Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Fabricating overhanging magnets for use in magnetic resonance force microscopy using a XeF2 isotropic etch. SARAH WRIGHT, Cornell Department of Chemistry and Chemical Biology, STEVEN HICKMAN, JOHN MAROHN, Cornell Department of Chemistry and Chemical Biology — Pushing magnetic resonance force microscopy towards single proton sensitivity demands meeting the nanofabrication challenge of producing an attonewton-sensitivity cantilever with a magnetic tip whose diameter is 50 nm or less. At the same time, the cantilever should also experience low force noise (and force gradient noise) near the surface of technologically interesting samples. Ideally then, the magnetic tip would overhang the leading edge of the cantilever – to increase the signal created by the magnet while simultaneously minimizing the noise created by the rest of the cantilever interacting with the surface. We will show that the isotropic etchant XeF_2 can be used to underetch a single crystal silicon cantilever to create an overhanging magnet. This etch is a controllable etch process with high selectivity to metals that can be used not only to produce magnetic resonance force microscopy cantilevers, but other overhanging metallic structures as well.

Sarah Wright
Cornell Department of Chemistry and Chemical Biology

Date submitted: 30 Nov 2007 Electronic form version 1.4