Supplementary Material

Cooling Behavior:

After the initial nucleation of insulating domains under cooling from high temperatures, a further decrease in the temperature results in the gradual growth of the insulating domains. This corresponds to the phase configuration at which σ_{ave} for the crystal is reduced. Eventually as the temperature is lowered towards T_{MIT} the crystallite is forced from its state of stress stabilized phase coexistence through the continuous growth of the insulating domains.

This process is illustrated in Figure 6. Here, for higher temperatures (a) *s*-SNOM measurements reveal the coexistence of a well-defined alternating set of insulating and metallic domains. With cooling below T_{MIT}, the growth of insulating domains results in a mostly insulating crystal with metallic domains with more irregular domain boundaries (b). Further cooling results in the inevitable breakup of metallic domains (c) with the metallic stripes eventually breaking into smaller islands of metallic phase.

The entirety of the cooling process is illustrated in Figure 6e and f which represents the corresponding cooling ramp to the *s*-SNOM heating ramp consisting of repeated linescans displayed in Figure 2. Here, topography of a linescan down the center of a VO_2 crystal (e) which was found to be in the M1 phase at room temperature is correlated with IR *s*-SNOM signal over a wide temperature range. For this crystal the nucleation of insulating domains is observed between 365-370 K. The resulting growth of insulating domains through further cooling results in the eventual disappearance of metallic domains at approximately 330 K, The hysteresis curve of the fraction of metallic domains for both the heating and cooling curves over the nearly 6 μm section of the crystal observed is given in Figure 6g. Interestingly for this small segment of the crystal, the hysteresis of the volume fraction appears to be smaller at higher temperatures and larger at temperatures in the vicinity of T_{MIT}

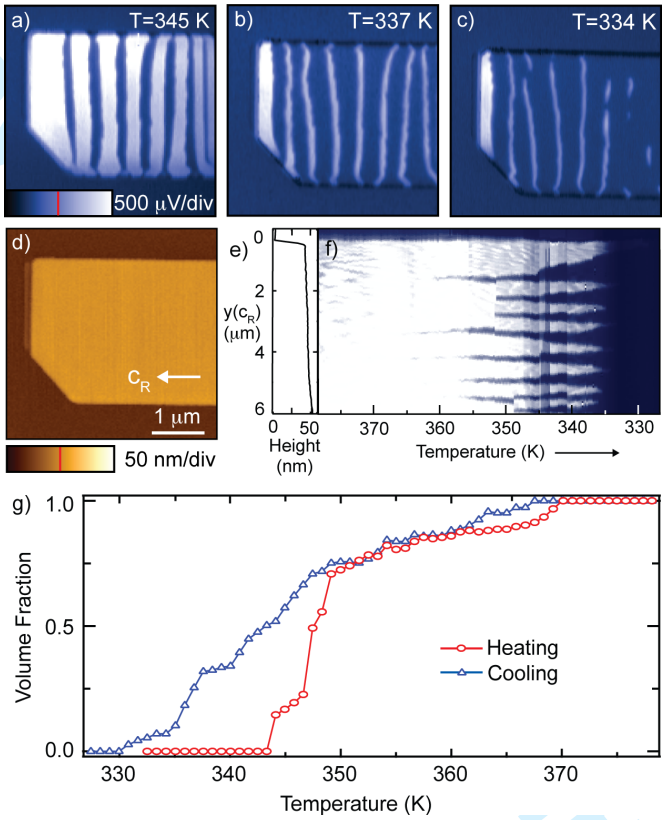

Figure 6: *s*-SNOM images (a-c) with corresponding topography (d) of a VO_2 crystal (h=25 nm) being cooled through the MIT. Periodic metallic and insulating domains exist slightly above T_{MIT} (a). As temperature is lowered, the size of the metallic domains decreases (b) resulting in the eventual break up and dissipation of metallic domains (c). Longitudinal line scan tracing the spatial domain dissipation with sample cooling(e, f), corresponding to same crystal as the similar heating plot in Figure 2e,f).