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Fabrication and Characterization of Polyamide Nanocomposites Using Functionalized Nanotubes. KAREN I. WINEY, M. MONIRUZZAMAN, University of Pennsylvania, J. CHATTOPADHYAY, W.E. BILLUPS, Rice University — We have prepared nylon 6,10 nanocomposites with functionalized single wall nanotubes (fSWNT) using an interfacial polycondensation method previously developed in our lab. The specific functional groups (CH2)nCOCl on the sidewall of the nanotubes were designed to permit covalent bonding to the nylon matrix while fabricating the nanocomposite. Using a binary mixture of dichlorobenzene/water solvent system, we have been able to prepare nylon 6,10 and nylon 6,10 / fSWNT nanocomposites with a yield of 80%. The composites were characterized using FTIR and Raman spectroscopies, optical and scanning electron microscopies, differential scanning calorimetry, and thermogravimetric analysis. The composites show good dispersion of nanotubes at the micron and submicron levels. Improved protocols have been developed to reduce the degradation of the composites at elevated temperatures. The nylon 6,10 / fSWNT nanocomposites were spun into fibers using melt fiber spinning at 240C and the mechanical properties of the fibers were studied as a function of nanotube loading.

Karen I. Winey
University of Pennsylvania

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