

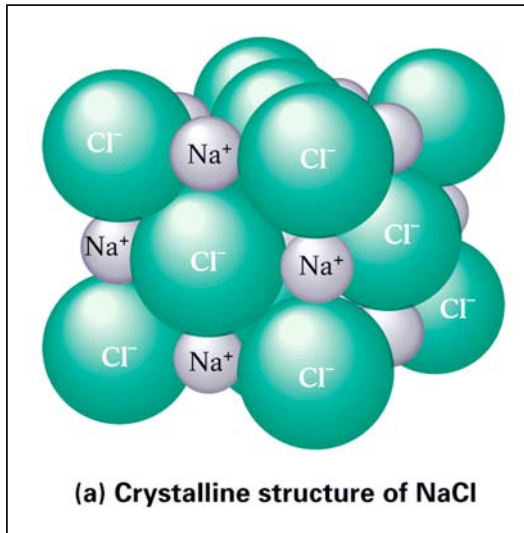
Definition of a Mineral

- Natural
- Solid
- Inorganic
- Crystalline Structure
- Chemical Compound



Source: E. R. Degginger/Bruce Coleman Inc.

Mineral Formation



Form Igneous Rocks

Primary

1. Crystallize out of a magma
2. Crystallize out of water

Form Sedimentary Rocks

Secondary

3. Chemical Weathering
4. Metamorphism

Form Metamorphic Rocks

Physical Properties of Minerals

A. Mineral Shape

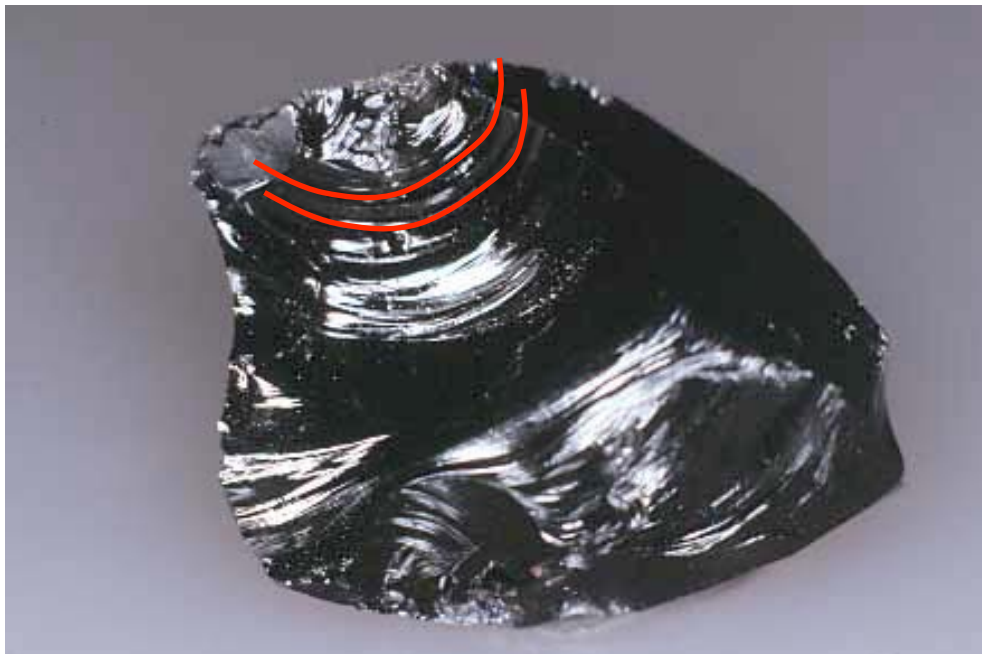
Crystal Form



Source: Jeffrey Scovil

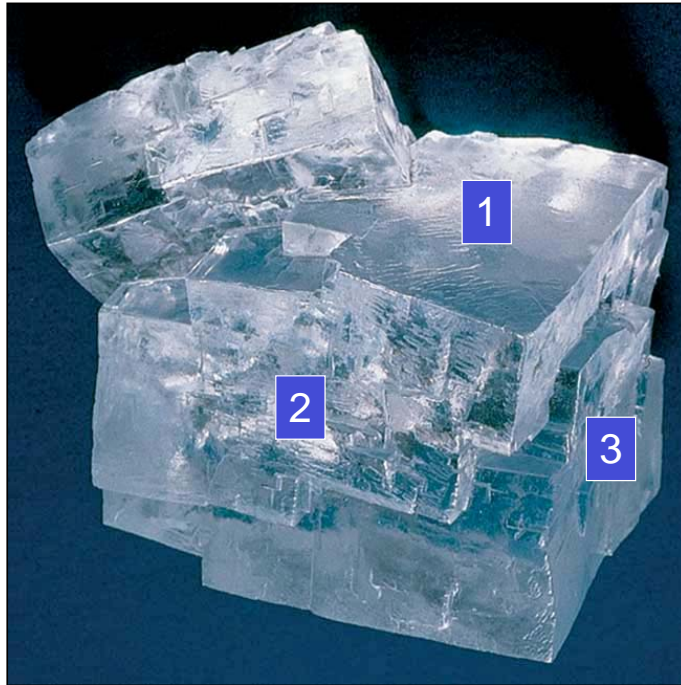
Fracture

Quartz: Conchoidal



Mineral Cleavage

Halite - 3 planes; angle 90°



Source: Ed Degginger/Bruce Coleman Inc.

