



# MSE SEMINAR

Materials Science and Engineering  
Michigan Technological University

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Room 610, M&M Building



## Lithium Nitride Material for Hydrogen Storage

**Yun Hang Hu**

Research Professor

Department of Chemical and Biological Engineering  
State University of New York at Buffalo

The storage of a sufficient amount of hydrogen is one of the most challenging tasks on the way to introduce and establish hydrogen as an alternative fuel. Lithium nitride ( $\text{Li}_3\text{N}$ ) material is a potential candidate for  $\text{H}_2$  storage because it can be hydrogenated to lithium amide ( $\text{LiNH}_2$ ) and lithium hydride ( $\text{LiH}$ ), which contain about 10wt% hydrogen. In this presentation, hydrogen storage in  $\text{Li}_3\text{N}$  material will be addressed, with emphasis on the following important results: (1). A potential issue regarding N-based materials for hydrogen storage is the generation of  $\text{NH}_3$ , which consumes some  $\text{H}_2$  and also constitutes a poison for the down stream processes. However, it was demonstrated the ultra-fast reaction between  $\text{NH}_3$  and  $\text{LiH}$  could eliminate  $\text{NH}_3$  during the hydrogen storage process of  $\text{Li}_3\text{N}$ . (2). Although  $\text{Li}_3\text{N}$  can theoretically absorb as much as 10wt% hydrogen, its reversible hydrogen capacity is about 5.5 wt% because only a fraction of the hydrogen absorbed can be desorbed at relatively low temperatures. (3). Pre-adding  $\text{LiNH}_2$  into  $\text{Li}_3\text{N}$  can increase its reversible hydrogen capacity up to 6.8wt%.

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