(28) **Today**

Sections 6.1 – 6.5

Next Class (29)

Sections 6.6 – 6.11

(30) **Second Class from Today**

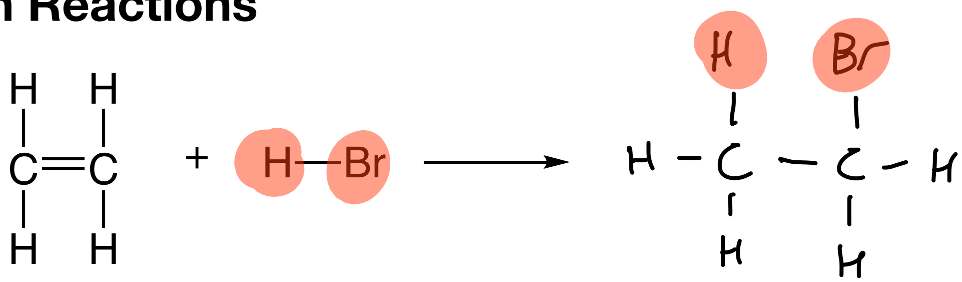
Chap 7

Third Class from Today (31)

Test 3

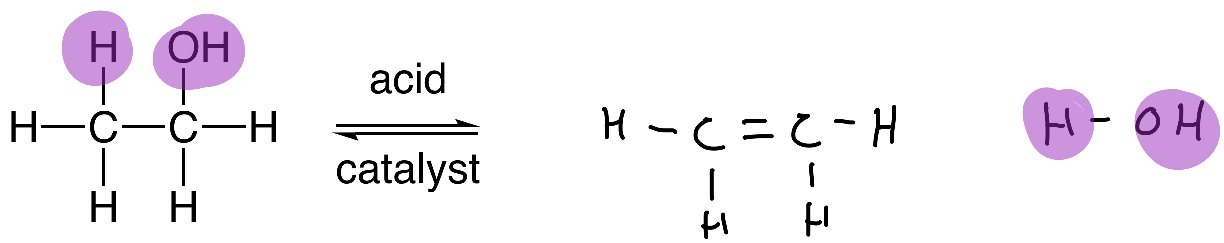
Kinds of Organic Reactions

Addition Reactions



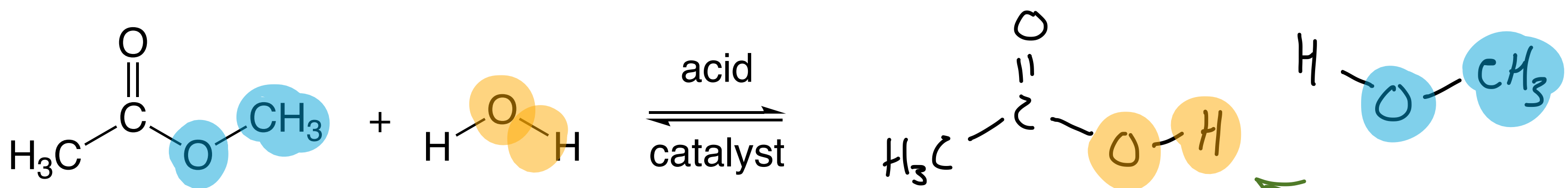
up next in chap 7

Elimination Reactions



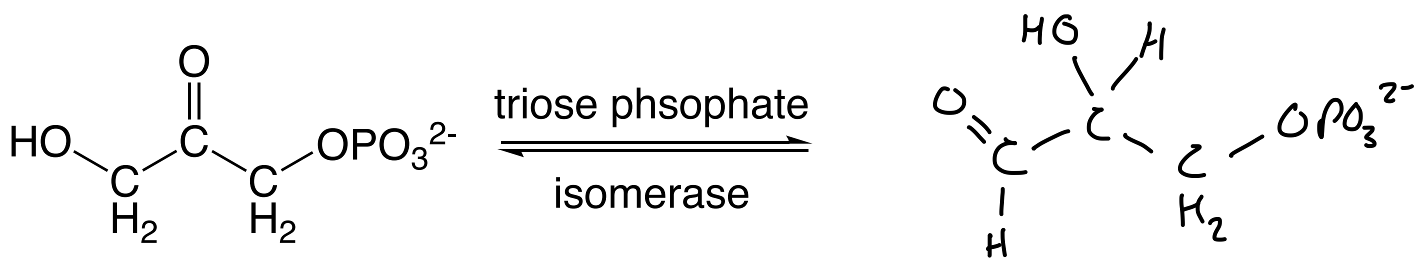
elimination & substitution time permitting

