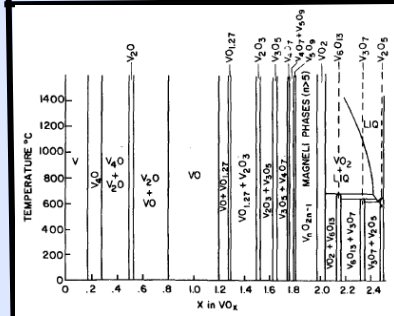
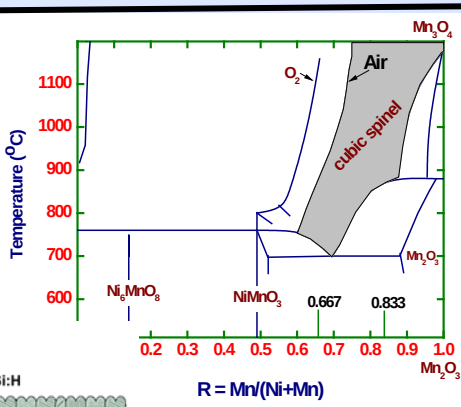
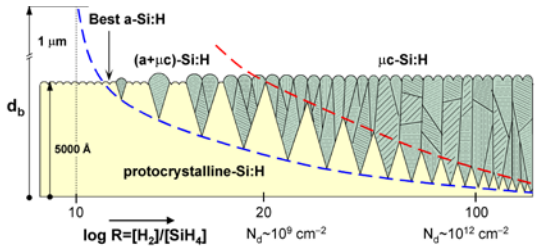
Monolithic Silicon Microbolometer Materials for Uncooled Infrared Detectors

Objective:

Gain and exploit knowledge of the physics and chemistry of uncooled bolometric materials and quantify their fundamental and technological attributes and limitations.

Technical Success:

- Structure of uncooled Vo_x proposed to be composite of nanocrystalline and amorphous material
- α silicon/germanium electrical properties (TCR, resistivity, 1/f) were correlated to the microcrystallinity
- Transport modeling indicated a possible mechanism for the difference between α silicon and VOx

Approach:

- Molecular structure modeling, predictive transport modeling and process control modeling.
- Thin film growth, material modification and process integration
- Chemical, structural and temporal characterization
- Electronic transport and optical characterization, testing and analysis