MITT.ÖSTERR.MINER.GES. 143 (1998)

MINERAL CHEMISTRY OF METAMORPHIC TARAMITE FROM LOW-GRADE METABASITES IN THE GEMERICUM, WESTERN CARPATHIANS

by

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MinPet 98

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A Na-Ca amphibole of taramite composition was found in the Early Paleozoic greenschist belt in the Gemericum. The hosted rocks are primary basalts with pillow lava and porphyric structures. As relic igneous phases, metabasalts contain diopsidic augite and large phenocyrsts of plagioclase, replaced by albite with small amounts of taramite, epidote and garnet. The presence of taramite is restricted to a 2 km long zone, where the metabasalts form lenses in metabasites with greenschist facies assemblage. The taramite associates with albite, epidote, titanite, magnetite and rarely also with Ca-rich garnet, calcite, biotite, chlorite, quartz and actinolite. The taramite intergrows with biotite, rarely also with chlorite or calcite and follows the foliation of the rock.

It has Si = 6.0 - 6.4 a.f.u., X_{Al} = 0.83 - 0.93, X_{Mg} = 0.30 - 0.45 and Na^{M4} = 0.51 - 0.80 a.f.u. The A site is occupied by 0.6 - 1.0 a.f.u of Na + K. Large amphibole crystals are weakly zoned with increase of Mg, Si and decrease of Ca, Al and Na towards the rims. Some rim analyses have compositions of ferropargasite. Actinolite was found as accessory phase in contact with taramite. Departure from ideal end-member taramite is due mainly to tschermak's substitution, leading to Si totals of 6.0 - 6.4, