

Research interest

My research interests lies in the area of fabricating and characterizing metal alloys designed to store hydrogen gas as a solid. Hydrogen gas stored as a solid is better known as metal hydrides. Metal hydrides cover a broad range of applications, one of which is a portable source of hydrogen that can be included in the design of fuel cells. In order to be a good storage medium, metal hydrides must possess properties such as low dissociation pressures and small positive enthalpy change (ΔH). These properties are important for storage and future liberation of hydrogen gas when needed. Hydrogen gas will be the choice fuel in the future and the fabrication of metal alloys for the purpose of storing hydrogen gas will play a significant role in the advancement of fuel cell technology.

The metal hydride systems that I am interested in are the alanates: NaAlH_4 and LiAlH_4 . The above compounds are sodium alanate and lithium alanate respectively. These compounds have the desired hydrogen storage capacity; however, in order to have application in fuel cell technology, the hydrogen dissociation temperature and pressure needs to be in the range of 0-100⁰C and 1 -10 atm.

The objective of this project is the fabrication and characterization of these metal hydride systems using pressure composition isotherms to determine the optimum temperature and pressure for the loading and unloading of hydrogen gas on these materials.