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Ultrafast dynamics of the nanoscale metal-insulator transition in VO₂ JOANNA ATKIN, BRIAN O'CALLAHAN, SVEN DOENGES, ANDREW JONES, MARKUS RASCHKE, University of Colorado at Boulder — The metal-insulator transition (MIT) of vanadium dioxide (VO₂) exhibits a rich phase behavior involving two monoclinic (M1, M2), a triclinic, and a tetragonal phase that form a complex domain structure and lead to spatial inhomogeneities in the electronic transition. The interplay of these different phases with strain can affect the progress of both the thermal and photoinduced MIT. We report on nano-optical imaging of the MIT in individual microcrystals and thin films of VO₂, in order to probe the effects of substrate and crystallite strain, morphology, and orientation on the emergent metallic phase. We find a large variation in transition rates and dynamical behavior among single crystal microrods, indicating intrinsic inhomogeneities in the MIT.

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