

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Anomalous Long-Range Proximity Effect in Template-Fabricated  
Single-Crystal Superconducting Nanowires**<sup>1</sup> WENHAO WU, HAIDONG LIU,

ZUXIN YE, ZHIPING LUO, K. D. D. RATHNAYAKA, Texas A & M University  
— We report an anomalous proximity effect observed in single-crystal nanowires of Zn, Sn, and Pb of length up to 60  $\mu\text{m}$ . These nanowires were electrochemically deposited into the pores of anodic aluminum oxide membranes and polycarbonate membranes. Using an *in situ* self-contacting method, single nanowires were electrically contacted on both ends to a pair of macroscopic film electrodes of Au, Sn, and Pb pre-fabricated on both surfaces of the membranes. We observed that superconductivity in the nanowires was strongly suppressed when Au electrodes were used. When superconducting electrodes with higher transition temperatures were used, the nanowires became superconducting at the transition temperatures of the electrodes. We will present measurements of the sample resistance and the  $I - V$  characteristics at various temperatures and magnetic fields. Scanning electron microscopy and transmission electron microscopy analyses of the structure and the composition of the nanowires will also be presented.

<sup>1</sup>This work is supported by NSF under Grant Nos. DMR-0551813, DMR-0606529 and DMR-0315476

Wenhao Wu  
Texas A & M University

Date submitted: 27 Nov 2007

Electronic form version 1.4