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Percolation behavior for high performance polyimide nanocomposites processed by melt mixing MICHELLE SCHLEA, Georgia Institute of Technology, ERIC MINTZ, Clark Atlanta University, MEISHA SHOFNER, Georgia Institute of Technology — In this work, high shear melt mixing was utilized to disperse carbon nanotubes in PETI-330, a phenylethynyl-terminated imide oligomer with a glass transition temperature of 330°C. Achieving full particle dispersion with carbon nanotubes is a common problem due to particle dimensions and interaction between the nanotubes and polymer; however, by controlling the processing conditions during melt-mixing, a range of morphologies could be obtained by using up to 3 wt% multiwall carbon nanotubes in PETI-330. Rheological and electrical properties were used to characterize percolation behavior and quantitatively analyze particle morphology. The effects of particle size on these properties were examined by comparing composites containing multiwall carbon nanotubes with those containing carbon nanofibers. Results indicate processing conditions required for desired morphologies, differences in behavior between the particle systems, and implications on subsequent processing methods such as resin transfer molding.

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