Course 343 Lecturer Hackenberger

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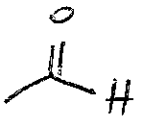
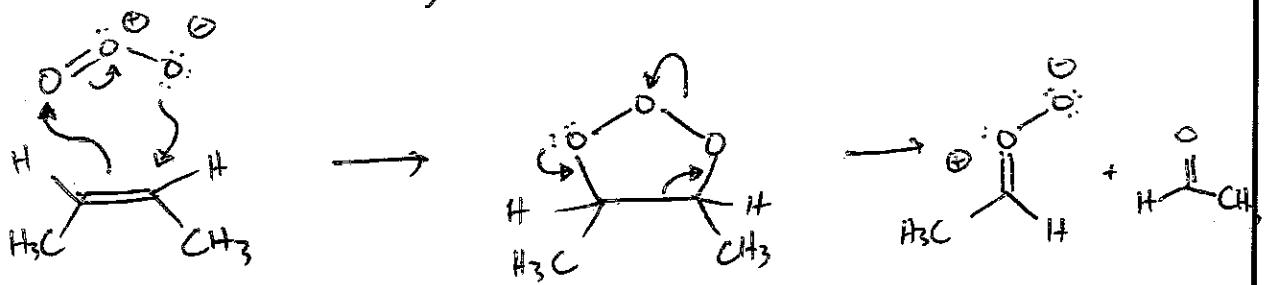
- Last lecture: alkene reactions: hydroboration (anti-Markovnikov)

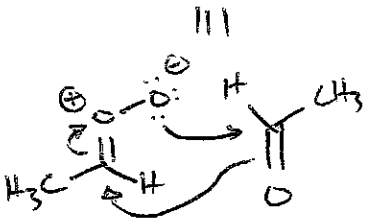
- Ozonolysis:

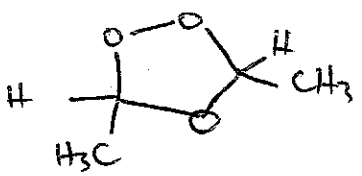
$CH_3-CH=CH-CH_3 \xrightarrow[2)\ SMe_2]{1)\ O_3}$ 2× 

concerted mechanism (cycloaddition)



"molozonide" not stable





Reaction products $\xleftarrow[\text{or } H_2O_2]{(CH_3)_2S}$

"ozonide" stable

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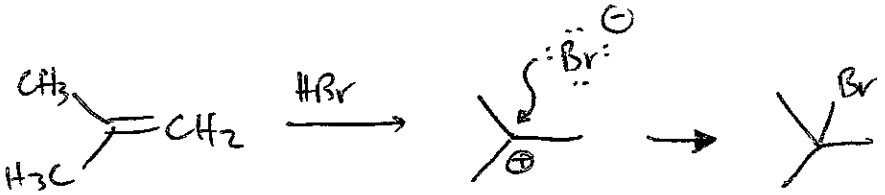
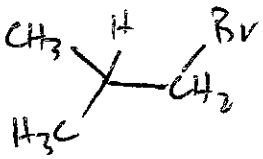
• Addition of HBr to alkenes under radical conditions

Normal conditions:



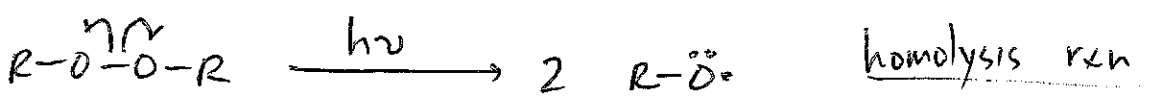
sometimes observed:

Anti-markovnikov product



• This product is formed by a radical process (due to peroxide impurities in the reaction)

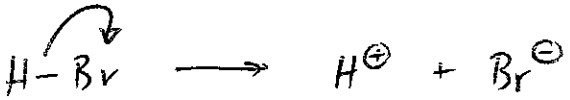
• Radicals: · species with unpaired electrons
· formed by homolysis of bond



homolysis rxn

(peroxide)

• contrast with heterolysis rxn



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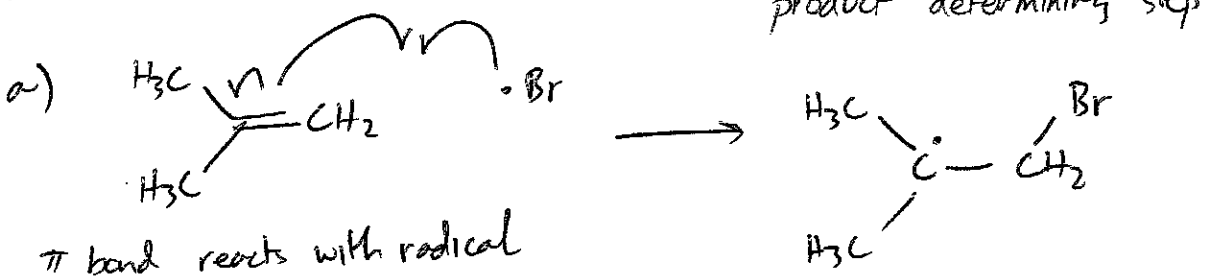
Mechanistic rational for radical reactions:

