Synthesis Technologies

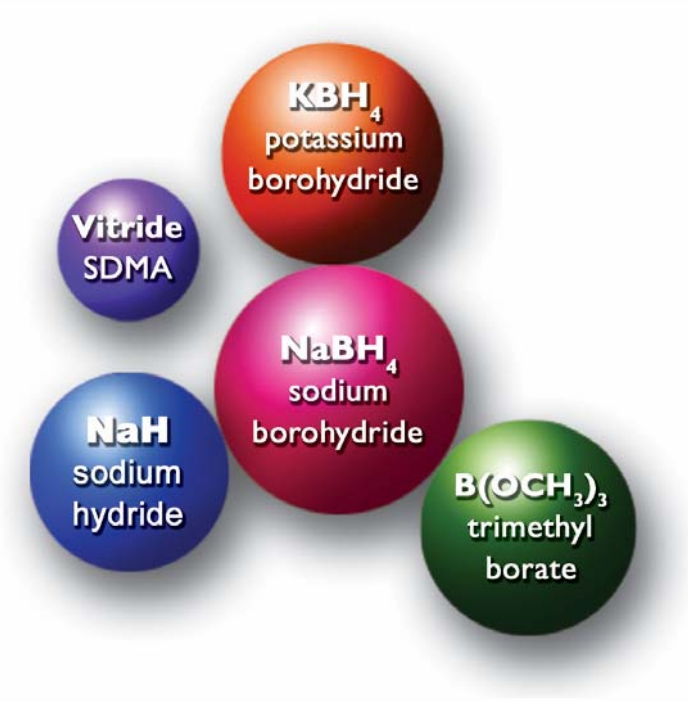
Reducing Agents and Coupling Precursors

Product list for Synthesis Applications

With its 50+ years of manufacturing experience, Rohm and Haas Company is a unique supplier offering the most complete range of hydride products and services:

Reducing Agents

- *VenPure SF powder*
- *VenPure AF granules*
- *VenPure SF granules*
- *VenPure AF caplets*
- *VenPure solution*
- *VenPure 20/20 solution*
- *VenPure KB100*
- *Organic NaBH4 solutions available upon request*
- *Vitride Solution*



Coupling Precursors

- *TriMethyl Borate Pure*
- *60% NaH dispersion in mineral oil*

www.hydridesolutions.com

Product Stewardship

Rohm and Haas sells metalhydride & companion products as part of a comprehensive Product & Services package, including :

- the highest ***product quality***
- the broadest ***range*** of product grades
- formulations ***stable*** under various transport conditions
- the availability of a choice of **soluble bags** and ***package sizes***
- safety audits and ***training***
- ***technical advice*** with regards to both the safe handling and the cost-efficient synthetic use

Applications

Sodium borohydride is a water soluble reducing agent exhibiting unique properties in organic synthesis. $NaBH_4$ is used not only neat to reduce aldehydes, ketones, acid chlorides and anhydrides, but also in a derived form for acid/ester ***reductions and*** for ***dehalogenations***. Also, $NaBH_4$ is the precursor for the industrial production of ***boranes***, a product group which includes reducing agents, drivers of stereoselectivity, and higher organoboranes.

Within the market of metal hydride reductions in organic synthesis, $NaBH_4$ is the primary reductant used on industrial scale, with a estimated (equivalent) market share greater than 50%. Some of the ***benefits*** of using borohydride chemistry :

- the ***least expensive*** metal hydride commercially available (on a hydride equivalent basis)
- ***safe*** with regards to storage and use & handling
- industrial implementation requires no or limited ***equipment*** investment
- ease of ***work-up*** (water soluble boron salts)
- ubiquitous ***solvents*** such as water and methanol are typically employed
- unique and ***versatile*** as a hydride reducing agent for both ***chemo-*** and ***diastereo-selectivity***

VenPure SF powder is a formulation of $NaBH_4$ designed for usage in solvents, like THF, which require a large active surface. A proprietary anti-caking agent is used to increase the product's flowing characteristics.

VenPure AF caplets is a $NaBH_4$ product designed to be dissolved in solvents like water and methanol. The caplets are bean-shaped pellets are about 1 cm long, which allow for a dust-free, straightforward use & handling. It does not contain an anti-caking agent.

VenPure SF granules is an $NaBH_4$ product designed for large scale usage in solvents such as ethanol and glymes. The particle size is comparable to table sugar (> 0.5mm), with only small amounts of fines (typically < 3%), which allows for a straightforward use and handling. A proprietary anti-caking agent is used to increase the product's flowing characteristics.
As compared to VenPure SF granules, ***VenPure AF_granules*** do not contain an anti-caking agent, which adds to its high purity.

VenPure KB100 (KBH4) powder is a reducing agent alternative to the more abundantly used Sodium Borohydride ($NaBH_4$). It is especially employed in organic syntheses where K is the better performing cation, e.g. for the in-situ generation of $LiBH_4$, a well-known reducing agent for esters.

Sodium hydride is used as a deprotonating agent in condensation and alkylation reactions, and as a polymerization catalyst. Sodium hydride is insoluble in most solvents, including ethers, hydrocarbons, amines and ammonia. It is offered by Rohm and Haas as a 60 ± 3% NaH microcrystalline dispersion in mineral oil. The particle size range is typically 5-50µ.

Trimethyl borate (TMB) is well established as a precursor in the production of boronic acids/esters, which find synthetic use in C-C coupling reactions, also known as Suzuki couplings. In addition to the standard (min. 99% pure) TMB quality, Rohm and Haas has developed higher quality grades, which are available upon request. Indeed, in the synthesis of boronic acids/esters for Suzuki couplings, it is imperative that the TMB precursor is free of protic traces (from water, methanol, etc.). The lack of any moisture or alcohol residue in Rohm and Haas' higher-quality grade of TMB, may result in a significant yield improvement of a given boronic intermediate synthesis.

Vitride (70% SDMA in toluene) is an aluminumhydride reducing agent of medium strength. It is typically used to reduce esters, acids and amides. It is an oxygen-stable, pumpable liquid, compatible with most of the ubiquitous aprotic solvents.

Please feel free to contact us via hydride@rohmhaas.com