A NEW METHOD FOR α-SUBSTITUTION IN NITROGEN-CONTAINING HETEROCYCLES

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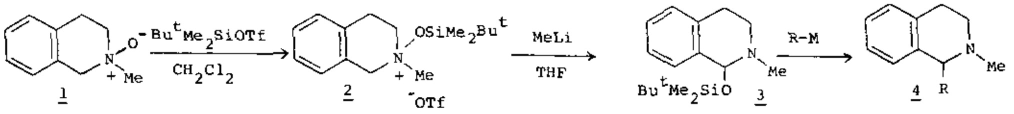
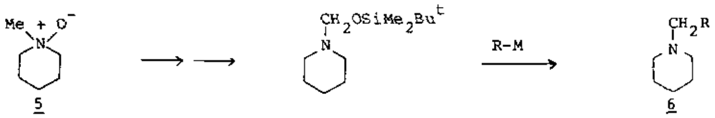
α-Siloxyamines obtained from tertiary amines via their N-oxides react with some nucleophiles to afford new tertiary amines having an α-substituent derived from the nucleophiles. For example, siloxyammonium salts (2) prepared from N-methyl-1,2,3,4-tetrahydroisoquioline N-oxide (1) and trialkylsilyl trifluoromethanesulfonate undergo rearrangement in the presence of strong base to give α-siloxyamine (3), which can be subjected to nucleophilic substitution reaction with organometallics such as Grignard reagents to afford 1-substituted N-methyl-1,2,3,4-tetrahydroisoquinoline (4).



Similarly, N-methylpiperidine N-oxide (5) can be converted into α-substituted derivatives (6), which has a new α-substituent in exocyclic α-position.



Besides Grignard reagents, trialkylaluminums, silyl enol ethers, silyl cyanides, and trialkylphosphites can also be used as nucleophiles. Of particular note is the accomplishment of the α-substitution of amines by phenyl and vinyl groups with sp^2 carbon as a reacting center.

In view of ready availability of amine N-oxides, a wide variety of nucleophiles, and its complementarity to the electrophilic α-substitution method, the present one-pot sequence provides a new convenient synthetic method for nitrogen-containing heterocycles.

Fuluoride-induced electrophilic transalkylation reaction using the above-mentioned α-siloxyamines and alkyl halides will also be described.