Mineral Cleavage

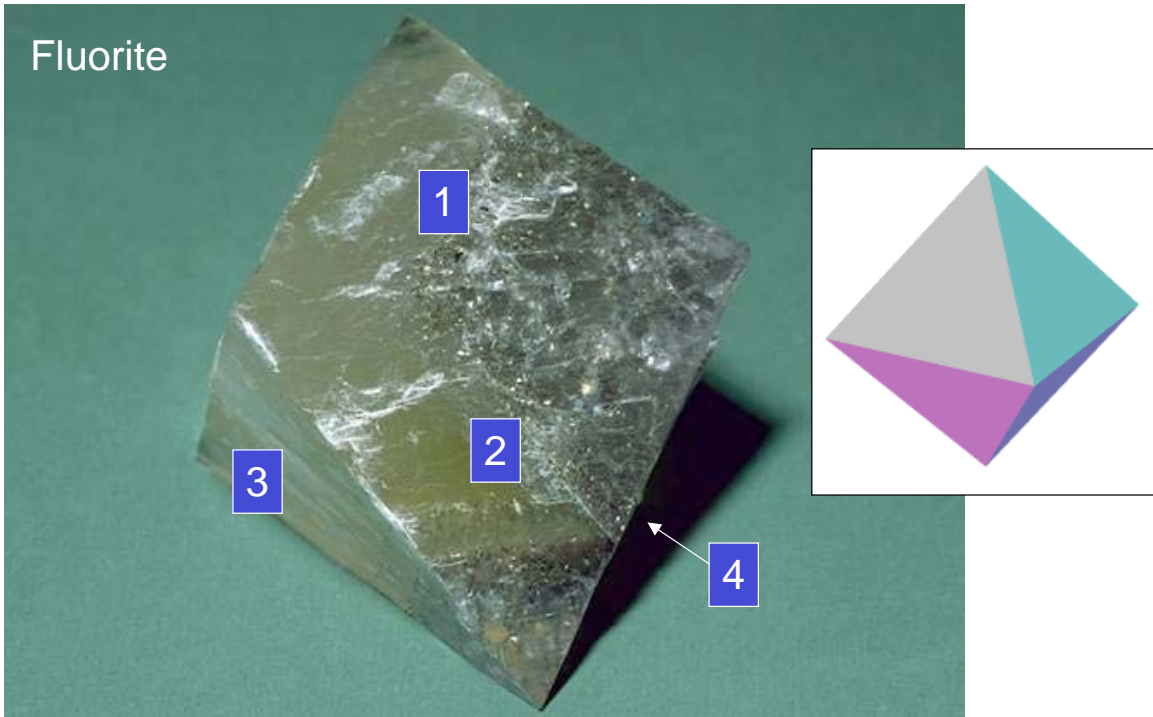
Muscovite - 1 plane; angle N/A



Source: Breck P. Kent

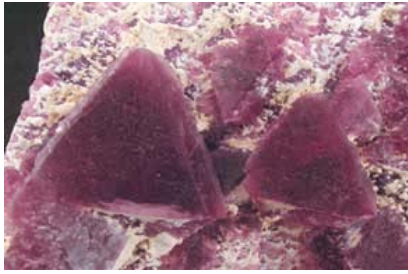
Mineral Cleavage

Fluorite: 4 planes; not 90°



Physical Properties of Minerals

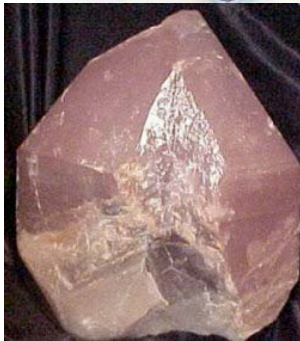
B. Mineral Appearance



Color



Quartz Color



Quartz Powder



Streak (Powder Color)

Hematite



Source: Breck P. Kent

Luster

Metallic	Highly reflected and “metal colored”	
Nonmetallic	Vitreous	Shines like glass
	Pearly	Whitish iridescence (like a pearl)
	Resinous	Dull shine (like wax)
	Earthy (Dull)	Surface doesn't reflect light

Metallic Luster



Source: E. R. Degginger/Earth Scenes

Nonmetallic Luster - Vitreous



