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# Thermal Gravimetric and Volumetric Hydrogen Desorption in $\text{LiNH}_2\text{-nanoMgH}_2$

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# Objective, Challenges

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- ▶ **Developing novel hydrogen storage materials with**
  - ▶ High gravimetric (6 wt.%) & volumetric capacity (0.045 kg H<sub>2</sub>/L)
  - ▶ Fast absorption/desorption kinetics (tank filling time < 3min)
  - ▶ Cycle life (1000+)
  
- ▶ **LiNH<sub>2</sub>+MgH<sub>2</sub> compound is a promising alternative**
  - ▶ Composition analysis: (2:1)(5.6 wt.% th.) or (1:1)(8.2 wt.% th.)
  - ▶ Using nanoMgH<sub>2</sub> (MgH<sub>2</sub> BM for 15h) instead of MgH<sub>2</sub>
  - ▶ Effect of catalysts (nanoFe, nanoCo, nanoNi, nanoTi, TiF<sub>3</sub>, MWNT)
    - ▶ Onset temperature
    - ▶ Desorption temperature
    - ▶ Desorption kinetics
  - ▶ Characterization by using TGA, TPD and PCT



# Method & Results

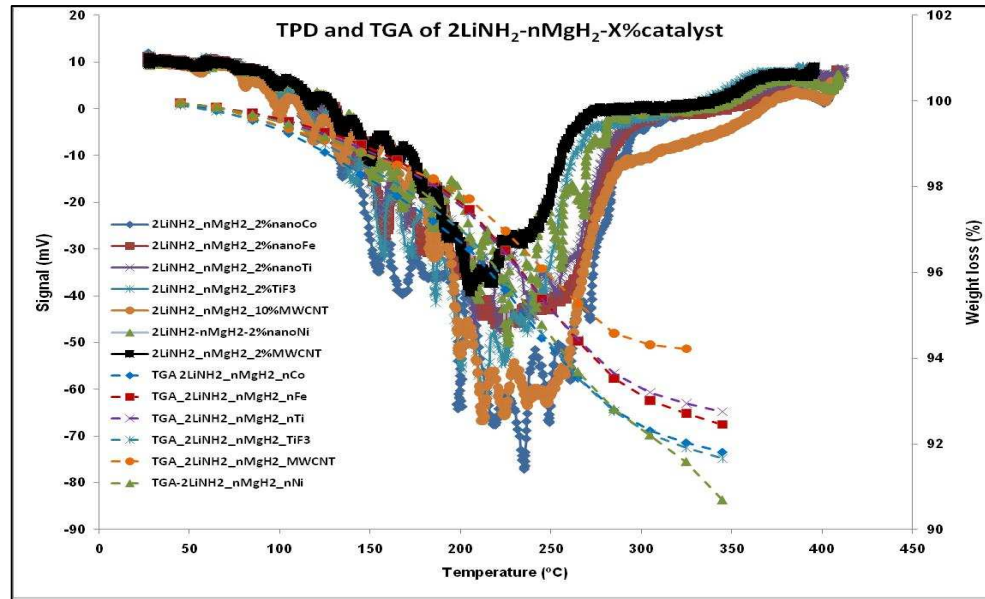
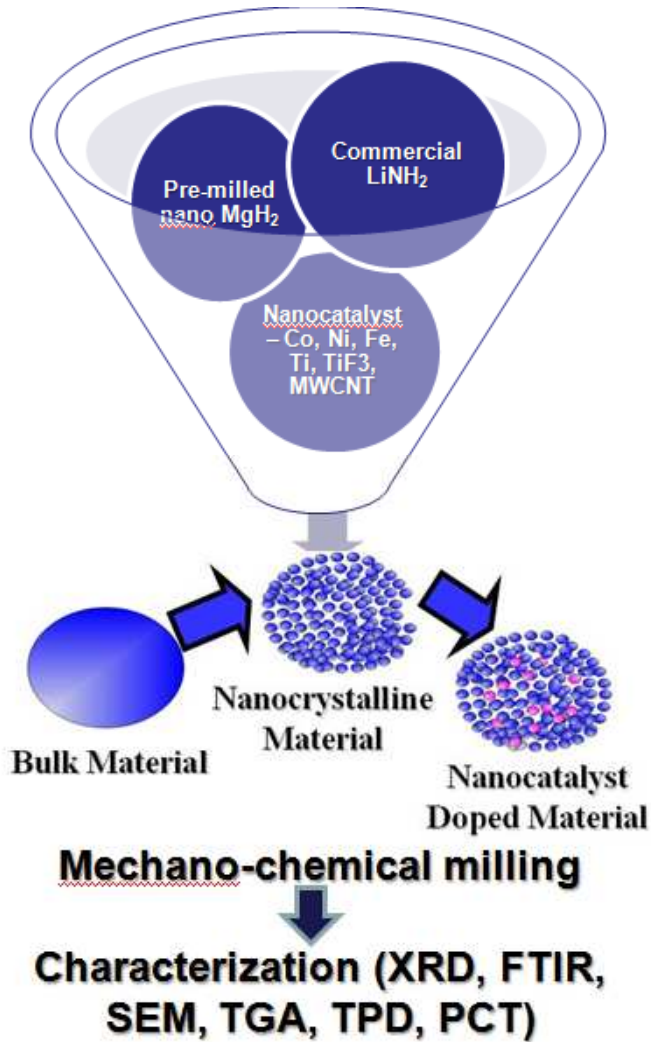


Figure 1: TPD and TGA profiles of catalyst doped LiNH<sub>2</sub>-nanoMgH<sub>2</sub> (1:1 and 2:1)

Reaction Kinetics (wt%/min)		On-set Temperature (°C)	
TiF3 -	0.5816	NanoCo -	121.96
nanoNi -	0.5330	TiF3 -	125.99
nanoTi -	0.5312	nanoTi -	136.65
nanoCo -	0.5255	nanoFe -	142.86
nanoFe -	0.5113	nanoNi -	149.30
MWCNT -	0.4189	MWCNT -	156.68