

SYNTHESIS OF COMPLEX ALUMINIUM AND BORON HYDRIDES

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A tremendous amount of new complex metal hydrides has been discovered in the last decade.¹⁻⁴ Mechano-chemical synthesis (i.e. ball milling) is a powerful yet simple method for production of both complex aluminium and boron hydrides, as proven by multiple examples.^{5,6} Nevertheless, some materials do not endure the energetic conditions during continuous ball milling. Indeed, in these cases other synthesis methods may be beneficial. Additionally, a simple double substitution reaction required for the production of many complex aluminium and boron hydrides usually produces a by-product, which may be detrimental for the continued usage of the desired compound.⁷ A wet-chemistry approach allows for the synthesis of less stable materials and through the choice of an appropriate solvent also the removal of by-products.⁸

Here, the handling and synthesis of several complex aluminium and boron hydrides will be covered. Wet-chemical synthesis will be compared to mechano-chemical synthesis with examples from complex boron hydrides and the influence of different solvents will be highlighted. Additionally, examples of the synthesis of unstable complex hydrides will be presented. Ultimately, the information should help and inspire new scientists in the field of complex hydrides by introducing material handling procedures and synthesis methods used in the research community.

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