

# MINERAL IDENTIFICATION BY THEIR PHYSICAL PROPERTIES

**LUSTER** The appearance of light reflected from a mineral. Luster is broadly described as metallic, having the appearance of a metal, or nonmetallic. Nonmetallic luster is further described as vitreous, pearly, resinous, or silky.

**STREAK** The color of a powder obtained from a mineral by rubbing it against an unglazed porcelain plate. A mineral's streak is commonly different than its color in hand specimen and is generally more diagnostic.

**HARDNESS** A mineral's resistance to abrasion. Hardness (H) is measured against Mohs hardness scale, which ranges from 1 (soft) to 10 (hard). Each value of hardness has a reference material, e.g. 1 is talc and 2 is gypsum, 10 is diamond. A mineral's hardness is evaluated by testing its ability to scratch or to be scratched by a reference material such as glass (H= 5.7).

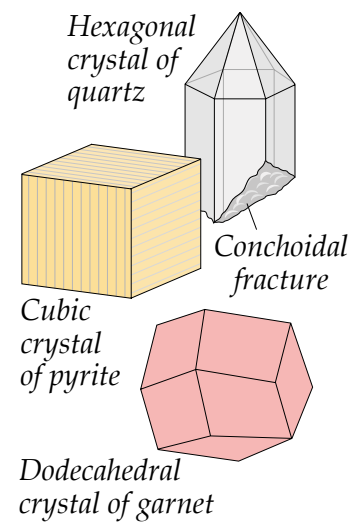
**CLEAVAGE** The tendency of a mineral to break along planes of weakness. The number of cleavage directions and the angles between them is diagnostic, as is the quality of particular cleavage directions, i.e. how planar and how common a cleavage direction is. Some minerals that lack cleavage display characteristic types of fracture, e.g. the conchoidal fracture of quartz.

**DENSITY** Mass per unit volume of a mineral. Common rock-forming minerals have densities (D) between 2.5 and 3.0 g/cm<sup>3</sup>. Some minerals, such as galena and barite, have noticeably high densities. Note that mineralogists commonly use a dimensionless expression of density, specific gravity (SG).

**CRYSTAL FORM** Given sufficient space, crystals grow with specific shapes bounded by planar crystal faces. Quartz crystals, for example, are hexagonal; pyrite and fluorite crystals are cubic; garnet crystals are more complex 12-sided dodecahedrons.

Diamond	10
Corundum	9
Topaz	8
Quartz	7
Orthoclase	6
Apatite	5
Fluorite	4
Calcite	3
Gypsum	2
Talc	1

**Mohs Hardness Scale**



## DETERMINATIVE TABLE FOR MINERALS WITH METALLIC LUSTER

1. Luster	2. Streak	Detailed description	Mineral name and chemistry
Metallic luster	Black, greenish black, or gray streak	Brass yellow to golden yellow; may tarnish to bronze or purple; brittle; H=3.5-4 (<glass); D=4.2; softer than pyrite	CHALCOPYRITE CuFeS <sub>2</sub>
		Cubic cleavage, often with stepped surfaces; silver-gray color; bright metallic luster dulled by tarnish; H=2.5; D=7.6; very dense	GALENA PbS
		Steel gray; H=1; D=2; soft, smudges fingers, marks paper; greasy feel; luster may be dull, earthy, rather than metallic	GRAPHITE C
		Magnetic; black to dark gray; H=6 (≥glass); D=5.2; granular masses may not appear metallic	MAGNETITE Fe <sub>3</sub> O <sub>4</sub>
		Pale brass yellow or darker due to tarnish; brittle; conchoidal fracture; cubic crystals with striated faces; H=6-6.5 (≥glass); D=4.2	PYRITE FeS <sub>2</sub>
	Reddish brown	Steel gray; micaceous, granular, or fibrous; H=5-6; D=5; platy metallic variety is known as specular hematite	HEMATITE Fe <sub>2</sub> O <sub>3</sub>
Pale yellow to yellowish brown	Yellow, brown or black; structureless or radial fibrous masses; H=5-5.5; D=3.5-4	LIMONITE Fe <sub>2</sub> O <sub>3</sub> • H <sub>2</sub> O	
	Six directions of cleavage; brown to yellowish brown; submetallic luster; yellowish streak with sulfur odor; H=3.5-4; D=4	SPHALERITE ZnS	