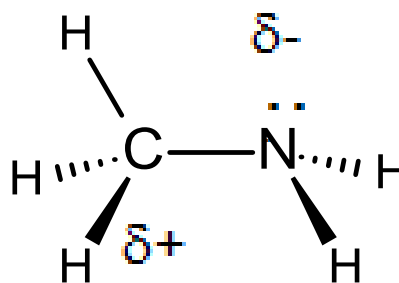
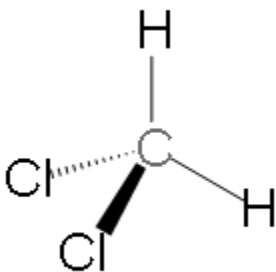


Why does the net dipole moment for methylamine point from the less e/n atom (C) toward the more e/n atom (N)?

Where is the net dipole moment for dichloromethane?

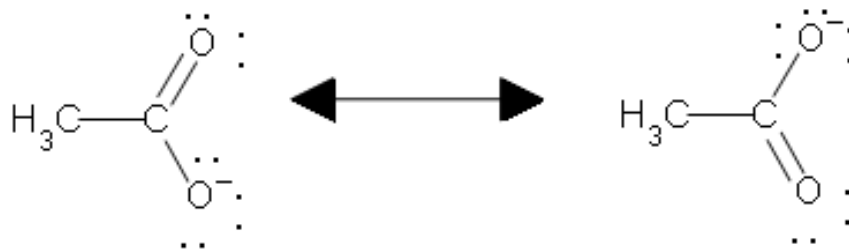


What about the net dipole moment for O=C=O?

How does resonance work? Can atoms be moved between resonance forms?

What about e<sup>-</sup>'s? What kinds of orbitals are involved?

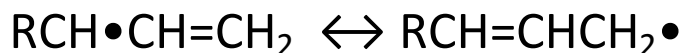
Where would the curved arrows go for acetate below?



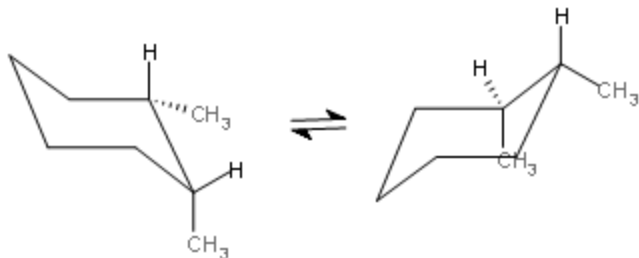
How does allyl radical resonance work?

Where would the curved arrows go?

Why are half-head arrows used?



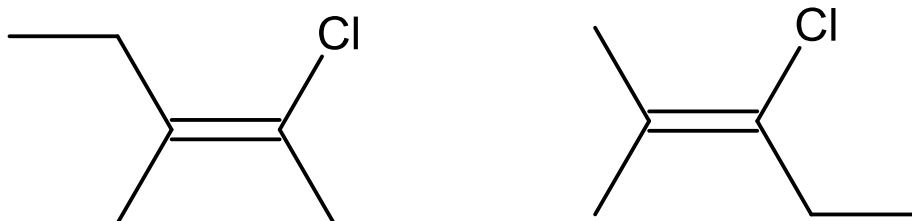
Is this molecule cis or trans? How can you tell?  
 How can you tell which methyl groups are ax and eq?  
 What happens to the structure when the ring flips?  
 What happens to ax and eq?



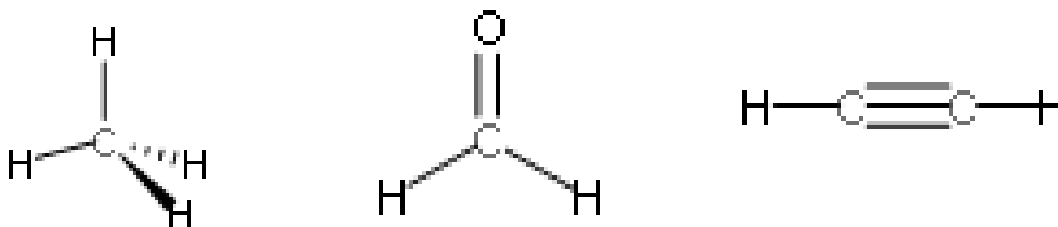
Are these two molecules geometric or constitutional isomers?  
 How can you tell?  
 Also, what steric strains are present in these molecules?  
 How many of each steric strain interaction?



