Permo-Triassic hydrothermal phosphate (lazulite) mineralization in the polymetamorphic Austroalpine Grobgneis complex, Eastern Alps, Austria

BERNHARD, F. Institute of Engineering Geology and Applied Mineralogy, Graz, Austria.

The polymetamorphic Austroalpine Grobgneis complex contains tens of lazulite occurrences, spread over an area of ca. 1000 km^2. Lazulite mineralization consists of up to one meter thick lazulite-quartz veins, which can be compositionally banded, comprising lazulite-rich domains and quartz-rich domains. Locally, discordant contacts of the veins with an older foliation and hydrothermal vein breccias are preserved. The veins are accompanied by several dm wide alteration zones, characterized by Mg-rich chlorites and hydrothermal alteration of metamorphic monazite to florencite. The age of the primary formation of the veins is constraint by EMP total Pb dating of accessory xenotime in quartz-rich domains, yielding an age of 246±23 Ma. Lazulite is Mg-rich (XMg = 0.92-0.98), and lazulite-rich domains are enriched up to 20 times in Sc (hosted in pretulite, $ScPO_4$) compared to upper crustal values. REE minerals are florencite and xenotime, but REE concentrations in lazulite-rich domains are usually below upper crustal levels.

The formation of lazulite-quartz veins can most probably be related to Permo-Triassic extensional tectonics, metamorphism and fluid circulation in this area, whereas the sources of P, Al and Mg remain to be disclosed.

Eo-Alpine lower amphibolite facies metamorphic overprint and deformation resulted in transposition of most veins in the regional Alpine foliation, boudinage of lazulite-rich domains and ductile deformation of quartz-rich domains. Lazulite is partly altered to apatite + muscovite along narrow shear zones. Veinlets crosscutting apatite-rich shear zones and lazulite-rich domains are filled with apatite + quartz or lazulite + quartz, respectively, suggesting only very localized late remobilization.