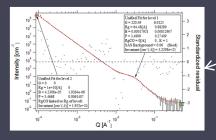
Enhancing Atomic Mobility and Desorption Kinetics in Light Metal Hydrides (Contract: 0847464; PI: Tabbetha A. Dobbins)

# Microstructure during Dehydrogenation

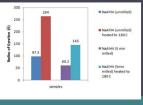


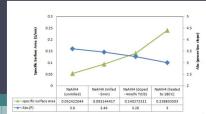
Hydrides are

(by USAXS)

Surface

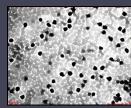
Fractals



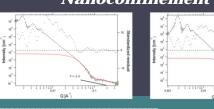


#### Nanoconfined Hydrides

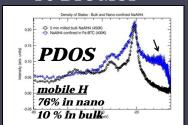
Confined in 200 nm Porous Alumina

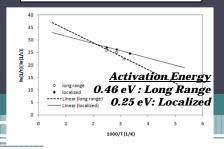


Mass Fractals in Nanoconfinement



Hydrogen Dynamics when Confined in 1.6 nm Fe-BTC MOF





### Project ENERGY

Hydrogen Storage Design Challenge at LSMSA High School







## Synchrotron X-ray Studies for Scientists and Engineers

Learning Activities

Friday Tours of CAMD beamlines Measurement at CAMD In-class Lectures Solving Homework Problems Exams

Primary Textbook
Elements of Modern X-ray
Physics by Jens Als-Nielsen

and Des McMorrow



#### **Citations**

- 1. Narase Gowda S., Ilavsky J., Gold S.A., Dobbins T., "Ultra Small Angle X-ray Scattering (USAXS) Studies of Morphological Changes in NaAlH4", *Materials Challenges in Energy*, Edited by Wicks G.G., et al., **224** pp 51-60 **(2010**).
- Dobbins T., Ukpai W., "A Study of the Thermodynamic Destabilization of Sodium Aluminum Hydride (NaAlH<sub>4</sub>) with Titanium Nitride (TiN) using Xray Diffraction and Residual Gas Analysis", Materials Challenges in Alternative and Renewable Energy: Ceramic Transactions Edited by Wicks G.G., et al. 224 pp 99-106 (2010).
- 3. NaraseGowda, S., Brown C., Jenkins T., Dobbins T., "Quasi-Elastic Neutron Scattering Study of Hydrogen Dynamics in Nano-confined NaAlH4, *PRB*, in preparation.
- 4. NaraseGowda S., Brown C., Jenkins T., Dobbins T., "Synergistic Effects of Nano-Confinement and TiCl3 Catalysis on NaAlH4 Desorption Studied by Quasi-Elastic Neutron Scattering, *Int. J. Hyd. Energy*, in preparation.
- 5. Dobbins T., NaraseGowda S., Butler L, "Study of the Morphological Changes in MgH2 Destablized LiBH4 Systems Using Computed X-ray Microtomography", *Journal of Alloys and Compounds*, in preparation.