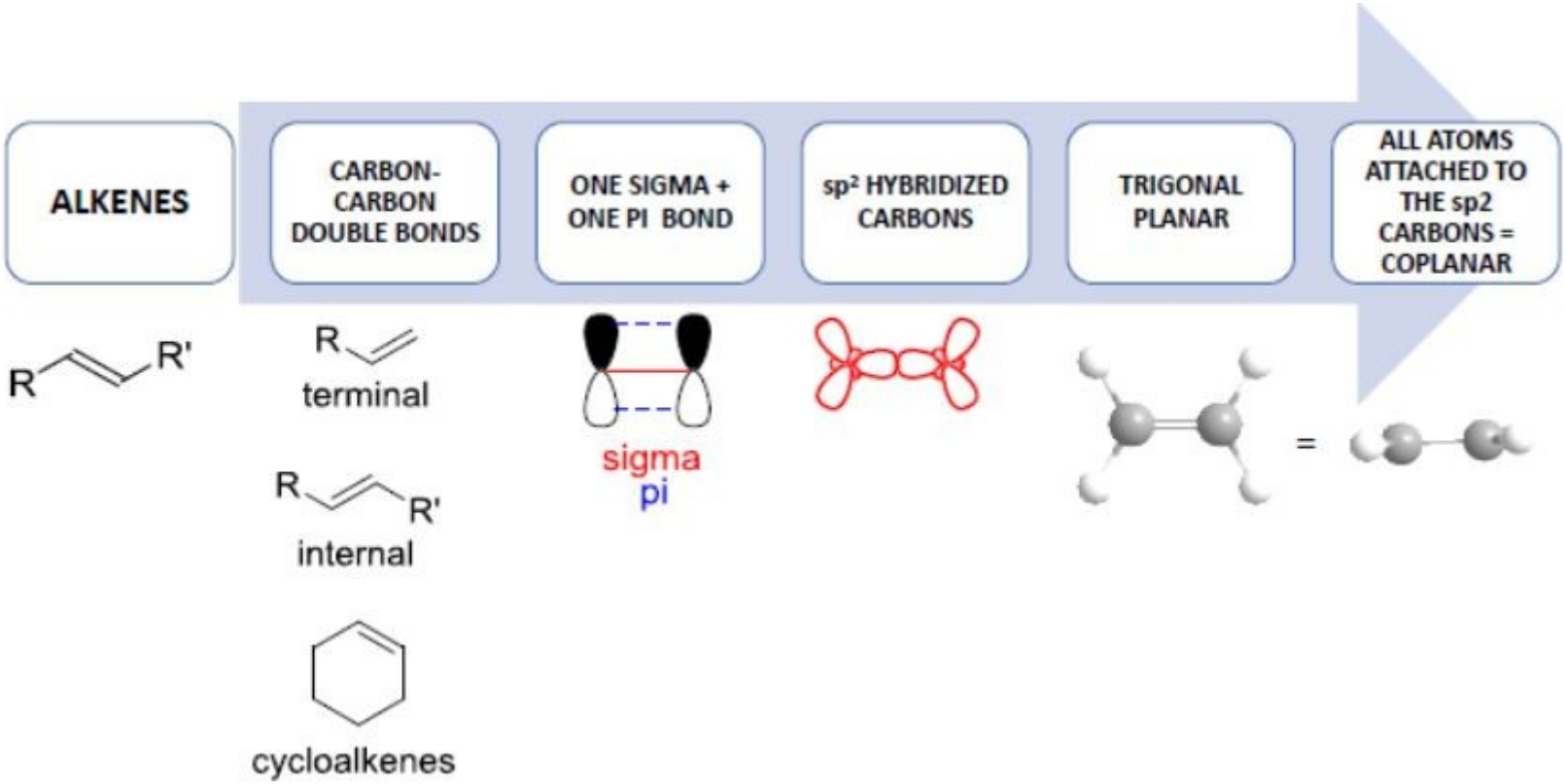
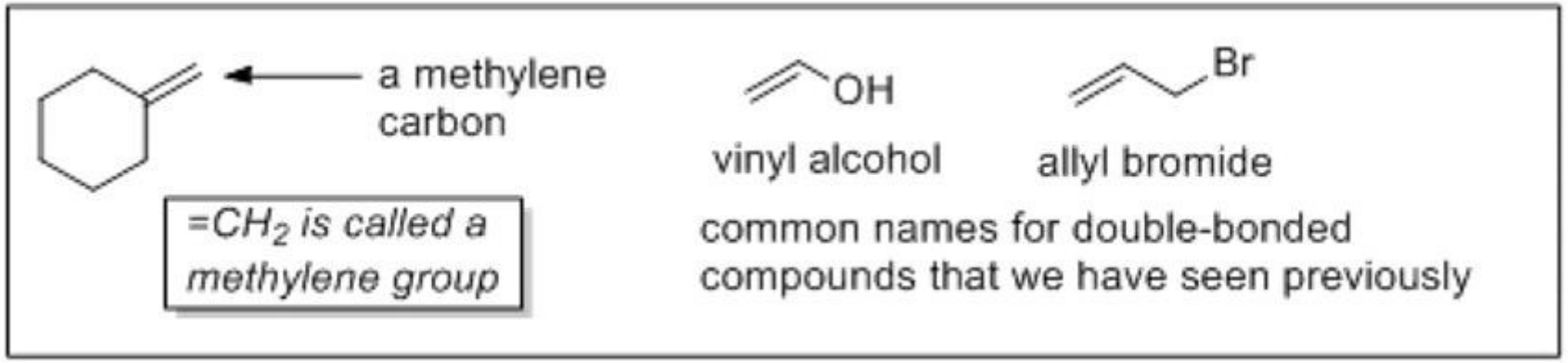
Alkenes

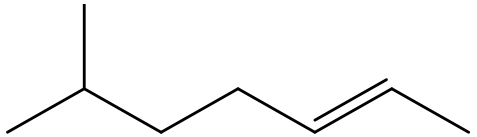
Properties of Alkenes



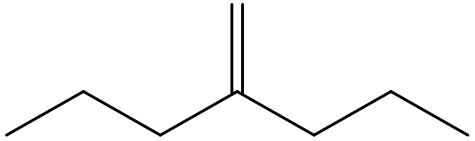
Different Terminal Alkenes



Naming Alkenes



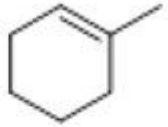
The longest chain containing the double bonds is 7 carbons and methyl is at 6.
So name is (trans)-6-methyl-2-heptene



