

SYNTHESIS OF HETEROCYCLES VIA VINYL CATIONS

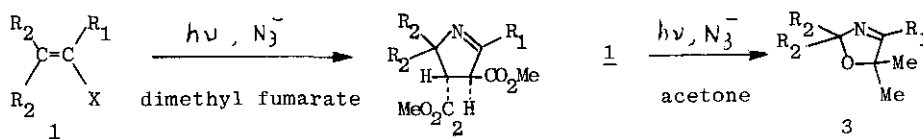
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Vinyl cations can be generated by photolysis or solvolysis of vinyl halides and react with various nucleophiles. We applied the reaction of vinyl cations to one-pot synthesis of heterocycles.

(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**.

