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In-situ studies on the Martensitic-type transition in VO_2 thin films VISWANATH BALAKRISHNAN, SHRIRAM RAMANATHAN, School of Engineering and Applied Sciences, Harvard University — We present in-situ kinetic studies across metal-insulator transition in epitaxial and polycrystalline VO_2 thin films through electrical resistance and stress measurements along with TEM investigations. Variable temperature wafer curvature experiments enable the probing of in situ stress relaxation kinetics associated with the structural component of the metal insulator transition. Primarily, no time or drive rate dependence is observed in the stress relaxations providing insight into the athermal nature of phase transition kinetics. However, proximate to the phase transition boundary, minor fraction of isothermal component that show time dependence in both stress relaxation and electrical measurement is captured. In situ electron diffraction and micro structural observations across the metal insulator transition provide evidence for martensitic type transition in polycrystalline VO_2 thin films. The studied aspects of time independent, Martensitic type, athermal transition kinetics along with negligible fraction of isothermal kinetics have significance in understanding the dynamics of structural phase transitions that accompany electronic property changes.

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