(28) **Today**

Section 6.5: Using Curved Arrows in Polar Reaction Mechanisms
Section 6.6: Radical Reactions
Section 6.3: Polar Reactions
Electron rich and electron poor
Section 6.4: An Example of a Polar Reaction: Addition of HBr to Ethylene
Arrow Pushing Practice

Next Class (29)

Section 6.4: An Example of a Polar Reaction: Addition of HBr to Ethylene
Arrow Pushing Practice
7.1 Industrial Preparation and Use of Alkenes (is an interesting read, but we will not discuss it in class)
7.2 Calculating the Degree of Unsaturation
7.3 Naming Alkenes
7.4 Cis–Trans Isomerism in Alkenes
7.5 Alkene Stereochemistry and the E,Z Designation
Skipping 7.6 for now
7.7 Electrophilic Addition Reactions of Alkenes

(30) **Second Class from Today**

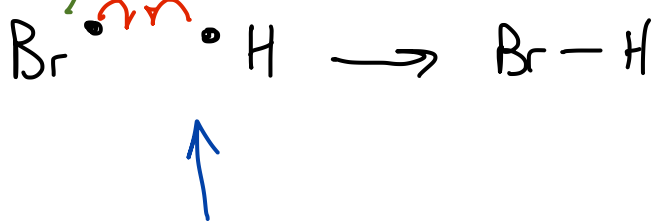
7.7 Electrophilic Addition Reactions of Alkenes
7.8 Orientation of Electrophilic Additions: Markovnikov's Rule (Regioselectivity)
7.9 Carbocation Structure and Stability
7.10 The Hammond Postulate
Drawing a transition state
7.11 Evidence for the Mechanism of Electrophilic Additions: Carbocation Rearrangements

Third Class from Today (31)

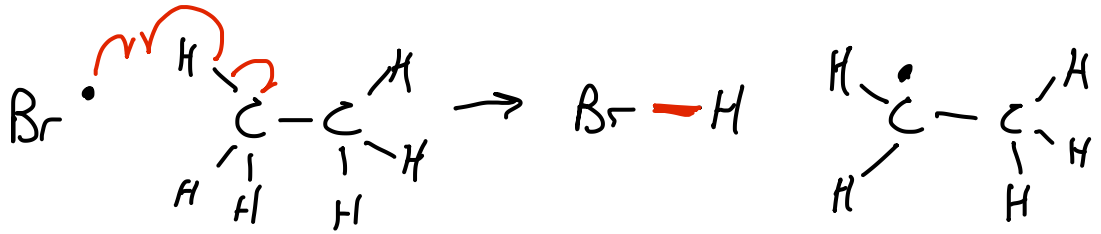
Practice Predicting Outcome of H^+ Initiated Electrophilic Addition Reactions
8.2 Halogenation of Alkenes: Addition of X_2
8.3 Halohydrins from Alkenes: Addition of HO-X
8.4 Hydration of Alkenes: Addition of H_2O by Oxymercuration
8.5 Hydration of Alkenes: Addition of H2O by Hydroboration

dot means odd # of e⁻'s

Radical Bond Formation Br is neutral so that means 7 e⁻'s in Br's valence shell



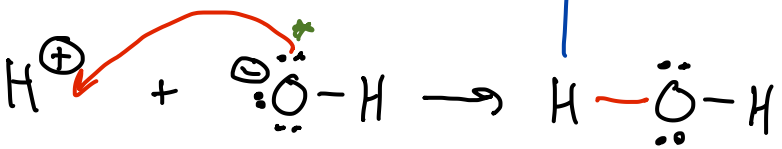
two "radicals" come together



a radical reacts with a non-radical a new radical will form

done

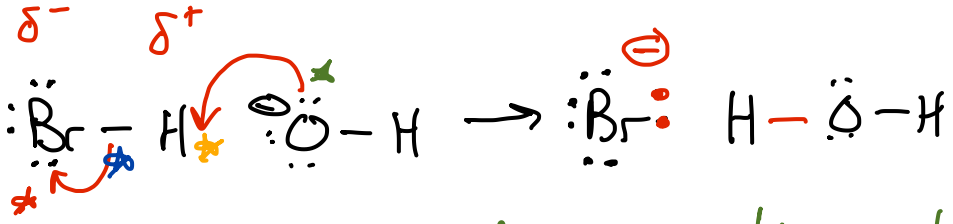
Polar Bond Formation got e⁻ charge ↓ by 1 ⊕ + -1 = 0



arrows start at a source of e⁻'s.

