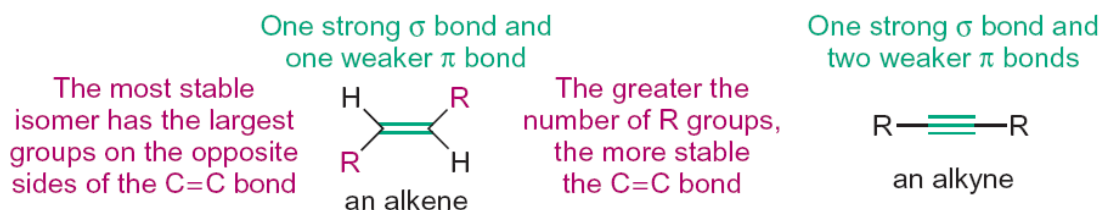


# Alkenes and alkynes: electrophilic addition and pericyclic reactions

## 21.1 Structure and reactivity of alkenes and alkynes

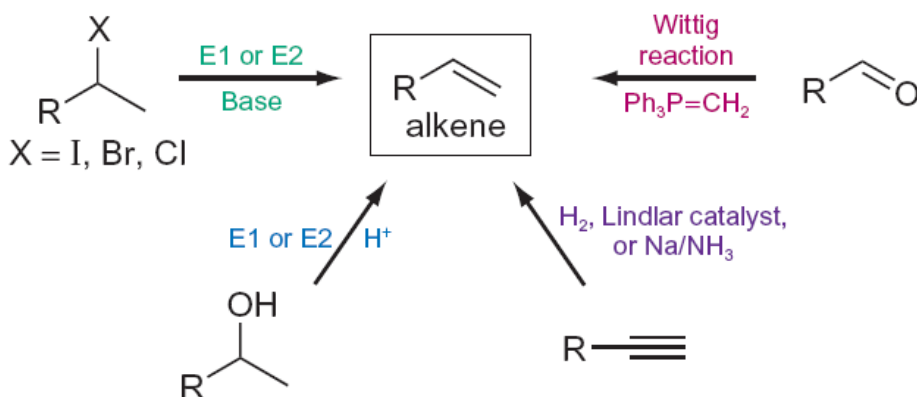


- C=C and C $\equiv$ C bonds react with electrophiles in electrophilic addition reactions.



## 21.2 Preparation of alkenes and alkynes

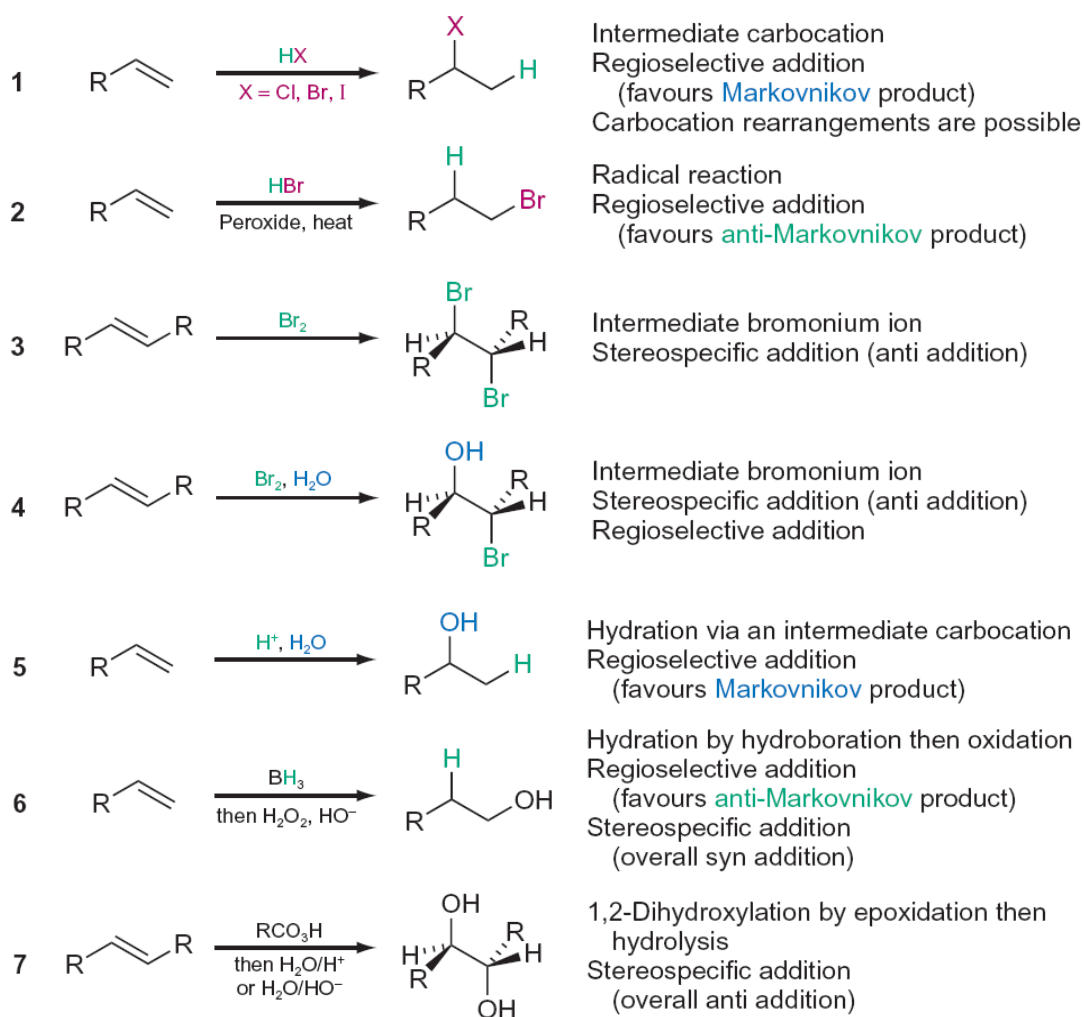
- Alkenes are prepared from halogenoalkanes, alcohols, alkynes, and aldehydes/ketones.



- Alkynes are prepared from 1,2-dibromoalkanes.
- Substituted alkynes are prepared by alkylation of alkynyl anions with halogenoalkanes.

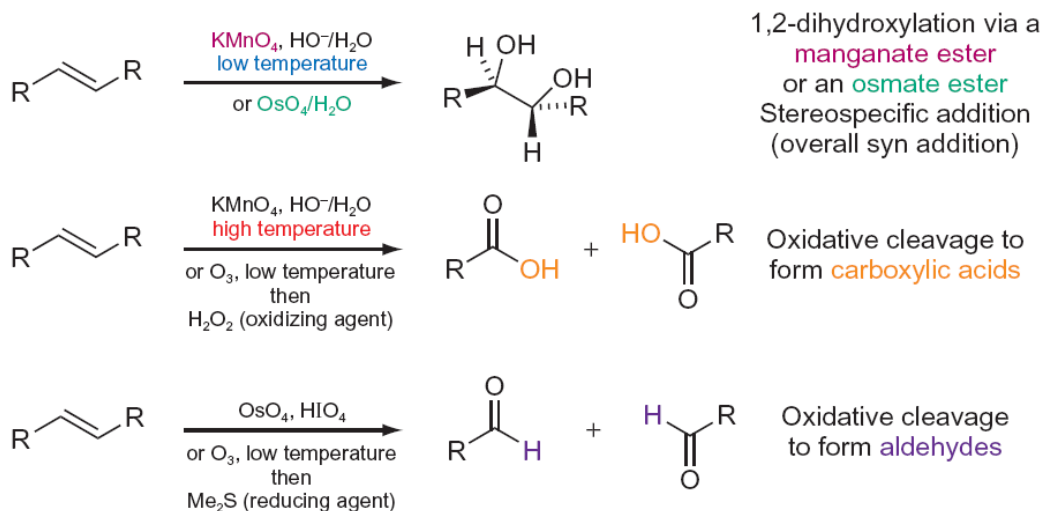
## 21.3 Electrophilic addition reactions of alkenes

Seven important addition reactions involving alkenes.



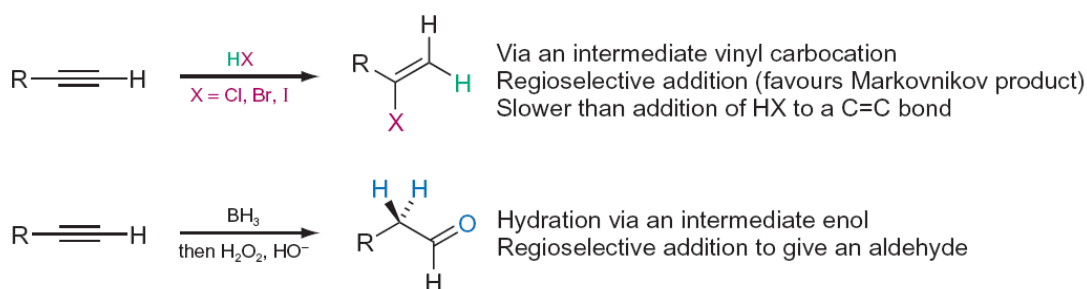
## 21.4 Pericyclic reactions of alkenes

Important pericyclic reactions involving alkenes.



## 21.5 Electrophilic addition reactions of alkynes

- Two important electrophilic addition reactions of alkynes.



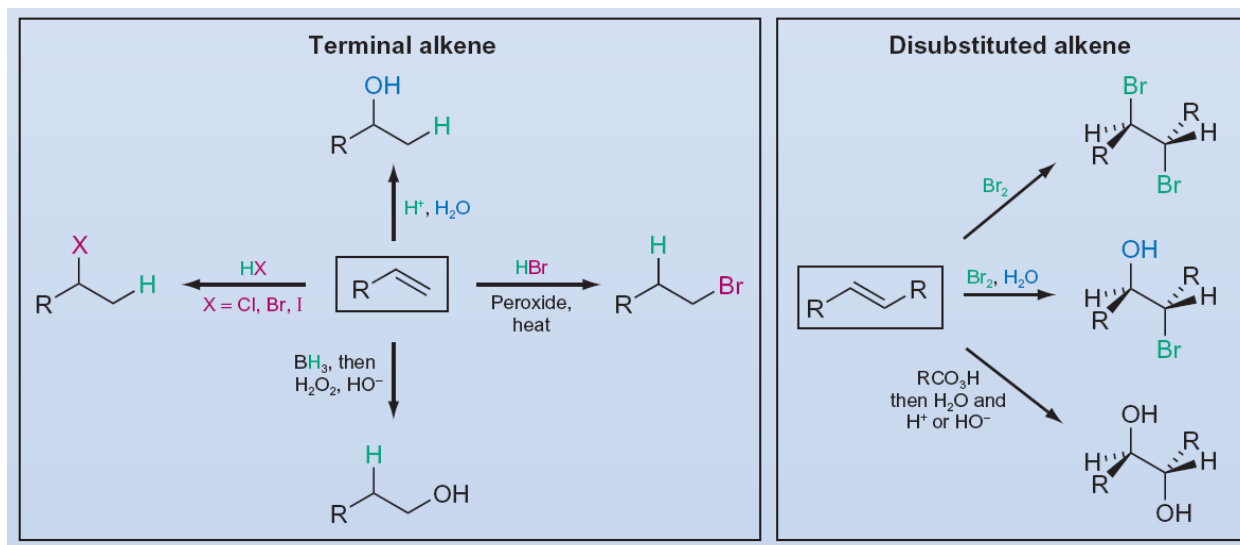
- HC≡CH and RC≡CH react with strong bases to form alkynylmetal reagents (for example, HC≡CNa), which can act as nucleophiles.

## Learning outcomes

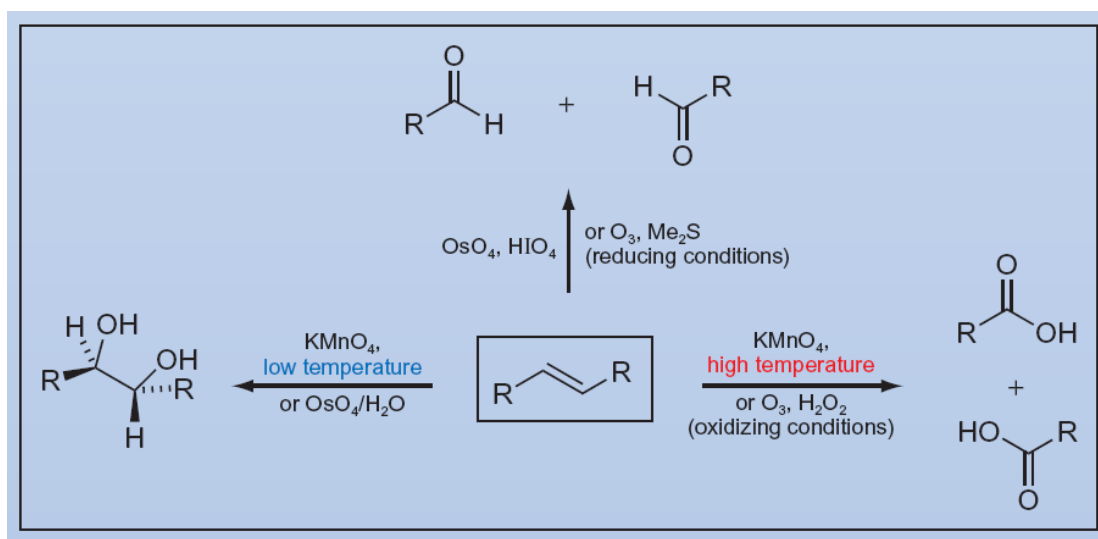
By the end of this chapter you should be able to do the following.

- Describe how alkenes are prepared from halogenoalkanes, alcohols, alkynes, and aldehydes/ketones.
- Describe how alkynes are prepared from 1,2-dibromoalkanes and how substituted alkynes are prepared by alkylation of alkynyl anions (RC≡C<sup>-</sup>) with halogenoalkanes.
- Understand how C=C and C≡C bonds react in electrophilic addition reactions.

- Write reaction mechanisms to explain how C=C bonds undergo the addition reactions shown below.



- Write reaction mechanisms to explain how C=C bonds undergo the pericyclic reactions shown below.



- Write reaction mechanisms to explain how C≡C bonds undergo the addition reactions shown below.

