Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Testing mechanical response of nanovolumes of material CATALIN PICU, DELI LIU, TOH-MING LU, GWO-CHING WANG, Rensselaer Polytechnic Institute — The measurement of the mechanical properties of nanoscale volumes of materials is an important topic in nanotechnology. However, the fabrication of suitable nanosize test structures and the measurement of their mechanical properties are challenging. In this work, we grow isolated helical Si nanosprings and slanted straight Cu nanorods with wire diameter of about 200 nm and total length larger than 4 micrometers, which we use as test specimens. The structures, which are fabricated by the oblique angle deposition technique with substrate rotation, are fixed to the substrate at one end. The other end of the nanostructure is loaded in a purely mechanical test, using a tip-cantilever assembly attached to a conventional AFM. Both mechanical and electromechanical loading is performed. Appropriate modeling is used to interpret the results. The constitutive behavior of the material is derived and discussed.

Catalin Picu
Rensselaer Polytechnic Institute

Date submitted: 02 Dec 2004 Electronic form version 1.4