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Metal-insulator transition in vanadium oxide nanowires JIANG WEI, ZENGHUI WANG, YUJIE XIONG, YOUNAN XIA, DAVID COBDEN — The oxides of vanadium are strongly correlated electronic materials. In the form of nanostructures, the correlations and the phenomena associated with them should be modified. For instance, in sufficiently thin nanowires the metal-insulator transition, which is first-order in the bulk, should become a crossover. We report on our synthesis of vanadium oxide nanowires and preliminary measurements of their transport properties. The nanowires as grown by vapor phase deposition on SiO_2 appear to be mainly V_2O_5, a semiconductor, and their conductance shows no features as a function of temperature. After annealing in hydrogen, hysteresis is seen in the conductance within a limited temperature range above room temperature, consistent with partial reduction to VO_2 which undergoes a metal-insulator transition in the bulk at 67^o C. After further annealing, the conductance increases by two orders of magnitude and the hysteresis disappears, consistent with further reduction of the nanowires to V_2O_3 which is a correlated metal at room temperature.

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