

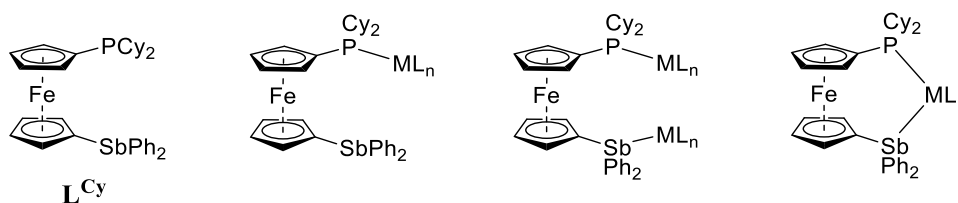
Title: Ferrocene stibane ligands

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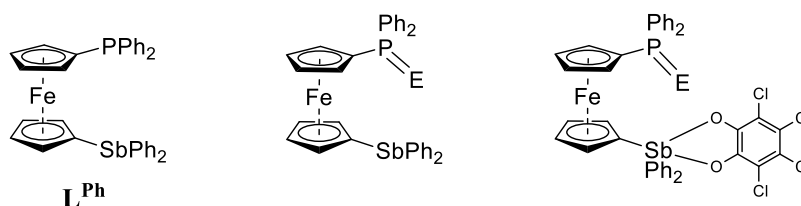
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Abstract: This diploma thesis reports a study into the coordination properties of ferrocene phosphino-stibine  $\text{Cy}_2\text{PfcSbPh}_2$  ( $\text{L}^{\text{Cy}}$ , Cy = cyclohexyl, fc = ferrocene-1,1'-diyl). Complexes with various transition metals were prepared ( $\text{Ru}^{\text{II}}$ ,  $\text{Rh}^{\text{III}}$ ,  $\text{Pt}^{\text{II}}$ ,  $\text{Pd}^{\text{II}}$ ,  $\text{Au}^{\text{I}}$ ), where the ligand binds in monodentate, bridging or chelating mode. Ruthenium(II) and rhodium(III) complexes were prepared from precursors with  $\pi$ -coordinated arene ligands, whereas  $[\text{MCl}_2(\eta^2:\eta^2\text{cod})]$  ( $\text{M} = \text{Pd}$ ,  $\text{Pt}$ ; cod = 1,5-cyclooctadiene) precursors were used to prepare palladium(II) and platinum(II) complexes and synthesis of gold(I) complexes started from  $[\text{AuCl}(\text{tht})]$  (tht = tetrahydrothiophene).



In addition, the thesis describes the reactivity of ferrocene phosphino-stibine  $\text{Ph}_2\text{PfcSbPh}_2$  ( $\text{L}^{\text{Ph}}$ ). Specifically, it focuses on the preparation of chalcogenides  $\text{Ph}_2\text{P}(\text{E})\text{fcSbPh}_2$  ( $\text{E} = \text{O}, \text{S}, \text{Se}$ ) and the corresponding stiborane derivatives  $\text{Ph}_2\text{P}(\text{E})\text{fcSbPh}_2(\text{O}_2\text{C}_6\text{Cl}_4)$  ( $\text{E} = \text{void}, \text{O}, \text{S}, \text{Se}$ ), in which the stiborane center bears tetrachloropyrocatechol substituent, which makes it Lewis acidic and potentially prone to behave as an acceptor of electron pair from the  $\text{Ph}_2\text{P}(\text{E})$  moiety. The presence of this interaction was confirmed by single-crystal X-ray diffraction analysis and  $^{31}\text{P}\{^1\text{H}\}$  NMR spectroscopy only if  $\text{E} = \text{void}$  or  $\text{O}$ . The nature of this interaction was clarified using computational methods. All substances were characterised by NMR spectroscopy ( $^1\text{H}$ ,  $^{13}\text{C}\{^1\text{H}\}$  and  $^{31}\text{P}\{^1\text{H}\}$ ), mass spectrometry and elemental analysis. When possible, the crystal structure was determined.



Key words: ferrocene, phosphines, stibines, reactivity, coordination properties, Lewis acid, structure elucidation