

Abstract Submitted  
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**Nanoscale manipulations of the structural and electronic phases in VO<sub>2</sub>.** MINA AZIZIHA, DUSTIN SCHRECONGOST, WEITAO DAI, West Virginia Univ, HAITIAN ZHANG, ROMAN ENGEL-HERBERT, Pennsylvania State University, CHENG CEN, West Virginia Univ — Vanadium Dioxide is a strongly correlated transition metal oxide with a metal-insulator transition at 340 K. Here we studied the phase transitions locally induced in VO<sub>2</sub> by biased conducting AFM probe. Firstly, a monoclinic to rutile-like structural transition can be produced by positive probe biases in air. This effect is attributed to the field ionization of surface adsorbed water and the subsequent ion injection into the VO<sub>2</sub> film. Secondly, a very stable layered structure can be generated from the rutile-like phase. The nature of the new phase, likely VO<sub>2</sub> · H<sub>2</sub>O, is still under active investigations. Near field scanning optical microscopy, Raman spectroscopy and electrical measurements were performed to image the phase transitions in nanoscale and characterize the related physical properties changes.

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