UNEXPECTED CONVERSION OF 1-(2,2,3,3-TETRACYANO-1-CYCLOBUTYL)PYRROLES IN METHANOL

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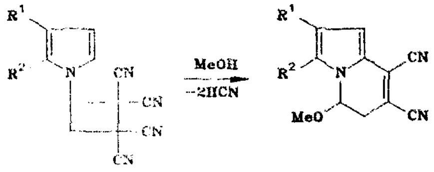
We have found a new reaction, viz., the formation of 3-methyl(2,3-dimethyl)-5,6-dihydro-5-methoxy-7,8-dicyanoindolizines (I, II) when 1-(2,2,3,3-tetracyano-1-cyclobutyl)-pyrroles (III, IV) are heated in methanol at 60° for 4-5 h.



III,IV   I,II

$R^1 = H, Me; R^2 = Me$

This result was not to be predicted on the basis of known analogies. Thus, boiling of 1-(2,2,3,3-tetracyano-1-cyclobutyl)carbazole (indole, phenothiazine) gives the respective 1-(3,4,4-tricyano-1,3-butadien-1-yl)carbazole (indole), and with the phenothiazine derivative the heterocycle is eliminated [1-3].

This reaction opens a route to the synthesis of a new class of functionally substituted indolizines from N-vinylpyrroles which are not easily available by the Trofimov reaction [4]. The starting compounds III and IV are obtained by [2 + 2] cycloaddition of tetracyanoethylene to N-vinylpyrroles by the procedure of [3].

Indolizine I: yield 99%; mp 125°; PMR spectrum ($CDCl_3$): 7.02 (1H, d, 1-H, J_{12} = 4.1 Hz); 6.40 (1H, d, 2-H); ABX system: 5-H and 6-CH_2 protons (5.83 (1H, q, X-H, J_{XA} = 5.6 Hz, J_{XB} = 1.7 Hz); 3.64 (1H, q, A-H, J_{AB} = 18.2 Hz); 3.48 (1H, q, B-H)); 3.19 (3H, s, OCH_3); 2.39 ppm (3H, s, CH_3); M^+ 231. Indolizine II: yield 97% mp 141° PMR spectrum (($(CD_3)_2CO$); 6.78 (1H, s, 1-H); ABX system of 5-H and 6-CH_2 protons (6.03 (1H, q, X-H, J_{XA} = 5.5 Hz, J_{XB} = 1.5 Hz); 3.81 (1H, q, A-H, J_{AB} = 18.5 Hz); 3.35 (1H, q, B-H)); 3.23 (3H, s, OCH_3); 2.31 (3H, s, 3-CH_3); 2.07 ppm (3H, s, 2-CH_3); M^+ 227.

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