

Electronic Supplementary Information

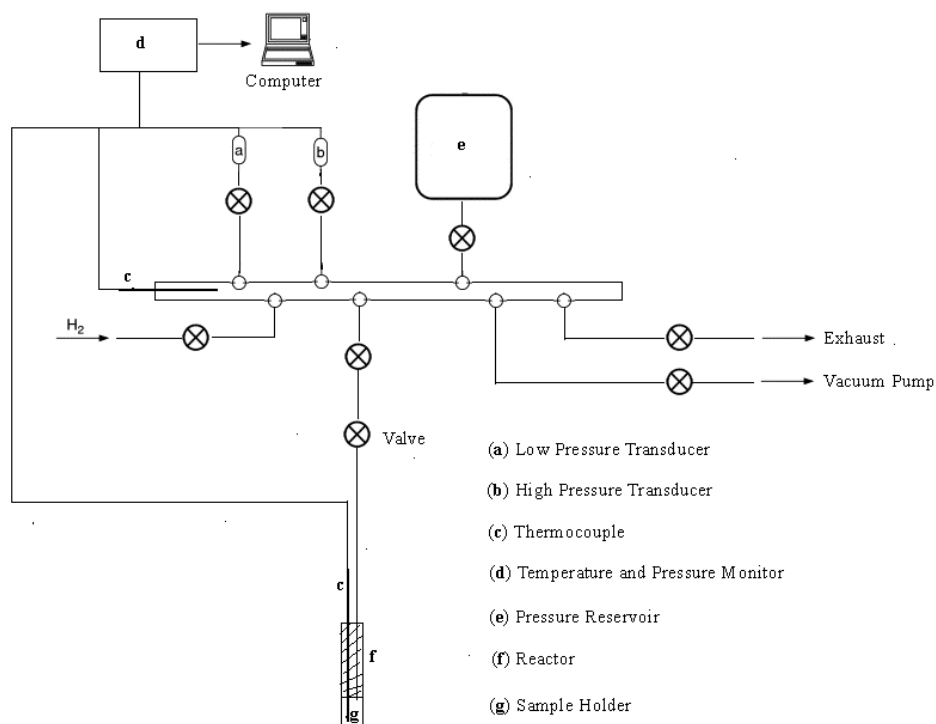


Fig. S1 Scheme of the homemade volumetric Sieverts-type apparatus.

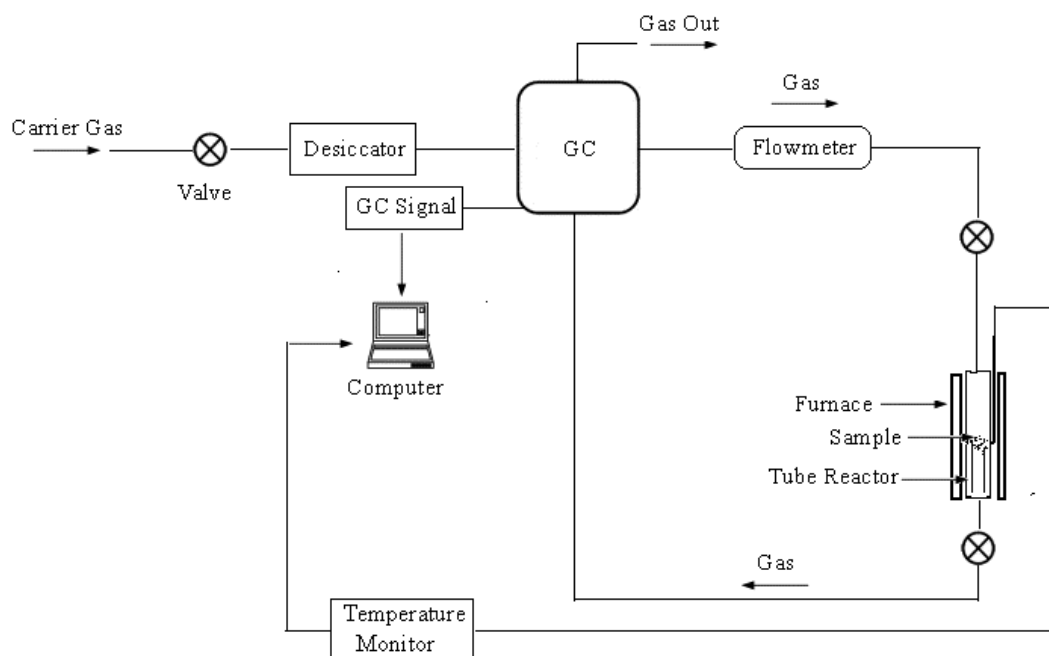


Fig. S2 Scheme of the homemade TPD apparatus.

