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SYNTHESES OF MEDIUM-SIZED LACTAM SYSTEMS BY THE PHOTO-RING-ENLARGEMENT OF N-SUBSTITUTED ALICYCLIC IMIDES

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The cyclic imides undergo most of the major photochemical reactions known for the simple carbonyl system. We have already shown that phthalimides, representative aromatic cyclic imides, undergo many of such reactions and several unique reactions as well. In an extension of this work, photoreactions of aliphatic cyclic imides are systematically investigated.

The parallelism of the photochemical behavior of the imide with that of a simple carbonyl was typically demonstrated by the photoreactions of alicylic imides. The principal feature of the Norrish type II processes of the alicyclic imides is that the cyclization is rather dominant leading to ketolactams with ring-enlargement by the two carbon unit derived from the side chain.

Variation of the N-substituents may lead to a wide variety of products. While the ring size of the imides can be increased beyond six, the imide ring may carry substituents including heteroatoms as well as cycloalkanes as desired. In view of their multifunctionality, these photoproducts will be further used as synthetic intermediates. Thus this novel ring expansion reaction has general synthetic potential and will afford an entry to various medium-sized and other heterocyclic systems. A number of illustrative examples of such compounds hitherto synthesized are discussed.