* lp e⁻'s on an atom
* a pair of e⁻'s in a bond

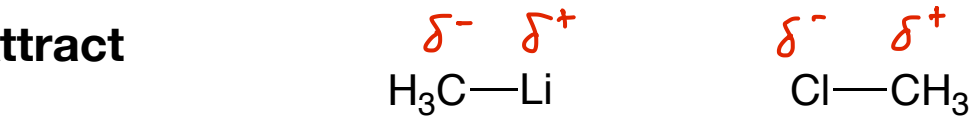
gave away e⁻ charge ↑ by 1



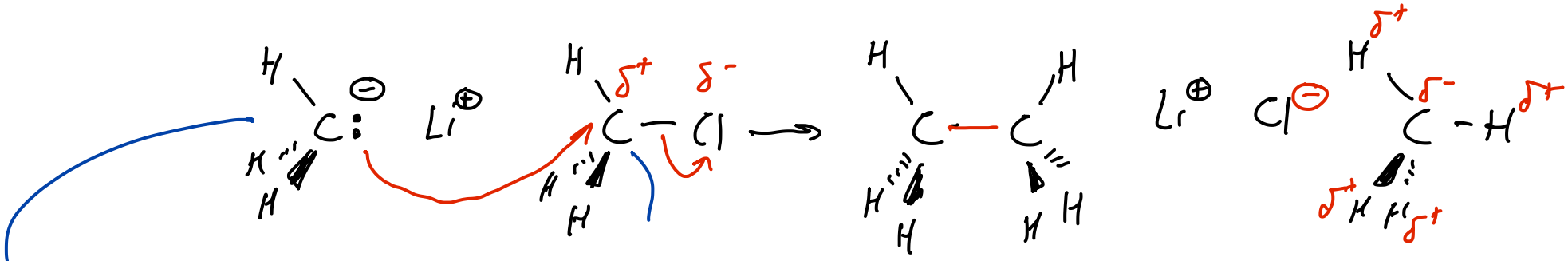
arrows end where the e⁻'s wind up

* at an atom the e⁻ become lp e⁻
* in between two atom e⁻'s form a bond

Opposites Attract



In organic molecules, Li, Na, K can be thought of as the +1 ions

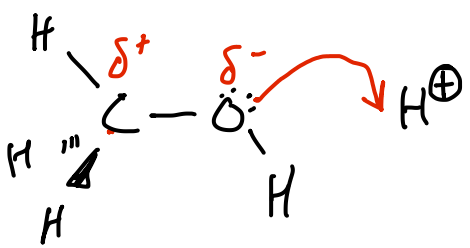


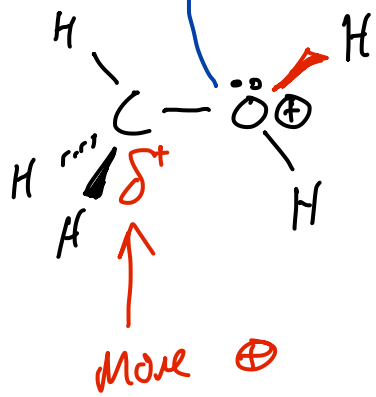
Bonds can be made more polar

Polarizability makes polar reaction possible too

