

Surface Chemistry

Surface chemistry is the study of chemical reactions at interfaces. It is closely related to surface engineering which aims at modifying the chemical composition of a surface for desired improvement. Surface science has importance in catalysis, electrochemistry and geochemistry.

CONCEPT MAP CLASS XII

Applications of Colloids

Colloids have very vast applications from food products to industries like rubber etc.

In Nature and Everyday Life

Food Articles

Number of food articles that we eat, are colloidal in nature, e.g.,

- **Milk**: Fat dispersed in water.
- **Bread**: Air dispersed in baked dough.

Medicines

Colloidal medicines are more effective as they are easily absorbed in the body, e.g.,

- **Silver colloid**: Germicidal
- **Copper colloid**: Anticancer
- **Mercury colloid**: Antisyphilis
- Colloidal dispersion of gelatin is used in coating over tablets and granules.

Blood Coagulation

Blood consists of negatively charged colloidal particles (albuminoid substances). On applying ferric chloride solution, it causes coagulation of blood to form a clot which stops further bleeding.

Formation of Delta

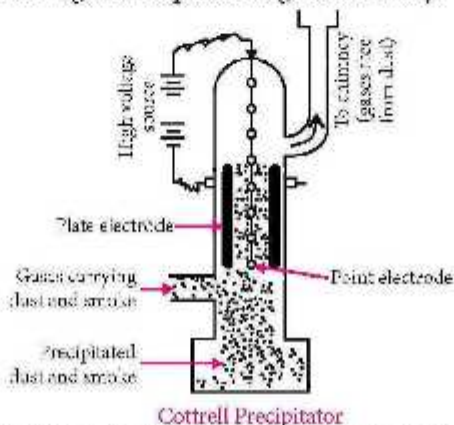
Formation of delta shaped heap of sand, clay, etc. where river falls into sea due to coagulation of sand/clay particles by electrolytes present in sea water.



In Industries

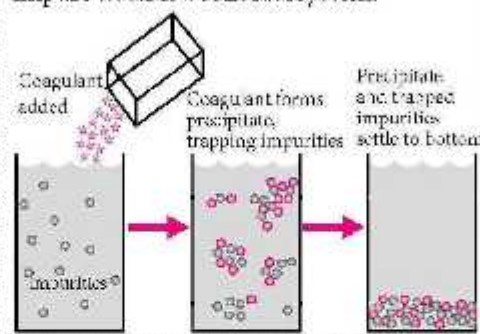
Smoke Precipitation

Smoke is a big problem for environment as it is the major cause of air pollution. Coagulation of the dispersed colloidal particles (smoke) occurs on metal plates before allowing them to pass through the chimney.



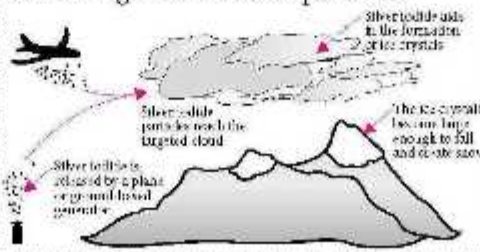
Purification of Drinking Water

Addition of the electrolyte (like alum) for water purification is based on the fact that impure water is a colloidal system.



Artificial Rain

Due to mixing of oppositely charged sand or common salt with the clouds to bring about coagulation of water particles.



Applications of Adsorption

Adsorption finds extensive applications in research laboratories and in industries. It can be used to remove certain classes of pollutants from air and industrial waste water.

In Gas Masks

Gas masks are used to adsorb poisonous gases (e.g., Cl_2 , CO , oxides of sulphur etc.) and thus purify the air for breathing. Activated charcoal is used for this purpose.

Removal of Colouring Matter from Solution

Many substances such as sugar, juice and vegetable oils (having coloured impurities) can be decolourised by using adsorbents like activated charcoal or fuller's earth, e.g., animal charcoal is used as a decolouriser in the manufacture of cane sugar.

Heterogeneous Catalysis

Mostly heterogeneous catalytic reactions proceed through the adsorption of gaseous reactants on solid catalyst, e.g.,

- Finely powdered nickel is used for the hydrogenation of oils.
- Finely divided vanadium pentoxide (V_2O_5) is used in the Contact process for the manufacture of sulphuric acid.

In Curing Disease

Some drugs can adsorb the germs and kill them hence, save us from diseases.

Separation of Inert Gases

Due to the difference in degree of adsorption of gases by charcoal, a mixture of inert gases can be separated by adsorption on coconut charcoal at different temperatures.