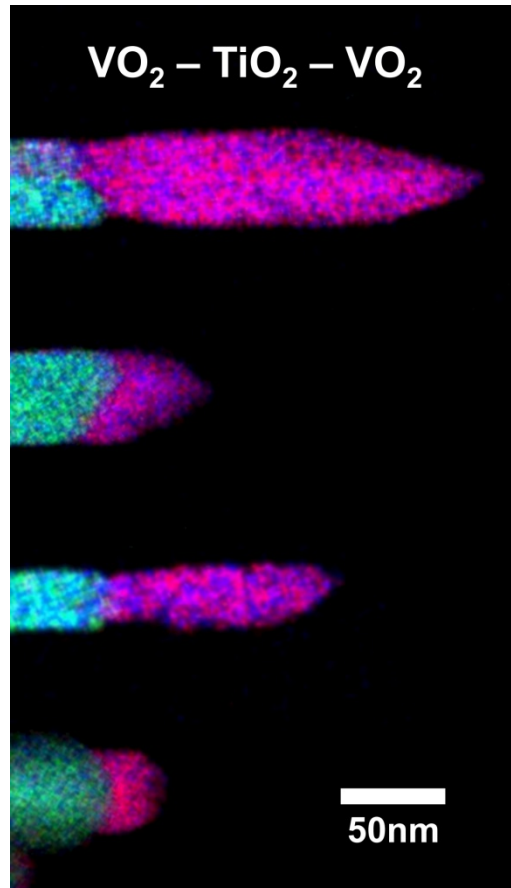
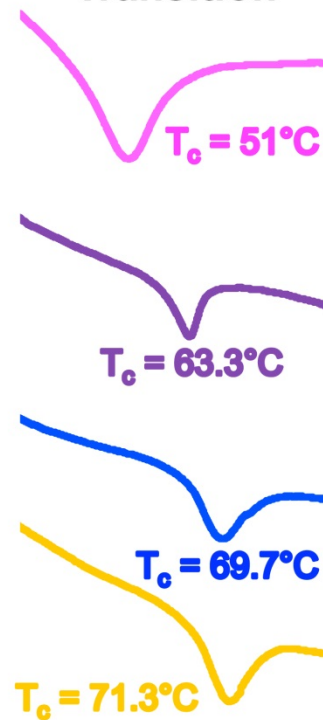


Functional nanostructure synthesis

Penn State MRSEC DMR-1420620 X. Li and R. E. Schaak, Size- and Interface-Modulated Metal-Insulator Transition in Solution-Synthesized Nanoscale $\text{VO}_2\text{-TiO}_2\text{-VO}_2$ Heterostructures, *Angew. Chem., Int. Ed.*, **2017** (available online at <http://onlinelibrary.wiley.com/doi/10.1002/anie.201706599/abstract>).



Insulator to Metal Transition



- Vanadium dioxide (VO_2) nanostructures that exhibit a switchable metal-insulator transition are difficult to synthesize in solution, in part because there are several closely related VO_x compounds with similar structures and compositions.
- We circumvented this bottleneck by growing VO_2 epitaxially on the tips of nanorods of TiO_2 , which is structurally similar to the targeted VO_2 phase.
- Four distinct types of $\text{VO}_2\text{-TiO}_2\text{-VO}_2$ nanostructures were accessible, and the metal-insulator transition temperature was tunable based on the sizes of the VO_2 domains and the characteristics of the $\text{VO}_2\text{-TiO}_2$ interfaces.