scales (20 nm to 1micron). Imprint lithography (the technique of physically pressing and deforming a polymer layer for patterning purposes) is a low cost and high throughput alternative to conventional patterning. PS coated gold nanoparticles were synthesized following Brust's method and subsequently dispersed in PS matrices of varying molecular weights. Nano- imprinting was conducted under different temperature and pressure conditions. TEM, SEM, AFM and UV-Vis techniques were used to characterize these composites.

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