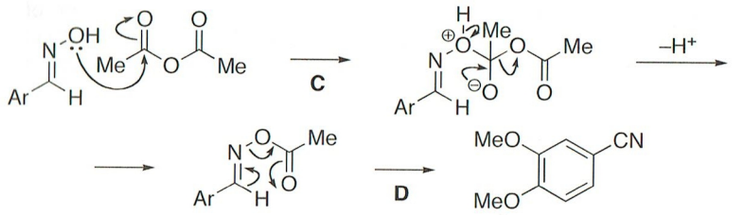
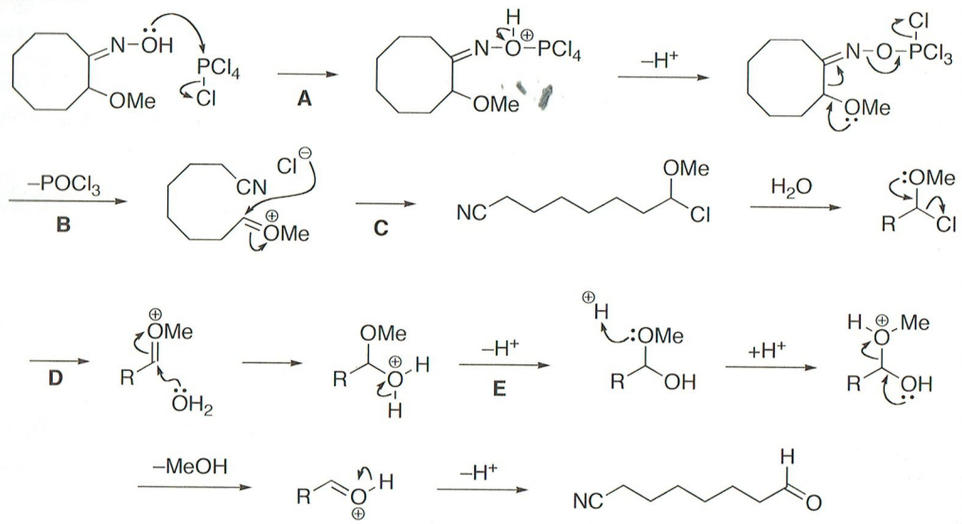


Buck, J. S.; Ide, W. S. *Org. Synth., Coll. Vol. II* **1943**, 622.

A: Addition of NH_2OH to the aldehyde. **B**: Proton transfer followed by elimination of water to form an oxime. **C**: Acetylation of the oxime. **D**: *syn*-Elimination of AcOH to form a nitrile.

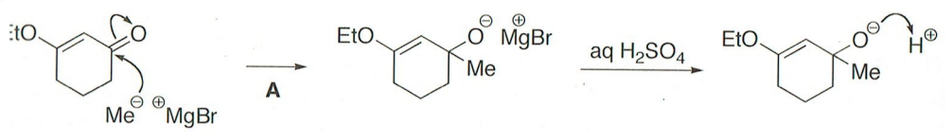
A015

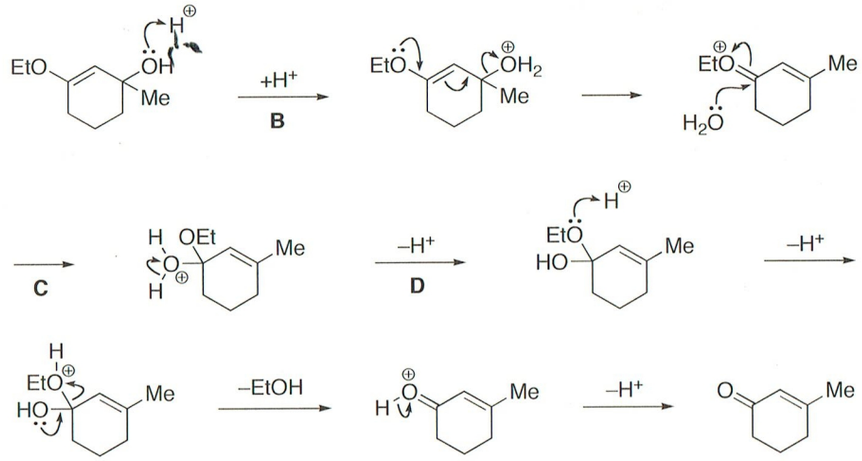


Ohno, M.; Naruse, N.; Terasawa, I. *Org. Synth., Coll. Vol. V* **1973**, 266.

Beckmann fragmentation. **A**: Attack of the oxime to PCl_5. **B**: Elimination of $POCl_3$ is helped by the oxygen lone pair of the methoxy group, causing the cleavage of the C-C bond. **C**: Addition of chloride ion. **D**: Elimination of chloride ion followed by addition of water. **E**: Proton transfer followed by elimination of MeOH.