1) Initiation step a) 

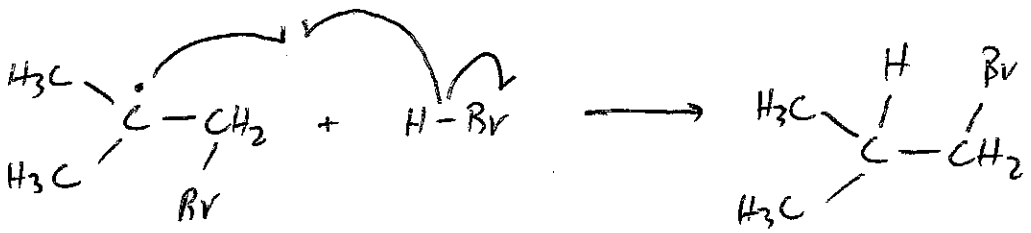
b) 

2) Propogation step

product determining step

a) 

π bond reacts with radical

b) 

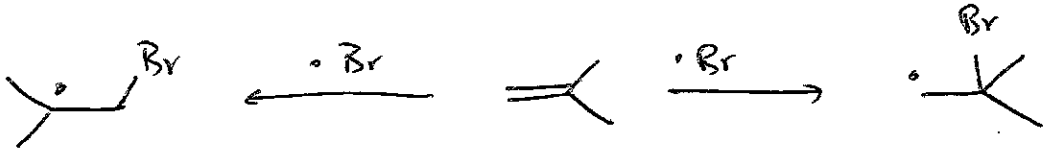
3) Termination (see book)

+ •Br

Another Br• formed, so reaction can continue

~~3) Termination~~

Rationale for selectivity: ~~2° radical favored~~ (see next page)



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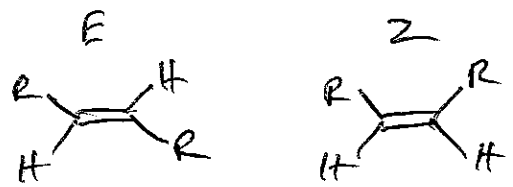
a) Radical stability follows same trends as carbocations ($3° > 2° > 1°$) due to being e^--deficient species

b) Sterics: large Br• prefers to react at terminal (more accessible) carbon

Chapter 6: Stereoisomers

- Isomers: chemical compounds with same molecular formula but different chemical structure
- Stereoisomers: bond structure is same, but geometrical positioning is different
  - example: E/Z alkenes



- New example: enantiomers: mirror image, but not superimposable

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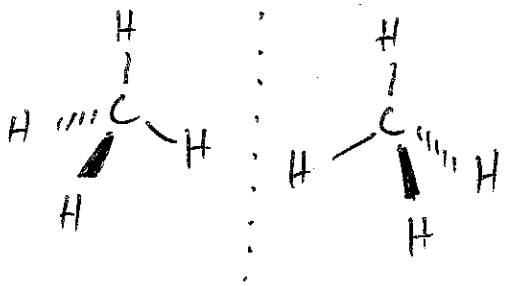
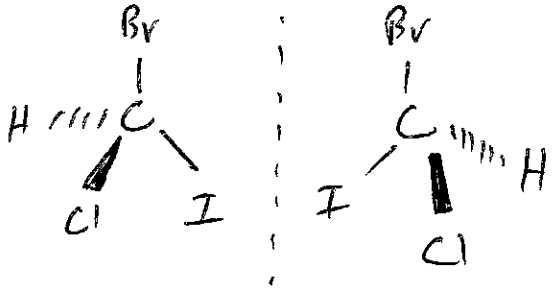


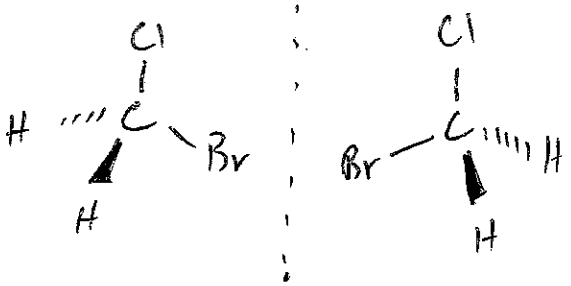
superimposable ✓

Contrast:



- not superimposable (build a model)
- pairs of enantiomers
- chiral molecule
- the central carbon is called a stereogenic center

- Def: a molecule that differs from its mirror image is chiral
  " " " is equivalent to " " is achiral



superimposable!

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Chiral	Achiral
• non-superimposable mirror image	• Mirror image is identical
• must have sp^3-hybridized carbon with 4 different substituents	• 0 enantiomers

• R/S nomenclature

- specifies configuration at sp^3 chiral carbons

1) Assign priority to the four different substituents
2) Orient molecule so that lowest priority faces away from you
3) Assign R/S