Photolysis of Pyridazinium Dicyanomethylides

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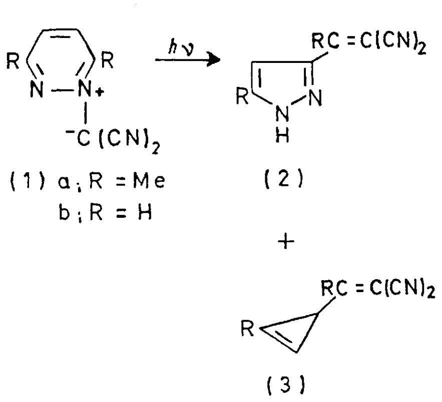
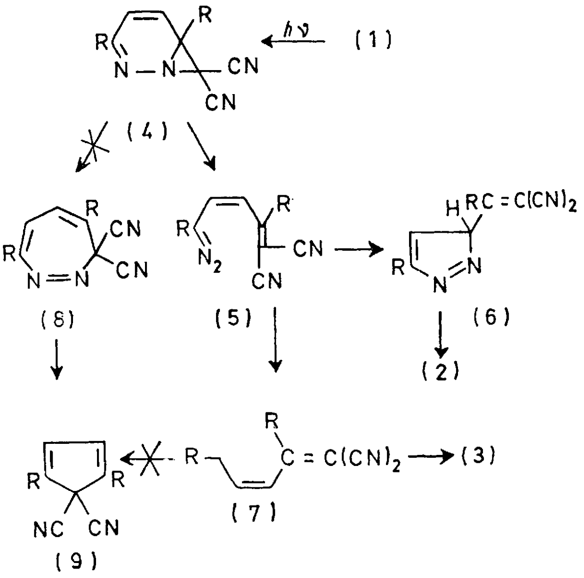
Summary Irradiation of pyridazinium dicyanomethylide gave 3-(2,2-dicyanovinyl)pyrazoles (**2**) and 3-(2,2-dicyanovinyl)cyclopropenes (**3**) formed it is believed *via* a mechanism similar to that operating in the photolysis of pyridazine *N*-oxides.

Many reports have been published on the photolyses of *N*-oxides[1] and *N*-imino-ylides[2] of aza-aromatic compounds, including those[3–5] of pyridazine *N*-oxides. For *N*-methylides, only one report,[6] the photolysis of pyridinium dicyanomethylide, was known. Thus, we have examined



Scheme 1



Scheme 2

the photolysis of pyridazinium dicyanomethylide (**1**).

The methylide[7] (**1a**,**b**) was irradiated in benzene for *ca.* 40 h (400 W, high-pressure Hg lamp) and the following products were isolated by chromatography on alumina: (**2a**):† m.p. 128—130° (15%); (**2b**) m.p. 118—119° (20%); (**3a**) oil, b.p. 96—98/1 mmHg (bath temp.), (20—25%); (**3b**) an oil, b.p. 80°/1 mmHg (bath temp.) (3—5%). Pyridazine and 7,7-dicyanonorcaradiene, formed by addition of the solvent benzene to dicyanomethylcarbene, derived from (**1**), were also obtained (1—2%).

Irradiation of (**1**) in methylene chloride resulted in an increased yield of pyrazole (**2**) and a decreased yield of cyclopropene (**3**).

It is likely that compounds (**2**) and (**3**) are formed *via* a mechanism similar to that which operates in the photolyses[3,5] of pyridazine *N*-oxides (see Scheme 2).

Since 1*H*-1,2-diazepines are formed in high yield upon photolysis of *N*-iminopyridinium ylides,[2] the formation of 3*H*-1,2-diazepine (**8**) or cyclopentadiene (**9**), derived from (**8**) by elimination of molecular nitrogen, was possible. This proved not to be so.

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† Satisfactory elemental analyses, i.r. (CN: 2210 cm^{-1}) and mass spectral data were obtained for all compounds reported.

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