

Abstract Submitted
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On the Repeatability of Domain Formation and Growth During the Metal-Insulator Transition in Vanadium Dioxide Films¹ T.J. HUFFMAN, PENG XU, M.M. QAZILBASH, Department of Physics, College of William and Mary, BONG-JUN KIM, HYUN-TAK KIM, Electronics and Telecommunications Institute (ETRI) — Nanoscale phase coexistence between insulating and metallic domains has been observed in films of vanadium dioxide (VO₂) using scattering-type scanning near-field infrared microscopy (s-SNIM). When insulating VO₂ transitions to the metallic phase, small regions of the metallic phase first nucleate, and then grow as the metal-insulator transition (MIT) progresses. It is an open question if the patterns of insulating and metallic VO₂ in a given scan area are reproducible upon repeated thermal cycling across the MIT. To investigate this matter, we image the same area of a VO₂ film with s-SNIM over multiple thermal cycles through the MIT. In this way, we uncover the relative contributions of deterministic and random events occurring at the nanoscale during the progress of the MIT. Our experiments reveal the nature of phase coexistence in VO₂ films and the real-space dynamics of the MIT.

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