Abstract Submitted
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The Effects of Supercritical CO_2 and Nanoparticles on Metallization of Polymer Thin Films[1] B. KUGLER, Jericho High School, F. SHAIKH, Half Hollow Hills West, J. ROSENGARD, Half Hollow Hills East, R. HOLZER, Rambam Mestiva, J. JEROME, T. KOGA, M. RAFAILOVICH, J. SOKOLOV, Stony Brook Univerisity — Thin films of Poly (methyl methacrylate), Polystyrene (PS), and Ethylene Vinyl Acetate (EVA) were metallized by vapor deposition of chromium (Cr). The surface morphology was analyzed using atomic force microscopy and correlated to the interfacial width between the polymer and metallized layers. The results showed that in all cases exposure of the substrates to supercritical CO_2 resulted in doubling the interfacial width between the metal and polymer. This was in turn manifested by a reduction of the RMS roughness and surface contact angles. Metallization of films containing nanoparticles was also performed. The results showed that the addition of POSS-PMMA particles dramatically reduced the RMS roughness for PMMA and EVA while increasing it for PS. Addition of Au nanoparticles decreased the roughness for EVA and PS. X-ray reflectivity indicated that the Au nanoparticles segregated to the surface thereby providing a wetting layer for the Cr. A model to explain these effects based or preferential surface segregation of nanoparticles for films exposed to supercritical fluids will be represented.

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