

Learning Series: Tools for the Rockhound

This mineral identification chart was created by Art Crossman as a college course project at Mansfield University in 1997. The chart is based upon mineral properties and has four pages. The left column sorts the minerals into those that break with cleavage and those that break by fracturing. Next minerals are sorted by hardness with the hardest being found at the top of each cleavage/fracture group. Information about additional mineral properties such as streak, color, luster, diaphaneity, specific gravity and more is also given on the chart. Minerals listed on the chart include: goethite, sphalerite, biotite, graphite, pyrite, hematite, magnetite, pyrrhotite, chalcopyrite, bornite, epidote, orthoclase, plagioclase, nepheline, augite, hornblende, apatite, serpentine, dolomite, fluorite, barite, calcite, phlogopite, chlorite, muscovite, kaolinite, halite, gypsum, talc, corundum, tourmaline, garnet, quartz, olivine, limonite, and bauxite - but you can add as many others as you want or delete any that are present.

Source: <https://geology.com/minerals/mineral-identification.shtml>

NONMETALLIC MINERALS HARDNESS (9 - 1)

	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
FRACTURE	colorless	brown, pink, blue & others	9	fracture, sometimes with parting	vitreous to adamantine	transparent, translucent	sometimes has hexagonal crystals	4.02	CORUNDUM
	colorless	black, green brown, pink yellow	7 - 7.5	fracture	vitreous	transparent, to opaque	sometimes striations	3.02 - 3.2	TOURMALINE
	colorless	usually red, green, black or any color	6.5 - 7.5	fracture	vitreous to resinous	transparent, to opaque	sometimes isometric crystals	3.5 - 4.3	GARNET
	colorless	any color	7	conchoidal fracture	vitreous to greasy	transparent to translucent	sometimes has hexagonal crystals	2.65	QUARTZ
	colorless	olive, green, brown	6.5 - 7	conchoidal fracture	vitreous	transparent to translucent	frequently as granular masses	3.27 - 4.27	OLIVINE
	reddish	red - brown, silver, or black	5 - 6.5	fracture	dull	opaque	sometimes oolitic or magnetic	5.26	HEMATITE
	yellowish-brown	yellow, brown, or black	4 - 5.5	fracture	dull	translucent, opaque	earthy color and appearance	2.7 - 4.3	LIMONITE
	white	white, gray yellow, red brown	1 - 3	fracture	dull earthy	translucent, opaque	pisolitic	2.00 - 2.55	BAUXITE

By: Art Crossman

Mineralogy / Petrology (1997)

NONMETALLIC MINERALS

HARDNESS (4 - 1)

	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
CLEAVAGE	white	any color clear, yellow purple, blue	4	perfect four directions	vitreous	transparent, translucent	sometimes fluorescent	3.18	FLUORITE
	white	white, gray red, brown clear, etc.	3 - 3.5	perfect 3 directions small faces	vitreous- pearly	transparent, translucent	very heavy for a nonmetallic mineral	4.3 - 4.6	BARITE
	white	white, gray green, yellow clear, etc.	3	perfect 3 directions, "rhombic"	vitreous- pearly	transparent, translucent	breaks rhombic HCl reaction double refraction	2.71	CALCITE
	colorless	dark green dark brown or black	2.5 - 3	perfect cleavage in one direction	nonmetallic	translucent	thin flakes, tough, flexible	2.8 - 3.2	BIOTITE
	colorless to white	yellow to brown in thin sheets	2.5 - 3	perfect in one direction	vitreous to pearly	transparent	frequently a copper - like luster	2.68	PHLOGOPITE
	gray to green	greenish, gray, black	2 - 2.5	perfect in one direction indistinct	vitreous dull pearly	transparent, translucent	foliated or scaly appearance	2.6 - 3.3	CHLORITE
	colorless	clear, white yellowish, silvery, etc.	2 - 2.5	perfect cleavage in one direction	vitreous to pearly	transparent	splits into thin sheets	2.7 - 3.0	MUSCOVITE
	white	white, gray, yellowish	2 - 2.5	one direction but usually indistinct	dull, earthy	translucent	plastic when wet crumbly when dry	2.6	KAOLINITE
	white	white, gray blue, red clear	2 - 2.5	perfect 3 directions at 90 degrees	vitreous to pearly	transparent, translucent	water soluble, tastes salty	2.16	HALITE
	white	white, gray brown, red clear & others	1.5 - 2	perfect in one direction 2 indistinct	vitreous to pearly	transparent, translucent	sometimes as fibrous masses	2.3 - 2.4	GYPSUM
white	green, gray white, silver & other colors	1	one direction but usually indistinct	pearly to greasy	translucent, opaque	feels greasy, tiny flakes upon rubbing	2.7 - 2.8	TALC	

