

Mechanochemical Synthesis of Novel Mg- and Ca-Containing Bimetallic Amidoboranes

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Mechanochemistry can be very useful for synthesis of bimetallic amidoboranes - very prominent materials for hydrogen storage. By using the mechanical ball milling technique, solventless solid state reaction between ammonia borane (NH_3BH_3), alkali metal hydrides (NaH , LiH) and alkaline earth metal hydrides (CaH_2 and MgH_2) is absolutely possible [1], [2]. Exclusively hydrogen and bimetallic amidoboranes are obtained as final products. Here we report several examples of successful synthesis - $\text{Na}_2\text{Mg}(\text{NH}_2\text{BH}_3)_4$, $\text{Li}_2\text{Mg}(\text{NH}_2\text{BH}_3)_4$, $\text{Na}_2\text{Ca}(\text{NH}_2\text{BH}_3)_4$ and $\text{Li}_2\text{Ca}(\text{NH}_2\text{BH}_3)_4$ – all prepared and characterised by our group.

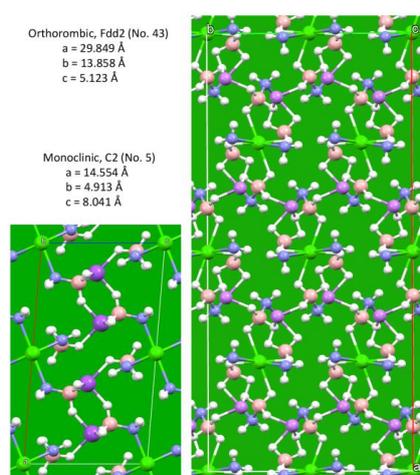


Figure 1 Unit cells of synthesized Ca-containing amidoboranes. Left) $\text{Na}_2\text{Ca}(\text{NH}_2\text{BH}_3)_4$; Right) $\text{Li}_2\text{Ca}(\text{NH}_2\text{BH}_3)_4$.

[1] I. Milanović et al., *ACS Sustainable Chem. Eng.* **9** (2021) 2089.

[2] N. Biliškov et al., *Chem. Eur. J.* **23** (2017) 16274.