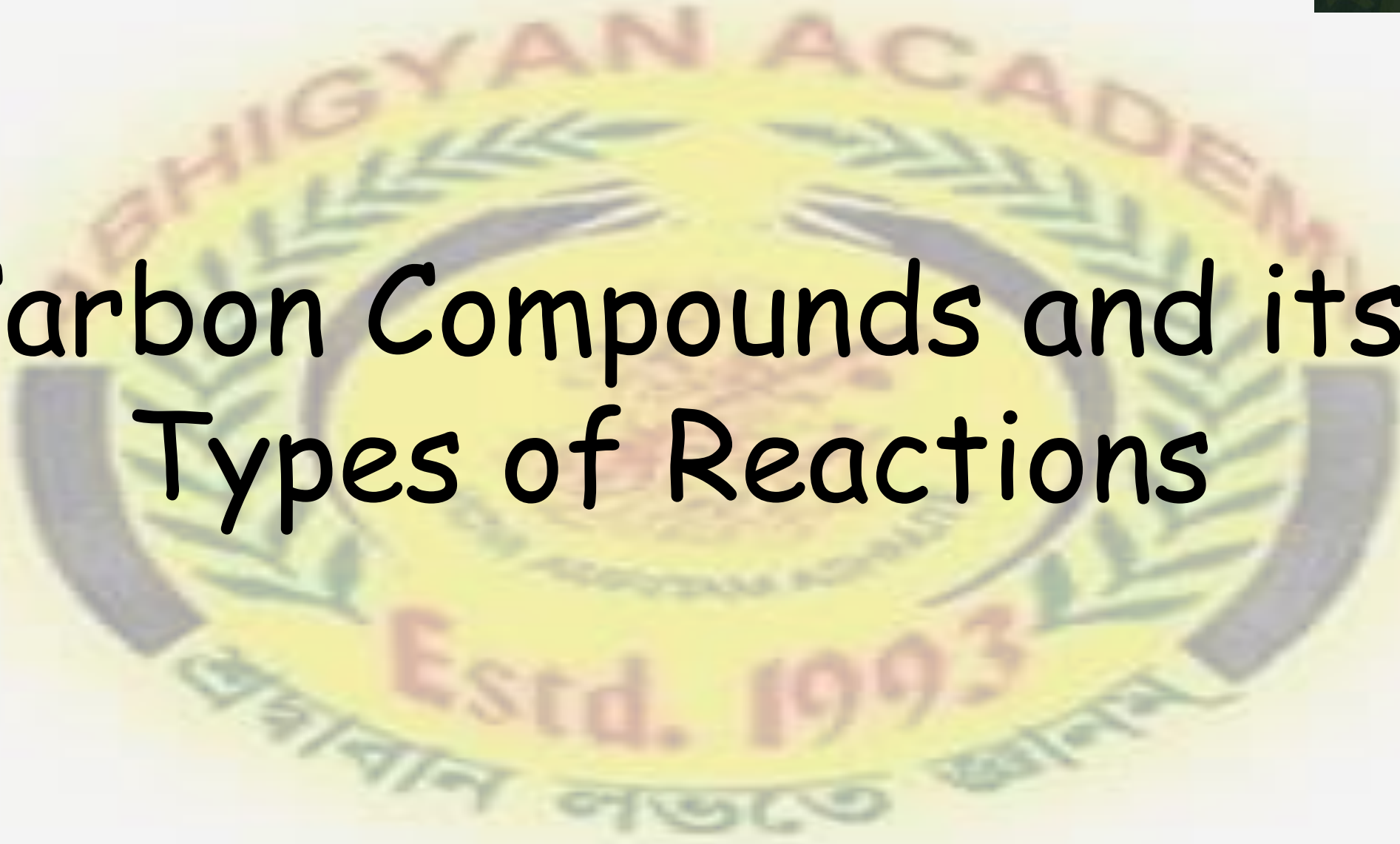


Carbon Compounds and its Types of Reactions



Allotropes of carbon

- An element possessing different physical forms of existence is known as allotropes of that element.
- The three allotropes of carbon are: Diamond, Graphite, and Buckminsterfullerene.

