

Rapid Synthesis and *In-situ* X-ray Scattering of Vanadium Dioxide

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Abstract: In this talk, I will present rapid synthetic strategies using microwave assisted heating for vanadium dioxide, a thermochromic material possessing a metal-insulator transition temperature at 68°C. For smart windows applications, VO₂ is attractive due to its semiconducting to metallic phase transition near room temperature. Below the transition temperature, it is transparent in the near-infrared, and above the transition temperature, it is translucent to near-infrared. I will include a comparison of slow furnace growth and phase-pure synthesis of VO₂ and doped VO₂ via rapid microwave-assisted heating. *In-situ* X-ray scattering through the phase transition reveal heating and inhomogeneities in doped VO₂ synthesized via rapid heating. I will also present challenges with cross-correlative, multi-modal characterization approaches between *in-situ* X-ray and transmission electron microscopy.