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UNUSUAL REACTION OF 4,5,7-TRIMETHYL-1-VINYL-4,5,6,7-TETRAHYDROPYRROLO-[3,2-*c*]PYRIDINE WITH TETRACYANOETHYLENE

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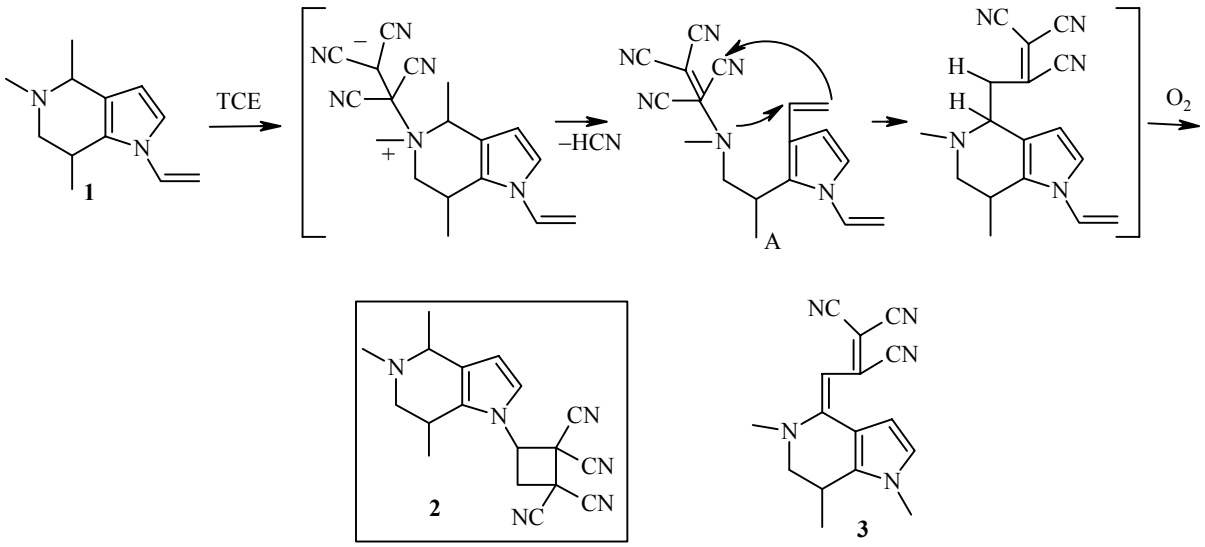
Gorshkov et al. [1] have reported that 1-vinylpyrroles react with tetracyanoethylene to give 1-tetracyanocyclobutylpyrroles. We have found that the reaction of 4,5,7-trimethyl-1-vinyl-4,5,6,7-tetrahydropyrrolo[3,2-*c*]pyridine (**1**) with tetracyanoethylene does not give the expected 1-tetracyanocyclobutyl derivative **2**. The major product of this reaction was 5,7-dimethyl-(2,3,3-tricyano-1-propenylidene)-1-vinyl-4,5,6,7-tetrahydropyrrolo[3,2-*c*]pyridine (**3**) isolated in 26% yield.

By analogy to the ethyl ester of acetylenedicarboxylic acid [2], cleavage of the tetrahydropyridine ring in **1** likely occurs in the first step of this reaction.



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The resultant 3-vinylpyrrole A undergoes cyclization and oxidation to convert to **3**. The structure of **3** was established by X-ray diffraction analysis. The ^{1}H NMR spectrum of **3** correlates well with the proposed structure.

5,7-Dimethyl-4-(2',3',3'-tricyano-1-propylidene)-1-vinyl-4,5,6,7-tetrahydropyrrolo[3,2-*c*]pyridine (3). A solution of tetracyanoethylene (0.08 g, 0.6 mmol) in THF (5 ml) was added dropwise to a solution of **1** (0.1 g, 0.6 mmol) in THF (3 ml) cooled to -10°C. The mixture was warmed to 20°C and maintained for 24 h with monitoring by thin-layer chromatography. The residue after evaporation of THF was subjected to chromatography on a alumina column (10 × 3 cm) using ether as the eluent to give 0.046 g (26%) of orange crystalline **3**; mp 218-220°C (ethyl acetate), R_f 0.6 (Alufol, ethyl acetate). ^{1}H NMR spectrum ($CDCl_3$), δ, ppm, *J* (Hz): 1.29 (3H, d, *J* = 7.0, 7-Me); 3.10 (1H, m, 7-H); 3.37 (1H, dd, *J* = 13.4 and 1.5, 6-He); 3.38 (3H, s, N–Me); 4.03 (1H, dd, *J* = 13.4 and 4.5, 6-Ha); 5.04 (1H, dd, *J* = 8.9 and 1.8, C=CH_2); 5.36 (1H, dd, *J* = 15.7 and 1.8, C=CH_2); 5.72 (1H, s, =CH–C(CN)=); 6.55 (1H, d, *J* = 3.4, 3-H); 6.78 (1H, dd, *J* = 15.7 and 8.9, N–CH=C); 6.97 (1H, d, *J* = 3.4, 2-H). Found, %: C 70.43; H 5.41; N 24.60; M^+ 289. $C_{17}H_{15}N_5$. Calculated, %: C 70.59; H 5.19; N 24.22; M 289.

REFERENCES

1. A. G. Gorshkov, S. S. Domnina, F. N. Mikhaleva, and G. G. Skvortsova, *Khim. Geterotsikl. Soedin.*, 848 (1985).
2. L. G. Voskressensky, T. N. Borisova, B. Nsabimana, and A. A. Varlamov, in: *Book of Abstracts, 13-th ICOS*, Warsaw, Poland (2000), p. 91.