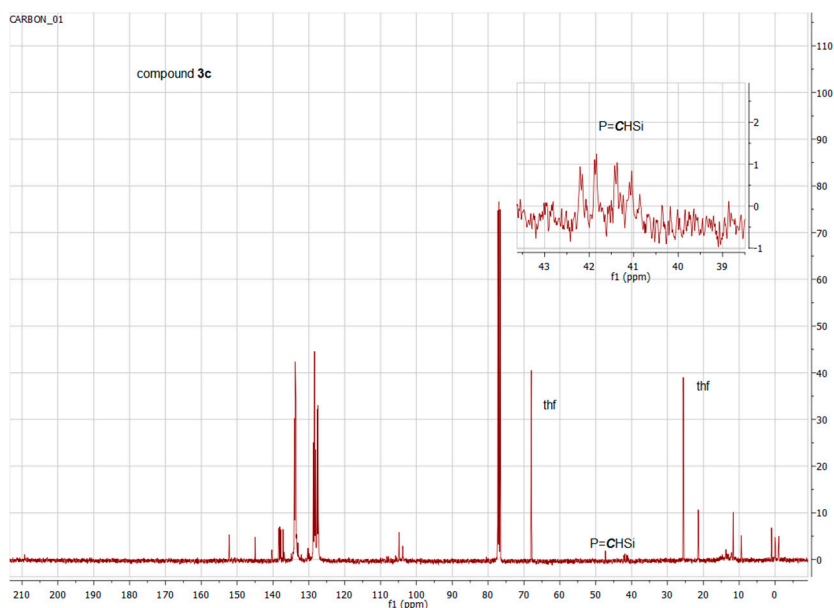


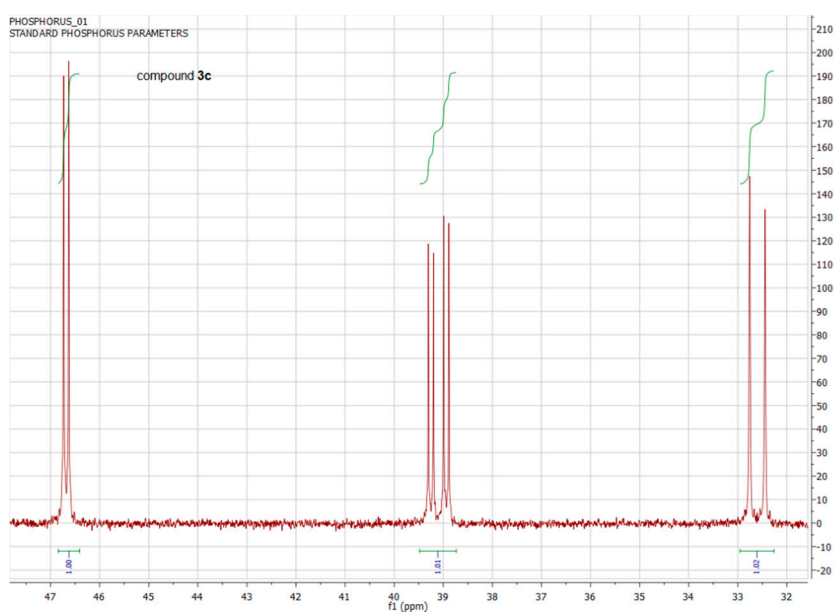
# Supplementary Materials: $\eta^1:\eta^2$ -*P*-pyrazolylphosphaalkene Complexes of Ruthenium(0)

Victoria K. Greenacre and Ian R. Crossley

Representative multinuclear NMR spectra ( $^{31}\text{P}\{^1\text{H}\}$  and  $^{13}\text{C}\{^1\text{H}\}$ ) for compounds 3–6. Spectra for compound 3c are shown in Figures S1 and S2.

