Abstract Submitted
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Role of Crystallinity in CNT Dispersion and Electrical Conductivity of SWCNT-Thermoplastic Nanocomposites[1] ADE KISMARAHARDJA, JAMES BROOKS, Florida State University, KEESU JEON, RUFINA ALAMO, FAMU-FSU College of Engineering — Using a homopolymer iPP and a series of propylene-ethylene random copolymers with a content of ethylene from 7 to 21 mol% as matrixes, SWCNT nanocomposites have been prepared in a range of CNT concentration from 0.15 to 1 wt%. The poly(propylenes) have crystallinities ranging from 70 to 10 %, and serve to test the role of CNTs acting as nucleants to preserve the uniform dispersion of CNTs after sonication in solution. Growth of the semicrystalline structure from the nanotubes is a barrier to prevent CNT clustering. Less crystallizable polymers lead to composites with poorer dispersion and lower electrical conductivity. At SWCNT concentrations of 0.15wt%, SEM images of nanocomposites with the highest crystallinity matrix indicate de-bundled and uniformly dispersed nanotubes, while CNT aggregates remain in the lowest crystallinity nanocomposites. Electrical conductivity in the former is relatively high, while the latter are insulators. Also discussed is CNT dispersion from analysis of Raman spectra and polymorphism of the nanocomposites in reference to the unblended matrix.

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