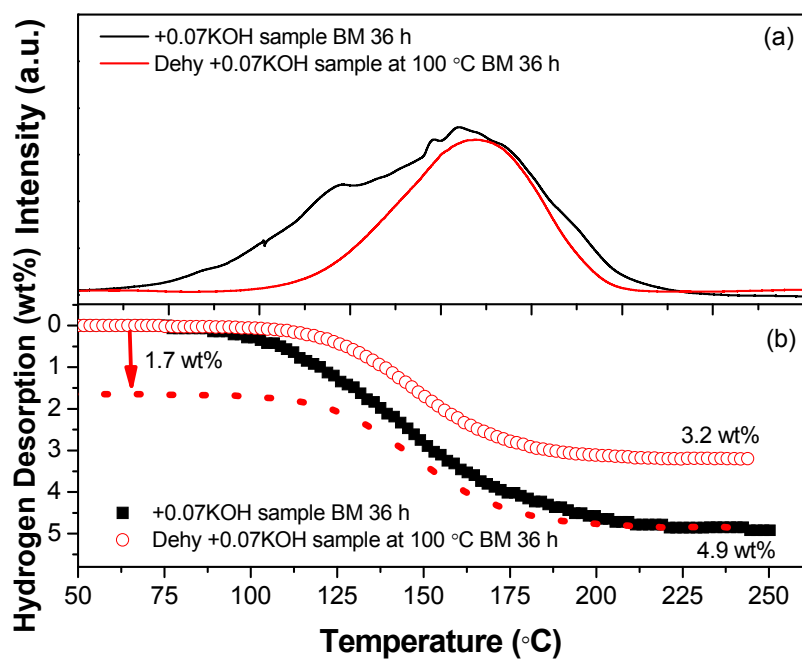


Fig. S3 TPD (a) and volumetric dehydrogenation (b) curves of the $\text{Mg}(\text{NH}_2)_2\text{-}2\text{LiH-}0.07\text{KOH}$ system with different treatments.

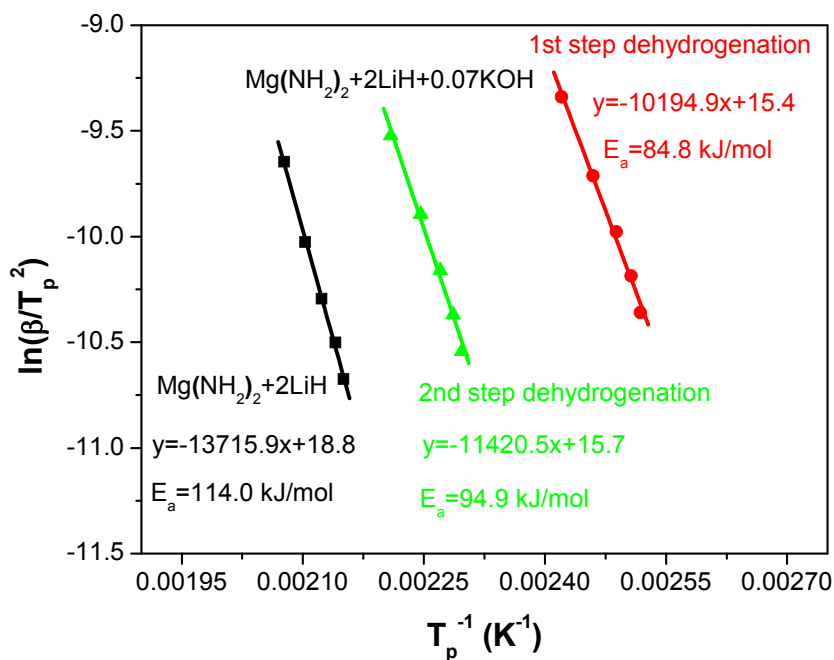


Fig. S4 Kissinger plots of the $\text{Mg}(\text{NH}_2)_2\text{-}2\text{LiH-}x\text{KOH}$ systems milled for 36 h.

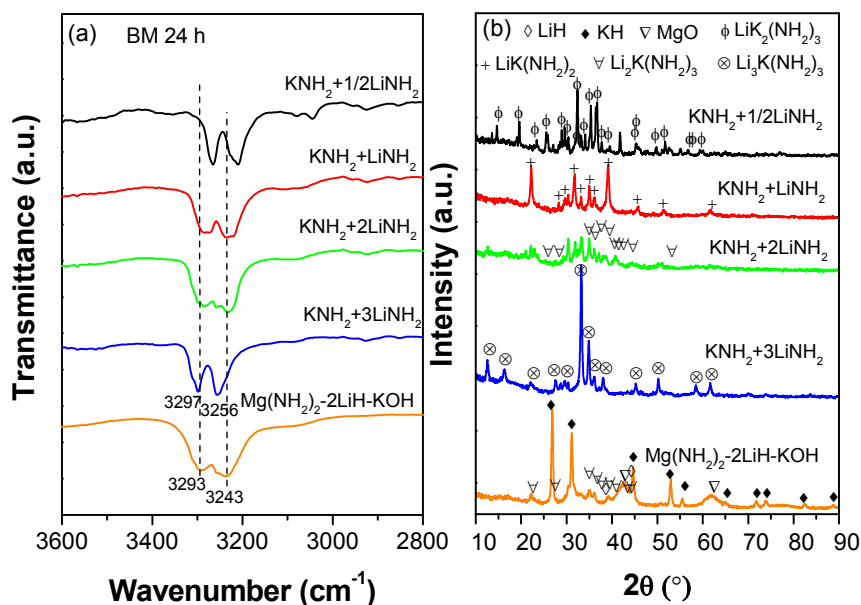


Fig. S5 FTIR spectra (a) and XRD patterns (b) of the $\text{KNH}_2\text{-}x\text{LiNH}_2$ ($x=0.5, 1.0, 2.0$ and 3.0) mixtures after 24 h of ball milling under ammonia atmosphere.

Table S1 FTIR peak positions for amides and imides.

Samples	Position (cm^{-1})	References
$\text{Mg}(\text{NH}_2)_2$	3327, 3274, 1572	[1]
	3326, 3271	[2]
LiNH_2	3313, 3259, 1568.2, 1563, 1559.6, 1539.3	[3]
	3312, 3258	[4]
Li_2NH	3160	[5]
Crystallized MgNH	3251, 3240, 3197, 1560	[1]
Amorphous MgNH	3195	[2]
$\text{Li}_2\text{Mg}_2\text{N}_3\text{H}_3$	3196, 3164	[6]
Cubic $\text{Li}_2\text{MgN}_2\text{H}_2$	3174	[7]
Orthorhombic $\text{Li}_2\text{MgN}_2\text{H}_2$	3183, 3164	[8]

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