

ANNOUNCEMENT

Chemical Engineering Seminar

When: *Friday January 16, 2015 at 3:00 PM*

Where: *Livermore 101*

Influence of processing on electrical properties of polymers reinforced by carbon nanotubes

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Carbon nanotubes (CNT) are being intensively studied because their potential applications are extremely varied. One of the important applications concerns the electrical properties enhancement of polymers reinforced by CNT. We are especially interested in the development of polymer piezoelectric membranes. Mixing CNT with polymer melt is discussed. The composites were prepared from twin-screw extruded pellets with 0.67, 1.33, 2 and 4 wt% multi-walled carbon nanotubes (MWNTs) in a PA12 matrix. Samples were processed by injection molding and compression molding. The compression molded samples have an electrical percolation threshold close to 1.2 wt%. Coupled rheological and electrical measurements show that their electrical properties start decreasing as soon as shear begins and are partially restored during flow, suggesting successively breakage and reconstruction of a percolating network. On the other hand, the electrical properties of the injection molded composites are close to the matrix ones, showing that cooling is too fast for the MWNTs to form a percolating network. There is some electrical anisotropy in these composites, as evidenced by a greater conductivity measured in the flow direction. However polarized Raman spectroscopy analysis does not reveal a significant orientation of the MWNTs. What is the role of CNT tortuosity?

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