Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Quasi-one-dimensional electronic structure of β'-$Cu_xV_2O_5$ (x=0.33∼0.65) studied by photoemission[1] S.-K. MO, F. WANG, J. W. ALLEN, Univ. of Michigan, J. HE, Univ. of Tennessee, R. JIN, D. MANDRUS, Oak Ridge National Lab, H. HÖCHST, Synchrotron Radiation Center — β'-$Cu_xV_2O_5$ is a quasi-one-dimensional (quasi-1D) oxide that undergoes a metal to insulator transition (MIT) when x decreases from 0.65 to below 0.60. It becomes a superconductor below 6K under pressure around 3GPa. In the metallic phase, the electrical resistivity along the chain direction is 30 times larger than that across the chain direction, making this material suitable for studies of quasi-1D electronic structures. We present the first photoemission spectra of β'-$Cu_xV_2O_5$ in both metallic (x=0.60, 0.65) and insulating (x=0.33, 0.55) phases. Angle-integrated spectra show a clear indication of the MIT. Nonetheless the intensity near the Fermi energy (E_F) is heavily suppressed in the metallic phase, just as in the spectra of $Li_{0.9}Mo_6O_{17}$ and certain other low dimensional oxides [1]. We observe a single band crossing E_F along the chain direction, around the Γ-point of the Brillouin zone, only in the metallic phase angle-resolved spectrum. Fermi surface intensity maps have clear 1D character and the Fermi wavevector changes according to the concentration of the dopant. [1] G.-H. Gweon, J.W. Allen, and J.D. Denlinger, Phys. Rev. B **68**, 195117 (2003).

[1]Supported by U.S. NSF at UM (DMR-03-02825), at ORNL by the U.S. DoE, at UT by the NSF, at SRC by the NSF.

S.-K. Mo
Univ. of Michigan

Date submitted: 22 Nov 2005 Electronic form version 1.4