Opposites Attract

Bonds can be made more polar

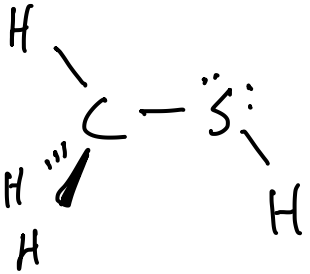




since this O is now ⊕ it will pull e⁻ density away from the C even more strongly

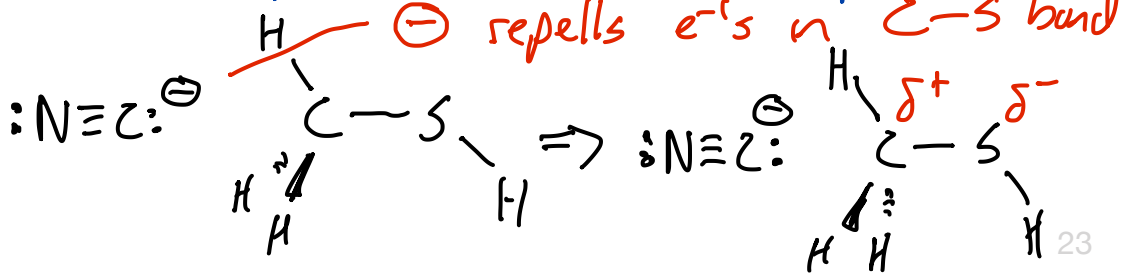
More ⊕

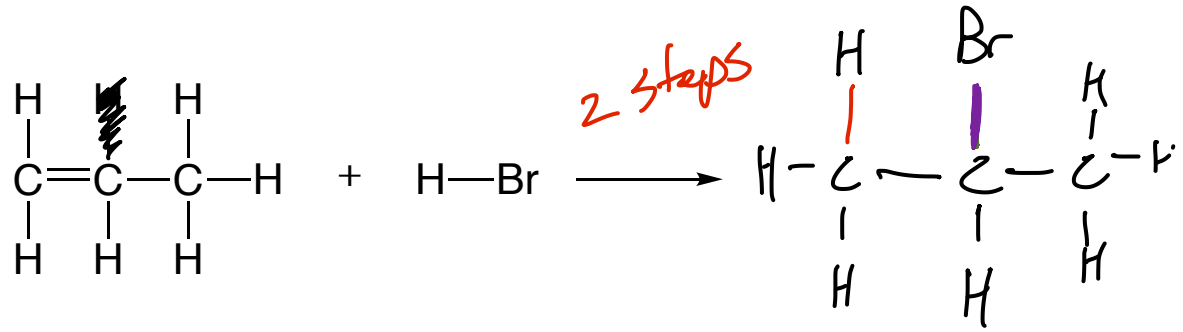
Polarizability makes polar reaction possible too



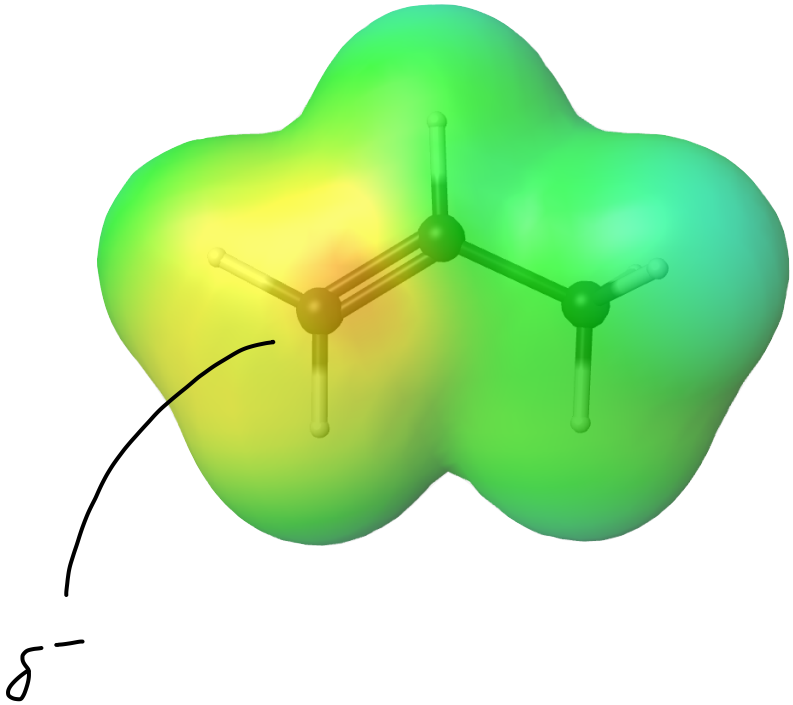
- atoms like S, Br, I ... their e⁻ are easily pushed around (polarizable)
- add a polar molecule & the C to S bond can become polar because S is polarizable

