

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Synthesis and characterization of superconducting, single-crystal Al nanowires using template based electrodeposition¹ MEENAKSHI SINGH, JIAN WANG, MINGLIANG TIAN, Penn State University, ALEXIS PEREIRA, University of Puerto Rico Cayey, NITESH KUMAR, THOMAS MALLOUK, MOSES CHAN, Penn State University — Al nanowires (ANW) have been fabricated using template based electrodeposition at room temperature for the first time. An anhydrous electrolyte comprised of AlCl_3 and LiAlH_4 in tetrahydrofuran with a Pt anode and Ag cathode was used to electrodeposit Al in an anodic aluminum oxide template. X-ray diffraction and electron diffraction show that the ANW are single crystal with (110) as the growth direction. Transmission electron microscopy shows that the wires have uniform diameters with an oxidation layer a few nanometers thick around them. Four electrode transport measurements on a single 70 nm thick ANW have shown significant enhancement in the critical temperature and the critical field and decrease in the critical current density from the bulk value.

¹This work was supported by: Center for Nanoscale Science (Penn State MRSEC) funded by NSF, Grant No. DMR-0820404.

Meenakshi Singh
Department of Physics, Penn State University

Date submitted: 21 Nov 2008

Electronic form version 1.4