(30) **Today**

Sections 6.5 – 6.11

Next Class (31)

Sections 6.5 – 6.11
Chap 7

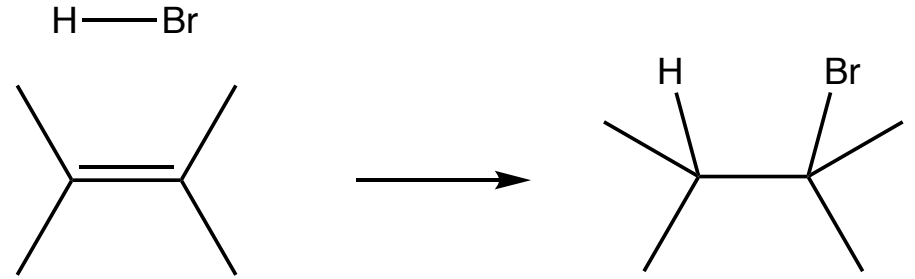
(32) **Second Class from Today**

Test 3 on Chap 4 and 5

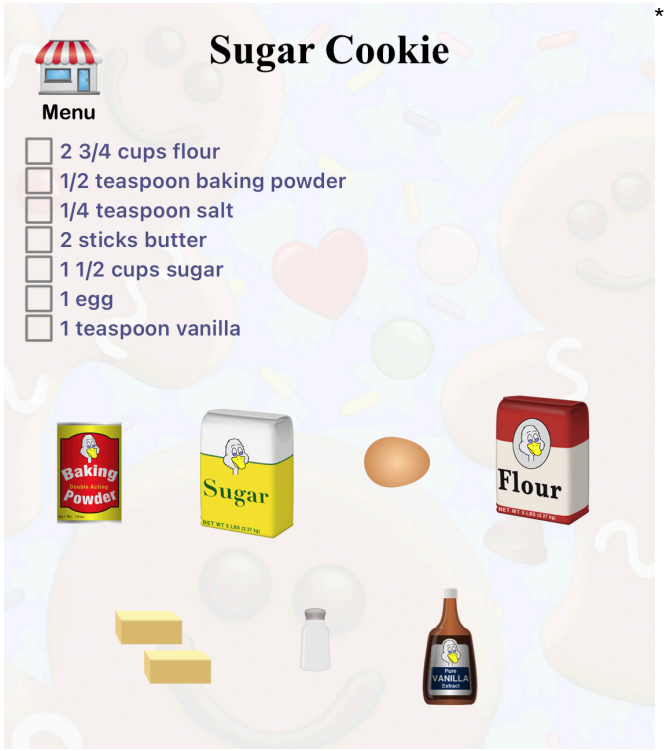
Third Class from Today (33)

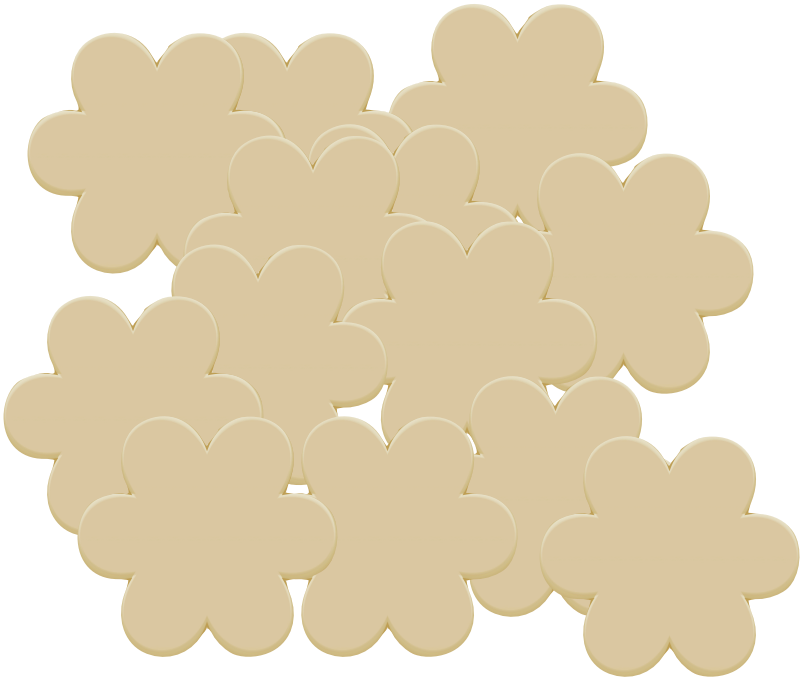
Chap 7

Balanced chemical equations are like ingredient lists

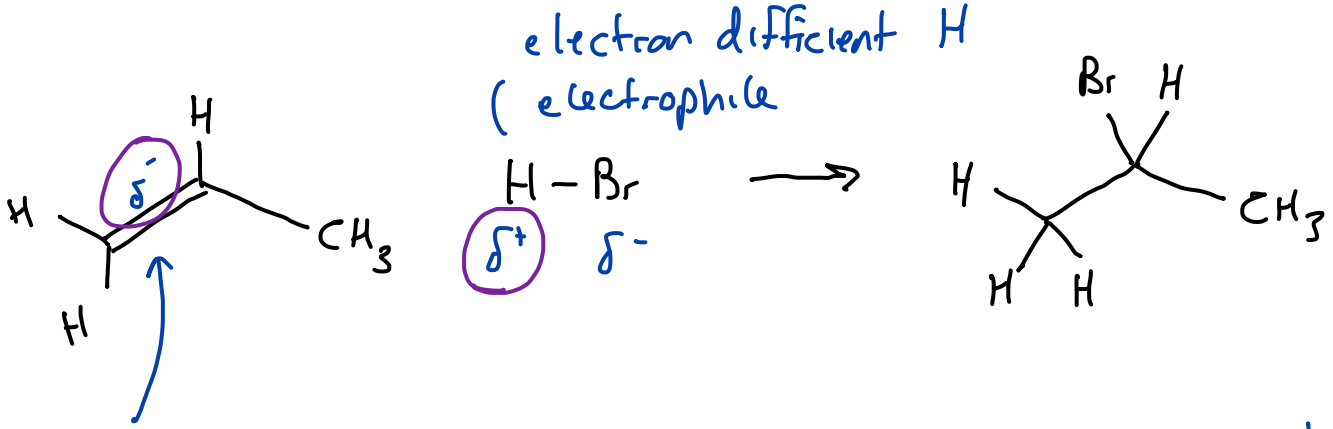


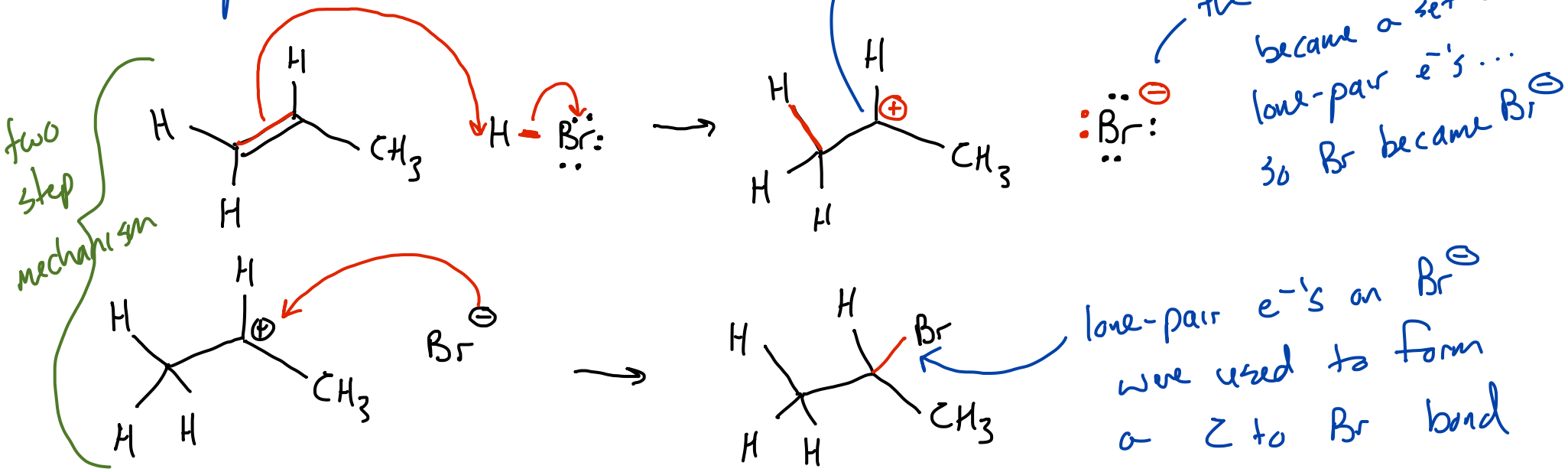
addition reaction