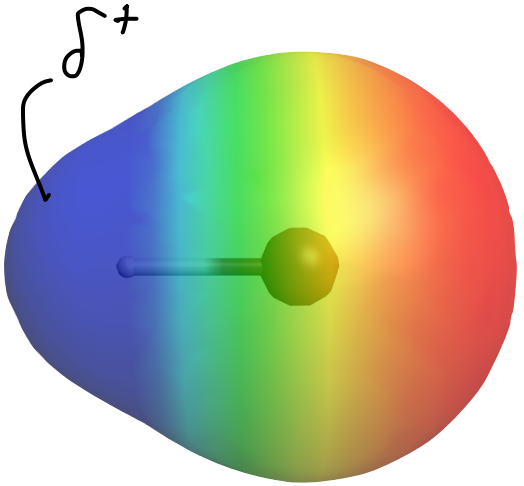
$C_{EN} = 2.55$ $S_{EN} = 2.58$



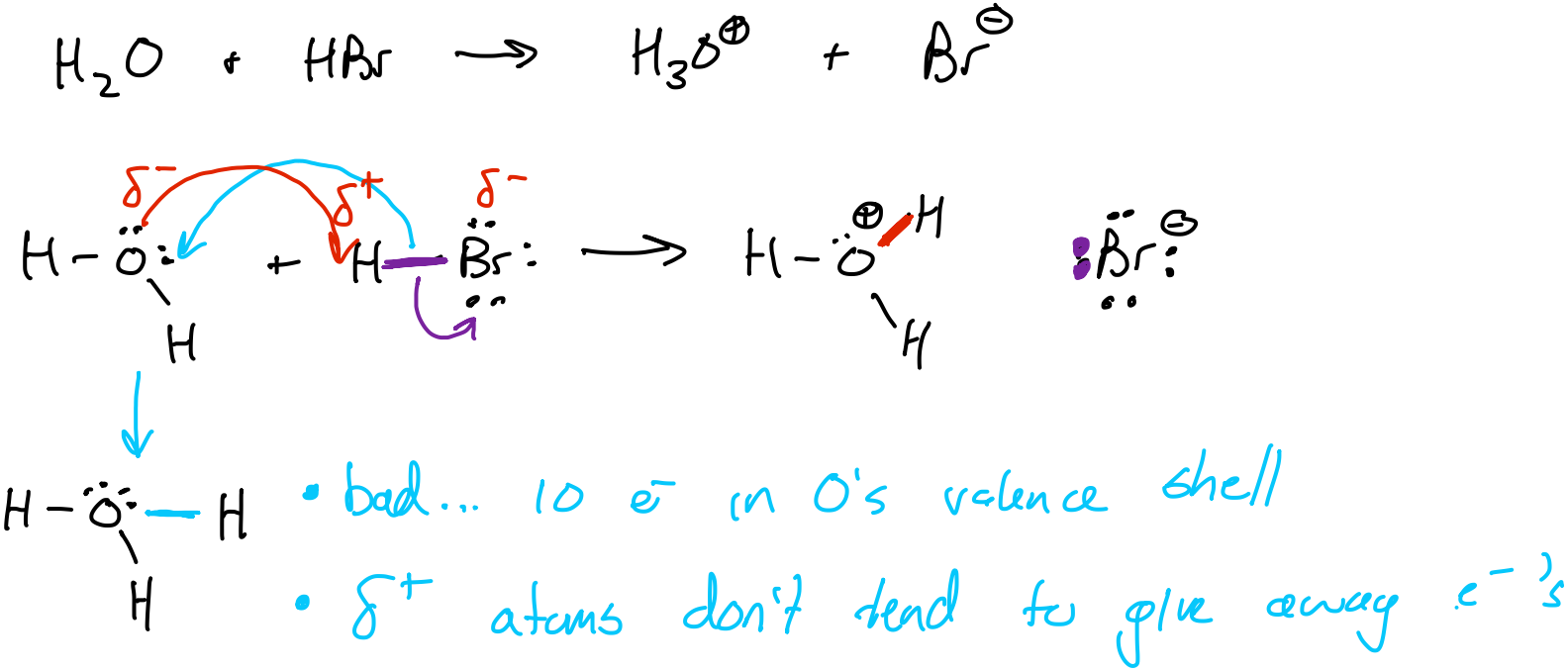


What's wrong with this structure?





Reaction of HBr with H_2O



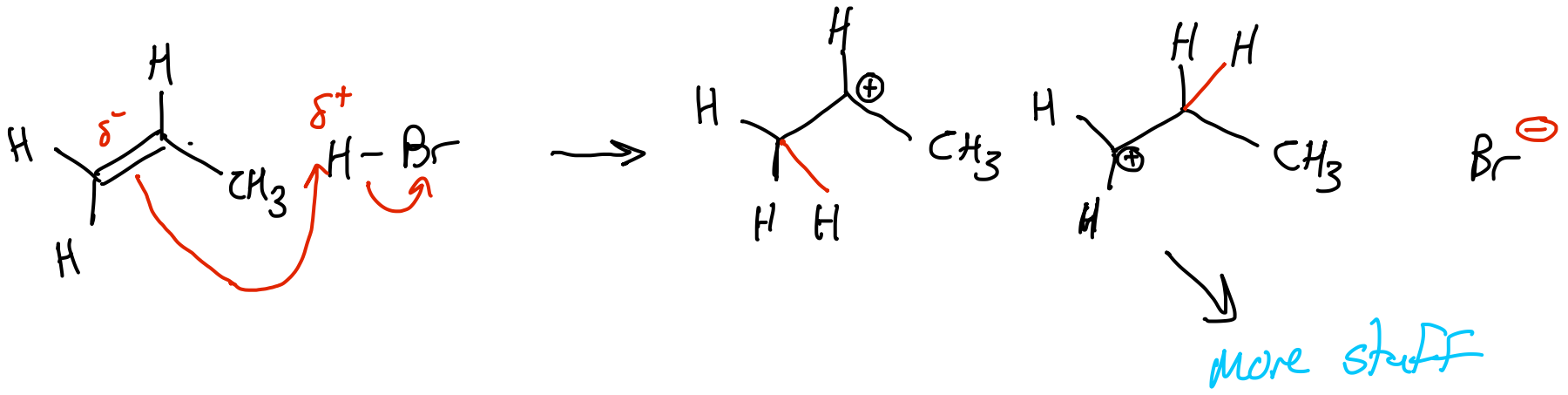
Drawing arrows....

Find all bonds that are <u>created</u>. Find where e⁻'s came from

Find all bonds that are <u>lost</u>. Find where the e⁻ went

Using Curved Arrows in Polar Reaction Mechanisms: Section 6.5

