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Abstract

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SOME SILICON HYDROCARBONS OF THE DISILANEMETHANE AND DISILANEETHANE SERIES

In a number of previous communications we described silicon hydrocarbons of the disilanemethane and disilaneethane series, obtained by the interaction of organomagnesium compounds with hexachloro-, pentachloro-, and tetrachloro derivatives of disilanemethane and with hexachlorodisilaneethane ([1–6]). The possibility was also shown of the addition reaction of pentachloro- and tetrachlorodisilane to unsaturated hydrocarbons, leading to the formation of alkyl- and dialkylchloro derivatives of disilanemethane ([7]).

In the present communication, silicon hydrocarbons of the disilanemethane series with various organic radicals are described, obtained by the interaction of organolithium compounds with alkyl- and dialkylchloro derivatives of disilanemethane described by us earlier ([7]), as well as hexaalkyl derivatives of disilanemethane and disilaneethane, obtained by the interaction of organomagnesium compounds with hexachlorodisilanemethane and hexachlorodisilaneethane.

Table 1 gives the properties of the silicon hydrocarbons obtained.

Experimental Part

1. Preparation of hexyltetraethyldisilanemethane.
To ethylmagnesium bromide, prepared from 33 g of ethyl bromide, 7.3 g of magnesium in 100 ml of ether, 7.3 g of hexyltetrachlorodisilanemethane was added. The reaction mixture was heated for 2 hours on a water bath and, after distilling off the ether, for 2 hours on an oil bath at 125°. 3.7 g (yield 55%) of hexyltetraethyldisilanemethane was obtained. B.p. 125–130°/2 mm.

Found, %: C 66.04; 66.03; H 13.28; 13.38
$C_{15}H_{36}Si_2$. Calculated, %: C 66.09; H 13.31

2. Preparation of hexylpentabutyldisilanemethane.
To butyllithium, prepared from 14 g of lithium and 140 g of butyl bromide in 400 ml of ether, 35 g of hexylpentachlorodisilanemethane was added. The reaction mixture was heated for 10 hours on a water bath. After distillation over metallic sodium, 30 g (yield 68%) of hexylpentabutyldisilanemethane was obtained. B.p. 179–181°/2 mm.

Found, %: C 73.85; 78.66; H 13.63; 13.68
$C_{27}H_{60}Si_2$. Calculated, %: C 73.55; H 13.72

3. Preparation of heptylpentabutyldisilanemethane.
To butyllithium, prepared from 14 g of lithium and 140 g of butyl bromide in 400 ml of ether, 33 g of heptylpentachlorodisilanemethane was added. The reaction mixture was heated on a water bath for 10 hours. After distillation over metal-

metallic sodium, 28 g (yield 64%) of heptylpentabutyldisilanemethane was obtained. B.p. 185–188°/2 mm.

$C_{28}H_{62}Si_2$. Found, %: C 73.87; 73.96; H 13.58; 13.53
Calculated, %: C 73.92; H 13.74

4. Preparation of dihexyltetrabutyldisilanemethane. To butyllithium, prepared from 3 g of lithium and 28 g of butyl bromide in 100 ml of ether, 7 g of dihexyltetrachlorodisilanemethane was added.

Table 1

Some silicon hydrocarbons of the disilanemethane and disilaneethane series

No.	Compound	Formula	B.p., °C/mm Hg	d_4^{20}	n_D^{20}	MR_D, found	MR_D, calc.
1	Hexyltetraethyldisilanemethane	$C_{19}H_{44}Si_2$	130/2	0.8344	1.4605	92.09	92.40
2	Hexylpentabutyldisilanemethane	$C_{30}H_{66}Si_2$	181/2	0.8334	1.4641	146.02	146.40
3	Heptylpentabutyldisilanemethane	$C_{31}H_{68}Si_2$	188/2	0.8391	1.4646	149.67	151.03
4	Dihexyltetrabutyldisilanemethane	$C_{37}H_{80}Si_2$	203/2	0.8354	1.4664	155.21	155.66

No.	Compound	Formula	B.p., °C/mm Hg	d_4^{20}	n_D^{20}	MR_D, found	MR_D, calc.
5	Diheptyltetrabutyldisilanemethane	$C_{39}H_{82}Si_2$	125/2	0.8396	1.4673	164.28	164.92
6	Hexaoctyldisilanemethane	$C_{65}H_{134}Si_2$	286/3	0.8408	1.4698	248.52	248.26
7	Hexaoctyldisilaneethane	$C_{66}H_{136}Si_2$	301/3	0.8426	1.4703	252.87	252.89

The reaction mixture was heated for 12 hours on a water bath. After distillation over metallic sodium, 4.7 g (yield 53%) of dihexyltetrabutyldisilanemethane was obtained. B.p. 199–203°/2 mm.

$C_{29}H_{64}Si_2$. Found, %: C 74.21; 74.23; H 14.04; 13.98
Calculated, %: C 74.27; H 13.76

5. **Preparation of diheptyltetrabutyldisilanemethane.** To butyllithium, prepared from 3 g of lithium and 28 g of butyl bromide in 100 ml of ether, 8 g of diheptyltetrachlorodisilanemethane was added. The reaction mixture was heated for 12 hours on a water bath. After distillation over metallic sodium, 5.4 g (yield 56%) of diheptyltetrabutyldisilanemethane was obtained. B.p. 121–125°/2 mm.

Found, %: C 75.68; 75.69; H 14.09; 14.16
$C_{31}H_{68}Si_2$. Calculated, %: C 74.92; H 13.79

6. **Preparation of hexaoctyldisilanemethane.** A mixture of 290 g of *n*-octyl bromide and 35.5 g of hexachlorodisilanemethane in 150 ml of ether was added to 36 g of magnesium and 150 ml of ether. The reaction mixture was heated on a water bath for 3 hours and then, after removal of the ether, for 3 hours on an oil bath at 150–160°. 40 g (yield 40.4%) of hexaoctyldisilanemethane was obtained. B.p. 285–286°/3 mm.

Found, %: C 78.56; 78.36; H 14.01; 13.98
$C_{49}H_{104}Si_2$. Calculated, %: C 78.52; H 13.98

7. **Preparation of hexaoctyldisilaneethane.** A mixture of 290 g of *n*-

octyl bromide, 36 g of hexachlorodisilaneethane, and 150 ml of ether was added to 36 g of magnesium and 150 ml of ether. The reaction mixture was heated on a water bath for 3 hours and then, after removal of the ether, for another 3 hours on an oil bath at 150-160°. 43 g (yield 44.3%) of hexaoctyldisilaneethane was obtained. B.p. 299-301°/3 mm.

Found, %: C 78.63; 78.72; H 14.05; 13.95
$C_{50}H_{106}Si_2$. Calculated, %: C 78.65; H 13.99

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Note: Figure translations are in progress. See original paper for figures.