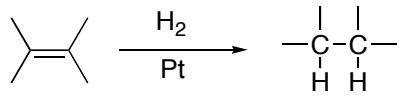
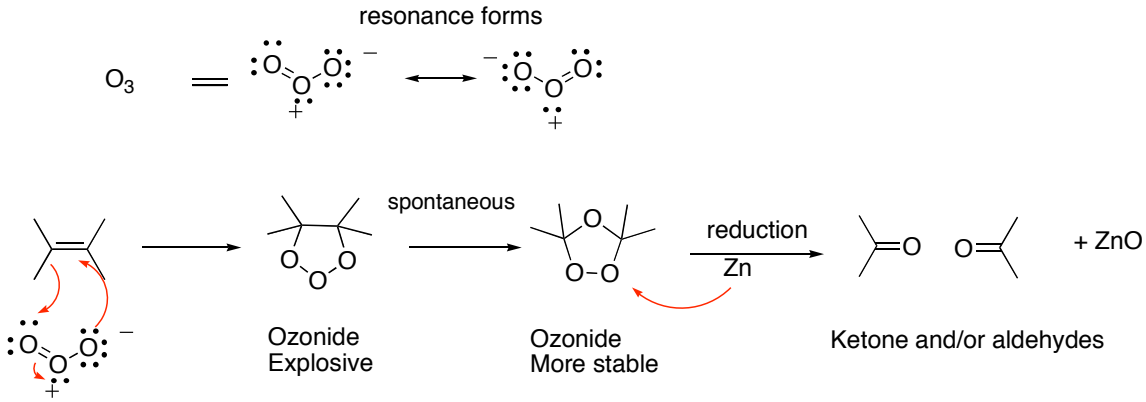
Reduction: process that adds electrons

Eg. 

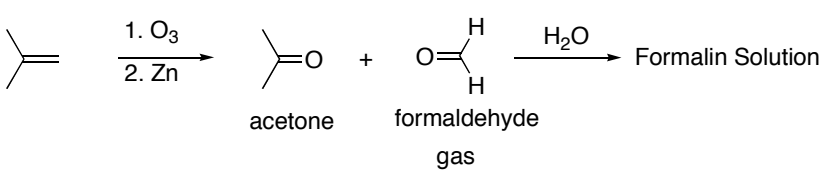
Oxidation: process that removes electrons

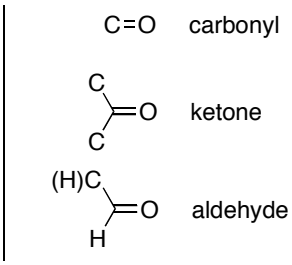
Ozonolysis: cleavage of alkenes by ozone (O_3)

General reaction:

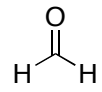


Eg.

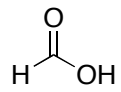




formaldehyde name comes from formic acid, which comes from formica (ant):

