

Physical Properties of Minerals – PowerPoint Notes

Atoms make up elements and elements make up _____. (Minerals make up ROCKS)

There are over 2000 minerals. Some minerals are composed of only one element. These are called Native elements. 2 examples _____ and _____.

Mineral Criteria

- Crystalline solid – atoms have specific arrangement or crystal structure
- 2. Naturally occurring – not manufactured by man.
- 3. Have a definite chemical composition – may be a single element or combination
- 4. Inorganic – minerals not made by living things (organic)

Mineral Formation

- Crystallize from _____ or _____.
Liquid magma/lava cools to solid with a definite internal arrangement of atoms with a regular repeating pattern
- PRECIPITATE FROM _____ dissolved minerals come out of solution (water) to form solids usually by evaporation.

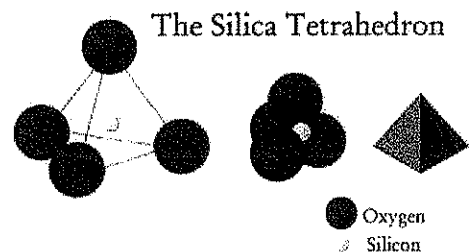
Minerals are identified by their physical properties

- Crystal Form – determines the physical properties
- Color
- Streak
- Luster – metallic, non-metallic
- Hardness – Mohs Hardness Scale (1-10)
- Cleavage
- Fracture
- Acid Test for carbonate minerals

A mineral's physical properties are controlled by its internal arrangement of atoms – regular, repeating pattern in its crystal form.

The most common crystalline structure is the silica _____. It is the basic building block for all silicate minerals.

(Silicate minerals make up the majority of rock types)



To illustrate how the **internal arrangement of atoms in the crystal structure controls the physical properties of minerals**, consider graphite and diamond. Both are made of the element _____ but in graphite the atoms are arranged in such a way that the mineral is soft and flaky. In diamond, the geometric arrangement of atoms yields the hardest substance known on the planet.

Color – easiest to identify but not very reliable because many minerals have a variety of colors.

Streak – color of a _____ made from mineral. Very useful because the color of the powder is consistent. Use a streak _____ to rub mineral sample.

Hardness - _____ to scratching or abrasion (physical action of wearing away). Usually measured by comparison to Mohs hardness scale.

Hardness	Mineral
1	Talc *
2	Gypsum
2.2	<i>Fingernail</i>
3	Calcite
4	Fluorite
5	Apatite
5.5	<i>Glass, steel knife</i>
6	Feldspar
7	Quartz
8	Topaz
9	Corundum
10	Diamond

Luster – how light reflects off surface.
2 types - METALLIC AND NON-METALLIC.

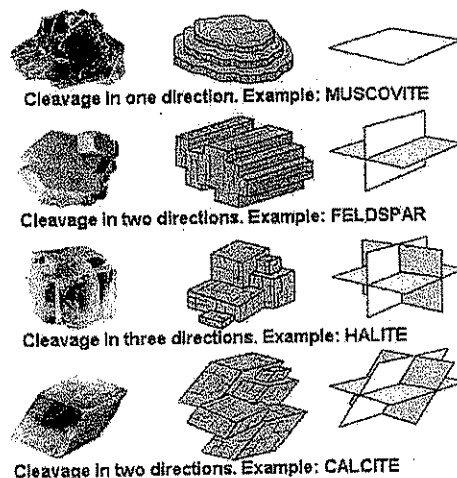
- Metallic – shines like a hard metal or a shiny pot or pan.
- Non-metallic: vitreous or glassy, silky, pearly or iridescent; dull; earthy

Many **non-metallic** minerals are _____.

E.g. metallic _____
glassy or vitreous _____
earthy _____

Cleavage/ Fracture

- Some minerals split along flat surfaces (called cleavage _____) when struck hard--this is called mineral cleavage
- Other minerals break unevenly along rough or curved surfaces--this is called fracture
- A few minerals have both cleavage and fracture (ex. _____)
- Cleavage is a confusing concept. Keep in mind that cleavage is not just one plane but should be a family of plane surfaces all oriented in the same direction due to weak bonds in the crystal structure



Acid Test for carbonate minerals – react with dilute HCL acid - bubble