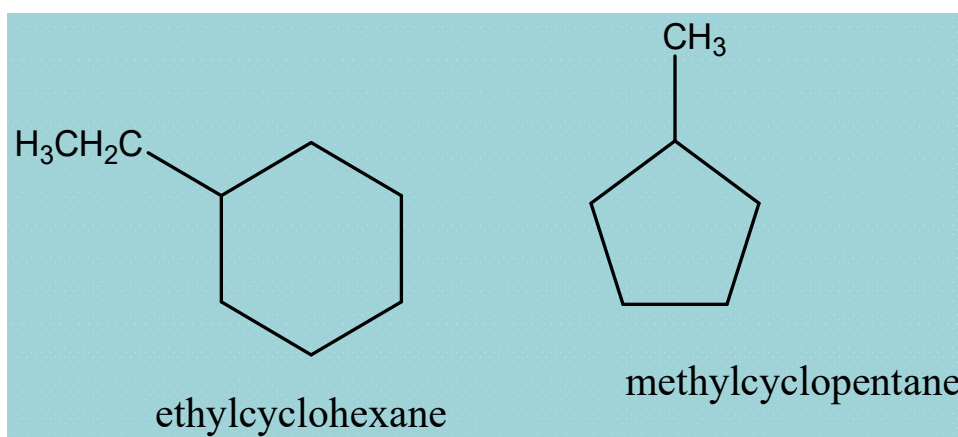


Rules for naming cycloalkanes:

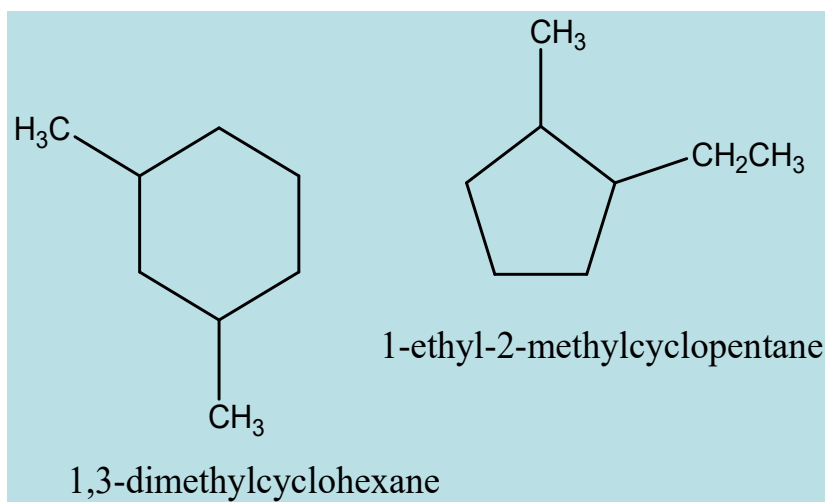
1- In the case of a cycloalkane with an attached alkyl substituent, the ring is the parent hydrocarbon unless the substituent has more carbon atoms than the ring.

In that case, the substituent is the parent hydrocarbon and the ring is named as a substituent.

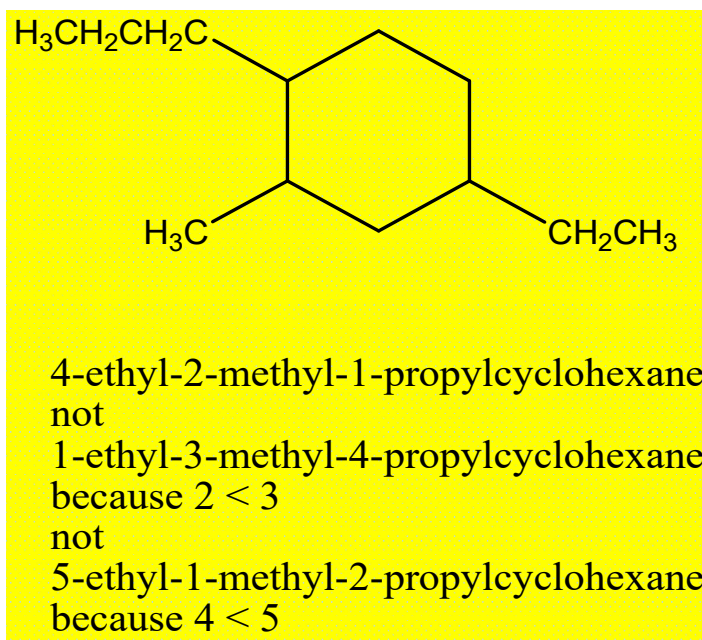
There is no need to number the position of a single substituent on a ring.