Addition of HBr to Propene



Using curved arrow to think about possible rxns

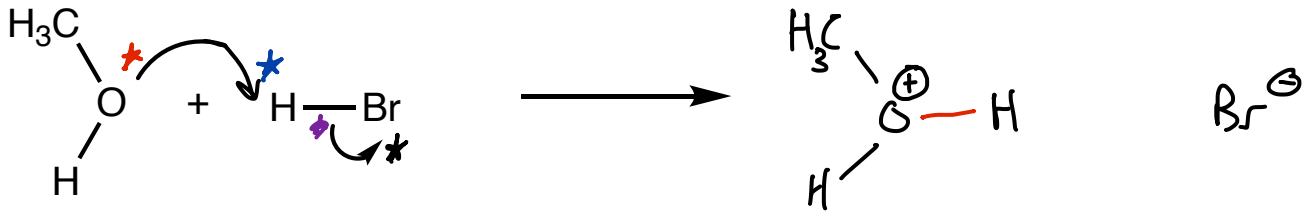
start at δ^- and draw arrow to δ^+

- break bonds as necesary to make room moving e^- in polar bond toward neg atom

Step 1: Identify the electrons that the arrow is starting at

Step 2: Describe what the electrons are doing: making a bond, or becoming a lone pair

Step 3: Draw the result.

