CASSITERITE IN QUARTZ-FELDSPAR VEINLETS OF IGNIMBRITE (SOUTHERN BÜKK MTS., HUNGARY)

SZAKÁLL, S. & KRISTÁLY, F.
Institute of Mineralogy and Geology, University of Miskolc, Miskolc, Hungary
E-mail: askszs@uni-miskolc.hu

An unusual vitreous rock type was found exposed in an experimental quarry in the vicinity of Kács locality. The territory is characterised by various volcanic products, displaying the effects of different alteration processes. The aforementioned rock type is dominantly reddish to light brown with dense network of centimetre-wide veinlets, filled with bright white coarsely crystallized feldspars and quartz. These veinlets are the product of hydrothermal activity affecting a consolidated tuffaceous product undergoing mechanical deformations. A late-stage percolation of fluids is indicated by Mn-oxide rich layers and films covering the feldspar veinlets and thin cracks. The groundmass is built up by fine-grained quartz with phenocrystals of biotite and feldspars in a fluidal-vitrophyric texture, built up by layers of different volcanic stages as indicated by the presence of coarse, highly oriented obsidian windles. The petrography of the formation is characteristic for welded ingnimbrites, tectonized and affected by hydrothermal fluids. The stratigraphic position of the formation corresponds to the Middle Pyroclastic Complex, as the Tibolddaróc unit.

Samples were collected from the different textural-petrographic varieties of the host rock, alteration products and the veinlets. Investigations by X-ray powder diffraction and scanning electron microscopy with energy-dispersive spectrometry was applied to identify and characterize minerals in different textural positions. The hydrothermal veinlets consist of sanidine and quartz (like), mostly subhedral and anhedral crystals. The host rock is built up by subhedral, resorbed quartz and Na-rich plagioclase in a mixed glassy and feldspar groundmass. Millimetre-sized or even larger rounded euhedral ilmenite crystals and biotite phenocrysts can be distinguished macroscopically.

Cassiterite was found related to the sanidine-rich veinlets, as intragranular anhedral aggregates up to 50–100 μm, mostly deposited on the surface on SiO_2 grains (Fig. 1). EDS measurements show that minimal amount of Ti, Mn and Fe is always present, however it was not possible to decide if submicrometric ilmenite inclusions or elemental substitution is the reason. The sanidine in the veinlets has K:Na = 2:1 ratio. The Mn-oxide layers have a widely varying composition including Ca, Fe, Ba and Mg in significant amount, but the presence of Na, S, Cl, K and trace amounts of Co, Ni and Ce are also constant. The high Al and Si content suggest a mixture of clay minerals and Mn-oxides, a few barite crystals were also observed. The biotite phenocrysts are Ti-rich and Cl-bearing annites, showing alteration and loss of Ti-content in the vicinity of the hydrothermal veins. The primary ilmenites are Mg-bearing and show marks of dissolution, while a generation of smaller ilmenite-like crystals in the hydrothermal assemblage tend to have Mn content instead.

XRD measurements were performed on selected materials from host rock and veins. In the hydrothermal assemblage mostly Na-rich plagioclase and sanidine were found. The most important feature is the lack of quartz and dominance of tetragonal cristobalite, meaning that SiO_2 associated to sanidine and cassiterite is signalling a more special environment. The Mn-oxide crusts could not be identified as any crystalline phase, but the presence of 14 Å phyllosilicates was observed.

The textural arrangement and paragenesis of cassiterite is characteristic for the “tin wood” genetical type of Sn-mineralization. The temperature range of mineralising fluids had a wide range, from mesothermal to low epithermal. Cassiterite was deposited in the lower stage, following the sequence of sanidine > cristobalite > cassiterite > Mn-oxides.

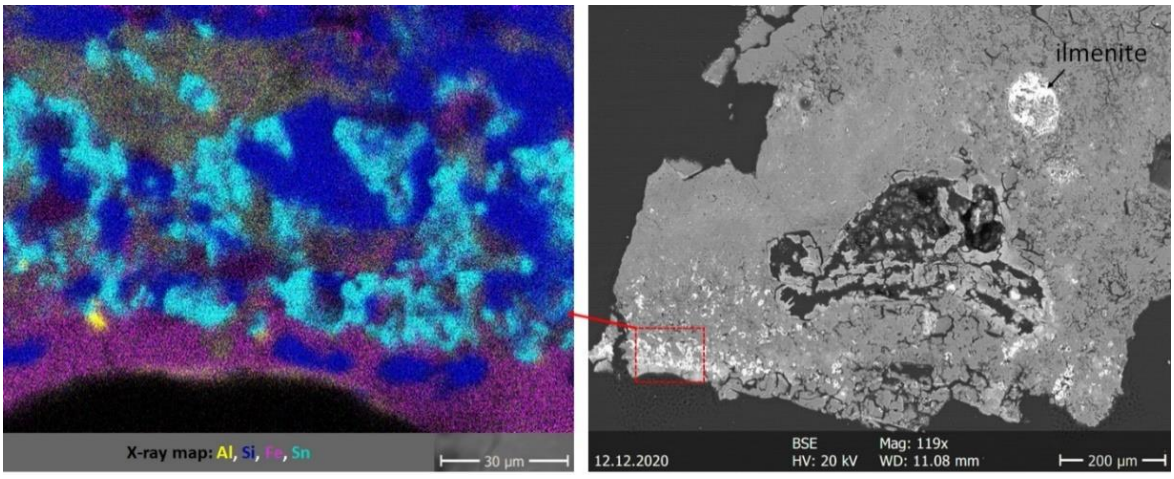

Fig. 1. Textural position of cassiterite precipitation and X-ray map showing its relation to the SiO_2 phase (cristobalite).