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Polymer Diffusion in Single Wall Nanotube / Polystyrene Nanocomposites MINFANG MU, RUSSELL J. COMPOSTO, KAREN I. WINEY — In addition to providing exception properties, single wall carbon nanotubes (SWNT) enable fundamental studies of polymer diffusion. SWNT and small SWNT bundles have high aspect ratios ($>$ 30:1) and diameters on the order of nanometers, such that nanocomposites containing $\sim$ 1wt% SWNT provide a fixed set of nanoscale obstacles. Here we will report our first results of polymer diffusion in these materials. A SWNT / polystyrene nanocomposite is prepared by a coagulation method and compression molding. Trace diffusion experiments are performed using deuterated polystyrene (dPS) where the concentration profile is characterized by forward recoil spectrometry (FRES) as a function of diffusion time and temperature. The SWNT filler, particularly with the creation of a SWNT network, inhibits the diffusion of dPS and the diffusion coefficient decreases by one order of magnitude in the nanocomposite.

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