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ABSTRACT

Epoxy resins are inherently brittle caused by their highly cross-linked network structure. Herein, we report an effective method of toughening without loss of mechanical properties. Carboxylated carbon nanotubes (CNT-COOHs) were added to an epoxy (EP)/polysulfone (PSF) blend to control the phase separation behavior, fracture toughness and mechanical properties of the resultant ternary composites. Although CNT-COOHs did not change the phase separation mechanism of the EP/PSF blend they had an important influence on the final phase morphology. Rheological analysis showed that the complex viscosity and the cure-reaction rate of EP/PSF were increased by adding CNT-COOHs, leading to a significant suppression of the phase separation process which stopped at an earlier stage. Also, the fracture, mechanical and thermal properties of the EP/PSF/CNT-COOH composites were found to be increased due to the presence of CNT-COOHs.

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