*CookieDoodle https://apps.apple.com/us/app/cookie-doodle/id342128086

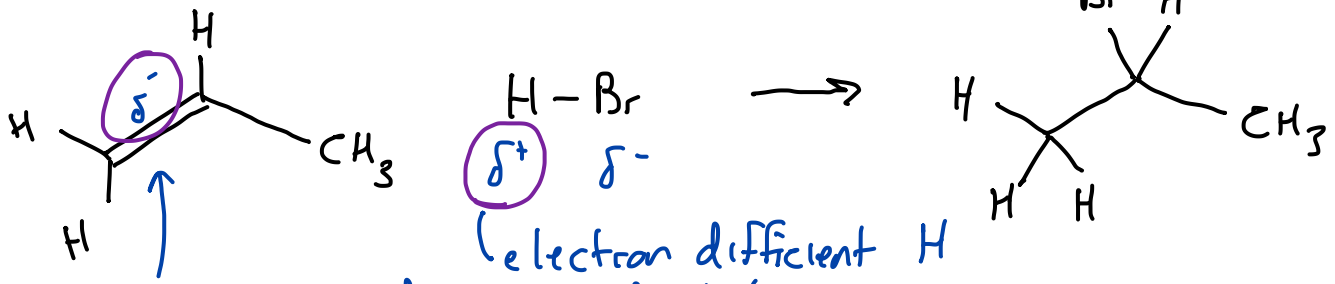




A mechanism is a hypothesis that makes testable predictions
Experiments support or refute hypothesis with support mechanism becomes "accepted"

