

ALH₃-N-COMPOUNDS – MECHANOCHEMICAL SYNTHESIS OF ENERGETIC MATERIALS

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Aluminium hydride (AlH₃) itself was considered as a hydrogen storage material more than 50 years ago due to its high volumetric (148 g H₂ L⁻¹) and gravimetric (10.1 wt%) hydrogen density. Due to its low decomposition temperature and weight, research on AlH₃, which limits the impractical conditions of rehydration, is still ongoing. Attempts to stabilize AlH₃ with a Lewis base, such as an amine, lead to a significant reduction in the thermodynamic hydrogenation barrier of Al. This approach allows hydrogenation at room temperature and appropriate pressure to produce amine-AlH₃ adducts, known as amino-alanes. The influence of tertiary amines leads to stabilized phases under mechanochemical conditions that offer promising properties for reversible hydrogenation. Possible applications of these compounds as energetic materials are discussed.

References

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