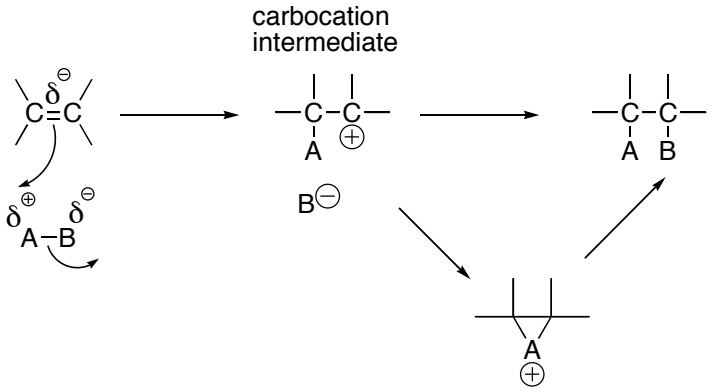
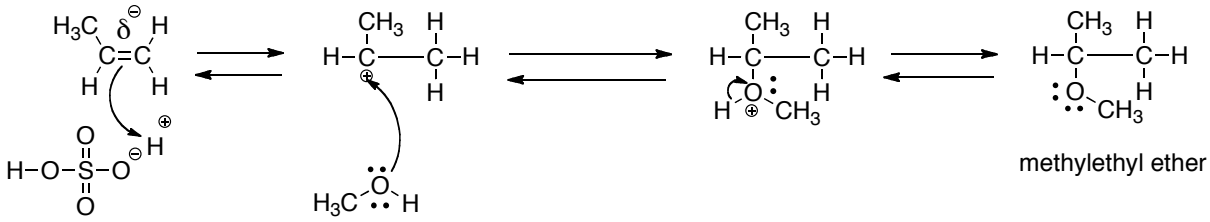
Addition reactions of alkenes



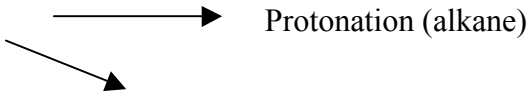
- Follows Markovnikov rule

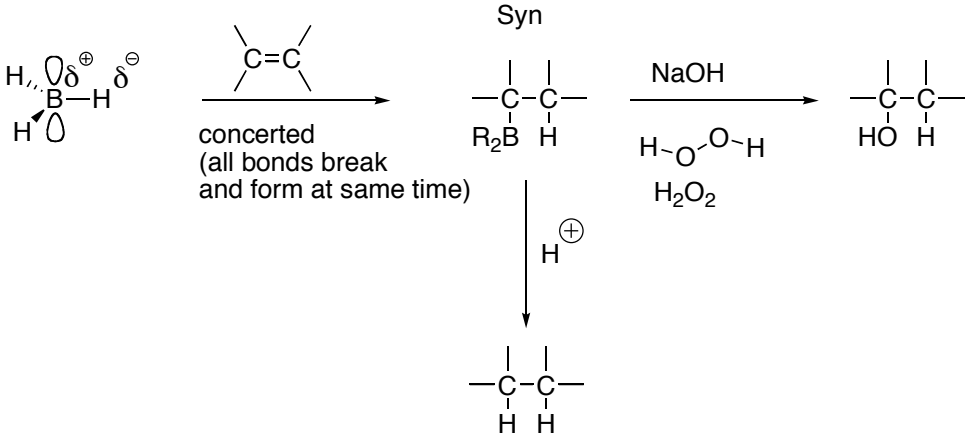


- The reverse reaction is called an elimination

Hydroboration

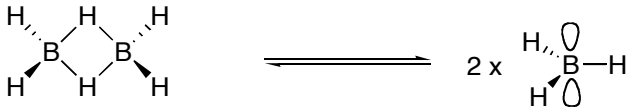
General



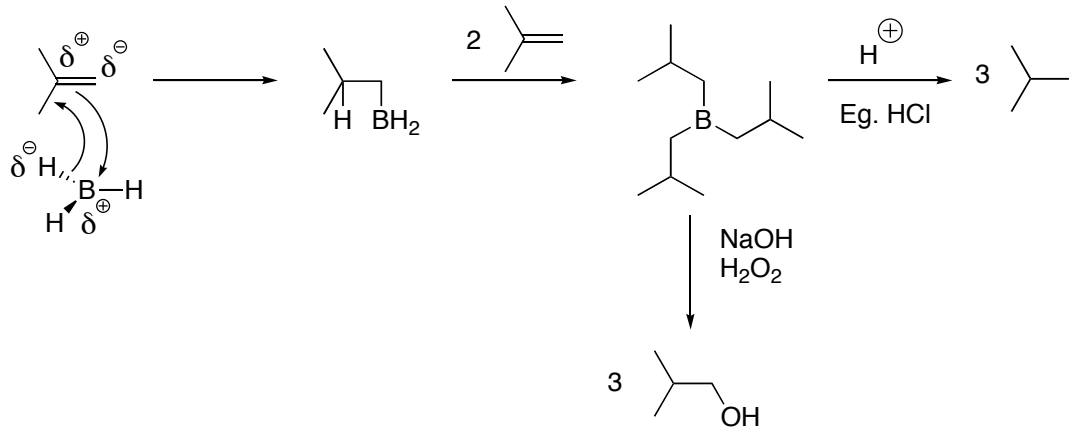


Formally Anti-Markovnikov
Addition of H-OH in opposite sense.