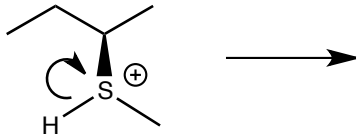


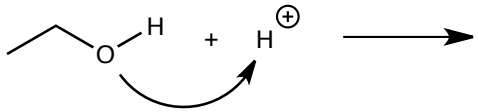
* Starts at O atom ... lp e⁻
* ends between O + H ... make a bond
* Starts at a bond ... bond is being broken
* ends at an atom ... bond is becoming a pair of lp e⁻

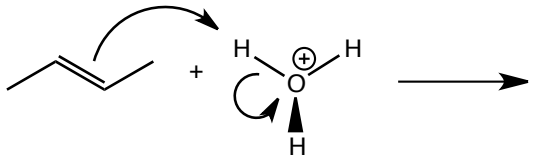
Step 1: Identify the electrons that the arrow is starting at

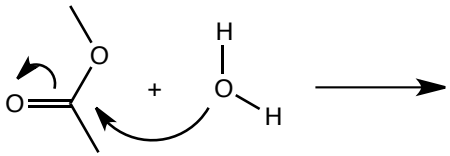
Step 2: Describe what the electrons are doing: making a bond, or becoming a lone pair

Step 3: Draw the result.









Step 1: Identify the electrons that the arrow is starting at

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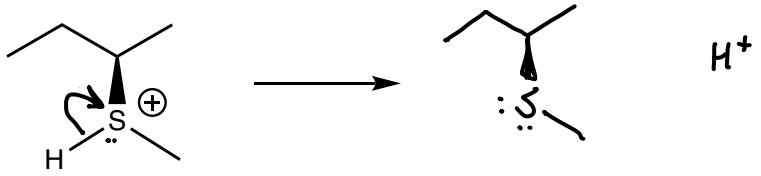
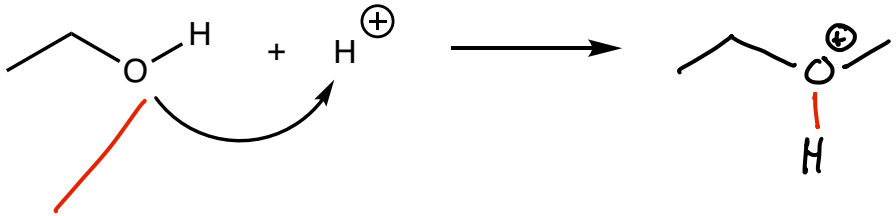


