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Preparation of Metallaiminophosphoranes and Their Reactivity

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PREPARATION OF METALLAIMINOPHOSPHORANES AND THEIR REACTIVITY

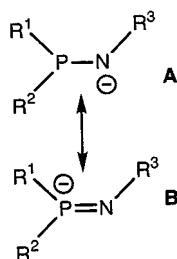
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Treatment of $[\text{Cp}^(\text{CO})_2\text{M}\{\text{P}(\text{NPh})(\text{OMe})_2\}]\text{PF}_6$ ($\text{M} = \text{Fe}$ and Ru) with NaNH_2 gives metallaiminophosphoranes, $\text{Cp}^*(\text{CO})_2\text{M}\{\text{P}(\text{NPh})(\text{OMe})_2\}$. The x-ray structures and reactivity of the complexes are reported.*

Keywords: Iron; metallaiminophosphorane; P–N double bond; reactivity; ruthenium; x-ray structure

Although $[\text{R}^1\text{R}^2\text{PNR}^3]^-$ could be described as a resonance hybrid of a phosphinoamide (**A**) and an iminophosphide (**B**), the former generally prevails in the resonance, so that the transition-metal complexes of **B**, that is, metallaiminophosphoranes, are quite rare so far. We here report the preparation, structures and reactivity of Fe- and Ru-imino-phosphoranes. Treatment of $[\text{Cp}^*(\text{CO})_2\text{M}\{\text{P}(\text{NPh})(\text{OMe})_2\}]\text{PF}_6$ **1** ($\text{M} = \text{Fe}$, Ru ; $\text{Cp}^* = \eta^5\text{-C}_5\text{Me}_5$) with NaNH_2 gave $\text{Cp}^*(\text{CO})_2\text{M}\{\text{P}(\text{NPh})(\text{OMe})_2\}$ **2** in good yield. The P–N bond in **2**_{Fe} is comparable



SCHEME 1

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in length to that of **2_{Ru}** and both are considerably shorter than that of the formal P–N single bond, suggesting that the P–N bonds in **2** have substantial double bond character. In contrast to the P=O analogue of **2_{Fe}**, that is, Cp*(CO)₂Fe{P(O)(OMe)₂}, which reacts with 9-BBN to give a CO reduction product, the reaction of **2_{Fe}** resulted in decomposition.