



New Pd (II) and Pt (II) Schiff Base Complexes for Catalytic Applications in C-H Bond Activation and Oxygenation of Hydrocarbons

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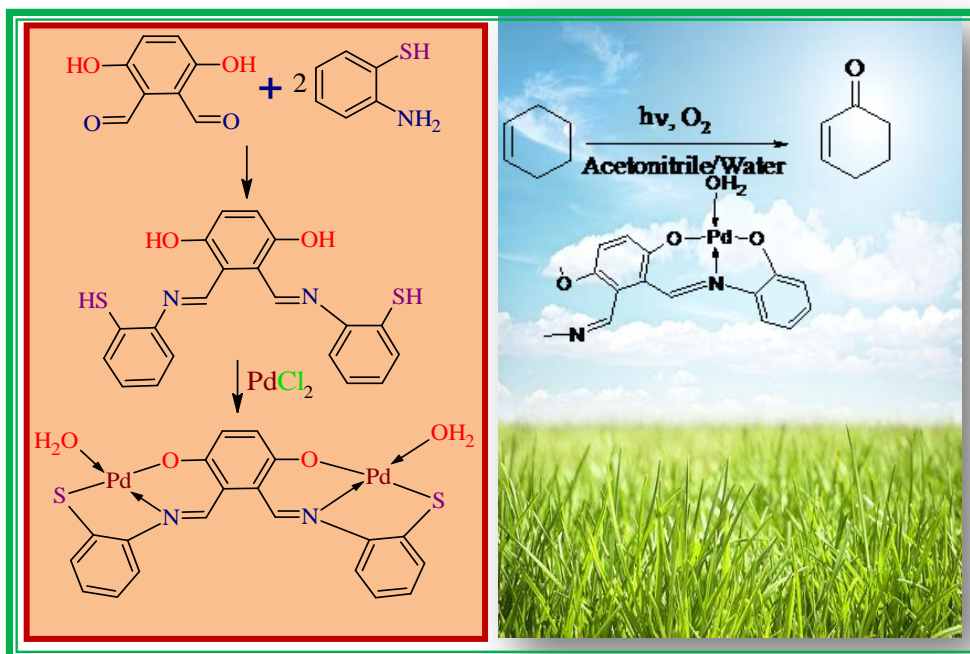
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ABSTRACT

Two new Schiff base ligands have been prepared by condensing 3,6-dihydroxybenzene-1,2-dicarbaldehyde with 2-aminophenol or 2-aminothiophenol and characterized by spectroscopic methods like mass, IR, ¹H and ¹³C NMR. The new Schiff bases react with PdCl₂ and PtCl₂ to form complexes of formula [M₂L(H₂O)₂]. The IR and NMR spectral investigations reveal the coordinating atoms of the ligands as azomethine N, phenolic O and thiophenolic S atoms. The complexes are diamagnetic and electronic spectra of the complexes establish the square planar geometry around the metal centre. The complexes exhibit photocatalytic activity in the oxidation by C-H bond activation of allylic C atoms in acetonitrile-water mixture. The metal complexes catalyze the formation of HO• radicals from water in presence of dissolved oxygen. Pd(II) complexes exhibit better catalytic properties compared to Pt(II) complexes, probably due to less stability of the Pd(IV) state formed in the catalytic cycle and also due to the phosphorescence effect of platinum complexes that absorb 30-40% of incident light and thus decreasing photocatalytic formation of HO• radicals. Aqueous acetonitrile was found to be a better solvent system compared to aqueous-DMSO or DMF, because of higher solubility of O₂ in acetonitrile.

Graphical Abstract



Keywords: Schiff base ligands, Platinum group metal complexes, C-H bond activation, Allylic oxidation, Photo catalytic reactions.
