ELECTROREDUCTIVE SYNTHESIS OF NITROGEN HETEROCYCLES

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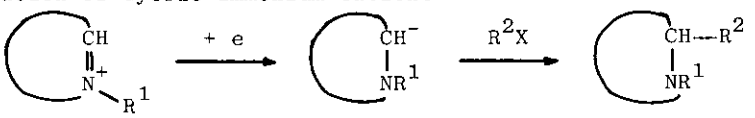
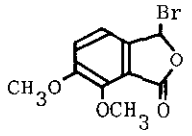
Electroreduction of immonium salts of nitrogen heterocyclic compounds followed by the nucleophilic attack of the resulting anionic species to alkyl halides is a new versatile tool to introduce alkyl substituents into nitrogen heterocycles. Using this new method, following four patterns of reaction were exploited.

1. Alkylation of cyclic immonium cations



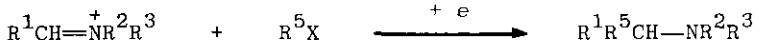
$R^1 = H, CH_3$

The cyclic immonium cations studied were the salts of isoquinoline, 3,4-dihydroisoquinolines, 4,5-dihydro-3-carboline, and benzthiazole. Alkyl halides were mainly derivatives of benzyl bromide and bromophtalides like I. More than thirty compounds were synthesized in reasonably high yields.



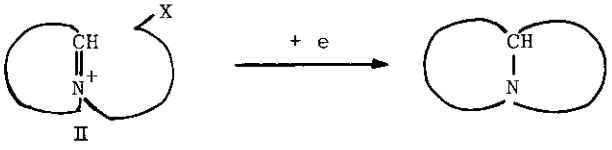
I

2. Alkylation of linear immonium cations



3. Annelation

The electroreduction of the immonium salts like II gave a new pattern of annelation by intramolecular alkylation.



II

4. Dimerization