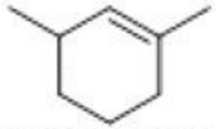
2-propyl-1-pentene

Naming Alkene Rings

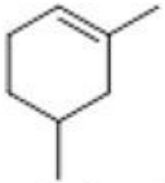
cyclohexene



1-methylcyclohexene



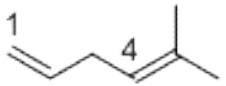
1,3-dimethylcyclohexene



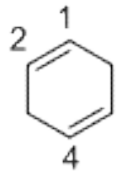
1,5-dimethylcyclohexene (alkene carbons **must** be one and two-note that the more substituted carbon is assigned number one)

Nomenclature

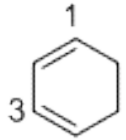
1,3-butadiene (not 2,4)



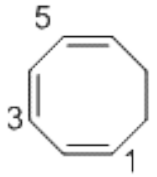
5-methyl-1,4-hexadiene
(note that giving the double bond carbon number one takes precedence)



1,4-cyclohexadiene
(use the number one when there is > 1 double bond in the ring)



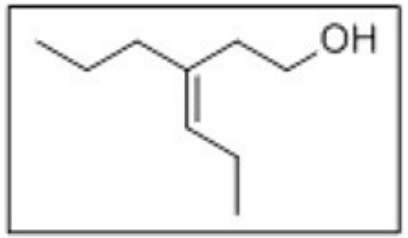
1,3-cyclohexadiene



1,3,5-cyclooctatriene
(note: in rings > 7 carbons *E* and *Z* labels should be included - see Figure 3)

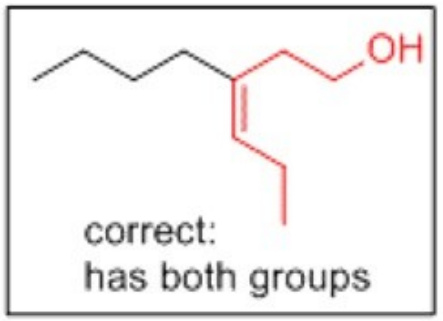
Naming Compounds with Double Bond and Additional Functional Groups

NAME:

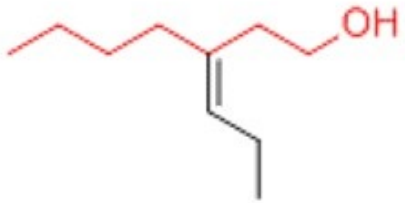


recognize as an alkenol

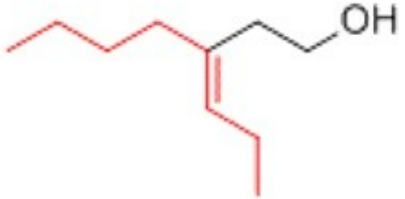
1. Assign as parent chain the longest one that include both the -OH and the double bond:



NOT

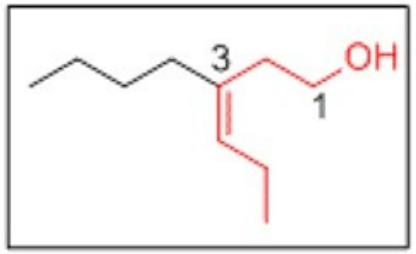


NOT

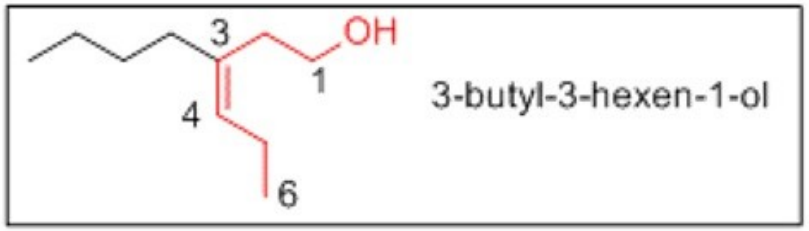


Naming Compounds with Double Bond and Additional Functional Groups

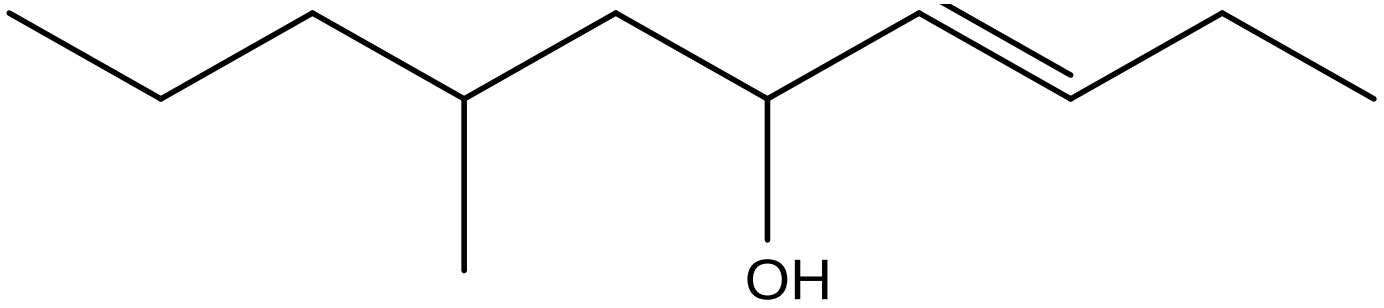
2. Assign the -OH carbon with lowest possible number:



