

Mound Science and Energy Museum Association
presents

**The Diverse Roles of Hydrogen and Metal Hydrides:
A Historical Perspective**

Presented by: *Robert Bowman, Ph.D.*

October 22, 2025

Starting Time: 7:00 pm

1075 Mound Road, Miamisburg, OH

Summary: This talk will first briefly summarize the relevant chemistry background of molecular hydrogen (H_2) and metal hydrides (MH_x) that define their potential roles and limitations as fuel as well as a range of diverse applications. Included will their historical uses for transportation from dirigibles to rocket fuel up through their current promise, status, and safety issues to be addressed prior to becoming modern renewable energy sources for nearly all modes of transportation when used in fuel cell power systems. The relevant properties for candidate metal hydrides include total and reversible hydrogen storage capacities, their thermodynamic parameters as well as the kinetics for hydrogen absorption and desorption, and vulnerabilities to contamination and explosive reactions. Examples will include ground, marine, and aerospace applications..

Presenter Information: Dr. Bob Bowman is a former Monsanto, Mound fellow who also held science & engineering positions at The Aerospace Corporation, Aerojet, the Jet Propulsion Laboratory, and had retired in 2018 from the Oak Ridge National Laboratory. All of Bob's degrees are in Chemistry, including a Ph.D. from the California Institute of Technology. He currently provide consultation services on properties, characterizations, and applications of hydrogen storage and compression materials/systems based upon his 55+ years as researcher on metal hydrogen technology for DOE, NASA, and USAF projectss. Bob is the author/co-author of over 250 publications on the properties and applications of metal hydrides. in nuclear technology, renewable energy, and space missions.