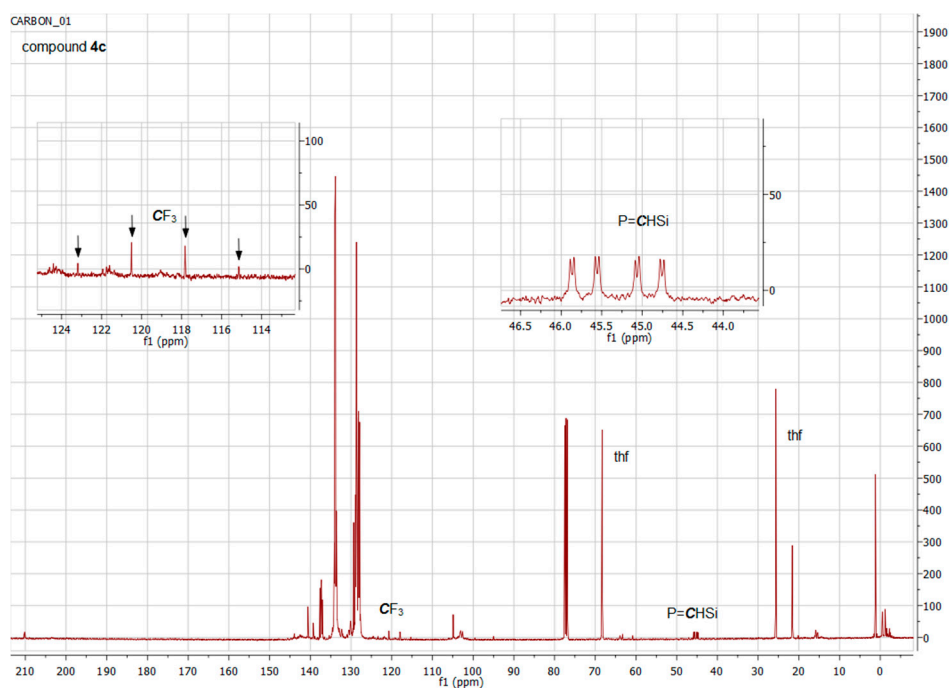


**Figure S1.** The  $^{13}\text{C}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-}N:\eta^2\text{-}P,\text{C-P}(\text{pz}^{\text{Me}_2})=\text{CH}(\text{SiMe}_2\text{Tol})\}(\text{CO})(\text{PPh}_3)_2]$  (3c), illustrating key indicative resonances. Note: spectra additionally show trace contaminants and residual solvent.

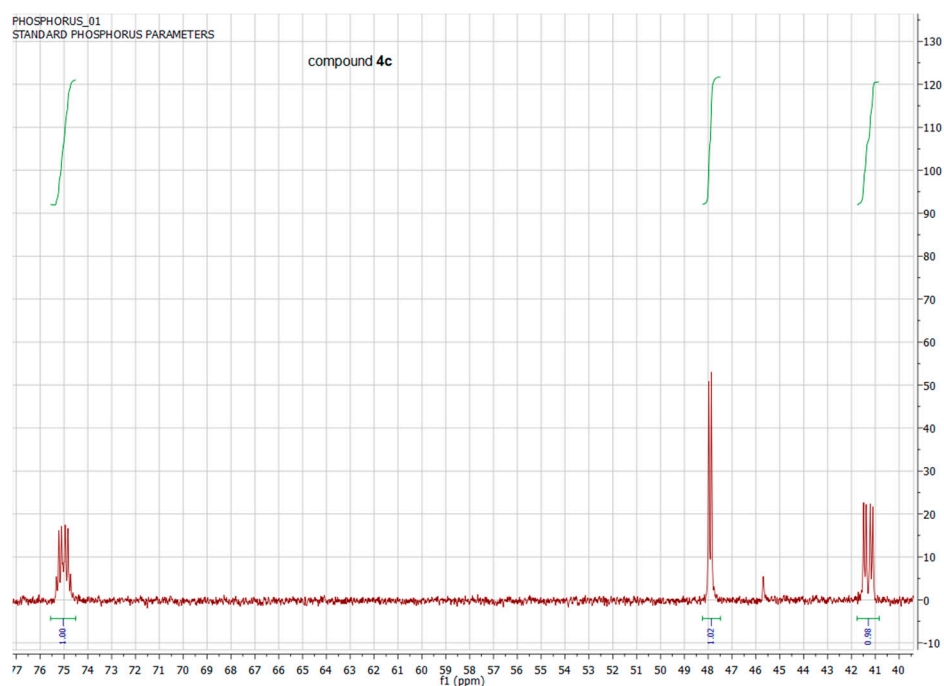


**Figure S2.** The  $^{31}\text{P}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-}N:\eta^2\text{-}P,\text{C-P}(\text{pz}^{\text{Me}_2})=\text{CH}(\text{SiMe}_2\text{Tol})\}(\text{CO})(\text{PPh}_3)_2]$  (3c), illustrating key indicative resonances.