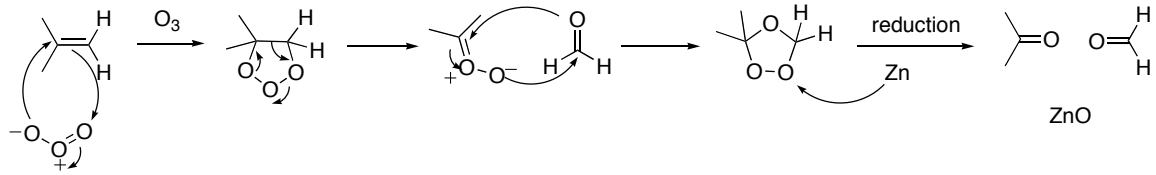


formaldehyde

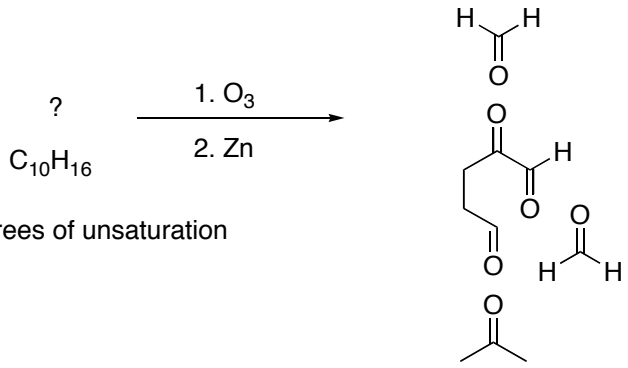


formic acid is an ant defense substance
(formica means ant)

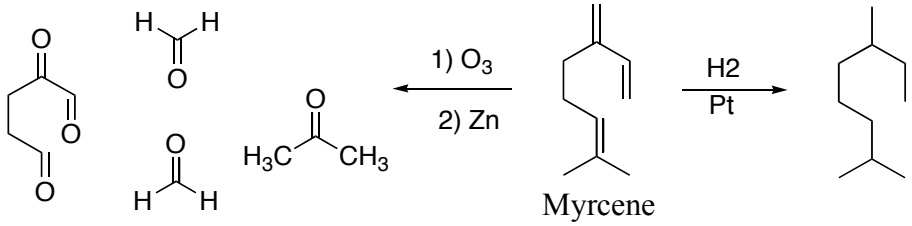
Mechanism:



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 ?



3 degrees of unsaturation

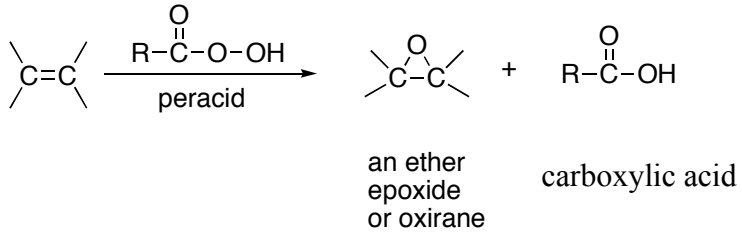


Myrcene

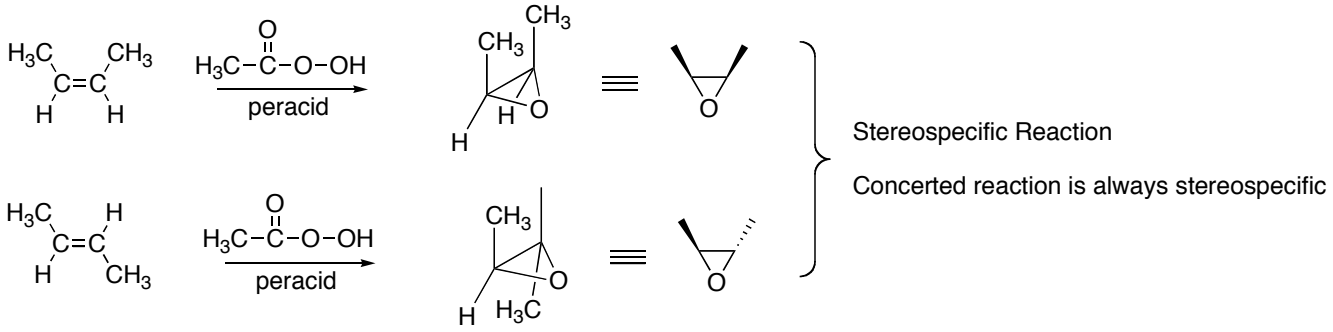
<u>Epoxidation</u> – Oxirane formation

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

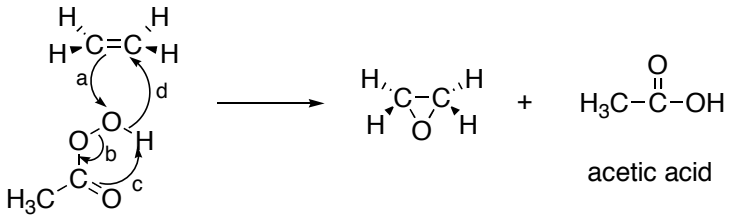
ex)



