Nanoscale Epitaxial Films of Cu_2O_{2-x}
- An attempt to make cubic CuO -

Motivation

- *Explore structural and physical properties of a most fundamental cuprate structure, including effects of doping*
- *Explore general methodology for epitaxial stabilization of otherwise non-equilibrium crystal structures*

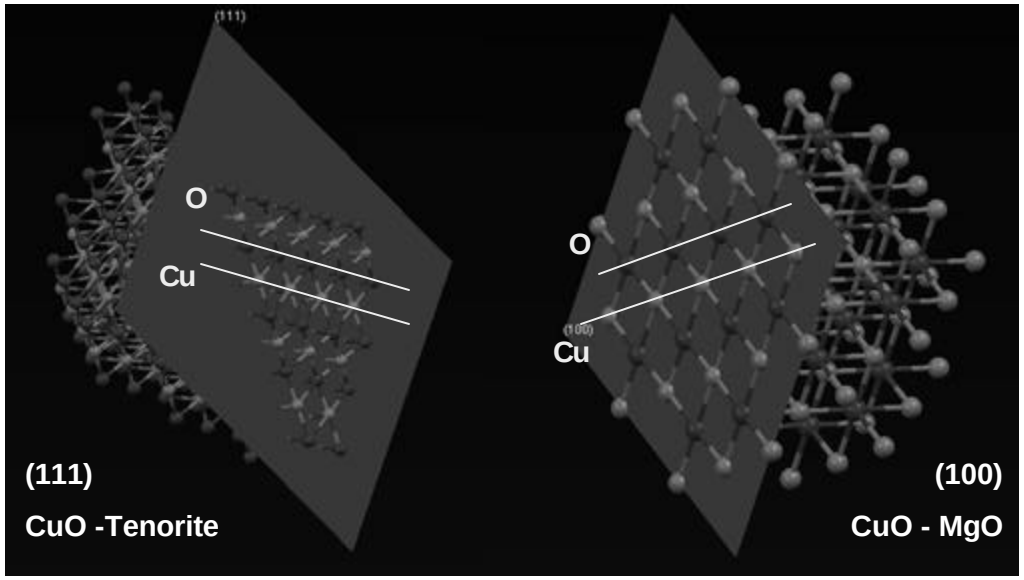
Cast

Stanford: Wolter Siemons, Gertjan Koster, Hideki Yamamoto, Bob Hammond, Ted Geballe, Paul Grant and Malcolm Beasley

Twente: Guus Rijnders and Dave Blank

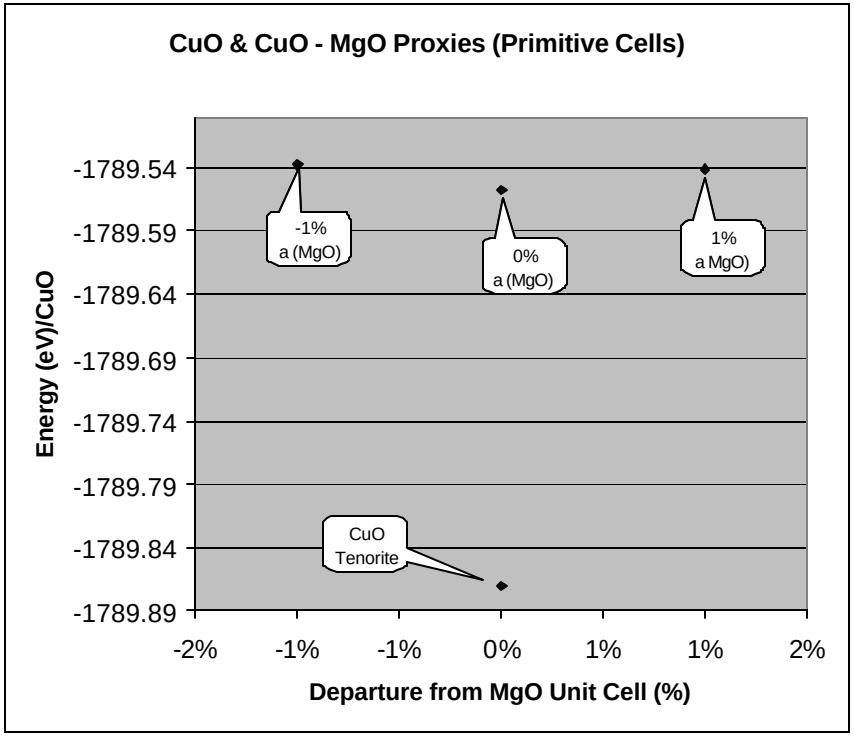
Support: EPRI, DOE and NanoNed

“Cloning” CuO on fcc Proxy Substrates



- CuO (tenorite) has a low-symmetry monoclinic with short bond lengths
- Can it be epi-grown on an fcc substrate (MgO, NiO, STO, SRO) in cubic or tetragonal form (possibly via IBAD)?

- DFT geometry optimization calculations indicate possibility cubic phases can exist quasistaticaly
- But not as stable as tenorite!



It Works!