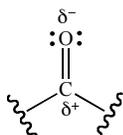


# Chapter 24: Carbonyl Chemistry I - Fundamentals

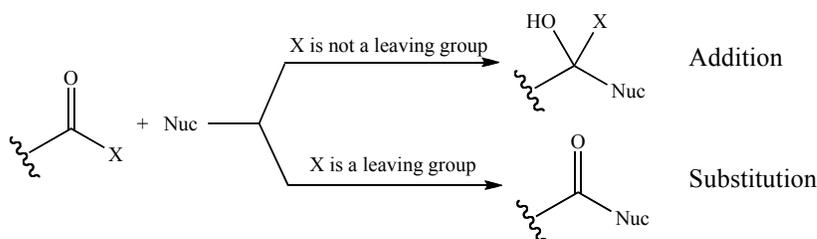
## 24.01 Why Should I Study This?

In the next four chapters we will explore the chemistry of molecules that contain a carbon-oxygen double bond (the **carbonyl group**). More than one-quarter of the common functional groups contain a carbonyl.



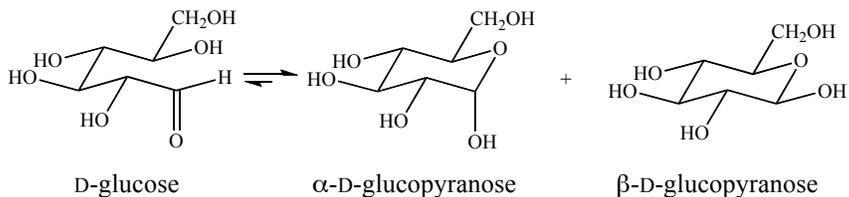
The carbonyl group

The carbonyl group is polar and so it can function both as an electrophile and as a nucleophile. We'll also learn that there are two fundamental carbonyl reaction types: addition (which occurs when the carbonyl is not bonded to a leaving group, in aldehydes and ketones) and substitution (which occurs when the carbonyl is bonded to a leaving group, in esters, acid chlorides, and others).

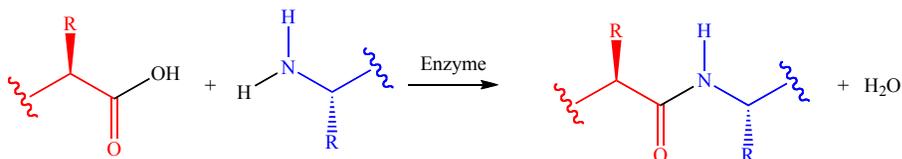


Carbonyl addition and substitution reactions

Because the carbonyl group is a common component of organic molecules, reactions of the carbonyl group are among the most common of all organic reactions, and are thus widespread in biology, the lab, and in industry. For example, the conversion of D-glucose into its cyclic form (D-glucopyranose) is a carbonyl addition reaction, which occurs at an aldehyde carbonyl:



Biosynthesis of proteins involves joining the carboxylic acid group of one amino acid with the amino group of the next amino acid. This is a carbonyl substitution reaction.



### Concept Connection

Common functional groups  
(xx.xx)

### Concept Connection

Bond polarity (xx.xx)  
Leaving groups (11.03B)