Substitution Reactions

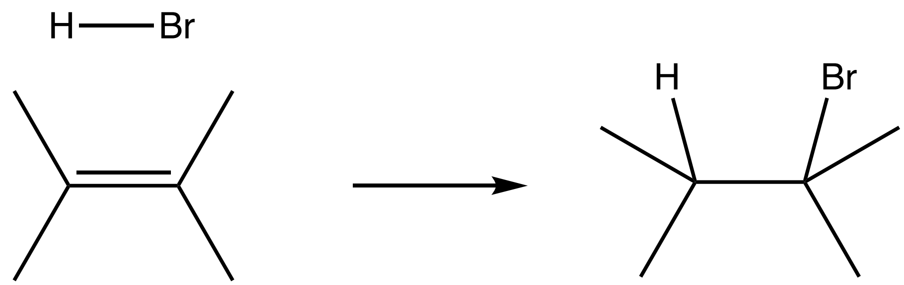


acyl substitution spring semester

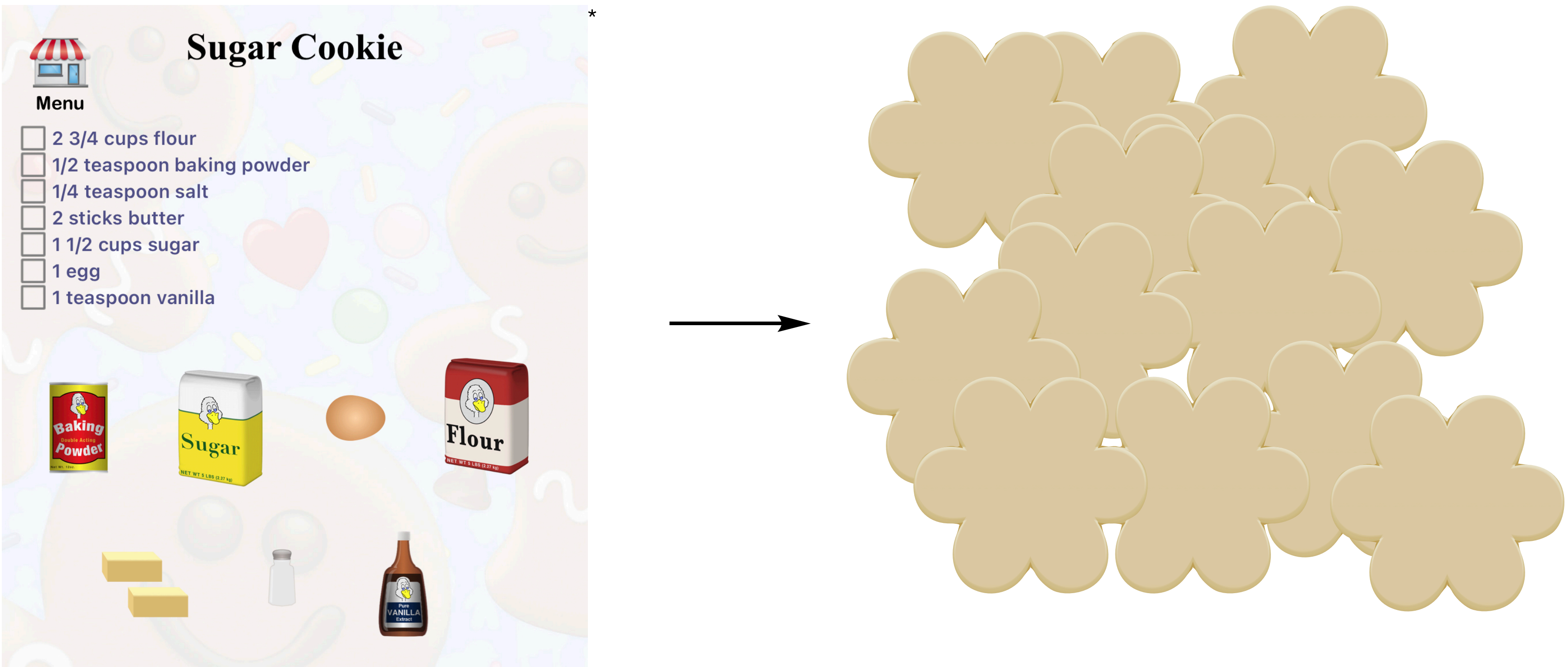
Rearrangement Reactions



Balanced chemical equations are like ingredient lists



no effort is made to show how the reaction occurs



balanced chem eq analogus to ingredient list for a recipe

a mechanism is analogous to the instructions in the recipe

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

Homolytic Cleavage

because the H's have an unpaired e^- they are called radicals

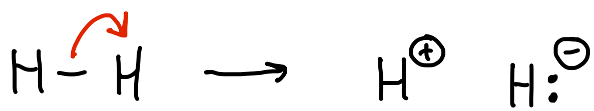
even distribution of e^-'s

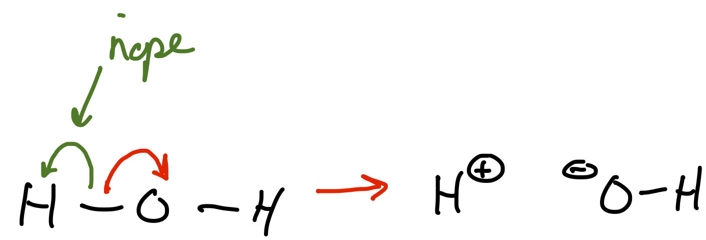
charges of the atoms at either end don't change

e^- movement arrows have 1 barb

nonpolar

