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Identifying the Role of Domains in Metal-Insulator Transitions in Individual Nanowires of Tungsten-Doped  $VO_2$ ADAM STABILE, SUJAY SINGH, TAI-LUNG WU, Department of Physics, SUNY at Buffalo, LUISA WHITTAKER, Department of Chemistry, SUNY at Buffalo, PAYAM TAHERIROSTAMI, Department of Physics, SUNY at Buffalo, SARBAJIT BANERJEE, Department of Chemistry, SUNY at Buffalo, G. SAMBANDAMURTHY, Department of Physics, SUNY at Buffalo — Though it is well known that the metalinsulator transition (MIT) in  $VO_2$  can be achieved by a variety of external parameters, an understanding of how different parameters drive such a transition has remained relatively unknown. We report transport and Raman spectroscopic characteristics on voltage (V)- and temperature (T)-driven MIT in individual, single-crystal, tungsten-doped  $VO_2$ nanowires. From transport analyses we discuss the T-dependent features in I vs V curves; specifically hysteresis gaps and resistance jump features seen in sub-micron devices. From Raman spectroscopic analyses we discuss the Raman intensity of  $A_q$  modes while driving the temperature and voltage across the transition. We conclude that driving Tsupports a slow transition to the rutile (R) metallic phase with a wide temperature range of mixed insulating, monoclinic (M1) and R states due to the population of metallic domains. V-driven transition does not appear evolve via the formation of domains, but is activated when V is sufficiently large above a T-dependent threshold.

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