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Surface segregation of silver nanoparticles in the in-situ synthesized Ag/PMMA nanocomposites. RANJAN D. DESHMUKH, RUSSELL J. COMPOSTO, Materials Science and Engineering, University of Pennsylvania — Silver nanoparticles were synthesized in-situ, by thermal decomposition of (1,1,1,5,5,5 Hexafluoroacetylacetonato)silver(I), Ag(hfac), precursor at 185 ^{o}C, in thin films of Poly(methyl methacryalate), PMMA. Rutherford backscattering spectrometry, RBS, was used to observe and quantify the silver distribution along the thickness of the sample. Strong surface segregation of nanoparticles to the polymer surface and substrate was observed in PMMA thin films by RBS and also confirmed by cross-sectional transmission electron microscopy (TEM). Surface segregation mechanism has been attributed to simultaneous thermal decomposition and diffusion of precursor to polymer surface and substrate. It has been shown that the particles present near the surface could be initially exposed and then are eventually covered by the polymer leading to particle sinking as observed by TEM. Atomic force microscopy (AFM) showed bigger nanoparticles and wider size distribution on increasing the nanoparticle loading from 5 to 20-wt %. UV/Visible spectroscopy on PMMA/Ag nanocomposite films showed plasmon resonance peaked at 422 nm due to the presence of silver nanoparticles.

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