

The Properties of Several Common Minerals

Mineral/Composition ¹	Hardness	Cleavage	Color(s)	Occurrence ²	Comments
Amphibole Si, Al, Fe, Mg, Ca Na, O, H	5–6	2 directions at 60 and 120 to each other	Black	I, M	Crystals are often elongate when found in rocks. Can be difficult to distinguish from black mica, but it has two cleavage directions (not one) and does not “flake” off.
Calcite CaCO ₃	3	3 directions, not at 90 to each other	Colorless, white, pink, gray	S, M	See Fig’s 2.15 and 2.17 in the textbook. Glassy luster. Clear crystals display double refraction. Will dissolve in dilute hydrochloric acid, releasing bubbles of carbon dioxide gas. Calcite is the major mineral in limestone and marble.
Chlorite Mg, Fe, Si, Al, O, H	2–2.5	1 direction	Various shades of green	M	Very similar to mica, but chlorite is always green. Large crystals are very rare (we were lucky to find some).
Clay Si, Al, Na, K, O, H	2–2.5	Not applicable (individual crystals too small to see)	White, gray	S	Earthy luster. Formed by hydration (a type of chemical weathering) of many kinds of minerals, especially feldspar and mica.
Feldspar Si, Al, Ca, K, Na, O	6	2 directions at 90 to each other	White, gray, pink, light green, black	I, M, S	See Figure 2.3 on p. 31 in the textbook. One direction of cleavage is often better than the other.
Garnet Si, O, Al, Fe, Mg, Ca, and more	6.5–7.5	None; displays conchoidal fracture	Dark red, light green, tan	M, I (rare)	Glassy luster. Often in well-formed crystals with 12 sides. Some sides are diamond-shaped.

¹ See Table 1.2 on p. 24 of the textbook for full names of elements. Elements not in Table 1.2: S = sulfur; H = hydrogen, C = carbon, Cl = chlorine

² “I” denotes igneous rocks; “S” denotes sedimentary rocks; “M” denotes metamorphic rocks

The Properties of Several Common Minerals, Continued

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Halite NaCl	2.5	3 directions at 90 to each other	Colorless, white gray	S	See Figure 2.2 on p. 31 in the textbook. Glassy luster. Salty taste (table salt is powdered halite).
Iron Oxide Fe, O	1–6.5	None; usually the crystals are too small to see if there is cleavage or not	Usually brick red; can be red-brown, yellow, or lead gray (colors sometimes mixed)	S, I (rare)	Usually has an earthy luster. Has a red or yellow streak. Can have a metallic luster (when it does, its color is lead gray). Many iron-rich minerals oxidize (a type of chemical weathering) to form iron oxide.
Mica Si, Al, Fe, Mg, K, O H	2–3	1 direction	Black, brown, gold, silver, clear	I, M, S (rare)	See Figure 2.14 on p. 37 in the textbook. Occurs as “books,” “sheets” are elastic (you can bend them but they bounce back). Cleavage surfaces are very shiny, they look almost like metal.
Olivine (Mg, Fe) ₂ SiO ₄	6.5–7	None	Light green	I	Glassy luster. Transparent. Common in mafic and ultramafic rocks. The transparent gem variety is known as peridot.
Quartz SiO ₂	7	None; shows very nice conchoidal fracture	Clear when pure; can be tinted any color. Purple is amethyst; pink is rose quartz	I, M, S	See Figures 2.1 (p. 30) and 2.16 (p. 39) in the textbook. Has a very glassy luster. Well-formed crystals have a distinctive 6-sided prism shape.
Serpentine Si, Fe, Mg, O, H	2–5	None; has gently-curved cleavage-like surfaces	Various shades of green to black	M	Slippery feel. The California state rock is serpentinite, a rock made of almost 100% serpentinite. Serpentine forms when water combines with olivine in mafic and ultramafic rock (in other words; the mafic or ultramafic rock undergoes metamorphism)

