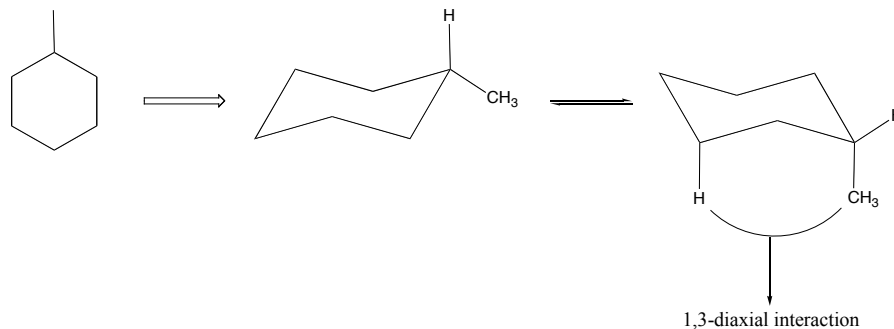


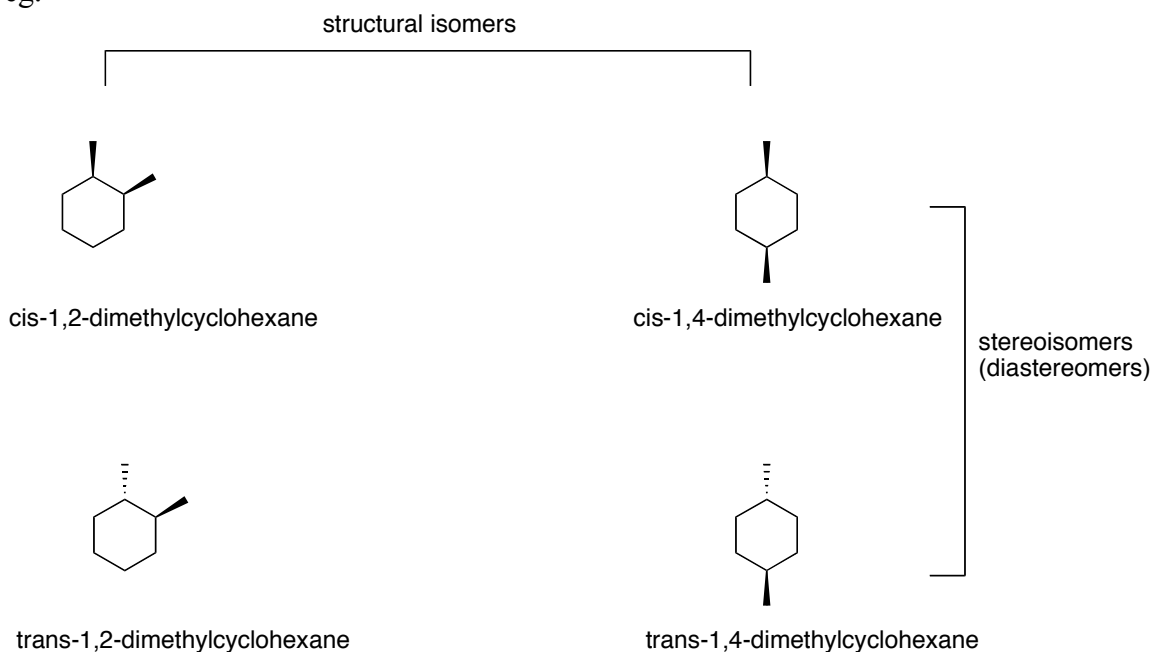
REVIEW:**Cyclohexane – conformations**

- most stable conformation is when methyl group is equatorial
- when methyl group is placed axial, less stable conformation due to 1,3-diaxial interaction (as shown above)

Isomers - different compounds with same molecular formula – 2 basic types

1. structural/constitutional isomers
 - compounds with same molecular formula and different names, numbers
2. Stereoisomers – have normally same name but different 3-D structure – 2 sub-types
 - (a) diastereomers/diastereoisomers (geometric isomers)
 - (b) enantiomers (non-superposable mirror images of same molecule)

eg.

