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Tethered Lubricant Films Based On Cross-linked Polydimethylsiloxane LUCAS LANDHERR, CLAUDE COHEN, LYNDEN ARCHER, Cornell University — We report on the interfacial friction and wear properties of surface-tethered cross-linked polymer thin films. We show that thin, two-tiered films produced by covalently tethering polydimethylsiloxane (PDMS) networks to self-assembled monolayers manifest the lowest friction coefficient ($\mu = 0.0039$) recorded for a dry lubricant film. Using a combination of lateral force microscopy, equilibrium swelling, and adhesion measurements we determine the physical processes responsible for these low friction coefficients. We also investigate the effect of free (unattached) and pendent polymer chains dispersed in thin PDMS network films on transient mechanical properties, interfacial friction, and wear characteristics.

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