Spectra for compound **4c** are shown in Figures S3 and S4.

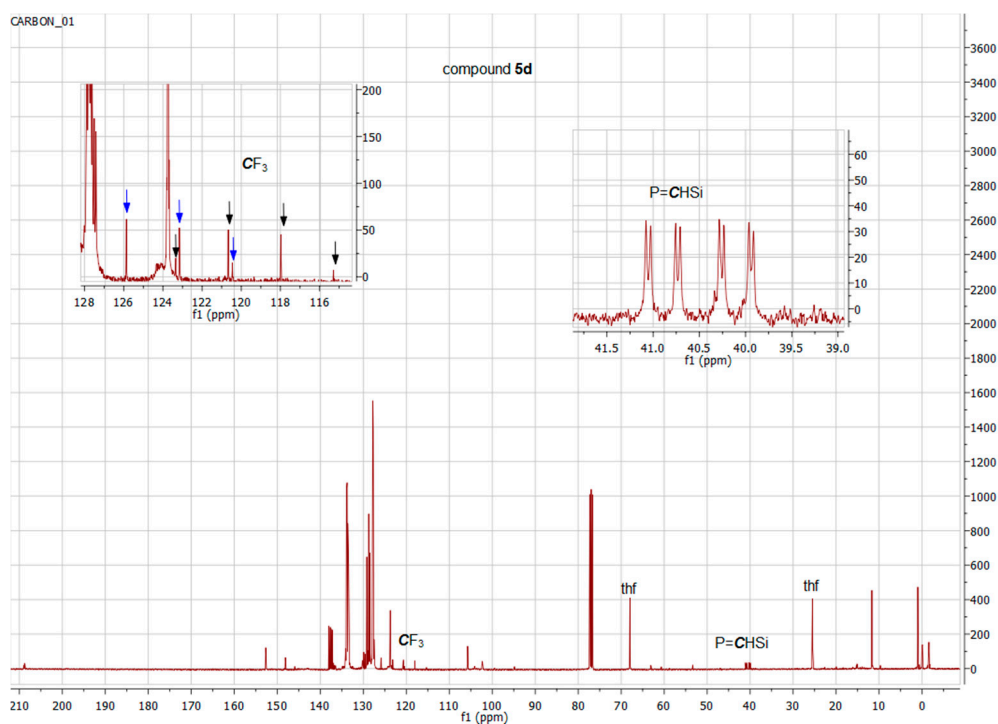


**Figure S3.** The  $^{13}\text{C}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-N}:\eta^2\text{-P,C-P}(\text{pz}^{\text{CF}_3})=\text{CH}(\text{SiMe}_2\text{Tol})\}(\text{CO})(\text{PPh}_3)_2]$  (**4c**), illustrating key indicative resonances. Note: spectra additionally show trace contaminants and residual solvent.