2- If the ring has two different substituents, they are cited in *alphabetical order* and the number 1 position is given to the substituent cited first.



3- If there are more than two substituents on the ring, they are cited in alphabetical order. The substituent given the number 1 position is the one that results in a second substituent getting as low a number as possible.

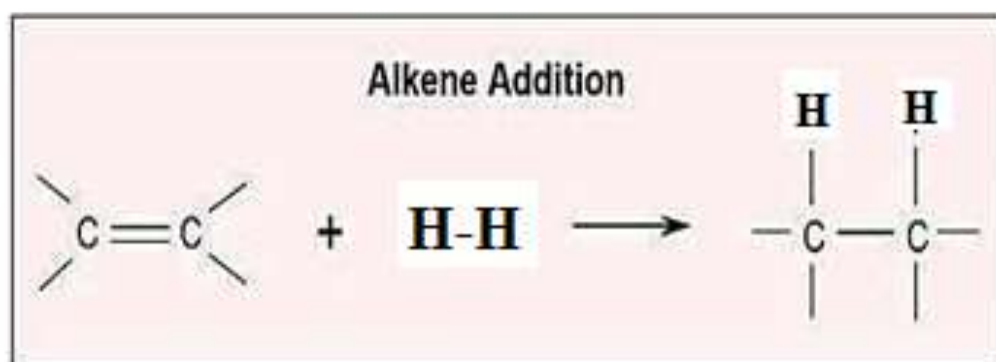


Synthesis of alkanes

1- Catalytic hydrogenation of alkenes

The double bond of an alkene consists of a sigma (σ) bond and a pi (π) bond. Because the carbon-carbon π bond is relatively weak, it is quite reactive and can be easily broken and reagents can be added to carbon.

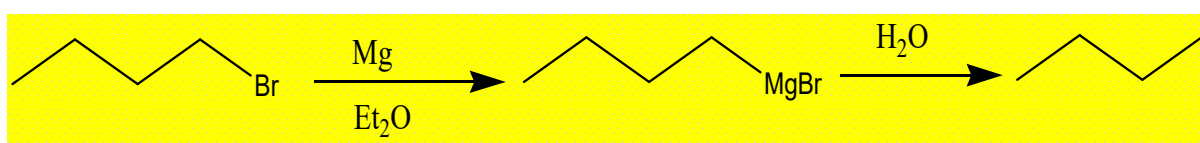
Reagents are added through the formation of single bonds to carbon in an addition reaction.



Synthesis of alkanes

2- Hydrolysis of Grignard reagent

Starting with alkyl halides to give Grignard reagent upon reaction with Magnesium and dry diethyl ether. Hydrolysis of Grignard reagent with water gives the alkane.



Reactions of alkanes

1. Halogenation

Halogenation is the replacement of one or more hydrogen atoms in an organic compound by a halogen (fluorine, chlorine, bromine or iodine). Unlike the complex transformations of combustion, the halogenation of an alkane appears to be a simple substitution reaction in which a C-H bond is broken and a new C-X bond is formed.

The chlorination of methane, shown below, provides a simple example of this reaction.



The following facts must be accommodated by any reasonable mechanism for the halogenation reaction

1. The reactivity of the halogens decreases in the following order: $F_2 > Cl_2 > Br_2 > I_2$.
2. We shall confine our attention to chlorine and bromine, since fluorine is **so explosively reactive** it is difficult to control, **and iodine is generally unreactive**.
3. Chlorinations and brominations are normally exothermic.
4. Energy input in the form of heat or light is necessary to initiate these halogenations.
5. If light is used to initiate halogenation, thousands of molecules react for each photon of the absorbed.
6. Halogenation reactions may be conducted in either the gaseous or liquid phase

The mechanism is illustrated in the following chart including 3 steps:

1-Initiation step

2-Propagation step

3-Termination step

