Title: Synchrotron Powder Diffraction of Zirconium Hydride (ZrH₂) up to 50 GPa

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Our purpose of the experiment was to find out the structural characteristics of Zirconium Hydride at low pressures. In order to achieve our goal we used the Advanced Photon Source (APS) a national synchrotron-radiation facility at U.S Dept of Energy’s Argonne National Laboratory in Chicago to produce a high resolution and high intensity X-ray that is used for powder diffraction. Synchrotron-radiation is generated by the acceleration of electrons in a synchrotron at the speed first in one direction and then in another direction emitting radiation in the range of billion electron volts (GeV). The X-rays produced are then used for power diffraction, a scientific technique that used to determine the structure characteristics of materials. This technique allows us to view smooth diffraction rings which when analyzed gives data on the structure of materials. During our experiment we were able to take the pressure of our diamond anvil cell up to 50 GPa, which will provide us with significant data.