Russian Journal of General Chemistry, Vol. 72, No. 7, 2002, pp. 1148–1149. Translated from Zhurnal Obshchei Khimii, Vol. 72, No. 7, 2002, pp. 1227–1228.

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LETTERS TO THE EDITOR

Reactions of 1-Hydrosilatrane with 2-Hydroxyethylamines

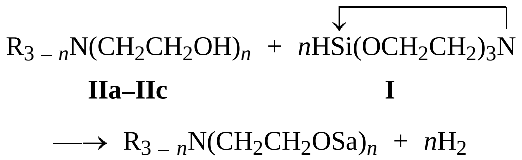
M. G. Voronkov, G. A. Kuznetsova, and V. P. Baryshok

Favorskii Irkutsk Institute of Chemistry, Siberian Division, Russian Academy of Sciences, Irkutsk, Russia

Received May 28, 2001

Among silatranes, 1-hydrosilatrane (**I**, SaH) is of considerable theoretical and practical interest, which is due to high and specific reactivity of the Si–H bond [1–7]. This compound readily reacts with alcohols and phenols [1], alkanediols [2, 3], and carboxylic acids [4]. Dehydrocondensation of **I** with glucose and mannose yields silatranyl derivatives of monosaccharides [5]. Silatrane **I** was suggested as an effective reductant [6–13].

We have studied dehydrocondensation of alkyl(2-hydroxyethyl)amines **IIa**–**IIc** with silatrane **I**.



$$R_{3-n}N(CH_2CH_2OH)_n + nHSi(OCH_2CH_2)_3N$$

IIa–IIc **I**

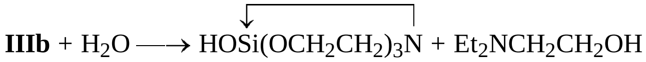
$$\longrightarrow R_{3-n}N(CH_2CH_2OSa)_n + nH_2$$

IIIa–IIIc

n = 1, R = Me (**a**), Et (**b**); n = 3 (**c**).

This reaction readily occurs under mild conditions without a catalyst. Amino alcohols **II** with R = H or $n = 2$ under similar conditions react to give polymers.

(*N*-Diethylaminoethoxy)silatrane **IIIb** is smoothly hydrolyzed to give 1-silatranol **IV** in 96% yield.



$$\mathbf{IIIb} + H_2O \longrightarrow HOSi(OCH_2CH_2)_3N + Et_2NCH_2CH_2OH$$

IV

This reaction is a simple and convenient route to 1-silatranol **IV**. Previously compound **IV** was prepared in a lower yield by hydrolysis of $N(CH_2CH_2OSa)_3$ [9].

Reaction of 1-hydrosilatrane with *N*,*N*-dimethylaminoethanol. A mixture of 3.1 g of 1-hydrosilatrane and 1.6 g of *N*,*N*-dimethylaminoethanol in 40 ml of anhydrous chloroform was heated for 7 h until hydrogen evolution ceased. The solvent was distilled off, and the residue was sublimed to give 3.5 g (75%) of 1-[2-(dimethylamino)ethoxy]silatrane **IIIa**, mp 117–118°C (published data [14, 15]: yield 55%, mp 114–115°C). Found, %: C 45.34; H 8.83; N 10.57; Si 10.52. $C_{10}H_{22}N_2O_4Si$. Calculated, %: C 45.78; H 8.45; N 10.68; Si 10.70.

Reaction of 1-hydrosilatrane with *N*,*N*-diethylaminoethanol. A mixture of 3.5 g of 1-hydrosilatrane and 2.4 g of *N*,*N*-diethylaminoethanol in 40 ml of chloroform was heated for 4 h. The solvent was distilled off, and the residue was treated with pentane; 4.1 g (70%) of **IIIb** was obtained, mp 98–99°C (published data [14, 15]: yield 59%, mp 94–95°C). Found, %: C 49.70; H 9.18; N 9.57; Si 9.40. $C_{12}H_{26}N_2O_4Si$. Calculated, %: C 49.64; H 9.02; N 9.65; Si 9.67.

1-Silatranol IV. A 0.09-g portion of water was added to a solution of 1.45 g of **IIIb** in 10 ml of chloroform, and the mixture was refluxed for 3.5 h. The precipitate was filtered off; yield 0.7 g (74%), mp 205–207°C (published data [9]: yield 57%, mp 205–210°C). Found, %: C 37.90; H 7.15; N 7.45; Si 14.44. $C_6H_{13}NO_4Si$. Calculated, %: C 37.68; H 6.85; N 7.32; Si 14.69.

Reaction of 1-hydrosilatrane with triethanolamine. A solution of 1.49 g of triethanolamine in 15 ml of chloroform was added dropwise over a period of 1 h to a refluxing solution of 5.25 g of **I** in 30 ml of chloroform. The mixture was refluxed for an additional 0.5 h, and the solvent was distilled off at reduced pressure (10–15 mm Hg). The creamy white finely crystalline residue was mixed with 30 ml of hexane and then filtered off; yield 6.45 g (96%), mp 258–260°C (published data [9]: yield 54%, mp 260°C). Found, %: C 43.11; H 7.27; N 12.88; Si 8.16. $C_{24}H_{48}N_4O_{12}Si_3$. Calculated, %: C 43.09; H 7.23; N 12.60; Si 8.38.

The IR spectra were recorded with a Specord IR-75 spectrometer (KBr pellets).

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ACKNOWLEDGMENTS

The study was financially supported by the Russian Foundation for Basic Research (project no. 00-15-97395).

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