

## Colloidal solution and its properties

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Colloid solution is heterogeneous mixture in which the size of particles lies between the true solutions and suspensions.

- Colloidal particles can easily scatter a beam of visible light. This phenomenon is called Tyndall effect.

### Properties of colloidal solution:

1. The particles of colloid can't be seen by naked eyes individually.
2. It is a heterogeneous mixture and thus solute and solvent can't be separated by filter paper.
3. Size of particles is smaller than suspensions but greater than solutions (1 nm to 100 nm).
4. It is a stable mixture. Particles do not settle down at the bottom over a period of time.
5. They do not settle down when left undisturbed which means colloid is quite stable.

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Some common examples of colloids (in the table)

Dispersed phase	Dispersing Medium	Type	Example
Liquid	Gas	Aerosol	Fog, clouds, mist
Solid	Gas	Aerosol	Smoke, automobile exhaust
Gas	Liquid	Foam	Shaving cream
Liquid	Liquid	Emulsion	Milk, face cream
Solid	Liquid	Sol	Milk of magnesia, mud
Gas	Solid	Foam	Foam, rubber, sponge, pumice
Liquid	Solid	Gel	Jelly, cheese, butter
Solid	Solid	Solid Sol	Coloured gemstone, milky glass

## Physical and Chemical changes



- The process which brings about changes in physical properties and no new substances are formed are physical changes. The common physical changes are changes in colour, hardness, rigidity, fluidity, density, melting point, boiling point etc.
- The process in which new substances are formed and chemical properties of substances get changed are chemical changes. Some chemical properties are odour, inflammability etc.

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Physical Change	Chemical Change
It brings about change in physical properties such as physical state, shape, size etc.	It brings about changes in chemical properties.
No changes in chemical compositions are observed.	Changes in chemical properties are observed.
It is reversible.	It is irreversible that means permanent
No new substance is formed.	New substance is formed.

## Types of pure substances

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The pure substance is divided in two types on the basis of their chemical composition:

- (i) Elements
- (ii) Compounds

### (i) Elements

- According to Antoine Laurent Lavoisier, element is a basic form of matter that cannot be broken down into simpler substances by chemical reactions.
- It is divided in three types which are metals, non-metals and metalloids.



# Properties of Metals

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(i) They have a lustre (shine).

(ii) They have silvery-grey or golden-yellow colour.

(iii) They conduct heat and electricity.

(iv) They are ductile (can be drawn into wires).

(v) They are malleable (can be hammered into thin sheets).

(vi) They are sonorous (make a ringing sound when hit).

- Examples of metals are gold, silver, copper, iron, sodium, potassium etc.

- Mercury is the only metal that is liquid at

## Properties of non-metals

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(i) They display a variety of colours.

(ii) They are poor conductors of heat and electricity.

(iii) They are not lustrous, sonorous or malleable.

- Examples of non-metals are hydrogen, oxygen, iodine, carbon (coal, coke), bromine, chlorine etc.

**Metalloids:** Elements having intermediate properties between those of metals and non-metals are called metalloids. Examples are boron, silicon, germanium etc.

## Suspension and its properties



A suspension is a heterogeneous mixture in which the the solute particles do not dissolve but remain suspended throughout the bulk of the medium. Ex: Chalk in water, smoke in the air

### Properties of Suspension :

1. It is a heterogeneous mixture.
2. Particles of a suspension are visible to the naked eye.
3. Size of the particles is greater than 100 nm.
4. It is unstable mixture. Solute settles down at the bottom over period of time.
5. If the solution is passed through filter paper, solute and solvent gets separated.
6. It scatters light when light is passed through the solution i.e. it shows Tyndall effect.