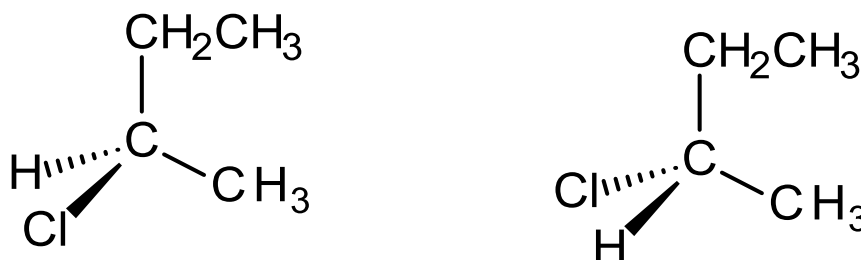
Can you assign cis or trans to these molecules? Why not?  
 How do you determine if they are E or Z?  
 How can you tell if these molecules are geometric or constitutional isomers?



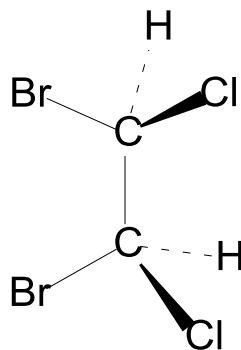
What are the hybridizations of these carbons?  
 How many of each orbital type does each C have?  
 What are the C's geometries?



Do these molecules have symmetry planes? Are they Enantiomers?  
 Can you assign R and S to each of them?

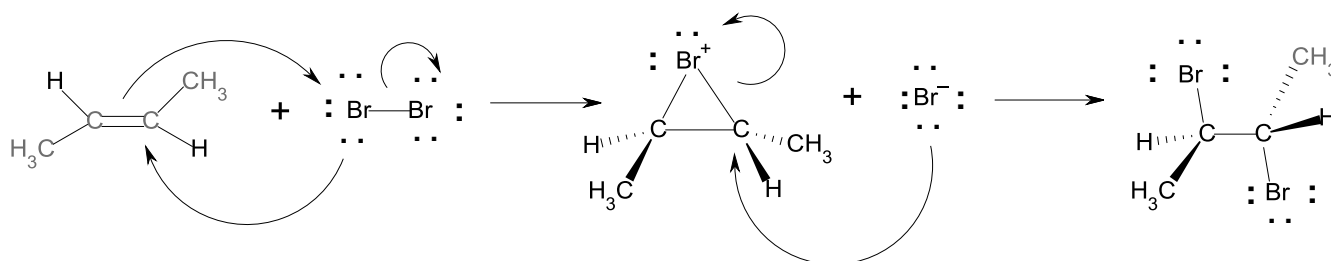


Can you assign R and S to both chiral centers below?  
 Is there a symmetry plane? Where?  
 Does it have an enantiomer? How is it related to its mirror image?  
 What type of compound is this?

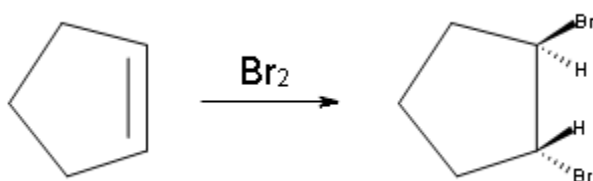


Where is the bromonium cation? Why is it an intermediate?

What are the curved arrows telling us?



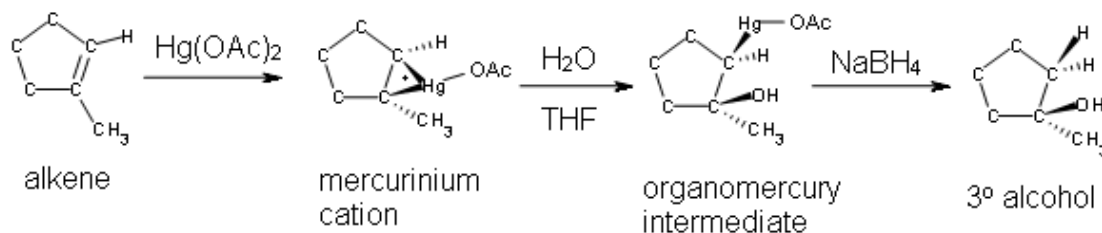
Why does a trans product result from a bromonium ion?