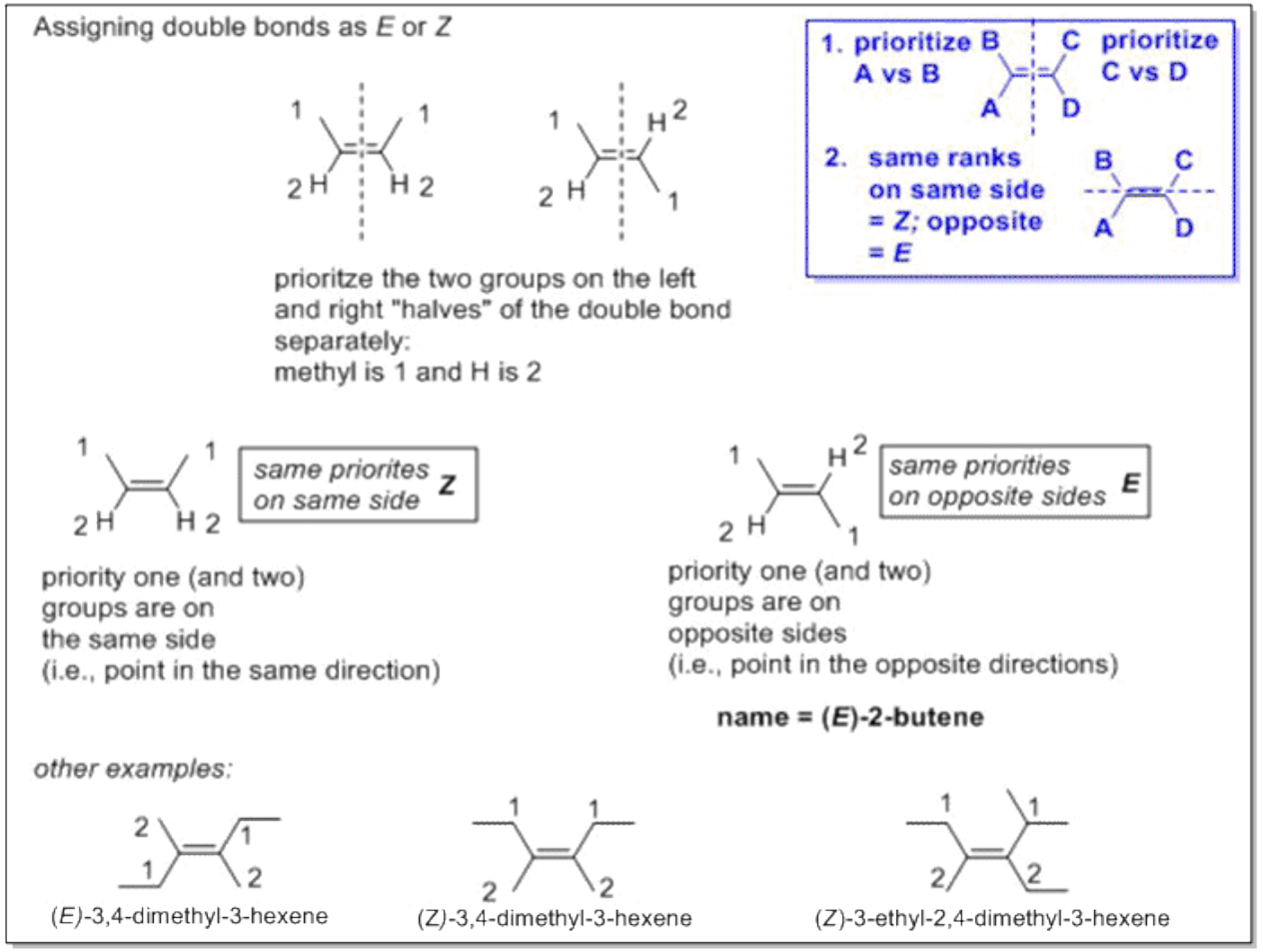
3. Write the structure with the alkene carbon number before the parent name and the -OH carbon number before the -ol suffix:



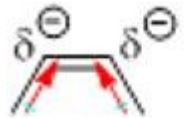
Practice Nomenclature



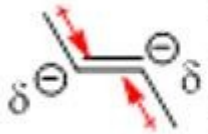
Stereochemistry and Double Bond Nomenclature



