

From the general mineralogical composition, the rock might be considered as an olivine-free gabbro. But from the prevalence of the ophitic structure, it must be classed as a transition form between a gabbro proper and a diabase. The basic nature of the feldspar however, as well as the nature of the inclusions, and the alteration products, belong more typically to a gabbro, than to a diabase.

Under the microscope the rock is seen to be made up largely of plagioclase feldspar, pyroxene, hornblende, and chlorite. Besides these minerals, there are small amounts of brown mica, apatite, quartz, magnetite, and secondary sulphides in varying amount.

The feldspar is as a rule fairly fresh, and nearly always builds sharply bounded crystals, about 2 to 4 times as long as broad. With reference to the pyroxene they are idiomorphic. The crystallization of the feldspar has apparently begun before that of the pyroxene, and extended through it, so that the feldspars appear to lie in a cement of pyroxene. (See Fig. 6.)

Twinning according to the albite law is universal, and at times is combined with a carlsbad twinning. Measurements of the extinction angle range up to 32 and 34 deg., showing that the feldspar belongs to the basic end of the group, that is, bytownite or anorthite. In the feldspar crystals themselves, are numerous, zonally arranged needles, of a highly refracting mineral, whose exact nature could not be determined, but which is probably rutile. There are also inclusions of a secondary nature, where alteration has begun.



Fig. 1.—Ore rock showing pyrrhotite replacing feldspar, and hornblende along shearing planes, which can be traced through the section. The rock minerals in the vicinity of the ore are largely altered to aggregates of decomposed feldspar, fibrous, green hornblende and chlorite. There are a few grains of colorless epidote, and a small amount of fresh, regenerated feldspar.—Magnified about 70 diameters.

These consist of small centers, of highly refracting particles, of a saussuritic nature. The feldspar resists alteration much better than the other minerals.

The prevailing pyroxene is most closely related to diallage, but is peculiar in some respects. A few grains of other pyroxenes, resembling diopside, and an orthorhombic variety, were also noticed, but the amount is very subordinate. The diallage as stated is without crystal boundaries, and forms a cement for the feldspar. The color is light brown, often with a tinge of violet (indicating titanium). Pleochroism is very faint, and only observable as changes of shade.

Besides the ordinary cleavages, which are well developed, the pyroxene is characterized, in that it possesses the peculiarity of a decided *fibrous structure parallel to the base*. The maximum extinction angle is high, corresponding to diallage, and reaches 39 to 40 deg. Regular intergrowths with diopside as well as with brown hornblende, are frequently noticed.

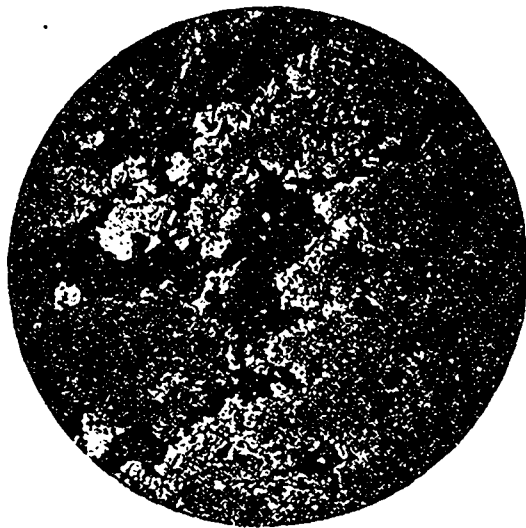


Fig. 2.—Ore-rock with considerable calcite, showing the etched borders of the epidote and hornblende, and ore along the cleavages and between the grains. A fragment of brown hornblende, partly bleached, and altered, is cut entirely in two by the ore, which is also seen along its cleavage planes.—Magnified about 70 diameters.

The pyroxene is always in a more or less advanced stage of alteration, which makes its exact determination at times difficult. In most cases it is filled with fine dust-like inclusions, of both a primary and secondary nature. The latter are highly polarizing and consist of calcite and epidote, with more or less of a talcose mineral. Again it is often pierced with numerous needles of a secondary green hornblende, or chlorite. In a further stage, a green fibrous horn-

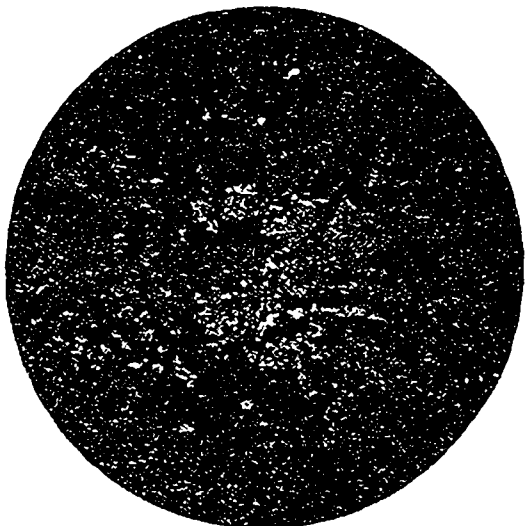


Fig. 3.—Ore-rock, with part of an irregular veinlet of sulphides, along a line of weakness, where the rock is much crushed and decomposed. Residues of epidote, pyroxene, etc., can be seen entirely surrounded by ore. The epidote is finely granulated, and shows the effects of a severe dynamic strain. It is also filled with decomposition products, and associated with calcite, while chlorite is also abundant. Small amounts of altered hornblende and diallage also remain, partly replaced by ore. Magnified about 65 diameters.