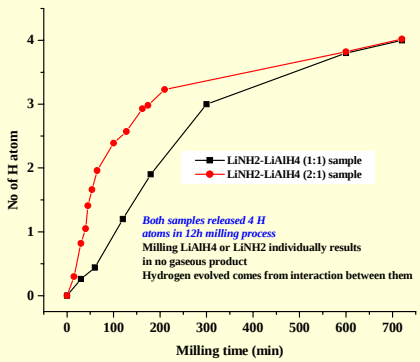
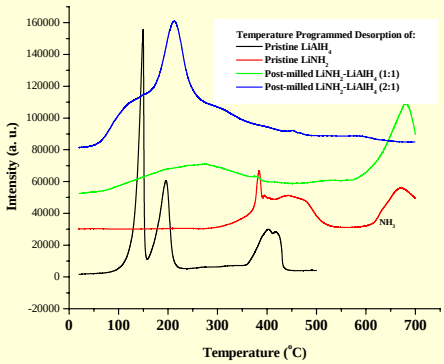
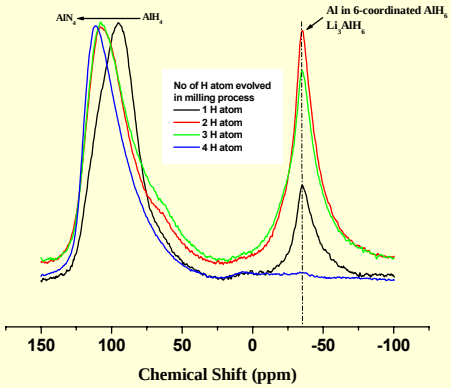
$LiNH_2/LiAlH_4$ system for hydrogen storage

•*Large amount of hydrogen desorbed from $LiNH_2$-$LiAlH_4$ mixture*







Starting materials were ball milled using a planetary mill at 200rpm

Post-milled samples released more hydrogen upon heating

^{27}Al NMR study on hydrogen desorption from $LiAlH_4$-$LiNH_2$ (1:2) mixture in milling process

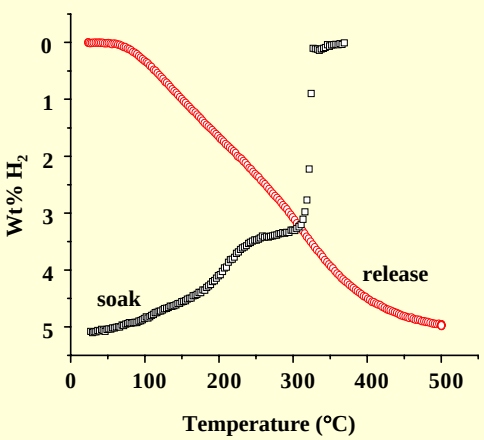
$LiAlH_4 + LiNH_2 \rightarrow [Li_2AlNH] + 5/2H_2$ 8.2wt%

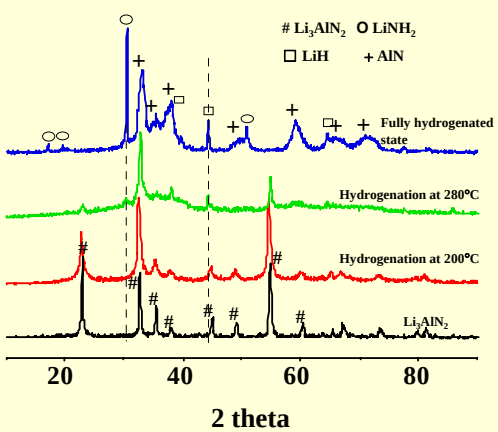
$LiAlH_4 + 2LiNH_2 \rightarrow Li_3AlN_2 + 4H_2$ 9.5wt%