Physical Properties of Alkenes

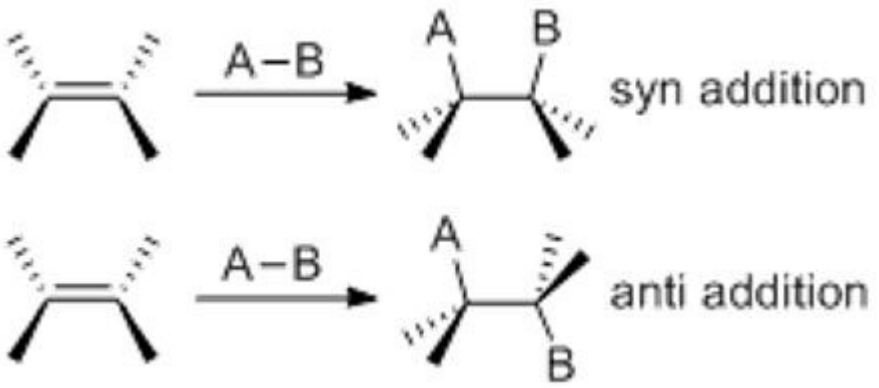


more polar

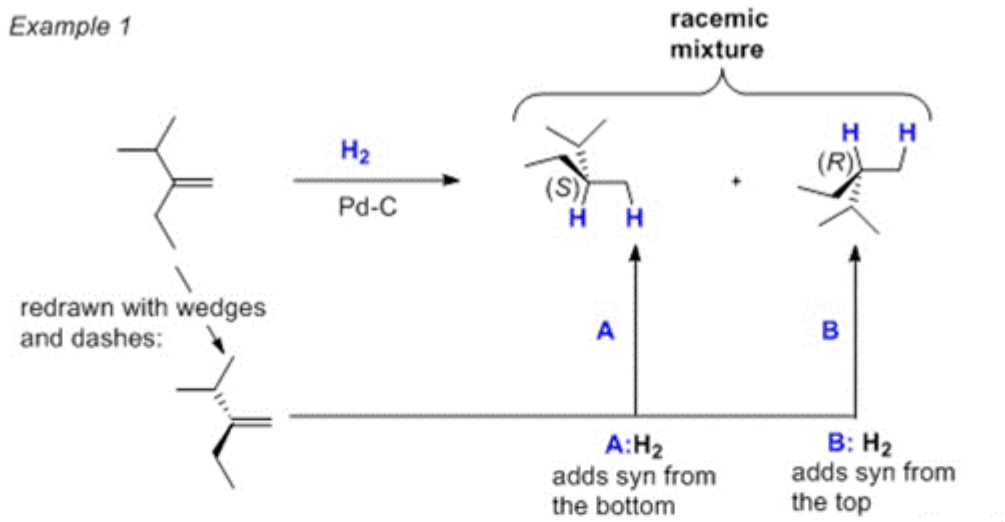


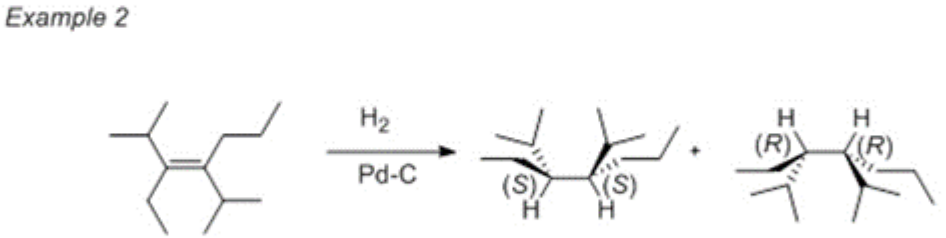
bond dipoles are more offsetting

Addition Reactions of Alkenes