Using Curved Arrows in Polar Reaction Mechanisms: Addition of HBr to Propene

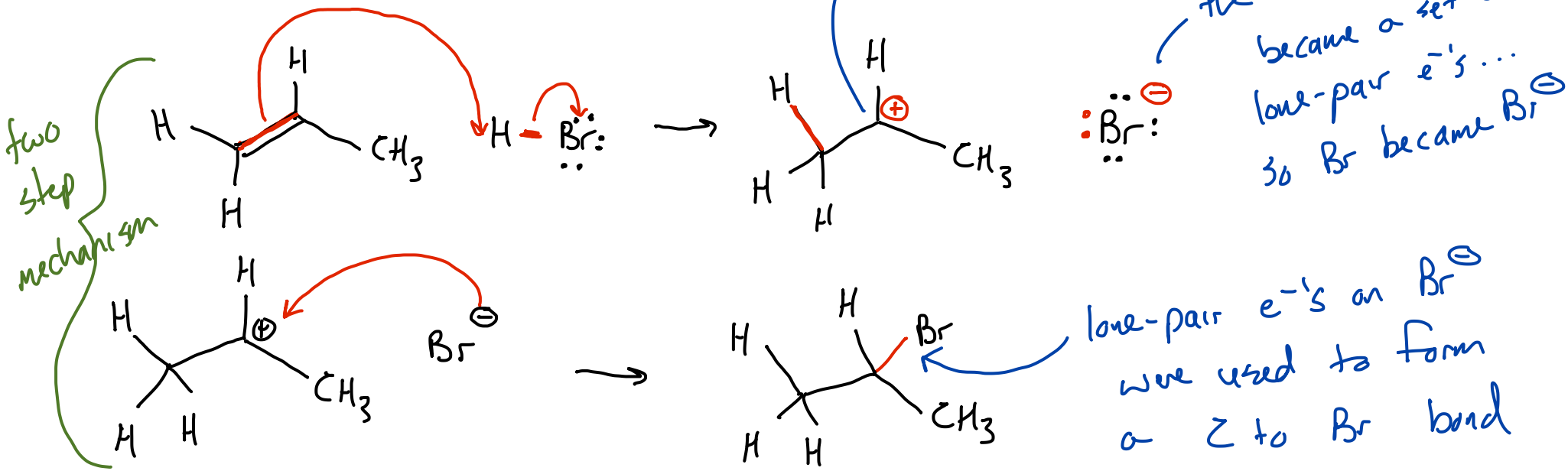
Section 6.5



balanced chemical equation

electron rich π bond
nucleophilic

electron difficient H
electrophile



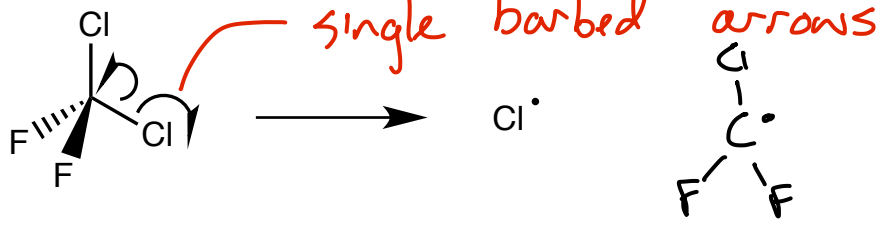
A mechanism is a hypothesis that makes testable predictions
Experiments support or refute hypothesis with support mechanism becomes "accepted"

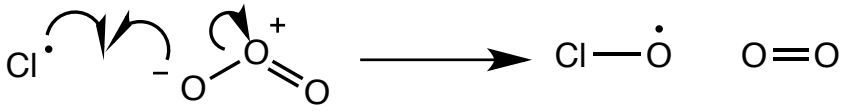
radical = odd # of electrons

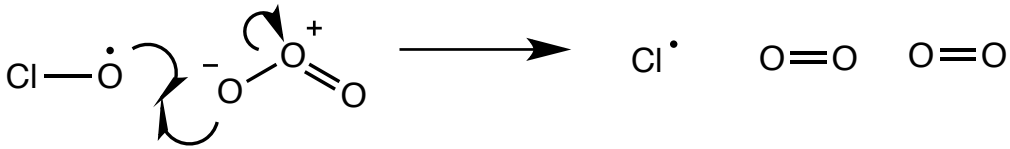
Radical Chain Reactions in Environmental Chemistry
ozone depletion

