

Density of minerals IV: Simple anions

This plot shows the density of minerals with simple anions (e.g., Cl⁻, O²⁻, or P³⁻) as opposed to those with complex anions (e.g., the CO₃²⁻ of CaCO₃). At least three things emerge. First, more dense anions lead to more dense minerals, as the upward trend of all the linking lines shows. For example, tellurides are more dense than selenides of the same cation, which are more dense than sulfides of the same cation. Secondly, minerals with 3-anions are more dense than corresponding minerals with 2-anions, which are more dense than minerals with 1-anions (the halide minerals). Finally, minerals with anions from the top row of the periodic table (oxides and, to a lesser extent, fluorides) are unusually dense compared to minerals with anions of the same charge. For example, oxides are much more dense than sulfides of the same cation, and commonly more dense than selenides and even tellurides of the same cation. This difference is probably due to differences in bonding and illustrates why sulfides, selenides, and tellurides are commonly categorized together but never lumped with the oxides.

			He
N ³⁻	O ²⁻	F ⁻	Ne
P ³⁻	S ²⁻	Cl ⁻	Ar
As ³⁻	Se ²⁻	Br ⁻	Kr
Sb ³⁻	Te ²⁻	I ⁻	Xe

triangles	minerals with 3- anions (nitrides, phosphides, etc.)
squares & diamonds	minerals with 2- anions (oxides, sulfides, selenides, etc.)
circles	minerals with 1- anions (halides)
blue	Cu-bearing minerals
red	Fe-bearing minerals
black	minerals of other cations
filled symbols	minerals
open symbols	non-mineral synthetics