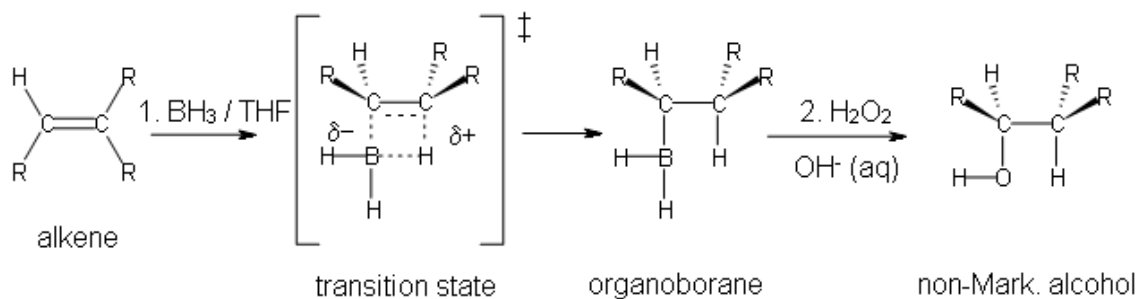
What does hydration mean?

What is the difference between Markovnikov and antiMark orientations?

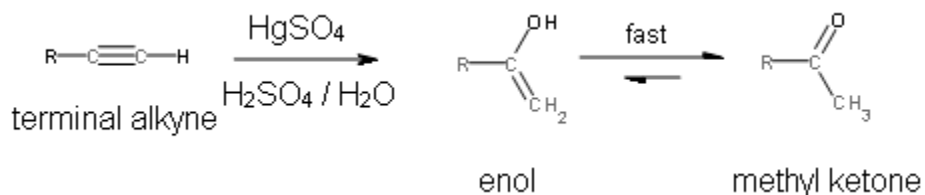
Which reagents go with which type?



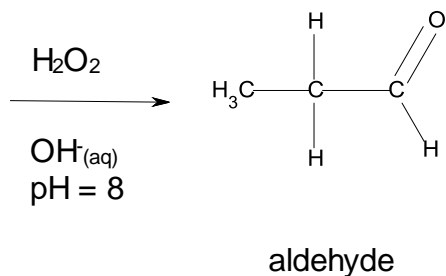
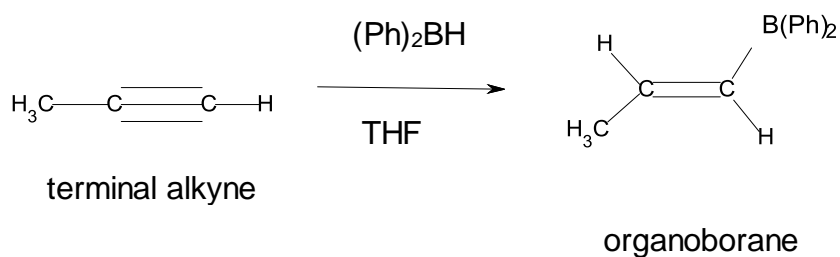
What determines the orientation of the added BH<sub>2</sub> and H in the 1<sup>st</sup> step's transition state (with the dotted lines)?



What is the difference between alkene and alkyne hydrations?



What would happen if we used  $\text{BH}_3$  instead of the  $(\text{Ph})_2\text{BH}$  for the terminal alkyne below?



Which H can be removed from a terminal alkyne to create an acetylide ion?



How does alkylation of an acetylide work? What is the mechanism type?

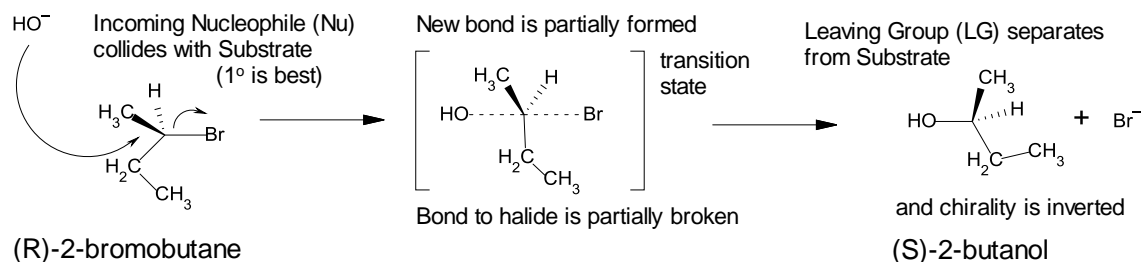


What is a substitution reaction?

What is the product of an elimination reaction?

