THE PHOTO-RING-EXPANSION REACTION OF ALICYCLIC IMIDES. APPLICATION TO THE SYNTHESES OF HETEROCYCLIS AND THE MECHANISM

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The cyclic imides undergo most of the major photochemical reactions known for the simple carbonyl system.[1] The parallelism of the photochemical behavior of the imide with that of a simple carbonyl was typically demonstrated by the photoreactions of alicyclic imides. The principal feature of the Norrish type II processes of the alicyclic imides is that the cyclization is rather dominant leading to keto lactams with ring-expansion by the two carbon unit derived from the side chain.[2]

On the basis of structural variations of the substituents both in the imide rings and the side chains, a series of seven- and eight-membered lactam derivatives including various di- and tri-cyclic systems have been synthesized.[3] Attention was then focussed on the syntheses of multiple-ring heterocyclic systems. Thus by the photoreactions of a series of endo- and exo-bicyclo[2,2,1]-heptane-2,3-dicarboxylic acid imides, lactams containing a bicycloheptane system were synthesized. It is worth noting that the endo- and exo-configurations were retained in the course of the photolysis. Further, as the examples of the imides with N-substituents of complex structure, N-adamantyl succimides were irradiated leading to the corresponding multicyclic systems.

References

1. Y. Kanaoka, Acc.Chem.Res., **11**, (1978) in press.
2. Y. Kanaoka and Y. Hatanaka, J.Org.Chem., **41**, 400 (1976).
3. Y. Kanaoka, H. Okajima and Y. Hatanaka, Heterocycles, **8**, 339 (1977).