Abstract Submitted
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Nano-optical study of the metal-insulator transition (MIT) phase behavior of individual VO_2 microcrystals ANDREW C. JONES, SAMUEL BERWEGER, JIANG WEI, DAVID COBDEN, MARKUS B. RASCHKE, Departments of Chemisty and Physics, University of Washington — Understanding the nature of the metal-insulator transition (MIT) in VO_2 has remained a challenging problem due to the associated structural lattice changes leading to strain, the prevailing use of polycrystalline film samples, and the limited spatial resolution in most studies, thus hindering access to the complex phase behavior due to inevitable inhomogeneities. Combining scattering-Scanning Near-field Optical Microscopy (s-SNOM) for ultrahigh spatial resolution imaging with Raman microscopy we identify the two insulating monoclinic M1 and M2 phases and associated nano-domain formation in the MIT to the metallic R phase. We deduce that the MIT is sensitively influenced by the competition between the M1, M2, and R phases with their different lattice constants subject to external and internal strain. The implications for the interpretation of the results from polycrystalline thin films studies will be discussed.

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