Katla Geopark: An Educator's Guide and Worksheets

Geology and history

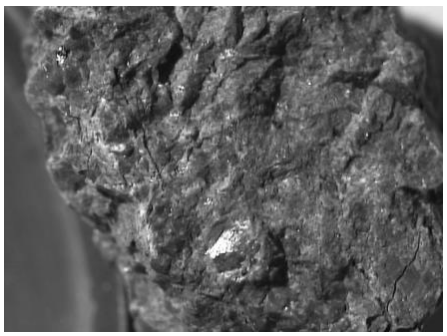
KATLA GEOPARK
ICELAND

Pöstin – Minerals. Teaching Instructions

Igneous volcanic rock with a lot of olivine and pyroxene used to be classified as ankaramite. At present, the classification is based solely on chemical analysis, and ankaramite is therefore considered to be picrite.

Igneous rock consists of crystallised minerals, and the cooling speed of the magma determines for the most part how coarse the crystals are. The slower that the magma cools, the larger the crystals will become. Cryptocrystalline rock solidifies quickly on the surface, while coarse-grained rock solidifies slowly, e.g. underground in large laccoliths where the crystals have plenty of time to grow. Points of contact and the surface of lava flows, however, are glassy, as the cooling is so fast that crystals are unable to form. In some cases, the mineral crystals begin to form in the magma before it reaches the surface, and when the magma is ejected and solidifies fully, most of the rock will be cryptocrystalline with larger mineral crystals in between and is termed porphyritic rock.

Ankaramite (picrite) is a porphyritic alkaline igneous rock with a lot of dark minerals. Its base mass is fine grained or cryptocrystalline and can be either vesicular or dense. The pyroxene and olivine crystals that are in the rock have formed underground before the magma reached the surface. Ankaramite is found in the distribution areas of alkaline basalts around the Eyjafjallajökull glacier, both as lava fields and as dikes. Earlier theories posited that these are lava sills and laccoliths, but recent research indicates that a lava lake formed and that the ankaramite ash lying above it is from the same time.



Pyroxene is a class of magnesium-iron-calcium-aluminium-silicates, which means that there are many types of pyroxene. Augite is the most common type in Iceland. Pyroxene is black or dark green in colour and has crystals formed into prisms. Pyroxene is the main mineral in basalt and gabbro. It is found as grains in several types of basalt.

Olivine crystals

Olivine is usually olive-green (hence the name), although it can become reddish due to the oxidation of the iron it contains. It has shell-like fracture surfaces and is glassy. Olivine crystallises from magma that is rich in magnesium and does not contain much silicon.

Olivine, or variations thereof that form under high pressure, form over 50% of the Earth's upper crust, which means that the mineral is one of Earth's most common minerals measured by volume. Olivine has also been found in meteorites, on Mars and on the moon.

Pöstin – Minerals. Worksheet

Purpose:
Participants will learn the difference between the terms rock and mineral, as well as learn how minerals and porphyritic rock form.

Execution:
The group is divided into two-person teams, and each team is provided with a hammer, a chisel and a loupe.
Examine the rock and find a rock containing olivine and pyroxene minerals.

When each pair has found a rock, hold a competition to determine who found the most beautiful rock and who held the best presentation about their rock. Tell the rock's story (where, when and how the rock and the minerals were formed) and provide reasoning as to why this particular rock deserves to win.

Finally, vote for:
The most beautiful rock, the most effective story, the best presentation, the most beautiful olivine mineral and the most beautiful pyroxene mineral.

Draft presentation: