

## ORGANIC CHEMISTRY 2 LECTURE GUIDE 2019

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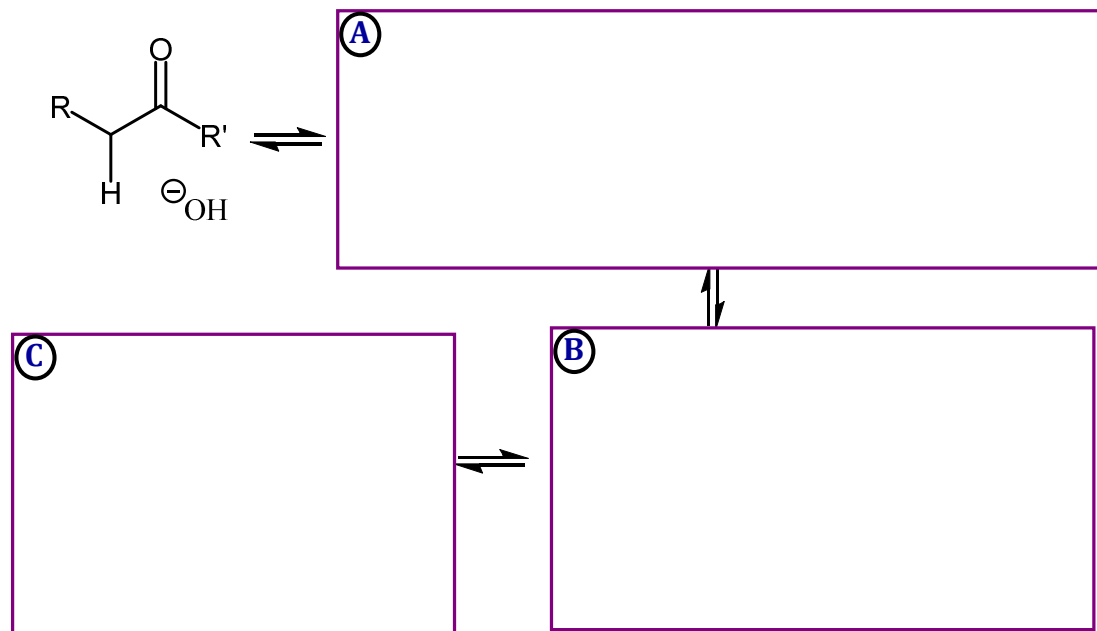
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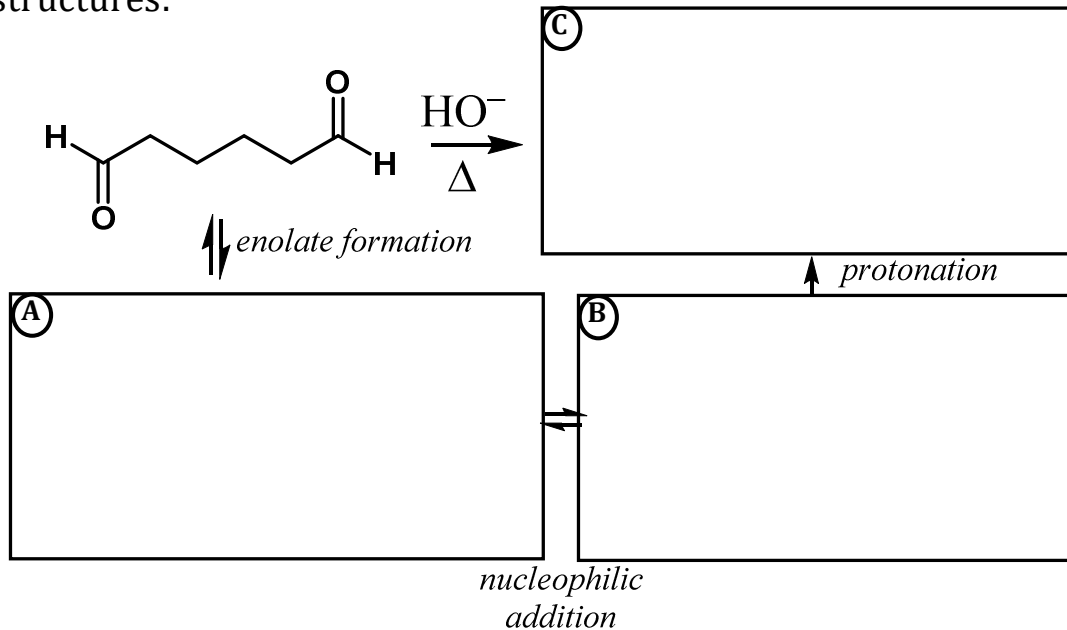
**Lesson VI.17. Aldol Addition***Aldol addition is a Type A reaction*

If an enolate is used as the nucleophile in a Type A reaction, this is called an **Aldol Addition**.

Notes

**Lesson VI.17. Aldol Addition***Intramolecular aldol forms rings*

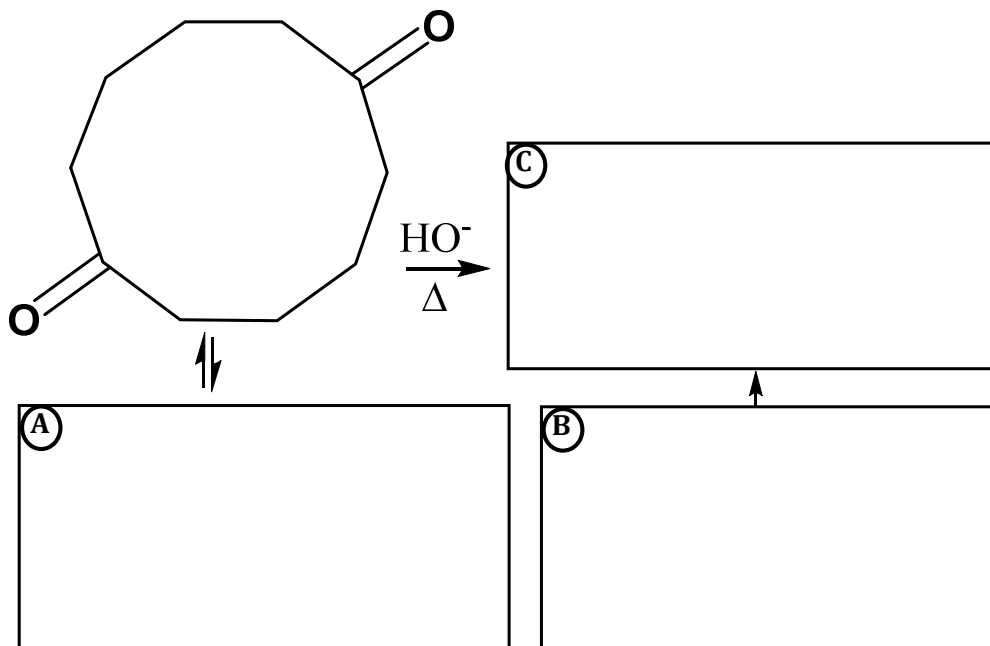
Intramolecular aldol addition can be used to form cyclic structures:



Notes

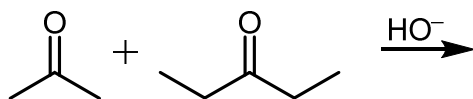
**Lesson VI.17. Aldol Addition***Bicyclic structures via aldol addition*

Bicyclic structures can also be formed intramolecularly:

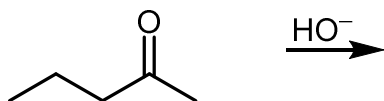
Notes

**Lesson VI.17. Aldol Addition***Mixed aldol reactions*

Although the aldol addition is quite useful, it has its drawbacks. Consider, for example what would happen if you mixed two different carbonyls together to try to couple them:



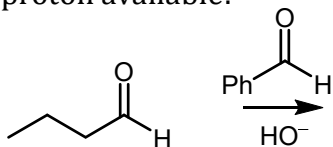
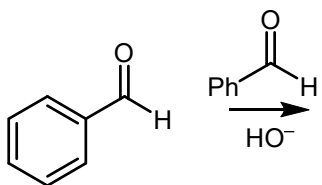
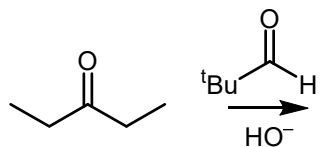
Or even one carbonyl that happens to have a different R group on each side of the carbonyl:



Notes

**Lesson VI.17. Aldol Addition***Mixed aldol addition*

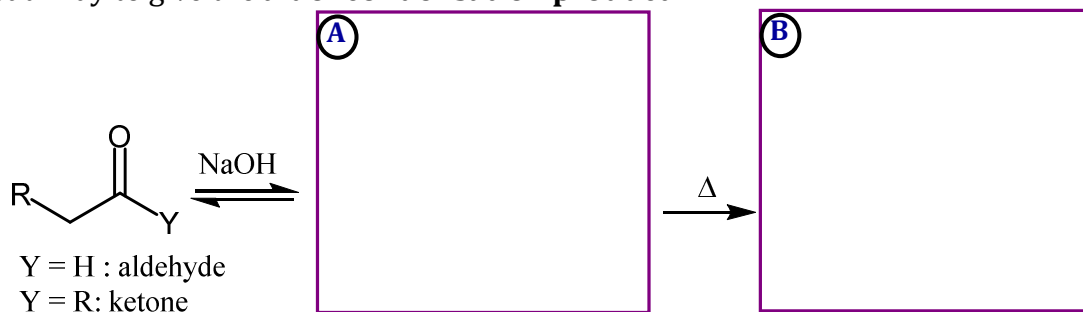
Because product mixtures result from the reactions shown on the previous page, the reaction is often cleanest when there is only **ONE type** of enolizable (alpha) proton available:

**A****B****C**Notes

## Lesson VI.17: Carbonyl Reaction Type D: Replacing Both Bonds to Carbonyl Oxygen in Ketones/Aldehydes

### *Aldol condensation*

We have seen that an enolate can serve as the nucleophile in a Type A reaction with aldehydes and ketones to give aldol addition products. With continued heating, the aldol addition product undergoes further reaction by an E2-like pathway to give the **aldol condensation product**:



Note that the alkene unit can exhibit *E*-/*Z*- and *cis*-/*trans*- isomers. The major alkene product formed is:



### Notes