Sodium cyanoborohydride

Product Number S 8628
Store at Room Temperature

Product Description
Molecular Formula: BCH$_3$NNa
Molecular Weight: 62.84
CAS Number: 25895-60-7

Sodium cyanoborohydride 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 borohydride.\(^1\)

Some of the reactions where the selectivity of sodium cyanoborohydride are demonstrated are as follows:

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.\(^2\)

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.\(^4\)

Precautions and Disclaimer
For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions
Sodium cyanoborohydride is soluble in water (100 mg/ml, with heating), methanol, ethanol, and THF. It is insoluble in nonpolar solvents such as benzene or hexane.

References

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