

The ^1H n.m.r. spectrum of a solution of (2) recorded as soon as possible after preparation showed that *ca.* 94% of silaethene and 6% of acylsilane were present, as determined from the relative intensities of the Me_3Si signals of (2) at δ 0.51 or 0.47 compared with the signal of the mixture of (1) and (2) at δ 0.41 (accidental overlap). With time the amount of (1) increased at the expense of (2).

Using high resolution ^{13}C n.m.r. spectroscopy it was possible to observe the $^1J(^{29}\text{Si}-^{13}\text{C})$ coupling constants for the acylsilane (34.0 Hz) and the silaethene (84.3 Hz), the latter larger value being consistent with previous general observations that an increase in coupling constant occurs with a change from sp^3 to sp^2 hybridization.

A suspension of compound (2) in mineral oil gave the strong i.r. absorption at 1135 cm^{-1} characteristic of a silaethene.^{2§} No carbonyl absorption at 1620 cm^{-1} was observed, except after several hours when a weak band developed. Hence the crystals of (2) do not contain the acylsilane (1) initially.

The mass spectrum of (1) with the spectrometer source at 60°C and the sample insertion probe at 40°C gave a typical acylsilane fragmentation pattern: M^+ m/z 410 (100%), $(M - \text{Me})^+$ 395 (75%), $(M - \text{Me}_3\text{Si})^+$ 337 (90%), $(M - \text{adamantyl})^+$ 275 (25%), and smaller fragments. In contrast, under the same conditions the needles of (2) showed an entirely different fragmentation pattern: M^+ m/z 410 (1%), $(M - \text{C}_6\text{H}_{15}\text{Si}_2)^+$ 279 (20%), $(M - \text{C}_5\text{H}_{14}\text{-Si}_3)^+$ 252 (30%), $(M - \text{C}_6\text{H}_{17}\text{Si}_3)^+ \equiv (\text{adamantyl-CH-}$

$\text{OSiMe}_3)^+$ 237 (100%), and smaller ions: none of these ions is observed in the spectrum of (1). However, when the source temperature was raised to *ca.* 110°C the observed spectrum was a composite of spectra of (1) and (2), presumably owing to the partial isomerization of (2) back to (1). Under chemical ionization (C.I.) conditions with CH_4 , the needles of (2) gave the ion $(\text{MH})^+$ at m/z 411 (100%), the molecular weight confirming that the compound was monomeric. These spectra are not those of a head-to-head dimer since, in several examples studied, a strong signal for $(\text{Me}_{12}\text{Si}_6)^+$ at m/z 348 is always observed, and under C.I. conditions the $(\text{MH})^+$ peak of the dimer is a major peak.

It is clear from the above data that the solid studied is neither the acylsilane (1) nor a dimer of the silaethene (2). The strong i.r. absorption at 1135 cm^{-1} confirms that the material described has the structure attributed to the silaethene (2), and hence it is evident that reasonably stable silaethenes can be isolated and studied. A crystal structure determination is being undertaken.

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§ This absorption is the only strong absorption characteristic of silaethenes in general, having been observed by us in two other examples. It may be the $\text{Si}=\text{C}$ stretch, calculated by others as occurring near 1145 cm^{-1} for $\text{H}_2\text{Si}=\text{CH}_2$: H. B. Schlegel, S. Wolfe, and K. Mislow, *J. Chem. Soc., Chem. Commun.*, 1975, 246. It instantly disappears when oxygen or protic solvents are introduced into the system.

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