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Importance of Chain Connectivity in the Formation of Non-covalent Interactions between Polymers and Single-Walled Carbon Nanotubes DIAS LINTON, BRAD C. MILLER, HUIMIN LI, CHARLES FEIGERLE, Department of Chemistry, University of Tennessee, Knoxville, TN 37996, BOBBY G. SUMPTER, Oak Ridge National Laboratory, Oak Ridge, TN 37831, MARK D. DADMUN, Department of Chemistry, University of Tennessee, Knoxville, TN 37996 and Oak Ridge National Laboratory, Oak Ridge, TN 37831 — Our work is focused on understanding and utilizing non-covalent electron donor-acceptor (EDA) interactions between polymers and SWNT to optimize interfacial adhesion and homogeneity of nanocomposites without modifying the SWNT native surface. Nanocomposites with polymer bound electron donating 2-(dimethylamino)ethyl methacrylate or electron accepting acrylonitrile and cyanostyrene moieties leads to improved SWNT dispersion if the interacting functional group is a minor component of a copolymer matrix. Correlation of experimental (Raman mapping, Raman D* band peak shifts, and optical microscopy) and computational results indicates that chain connectivity is critical in controlling the accessibility of the functional groups to form EDA interactions. Thus, controlling the amount of e^- donating or withdrawing moieties throughout the polymer chain will direct the extent of EDA interaction, which enables tuning the SWNT dispersion.

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