Quartz

Nonmetallic Luster - Earthy

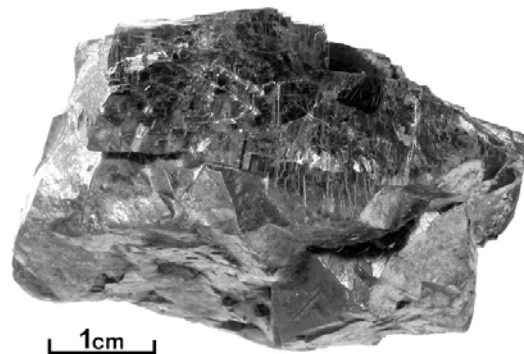


Source: Breck P. Kent



1. Opaque
2. Translucent
3. Transparent

Optical Properties

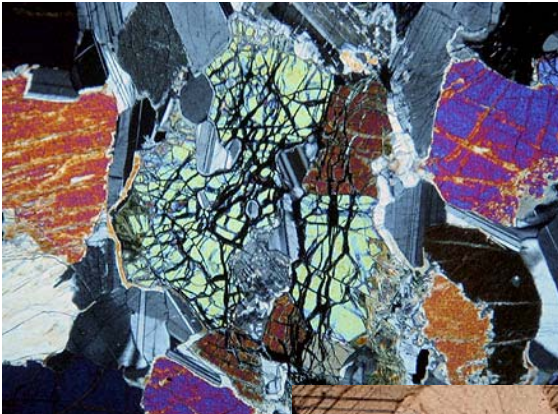


Petrologic Microscope



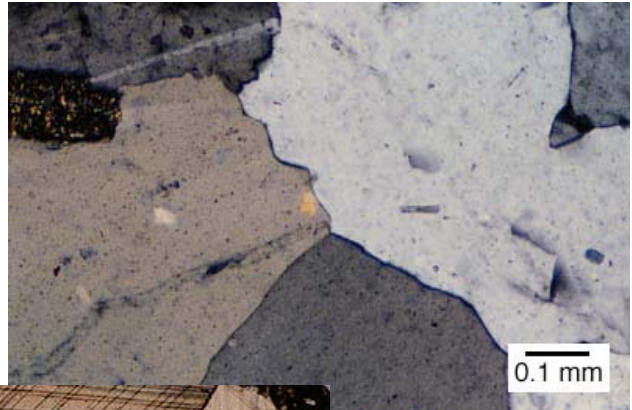
Biotite in white light

Olivine



Polarized Light

Quartz



Calcite



Physical Properties of Minerals

C. Mineral Strength/Density

Mohs Hardness Scale

Mineral	Hardness	Hardness of Some Common Objects
Talc	1	
Gypsum	2	
		Human fingernail (2.5)
Calcite	3	
		Copper penny (3.5)
Fluorite	4	
Apatite	5	
		Glass (5–6), Pocketknife blade (5–6)
Orthoclase (potassium feldspar)	6	
		Steel file (6.5)
Quartz	7	
Topaz	8	
Corundum	9	
Diamond	10	

