1-Trimethylsilyl-2,2,4,4-tetramethylcyclodisilazane

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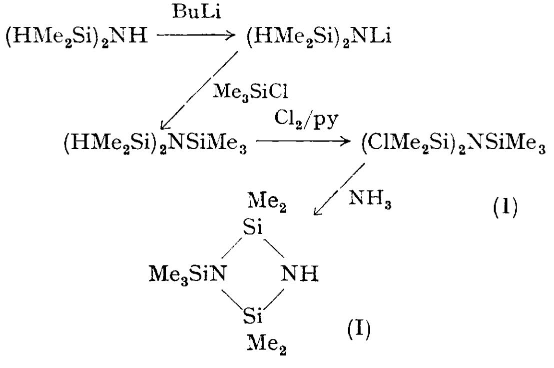
ALL cyclodisilazanes hitherto reported[1–5] have been substituted at both nitrogen atoms. The cyclodisilazane system is very strained and substitution at nitrogen has appeared to be essential to stabilise the ring.

We now report the preparation of a cyclodisilazane containing one NH group by the following route:

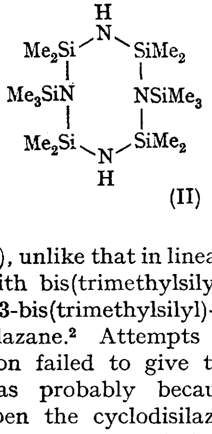


(1)

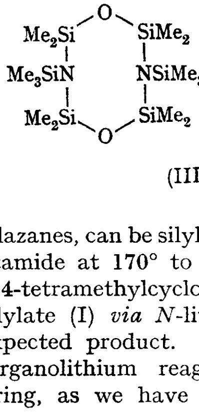
(I)

This novel compound, 1-trimethylsilyl-2,2,4,4-tetramethylcyclosilazane (I), is, as expected, very reactive. The strain present is also reflected in its i.r. and n.m.r. spectra. The former exhibits an abnormally high NH stretching frequency (3510 cm.$^{-1}$), indicating high acidity, a low NH bending frequency (1000 cm.$^{-1}$), and an SiNSi asymmetric stretch at 870 cm.$^{-1}$ (characteristic of cyclodisilazanes[4]). In the n.m.r. spectrum, the signal of the SiMe$_2$ protons is **14** c./sec. downfield from tetramethylsilane, again indicating the strained cyclodisilazane system.[6]

The compound (I) is stable to heat when pure, but in the presence of ammonium sulphate (1%) at 190° it is converted into its dimer (II). Hydrolysis is rapid and complicated in homogeneous solution, but in heterogeneous solution the main product (54%) is the siloxazane (III). The NH group in (I), unlike that in linear disilazanes, can be silylated with bis(trimethylsilyl)acetamide at 170° to give 1,3-bis(trimethylsilyl)-2,2,4,4-tetramethylcyclodisilazane.[2] Attempts to silylate (I) *via N*-lithiation failed to give the expected product. This was probably because organolithium reagents open the cyclodisilazane ring, as we have now shown for 1,3-diethyl-2,2,4,4-tetramethylcyclodisilazane [reaction (2)].



(II)



(III)

$$(Me_2SiNEt)_2 + MeLi \rightarrow Me_3Si{\cdot}NEt{\cdot}SiMe_2N(Et)Li \xrightarrow{Me_3SiCl} Me_3Si{\cdot}NEt{\cdot}SiMe_2{\cdot}NEt{\cdot}SiMe_3 \qquad (2)$$

This is the first reported case of cleavage of an Si–N bond by an organometallic reagent.

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