Heterolytic Cleavage





uneven distribution of e^-'s (both e^-'s go to atom at one end of the bond to the more electronegative atom)

charges of the atoms at the ends of the bonds become more ⊖ + more ⊕

e^- movement arrows have 2 barbs

making things more polar

Opposites Attract

δ^- δ^+ H_3C—Li δ^- δ^+ Cl—CH_3

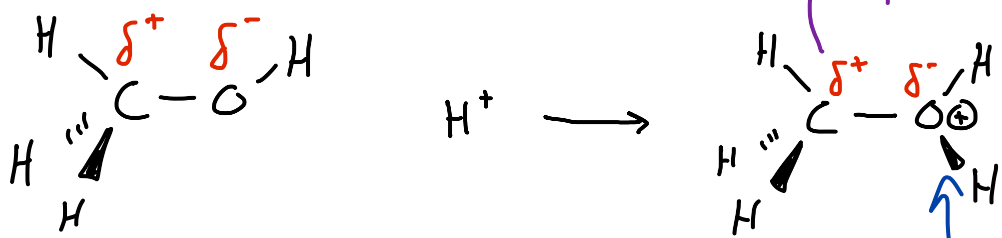
this C is e⁻ rich

this C is e⁻ poor

the ⊖ on the C will be attracted to the ⊕ on the other C → H_3C-CH_3 LiCl

substitution reaction

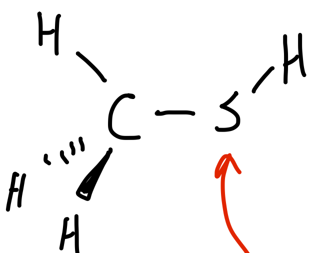
Bonds can be made more polar



now more ⊕ than before

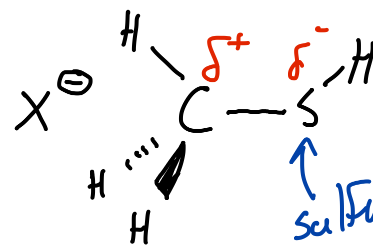
since the O atom is losing e⁻ density to the H^+, it pulls the e⁻'s between the C + O even more strongly on the

