

TechBriefs

Savannah River National Laboratory

U.S. DEPARTMENT OF ENERGY • SAVANNAH RIVER SITE • AIKEN • SC

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Benefits

- > Economical production of a hydrogen storage material
- > Easy separation of the desired alane adduct product
- > Provides a pathway for the use of lower cost precursors in the production of alane

Applications

- > Hydrogen storage
- > Solid energy storage

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Mechanochemical Solid/Liquid Reaction in Formation of Alane

Technology Overview

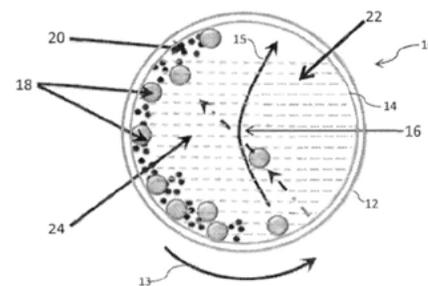
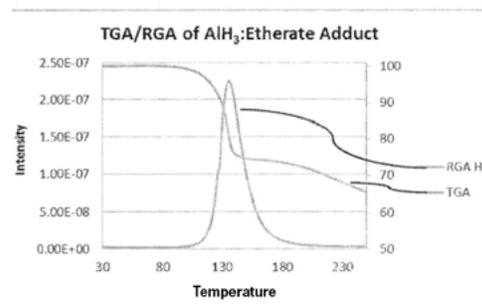
Savannah River National Laboratory (SRNL) has developed novel methods for the formation of Aluminum Hydride, a hydrogen storage material. In this method, the product is both stabilized and phase-separated from the reactants immediately upon formation. This method allows for lower cost precursor materials to be utilized.

Description

Aluminum hydride (alane) has the ability to release nearly all the stored hydrogen on demand. This makes it quite useful for solid phase storage of hydrogen as a fuel and in solid energy applications. This method can utilize low cost reactants that can provide a route for facile separation of the alane product from the reactants and impurities. A non-soluble alkali metal alanate or hydride is combined with an aluminum halide in the presence of a liquid phase solvent which can also act as a Lewis base. Mechanical energy is repeatedly transferred to the reactants, encouraging a mechanochemical reaction between the solid phase alkali metal alanate or hydride and the aluminum halide to form alane adducts. This alane adduct can then be dissociated and crystallized to provide α -alane.

Intellectual Property

This technology and methods for its use have been granted U.S. Patent No. 10,138,122 B2 (November 27, 2018), "Mechanochemical Solid/Liquid Reaction in Formation of Alane" and is available for licensing.



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Technology transfer

The Savannah River National Laboratory (SRNL) is the U.S. Department of Energy's (DOE) applied research and development laboratory at the Savannah River Site (SRS).

With its wide spectrum of expertise in areas such as homeland security, hydrogen technology, materials, sensors, and environmental science, SRNL's cutting edge technology delivers high dividends to its customers.

The management and operating contractor for SRS and SRNL is Savannah River Nuclear Solutions, LLC. SRNS is responsible for transferring its technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

Partnering opportunities

SRNS invites interested companies with proven capabilities in this area of expertise to develop commercial applications for this process under a cooperative research and development agreement (CRADA) or licensing agreement. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience at bringing similar products to market, reasonable schedule for product launch, sufficient manufacturing capacity, established distribution networks, and evidence of sufficient financial resources for product development and launch.

SRNL-L1100-2020-00109



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