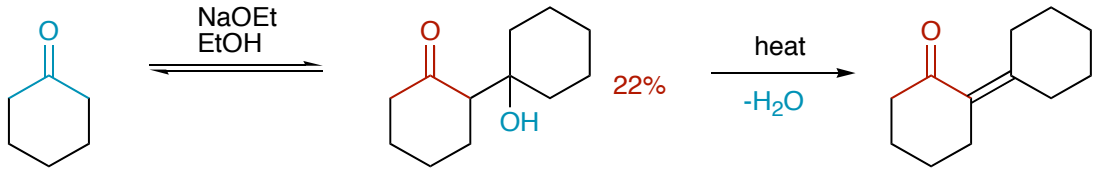
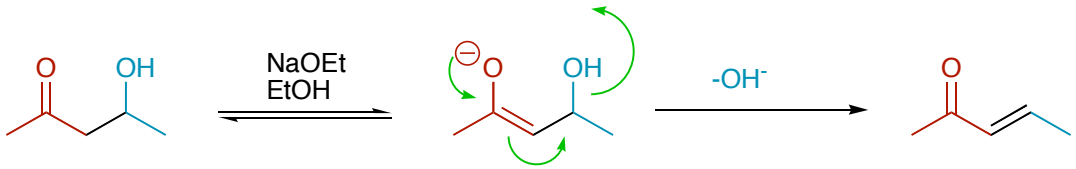
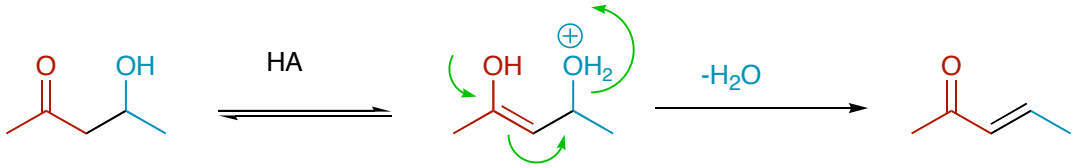
Chapter 22 - Carboxylic Alpha-Substitution Reactions

Dehydration of Aldol Products

Beta-hydroxy carbonyl compounds, the products of an aldol reaction, readily undergo dehydration to afford a conjugated alkene. Usually this requires little more than the application of a little more heat to the reaction. The process is base or acid catalyzed. Thus, if the aldol products are isolated and treated with acid, they can also undergo dehydration readily.

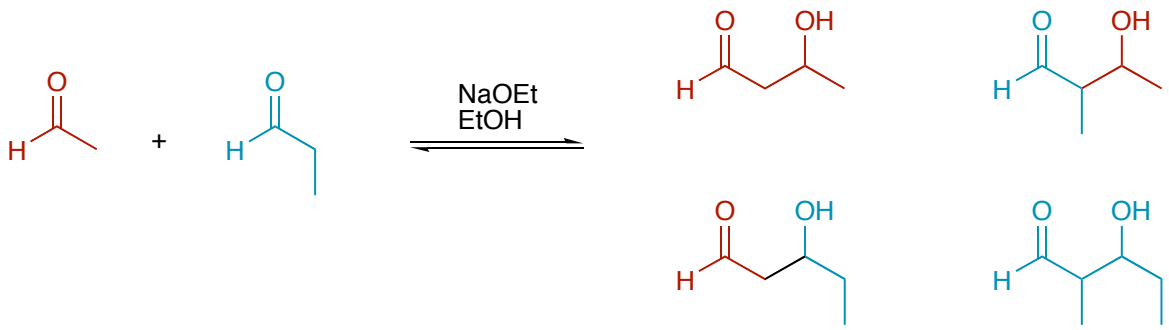




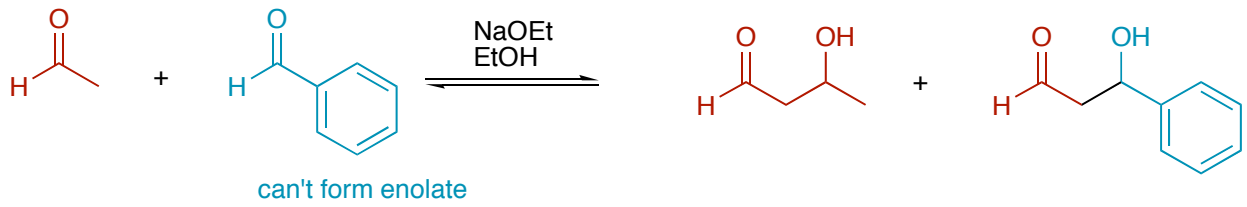


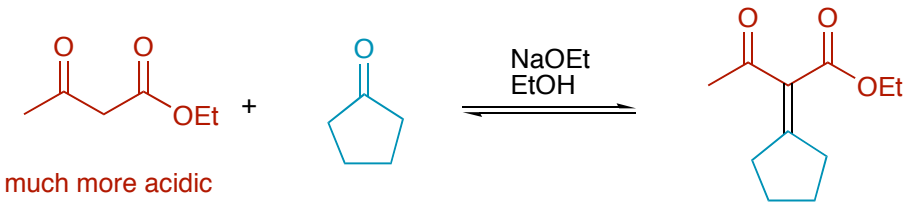
Mixed Aldols

Aldol reactions between two different enolizable carbonyls is difficult to do without forming a mixture of products. These come form self-condensation and from cross-condensations.



Some of the possibilities can be reduced by utilizing one of the carbonyls that does not have enolizable alpha-protons. Another way to get more selectivity is to utilize a dicarbonyl compounds that is much more acidic than an aldehyde or ketone.





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.