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**Zirconium Hydride: Structural Integrity at High-Pressures - A Synchrotron X-Ray Difffraction Study** PATRICIA E. KALITA, A. CORNELIUS, Department of Physics, University of Nevada Las Vegas, NV, USA, S. SINOGEIKIN, Geophysical Lab, Carnegie Institution of Washington, Washington DC, USA, A. MARTIN, Department of Physics, Xavier University of Louisiana, New Orleans, LA, USA, T. HARTMANN, Institute of Nuclear Science & Engineering, Idaho State University, Idaho Falls, ID 83401. USA, K.E. LIPINSKA-KALITA, Dept. of Chemistry, University of Nevada Las Vegas, NV, USA — Metal hydrides are of great interest not only form the fundamental research point of view but also because of their many technological applications, including hydrogen storage. Here we present our most recent studies in situ, high-pressure, angle-dispersive, synchrotron x-ray diffraction studies of zirconium hydride. We investigate the effects of hydrostatic and non-hydrostatic conditions. We also show the results of structural refinements as well as the bulk modulus of ZrH2. *Work at UNLV is supported by DOE award No. DEFG36-05GO0850. Portions of this work were performed at HPCAT (Sector 16), Advanced Photon Source (APS), Argonne National Laboratory. Use of the HPCAT facility was supported by DOE-BES, DOE-NNSA (CDAC), NSF, DOD –TACOM, and the W.M. Keck Foundation. Use of the APS was supported by DOE-BES, under Contract No. W-31-109-ENG-38.

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