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High Throughput Tomography at the Advanced Photon Source 2BM Beamline enabling the Study of the Morphological Changes in MgH2 Destabilized LiBH4 Systems[1] TABBETHA DOBBINS, Rowan University, SHATHABISH NARASEGOWDA, Louisiana Tech University — Understanding morphologies in two phase hydride systems, such as MgH2 and LiBH4 mixtures, will permit the study of mass transport (i.e. diffusion), interface reaction(i.e. H2 desorption reactions) and ultimately models for H2 desorption and uptake rates. Many hydride systems are prepared by high energy ball milling which delivers stochastic microstructures from which many images are needed in order to collect reliable particle size and interfacial area data. The high throughput tomographic imaging system at 2BM of the Advanced Photon Source permitted data collection from a series of mixed hydrides—with the goal of optimizing energy for absorption contrast from a two phase system and determining relative amounts of hydride phase as well as interfacial area between the hydrides. Two-phase mixtures at LiBH4:MgH2 ratios of 1:3, 1:1, and 2:1 were imaged. The optimal energy for measurement was determined to be 15 keV (having 18% transmission for the MgH2 phase and above 90% transmission for the LiBH4 phase). Results showed that the % of interfacial area for the mixed composite system was always higher in the catalyzed system—increasing from 15% to 34% in the 1:3 system, from 27% to 60% in the 1:1 system, and 22% to 37% in the 2:1 system.

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