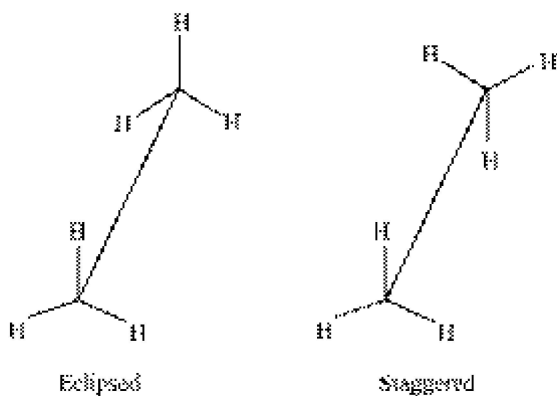


13. Alkanes

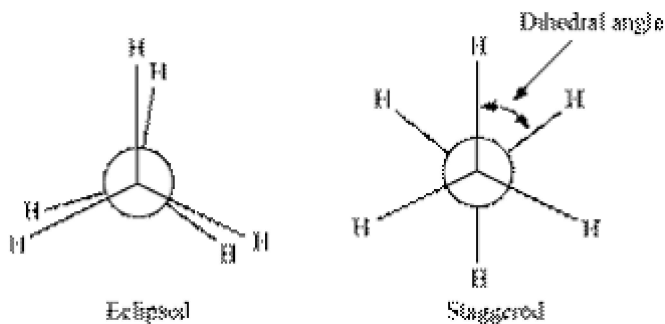
Alkanes:

- General formula is C_nH_{2n+2} .
- Isomerism: Structural isomer \rightarrow Difference in structure
Chain isomer \rightarrow Difference in chain
- Conformations: The spatial arrangements of atoms which can be converted into one another by rotation around a C–C single bond

1. Sawhorse projections



2. Newman projections



Alkanes:

- General formula is C_nH_{2n+2} .
- Occurrence:
 - Methane is the main constituent of marsh gas.
 - Methane is exhaled by animals that feed on food containing cellulose.
 - Methane is found in the intestinal gas of humans and animals.
 - Methane is found in cavities in coal.
- Prepared by:
 - Reduction of unsaturated hydrocarbons
 - Reduction of alkyl halides
 - Wurtz reaction



- Decarboxylation reaction
- Kolbe's electrolysis
- Properties
 - Non-polar, colourless and odourless
 - Hydrophobic
 - Combustion reaction produces carbon dioxide
 - Controlled oxidation converts them to alcohols, aldehydes or carboxylic acids
 - Undergo isomerisation in the presence of AlCl_3 and HCl
 - Aromatization reaction takes place at 773 K at 10–20 atmospheric pressure in the presence of the oxides of V, Mo, or Cr supported over alumina
 - On heating to a higher temperature, higher alkanes decompose into lower alkanes or alkenes (**Pyrolysis and cracking**)
 - Alkyl halides can be prepared by substitution reaction of alkanes
- Uses:
 - Preparation of acetylene, formaldehyde, methanol, chloromethane and tetrachloro methane
 - Domestic fuel
 - Preparation of a useful solvent in dry cleaning