REACTION OF PHTHALIMIDE WITH DIETHYLENE TRIAMINE AND TRIETHYLENE TETRAMINE

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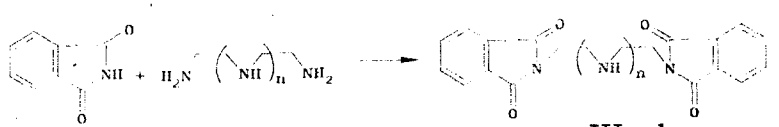
It is known that both primary [1] and secondary [2] amines can react with the phthalimide ring to form imides or amides, depending on the kind of substituents. To elucidate the behavior of the phthalimide ring in simultaneous reaction with primary and secondary amines, we reacted phthalimide I with amines IIa,b. We found that when heated briefly to 190-220° the imide ring of I reacts mainly with primary amino groups; this leads to their protection in the presence of secondary amines, with the formation of the respective N,N'-aminoethylenediphthalimides IIIa,b.



I IIa, b IIIa, b

a n = 1, b n = 2

Such a synthetic path to the diphthalimides IIIa, b is more stepwise than the one known hitherto [3], viz., the reaction of potassium phthalimide with the respective dihaloderivatives of the secondary amine.

A mixture of 0.2 mole of phthalimide I and 0.1 mole of amine IIa or IIb was heated rapidly to 220 or 195°, respectively, held at that temperature until ammonia evolution is finished, and crystallized. The individuality of the compounds was monitored by TLC (Silufol UV-254; methanol–chloroform eluent 1:0-1:8; development in UV light and with ninhydrin). There were obtained: bis(2-phthalimidoethyl)amine (IIIa), 85% yield, mp 178-180° (from DMFA); and N,N'-bis(2-phthalimidoethyl)ethylene diamine (IIIb), 65% yield, mp 153-154° (from propanol-2). Composition and structure of the synthesized imides were confirmed by elemental composition and IR, PMR, and mass spectra.

LITERATURE CITED

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