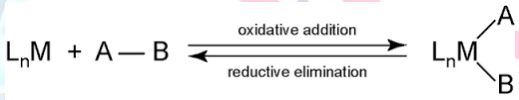
22nd Iranian Inorganic Chemistry Conference,
23-25 August, 2023
University of Kurdistan

Selective Carbon−Carbon Bond Forming Reductive Elimination from Cycloplatinated(IV) Complexes

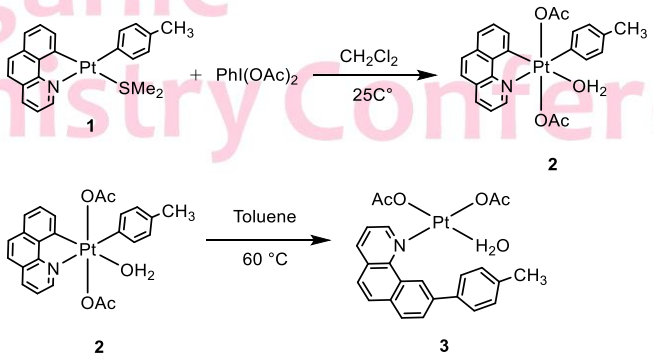
*Susan kiyavash[a] and Marzieh Dadkhah Aseman[a,]**

[a] *Department of Chemistry, Faculty of Sciences, Tarbiat Modares University, Tehran 15719-14911, Iran;*

Oxidative addition involves the attachment of two groups A−B to a metal complex of relatively low oxidation state. This produces a new complex with an oxidation state two units higher than before. Reductive elimination reaction is exactly the opposite of the oxidative addition reaction during which A and B are removed from metal center, during this process the oxidation number of the central metal decreases by two units. Since oxidative addition and reduction-elimination reactions are among the basic steps in many catalytic cycles, mechanistic investigations need to be studied more in depth to provide a useful basis for further developments.



In the present work, complex [Pt(bhq)(*p*-Me-C_6H_4)(H_2O)($OAc)_2$], **2**, in which bhq = deprotonated benzo[h]quinoline is prepared through the reaction of [Pt(bhq)(*p*-Me-C_6H_4)(SMe_2)], **1** with 1 equiv of $PhI(OAc)_2$ via an oxidative addition (OA) reaction. Complex **2** was fully characterized by means of ^{1}H, ^{13}C, ^{195}Pt NMR and ESI-Mass spectroscopic techniques. Density functional theory (DFT) calculations signify that the OA reaction initiated by a nucleophilic attack of the platinum(II) central atom of **1**, on the Iodine(III) atom of $PhI(OAc)_2$ while it had commenced by a nucleophilic substitution reaction of coordinated SMe_2 with H_2O. In the next step **2** undergo selective $C(sp^2)$−$C(sp^2)$ bond forming reductive elimination reaction at elevated tempreture to form new Pt(II) complex **3**. DFT calculations showed that the reductive elimination reaction occurs through three-center concert mechanism (Scheme 1).



Scheme 1: Oxidative addition and reductive elimination reactions of cycloplatinated complexes.

Keywords: Platinum complexes, oxidation-addition reactions, reductive elimination reactions

22nd
Iranian
Inorganic
Chemistry Conference