Specific Gravity (Density)



**Reaction to HCl
(Calcite)**

**Magnetism
(Magnetite)**

Physical Properties of Minerals

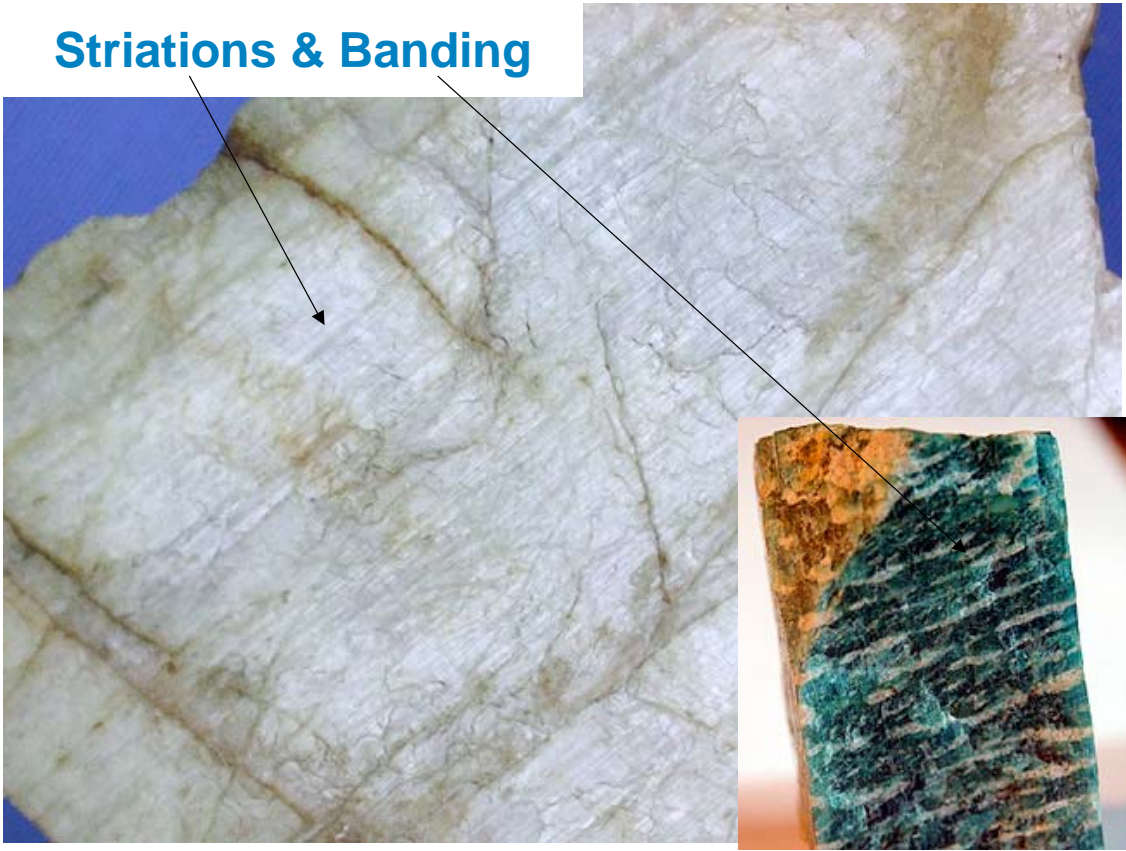
D. Other Properties

**Taste
(Halite)**

**Smell
(Sulfur)**

**Feel
(Talc)**

Striations & Banding

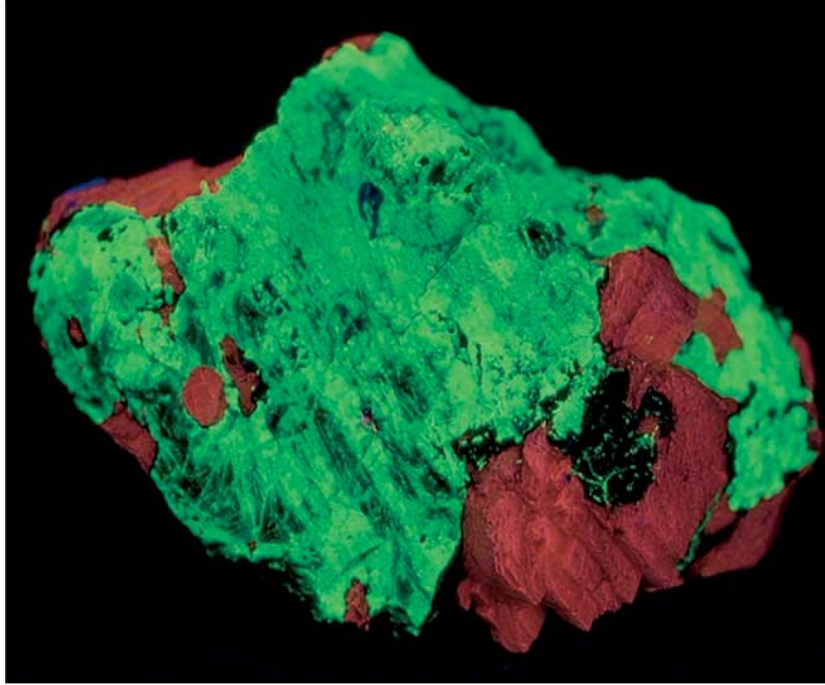


Fluorescence - White light



Source: Breck P. Kent

Fluorescence - UV light



Source: Breck P. Kent

Piezoelectricity