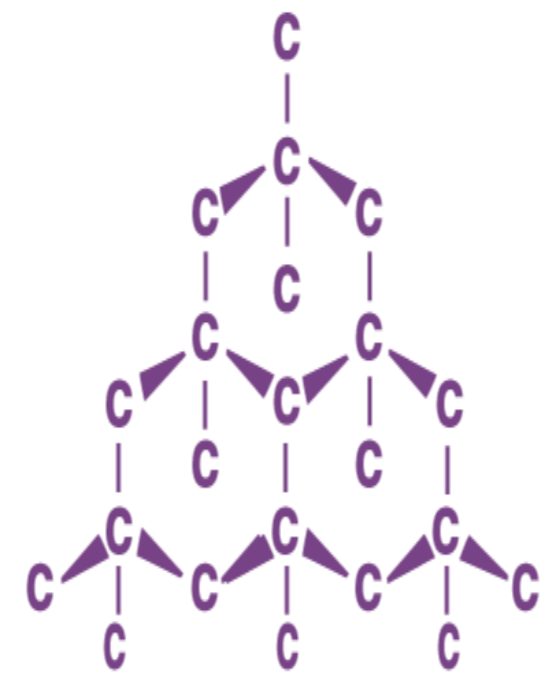
Diamond:

It is an extremely hard, transparent crystal with carbon atoms arranged in a tetrahedral lattice. This allotrope of carbon is a poor electrical conductor and an excellent thermal conductor.

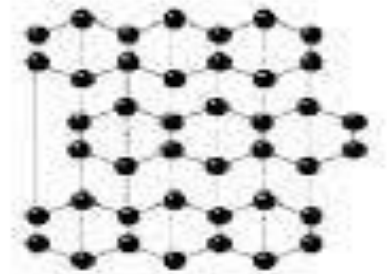
Graphite: It is a soft, black, flaky solid, a moderate electrical conductor. The C atoms are bonded in flat hexagonal lattices (graphene), which are then layered in sheets.

Graphene is an allotrope of carbon consisting of a single layer of atoms arranged in a hexagonal lattice nanostructure.