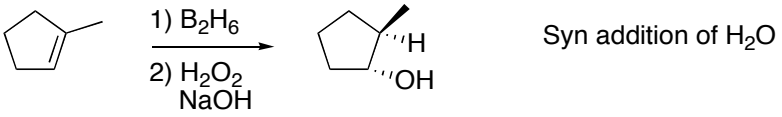
B_2H_6 – diborane behaves like BH_3



Eg 1.

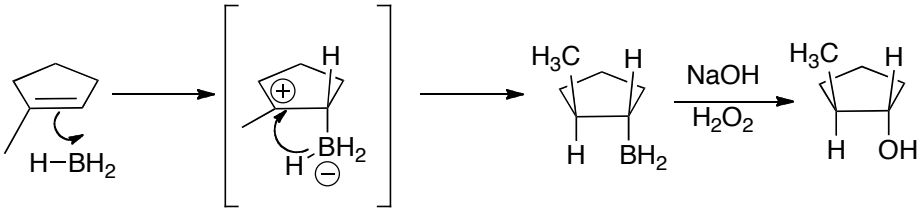


Eg 2.

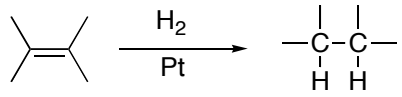


Syn addition of H_2O

Overall anti-Markovnikov addition of water



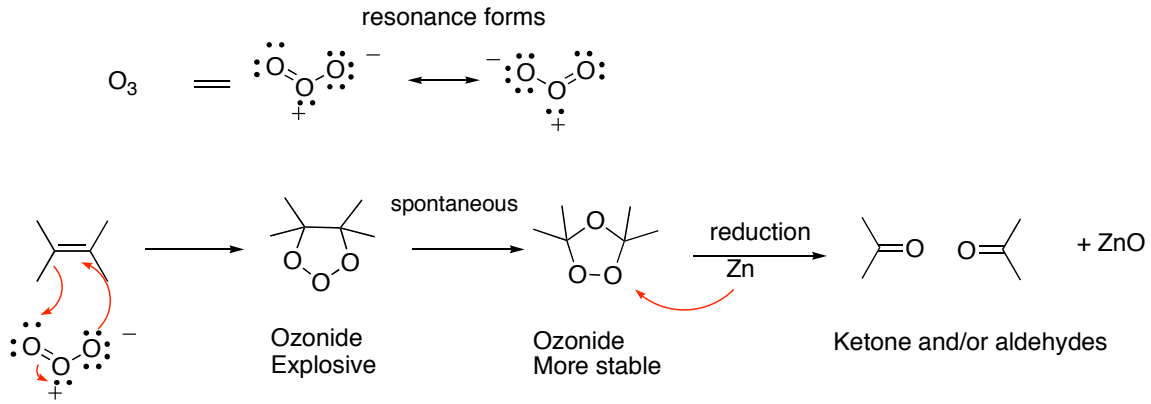
Reduction: process that adds electrons

Eg. 

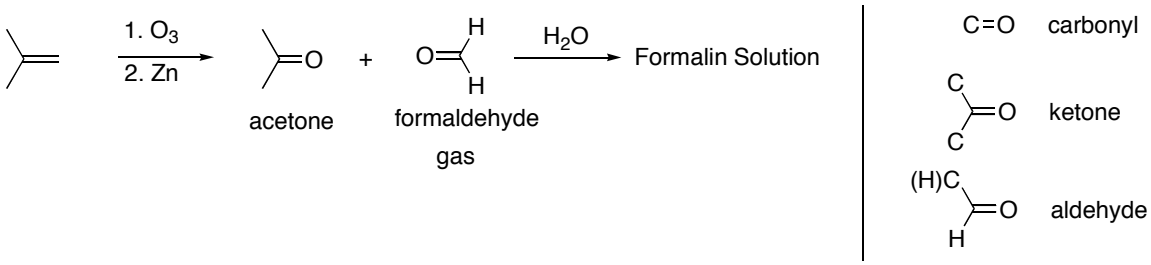
Oxidation: process that removes electrons

Ozonolysis: cleavage of alkenes by ozone (O_3)

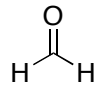
General reaction:



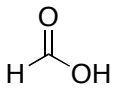
Eg.



formaldehyde name comes from formic acid, which comes from formica (ant):