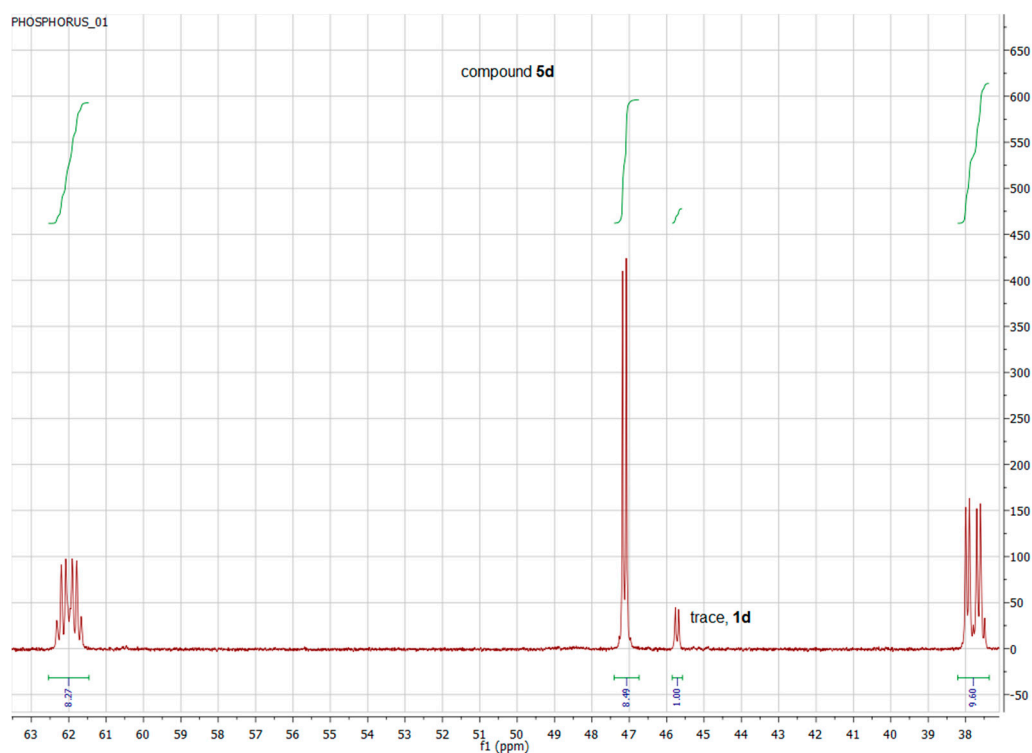


**Figure S4.** The  $^{13}\text{P}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-N}:\eta^2\text{-P,C-P}(\text{pz}^{\text{CF}_3})=\text{CH}(\text{SiMe}_2\text{Tol})\}(\text{CO})(\text{PPh}_3)_2]$  (**4c**), illustrating key indicative resonances. A trace of residual **1c** is apparent.

Spectra for compound **5d** are shown in Figures S5 and S6.

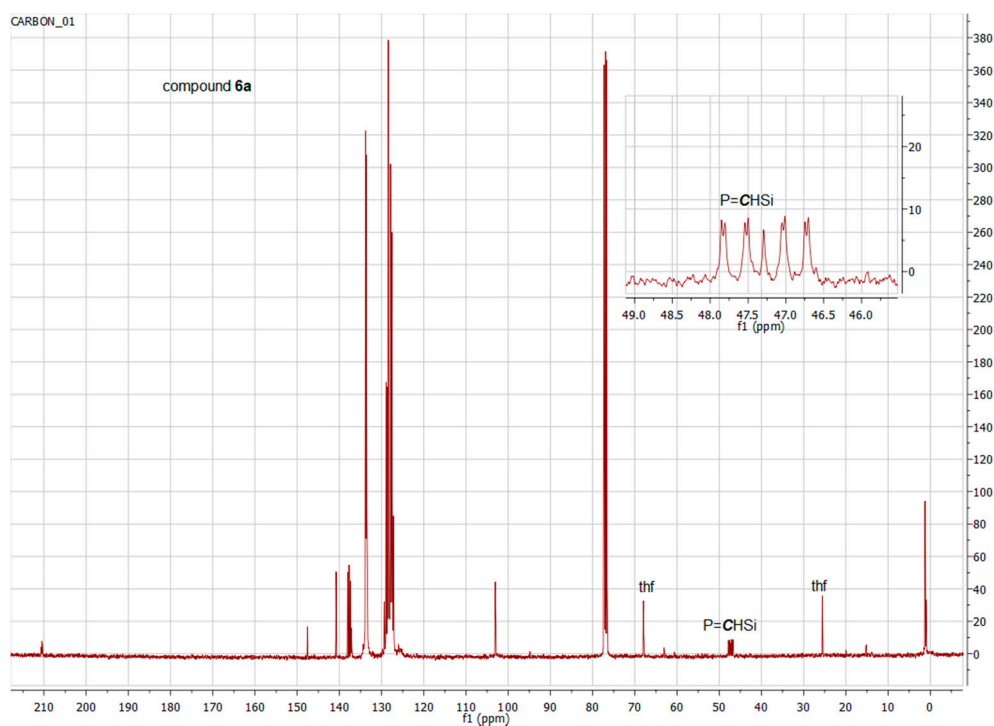


**Figure S5.** The  $^{13}\text{C}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-}N\text{-}\eta^2\text{-}P\text{-}C\text{-}P(\text{pz}^{\text{Me,CF}_3})=\text{CH}(\text{SiMe}_2\text{C}_6\text{H}_4\text{CF}_3\text{-}p)\}(\text{CO})(\text{PPh}_3)_2]$  (**5d**), illustrating key indicative resonances. Note: spectra additionally show trace contaminants and residual solvent.

