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Controlling the Phase Behavior of Gold Nanoparticles within Polymer Matrix by Varying Composition and Length of Ligands SEYONG KIM, MISANG YOO, Korea University, BUMJOON KIM, Korea Advanced Institute of Science and Technology, JOONA BANG, Korea University — Nanocomposites have been investigated for many years due to their facsinating features. In spite of the captivative properties, compatibility problem has been an obstacle for manufacturing the nanocomposites. To achieve the compatibility between NPs and polymer matrix, thiol-terminated polymeric ligands have been used for tuning the surface property of the NPs. However, in case of Au NPs, Au-thiol bond is unstable above 60 °C. In our recent work, we designed thermally stable Au NPs by using thiol terminated photo crosslinkable block copolymer, PS-b-PSN3-SH. With the thermally stable Au NPs, we demonstrated that Au NPs are stable at high temperature and can serve as compatibilizers for PS/PMMA blends. Herein, we prepared Au NPs using photo crosslinkable polymeric ligands which have various ligand composition and lengths. As the ligands characteristics were changed, the phase behaviors of Au NPs in both homopolymer and block copolymer bulk sample were significantly different. For example, the NPs become more dispersed within the polymer matrix with longer polymer ligands, while they are aggregates when shorter ligands were used. In this work, morphologies of Au NPs within polymer matrix were systematically investigated using the cross-sectional transmission electron microscopy.

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