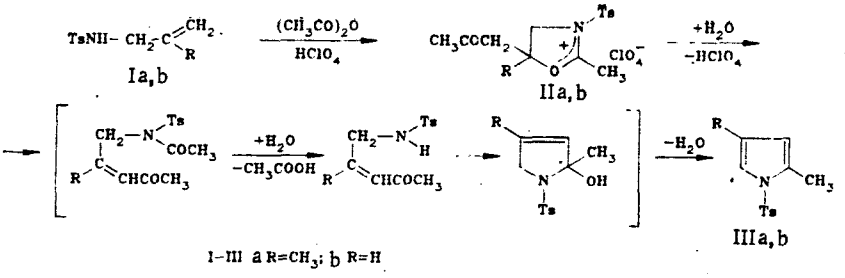
NOVEL SYNTHESIS OF THE PYRROLE RING

V. N. Voshchula and V. I. Dulenko

UDC 547.741.04

We have found that acylation of N-methallyltoluenesulfonamide (Ia) with a mixture of acetic anhydride and 70% perchloric acid results in the formation of 2,5-dimethyl-3-tosyl-5-acetonyloxazolinium perchlorate (IIa), which undergoes recyclization upon treatment with aqueous ammonia to give 1-tosyl-2,4-dimethylpyrrole (IIIa). Acylation of N-allyltoluenesulfonamide (Ib) gives the oxazolinium salt IIb as a noncrystalline oil, which, upon further workup with aqueous ammonia and subsequent purification by column chromatography yields 1-tosyl-2-methylpyrrole (IIIb).



I–III a R=CH_3; b R=H

Oxazolinium Salt IIa, mp 89-90°C, yield 85%. PMR spectrum (CF_3COOH): 1.7 (3H, s, 5-CH_3), 2.25 (3H, s, CH_3CO), 2.5 ($_3$h, s, CH_3 tosyl), 2.83 (2H, s, 2-CH_3), 3.43 ($_2$h, s, CH_2CO), 4.35 (2H, s, 4-CH_2), 7.47 (2H, d, 3- and 5-H tosyl, J = 9 Hz) 7.92 ppm (2H, d, 2- and 6-H tosyl, J = 9 Hz).

Pyrrole IIIa, mp 85°C, yield 94%. PMR spectrum (octafluorotoluene): 1.93 (3H, s, 4-CH_3), 2.13 (3H, s, 2-CH_3), 2.5 (3H, s, CH_3 tosyl) 5.7 (1H, s, 5-H), 6.87 (1H, s, 3-H), 7.23 (2H, d, 3- and 5H tosyl, J = 9 Hz), 7.47 ppm (2H, d, 2- and 6-H tosyl, J = 9 Hz).

Pyrrole IIIb, mp 84°C, yield 8%. PMR spectrum ($CDCl_3$): 2.22 (3H, s, 2-CH_3), 2.3 (3H, s, CH_3 tosyl), 5.82 (1H, m, 4-H), 6.02 (1H, t, 5-H, J = 3.5 Hz), 7.08 (3h, m. 3- and 5-H tosyl and pyrrole), 7.52 ppm (2H, d, 2- and 6-H tosyl, J = 9 Hz). Pyrrole IIIb was also prepared independently from 2-methylpyrrole and toluenesulfonyl chloride, according to [1].

Elemental analyses were consistent with calculated values for all of the compounds prepared in this work.

The alkenyltoluenesulfonamide precursors I were prepared according to [2].

LITERATURE CITED

1. E. P. Papadopoulos and N. F. Haidar, Tetrahedron Lett., No. 14, 1721 (1968).
2. D. Klamann and H. Bertsch, Chem. Ber., 89, 2007 (1956).

Institute of Physical Organic Chemistry and Carbon Chemistry, Academy of Sciences of the Ukrainian SSR, Donetsk 340114. Translated from Khimiya Geterotsiklicheskikh Soedinenii, No. 7, pp. 995-996, July, 1987. Original article submitted December 2, 1986.

0009-3122/87/2307-0819$12.50