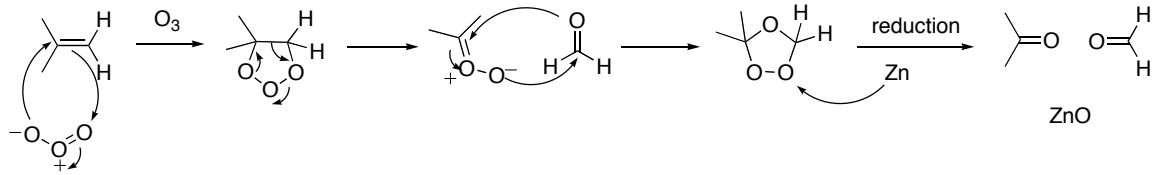


formaldehyde

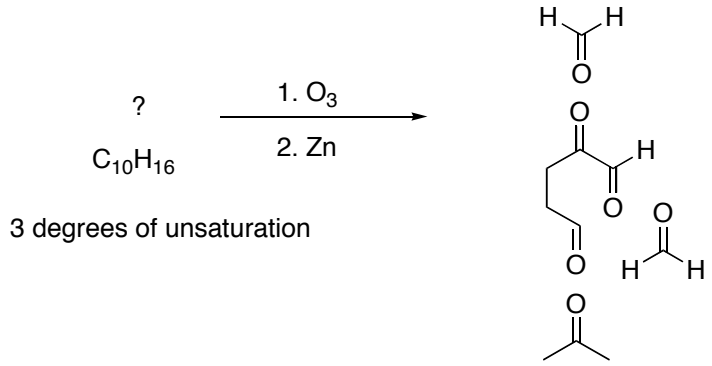


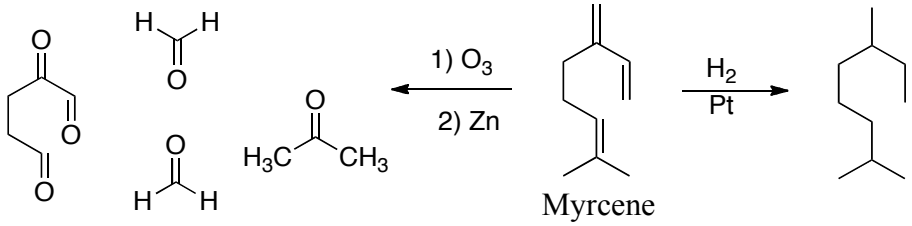
formic acid is an ant defense substance
(formica means ant)

Mechanism:



Sample question for practice: What is a possible structure for the starting material below ($C_{10}H_{16}$)?
Are there other isomers that will give the same products for ozonolysis followed by Zn treatment?

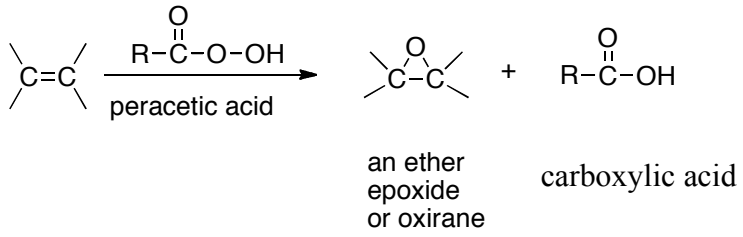




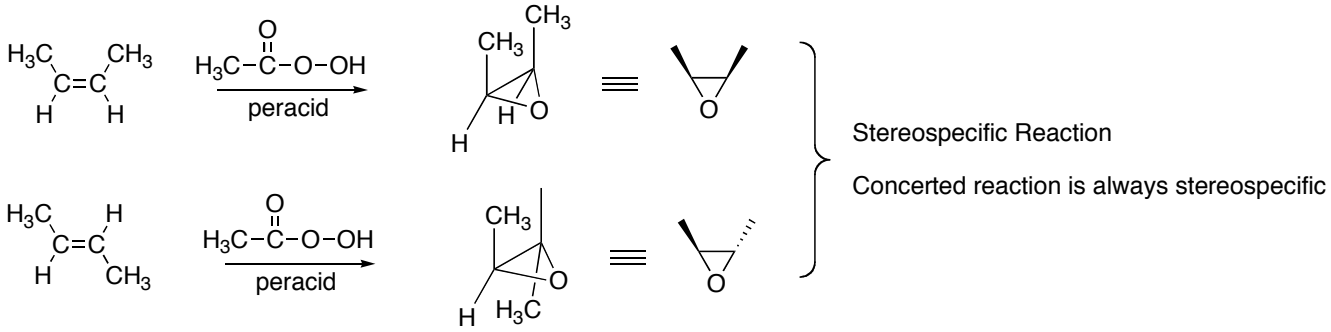
<u>Epoxidation</u> – Oxirane formation

1) <u>Epoxide formation (epoxidation)</u> – Oxirane formation

ex)



- Syn Addition
- Concerted reaction: all bonds break and form at the same time



Mechanism: