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Polymer-Graphite Nanocomposites: Comparison to Clay- and Carbon Nanotube-Based Hybrids KATSUYUKI WAKABAYASHI, KOSMAS KASIMATIS, Department of Chemical and Biological Engineering, JOHN M. TORKELSON, Department of Chemical and Biological Engineering; Department of Materials Science and Engineering, Northwestern University — Although polymer-layered silicate and polymer-carbon nanotube nanocomposites have been widely studied in the last decade, hybrids containing nanoscale entities of graphite have been studied far less. Its structural analogy to layered silicates and chemical analogy to carbon nanotubes make graphite an attractive nanofiller in both scientific study and technological application. A common challenge of efficient dispersion of the nanofiller in the polymer matrix associated with conventional fabrication methods is overcome by processing using the solid-state shear pulverization technique. The level of dispersion and presence of graphite nanosheets are confirmed by X-ray diffraction and electron microscopy, while enhanced mechanical, thermal, and electrical properties of the resulting materials are characterized using tensile testing, dynamic mechanical testing, differential scanning calorimetry, thermogravimetric analysis and impedance spectroscopy.

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