

**author**  
**maintainer\_email**  
**doi**  
**institution** (Argonne National Laboratory, California Institute of Technology, Colorado School of Mines, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Liox Power Inc., National Renewable Energy Laboratory, Northwest University, Pacific Northwest National Laboratory, Penn State University, Sandia National Laboratories, University of California Berkeley, University of Delaware, University of Hawaii at Manoa, University of Michigan, University of Michigan Ann Arbor, University of Missouri St. Louis, University of South Florida, University of Southern California, Washington State)  
**sample\_barcode**  
**sample\_name**  
**sample\_description**  
**collection\_date**  
**comments**

- focus\_area**
- 1-Dynamic Sorbent Materials
  - 1-Enthalpy-Entropy
  - 1-Multi H2s Per Metal
  - 1-Nanoscale Defects in Sorbents
  - 1-Optimizing of Sorbent Packing
  - 1-Optimizing Sorbent Binding Energies
  - 2-Activation of B-B and B-H Bonds
  - 2-Machine Learning for New MH
  - 2-Metal Hydride Thermodynamics
  - 2-Microstructural Impacts of CMH Hydrogenation-Dehydrogenation Reactions
  - 2-Nanoscaling to Improve Thermodynamics and Kinetics
  - 2-Solid Interfaces and Surfaces
  - 3-Advanced in-situ and ex-situ Synchrotron and ATR Drifts
  - 3-Advanced NMR Spectroscopy
  - 3-High Temperature Validated PCT System
  - 3-PCT Calorimetry
  - 4-Adsorbents as Hydrogen Carriers
  - 4-Alternate Electrochemical Approaches without Direct Production of H2
  - 4-Bioinspired Hydrogen Materials as Hydrogen Carriers
  - 4-Catalyst-Stability
  - 4-Developing Priority Research Directions for Liquid Organic Hydrogen Carriers
  - 4-Eutectic Systems as Hydrogen Carriers
  - 4-Heterolytic-Cleavage
  - 4-Plasmon Interactions for On-Demand Hydrogen Release Via an Opto-Thermal Process

- capability\_node**
- Ab Initio Calculations Capabilities
  - Advanced PCT Measurements with Cryogenic Cooler
  - Chemistry of Hydrogen Interactions with Materials
  - Clean Transfer of Cell for Air-Free Sample Transfer
  - Computational Characterization and Screen of Porous Sorbents
  - Diffuse Reflectance with Cryostat and Gas Adsorption
  - Gas Flow Cell for In-Situ Operando X-ray Spectroscopic Studies
  - High-Pressure Hydrogen Materials Synthesis and Testing
  - Low-Energy Ion Beam Analysis
  - Modeling of Interfaces in Hydrides
  - Molecular Dynamics of Model of Hydrogen Diffusion
  - Multiscale Kinetic Modeling of Hydrides
  - Nanostructured Metal Hydrides
  - Near Ambient Pressure XPS
  - Porous Carbon Synthesis
  - Sum Frequency Generation Vibration Spectroscopy
  - Synthesis of Metal Hydride Composites
  - Thermal Conductivity
  - Thermodynamic and Kinetic Modeling of Microstructures
  - Thermodynamics of Phase Diagram Prediction of Hydrides

- data\_source\_type**
- Lab Experimental
  - Historical or Literature
  - Modeling and Simulation
  - External Data or Tools
  - Survey Data

- measurement\_types (multi-choice)**
- BET
  - DRIFTS
  - DSC
  - GC
  - ICP
  - LC
  - NMR
  - Other
  - PCT
  - Raman
  - SEM
  - Small Angle Xray Scattering
  - Soft Xray Microscope
  - TEM
  - TGA
  - TGA-DTA
  - Thermal Conductivity
  - TPD
  - UVVis
  - XAS-EXAFS
  - XPS
  - XRD
  - XRF

HyMARC Resource Metadata: 2019-11-04

**data\_source** LBNL NMR-FTIR-PCT,LBNLSoft Xray Microscope,NREL PCT 1, NREL PCT 2, NREL PCT 3,PNNL High-Low Temp NMR)  
**data\_source\_other**  
**data\_tool** (Multi-spectra)  
**lab\_environment** (Indoor Lab, Outdoor Lab)  
**measurement** (Biased, Non-biased)  
**literature\_doi**  
**resource\_comments**  
**measurement\_type\_other**

- measurement\_type**
- BET
  - DRIFTS
  - DSC
  - GC
  - ICP
  - LC
  - NMR
  - Other
  - PCT
  - Raman
  - SEM
  - Small Angle Xray Scattering
  - Soft Xray Microscope
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  - TGA
  - TGA-DTA
  - Thermal Conductivity
  - TPD
  - UVVis
  - XAS-EXAFS
  - XPS
  - XRD
  - XRF

**sem\_detector\_type**  
 detector\_sampling\_time  
 detector\_scanning\_speed  
 magnification\_max  
 magnification\_pixel\_size  
 magnification\_working\_distance  
 magnification\_probe\_voltage

**tem\_operator**  
 tem\_acquisition\_date  
 tem\_acquisition\_time  
 tem\_specimen\_name  
 tem\_specimen\_description  
 tem\_model\_name  
 tem\_imaging\_mode  
 tem\_hv\_setting  
 tem\_magnification  
 tem\_pixel\_size  
 tem\_pixel\_array\_size  
 tem\_probe\_current  
 tem\_camera\_length  
 tem\_indicated\_mag  
 tem\_exposure  
 tem\_collection\_angle  
 tem\_convergence\_angle  
 tem\_ccd\_binning (Yes, No, Unknown)

**xray\_source\_anode**  
 xray\_source\_spectra  
 scattering\_geometry\_theta\_min  
 scattering\_geometry\_theta\_max  
 xrd\_detector\_type  
 detector\_area

**operator**  
**acquisition\_timestamp**  
**specimen\_name**  
**specimen\_description**