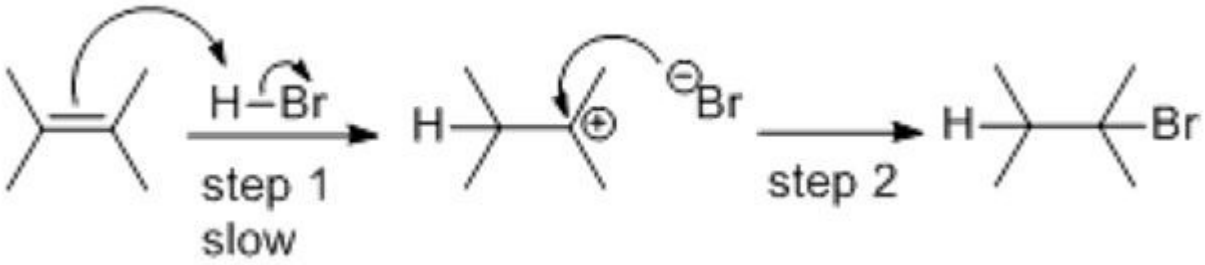


Hydrogenation of Alkenes

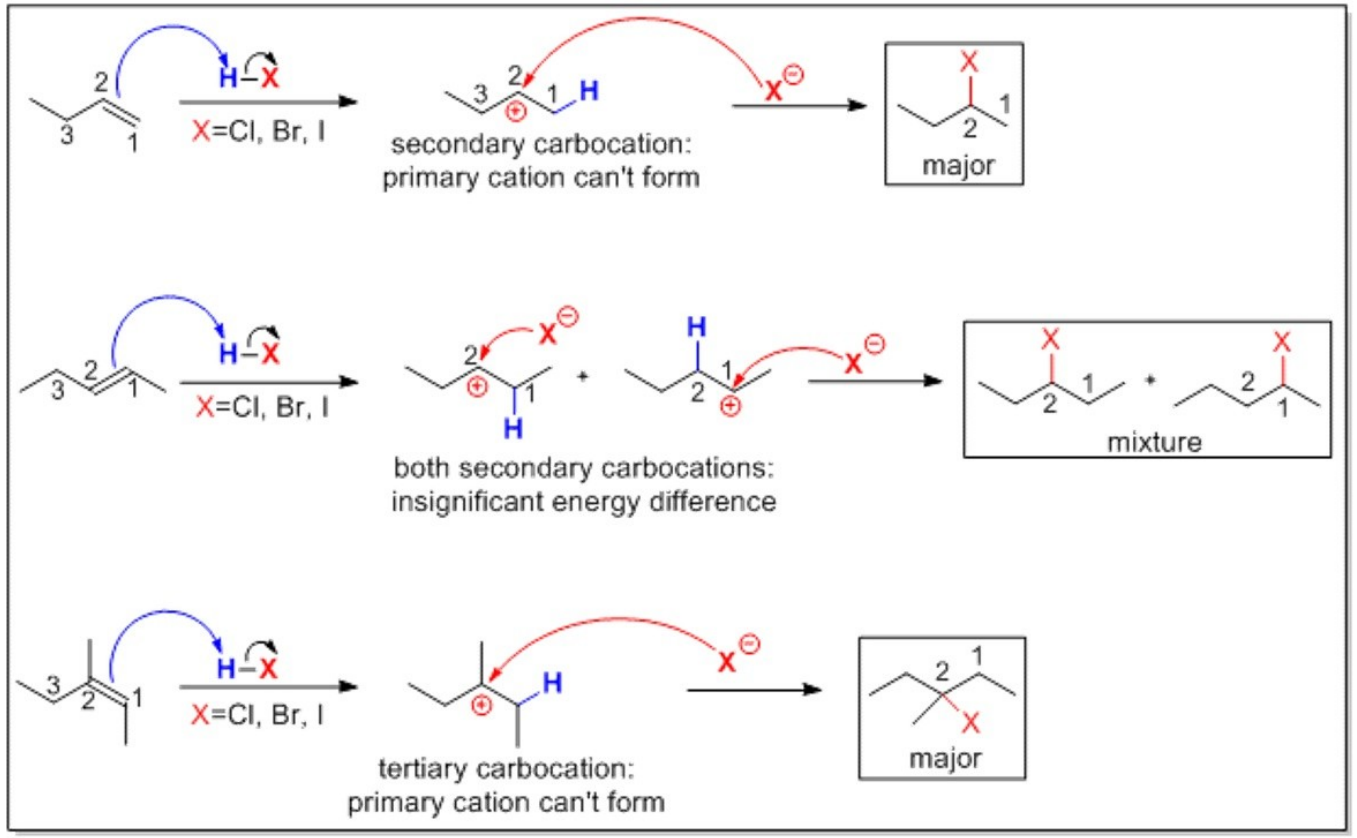




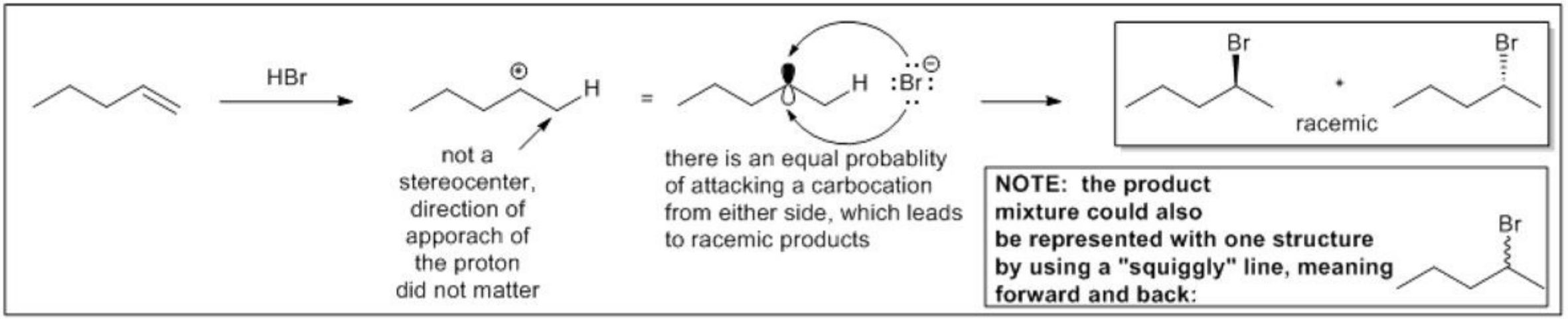
Addition of Hydrogen Halides



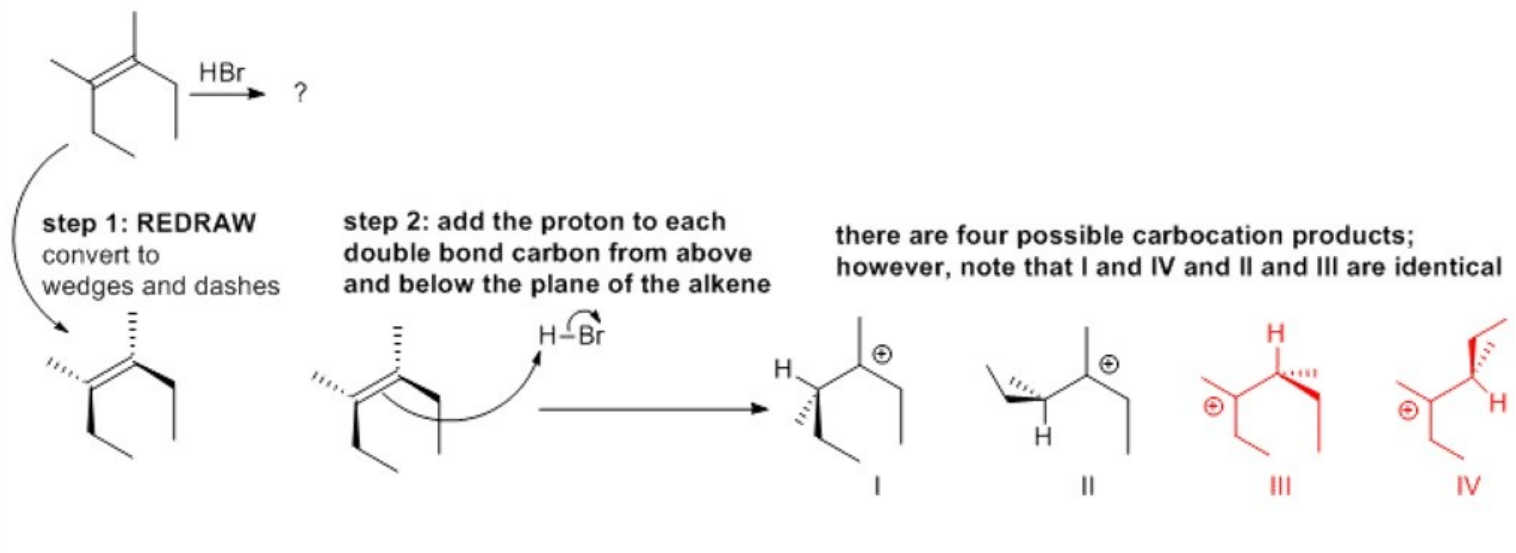
Addition of Hydrogen Halides



