Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Structure and Transport in ultrathin $SrRuO_3$[1] ARTHUR P. BADDORF, JUNSOO SHIN, Oak Ridge National Laboratory, TN, 37831, VON BRAUN NASCIMENTO, University of Tennessee, TN 37996, ALBINA Y. BORISEVICH, SERGEI V. KALININ, VINCENT MEUNIER, PETER MAKSYMOVYCH, Oak Ridge National Laboratory, TN, 37831 — $SrRuO_3$ (SRO) is a common electrode material in oxide thin film growth, and is also representative "bad" metal. Although bulk SRO is orthorhombic, a typical study grows a pseudocubic film on $SrTiO_3$(100) substrate. We have measured electrical conductivity and structure of in-situ grown SRO films using scanning probe microscopy, low energy electron diffraction (LEED) and scanning transition electron microscopy. The films remain conducting down to the thickness of one layer. LEED displayed sharp (1x1) patterns at 80 and 300K up to 5 layers, but revealed strong half-order spots with weak intensity at quarter-order by 20 layers. STM images show the surfaces of thick films to have many vacancies, which first principles theory suggests are missing SrO molecules.

[1]Research conducted at the Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, sponsored by the Division of Scientific User Facilities, and in the Materials Science and Technology Division, U.S. Department of Energy.

Peter Maksymovych
Oak Ridge National Laboratory, TN, 37831

Date submitted: 21 Nov 2008 Electronic form version 1.4