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LETTERS TO THE EDITOR

Synthesis of *Z,Z*-Bis(2-chlorovinyl)ditelluride

M. V. Musalova, M. V. Musalov, V. A. Potapov, and S. V. Amosova

Favorskii Irkutsk Institute of Chemistry, Siberian Branch, Russian Academy of Sciences, ul. Favorskogo 1, Irkutsk, 664033, Russia
e-mail: amosova@irioch.irk.ru

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Organic ditellurides are important reagents for modern organic synthesis [1, 2]. Their reduction leads to organyltellurolate anions, which enter the reactions of nucleophilic substitution and addition [1]. The halogenation of organic ditellurides results in organyltellurium halogenides and -trihalogenides, which enter various reactions of electrophilic substitution and addition to alkenes and alkynes [2]. Compounds containing 2-halovinyltellurium group are also important precursors, which are used in stereoselective synthesis of functionalized alkenes by the reactions of cross-coupling and transmetallation [1, 2]. The stereoselective synthesis of ditellurides containing 2-halovinyl group is an important synthetic problem in the chemistry of organotellurium compounds. As a rule, the preparation of these compounds is based on the addition of tellurium tetrachloride to alkynes [3–8].

Earlier, we have first performed the reaction of tellurium tetrachloride with acetylene, which occurs stereoselectively as the *anti*-addition and results depending on the conditions of the reaction in *E*-(2-chlorovinyl)tellurium trichloride or *E,E*-bis(2-chlorovinyl)telluriumdichloride [3–5]. The reduction of *E*-(2-chlorovinyl)tellurium trichloride by sodium pyrosulfite affords *E,E*-bis(2-chlorovinyl)ditelluride [3–5], which was used for introduction of the *E*-2-chlorovinyltellurium group in organic compounds.

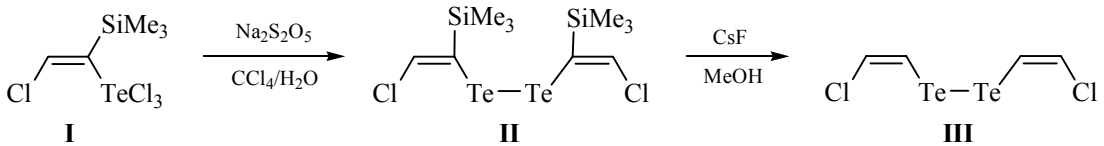
The present work consists in the elaboration of stereoselective synthesis of *Z,Z*-bis(2-chlorovinyl)ditelluride (**III**), which is a promising intermediate for the synthesis of new organotellurium compounds containing the *Z*-2-chlorovinyltellurium group. As a starting compound we have chosen *Z*-(1-trimethylsilyl-2-chlorovinyl)tellurium trichloride (**I**), which was obtained from tellurium tetrachloride and trimethylethynylsilane [8].

Based on the reduction of compound **I** with sodium pyrosulfite in the system CCl_4/H_2O a method was elaborated for the synthesis of the earlier unknown *Z,Z*-bis(1-trimethylsilyl-2-chlorovinyl)ditelluride (**II**) in 92% yield (Scheme 1).

In the reaction of desilylation of compound **II** the best yield of product **III** (80%) was obtained when using cesium fluoride in methanol. The use of standard reagents (KOH/*i*-PrOH, NaOH/MeOH) was less effective, the yield of compound **III** was 50–60% and side products were formed.

The structure of compounds **II** and **III** was proved by the ^1H and ^{13}C NMR spectroscopy and was con-

Scheme 1.



I **II** **III**

firmed by elemental analysis. The coupling constants of the olefin protons in the ^{1}H NMR spectrum of product **III** (6.3 Hz) are typical for compounds having the 2-chlorovinylchalcogeno group with the *Z*-configuration [9].

Therefore, a convenient method for the synthesis of the earlier unknown ditelluride **III**, a promising intermediate for introduction of *Z*-2-chlorovinyltellurium group into organic compounds and the synthesis of new organotellurium compounds, is developed.

***Z,Z*-Bis(1-trimethylsilyl-2-chlorovinyl)ditelluride (II).** Dark-red oil. ^{1}H NMR spectrum, δ, ppm: 0.22 s [18H, Si(CH$_3$)$_3$], 6.56 s (2H, =CHCl). ^{13}C NMR spectrum, δ, ppm: 0.06 [Si(CH$_3$)$_3$], 120.33 (=CTe), 134.36 (=CHCl). Found, %: C 23.25; H 3.98; Cl 13.28; Si 10.47; Te 48.42. $C_4H_4Cl_2Te_2$. Calculated, %: C 22.99; H 3.86; Cl 13.57; Si 10.75; Te 48.84.

***Z,Z*-Bis(2-chlorovinyl)ditelluride (III).** Dark-red oil. ^{1}H NMR spectrum, δ, ppm: 6.43 d (2H, =CHCl, J = 6.3 Hz), 7.62 d (2H, =CHTe, J = 6.3 Hz). ^{13}C NMR spectrum, δ, ppm: 106.23 (=CHTe), 127.70 (=CHCl). Found, %: C 12.97; H 1.03; Cl 19.12; Te 66.99. $C_4H_4Cl_2Te_2$. Calculated, %: C 12.70; H 1.07; Cl 18.75; Te 67.48.

^{1}H (400.13 MHz) and ^{13}C (100.61 MHz) NMR spectra were taken on a Bruker DPX-400 spectrometer in $CDCl_3$ with HMDS as an internal standard.

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