SYNTHESIS OF TETRABENZOPORPHINS OF THE BASIS OF ISOINDOLINE

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Tetrabenzoporphin and its metal complexes, which are close structural analogs of phthalocyanine and porphin, are becoming of increasing interest to researchers [1]. 3-Carboxymethylphthalimidine [2], 1,3,4,7-tetramethylisoindole [3], phthalimide [4], 3-methylenephthalimidine [4], 2-acetylbenzoic acid [5], as well as 3-carboxymethylenephthalimidine [4], have been used as starting compounds for their synthesis. meso-Tetraaryltetrabenzoporphins of zinc have been previously obtained by condensation of phthalimide with arylacetic acids or 3-benzylidenephthalimidine with zinc acetate [4]. Most of the synthetic methods indicated above presuppose the presence of a carbonyl group in the isoindologen.

We have proposed an alternative method for the synthesis of zinc tetrabenzoporphins by condensation of isoindoline (in the hydrochloride form) with a carbonyl component, viz., mesaconic acid hydrate, paraformaldehyde, diphenylformamide, and N-methylformanilide, in the presence of zinc acetate and alkali at 300-360°C for 6 min to 1 h in a stream of nitrogen or helium. The yields of analytically pure substances reach 20% and are comparable to the yields of meso-tetraarylporphins in the known Rosenmund reaction — condensation of pyrrole with aromatic aldehydes in organic acids [6]. Nevertheless, the use of benzaldehyde in the condensation does not lead to the formation of the corresponding tetraaryltetrabenzoporphins. It is interesting that the latter are formed in ∿10% yields in the condensation of isoindoline hydrochloride with sodium phenylacetate or tribenzylamine.

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