homolytic cleavage

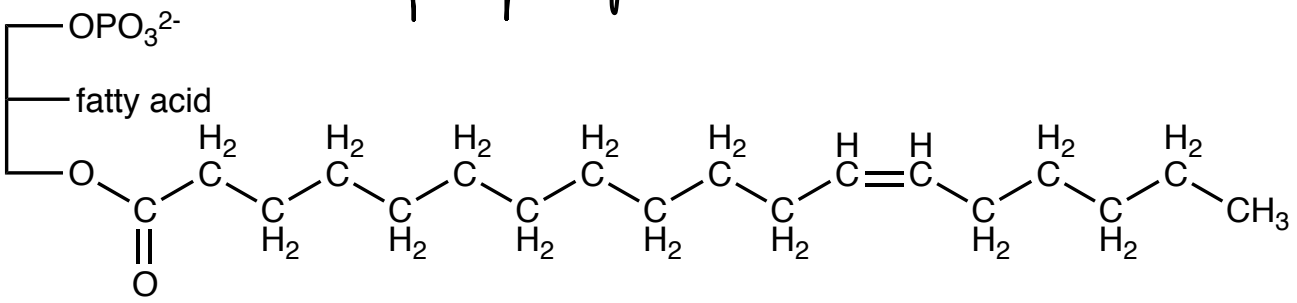
single barbed arrows





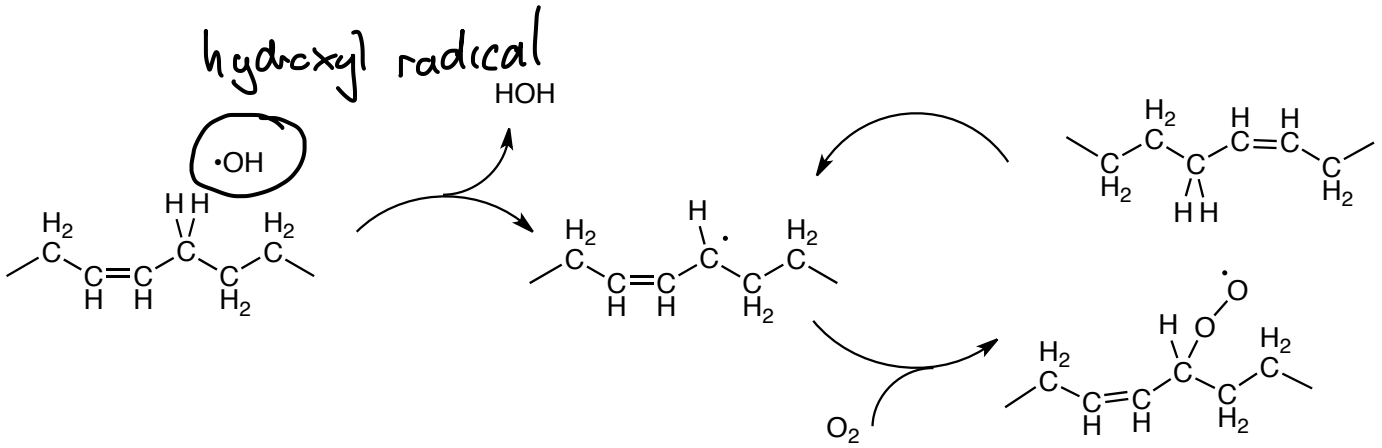


phospholipid .... cell membranes

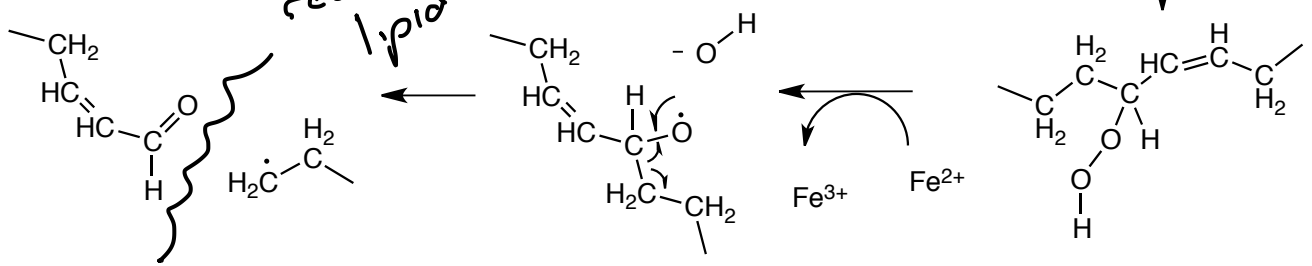


mitochondria ... and the etc

hydroxyl radical



radical chain reaction cleaves lipid in lipid bilayer



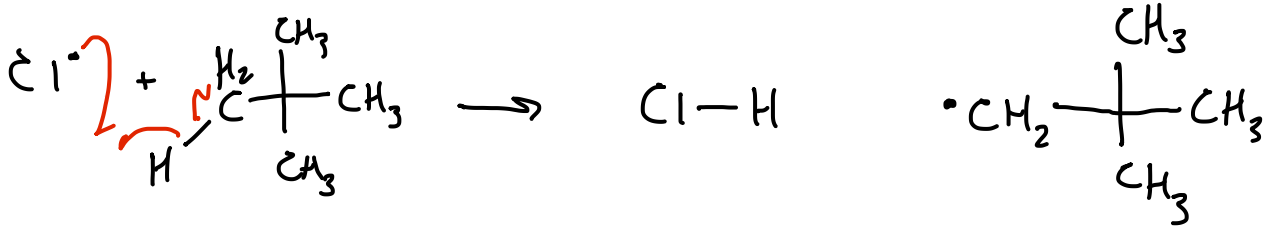
$h\nu$ ... Plank's Constant • frequence of photon

