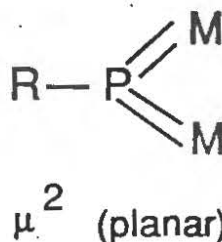


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$$\begin{array}{c} \text{O} \\ \diagup \\ \text{R}-\text{P}=\text{M} \\ \diagdown \\ \eta^1 \text{ (bent)} \end{array}$$


Terminal phosphinidene complexes have been obtained by Mathay et al. [4] via thermolysis reactions of 7-phosphanorbornadienes which are complexed to transition metal pentacarbonyl fragments of the chromium triad. The terminal phosphinidene complexes which result are only transient but their existence has been proven through a rich reaction chemistry [2] in which these compounds react with unsaturated organic and organometallic species in a manner similar to electrophilic transition metal singlet carbene complexes [5]. In the absence of trapping agents such as unsaturated moieties, the formation of transition metal stabilized phosphorus-phosphorus double bond compounds results [11]. The only isolable terminal phosphinidene to date was recently obtained by Lappert et al. [6]. These compounds exhibit the shortest metal phosphorus bond length of any phosphorus containing transition metal complex of the chromium triad. The isolable terminal phosphinidene complexes exhibit some of the highest upfield  $^{31}\text{P}$  NMR shifts known [6].

The synthesis of binuclear transition metal phosphinidene complexes containing a  $\mu^2$ -bridging phosphinidene was first achieved by Huttner et al. [7]. These compounds also show a rich reaction chemistry and are in general more stable than terminal phosphinidene complexes. A characteristic feature of these compounds is that they are brightly colored due to a strong long wavelength absorption in the visible region which is a result of the 3-center-4 $\pi$  electronic structure [8]. These complexes show considerable Lewis acidity in their reactivity as demonstrated by the formation of several adducts which have tetrahedral phosphorus centers [12]. Substitution reactions can occur at the phosphorus center to give a substituted phosphinidene. The  $\mu^2$ -bridging phosphinidene compounds can also dimerize to give transition metal stabilized phosphorus-phosphorus double bond compounds [13]. These bridging phosphinidene complexes can react with organometallic nucleophiles to give higher nuclearity phosphinidene compounds. This suggests a possible intermediacy of the  $\mu^2$ -phosphinidene complex in the formation of higher nuclearity transition metal compounds.

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