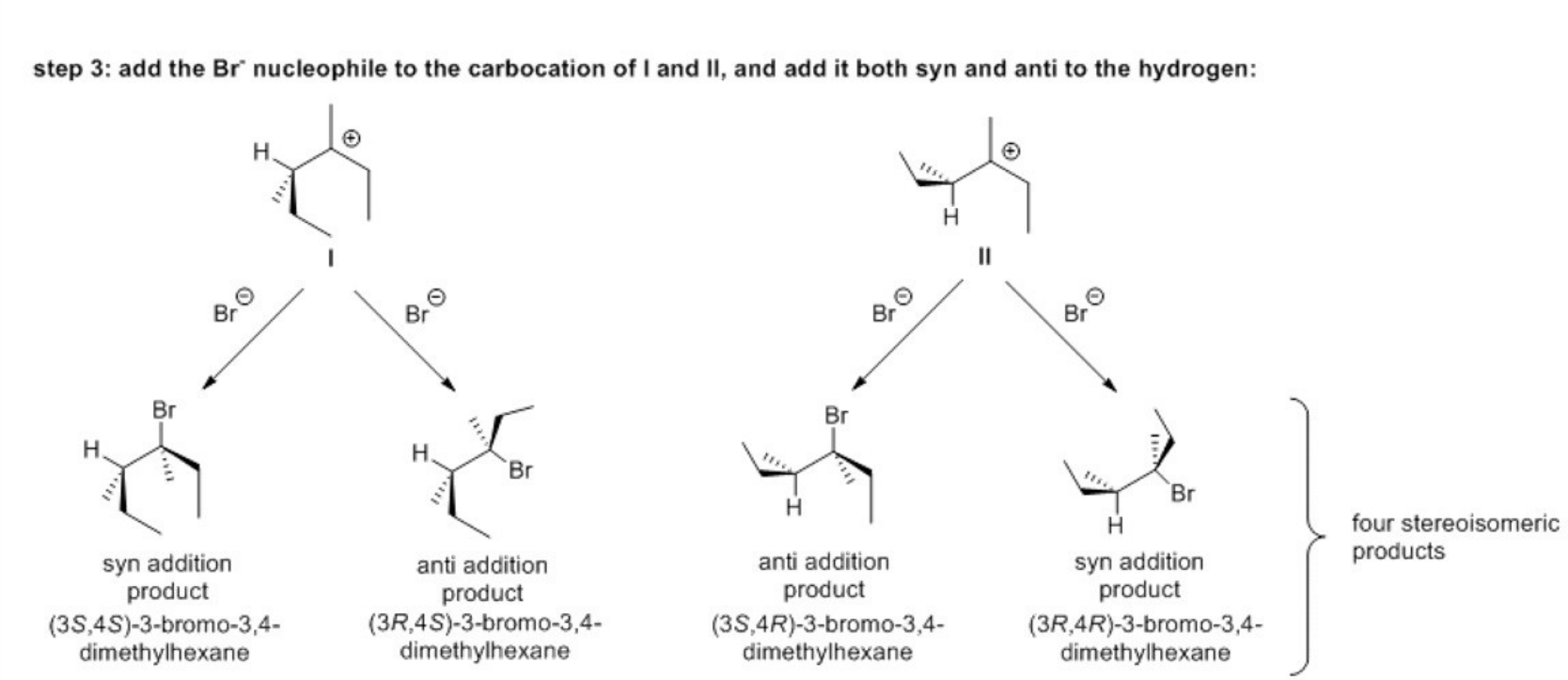
Addition of Hydrogen Halides



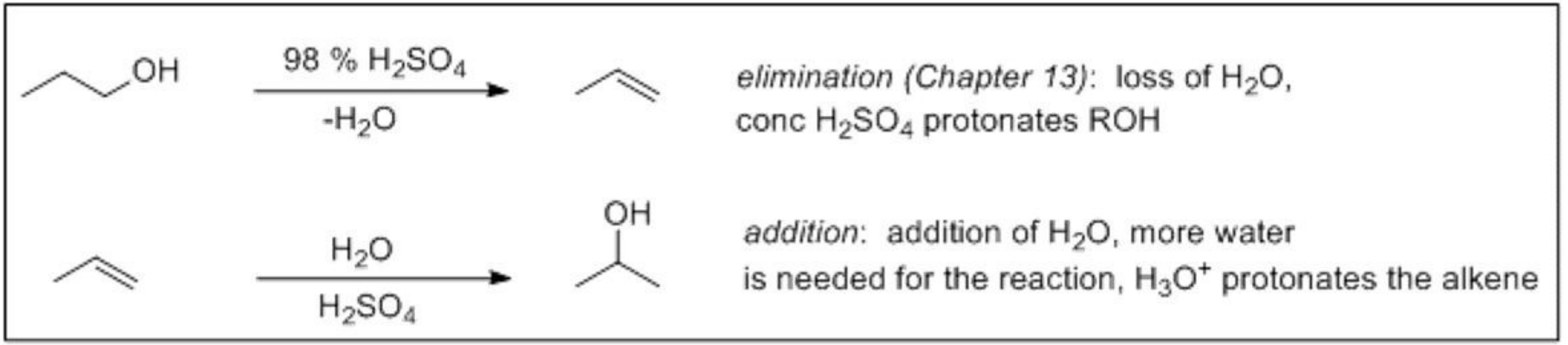
Addition of Hydrogen Halides- Mechanism



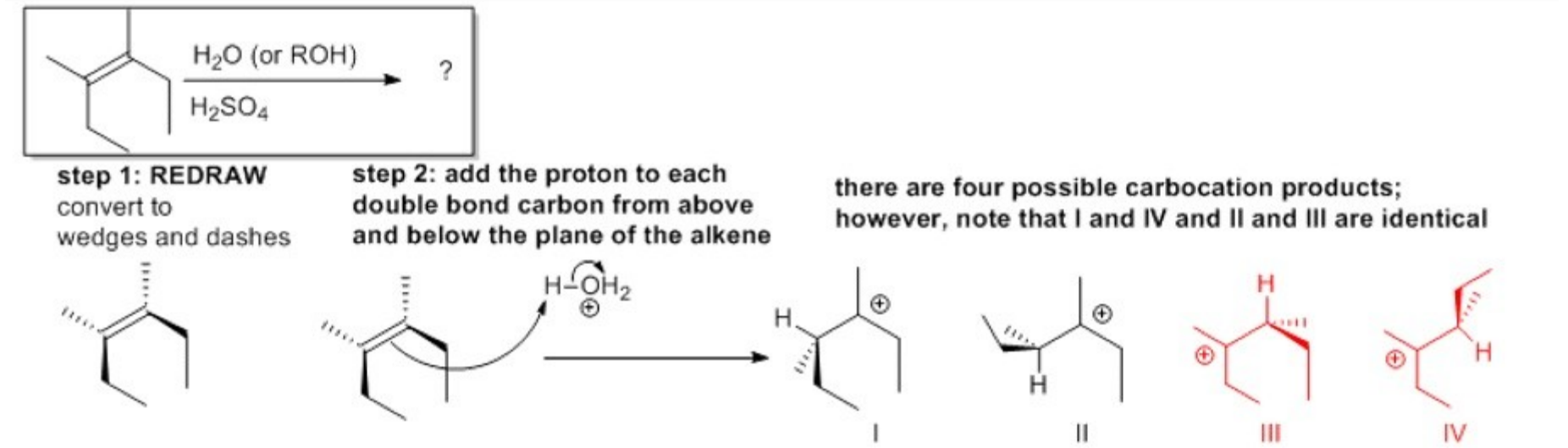
Addition of Hydrogen Halides- Mechanism



