

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Characterization of the Morphology and Rapid Expansion of Swellable Organically Modified Silica LILIANNA E. CHRISTMAN, AMANDA LOGUE, The College of Wooster, Department of Physics, PAUL L. EDMISTON, The College of Wooster, Department of Chemistry, SUSAN Y. LEHMAN, The College of Wooster, Department of Physics, Wooster OH 44691 — Swellable organically modified silica (SOMS) is a novel sol-gel derived material. SOMS is hydrophobic and selectively absorbs non-polar liquids and immediately swells 5 to 6 times upon absorption. SOMS can be used to remove organic contaminants from water; the contaminant can then be recovered and the SOMS reused. We have investigated the SOMS swelling behavior of neat organic liquids using macroscopic measurements of the force exerted during expansion and through atomic force microscopy (AFM) of the surface. A powdered SOMS sample was placed in a cylinder with an adjustable piston. Solvent percolated into the cylinder and the piston gradually moved to allow expansion while measuring the force using a load cell. During expansion the SOMS exerted forces up to 150 N per gram of material. AFM shows the surface of the SOMS is textured with cauliflower-like features. In unswollen SOMS, these globules have length scales of a few hundred nanometers, while for SOMS swollen in a solvent the features expand to several micrometers.

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Date submitted: 19 Nov 2010

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