



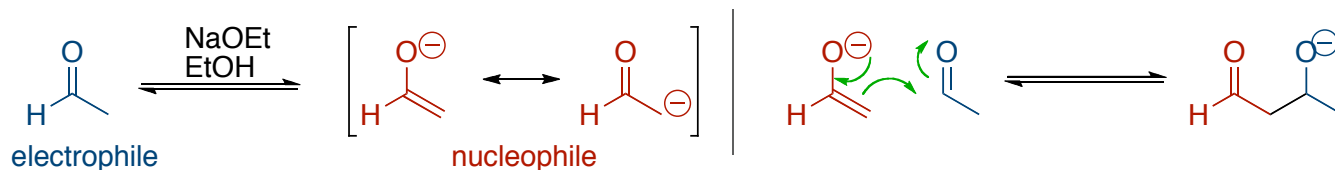
Chem 342 • Organic Chemistry II

Lecture Summary 31 - 29 Apr 2009

Chapter 23 - Carbonyl Condensation Reactions

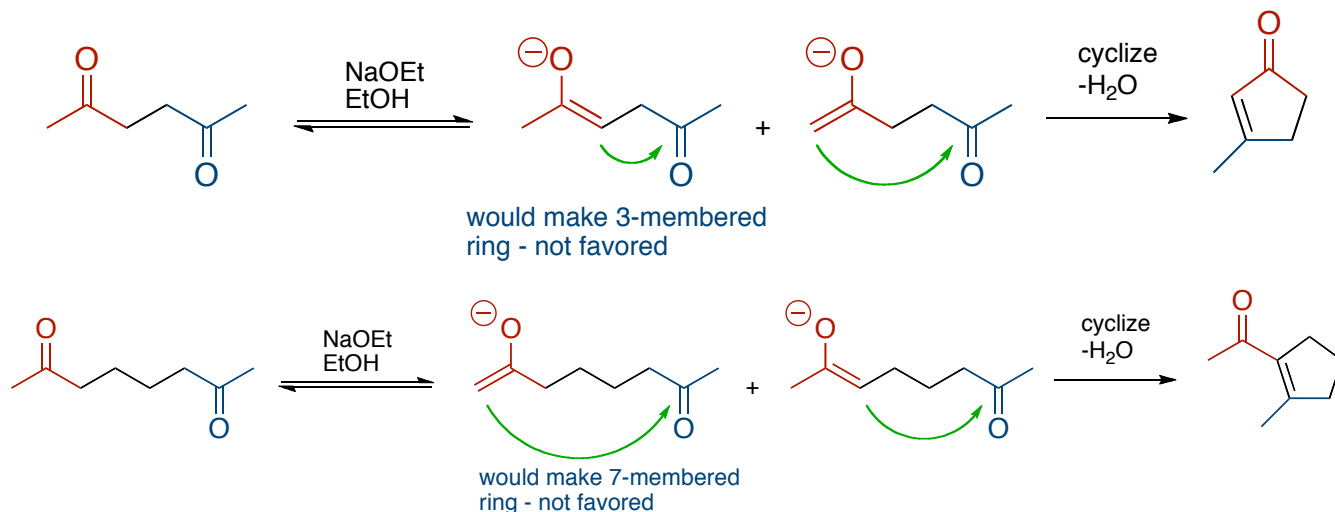
Carbonyls and Enolates

Carbonyl compounds generally react as an electrophile. That is, nucleophiles readily add to the carbonyl carbon. However, when deprotonated, an enolate is a nucleophile. Thus, when ketones and aldehydes are treated with bases that result in equilibrium between the carbonyl and the enolate (eg. alkoxides), they can react with each other. This we call a carbonyl condensation reaction.



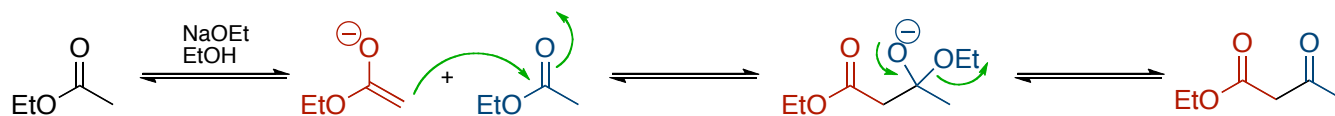
Intramolecular Aldol Reactions

Molecules containing two carbonyls can undergo aldol condensation reactions within the same molecule (intramolecular) to yield cyclic products. This will take place very readily when forming 5- or 6-membered rings.



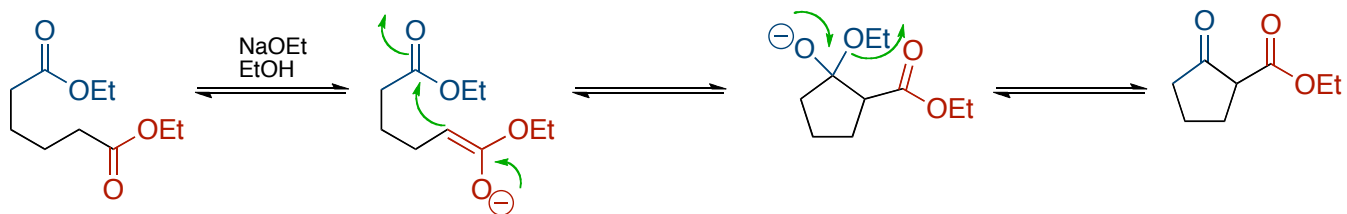
Claisen Condensation

The Claisen Condensation is very similar to an aldol reaction, except it is carried out with esters rather than aldehydes or ketones. This allows for the formation of a ketoester product as the intermediate loses ethoxide as a leaving group. A full equivalent of base is required for the Claisen condensation due to the product being more acidic than the starting ester.



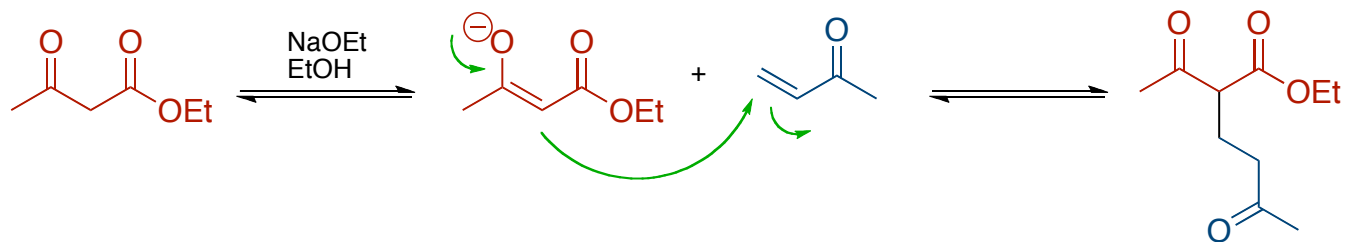
Dieckmann Cyclization

The Dieckmann Cyclization is just an intramolecular version of the Claisen Condensation.



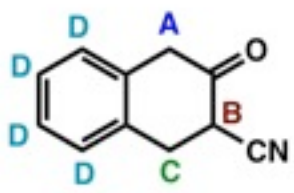
Michael Reaction

Like amines and Gilman reagents, enolates will react with unsaturated carbonyls at the beta carbon.



Daily Quiz

Q: Which of the hydrogens on the following molecule would you expect to have a pKa around 20?



1: Hydrogens on carbon A.

2: Hydrogens on carbon B.

3: Hydrogens on carbon C.

4: Hydrogens on carbons D.