Polarizability makes polar reaction possible too

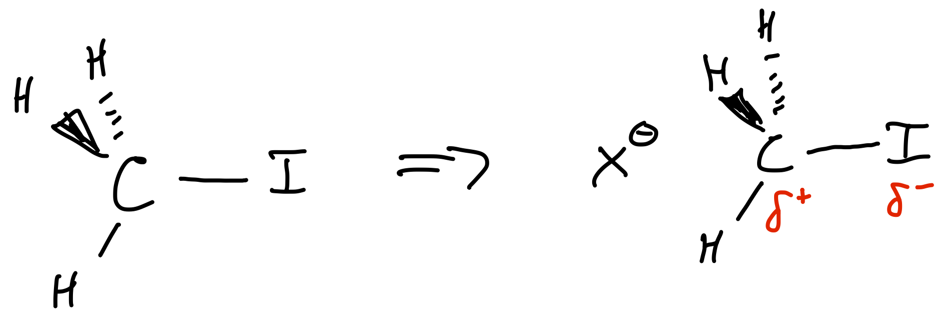


⟹ bring a ⊖ near the slightly ⊕ C

sulfur is only slightly more electronegative so this bond is only slightly polar



sulfur is big so it is easy to move e⁻'s around and make it polar



C + I have similar electronegativities C is only slightly ⊕

but the C to I bond is polarizable because I's e⁻'s are so far from it's nucleus and an incoming ⊖ charge can induce a dipole

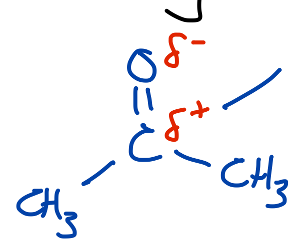
Electrophiles

love e^-'s

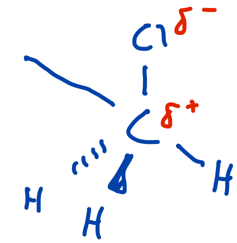
they are e^- poor ⊕, $\delta^{\oplus}$, and some neutral atoms

they accept e^-'s to form bonds when doing chemical reactions

$H^{\oplus}$ so an H of HCl



the C atom is an electrophile



F–F, Cl–Cl, Br–Br

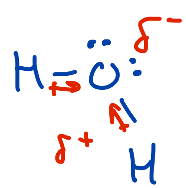
electronegative atoms competing for e^-'s