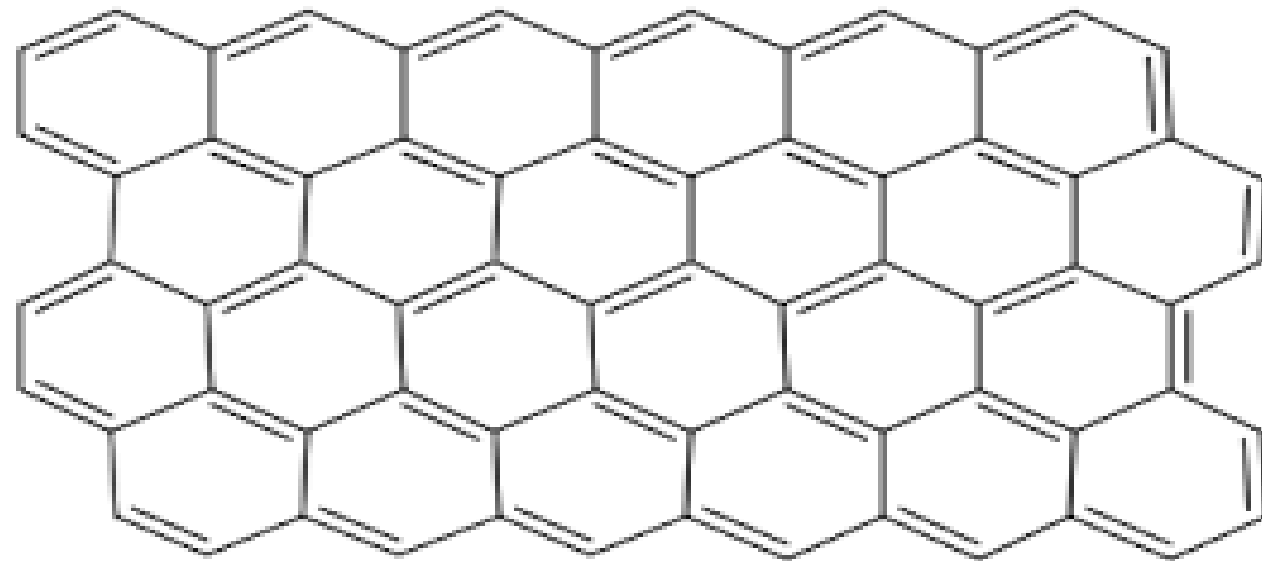
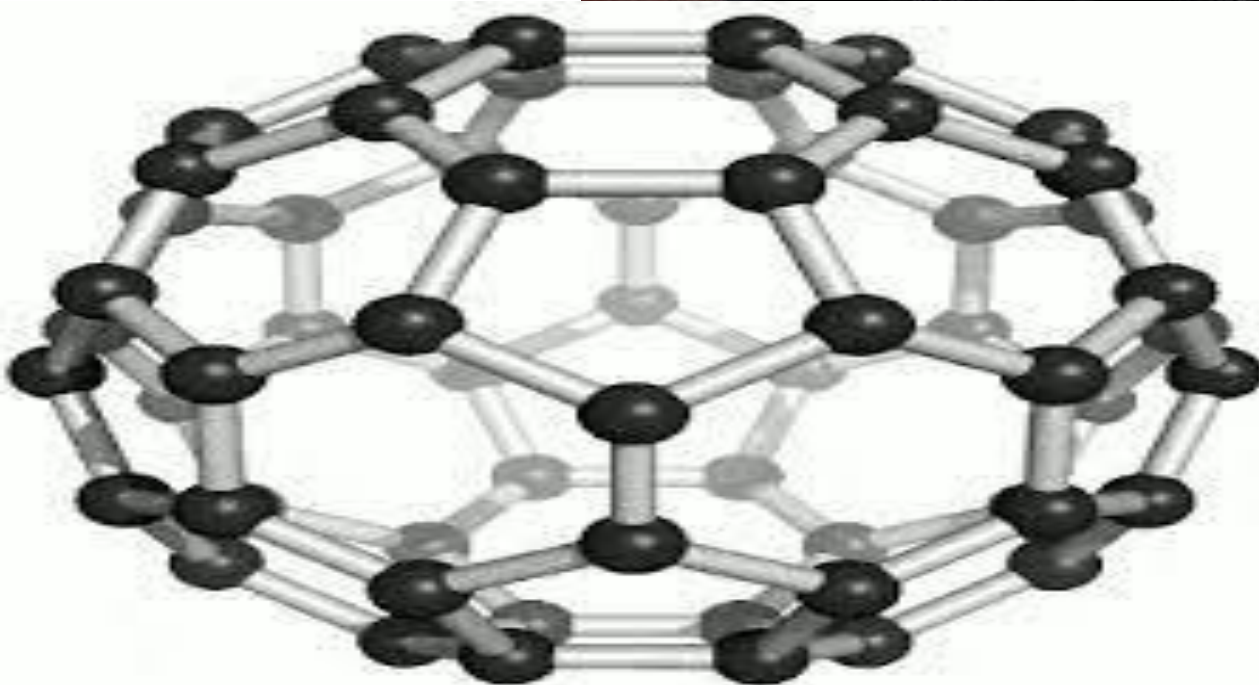
Carbon nanotubes: Allotropes of carbon with a cylindrical nanostructure.



Diamond



Graphite



Graphene

SUBSTITUTION REACTION BY Saturated hydrocarbons :

Saturated hydrocarbons are quite unreactive. Being unreactive, saturated hydrocarbons do not react with many substances. Saturated hydrocarbons, however, react with chlorine in the presence of sunlight. If the substitution of hydrogen atoms takes place by chlorine, it is also called chlorination.

Substitution reaction

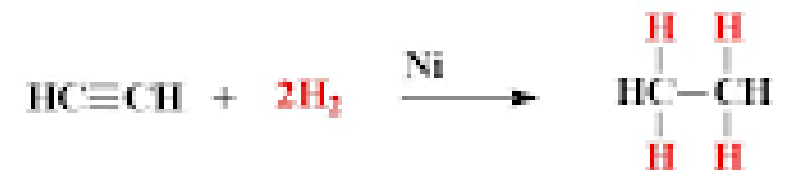


Addition reaction BY UNSATURATED HYDROCARBON :

In addition reaction an unsaturated hydrocarbon is converted to saturated hydrocarbon by the addition of hydrogen

