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Layered polymer nanocomposite films of type-specific single wall carbon nanotubes MATTHEW R. SEMLER, JOHN M. HARRIS, NDSU, JEFFREY A. FAGAN, NIST, ERIK K. HOBBIE, NDSU — Thin networks of single-wall carbon nanotubes (SWCNTs) on elastic polymer substrates show significant promise for applications in flexible electronics, but the modulus and conductivity of such films can degrade significantly under an applied strain. This softening occurs because strong van der Waals interactions between adjoining nanotubes promote coarsening into a preferred parallel alignment under even modest compression. We demonstrate that by capping the nanotube layer with a thin glassy polymer film, the mechanical properties of networks can be substantially improved, which we attribute to the stabilizing influence of excluded-volume interactions.

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