The rare PNC pincer ligand, its Pt metalation, and reactivity of associated Pt complexes

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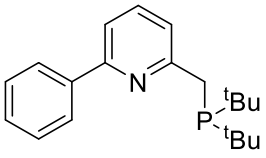
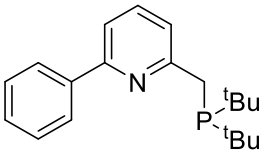
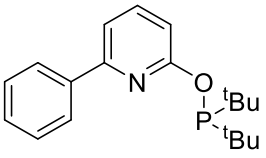
The 2phenyl-6bis-t-butylphosphinemethyl-pyridine (PNC) ligand and its close analogue, has only rarely been used in coordination chemistry[1] due to the difficulty of obtaining the desired pincer complexes cleanly, an inability to metalate the CH bond trans to the phosphine donor, and a tendency for facile cyclometallation of the pyridine ring instead of the pendant phenyl group. In addition, reductive elimination leading to a free phenyl moiety is a common decomposition pathway.[2]



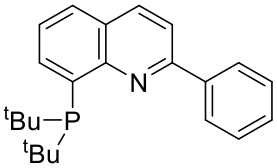
our work
Pt



van der Vlugt
Rh 1b, 2c



van der Vlugt
Ni 1c, 2a



Nevado
Au 1a

In the referenced works, the ligand or its derivatives have been used for Au, Rh, and Ni complexation. However, the pincer ligand offers an opportunity to create highly reactive T-shaped Pt complexes by utilizing metal/ligand cooperation when dearomatizing the ligand with base. In the current presentation, we report on the synthesis of stable PNC-Pt pincer complexes and discuss our initial exploration of their reactivity. The initial PNC-Pt-Cl complex and its alkyl derivative are remarkably stable, even under air and at elevated temperatures. Attempts to deprotonate the ligand arm for metal/ligand cooperation reactivity in substrate activation will be discussed, as well as the reactivity and properties of the PNC-Pt-Me complex.

1. a) Martin, J.; Schoergenhumer, J.; Biedrzycki, M.; Nevado, C., **2024**, *Inorg. Chem.*, 63, 8390-8396. b) Jongbloed, L.S.; de Bruin, B.; Reek, J.N.H.; Lutz, M.; van der Vlugt, J.I., **2015**, *Chem. Eur. J.*, 21, 7297-7305. c) Joengbloed, L.S.; Vogt, N.; Sandleben, A.; de Bruin, B.; Klein, A.; van der Vlugt, J.I., *Eur. J. Inorg. Chem.*, **2018**, 2408-2418.

2. a) Jongbloed, J.S.; Garcia-Lopez, D.; van Heck, R.; Siegler, M.A.; Carbo, J.J.; van der Vlugt, J.I., **2016**, *Inorg. Chem.*, 55, 8041-8047. b) Jongbloed, L.S.; de Bruin, B.; Reek, J.N.H.; Lutz, M., van der Vlugt, J.I., **2016**, *Catal, Sci. Technol.*, 6, 1320-1327.