

LETTERS TO THE EDITOR

Reaction of Divinyl Selenide with Selenourea

S. V. Amosova, K. A. Volkova, M. V. Penzik, A. I. Albanov, and V. A. Potapov

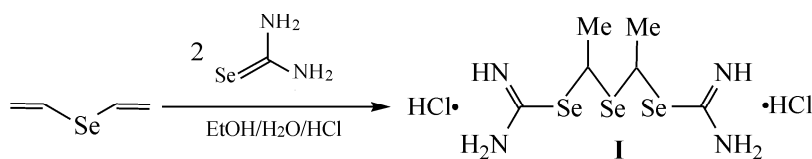
*Favorskii Irkutsk Institute of Chemistry, Siberian Branch, Russian Academy of Sciences,
ul. Favorskogo 1, Irkutsk, 664033 Russia*

Received July 9, 2007

DOI: 10.1134/S1070363208030262

Reaction of divinyl sulfide with thiourea proceeds in the presence of hydrochloric acid (EtOH/H₂O/HCl) and leads to the formation of a cyclization product, 2*H*,6*H*-2,6-dimethyl-4-amino-1,3,5-dithiazinium hydrochloride [1, 2]. No data on the reaction of divinyl selenide with selenourea was published before, but it was presumable that under the same conditions it would be analogous to the above-mentioned process. Formation of the corresponding cyclic compound, diselenoazinium hydrochloride, could be expected.

We have found that contrary to this suggestion the reaction of divinyl selenide with selenourea (EtOH/H₂O/HCl, 50–56°C) resulted in the formation of a previously unknown bis[1-carbamimidoylselanyl] ethyl] selenide dihydrochloride **I**, the product of selenourea addition to the double bonds of divinylselenide. At the double molar excess of selenourea in respect to the divinyl selenide the yield of compound **I** was quantitative.



The structure of this compound was established by means of ¹H, ¹³C, and ⁷⁷Se NMR spectroscopy and confirmed by the elemental analysis data.

Bis[1-(carbamimidoylselanyl)ethyl] selenide dihydrochloride (I). mp 55–57 °C. ¹H NMR spectrum (CDCl₃), δ, ppm: 1.94 d (6H, CHCH₃), 5.60 q (2H, CHCH₃), 9.52 s, 9.60 s (8H, NH₂, =NH·HCl). ¹³C NMR spectrum (CDCl₃), δ, ppm: 25.34, 25.37 (CH₃), 33.56, 33.63 (CH), 166.84, 167.13 (C=N). ⁷⁷Se NMR spectrum (CDCl₃), δ_{Se}, ppm: 495.8, 497.9 (SeC=NH), 436.9, 442.2 (CHSeCH). Found, %: C 15.62; H 3.56; Cl 15.21; N 12.50; Se 52.34. C₆H₁₆Cl₂N₄Se₃. Calculated, %: C 15.97; H 3.59; Cl 15.51; N 12.41; Se 52.53.

The NMR spectra were taken on a Bruker DPX-400 spectrometer, operating frequencies 400.13 (¹H, HMDS), 100.61 (¹³C, HMDS), and 76.30 MHz (⁷⁷Se, Ph₂Se₂).

REFERENCES

1. Trofimov, B.A., Gavrilova, G.M., Kalabin, G.A., Baistrov, V.V., and Amosova, S.V., *Khim. Geterotsikl. Soed.*, 1979, no. 11, p. 1466.
2. Gavrilova, G.M., Amosova, S.V., Trofimov, B.A., Kotsitsyna, E.I., Pertsikov, B.Z., Gostevskaya, V.I., Musorin, G.K., Al'pert, M.L., and Borodina, N.M., *Khim. Geterotsikl. Soed.*, 1986, no. 5, p. 697.