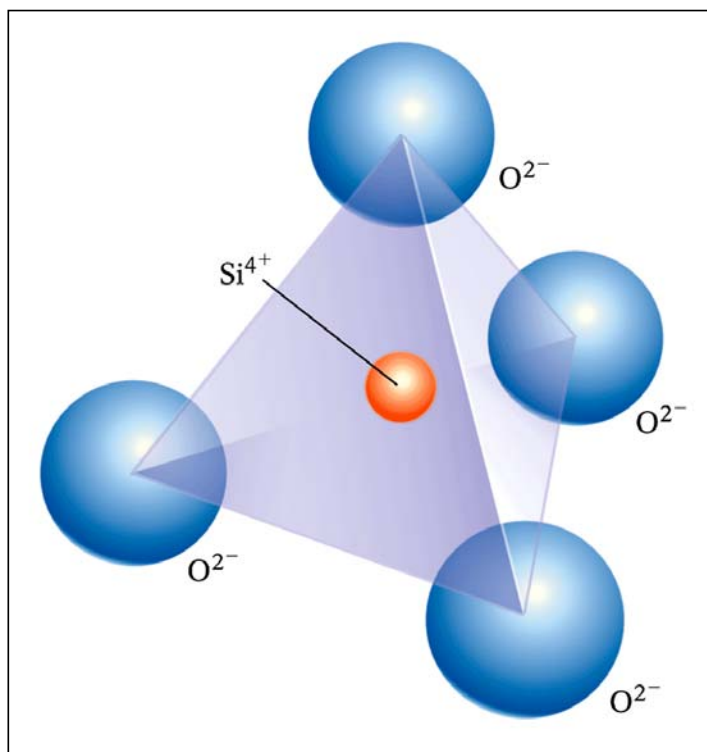
Silicate Minerals

(90% of the Earth's Crust)

Contain Silica - Silicon and Oxygen

Silicates:

**Silicon-
Oxygen
Tetrahedron**



Important Silicates

Micas

Feldspars



Silicates can be:

Mafic Minerals

Low Silica (Mg, Fe)

Dark colored
(including black & green)

Color

Light colored
(including white, tan, orange)

vs.

Heavy weight

Density

Light weight

Felsic Minerals

High Silica (Al, K)