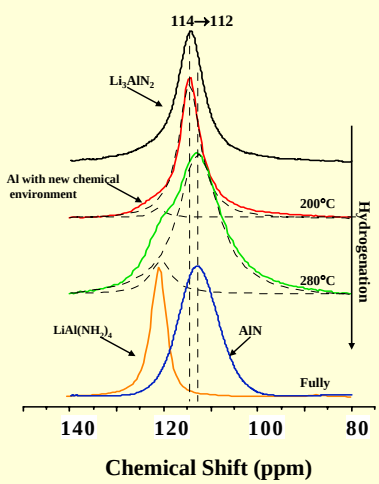
Z.T. Xiong, G.T. Wu, J.J. Hu and P. Chen, J. Power Sources 2006, 159, 167

Z.T. Xiong, G.T. Wu, J.J. Hu and P. Chen, Adv. Funct. Mater. submitted

•*Reversible hydrogen storage over Li_3AlN_2*







Volumetric measurements on hydrogen absorption/desorption over Li_3AlN_2

X ray diffraction patterns of hydrogenated Li_3AlN_2

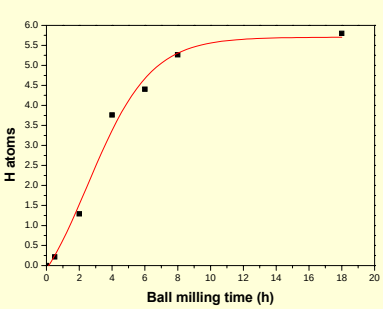
^{27}Al NMR spectra of hydrogenated Li_3AlN_2

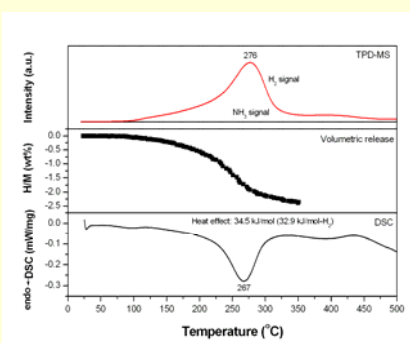
$Li_3AlN_2 + 2H_2 \leftrightarrow LiNH_2 + 2LiH + AlN$ ΔH = -50.1 kJ/mol-H_2

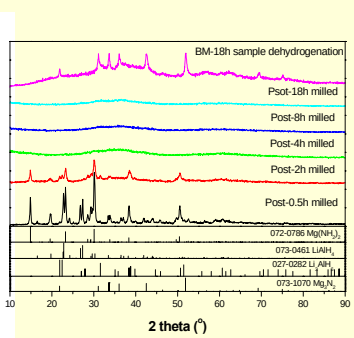
$Li_3N + 2H_2 \leftrightarrow LiNH_2 + 2LiH$ ΔH = -80.5 kJ/mol-H_2

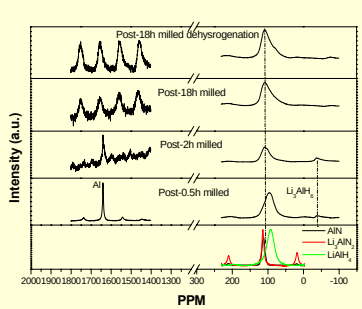
Considerable thermodynamic improvement of the Li-N-H system was achieved with the presence of AlN

$Mg(NH_2)_2/LiAlH_4$ system for hydrogen storage









The amount of hydrogen released from the $Mg(NH_2)_2$-$LiAlH_4$ system during ball milling

TPD, DSC and volumetric release behaviors of the post-18h milled sample of $Mg(NH_2)_2$-LiAlH4

XRD patterns of the sample of $Mg(NH_2)_2$-$LiAlH_4$ after different treatments

^{27}Al MAS spectra of the sample of $Mg(NH_2)_2$-$LiAlH_4$ after different treatments

$Mg(NH_2)_2 + LiAlH_4 \rightarrow 1/3Li_3AlN_2 + 1/3Mg_3N_2 + 2/3AlN + 4H_2$ 8.4wt%