

UPSC Civil Services Examination

UPSC Notes [GS-I]

Topic: Physical characteristics of minerals [Geography Notes for UPSC]

External crystal form

- The external crystal form determined by the internal arrangement of the molecules — cubes, octahedrons, hexagonal prisms, etc.

Cleavage

- It denotes the splitting of a crystal along a smooth plane.
- Not every mineral exhibits cleavage.
- A plane of structural weakness along which a mineral is likely to split.
- The quality of a mineral's cleavage indicates both the ease with which the mineral cleaves and the character of the exposed surface.

Fracture

- Fracture takes place when a mineral sample is split in a direction which does not serve as a plane of perfect or distinct cleavage.
- A mineral fractures when it is fragmented or crushed.
- Fracture does not result in the occurrence of clearly demarcated planar surfaces.
- Minerals may fracture in any possible direction.
- If the internal molecular arrangement is so complex that there are no planes of molecules; the crystal will break in an irregular manner, not along planes of cleavage.

Lustre

- Minerals may be categorized according to whether they are opaque or transparent.
- Each mineral has a unique lustre like silky, metallic, glossy, etc.

Colour

- Some minerals have a characteristic colour determined by their molecular structure.
- Eg: malachite, azurite, chalcopyrite, etc.

- Some minerals are coloured by impurities and because of impurities quartz may be white, green, red, yellow, etc.

Streak

- Streak is the shade of a mineral when it has been crushed to a fine powder.
- It may be of the same colour as the mineral or may differ.
- For eg:
 - Malachite is green and gives green streak.
 - Fluorite is purple or green but gives a white streak.

Transparency

- **Transparent:** Light rays pass through so that objects can be seen plainly.
- **Translucent:** Light rays pass through but will get diffused so that objects cannot be seen.
- **Opaque:** Light will not pass at all through the opaque objects.

Structure

- Structure refers to the particular arrangement of the individual crystals.

Hardness

- Hardness is defined as the level of difficulty with which a smooth surface of a mineral specimen may be scratched.
- It is dependent upon the strength of the bonds which compose its crystal structure.
- Ten minerals are selected to measure the degree of hardness from 1-10. They are:
 - Talc
 - Gypsum
 - Calcite
 - Fluorite
 - Apatite
 - Feldspar
 - Quartz
 - Topaz
 - Corundum
 - Diamond

Specific gravity

- Specific gravity is a unit-less quantity.
- It is defined as the ratio between the weight of a given object and the weight of an equal volume of water.

