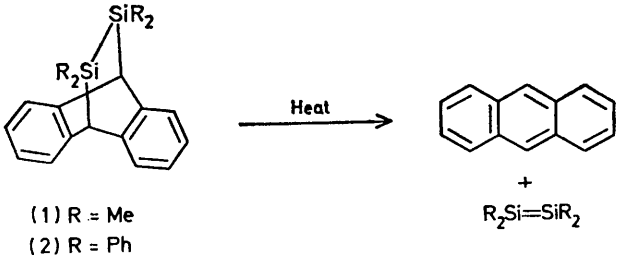
A Direct Route to a Novel Tetraphenyldisilabicyclo[2.2.2.]octa-2,5-diene: A Tetraphenyldisilene Precursor

By CLIFFORD L. SMITH* and JANET POUNDS
(Department of Chemistry, Southern University, Baton Rouge, Louisiana 70813)

Summary Synthesis of 2:3,5:6-dibenzo-7,7,8,8-tetraphenyl-7,8-disilabicyclo[2.2.2.]octa-2,5-diene from dichlorodiphenylsilane, anthracene and magnesium–magnesium bromide in THF is described; the disilabicyclo compound was found to undergo a retrodiene reaction, affording anthracene and presumably tetraphenyldisilene.

PEDDLE *et al.* have reported an approach to tetramethyldisilene ($Me_2Si{=}SiMe_2$) *via* thermolysis of the 7,8-disilabicyclo[2.2.2.]2,5-octadiene (**1**).[1]

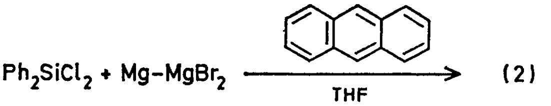


(1) R = Me
(2) R = Ph

We now report the preparation of 2:3,5:6-dibenzo-7,7,8,8-tetraphenyl-7,8-disilabicyclo[2.2.2.]octa-2,5-diene (**2**) and its thermal decomposition to anthracene and presumably tetraphenyldisilene.

Recently we have reported the formation of octaphenylcyclotetrasilane (**3**) from a reaction between dichlorodiphenylsilane, magnesium bromide and magnesium metal in tetrahydrofuran (THF).[2]

$$Ph_2SiCl_2 + Mg\text{-}MgBr_2 \xrightarrow{THF} \underset{(3)}{[Ph_2Si]_4} + MgCl_2$$



$$(2) \xrightarrow[-C_{14}H_{10}]{>320\,^{\circ}C} n\,[Ph_2Si{=}SiPh_2] \longrightarrow [Ph_2Si\text{-}SiPh_2]_n$$

When the reaction[2] was conducted in the presence of a stoicheiometric amount of anthracene, a white amorphous solid precipitated which was collected by filtration subsequent to hydrolysis of the red-coloured reaction mixture. Washing of this solid material several times with hot benzene followed by addition of hot petroleum ether (b.p. 30–60 °C) to the combined benzene extracts gave a white crystalline compound (**2**), m.p. 302—306 °C (with slight decomposition) in *ca.* 40% yield.

The ^1H n.m.r. spectrum [δ 4·62 (2H, s) and 6·72—7·32

---

* Correspondence to C.L.S. at Department of Chemistry, Albany State College, Albany, Georgia 31705.

(28H, m)] and the parent peak (*m/e* 542) were consistent with the structure of (**2**).†

Thermolysis of (**2**) above 325° gave an 80% yield of anthracene and a yellow-orange coloured non-volatile solid, presumably formed by polymerization of an incipient tetraphenyldisilene.

A major fragment (*m/e* 364) which is consistent with the mass of tetraphenyldisilene supports its formation from (**2**).

We thank the National Science Foundation for support, and Dr. R. E. Echols, Southern University, Baton Rouge, Louisiana and Dr. F. K. Cartledge, Louisiana State University, Baton Rouge, Louisiana for helpful discussions.

(*Received*, 20*th June* 1975; *Com.* 702.)

---

† Satisfactory elemental analyses have been obtained.

[1] G. J. D. Peddle, D. N. Roark, A. M. Good, and S. G. McGeachlin, *J. Amer. Chem. Soc.*, 1969, **91**, 2807; D. N. Roark and G. J. D. Peddle, *ibid.*, 1972, **94**, 5838.

[2] C. L. Smith and R. Gooden, *J. Organometallic Chem.*, 1974, **81**, 33.