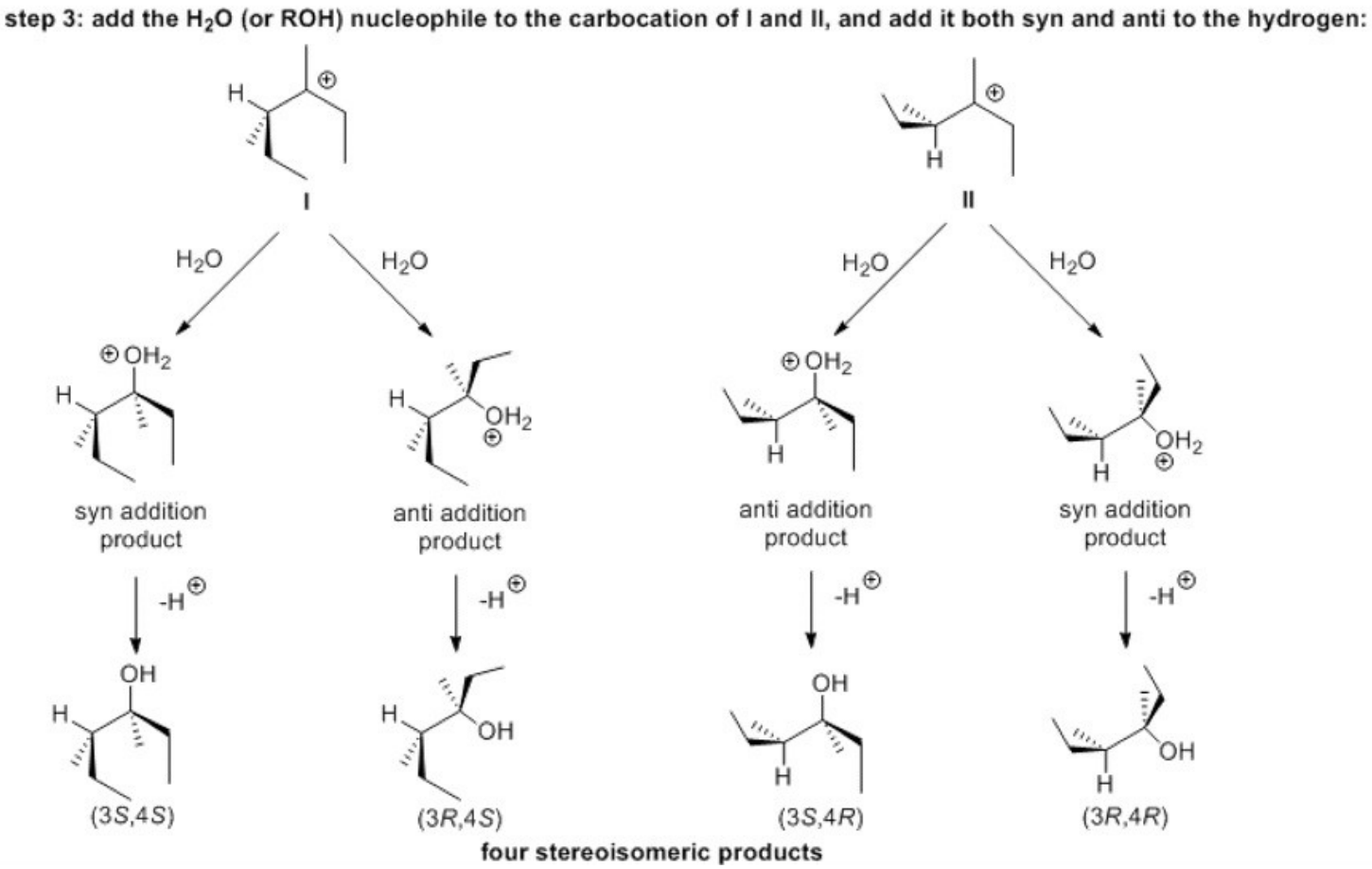
Addition of Alcohols and Water to Alkenes



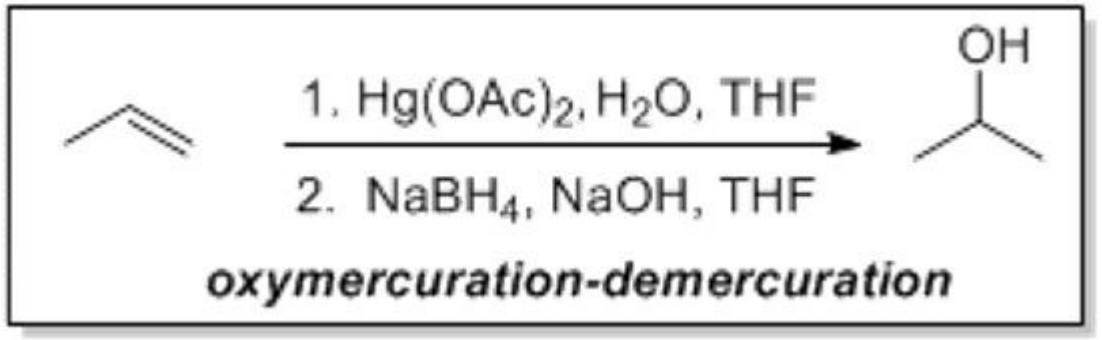
Addition of Alcohols and Water to Alkenes



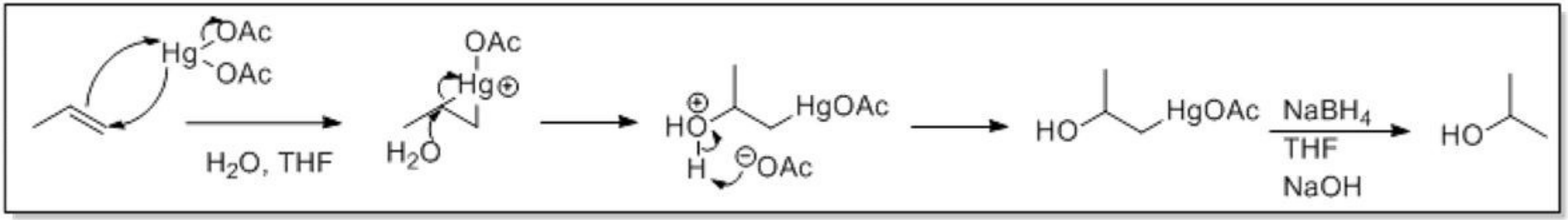
Addition of Alcohols and Water to Alkenes



