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Effect of shear on the rheological and electrical properties of epoxy/MWCNTs dispersions SAMEER S. RAHATEKAR, NIST, K. K. KOZIOL, ALAN H. WINDLE, University of Cambridge, ERIK K. HOBBIE, JEFFERY W. GILMAN, NIST — We report the rheological, electrical and associated microstructural properties of multiwall carbon nanotubes (MWCNTs) suspended in an epoxy resin under shear. Above a critical concentration, we find a network of MWCNT aggregates with enhanced conductivity and viscosity. High shear results in MWCNT dispersion, with shear thinning and low electrical conductivity. The influence of MWCNT concentration and length on the scaling behavior of the elastic shear modulus is studied, and the role of individual MWCNT bending on the elastic shear modulus is discussed. We find significant differences in the scaling of the elastic shear modulus for different MWCNT lengths. Finally, we carry out small angle neutron scattering (SANS) in an attempt to establish a quantitative relationship between MWCNT microstructure and the corresponding rheological and electrical properties.

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