SYNLETT
Spotlight 348

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

Lithium Bis(trimethylsilyl)amide

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Introduction

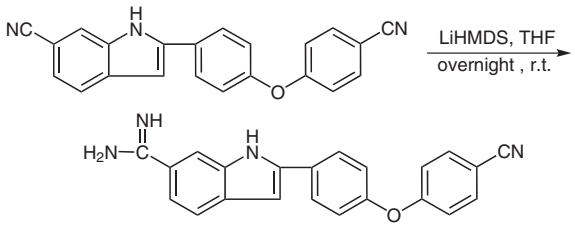
Lithium bis(trimethylsilyl)amide (LiHMDS) is a colorless solid, which is soluble in a variety of organic solvents suitable for reactive compounds, such as organometallic substances or substituted metal amides. The compound melts at 71–72 °C.[1] It is unstable in air and catches fire when compressed, but it is stable in an atmosphere of nitrogen. Reactions with a variety of nonmetallic halides give lithium halides and hexamethyldisilazyl derivatives.

The preparation of lithium bis(trimethylsilyl)amid must be performed in an atmosphere of dry nitrogen. The pentane containing *n*-butyllithium is added slowly to a stirred solution of hexamethyldisilazane (Scheme 1). The reaction mixture is boiled for 30 minutes, and evaporate the solvents. LiHMDS is obtained as colorless crystals.

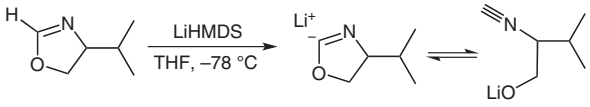
Scheme 1

Abstracts

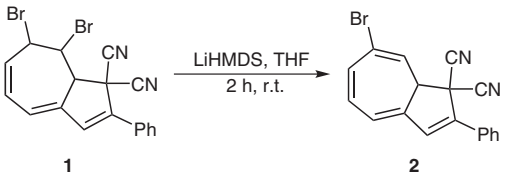
(A) B. Li et al.[2] reported an efficient and catalyst-free procedure for the synthesis of 2-[4-(4-cyanophenoxy)phenyl]-1*H*-indole-6-carboximidamide hydrochloride salt from 2-[4-(4-cyanophenoxy)phenyl] indole-6-carbonitrile by treatment with LiHMDS using THF as solvent at room temperature.



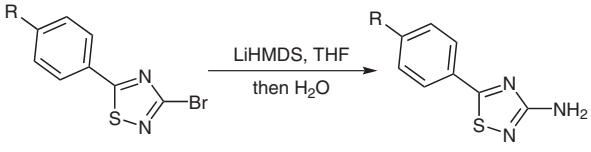
(B) A new method for preparing 2-lithio-(4*S*)-isopropyl-2-oxazolide from (4*S*)-isopropyloxazoline in THF using LiHMDS was developed. The product is isolated by deprotonation of (4*S*)-isopropyloxazoline with LiHMDS followed by removal of the volatile materials.[3]



(C) Petersen and co-workers[4] reported that **1** was treated with LiHMDS in THF at room temperature to produce **2** in a yield of >90%. Under same conditions, only lower yield of **2** was obtained using pyridine, DBU, acetylide or KO*t*-Bu.



(D) The preparation of the regioisomeric 3-amino-5-substituted-1,2,4-thiadiazoles can be attained by treatment of the 3-bromo-5-substituted-1,2,4-thiadiazoles with LiHMDS in THF.[5]



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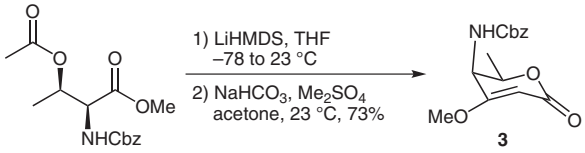
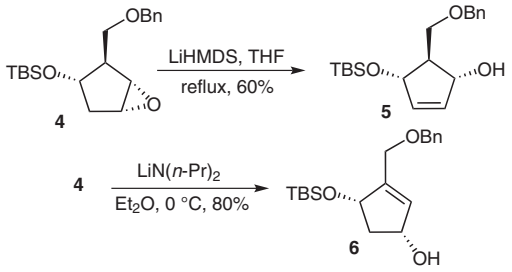
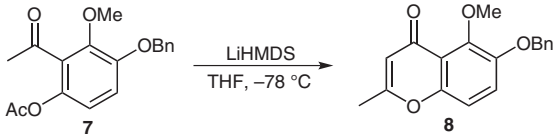
(E) LiHMDS has been employed in the preparation of enone **3** in two steps via deprotonating the acetate and NHCbz groups to induce a Dieckmann cyclization, followed by methylation with K_2CO_3/Me_2SO_4.[6]



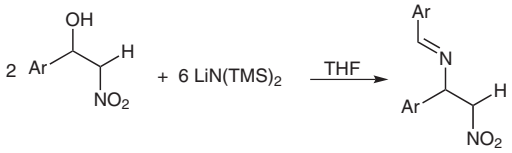
(F) Ruediger et al. found that treatment of protected epoxide **4** with LiHMDS in THF at reflux temperature formed the allylic alcohol **5** exclusively. However, when **4** was treated with lithium di-*n*-propylamide the unexpected allylic alcohol **6** was obtained.[7]



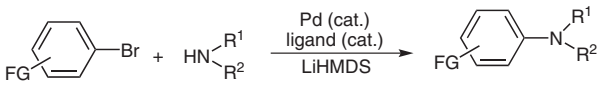
(G) Lee et al. reported that **7** underwent cyclization by treatment with LiHMDS in THF to give **8**.[8]



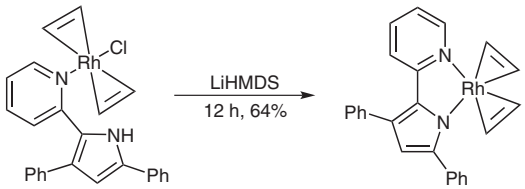
(H) A series of β-nitroalcohols can be converted into the corresponding nitroimines by the retro-nitroaldol–nitro-Mannich sequence of β-nitroalcohols with LiHMDS. In this reaction, LiHMDS behaved not only as base, but also as reagent.[9]



(I) LiHMDS behaved as a sterically hindered non-nucleophilic base in Pd/proazaphosphatrane ancillary ligand P(*i*-BuNCH$_2$CH$_2$)$_3$N-catalyzed aminations of arylhalide.[10]



(J) In addition to the above cases, LiHMDS can also be applied for the preparation of the bis(ethylene) complex (pypyrH)RhCl(C_2H_4)$_2$ by the treatment of (pypyrH)–RhCl(C_2H_4)$_2$ in benzene at ambient temperature.[11]



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