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Structure and Mechanical Properties of Model Nanotube Composites ANDREW B. SCHOCH, KENNETH R. SHULL, L. CATHERINE BRINSON, WESLEY R. BURGHARDT, THOMAS O. MASON, NEIL J. KIDNER, SUPAPORN WANSOM, LETA Y. WOO, Northwestern University — Thermoreversible gels based on solutions of acrylic triblock copolymers have been infused with multi-walled carbon nanotubes at various loadings. The fast transition between liquid and solid states allows for the nanotubes to be frozen into their positions. These composite materials exhibit distinct mechanical and electrical properties from the bulk gel. The storage modulus of the filled gels persists at temperatures well above the gel transition and signifies elasticity that comes solely from the nanotube inclusions. The magnitude of this additional elasticity at high temperatures increases dramatically with increasing nanotube volume fraction above a "percolation" threshold that is extremely low. Sensitivity to nanotube interactions is enhanced by the low background levels of gel elasticity above the gel transition temperature. Complementary alternating current impedance spectroscopy measurements were performed to asses the onset of electrical percolation in these systems.

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