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Segregated conductive polymer composite with synergistically electrical and mechanical properties

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Abstract

The potential of segregated conductive polymer composites is greatly hampered due to its poor mechanical strength and brittle nature. In this work, plunger type injection molding (PTIM) is developed to achieve synergistically electrical and mechanical properties on carbon nanotubes (CNTs)/polypropylene (PP)/ultra-high molecular weight polyethylene (UHMWPE) segregated conductive polymer composite. Morphology observation indicates that the segregated CNTs conductive network was formed along the interfaces between PP and UHMWPE grains. An ultralow percolation threshold of 0.13 vol. % is achieved, which is much lower than that of conventional injection molding. The strength of PTIM sample is improved; importantly, more than 10 times of improvement in elongation at break has been achieved compared to the sample obtained from frequently-used compression molding. Stability of the segregated conductive

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