

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Strain- and temperature-induced phase transitions in single crystalline VO₂ JOANNA ATKIN, University of Colorado, Boulder, EMILY CHAVEZ, University of Washington, SAMUEL BERWEGER, University of Colorado, Boulder, JINBO CAO, WEN FAN, JUNQIAO WU, University of California, Berkeley, MARKUS RASCHKE, University of Colorado, Boulder — The metal-insulator transition (MIT) of VO₂ exhibits a rich phase behavior involving two monoclinic (M1, M2), triclinic, and tetragonal phases that can form a complex domain structure and accompany the electronic transition. The interplay between these structural variants arises from strain due to differing lattice constants, temperature-dependent phase stability, and possible external strain from the substrate; the coupling between these effects renders a systematic study of the phase behavior difficult. We report on phase mapping of the structural changes through independent control of temperature and uniaxial strain in individual single-crystal nanorods, using Raman spectroscopy and near-field imaging. This allows us to investigate the transformation between the various insulating phases, elucidating the nature of the triclinic phase as a continuously distorted variant of the M1 monoclinic phase, intermediate in the first-order transformation into the monoclinic M2 phase.

Joanna Atkin
University of Colorado, Boulder

Date submitted: 19 Nov 2010

Electronic form version 1.4