Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Search for superconductivity in surface-doped WO_3 films
AKIO TSUKADA, ROBERT HAMMOND, THEODORE GEBALLE, MALCOLM BEASLEY, Geballe Laboratory for Advanced Materials, Stanford University —
We report the search for superconductivity in surface-doped WO_3 films. Possible evidence for high temperature superconductivity in this system has been reported in the literature. In our work, WO_3 films were grown by MBE and characterized by *in-situ* XPS, UPS, and *ex-situ* XRD and resistivity measurements. For some films, Na was deposited on the surface at room temperature, and the resultant Na+WO_{3-x} films annealed in vacuum ($\sim 10^{-8}$ Torr) for 1h at various temperatures (300 – 800C). With increasing thickness of Na, the intensity of the Na1s peak in XPS spectra and area of the W5d state in UPS spectra increased, suggesting some charge transfer to the WO_3 film. After annealing below 500C, XPS and UPS spectra did not change, while after annealing above 500C, the area of the W5d state drastically increased. The same behavior was observed for pure WO_{3-x} films, however, suggesting that oxygen vacancies are created during the annealing. The films started to decompose above 700C. The resistivity of our films decreased with increasing annealing temperature. However, so far we have not observed any sign of superconductivity down to 2 K in any of our films. This work is supported by Air Force Office of Scientific Research.

Akio Tsukada
Stanford University

Date submitted: 21 Nov 2008 Electronic form version 1.4