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**Investigation of Forces Exerted During the Expansion of Nanomechanically Tensioned Organosilica Materials** THERESA ALBON, PAUL EDMISTON, SUSAN LEHMAN, The College of Wooster, Wooster, OH — Osorb®is a sol-gel derived organosilica that instantaneously swells up to four times in volume with organic liquids. The nanoporous glass-like material is hydrophobic and does not swell in water but absorbs non-polar organic solutes from aqueous solution. Swelling due to absorption of organic solutes, liquids, or gases leads to the generation of substantial mechanical force, presumably derived from the relaxation of the interconnected network of organosilica nanoparticles that comprise the material. We have investigated the force exerted by placing a powdered sample in a cylinder with a freely movable piston. As solvent percolates into the cylinder from below, the exerted force is measured by a load cell. The piston is then gradually moved upward to allow the material to expand. As the sample just begins to swell, we have routinely observed forces in excess of 500 N per gram; the exerted force then decreases as the volume is allowed to increase. The relationship between the exerted force and sample volume is shown to be exponential, and we define the exponential decay constant as the characteristic volume $V_c$. We also determine the absorption capacity and fractional change in volume of the organosilica samples, and correlate these with changes in $V_c$.

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