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

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### A New Synthesis of Vinylidene Bis-phosphine Sulfides

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# A New Synthesis of Vinylidene Bis-phosphine Sulfides

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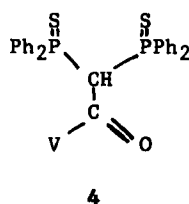
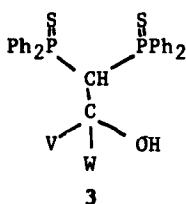
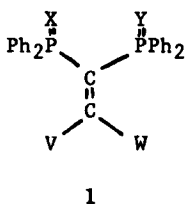
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1,1-Bis(diphenylphosphino)ethene, **1a**, was originally prepared by Colquhoun and McFarlane<sup>1</sup> by the reaction of lithium diphenylphosphide and vinylidene chloride. Subsequently, Schmidbaur et al.,<sup>2</sup> reported further novel chemistry of **1a** and its derivatives such as **1b** and **1c**.

We now report a new synthesis of **1c** as well as some other new compounds described below, including a new type of stabilized enol. We have observed that the reaction of the anion  $[\text{Ph}_2\text{P}(\text{S})\text{CHP}(\text{S})\text{Ph}_2]^-$ , **2**, with formaldehyde produces **1c** in good yield, presumably by the rapid dehydration of the putative intermediate **3a**. In a similar fashion, benzaldehyde produces **1d** from the intermediate **3b**.

The reaction of **2** with methyl formate yields the stable enol **1e**, which presumably arises from the tautomerization of the less stable aldehyde **4a**. Similarly, **2** reacts with benzoyl chloride to produce the enol **1f** from the keto intermediate **4b**.

The scope of the reactions of **2** and its analogues with various organic reagents will be discussed. The compounds **1c**, **1d**, **1e** and **1f** have been characterized by infrared, NMR and mass spectra.



**1a** X=Y=lone pair; V=W=H

**1b** X=Y=O; V=W=H

**1c** X=Y=S; V=W=H

**1d** X=Y=S; V=Ph; W=H

**1e** X=Y=S; V=OH; W=H

**1f** X=Y=S; V=OH; W=Ph

**3a** V=W=H

**3b** V=Ph; W=H

**4a** V=H

**4b** V=Ph

1. I.J. Colquhoun and W. McFarlane, J. Chem. Soc., Dalton Trans. 1982, 1915.

2. H. Schmidbaur, R. Herr, G. Mueller and J. Riede, Organometallics 1985, **4**, 1208.