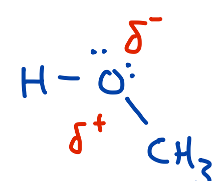
Nucleophiles

donate e^-'s into bonds when doing chemical reactions

they are e^- rich ⊖, $\delta^{\ominus}$, and some neutral atoms

$^{\ominus}OH$, $Cl^{\ominus}$,





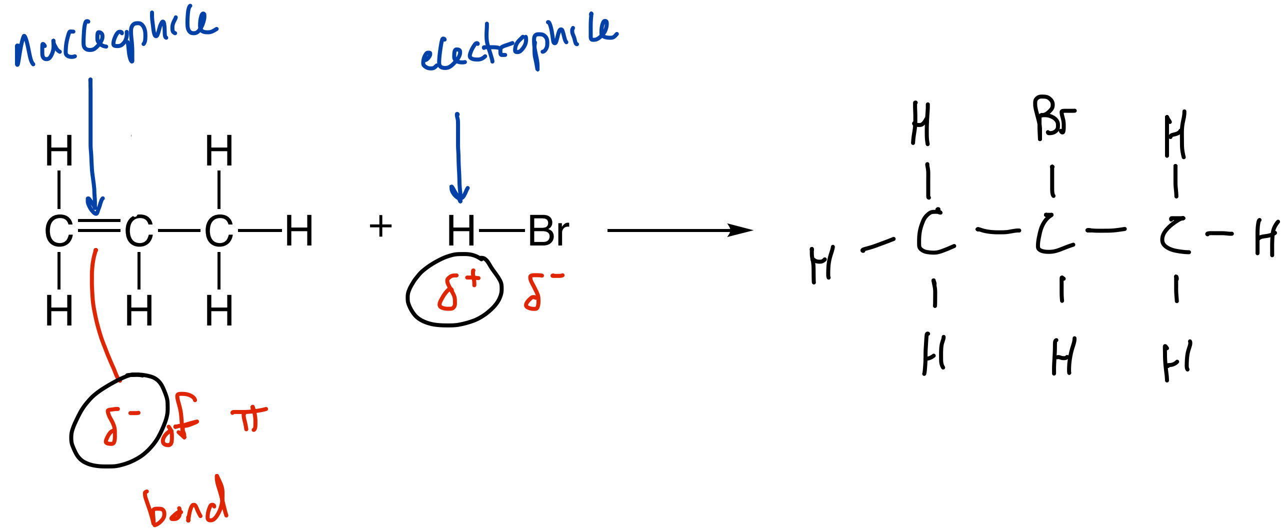
the 2nd bond is a π bond

an alkene

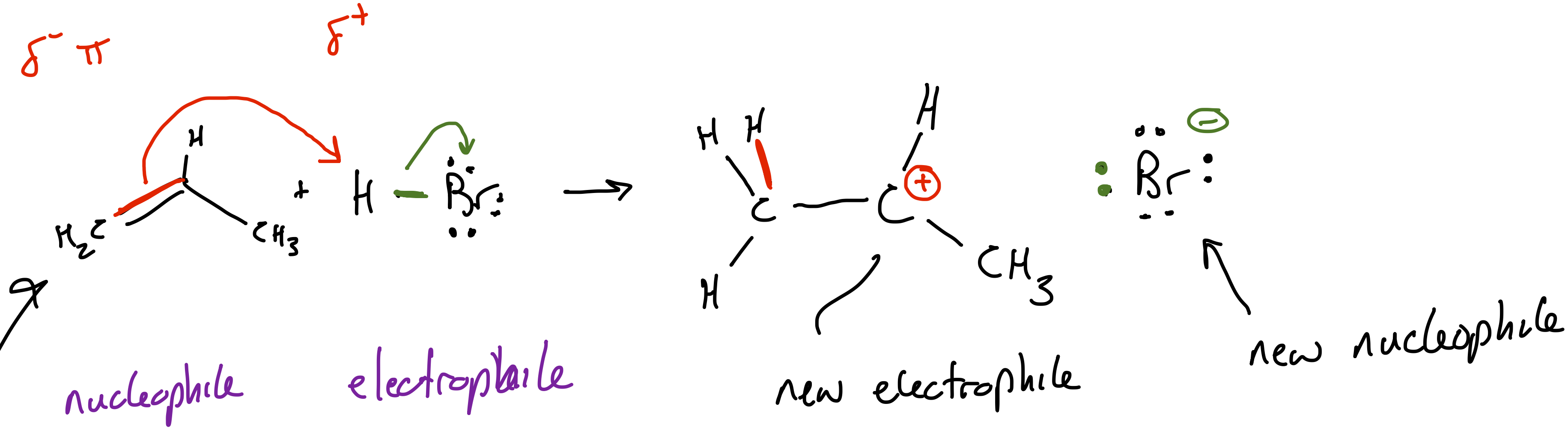
the e^-'s in the π bonds are out away from the nuclei

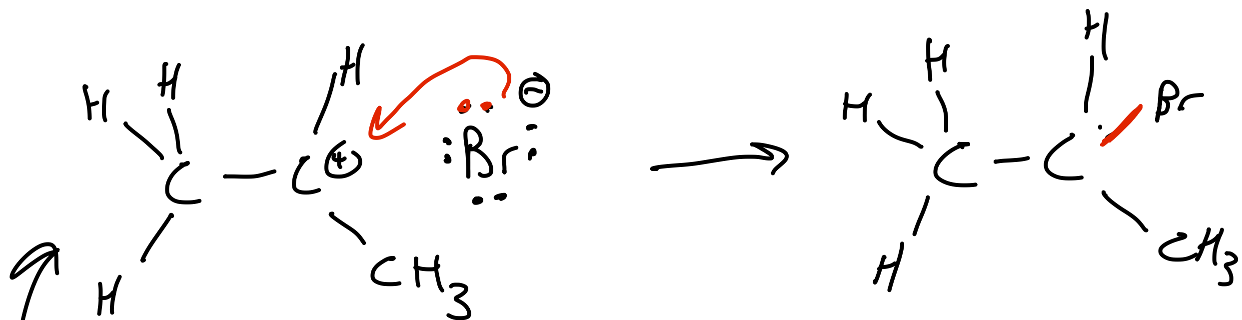
? no, the e^-'s are down between the nuclei

An Example of a Polar Reaction: Addition of HBr to Propene



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





this mechanism is a hypothesis that makes testable predictions about the outcome. When a mechanism is thoroughly tested experimentally it become a theory

Describing a Reaction: Energy Diagrams and Transition States

Section 6.9

A Comparison Between Biological Reactions and Laboratory Reactions

Section 6.11