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Dispersion of Carbon Nanotubes in Polymer Matrices using Tri-fluoroacetic Acid as a Co-solvent PAUL STOKES, HARISH MUTHARAMAN, HUI CHEN, QUN HUO, SAIFUL KHONDAKER, Nanoscience Technology Center & Departments of Physics, Chemistry, Mechanical, Materials & Aerospace Engineering, University of Central Florida — We report a simple approach of dispersing multi-walled carbon nanotubes (MWNTs) in a polymer matrix using trifluoroacetic acid (TFA) as a co-solvent. TFA is a low boiling point organic acid that is highly miscible with many organic solvents. MWNTs were readily dispersed in organic solvents mixed with 5-10 v% of TFA after mild sonication. The dispersed MWNT solution was then mixed with polymer solution to obtain a uniformly dispersed nanoparticle/polymer mixture solution. From this solution, nanocomposite films were prepared using drawdown bar method. The dispersion of MWNTs in solution and in dried polymer matrix on a glass substrate was studied by dynamic light scattering and scanning electron microscopy. The electrical conductivity of the carbon nanotube/polymer composite films with different loading ratio of MWNTs dispersed on a glass substrate was measured using two probe technique. A percolation threshold of 0.67 wt% MWNTs was found from the nanocomposite films. At a loading ratio of 1.25 wt% of MWNTs, the conductivity of the composite material was increased to the order of 10^{-3} S/cm.

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