

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Characterization and wear resistance of carbon nanotube-based tips for AFM local anodic oxidation nanolithography** LISHAN WENG, Department of Physics, Purdue University, MARK STRUS, ARVIND RAMAN, Department of Mechanical Engineering, Purdue University, LEONID ROKHINSON, Department of Physics, Purdue University — The AFM local anodic oxidation (LAO) lithography is a powerful scanning-probe-based patterning technique for fabrication and post-fabrication tuning of nanoscale structures and devices. The conventional tips suffer from rapid wear which degrades the quality of imaging and LAO lithography. Much research has been devoted to seek for wear-resistant AFM tips, and carbon nanotubes (CNT) are viable candidates. Apart from featuring small diameter, high aspect ratio, and mechanical flexibility, the CNT tips has been shown to last longer during LAO. We investigate the wear of CNT-based tips during LAO lithography by imaging the tips before and after the lithography using scanning electron microscope. CNTs show small contamination on the tip apex while preserve their original length and diameter after more than 200 micron of the lithography. We also analyze tip-surface interaction in order to optimize the quality of lithography and correlate energy dissipation during tapping mode to the line width and line thickness during LAO.

Lishan Weng  
Department of Physics, Purdue University

Date submitted: 26 Nov 2007

Electronic form version 1.4