

Abstract

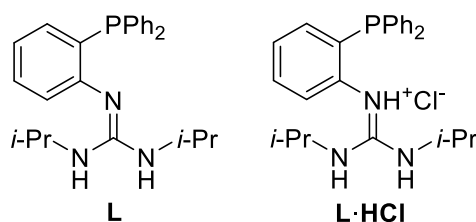
Title: Coordination properties of phosphinoguanidine ligand

Author: Bc. Zdeněk Leitner

Institution: Faculty of Science, Charles University in Prague, Department of Inorganic Chemistry

Supervisor: prof. RNDr. Petr Štěpnička, Ph.D., DSc.

Polar phosphine ligands have found use in variety of homogenous and biphasic catalytic processes. In the past, extensive research has been performed also on cationic phosphines, namely phosphinoguanidinium salts. However, neutral phosphinoguanidines have been mostly neglected and their coordination chemistry has not been described to a satisfactory extent, even though the combination of soft phosphorous and harder nitrogen Lewis base could exhibit interesting properties, mainly hemilabile coordination, as well as protonation-controlled nitrogen coordination. These properties could have a positive impact on catalytical performance of this ligand in systems, which benefit from hydrogen bonding or the presence of basic guanidine group.



The aim of this work was to study coordination properties of an earlier prepared ligand **L** and the corresponding phosphinoguanidine salt **L·HCl** in reactions with Group 11 metal precursors. New compounds were characterized, and their crystal structures were determined. In addition to conventional compounds, an uncommon dimeric complex $[\text{Au}_2\text{L}_2][\text{SbF}_6]_2$ containing an aurophilic interaction was also prepared.

Gold complexes were tested in catalytic intramolecular cyclisation of *N*-propargylbenzylamide, yielding substituted methylideneoxazoline. The best results were achieved using the dimeric complex $[\text{Au}_2\text{L}_2][\text{SbF}_6]_2$ with an addition of non-coordinating acid HNTf₂. The acid cleaves the dimer, generating the catalytically active species. It is an attractive silver-free route of catalyst activation.

Klíčová slova: phosphine ligands, guanidine, coordination properties, catalytic properties, Group 11 complexes