Hydrogenation

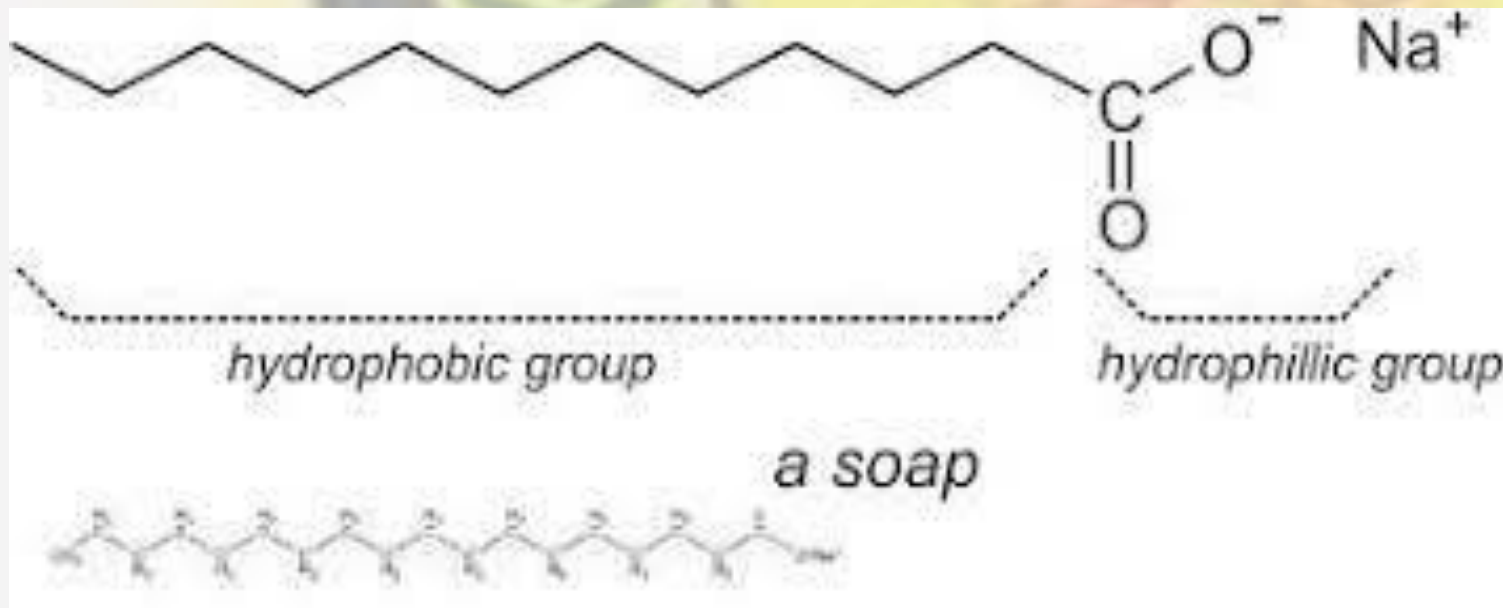
- In **hydrogenation**, hydrogen atoms add to the carbon atoms of a double bond or triple bond.
- A catalyst such as Pt or Ni is used to speed up the reaction.



SOAP, DETERGENT AND MICELLES

Soap is a sodium salt or potassium salt of long chain fatty acids having cleansing action in water

Examples : sodium stearate, sodium oliate and sodium palmitate
chemical formula is $C_{17}H_{35}COO^-$ plus a metal cation, either Na^+ or K^+



DETERGENT:

Detergents are ammonium or sulphonate salts of long chain carboxylic acids

The chemical formula for detergent is: $C_{18}H_{35}NaO_2S$.

