Components of Granite

Feldspar Group

Potassium Feldspars (AKA Alkali Feldspar or K-spar)

Microcline, Orthoclase = $KAlSi_3O_8$. They are the same chemically, but have different crystal structures; they are low-temperature feldspars; colors are tan to pink.

Orthoclase has monoclinic crystals = in the monoclinic system, the crystal is described by vectors of unequal lengths, as in the orthorhombic system. They form a rectangular prism with a parallelogram as its base. Hence two vectors are perpendicular (meet at right angles), while the third vector meets the other two at an angle other than 90°.

Microcline has triclinic crystals = the angles between these vectors must all be different and may include 90°.

Sanidine = $(K,Na)AlSi_3O_8$, the high temperature form of potassium feldspar. It has monoclinic crystal structure and is colorless to pink.

Sodium Feldspars (AKA Plagioclase)

More properly known as the plagioclase feldspar series, ranging from albite to anorthite endmembers (forms with widest variation in chemical structure) with chemical formulas of $NaAlSi_3O_8$ to $CaAl_2Si_2O_8$, where sodium and calcium can substitute for each other in the crystal lattice. Crystal structure is monoclinic and colors range from white to grey.

Feldspars as a group have two directional cleavages that can be seen as the “feldspar flash.”

Quartz

Quartz is a mineral composed of silicon and oxygen atoms in a continuous framework of SiO_4 silicon–oxygen tetrahedra, with each oxygen being shared between two tetrahedra, giving an overall chemical formula of SiO_2. Quartz is the second most abundant mineral in Earth's continental crust, behind feldspars as a group. Generally colorless in its pure form, it can have many colors due to contaminants. Crystals are hexagonal and, if complete, can have a beautiful point.

Mica Group

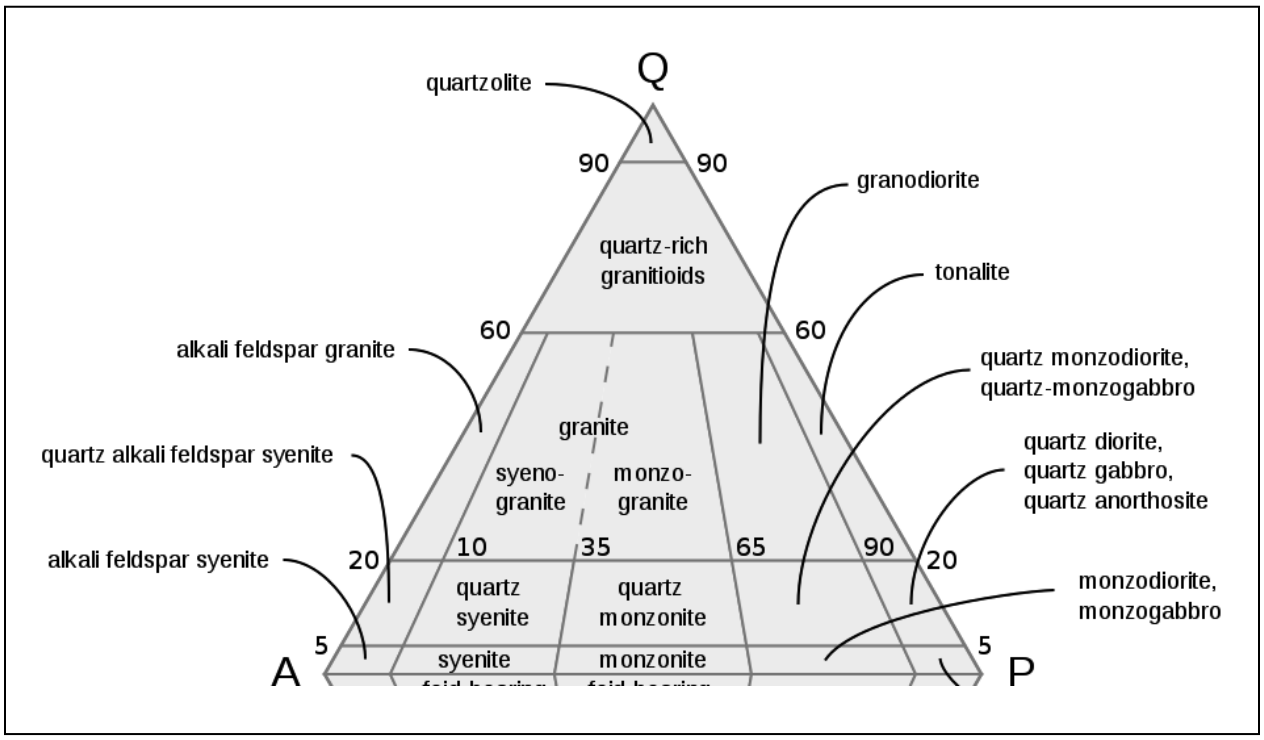
Muscovite = formula $KAl2(AlSi_3O_{10})(FOH)_2$, or $(KF)_2(Al_2O_3)_3(SiO_2)_6(H_2O)$. It has basal perfect cleavage with a monoclinic crystal structure. Color is white to pearly and usually transparent (used in early oven windows).

Biotite = formula $K(Mg,Fe)_3AlSi_3O_{10}(F,OH)_2$ It also has perfect basal cleavage and monoclinic crystal structure. Color is usually black because of iron content, but is usually at least partly transparent (often used in welding visors).

Granite vs. Granodiorite

These rocks are both classified as granitic, because they both are rich in quartz. Granite contains mostly potassium feldspars and has a low percentage of dark iron and magnesium minerals. In contrast, granodiorite contains more plagioclase (calcium and sodium) feldspar than potassium feldspar and has more dark minerals, especially **hornblende**. Thus it is a darker color than granite. Chemical and x-ray analysis of granite and granodiorite can be used to "fingerprint" these rocks, telling their exact composition and where they may have formed.

The QAP Diagram below shows the mineral composition of plutonic rocks.



Q= Quartz A = Alkali (Potassium) Feldspar P= Plagioclase Feldspar

Syenogranite is an intrusive igneous rock of the same general composition as granite. The feldspar component of syenogranite is predominantly alkaline (potassium) and usually orthoclase. The pink granite in the Salmon Mountains is syenogranite.

Monzogranite is an intrusive igneous rock of the same general composition as granite with the feldspar component containing greater amounts of plagioclase, but not as much as granodiorite. Monzogranite occurs near Lick Creek northeast of McCall and in the CuMo Project south of the South Fork of the Payette River.