

Reaction of coordinated ligands: Oxidative dehydrogenation of amine and reduction of azomethine groups.

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Reaction of coordinated ligands plays important role in catalysis, various biochemical processes and organic synthesis. In the literature, numerous reactions of the coordinated ligands were reported, including the reactions of template synthesis, hydrolyze, etherification, *trans*-etherification, hydrogenation, oxidative dehydrogenation. Despite of numerous extended studies, the mechanism of many of these reactions still requires comprehensive analyses. In this talk, I analyze the current states of: (1) oxidative dehydrogenation of the coordinated N,N'-bis(2-hydroxybenzyl)ethylenediamine and N,N'-bis(2-hydroxybenzyl)phenylenediamine ligands, (2) C-C coupling of coordinated Schiff-bases containing sterically hindered phenols, and (3) hydrogenation of the coordinated azomethine bond. I also report kinetics of azomethine reduction for various Schiff-bases and the azomethine complexes of various transition metal ions.

The mechanism of the reported reaction involves the formation of (Schiff-base or complex)-sodium borohydride complex, followed by decomposition of this intermediate by reacting with the water molecule. Reported kinetic data show that the rate of the reaction increases by changing number of d-electrons in transition metal atoms. The reported trend in kinetics of these reactions is opposite to the Irving-Williams rule. We have predicted the strength of metal-ligand bonding interaction to be one of the major factors affecting to the rate of these reactions.