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**Dynamic Consequences of the Fractal Network of Nanotube - Poly(ethylene oxide) Nanocomposites**[1] TIRTHA CHATTERJEE, RAMANAN KRISHNAMOORTI, Dept of Chemical and Biomolecular Engg., Univ of Houston — In this work, SWNTs are successfully dispersed in a PEO matrix with the aid of an anionic surfactant. A geometric percolation at $\sim 0.1$ vol % of SWNTs ($\phi_c$) is observed and indicates a good state of dispersion of tubes with an effective aspect ratio of $\sim 650$. At compositions ($\phi$) well above the percolation threshold, the melt state rheological properties of the nanocomposites are dominated by the self-similar fractal network of the nanotubes (verified by scattering measurements) and demonstrate 'time-temperature-concentration' superposition. The scaling of the network elastic strength, G $\left(\propto (\phi - \phi_c)^{3.4}\right)$, and critical strain for the onset of shear-thinning, $\gamma_c$ $\left(\propto (\phi - \phi_c)^{-1.9}\right)$, reveal a bond-bending mechanism to bear stress as expected from the strong short-range interactions between nanotubes. The onset of non-linearity and the damping behavior of the network show concentration invariance when represented against the local strain experienced by the network elements, with the onset occurring at a local strain value of 0.1.

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