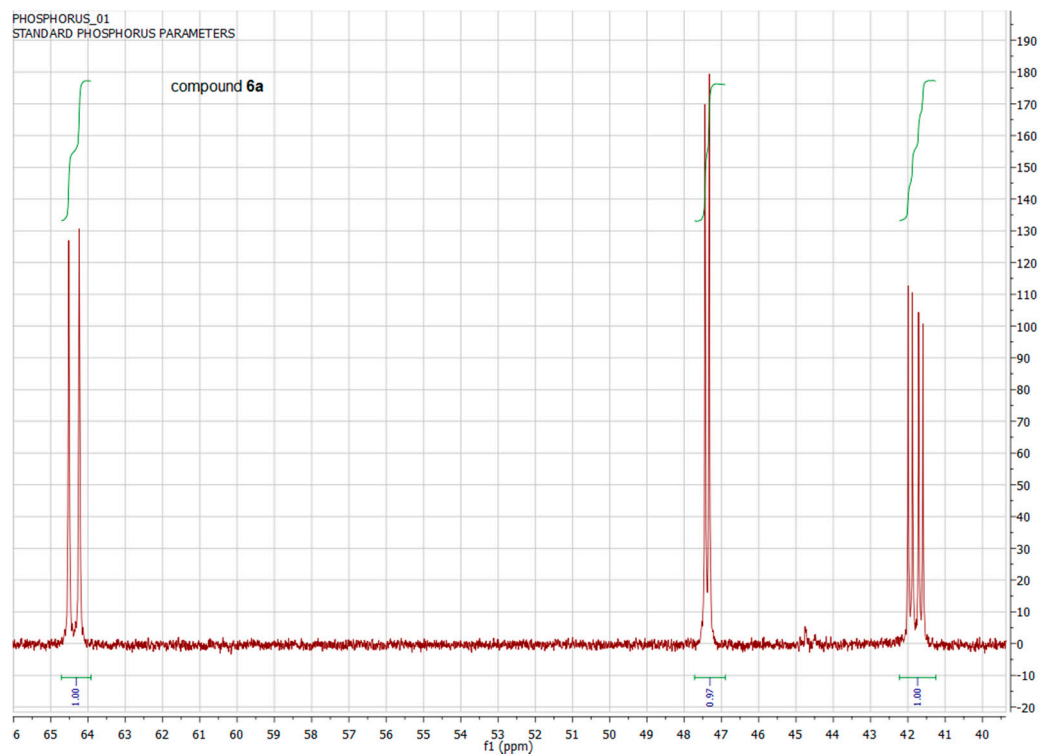


**Figure S6.** The  $^{13}\text{P}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-}N\text{-}\eta^2\text{-}P\text{-}C\text{-}P(\text{pz}^{\text{Me,CF}_3})=\text{CH}(\text{SiMe}_2\text{C}_6\text{H}_4\text{CF}_3\text{-}p)\}(\text{CO})(\text{PPh}_3)_2]$  (**5d**), illustrating key indicative resonances. A trace of residual **1d** is apparent.

Spectra for compound **6a** are shown in Figures S7 and S8.



**Figure S7.** The  $^{13}\text{C}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-N}:\eta^2\text{-P,C-P}(\text{pZ}^{\text{Ph}})=\text{CH}(\text{SiMe}_3)\}(\text{CO})(\text{PPh}_3)_2]$  (**6a**), illustrating key indicative resonances. Note: spectra additionally show residual solvent.



**Figure S8.** The  $^{13}\text{P}\{^1\text{H}\}$ -NMR spectrum of  $[\text{Ru}\{\eta^1\text{-N}:\eta^2\text{-P,C-P}(\text{pZ}^{\text{Ph}})=\text{CH}(\text{SiMe}_3)\}(\text{CO})(\text{PPh}_3)_2]$  (**6a**), illustrating key indicative resonances.