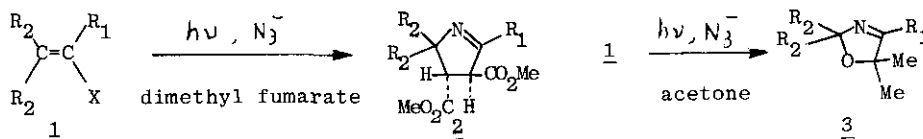


SYNTHESIS OF HETEROCYCLES VIA VINYL CATIONS

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Vinyl cations can be generated by photolysis or solvolysis of vinyl halides and react with various nucleophiles. We applied the reaction of vinyl cations to one-pot synthesis of heterocycles.

(1) Heterocycles from vinyl azides or azirines formed by the reaction of vinyl cations with azide ion. Photolysis of vinyl halides 1 and $\text{Bu}_4\text{N}^+\text{N}_3^-$ in the presence of dimethyl fumarate in acetonitrile gave pyrrolines 2. The photolysis of 1 with sodium azide in a two-phase solution of methylene chloride and water with $\text{Bu}_4\text{N}^+\text{X}^-$ also led to the similar results. Photolysis of 1 with $\text{Bu}_4\text{N}^+\text{N}_3^-$ in acetone yielded oxazolines 3.



(2) Heterocycles by the intramolecular cyclization following the reaction of vinyl cations with nucleophiles. Photolysis of vinyl bromides 1 and potassium cyanate or thiocyanate in a two-phase solution of methylene chloride and water with $\text{Bu}_4\text{N}^+\text{Br}^-$ gave isoquinolinones or isothioquinolinones 4, respectively. On the other hand, silver-assisted reaction of 1 in nitriles and the successive photolysis yielded isoquinolines 5.

