

## Formation of alunite supergroup minerals and rhabdophane during supergene alteration in a highly acidic environment, the Velence Mts., Hungary

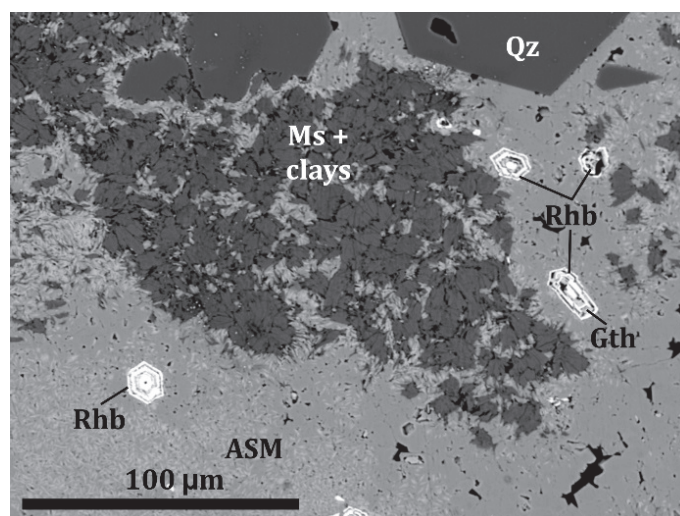
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A unique secondary mineral assemblage of alunite supergroup minerals (ASM) together with rhabdophane group minerals (RGM), goethite and associated clay minerals (Fig. 1) were identified in the A-type porphyritic microgranite in the eastern part of the Velence Mountains, Transdanubic Unit in Hungary. The secondary sulphates/phosphates are dominated by jarosite  $[\text{KFe}_3(\text{SO}_4)_2(\text{OH})_6]$  with less frequent plumbian alunite  $[\text{KAl}_3(\text{SO}_4)_2(\text{OH})_6]$ , Pb-rich members of the beudantite group in some areas: corkite  $[\text{PbFe}_3(\text{P}_{0.5}\text{S}_{0.5}\text{O}_4)_2(\text{OH})_6]$  and hinsdalite  $[\text{PbAl}_3(\text{P}_{0.5}\text{S}_{0.5}\text{O}_4)_2(\text{OH})_6]$  and all LREE-dominant rhabdophane end-members  $[(\text{Ce},\text{La},\text{Nd})\text{PO}_4]\cdot\text{H}_2\text{O}$  rich in some places in brockite  $(\text{Ca}_{0.5},\text{Th}_{0.5})\text{PO}_4\cdot\text{H}_2\text{O}$  and tristramite  $(\text{Ca}_{0.5},\text{U}_{0.5})\text{PO}_4\cdot 2\text{H}_2\text{O}$  components. Detailed EPMA study of the microgranite sample and Raman spectroscopy reveals extensive remobilization of REE, Th, U, P, S, Fe, Pb and the formation of a supergene mineral assemblage. This is most likely connected with alteration and chemical weathering of the host granite and related hypogene mineralisation in the aqueous low-temperature acidic environment near the saprolite zone. The occurrence and chemical composition of RGM suggest also distinctive fractionation of Ln (mostly LREE) during supergene processes. The source of remobilized elements (Pb, Fe, S) is most likely hypogene base-metals sulphides, while REE, Th, U and P come from weathered REE-bearing accessory minerals (allanite, monazite, xenotime).



**Fig. 1.** Fine-grained matrix of ASM with scattered rhabdophane (Rhb) grains, partially goethitized (Gth). Rock-forming minerals are represented by quartz (Qz) and muscovite (Ms) + clays

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