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Simultaneous electrical transport and Raman spectroscopic measurements on individual nanowires of $W_xV_{1-x}O_2$ TAI-LUNG WU, Department of Physics, University at Buffalo-SUNY, LUISA WHITTAKER, C.J. PATRIDGE, S. BANERJEE, Department of Chemistry, University at Buffalo-SUNY, G. SAMBANDAMURTHY, Department of Physics, University at Buffalo-SUNY — Vanadium oxide is a well-know material to study the metal-insulator transition (MIT) in correlated electron systems. Upon heating to about 340 K, VO_2 undergoes orders of magnitude drop in resistance from an insulating phase (I) to a metallic phase (M) and accompanies a lattice structural phase transition from a low-temperature monoclinical phase (M1) to a high-temperature tetragonal phase (R). We present results from combined electrical transport and Raman spectroscopic measurements to discern the effects of doping in controllably tuning the MIT in individual nanowires of single crystal $W_xV_{1-x}O_2$. The MIT temperature (T_c) in our $W_xV_{1-x}O_2$ nanowires can be tuned through a wide range from 280 to 330 K by controlling the dopant concentration. The M-I transition can also driven electrically in these nanowires. Our simultaneous measurement of electrical transport and Raman spectroscopic measurement help us understand the role of structural transition in affecting the macroscopic electrical transition in individual wires.

Tai-Lung Wu
Department of Physics, University at Buffalo-SUNY

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