

MINERALS

A mineral may be defined as an inorganic mass having a definite chemical composition and molecular arrangement



IDENTIFICATION OF MINERALS THROUGH PHYSICAL CHARACTERS

- **Form** – Minerals assume certain definite geometrical forms called **crystals**

Massive – No well developed crystals, rough surface

Crystalline – Few faces developed

Crystallized – Well developed crystals & faces smooth

Other forms – Fibrous – Fine thread like or fibre like mass e.g. Asbestos

Foliated – Consisting of thin and separable leaves also known as flaky e.g. Muscovite

Granular – Composed of grains e.g. Bauxite

Lamellar – Consisting of separable plates e.g. Wollastonite

Scaly – Occuring in small plates e.g. Mica

Tabular – Showing flat table top like surface e.g. Orthoclase

Columnar – Resembling slender columns e.g. Corundum

Dendritic – Tree like form e.g. Pyrolusite

Bladed – Form like a knife, blade or lath e.g. Galena, Kyanite

- **Colour** – The Colour of a mineral is often its striking property which depends upon absorption of some and the reflection of others of the coloured rays or vibrations which compose white ordinary light. Minerals show a variety of colours. Many of them are colourless or white and others are dark coloured.
- a) **Play of colours** – Minerals when turned in different directions with rapid succession display a changing series of prismatic colours as seen in the rainbow.
- b) **Change of colours** – Minerals when turned about in different directions with less rapid succession display a succession of colours as seen in mineral Labrodorite
- c) **Opalescence** – It is milky appearance as seen by mineral Opal and Cats eye

- **Lustre** – It depends upon the light reflection from the surface of mineral specimen.

Kinds of Lustre:

Metallic – e.g. Gold, iron, galena etc.

Submetallic – e.g. Chromite, cuperite etc.

Vitreous – e.g. Quartz, Orthoclase, fluorite etc.

Subvitreous – Calcite etc.

Resinous – e.g. Opal, amber, sphalerite etc.

Pearly – e.g. Talc, selenite etc.

Silky – e.g. Asbestos etc.

Admantine – e.g. Diamond

Dull

Transparent – A mineral is said to be transparent when an object can be seen clearly through it e.g. Selenite and Muscovite

Sub-transparent – When object seen appears indistinct

Translucent – When mineral transmits light but an object can not be seen through it

Opaque – When it transmits no light at all

- **Taste** – Minerals soluble in water and depends upon its taste


Types of taste are :

- Saline** – Taste of common salt
- Alkaline** – Taste of soda
- Bitter** – Taste of epsom salts
- Sour** – Taste of Sulphuric Acid
- Astringent** – Taste of an Alum

- **Odour** – Minerals when heated, rubbed or breathed upon give different odours

Types of Odour

- a) **Sulphurous** – Odour of burning sulphur e.g. Pyrite
 - b) **Horse – radish odour** – Odour of decaying horse radish e.g. Selenium
 - c) **Alliaceous** – Odour of garlic e.g. Arsenic compounds
 - d) **Fetid** – Odour of rotten egg e.g. Certain varieties of Limestone
 - e) **Argillaceous or Clayey** – Odour of moistened clay, when breathed upon
- **Hardness** – It denotes the resistance offered by a mineral to scratch its particles from the main mass. The hardness of a mineral can be tested by rubbing the mineral on the nails of the fingers, on the edge of the knife, on the edge of glass sheet or on the edge of a file. The best known scale invented so far is by Moh's Scale of Hardness

Mineral	Hardness	
Talc	1	
Gypsum	2	
Calcite	3	 
Fluorite	4	
Apatite	5	

Orthoclase	6	
Quartz	7	
Topaz	8	
Corundum	9	
Diamond	10	



- **Cleavage** – It is a natural broken surface along which a mineral can easily be split up. It is always due to the internal arrangement of molecules

Chief types are:

- Perfect** – When the broken surfaces are smooth and fission is also very easy e.g. Calcite, muscovite, asbestos etc.
 - Imperfect** – When the broken surface is not so smooth and fission is also not so easy e.g. Iron pyrite
 - Nil** – If breaking is somewhat difficult and broken surface is irregular, then cleavage is absent and written as nil.
- **Fracture** – It is an unnatural broken surface. It is always opposite to cleavage direction

Chief types are:

- Even** – When broken surface of mineral is quite smooth e.g. Chert

- b) Uneven** – When broken surface is rough and irregular e.g. Augite, hornblende etc.
- c) Hackly** – When broken surface is so sharp that it pinches the palm when pressed
- d) Conchoidal** – When mineral breaks with curved, concave or concentric rings as seen in broken soda water bottle e.g. Quartz, hematite etc.
- e) Subconchoidal** – When concentric rings are on small scale e.g. Tourmaline, beryl etc.
- f) Earthy** – When broken surface are friable and rough as seen in chalk
- g) Absent** – When no broken surfaces are seen
- **Specific Gravity** – Walkers balance and Jolly's balance
- **Magnetism** – A term applied for those minerals which are attracted by ordinary bar magnet due to presence of iron in them