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**Creating Opal Templated Continuous Conducting Polymer Films with Ultralow Percolation Thresholds Using Thermally Stable Nanoparticles** D.J. KANG, T. KWON, M.P. KIM, B.J. KIM, KAIST, H. JUNG, J. BANG, Korea Univ. — We propose a novel and robust strategy for creating continuous conducting polymer films with ultralow percolation thresholds using polymer-coated gold nanoparticles (Au NPs) as surfactant. Continuous poly(triphenylamine) (PTPA) films of high internal phase polymeric emulsions were fabricated using an assembly of crosslinked polystyrene (PS) colloidal particles as template. Polymer-coated Au NPs localize at the PS/PTPA interface and function as surfactant to efficiently produce a continuous conducting PTPA polymer film with very low percolation thresholds. The volume fraction threshold for percolation of the PTPA phase with insulating PS colloids was found to be 0.20. In contrast, with the addition of an extremely low volume fraction of surfactant Au NPs, the volume fraction threshold for percolation of the PTPA phase was dramatically reduced to 0.05. The SEM and TEM measurements clearly demonstrated the formation of a continuous PTPA phase within the polyhedral phase of PS colloids. To elucidate the influence of the nanoparticle surfactant on the blend films, the morphology and conductivity of the blends at different PS colloid/PTPA volume ratios were carefully characterized as a function of the Au NP concentration.

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