

CAREER: Thermochemistry of Nanoceramics: Understanding and Controlling Phase Transformation and Sintering via Interface Energetics

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As in nanomaterials the interface term accounts for a larger fraction of the atomic volume, any interface energy change can affect processing driving forces. **We measure surface and grain boundary energies of nanoceramics using calorimetry and conceptualize how to improve the control of sintering and phase transformation by monitoring and manipulating their driving forces.**

OUTREACH ACTIVITIES: Middle and High Schools in the Yolo County



Strong Materials

Smart Materials

Nano & Cool Materials

Sintering studies: SnO₂ and ZnO doped with Mg or Mn and Mn or Sb.

$$\delta G_{sys} = \delta \int \gamma_S dA_S + \delta \int \gamma_{GB} dA_{GB}$$

**Polymorphic stability studies
ZrO₂ doped with Y or Mg.**

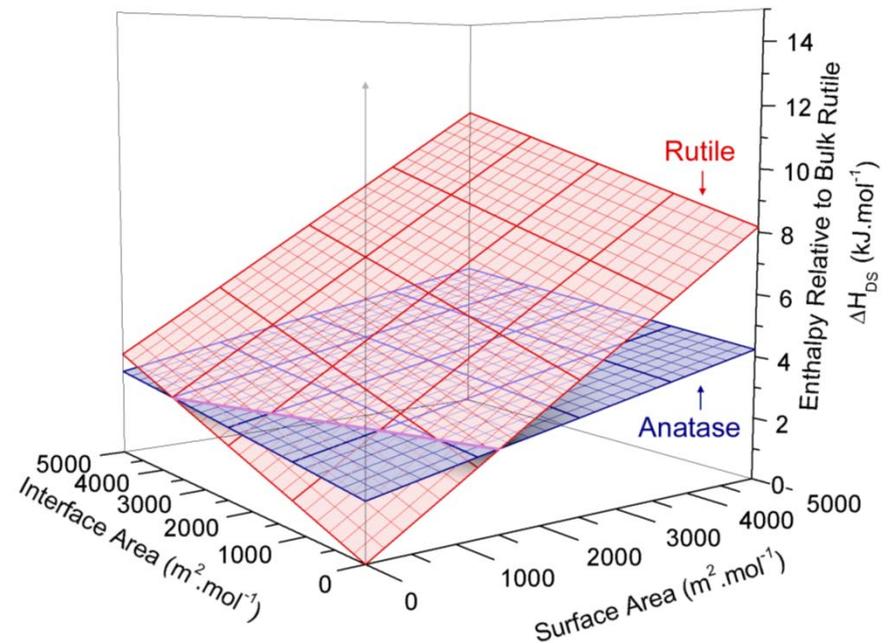


Figure: Effect of surface and grain boundary area in the stability of titania (TiO₂).