# THE SELENOPHENO[3,2-c]PYRYLIUM CATION – A NEW HETEROAROMATIC SYSTEM

V. I. Dulenko, N. N. Alekseev,
and S. N. Baranov

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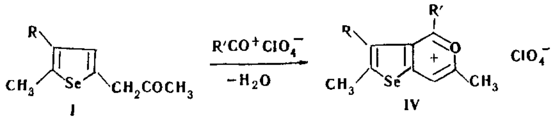
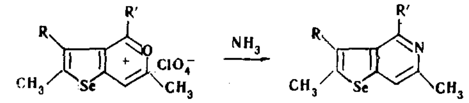
The preparation of thieno-, furano-, and indolopyrylium salts by acylation of the acetonyl derivatives of five-membered heterocycles with subsequent cyclization of the diketones formed was recently described in [1-3]. We have shown that this method is also applicable in the selenophene series.

Selenopheno[3,2-c]pyrylium salts (IV), isolable as stable perchlorates, are obtained by the acylation of 5-methyl-2-acetonyl derivatives of selenophene (I) with carboxylic acid anhydrides (II) in the presence of equimolecular amounts of perchloric acid (III):



When R = H, the yield of perchlorates is 30-40%. The low yields of products can be explained by the fact that the acylation proceeds equally at the 3- and 4-positions. A confirmation of this assumption is the increase in the yield (65-75%) of selenopheno[3,2-c]pyrylium salts on introduction of an alkyl substituent into the 4-position of the selenophene ring (R = $CH_3$). The reaction to form IV is carried out at room temperature by the addition to I of a previously prepared mixture of an equivalent amount of III with excess II. The structures of the synthesized IV were confirmed by a study of their IR spectra. The intense band at 1616-1620 cm$^{-1}$ belongs to the symmetrical stretching vibrations of the pyrylium cation, which served as a proof of the presence of the latter in molecules of the investigated compound. Two intense bands at 1100 and 625 cm$^{-1}$ are related to the vibrations of the $ClO_4^-$ anion.

The selenopheno[3,2-c]pyrylium cation is a new heteroaromatic system that is apparently capable of the conversions characteristic for pyrylium salts [4]. In fact, the previously undescribed selenopheno-[3,2-c]pyridines are obtained in good yield by the action of ammonia on the selenopheno[3,2-c]pyrylium salts:



## EXPERIMENTAL

2,3,4,6-Tetramethylselenopheno[3,2-c]pyrylium Perchlorate. This was obtained in 70% yield and had mp 163° (from alcohol). Found %: C 39.11; H 4.02; Cl 10.4; Se 23.41. $C_{11}H_{13}ClO_5Se$. Calculated %: C 38.88; H 3.83; Cl 10.45; Se 23.56.

2,4,6-Trimethylselenopheno[3,2-c]pyrylium Perchlorate. This was obtained in 37% yield and had mp 151° (from n-butanol). Found %: C 36.98; H 3.55; Cl 11.01; Se 23.91. $C_{10}H_{11}ClO_5Se$. Calculated %: C 36.86; H 3.37; Cl 10.90; Se 24.26.

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2,3,4,6-Tetramethylselenopheno[3,2-c]pyridine. This was obtained in 69% yield and had mp 81-82° (from hexane). Found %: N 6.12. $C_{11}H_{13}SeN$. Calculated %: N 5.88. The picrate had mp 203-204° (from alcohol). Found %: N 12.36. $C_{17}H_{16}N_4O_7Se$. Calculated %: N 11.99. The hydrochloride was obtained in 91% yield and had mp 315-316° (from acetone). Found %: N 5.02. $C_{11}H_{14}ClSeN$. Calculated %: N 5.1.

2,4,6-Trimethylselenopheno[3,2-c]pyridine. This was obtained in 61% yield and had mp 59-60° (from hexane). Found %: N 6.37. $C_{10}H_{11}SeN$. Calculated %: N 6.25. The picrate had mp 205° (from alcohol). Found %: N 12.41. $C_{16}H_{14}N_4O_7Se$. Calculated %: N 12.36.

## LITERATURE CITED

1. G. N. Dorofeenko, S. V. Krivun, V. I. Dulenko, and L. V. Dulenko, Zh. Organ. Khim., 1, 1171 (1965).
2. S. V. Krivun, V. I. Dulenko, L. V. Dulenko, and G. N. Dorofeenko, Dokl. Akad. Nauk SSSR, 166, 359 (1966).
3. G. N. Dorofeenko and L. V. Dulenko, Khim. Geterotsikl. Soedin., 417 (1969).
4. K. Dimroth, Angew. Chem., 72, 331 (1960).