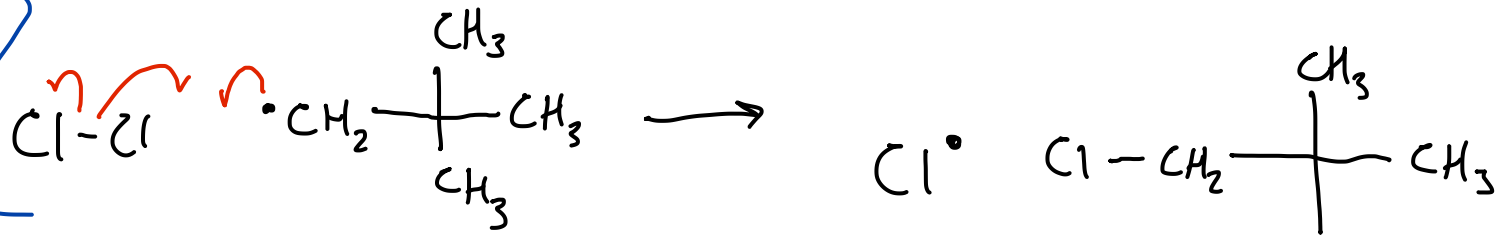
shine light on reaction

init

dot indicates a radical

propagation

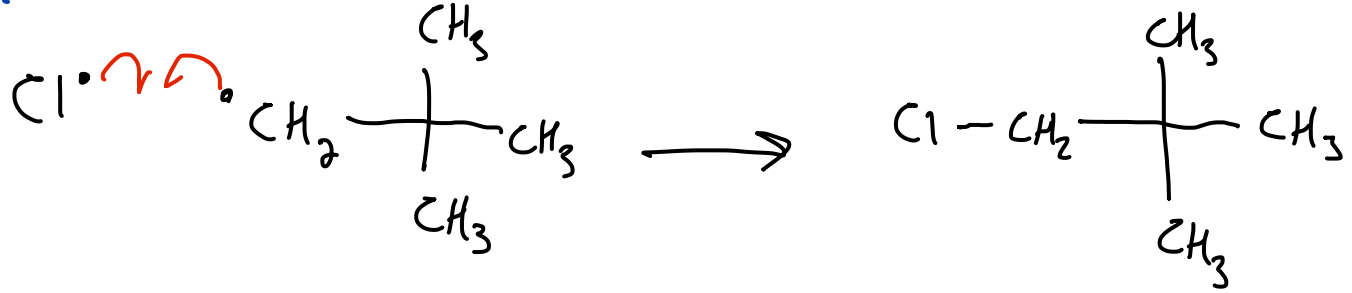




more radicals generated

nonpolar reaction

termination



The Equilibrium Constant

$$aA + bB \rightleftharpoons cC + dD$$

$$K_{eq} = \frac{[C]^c[D]^d}{[A]^a[B]^b}$$

$\frac{1}{100} < 1$

$\frac{100}{1} > 1$ ← lots of product; not much react

size of K

small K vs large K

< 1 > 1

reaction favors reactants reaction favors products

How can I get more D if my reaction has a small K?

Add more A or B to push toward product

Remove D as it forms + reaction will make more

Gibbs Free Energy

relates to universe reaction temp K

$$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$$

ΔG is related to the entropy of the universe

is a measure of whether a reaction, as written, is spontaneous

$\Delta G > 0$ ... spontaneous ... in the reverse direction

$\Delta G < 0$ spontaneous in the direction that the reaction is written

negative ΔG means the products are lower in E than the reactants $\Delta G = G_{prod} - G_{react}$

F - I

negative means energy is being released to the universe

endergonic

exogonic

Gibbs Free Energy

relates energy associated with the rxn to the entropy of the universe

$$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$$

T = temp K, reaction

ΔG is related to the entropy of the universe

is a measure of whether a reaction, as written, is spontaneous

S is entropy ... a measure of randomness

a $\oplus \Delta S$ ↑ entropy encourages reaction to proceed

H is enthalpy ... under very specific conditions ΔH is heat

releasing heat ... exothermic $\Delta H = H_{prod} - H_{react} < 0$

encourages reation

endothermic $\Delta H > 0$