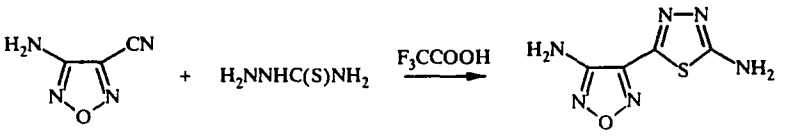
Chemistry of Heterocyclic Compounds, Vol. 34, No. 10, 1998

SYNTHESIS OF 4-(5-AMINO-1,3,4-THIADIAZOL-2-YL)-1,2,5-OXADIAZOLE-3-AMINE

I. V. Tselinskii, S. F. Mel'nikova, S. V. Pirogov, and A. V. Sergievskii

To expand the group of 1,3,4-thiadiazole derivatives which could be of interest as efficient stabilizers of silver halide photographic emulsions and the components of light-sensitive and photosemiconductor materials and drugs with antimicrobial and antiviral activity, we synthesized the first member of a series of 1,3,4-thiadiazoles containing an amino-1,2,5-oxadiazole fragment — 4-(5-amino-1,3,4-thiadiazol-2-yl)-1,2,5-oxadiazole-3-amine. It was formed with a yield of more than 75% in condensation of 3-amino-4-cyano-1,2,5-oxadiazole with thiosemicarbazide in trifluoroacetic acid.



4-(5-Amino-1,3,4-thiadiazol-2-yl)-1,2,5-oxadiazole-3-amine. A mixture of 6.1 g (5.5 mmole) of 3-amino-4-cyano-1,2,5-oxadiazole, 5.5 g (6.0 mmole) of thiosemicarbazide, and 20 ml of trifluoroacetic acid was heated for 4 h in a boiling water bath while stirring, cooled, and poured into 50 ml of 25% ammonia solution. The lightly colored sediment was filtered off, washed with water (to neutral reaction of the washing water), and dried in air. Yield of 7.6 g (75%); mp = 236-237°C. IR spectrum: 3456, 3368 (NH_2), 1688, 1648 (NH), 1512 (C–N, thiadiazole), 1468 (C–N, furazan), 1088 cm^{-1} (N–O, furazan). PMR spectrum (DMSO): 7.95 (2H, s, NH_2, thiadiazole) and 6.54 ppm (2H, s, NH_2, oxadiazole). ^{13}C NMR spectrum (DMSO): 169.978 ($C_{(5)}$, thiadiazole) and 143.56 ($C_{(2)}$, thiadiazole); 154.389 ($C_{(3)}$, oxadiazole), and 139.818 ppm ($C_{(4)}$, oxadiazole). Found, %: C 25.9; H 2.4; N 45.5; S 17.8. $C_4H_4N_6OS$. Calculated, %: C 26.0; H 2.2; N 45.5; S 17.4.

The research was conducted with the financial support of the Ministry of General and Professional Education (Grant No. 111/97).

St. Petersburg State Institute (Technical University), St. Petersburg 198013, Russia. Translated from *Khimiya Geterotsiklicheskikh Soedinenii*, No. 10, pp. 1430-1431, October, 1998. Original article submitted September 30, 1998.

 0009-3122/98/3410-1220$20.00