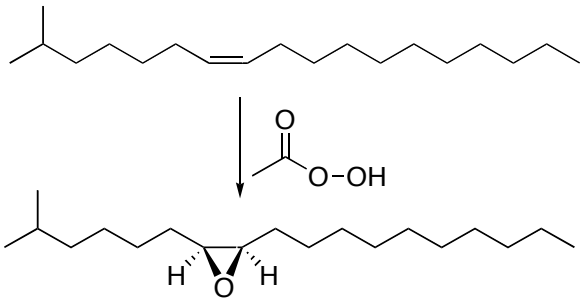
- Syn Addition
- Concerted reaction: all bonds break and form at the same time



<u>Mechanism:</u>



ex)

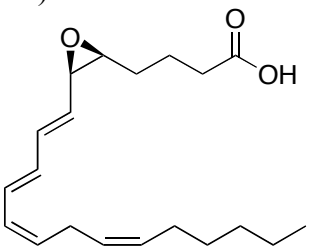


- Done by Adolf Butenandt

Gypsy moth sex pheromone

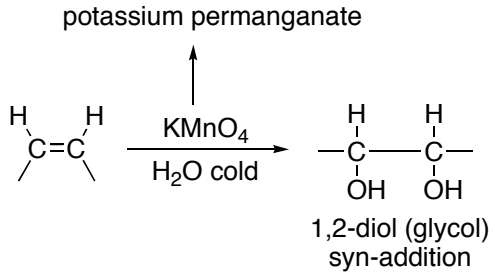
- Pheromones (pherein horman – to carry excitement)
- Chemical messengers

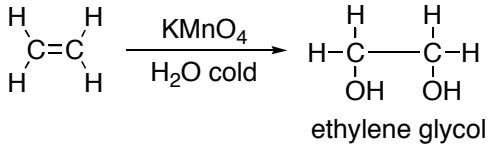
Ex)



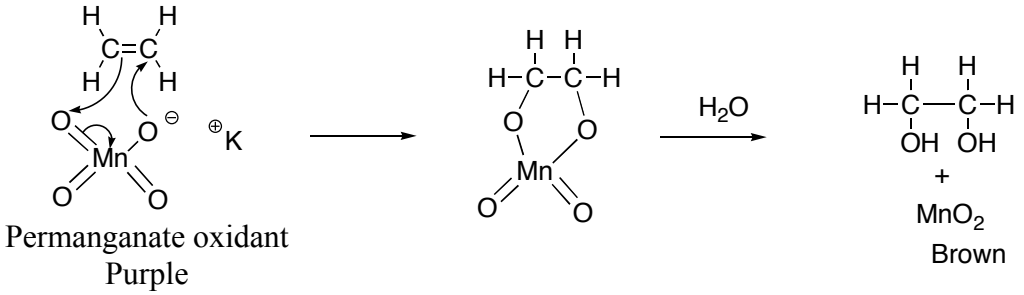
Leukotriene A4 -
- substance (chemical messenger) that mediates anaphylaxis (allergic reaction, asthma)

