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Nb-Ta MINERALISATION IN LITHIUM PEGMATITES IN THE EASTERN ALPS

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Results are presented on the evaluation of pegmatites in the Eastern Alps for niobium-tantalum (coltan) mineralisation. Spodumene bearing pegmatites were studied at Hohenwart, Lachtal, Mitterberg, Garrach, and the lithium deposit at Weinebene/Koralpe. All these pegmatites are of Permian age and occur in the Austroalpine Koralpe-Wölz nappe, which is characterised by Permian low-P and Eoalpine high-P metamorphism. The immediate host rocks of the often (sub)-concordant, normally zoned pegmatites are metapelites and metacarbonate rocks.

Heavy mineral concentrates were extracted from several kg of pegmatite material, using different beneficiation methods, and then investigated (polished grain mounts) by optical microscopy, EMPA, MLA and LA-ICP-MS techniques (AHRER, 2014). SEM-based determination of the modal mineralogy by MLA allowed to quantify the amounts of Nb-Ta minerals and, in combination with EMPA, to identify the Nb-Ta phases. Higher amounts (up to 16 %) of Nb-Ta minerals were found in the Wölzer Tauern area (Hohenwart, Lachtal). The Nb-Ta mineralogy is variable and seems to be influenced by the pegmatite host rocks. Whereas in micaschist-hosted pegmatite samples columbite-tantalite group minerals dominate, a few samples from Hohenwart hosted in marbles show predominance of pyrochlore- and microlite-group minerals. The Mn/(Mn/Fe) of columbite-tantalite ranges between 27-73%, Ta/(Ta+Nb) between 6-63%. Different types of zoning are recorded by columbite-tantalite.

Major and trace element concentrations determined in muscovite by LA-ICP-MS and ratios (K/Rb, K/Tl) can be successfully used as a proxy for pegmatite fractionation although these parameters are not well correlated with Nb and Ta concentrations in mica. Nevertheless, these parameters can be used as a guide to Nb-Ta mineralized pegmatite bodies/zones. Samples with K/Rb less than ~40 always contained distinct Nb-Ta minerals.

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