Hiden Reference: AP0029
Hiden Product: CATLAB-PCS Microreactor

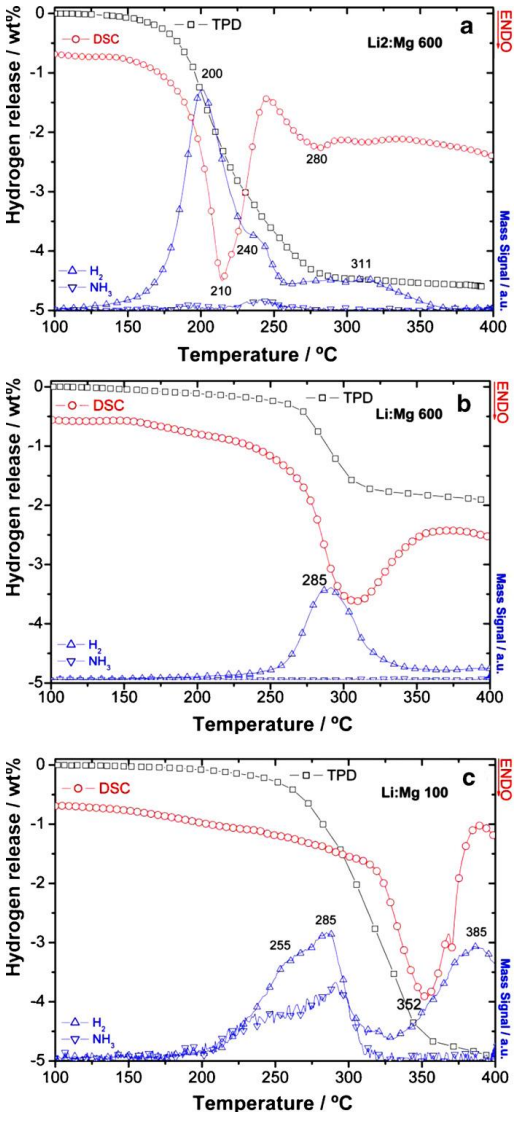
Gaseous release in $LiNH_2$–MgH_2 systems

Hydrogen is considered a safe and clean alternative to fossil fuels. Hydrogen storage is currently obtained by compressing the gas at high pressure. Researchers are currently attempting to tackle safety and energy density issues by locking hydrogen into solids, packing large quantities into small volumes. However, most of the known solids (i.e. intermetallics) show very low gravimetric density, smaller than 2 wt% of H_2. Lither materials (i.e. complex hydrides) can only absorb hydrogen under extreme temperature and pressure conditions.

Today, scientists within collaborative research networks in the EU and in the U.S. intensively investigate a promising material system for hydrogen storage consisting of lithium amide and magnesium hydride, which can be processed by different methods and in different ratios, absorbing and releasing hydrogen at modest temperatures and pressures.

"The results confirms the complexity of studying the solid-state hydrogen sorption reactions of such systems for hydrogen storage" says Marcello Baricco, Coordinator of Hydrogen Storage Projects inside the Nanostructured Interfaces and Surfaces (NIS), a Centre of Excellence located at University of Turin. "Moreover, we have added information to the unique features of this composite material, which shows the creation of new phases already during its synthesis and during its different reaction pathways".

Baricco along with the NIS group are using the Catlab instrument from Hiden Analytical to observe evolved gases from the Li-Mg-N-H composite. With the thermal programmed desorption measurements of the Quadrupole Mass Spectrometer, NIS researchers were able to detect the temperature ranges of desorption depending on the material system—providing insights into the release behaviour of hydrogen and the dependence of ammonia on the processing and Li:Mg ratios within this class of storage materials.



MS, TPD and DSC profiles relative to samples: Li_2:Mg600(a), Li:Mg600(b), and Li:Mg100(c)

HIDEN ANALYTICAL LTD
420 Europa Boulevard, Warrington, WA5 7UN, England
t: +44 (0) 1925 445225 f: +44 (0) 1925 416518
e: info@hiden.co.uk **w: www.HidenAnalytical.com**

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D.Pottmaier preparing the samples for measurements in the Catlab instrument from Hiden Analytical.

Project Summary by:
Daphiny Pottmaier and Marcello Baricco
NIS Centre of Excellence, Dipartimento di Chimica I.F.M., Universita' di Torino, Italy
www.nis.unito.it

Paper Reference:
D. Pottmaier, F. Dolci, M. Orlova, G. Vaughan, M. Fichtner, W. Lohstroh, M. Baricco *"Hydrogen release and structural transformations in LiNH2-MgH2 systems"* Journal of Alloys and Compounds, In Press, Corrected Proof, 04-November-2010

Hiden Product:
CATLAB-PCS Microreactor with integrated Mass Spectrometer for Catalysis Studies

Follow the link to the product catalogue on our website for further information:
http://www.hidenanalytical.com/index.php/en/product-catalog/49-catalyst-characterisation/74-catlab-pcs-microreactor-ms-for-catalysis-studies