Structures of Common Detergents



Sodium n-dodecyl benzene sulphonate



Sodium n-dodecyl sulphate

Soap

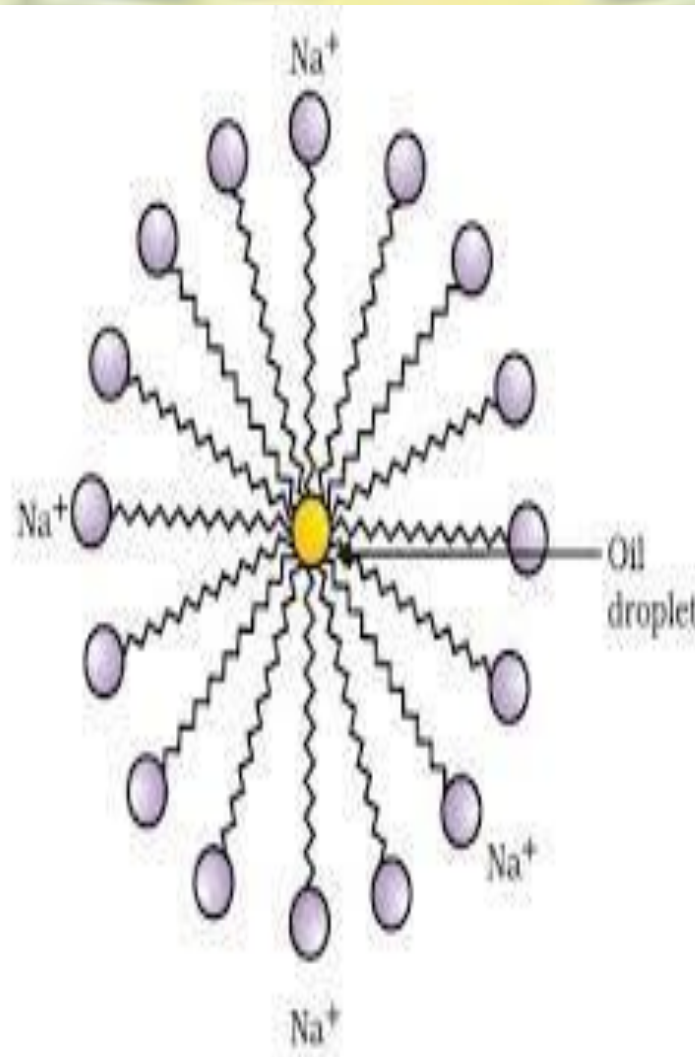
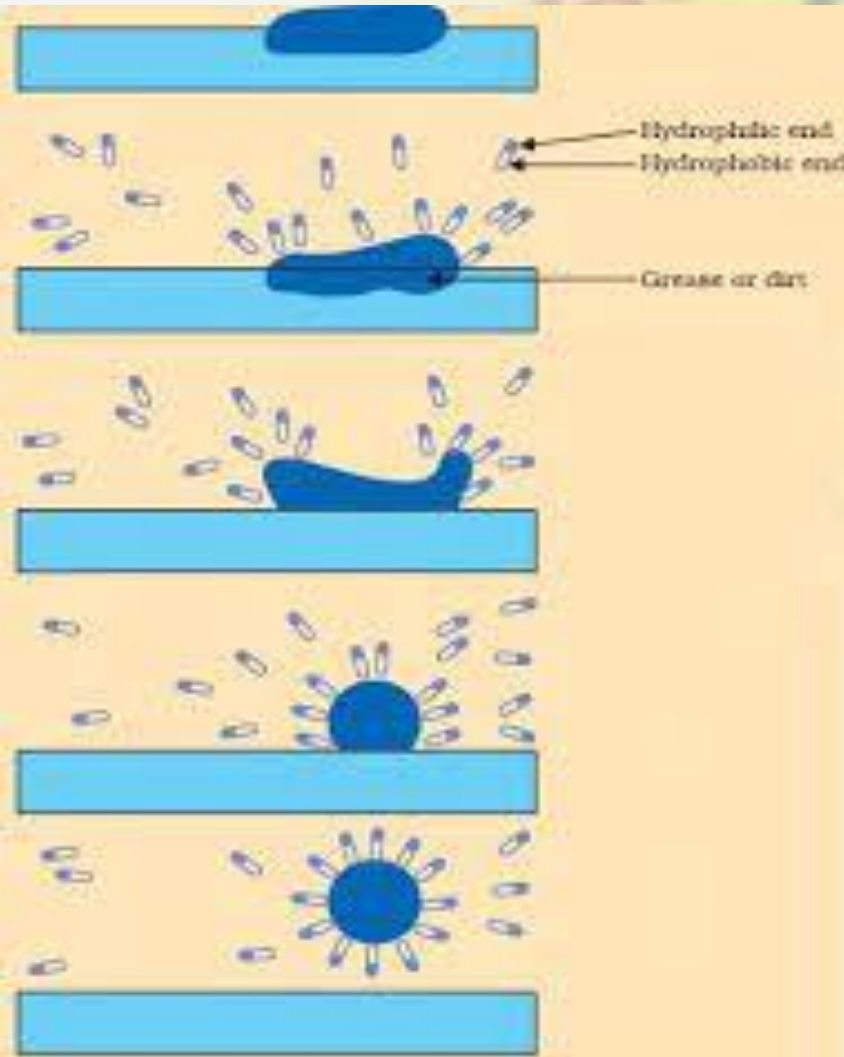
- Soap is sodium or potassium of a carboxylic acid that is attached to a long aliphatic chain.
- Soaps are produced using natural ingredients.
- Soaps are easily biodegradable.
- Soaps take time to get dissolved in water.

