

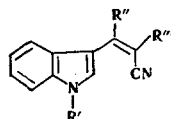
THE REACTION OF INDOLE WITH β -KETONITRILES

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UDC 547.757:543.422.4

Indole condenses with β -diketones to give 3-vinylindoles [1]. We have shown that indole reacts similarly with β -ketonitriles, which are analogs of the diketones. For example, on boiling indole for 10-12 h with 2-cyanocyclohexanone in acetic acid, there was obtained β -(3-indolyl)- α , β -tetramethyleneacrylonitrile (IR spectrum, KBr disks, cm^{-1} : 3340 [NH], 2230 [CN], 1612 [C=C]; UV spectrum, in alcohol: 220, 314 nm, $\log \epsilon$ 5.81 and 4.66. Similar products were obtained from 1-methylindole and 2-cyanocyclohexanone, benzoylacetonitrile, and α -formylphenylacetonitrile (see Table I).

TABLE 1



R'	R''	R'''	Mp, °C	Molecular formula	Found, %			Calculated, %			Yield, %
					C	H	N	C	H	N	
H	H	C ₆ H ₅	180	C ₁₇ H ₁₂ N ₂	84.37	4.98	11.26	83.60	4.99	11.48	21
CH ₃	(CH ₂) ₄		126	C ₁₆ H ₁₆ N ₂	81.83	6.81	11.75	81.35	6.77	11.86	11.3
CH ₃	H	C ₆ H ₅	130	C ₁₈ H ₁₄ N ₂	84.05	5.65	10.53	83.72	5.42	10.85	33.6
H	(CH ₂) ₄		174	C ₁₅ H ₁₄ N ₂	81.04	6.26	—	81.08	6.30	—	54
CH ₃	C ₆ H ₅	H	120	C ₁₈ H ₁₄ N ₂	84.47	5.67	11.02	83.72	5.42	10.85	20

Condensation of indole with α -formylphenylacetonitrile gives, in addition to the normal product, the dimerized compound β , β -(di-3-indolyl)- α -phenylpropionitrile, in 18.4% yield, mp 164° (from alcohol). Found: C 83.75; H 5.55; N 11.37%. C₂₅H₁₉N₃. Calculated: C 83.10; H 5.26; N 11.63%. In contrast to the acrylonitriles shown in Table I, in the IR spectrum of the dimerized compound the CN frequency appeared at 2270 cm^{-1} .

LITERATURE CITED

1. W. E. Noland and D. N. Robinson, J. Org. Chem., 22, 1134 (1957).

Institute of Chemistry, Academy of Sciences of the Moldavian SSR, Kishinev. Translated from Khimiya Geterotsiklicheskikh Soedinenii, No. 9, p 1293, September 1970. Original article submitted February 26, 1970.

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