

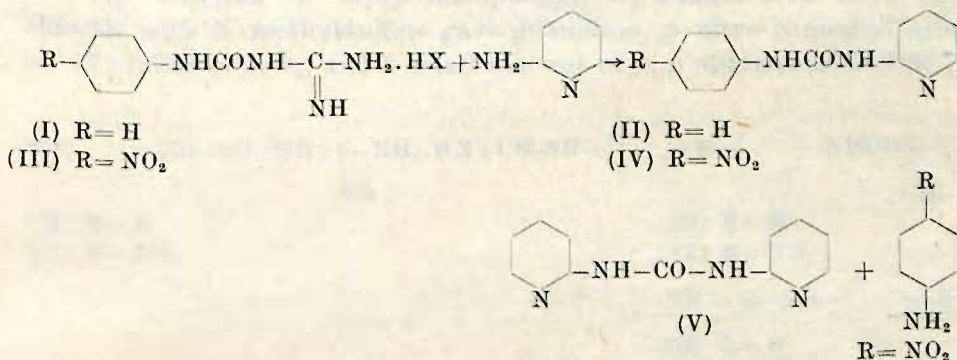
Reactions of Aromatic Amines with Cyanguanidine. Reactions of Phenyl Amidineurea and Their Derivatives with 2-aminopyridine

by

T. URBANŃSKI and B. SKOWROŃSKA-SERAFIN

Communicated by T. URBANŃSKI at the meeting of November 28, 1955

Continuing our former experiments [1], [2] on preparation and chemical properties of arylamidineureas, reactions of N_1 -phenyl- N_2 -amidineurea and N_1 -(*p*-nitrophenyl)- N_2 -amidineurea with 2-aminopyridine have now been studied. N_1 -phenyl- N_2 -amidineurea (I) nitrate on boiling with 2-aminopyridine gave guanidine and phenyl-2-pyridylurea (II) with a yield of 50%. No di-(2-pyridyl)-urea was, however, formed on prolonged boiling. N_1 -(*p*-nitrophenyl)- N_2 -amidineurea (III) hydrochloride reacted in a similar way giving at first *p*-nitrophenyl-2-pyridylurea (IV) (yield c. 66%). On prolonged boiling sym. dipyridylurea (V) and *p*-nitroaniline resulted:



Thus, the trend of reactions of phenylamidineureas with 2-aminopyridine is similar to that with aniline [1], [2].

Experimental

1 g. hydrochloride of N_1 -(*p*-nitrophenyl)- N_2 -amidineurea (III) were mixed with 2 g. fused 2-aminopyridine and gently warmed for 1-2 minutes, to obtain a clear solution. On cooling, a precipitate of *p*-nitro-

phenyl-2-pyridylurea (IV) resulted. After crystallisation from butyl alcohol, colourless needles without a sharp m. p. were obtained (they sintered at 242° and sublimed at 247° as yellow needles). The yield of pure (IV) was 0.6 g. (66% theoretical).

Analysis:

$C_{12}H_{10}O_3N_4$ requires 55.8% C; 3.9% H; 21.7% N.

found 55.6% C; 3.8% H; 21.4% N.

When (IV) was boiled further with 2-aminopyridine, N_1 , N_2 -(2-pyridyl)-urea (V) (m. p. 172-174°) and *p*-nitroaniline was formed. On prolonged boiling (e. g. 5 min.) of hydrochloride (II) with 2-aminopyridine, 0.3 g. *p*-nitroaniline (yield c. 53%) and a small quantity of (V) resulted.

Picrate of (IV) was formed from the alcoholic solution, m. p. 197-199° (decomp.).

DEPARTMENT OF ORGANIC TECHNOLOGY, INSTITUTE OF TECHNOLOGY, WARSAW,
INSTITUTE OF TUBERCULOSIS, WARSAW

REFERENCES

[1] T. Urbański, B. Skowrońska-Serafin, H. Dąbrowska, J. Jankowska, *On reactions of aromatic amines with cyanguanidine. Formation of aryl derivatives of amidineurea and their transformation into carbanilides*, Bull. Acad. Polon. Sci. Cl. III 1 (1953), 74.

[2] T. Urbański, B. Skowrońska-Serafin, H. Dąbrowska, *Reactions of aromatic amines with cyanguanidine. Formation of derivatives of amidineurea and their reaction with aniline*, Bull. Acad. Polon. Sci. Cl. III 2 (1954), 453.