Detergent

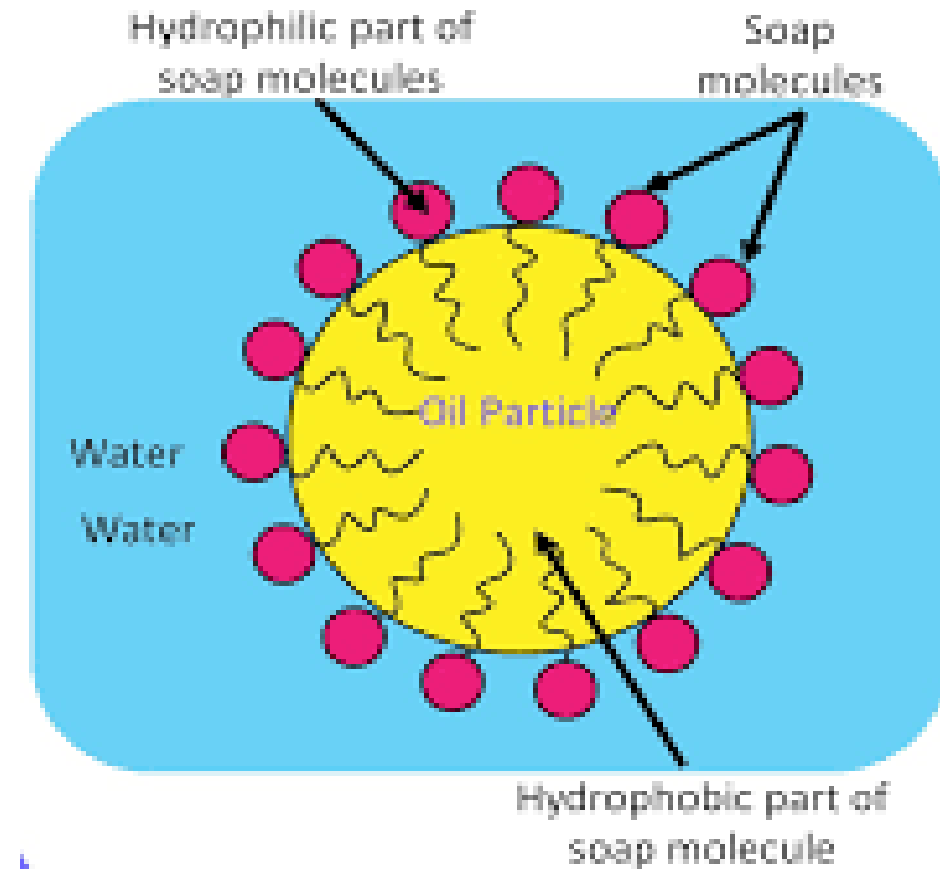
- Detergent is usually a sodium or potassium salts of a long alkyl chain that terminates with a sulfonate group.
- Detergents are produced using synthetic resources.
- Some detergents are biodegradable.
- Detergents take less time and dissolve faster in water.

Micelles

Micelles are the chemical structures that have hydrophilic and hydrophobic structures.



STRUCTURE OF MICELLE



Q. The part of the stearate ion that is hydrophilic in nature is _____

- (A). Head
- (B). Hydrocarbon chain
- (C). Tail
- (D). None of these

Q. The molecular formula of the stearate ion is _____

- (A). $C_{35}H_{17}COO^+$
- (B). $C_{17}H_{35}COO^-$
- (C). $C_{35}H_{17}COO^-$
- (D). $C_{17}H_{35}COO^+$

Q. Which of the following is the chemical formula of fullerenes?

- a) C_0
- b) C_6
- c) C
- d) C_{60}

Q. Wood Charcoal is an allotrope of

-
- a) carbon
 - b) silicon
 - c) nitrogen
 - d) germanium

