Structure and Reactivity of Rhodium(I) Carbonyl complexes as Model Nano-Wired Assemblies and Catalyst

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Square planar rhodium(I) complexes of the type [Rh(L,L'-Bid)(CO)(PPX_3)], where L,L'-Bid = monoanionic bidentate ligands and PPX_3 are tertiary phosphine ligands, have been extensively investigated as potential catalyst precursors in different conversion reactions [1-5].

The main objective of this study is to use **solution** and **solid state** ^{31}P NMR spectroscopy in conjunction with X-ray crystallography to investigate the structure and reactivity relationship of the rhodium(I) complexes for potential application in catalysis.

A range of complexes of the type [Rh(L,L'-Bid)(CO)(PPX_3)] with systematic manipulation of the steric and electronic properties were synthesized and characterized using IR, UV/Vis and NMR spectroscopy. These rhodium(I) complexes were obtained from the substitution of one carbonyl ligand in the complexes [Rh(L,L'-Bid)$(CO)_2$], by simple stoichiometric reaction with monodentate tertiary phosphines. Correlations of different parameters such as the first-order coupling constant $^1J_{Rh\text{-}P}$, chemical shift and the Rh-P bond-distances were evaluated in order to understand the coordination environment around the metal centre.

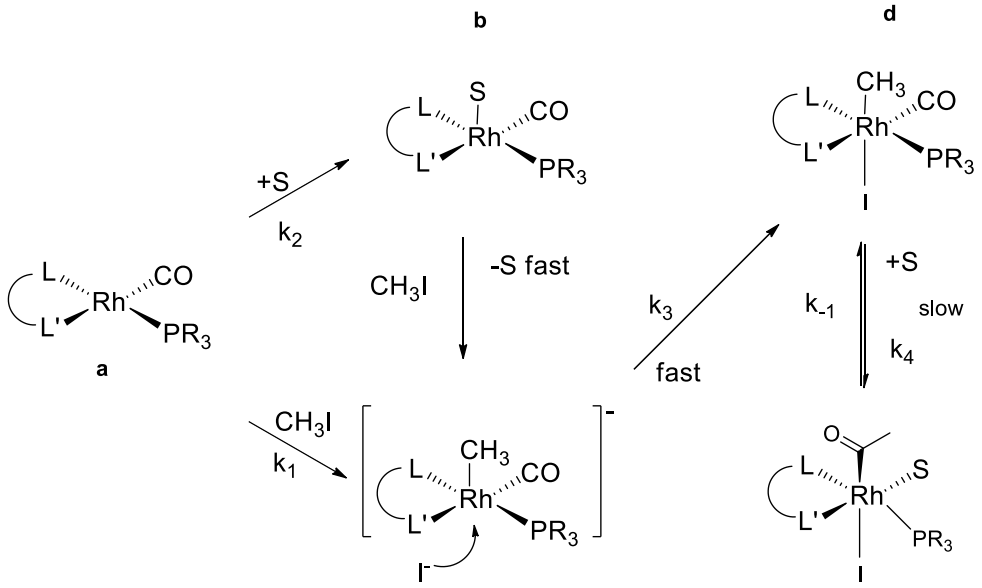

Figure 1: A representation of a typical scheme for the MeI oxidative addition to the rhodium [Rh(L,L'-Bid)(CO)(PX_3)], PX_3 = tertiary phosphine complexes.[9] S = solvent.

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Keywords: Rhodium(I) complexes, Metallophilic interactions, Catalysis