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Electronic phases in vanadium dioxide nanowires observed by scanning tunneling spectroscopy JOHN HATCH, Department of Physics, SUNY at Buffalo, LUISA WHITTAKER, Department of Chemistry, SUNY at Buffalo, TAI-LUNG WU, ADAM STABILE, G. SAMBANDAMURTHY, Department of Physics, SUNY at Buffalo, SARBAJIT BANERJEE, Department of Chemistry, SUNY at Buffalo, HONG LUO, Department of Physics, SUNY at Buffalo — The electronic behavior of vanadium dioxide around its metal-insulator transition has been the focus of many experimental and theoretical investigations, concerning transition mechanisms. In this work, we present our experimental investigation of the temperature driven metal-insulator transition in individual single crystal vanadium dioxide nanowires with scanning tunneling spectroscopy. The local density of states is studied at temperatures around the transition temperature. We observe three distinct electronic phases: the insulating phase and two metallic phases with different density of states, both in terms of conductivity and in the complexity of the density-of-states spectra. Vanadium dioxide nanowires doped with tungsten were also studied and will be discussed.

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