A016

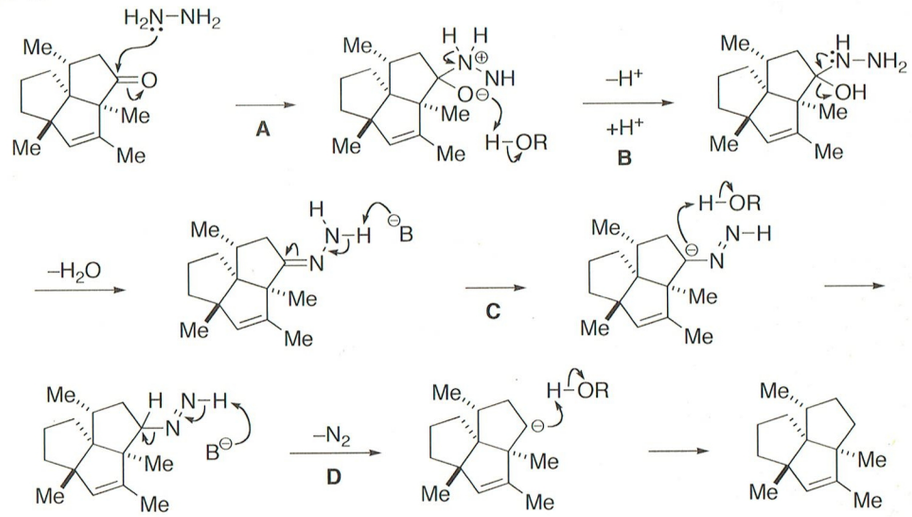




Woods, G. F.; Griswold, P. H., Jr.; Armbrecht, B. H.; Blumenthal, D. I.; Plapinger, R. *J. Am. Chem. Soc.* **1949**, *71*, 2028.

A: 1,2-Addition of MeMgBr to the carbonyl group. **B**: Protonation followed by elimination of water helped by the oxygen lone pair of the ethoxy group. **C**: Addition of water. **D**: Proton transfer followed by elimination of EtOH.

A017

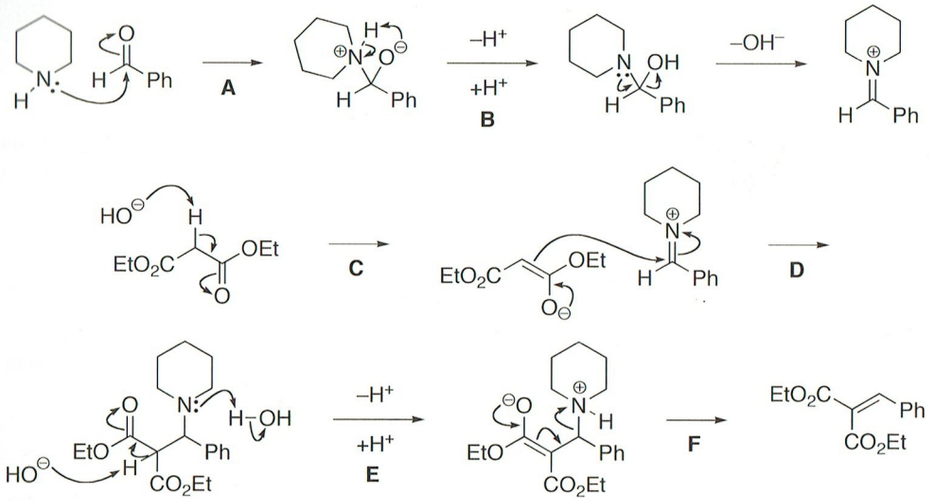


Paquette, L. A.; Han, Y. K. *J. Org. Chem.* **1979**, *44*, 4014.

Wolff-Kishner reduction. **A**: Addition of H_2NNH_2 to the carbonyl group. **B**: Proton transfer followed by elimination of hydroxide ion to form a hydrazone. **C**: Deprotonation of the hydrazone. **D**: Elimination

of N_2, an extremely good leaving group.

