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Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

The Synthesis and Reactivity of Trimethylsilyl Amide of Dichlorophosphoric(V) Acid, $\text{Me}_3\text{SiNHP(S)Cl}_2$

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To cite this Article Dostál, K. , Sikola, J. , Pinkas, J. and Meisel, M.(1987) 'The Synthesis and Reactivity of Trimethylsilyl Amide of Dichlorophosphoric(V) Acid, $\text{Me}_3\text{SiNHP(S)Cl}_2$ ', Phosphorus, Sulfur, and Silicon and the Related Elements, 30: 3, 766

To link to this Article: DOI: 10.1080/03086648708079258

URL: <http://dx.doi.org/10.1080/03086648708079258>

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The Synthesis and Reactivity of Trimethylsilyl Amide of Dichlorophosphoric(V) Acid, $\text{Me}_3\text{SiNHP(S)Cl}_2$

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Trimethylsilylamid $\text{Me}_3\text{SiNHP(S)Cl}_2$ (I) was first obtained ¹⁾ by reaction $\text{P}_2\text{S}_2\text{OCl}_4$ with hexamethyldisilazane (HMDS) as a crystalline very reactive compound (m.p.=42°C, $\delta^{31}\text{P}$ =51,3ppm).

We have found that (I) can also be prepared by the reaction:

$$\text{SPCl}_3 + \text{Me}_3\text{Si.NH.SiMe}_3 \xrightarrow[\text{diethylether}]{20^\circ\text{C. 20d}} \text{Me}_3\text{SiNHP(S)Cl}_2 + \text{Me}_3\text{SiCl.} \quad (\text{I})$$

However, contrary to the reaction of OPCl_3 with HMDS ^{2,3)}, reaction of SPCl_3 with HMDS also yields hitherto unknown diazaphosphetidine $[\text{Me}_3\text{SiNH.P(S).NSiMe}_3]_2$ (II). It has been proved that (II) is a product of the reaction of (I) with excess of HMDS. It is probable that by this reaction hypothetic amide-imide $\text{Me}_3\text{SiNHP(S)=NSiMe}_3$ as an intermediate is formed which by a cycloaddition leads to (II). In connection with the discussion of a relevant reaction mechanism we have studied the reactions of amides $\text{Me}_3\text{SiNHP(X)Cl}_2$ (X=O,S) with trialkylamines and the behaviour of products of these reactions towards HMDS. NMR spectra, i.r., Raman and mass spectra of all newly prepared compounds are reported.

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