DIRECT OBSERVATION AND TENSILE STRENGTH OF SOME POLYCARBONATE NANOCOMPOSITES CONTAINING CARBON NANOTUBULES

Josiah Reams, Tsvetanka Filipova, Guy Longbrake, and David A. Boyles
South Dakota School of Mines and Technology
Rapid City, SD 57701

ABSTRACT

Bisphenol A (BPA) polycarbonate is used in compact disks, automobile headlight lens covers, and jet fighter canopies owing to its high optical clarity, high impact resistance, and high tensile strength. Recently, our laboratory has synthesized a family of high aspect monomers similar in structure to BPA that have been polymerized to yield new polycarbonates. These monomers incorporate additional phenyl rings in their molecular backbone providing tri- and tetraaryl monomers. Among these monomers is tetraaryl bisphenol A (TABPA). Polycarbonates with TABPA monomer units are expected to have improved mechanical properties, such as higher tensile strength since the molecular cross sectional area of higher aspect materials allows for the possibility of strengthening mechanisms in the bulk polymer. Incorporation of nanoparticles, such as multiwalled carbon nanotubes (MWCNTs), has been demonstrated to modify the bulk mechanical properties of many polymers. Preparation of TABPA polycarbonate with MWCNTs dispersed in the polymer will be described, and investigations of MWCNT incorporation with scanning electron microscopy will be presented, as will methods and results for the determination of the tensile strength of TABPA polycarbonate nanocomposite.