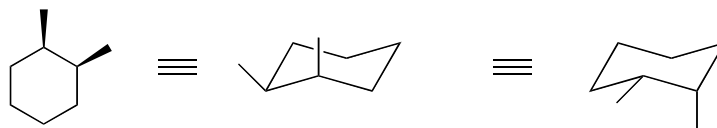


Conformations:

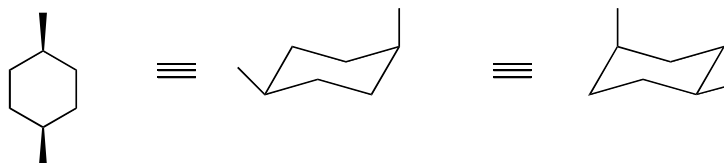
- different 3-D shapes a molecule can assume by rotation around single bonds

eg. Same conformation can be depicted in several ways

cis-1,2-cyclohexane



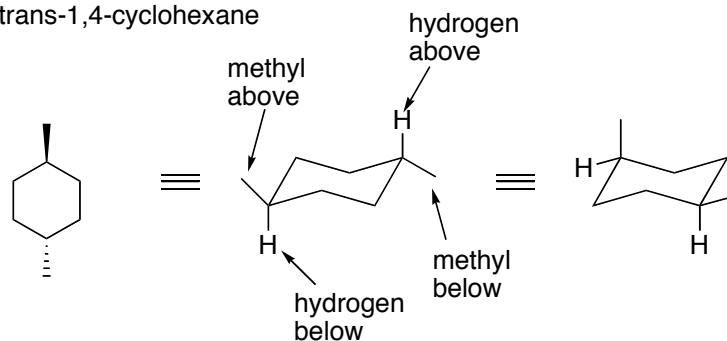
cis-1,4-cyclohexane



Note on drawing the most stable conformation of substituted cyclohexanes:

- generally, draw chair conformation of cyclohexane
- put the largest group in equatorial position
- draw the next group on the correct side (face) with respect to the largest group

trans-1,4-cyclohexane



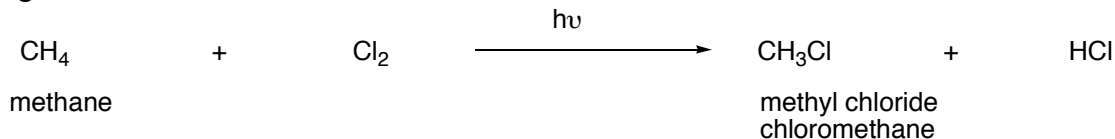
Reactions of alkanes: Two will be considered; combustion to CO_2 and H_2O – already discussed and....

1) Halogenation of alkanes

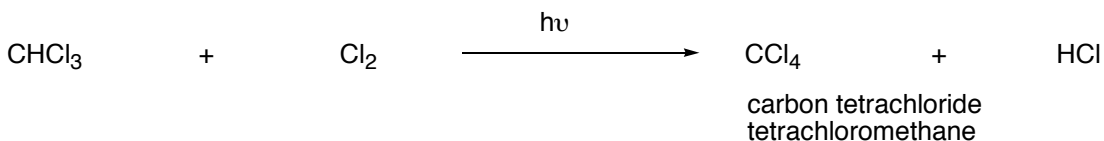
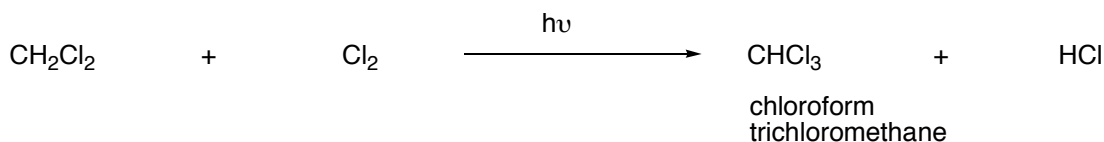
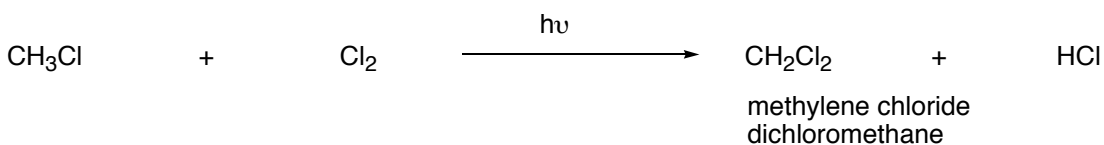


R= any alkane (group), R-X = alkyl halide / haloalkane (X=Cl, Br, F) ; I_2 fails

substitution reaction – replace one group by another (below, H is replaced by Cl)
eg.