<u>Dihydroxylation</u>

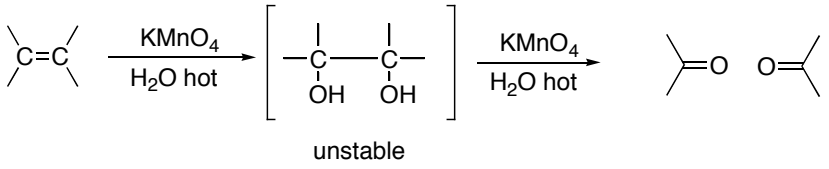




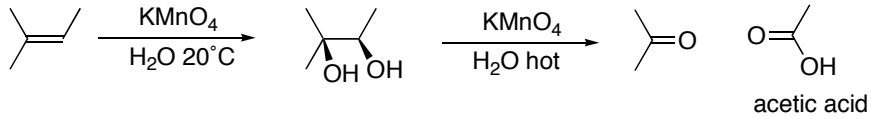
Mechanism



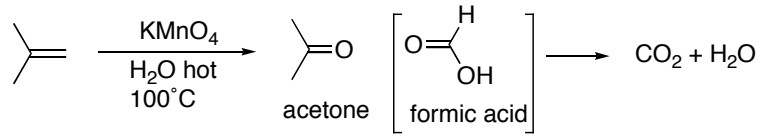
Permanganate oxidant
Purple



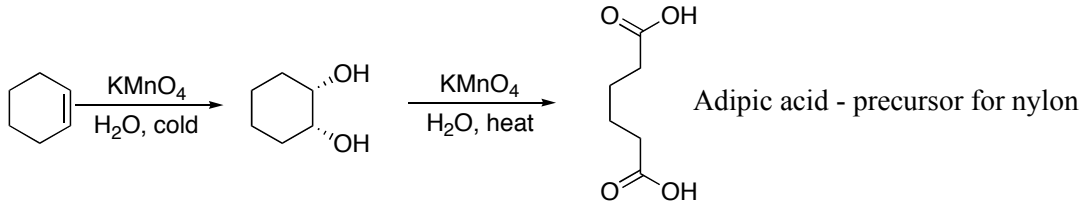
eg



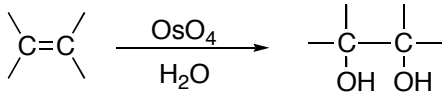
eg



eg

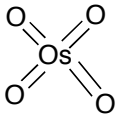


OsO_4, osmium tetroxide.



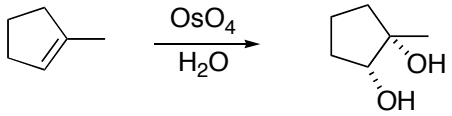
Syn - addition

- stops with diol, does not form carboxylic acid when heated.

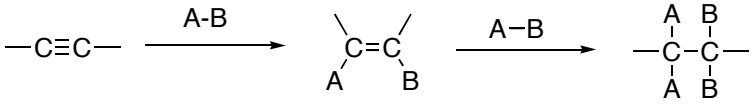


volatile and toxic solid

eg.



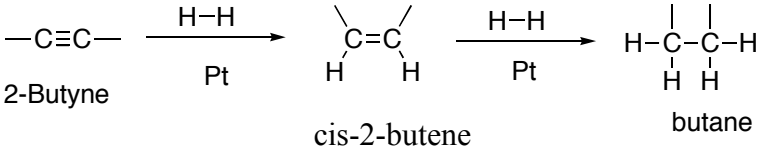
Addition Reactions of Alkynes



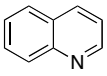
syn (or anti)

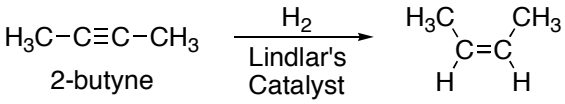
1) Hydrogen Addition

Ex.

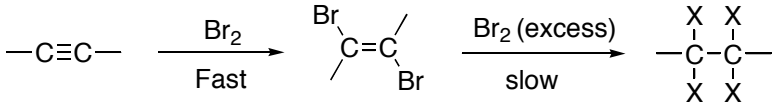


reaction can not be easily stopped at cis alkene

- to stop at alkene use Lindlar's catalyst: Pd, $BaSO_4$ or $CaCO_3$ quinoline 



2) Halogenation:



Two Br are pulling electrons away,
and slow down the second step