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Thermally Stable Au Nanoparticles via Photo-crosslinkable Polymeric Stabilizers JOONA BANG, MISANG YOO, Korea University, BUMJOON J. KIM, KAIST — Polymer nanocomposites consisting of polymers and inorganic nanoparticles (NPs) have attracted many interest due to their applications such as solar cell, sensors, catalysts and ferroelectric devices. To integrate NPs into polymer matrix in the controlled manner, thiol-terminated stabilizers have been used to tune the surface property of NPs such as Au, Pt, CdSe, etc. However, a practical use of such particles in the nanocomposites is very limited by thermal instability even at ~ 90 °C, leading to the agglomeration of NPs. To impart the thermal stability of NPs, we modified Au NPs surface using UV-crosslinkable polymeric stabilizers. After UV-crosslinking, it was found that the Au NPs exhibit the excellent stability at high temperature (~ 180 °C) in both solution and thin-film states. Furthermore, we demonstrate that thermally stable Au NPs can be used as compatibilizers in PS/PMMA blends. The NPs at the PS/PMMA interface produced the dramatic reduction in the droplet size after 1 day of thermal annealing at 180 °C, in which the particle size is unchanged.

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