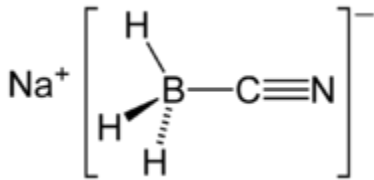
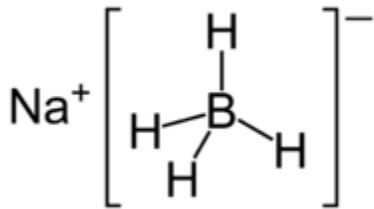


Sodium CyanoBoroHydride and Sodium BoroHydride

Products Information

Sodium CyanoBoroHydride and Sodium BoroHydride are popular reducing agents for a variety applications

Catalog #:	05777C, 5g	
Name:	Sodium cyanoborohydride. CAS:25895-60-7	
Molecular Weight :	MW : 62.84	
Solubility	Soluble in water (100 mg/ml, with heating), methanol, ethanol, and THF. It is insoluble in nonpolar solvents such as benzene or hexane	
Storage:	-20°C (or 4°C short term). (M) Protect from moisture. Keep dry	
		other names: cyanotrihydroborate UN:3134, II, 4.3, 6.1
Catalog #:	07998H, 5 g	
Name:	Sodium BoroHydride (NaBH₄) . CAS:16940-66-2 / 15681-89-7	
Molecular Weight :	MW : 37.83	
Solubility	Soluble in water (100 mg/ml, with heating), methanol, ethanol, and THF. It is insoluble in nonpolar solvents such as benzene or hexane	
Storage:	-20°C (or 4°C short term). (M) Protect from moisture. Keep dry	
		other names: cyanotetrahydroborate UN:3134, II, 4.3, 6.1
Catalog #:	22818F	
Name:	Sodium TriAcetOxyBorohydride CAS: 56553-60-7;	
Molecular Weight :	MW: 211.94	

Technical and Scientific Information

●Sodium CyanoBoroHydride

Sodium CyanoBoroHydride (NaBH₃CN) is a selective reducing agent used for a variety of chemical reductions, including aldehyde, ketones, oximes, enamines, reductive aminations of aldehydes and ketones, and reductive alkylations of amines and hydrazines. The utility of sodium cyanoborohydride as a reducing agent is greatly enhanced by its stability under acid conditions, and its solubility in aprotic solvents. Sodium cyanoborohydride is a milder and more selective reducing agent than sodium borohydride⁰

1. Reduction of aldehydes and ketones.

At pH 3-4, benzaldehyde can be reduced to benzyl alcohol with 87% yield. Under the same conditions cyclohexanone can be reduced to cyclohexanol with 88% yield.²

2. Reduction of oximes.

At pH 4, cyclopentanone oxime can be reduced to the corresponding hydroxylamine with 77% yield with no reduction to the amine.²

FT-05777C

3. Reductive amination of aldehydes and ketones.

At pH 6, benzaldehyde and ethylamine in the presence of sodium cyanoborohydride forms the secondary amine N-ethylbenzylamine with 91% yield.²

The steroid 5- α -androstane-3,17-dione can be selectively aminated at the 3-position using ammonium acetate with 100% yield.³

4. **Tertiary methylated amines** can be synthesized by reaction of an aromatic or aliphatic amine with aqueous formaldehyde and sodium cyanoborohydride in acetonitrile. m-Nitroaniline is alkylated with formaldehyde to m-Nitro-N,N-dimethylaniline with 68% yield.⁴

Ref.:

1. Aldrichimica Acta, Vol. 8, No. 1 (1975).

2. Borch, R.F. and Bernstein, M.D., J. Amer. Chem. Soc., 93, 2897 (1971).

3. Boutique, M.-H. and Jacquesy, R., Bull. Soc. Chim. Fr., 750, (1973).

4. Borch, R.F. and Hassid, A.I, J. Org. Chem., 37, 1673 (1972).

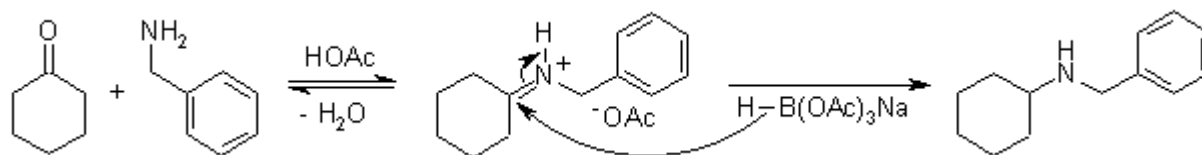
The reaction rate for the reduction by Sodium cyanoborohydride of iminium ions is much faster than for ketones or even aldehydes. However, when done as a one-pot procedure, it liberates the highly toxic gas HCN with strong acids. A safer reducing agent with comparable reactivity is Sodium TriAcetOxyBorohydride

•Sodium TriAcetOxyBorohydride.

TriAcetOxyBorohydride is a safer reducing agent than Sodium cyanoborohydride with comparable reactivity .

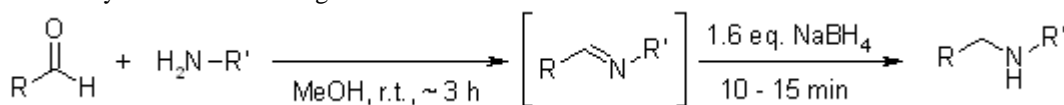
The boron-hydrogen bond is stabilized by the steric and electron-withdrawing effects of the acetoxo groups, making sodium triacetoxoborohydride a mild reducing agent.

Sodium triacetoxoborohydride is especially suitable for reductive aminations. Since the reaction rate for the reduction of iminium ions is much faster than for ketones or even aldehydes, the reductive amination can be carried out as a one-pot procedure by introducing the reducing agent into a mixture of the amine and carbonyl compound. The presence of a stoichiometric amount of acetic acid, which catalyzes the imine formation and provides the iminium ion, doesn't present any problem under these conditions.



Reductive amination (simplified)

Secondary amines also undergo this reaction.⁰



A. F. Abdel-Magid, K. G. Carson, B. D. Harris, C. A. Maryanoff, R. D. Shah, *J. Org. Chem.*, **1996**, 61, 3849-3862.

Related / associated products and documents

Reducing agents:

- **TCEP** (Tris(2-carboxyethyl)phosphine hydrochloride) #[UP242214](#) is an alternative which is not pungent, more stable and works even at low pH. It is more selective, i.e. do not reduce metals and buried disulfides.
- **DTBA** (DithioButyAmine) #[NCQ200](#) is a potent and versatile disulfide-reducing agent that is capable of reducing the enzyme papain, 14 times as fast as DTT could.
- **2-mercaptoethanol (bME)** #[136990](#) is a popular effective reducer, but extremely pungent.

Related products:

- Desalting tools
- Sulfhydryl-reactive crosslinkers (i.e. SMCC/MAL-PEO-NHS)

See [BioSciences Innovations catalogue](#) and [e-search tool](#).

- | | |
|--|--|
| • dithioerythritol (DTE) # 123378 | • Electrophoresis reagents |
| • TCEP hydrochloride # UP242214 | • Desalting columns (UP848742) |
| • Crosslinking reagents such as SMCC/MAL-PEO-NHS | • CelluSep Dialysis products |
| • Labeling agents (biotinylation, fluorescent labeling) | |

Ordering information

Catalog size quantities and prices may be found at <http://www.interchim.com>.

Please inquire for higher quantities (availability, shipment conditions).

For any information, please ask : Uptima / Interchim; Hotline : +33(0)4 70 03 73 06

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