$FC_S = 6 - (2+3)$ $= +1$

$FC_S = 6 - (4+2)$ $= 0$



start at lp e⁻'s to make a bond

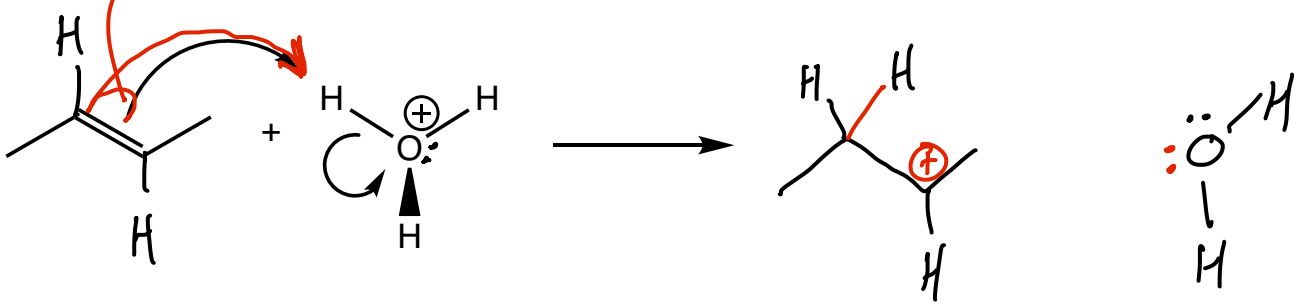
arrow ends at H, so bond to H

Step 1: Identify the electrons that the arrow is starting at

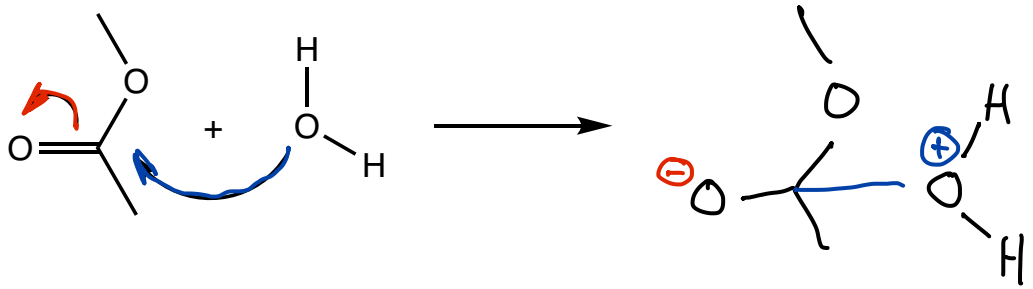
Step 2: Describe what the electrons are doing: making a bond, or becoming a lone pair

Step 3: Draw the result.

start @ π bond... break π bond.
arrow points at H (not part of original bond)

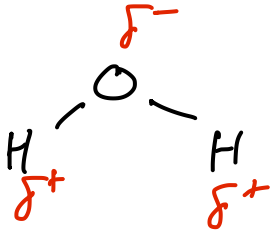


π bond becomes lp e⁻



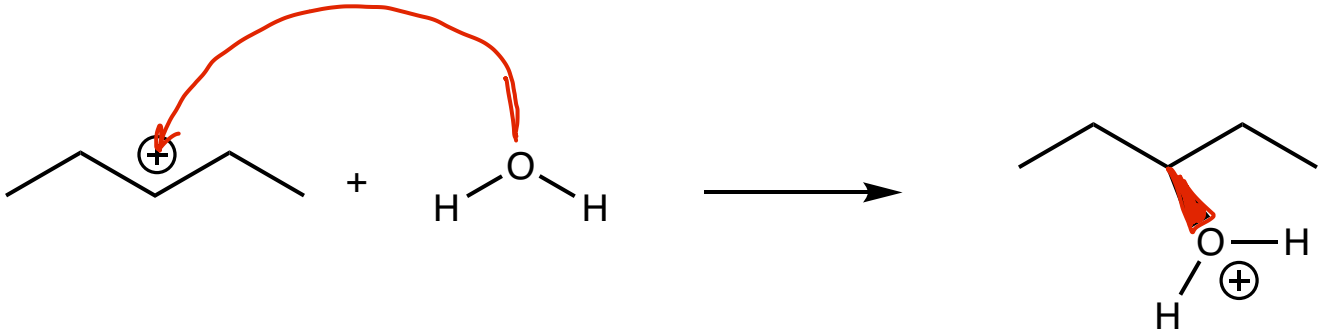
lp e⁻ form σ to 2 bond

Step 1: Find bonds that are forming, bonds that are lost, or changes in charge



Step 2: find the electrons to move.

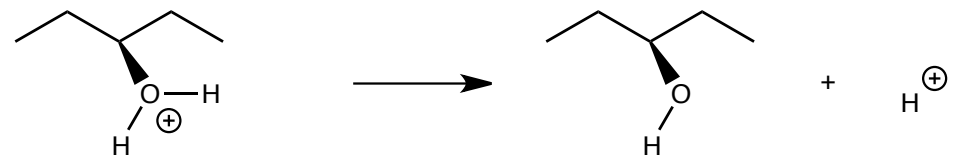
Step 3: Draw the arrows.

