

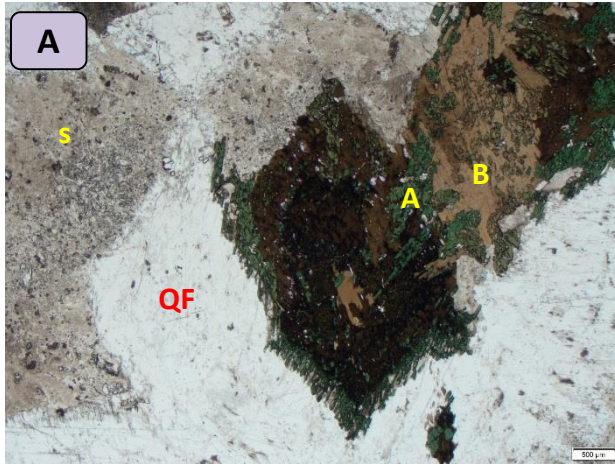
Pegmatite

Sample: TU25

Type of rock: Plutonic

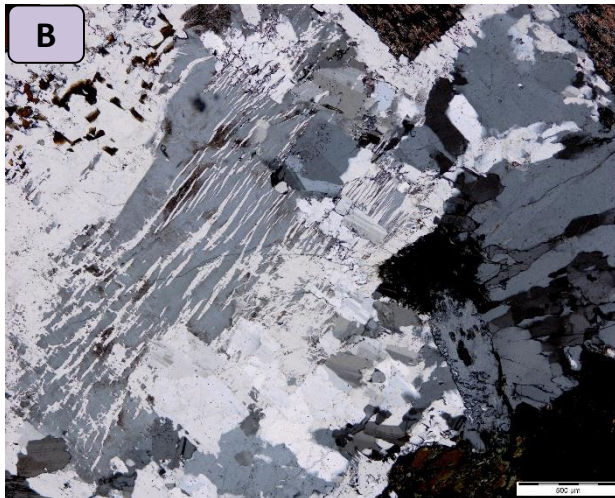
Age: Unknown

Location/Formation: Finland



PPL image

Magnification: 11x



XPL image

Magnification: 45x

Characteristic summary:

Main minerals:

Quartz and feldspars (pale), biotite (brown), aegirine (green), sericite (brownish).

Mineral Size:

Very coarse to medium

Mineral morphology:

Euhedral to subhedral

Fabric:

Holocrystalline

Noteworthy features

Components: The sample is composed of very coarse crystals, generally interlocked, of pale quartz and feldspar (QF), together with biotite (B) and aegirine (A), a sodium-rich pyroxene. Some of the feldspars are strongly altered and substituted with sericite (s). View under XPL (Image B) is essential to visualize the complex mosaic of interlocked quartz and feldspar.

Processes reconstructed from the thin section: The peculiar texture of this type of rock, with very large (up to several meter) interlocked crystals, records an unusual crystallization process. Usually, large crystals are attributed to slow rates of crystallization. Pegmatites are instead generated in dykes and sills similarly to diabase. From the thin section it cannot be reconstructed why their behavior is so different but, based on larger scale geological study, it is known that pegmatites form close to the magma chamber. Studies indicate that their development requires super-heated waters that 'escape' from magma and infill fractured surrounding rock. These waters are extremely rich in dissolved ions, including rare chemical elements. Since magma chemical ions are diluted into water, only few crystals form. However, since water can freely flow through faults and fractures, it can also rapidly resupply ions, which is the key to form very large crystal. This process also favors the accumulation of rare valuable elements, hence pegmatites are often exploited for mineral extraction. Also alternative models exist which could explain the genesis of this type of rock, such as an origin from metamorphic processes, because transitions to gneisses are also found.

Occurrence: Europe, e.g. France, Scotland, Germany

Technical use: Extraction of rare earth minerals and gemstones.