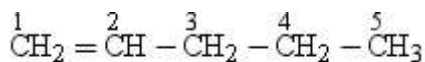


## 14. Alkenes

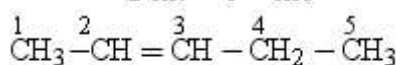
### Alkenes:

- General formula is  $C_nH_{2n}$ .
- Isomerism

#### 1. Position isomer



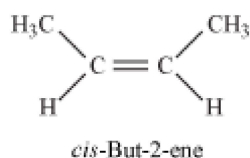
Pent - 1 - ene



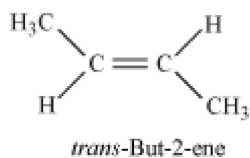
Pent - 2 - ene

#### 2. Geometrical isomerism

- *Cis*-isomer: Two identical atoms or groups are on the same side of the double bond



- *Trans*-isomer: Two identical atoms or groups lie on the opposite side of the double bond



### Alkenes:

- General formula is  $C_nH_{2n}$ .
- Alkenes are unsaturated hydrocarbons containing at least one double bond.
- Carbon-carbon double bond in alkenes consist of one sigma bond and one pi bond.
- **Prepared by:**
  - Partial reduction of alkynes
  - Dehydrohalogenation by heating alkyl halides with alcoholic KOH
  - Dehalogenation by reacting vicinal dihalides with Zn metal
  - Dehydration of alcohols using
    - Concentrated  $H_2SO_4$
    - Heated  $Al_2O_3$
- **Properties:**
  - Colourless, odourless, insoluble in water and fairly soluble in non-polar solvents
  - Undergo addition reactions:

- Addition of hydrogen to form alkanes
  - Addition of halogen to form dihalides
  - Addition of hydrogen halide to form alkyl halides
  - Addition of  $\text{H}_2\text{SO}_4$
  - Addition of water
- Oxidation of alkenes with
  - Baeyer's reagent converts them to vicinal glycols
  - Acidic  $\text{KMnO}_4$  or acidic  $\text{K}_2\text{Cr}_2\text{O}_7$  oxidises them to give ketones or acids (depending upon the nature of alkenes)
- Undergoes ozonolysis to form aldehydes
- Polymerises at high temperature in presence of suitable catalyst
- Undergoes combustion to form a large amount of heat
- **Uses:**
  - Manufacture of synthetic chemicals, polythene, raw materials for detergents
  - For ripening of fruits
  - producing oxy-ethylene