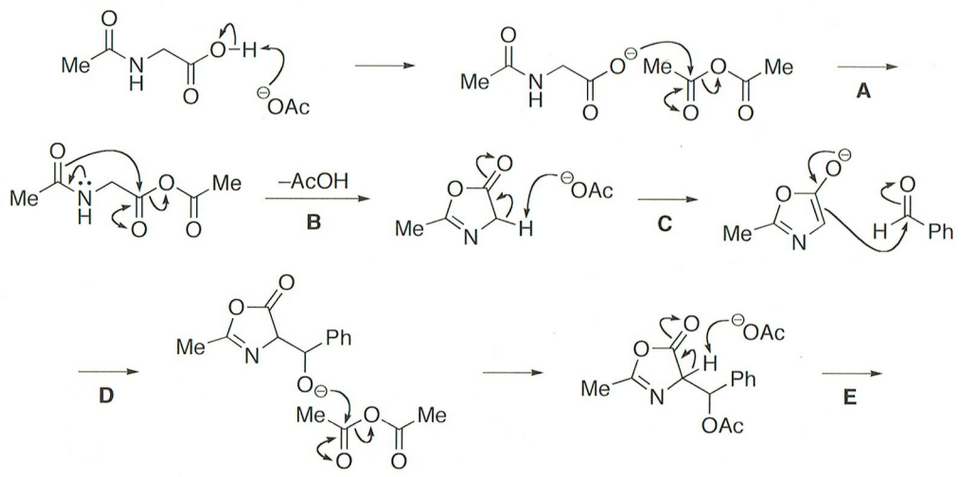
A018

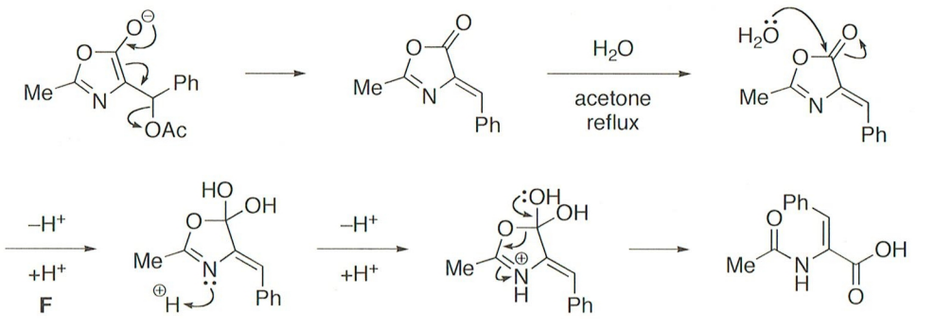


Allen, C. F. H.; Spangler, F. W. *Org. Synth., Coll. Vol. III* **1955**, 377.

Knoevenagel condensation. **A**: Addition of piperidine to the aldehyde. **B**: Proton transfer followed by elimination of hydroxide ion to form an iminium ion. **C**: Deprotonation of a malonate to form an enolate (pKa $RO_2CCH_2CO_2R$ = 13, H_2O = 15.7). **D**: Addition of the enolate to the iminium ion. **E**: Protonation of the amine and deprotonation of the malonate. **F**: Elimination of piperidine.

A019

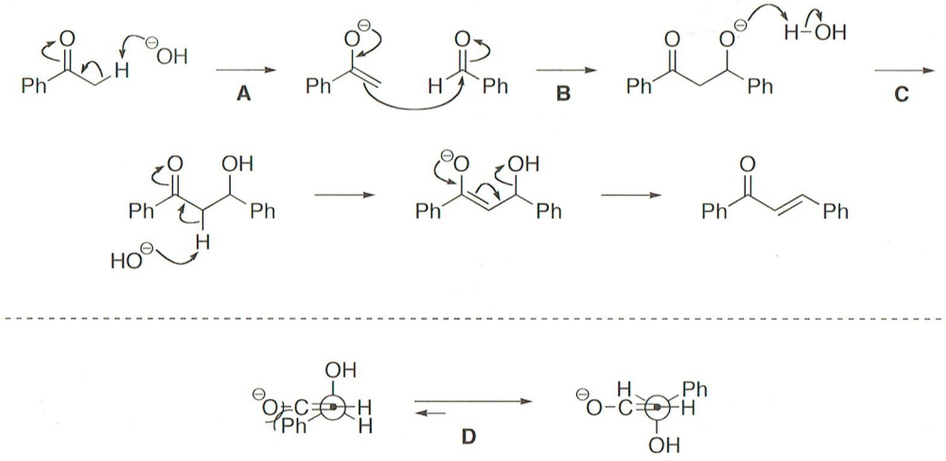




Herbst, R. M.; Shemin, D. *Org. Synth., Coll. Vol. II* **1943**, 1.

A: Formation of a mixed anhydride. **B**: Intramolecular attack of the amide oxygen to the mixed anhydride to form an azlactone. **C**: Facile deprotonation of the azlactone (aromatization). **D**: Addition of the enolate to an aldehyde followed by acetylation. **E**: Deprotonation followed by elimination of an acetate anion. **F**: Hydrolysis of the azlactone.

A020



Kohler, E. P.; Chadwell, H. M. *Org. Synth., Coll. Vol. I* **1941**, 78.

Aldol reaction. **A**: Deprotonation of the ketone to form an enolate. **B**: Attack of the enolate to an aldehyde. **C**: Protonation and deprotonation followed by elimination of a hydroxy ion. **D**: Newman