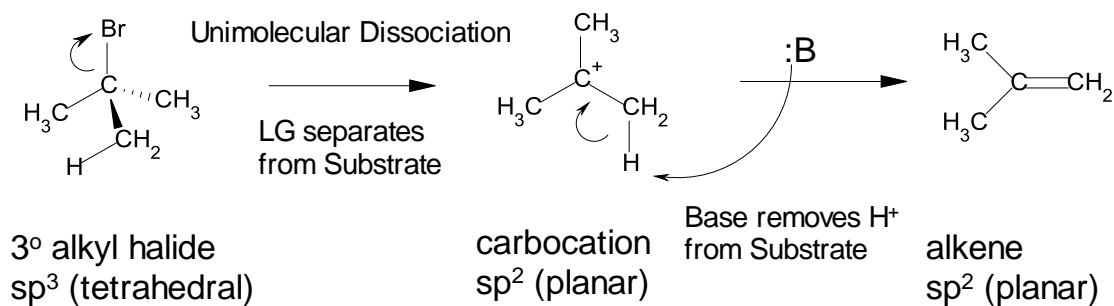
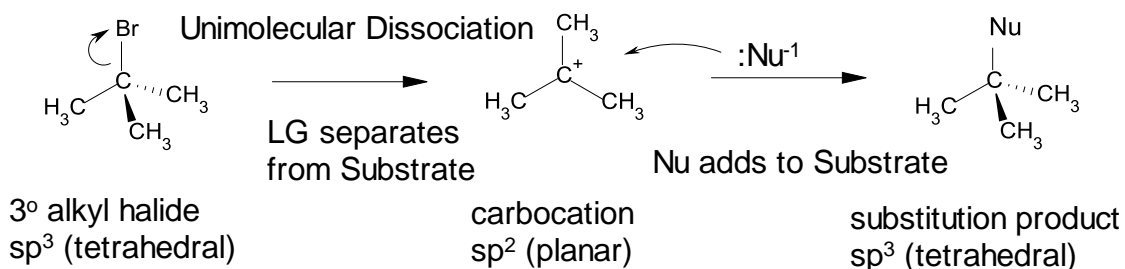
What do SN2, SN1, E1, and E2 stand for?

How does the SN2 transition state affect the chirality of the product?



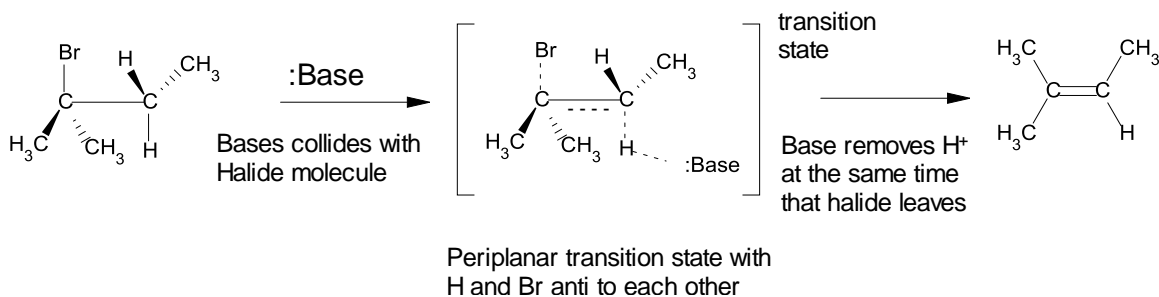
Why do SN1 and E1 compete with each other?

What do they have in common? What is the difference?



What is needed to create an E2 reaction?

What are the geometric requirements for E2?



Can you predict which of the reaction types will happen for **2°** Alkyl Halides?

- **S<sub>N</sub>2** predominates with a **nonbasic strong nucleophile** in a **polar aprotic solvent**.
- **S<sub>N</sub>1** and **E1** predominate with a **weakly basic nucleophile** or a **weakly nucleophilic base** in a **protic solvent**.  
The solvent should be neutral or acidic.
- **E2** predominates if a **strong base** is present.

What about for **1°** and **3°** Alkyl Halides?

What is generally the first step in naming a molecule?

How do you find the parent of an alkane?

What about the parent of an alkene or alkyne?

Why is it a good idea to count your carbons carefully?

How many bonds should each carbon have?

Which is the #1 carbon for an alkane parent?

What about the #1 carbon for a cycloalkane?

What about an alkene or alkyne? Cycloalkene?

How do you name and number the substituents?

How do you treat halogen atoms?

How do you treat a complex substituent?