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**Stabilizing nanotube films with thin polymer layers: Mitigating van der Waals forces through excluded-volume interactions** MATTHEW R. SEMLER, JOHN M. HARRIS, ERIK K. HOBBIE, North Dakota State University — Thin membranes of single-wall carbon nanotubes (SWCNTs) on elastic polymer substrates show considerable promise for flexible electronics applications, but the modulus and conductivity of these films decrease dramatically in response to applied strains. This softening arises from the strong van der Waals interactions between contacted nanotubes, which favor the parallel coarsening of SWCNT bundles in response to even very small external forces. By capping the SWCNT membranes with a thin layer of glassy polymer, we demonstrate a dramatic improvement in the mechanical response of the strained films. We link this behavior to the stabilizing influence of excluded-volume interactions mediated by the glassy polymer layer.

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