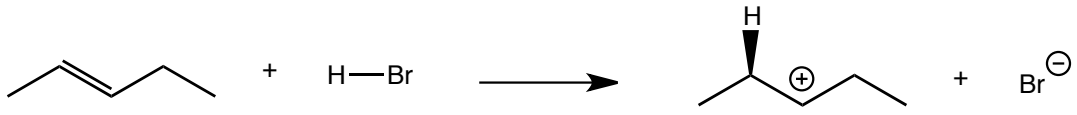


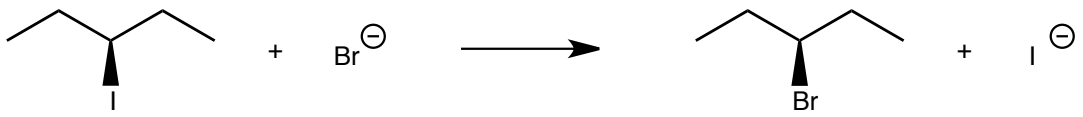
Step 1: Find bonds that are forming, bonds that are lost, or changes in charge

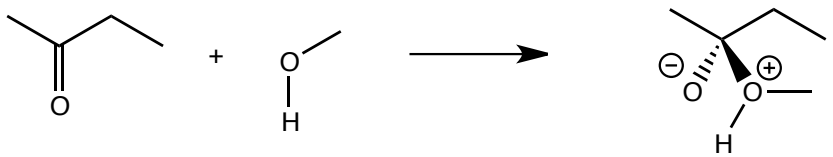
Step 2: find the electrons to move.

Step 3: Draw the arrows.







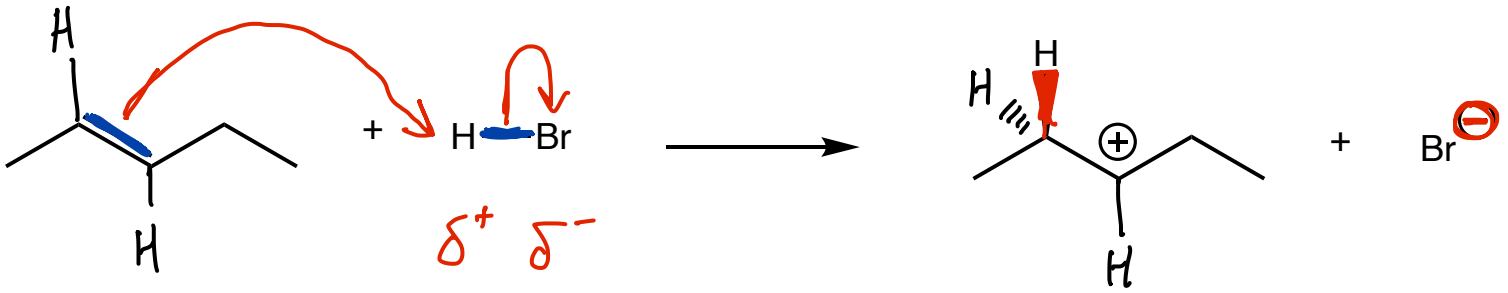


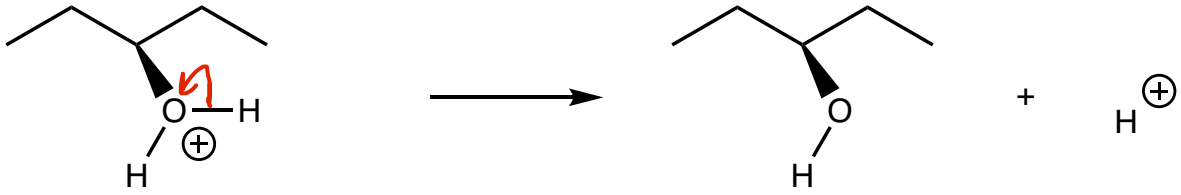
Step 1: Find bonds that are forming, bonds that are lost, or changes in charge

Step 2: find the electrons to move.

start arrow at bonds that are lost

Step 3: Draw the arrows.





Step 1: Find bonds that are forming, bonds that are lost, or changes in charge

Step 2: find the electrons to move.

Step 3: Draw the arrows.