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Microrheological Study of the Time Dependent Gelation of Single Wall Carbon Nanotube Suspensions D.T.N. CHEN, L.A. HOUGH, M.F. ISLAM, A.G. YODH, Dept. of Physics & Astronomy, University of Pennsylvania — Single wall carbon nanotubes (SWNTs) dispersed in water using an anionic surfactant, sodium dodecylbenzene sulfonate (NaDDBS) form reversible gels because of the bonding between the individual nanotubes (L.A. Hough, M.F. Islam, P.A. Janmey and A. G. Yodh Phys. Rev. Lett. **93**, 168102 (2004)). We study the time dependence of this reversible gelation using particle tracking microrheology. We empirically collapse the mean square displacement onto a single master curve that extends over several decades in time using a time-cure superposition. The frequency scaling exhibited by the viscoelastic moduli obtained from the master curve is remarkably similar to that of semiflexible polymer networks. By comparing the results from a range of initial SWNT concentrations below and above the rigidity percolation threshold, we gain insight into the evolution of structure during gelation. This work has been partially supported by the NSF through Grants DMR 05-20020 (MRSEC) and DMR-0505048, and by NASA grant NAG8-2172.

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