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Novel Phosphinidene-Bridged Organometallic Ta(IV) Complexes

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Multiple bonds between transition metal and main group elements are a field of major interest in inorganic synthesis,^[1] and this is the reason for our research into new phosphinidene complexes of tantalum.^[2]

The reaction of Cp^*TaCl_4 with LiPHR ($\text{R} = \text{Ph}, \text{Cy}, \text{tBu}$) gave the phosphinidene-bridged complexes $[\text{Cp}^*\text{TaCl}(\mu\text{-PR})]_2$ (Fig. 1, $\text{R} = \text{Ph}$) in high yield. Crystal structure analyses showed that the central Ta_2P_2 rings of these complexes are planar.

Another possible route to phosphinidene complexes is the reaction of phosphine adducts with DBU.^[3] However, the complex $[\text{Cp}^*\text{TaCl}_4(\text{PH}_2\text{Cy})]$ reacts with DBU to give the Ta(IV) complex $[\text{Cp}^*\text{TaCl}_4][(\text{DBU})\text{H}]^+$. In the solid state, the $(\text{DBU})\text{H}^+$ cation interacts with the $[\text{Cp}^*\text{TaCl}_4]^-$ anion via a hydrogen bond.

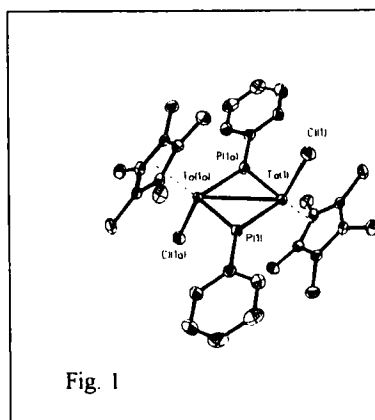


Fig. 1

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