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FORMATION OF 2,5-DIPHENYLTELLUROPHENE FROM DIETHYL DITELLURIDE AND DIPHENYLDIACETYLENE

V. A. Potapov, S. V. Amosova, and I. V. Doron'kina

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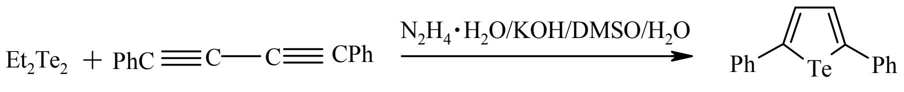
We have already developed a method for generating organic selenolate and tellurolate anions from organic diselenides and ditellurides in the $N_2H_4 \cdot H_2O$/KOH/DMSO/H_2O system [1, 2]. This system may be used to prepare alkyl vinyl, aryl vinyl, and alkyl styryl selenides and tellurides by the addition of organic selenolate and tellurolate anions to acetylene and phenylacetylene. The addition of alkaneselenolate anions generated from dialkyl diselenides in the $N_2H_4 \cdot H_2O$/KOH/DMSO/H_2O system to diphenyldiacetylene leads to products of the addition of alkaneselenolate anions at one or two triple bonds in diphenyldiacetylene depending on the reagent ratio [3]. The reaction of equimolar amounts of dialkyl diselenide and diphenyldiacetylene gives mostly products of the addition of alkaneselenolate anions at the two triple bonds, namely, (*Z,Z*)-1,4-bis(alkylseleno)-1,4-diphenyl-1,3-butadienes.

We carried out the reaction of equimolar amounts of diethyl ditelluride with diphenyldiacetylene in the $N_2H_4 \cdot H_2O$/KOH/DMSO/H_2O system at 55°C over 6 h, assuming an analogy with the reaction of dialkyl diselenides with diphenyldiacetylene [3], to obtain the product of the addition of ethanetellurolate anion at the two triple bonds, namely, 1,4-bis(ethyltelluro)-1,4-diphenyl-1,3-butadiene. 2,5-Diphenyltellurophene (**1**) was unexpectedly obtained from the reaction mixture instead of the predicted product. The yield of heterocycle **1** after recrystallization from ethanol was 23%. The yield was calculated relative to the amount of diethyl ditelluride taken and not optimized.



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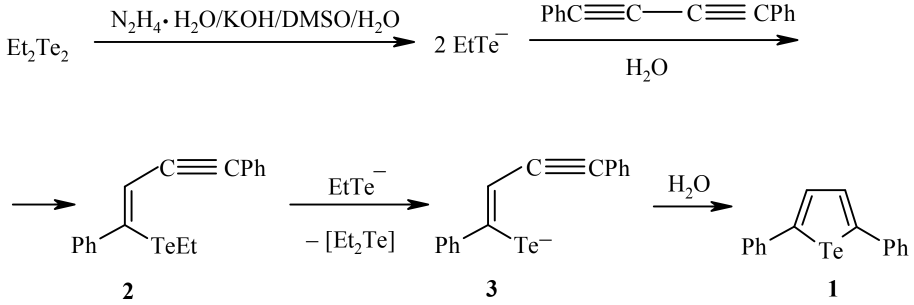
The proposed pathway for the formation of heterocycle **1** involves generation of ethanetellurolate anion formed in two-fold molar excess relative to diphenyldiacetylene and the addition of this anion to a triple bond in diphenyldiacetylene. The subsequent reaction of adduct **2** with excess ethanetellurolate anion may proceed either through addition of ethanetellurolate anion at the second triple bond or nucleophilic substitution at the tellurium atom to give diethyl telluride and intermediate **3**, which cyclizes to compound **1**. An advantage of the second pathway lies in the formation of a stable aromatic heterocycle, leading to energy release.

A. E. Favorsky Irkutsk Institute of Chemistry, Siberian Branch of the Russian Academy of Sciences, 664033 Irkutsk, Russia; e-mail: potapov@irioch.irk.ru. Translated from Khimiya Geterotsiklicheskikh Soedinenii, No. 2, pp. 280-281, February, 2002. Original article submitted October 10, 2001.



The spectral and physicochemical data for heterocycle **1** correspond to the indices found for an authentic sample prepared in our previous work [4].

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