Abstract

The amine functional group constitutes an essential component of agrochemical, biological and pharmaceutical compounds: amino acids, vitamins and commonly used analgesics. Various methods have been reported in the literature for the synthesis of amines which includes reductive amination of carbonyl derivatives with primary amines, but it often requires extreme reaction conditions to carry out the conversion. Another method to make amines is metal catalyzed reduction of the amide group, but it bears limited scope due to lower electrophilicity at the carbonyl group. An easy, direct and efficient method is metal catalyzed reduction of imines. This includes hydrosilylation as an efficient method which creates a convenient pathway for hydrogen transfer from readily available silanes via the metal catalyst to the substrate.

The effective one-step reduction of carbonyl, as well as protection of alcohol, can be achieved by metal-catalyzed hydrosilylation rather than conventional tedious two-step method of first reducing the carbonyl and then protecting the alcohol.

In chapter 1, a short overview of different methods for amine and alcohol synthesis from respective imines and carbonyl, hydrosilylation and its advantage, synthesis of NacNac ligand, and its Ni complex has been discussed.

In chapter 2, Hydrosilylation of carbonyl and imine using Ni- NacNac catalyst, plausible mechanism and substrate sope have been discussed. Also, Alcohol dehydrogenation using $Ni(Azo)_2$ and other attempted projects which includes, C–H activation via single electron transfer using PLY ligand; pyridine catalyzed C–H activation has been discussed.

Key words: hydrosilylation, carbonyl, imine, silane, nickel, NacNac ligand.