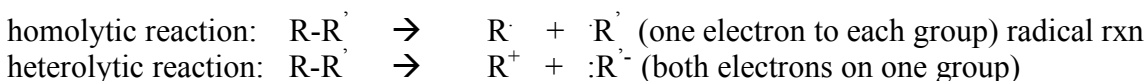


light energy, $E = h\nu$
 h = Planck's constant
 ν = frequency of light



Mechanism of reaction:

- step by step description of what happens during a reaction (hypothesis)



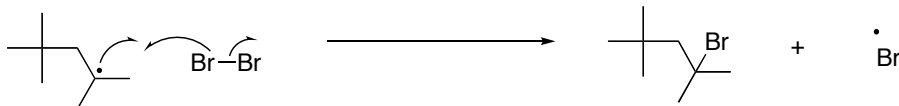
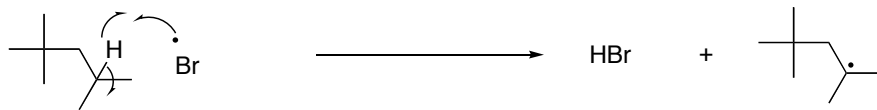
heterolytic reactions more common, but halogenation of alkanes involves homolytic reactions



X = Cl, Br, I

Reactivity in organic chemistry is associated with:

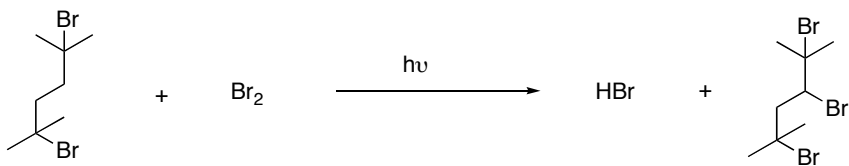
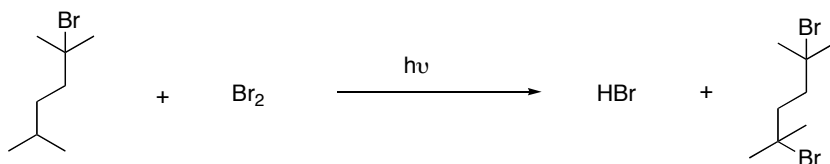
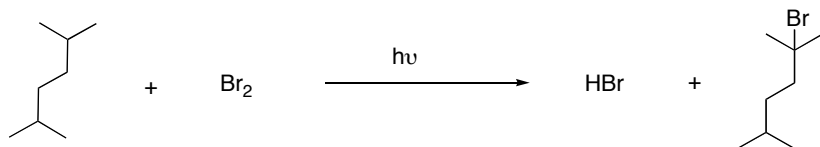
- polarized bonds (electronegative elements)
- lone pairs of electrons
- multiple bonds



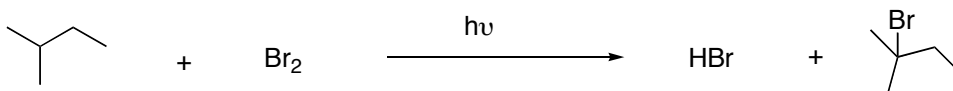
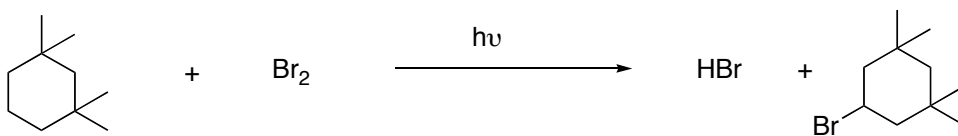
formation of tertiary radical favoured

eg.

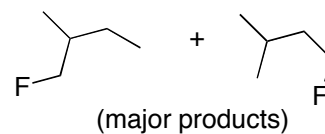
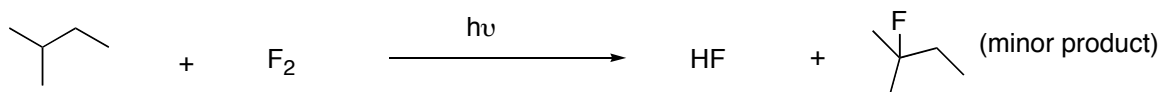
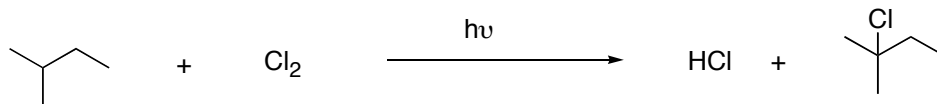
1.



2.



3.



WHY is fluorination different from chlorination or bromination – not selective for generation of tertiary (most stable) radical ?

- fluorine radical is most reactive radical, so goes for most accessible methyl hydrogen – giving the primary alkyl radical
-
- “less reactive → most selective”
- “most reactive → less selective”
-

Will discuss - **Hammond Postulate**