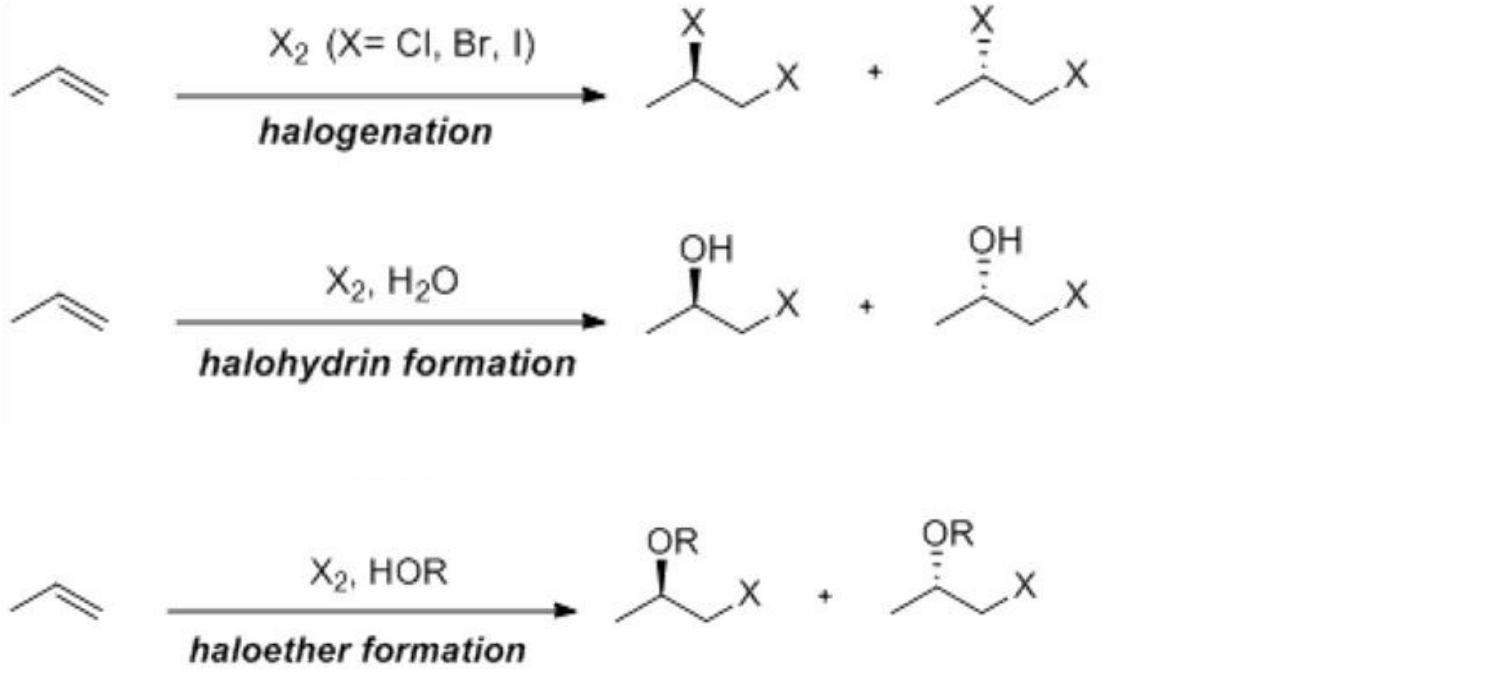
Oxymercuration-Demercuration



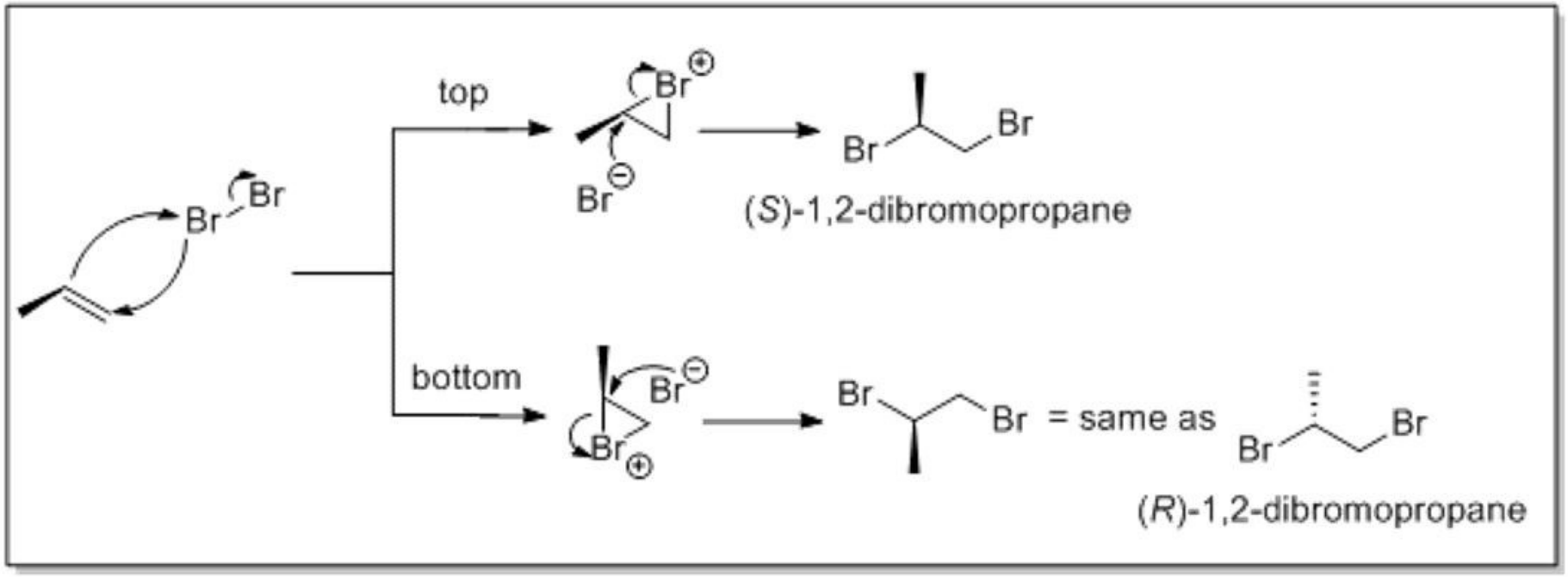
Oxymercuration-Demercuration



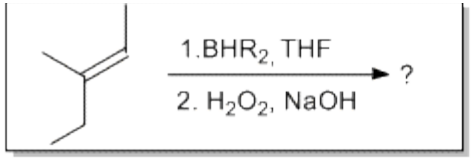
Halogenation, Halohydrin and Haloether Formation



Halogenation, Halohydrin and Haloether Formation

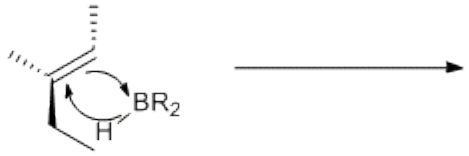


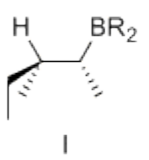
Hydroboration-Oxidation

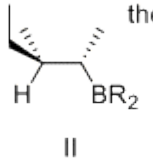


step 1: REDRAW
convert to
wedges and dashes

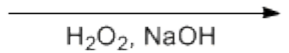
step 2: add the boron to the less substituted carbon, the hydrogen to the more substituted carbon and add from above and below (R= alkyl as in 9-BBN, so add to just one alkene)



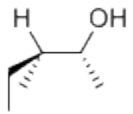


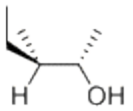


I and II
are the main regioisomers:
they are enantiomers



step 3: in the second reaction step the basic peroxide replaces BR_2 with -OH ***(there is ALWAYS RETENTION of stereochemistry in this step***

oxidation of I →  (2*R*,3*S*)-3-methyl-2-pentanol

oxidation of II →  (2*S*,3*R*)-3-methyl-2-pentanol