<http://geology.com/>

NONMETALLIC MINERALS
HARDNESS (7 - 4)

	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
CLEAVAGE	white or colorless	green to black	6 - 7	one direction indistinct	vitreous - dull	transparent, translucent	typically pistachio green	3.35 -3.4	EPIDOTE
	white or colorless	white, gray, pink, clear, green, yellow	6 - 6.5	two directions at 90 degrees	vitreous	transparent, translucent	few if any striations	2.5 - 2.6	ORTHOCLASE
	white or colorless	white, gray clear, blue green	6	two directions at 90 degrees	vitreous	transparent, translucent	striations on cleavage faces	2.6 -2.8	PLAGIOCLASE
	white or colorless	colorless, gray, white	5.5 - 6	one direction indistinct	greasy - vitreous	transparent, translucent	softer than quartz, cleavage	2.6 - 2.65	NEPHELINE
	greenish	green, gray brown, black	5 - 5.5	two directions intersects at 90 degrees	vitreous to dull	translucent	brittle	3.2 - 3.6	AUGITE
	colorless	brown, dark green, black	5 - 6	two directions intersects at 56 & 124 degrees	vitreous	translucent	appears fibrous or silky	3.0 - 3.4	HORNBLLENDE
	yellow or brown	yellow, brown, or black	5 - 5.5	one direction indistinct	dull to admantine	translucent	appears fibrous or silky	3.3 - 4.3	GOETHITE
	white	green, brown yellow, pink violet, etc.	5	poor cleavage in one direction	vitreous	transparent, translucent	brittle, fractured masses	3.1 - 3.2	APATITE
	white to gray	greenish, yellowish, black	3 - 5	one direction indistinct	greasy to waxy	transparent, translucent	varigated, sometimes fibrous	2.3	SERPENTINE
	white, yellow, or brown	white, red yellow, brown green, black	3.5 - 4	perfect cleavage in 6 directions	resinous to adamantine	translucent	brittle, looks like resin	3.9 - 4.1	SPHALERITE
	white	pink, white gray, and others	3.5 - 4	3 direction, rhombic indistinct	vitreous pearly	transparent, translucent	HCl fizz only with powder	2.85	DOLOMITE

<http://geology.com/>

METALLIC TO SUBMETALLIC MINERALS

FRACTURE CLEAVAGE	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
CLEAVAGE	yellow or brown	yellow, brown, black	5 - 5.5	one direction indistinct	submetallic	translucent	silky, fibrous appearance	3.3 -4.3	GOETHITE
	white, yellow, or brown	white, red yellow, brown, green, black	3.5 - 4	perfect cleavage in 6 directions	submetallic	translucent	brittle, looks like resin	3.9 - 4.1	SPHALERITE
	colorless	dark green, dark brown, or black	2.5 - 3	perfect cleavage in one direction	submetallic	translucent	thin flakes, tough, flexible	2.8 - 3.2	BIOTITE
	black	black, silver, or gray	1 - 2	cleavage sometimes indistinct	metallic or submetallic	opaque	marks paper, soils fingers, slippery	2.23	GRAPHITE
FRACTURE	black	brassy yellow	6 - 6.5	conchoidal fracture	metallic	opaque	sometimes in crystal shapes	5.02	PYRITE
	reddish	red -brown, black, silver	5 - 6.5	fracture	metallic or submetallic	opaque	sometimes oolitic or magnetic	5.56	HEMATITE
	black	black or silver	6	fracture	metallic or submetallic	opaque	strongly magnetic	5.18	MAGNETITE
	black	brownish	4	fracture	metallic	opaque	weakly magnetic	4.58 - 4.65	PYRRHOTITE
	greenish black	brassy yellow	3.5 - 4	fracture	metallic	opaque	brittle	4.1 - 4.3	CHALCOPYRITE
	black	brassy with iridescent colors	3	indistinct cleavage	metallic	opaque	iridescent peacock colors	5.0 -5.1	BORNITE