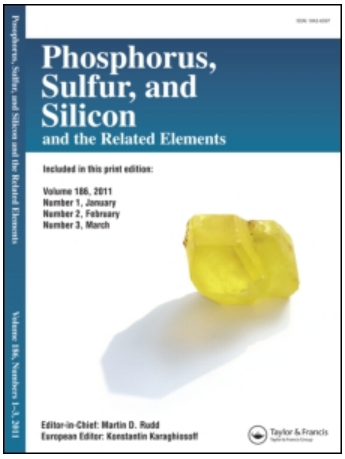


## Phosphorus, Sulfur, and Silicon and the Related Elements

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# Preparation of Metallaiminophosphoranes and Their Reactivity

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# PREPARATION OF METALLAIMINOPHOSPHORANES AND THEIR REACTIVITY

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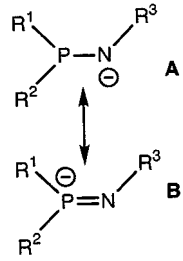
*Treatment of $[Cp^*(CO)_2M\{P(NHPh)(OMe)_2\}]PF_6$ ($M = Fe$ and Ru) with $NaNH_2$ gives metallaiminophosphoranes, $Cp^*(CO)_2M\{P(NPh)(OMe)_2\}$. The x-ray structures and reactivity of the complexes are reported.*

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

Although $[R^1R^2PNR^3]^-$ 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 $[Cp^*(CO)_2M\{P(NHPh)(OMe)_2\}]$-$PF_6$ **1** (M = Fe, Ru: $Cp^* = \eta^5$-$C_5Me_5$) with $NaNH_2$ gave $Cp^*(CO)_2M\{P(NPh)(OMe)_2\}$ **2** in good yield. The P—N bond in $\mathbf{2_{Fe}}$ is comparable




**SCHEME 1**

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in length to that of $\mathbf{2_{Ru}}$ 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 $\mathbf{2_{Fe}}$, that is, $Cp^*(CO)_2Fe\{P(O)(OMe)_2\}$, which reacts with 9-BBN to give a CO reduction product, the reaction of $\mathbf{2_{Fe}}$ resulted in decomposition.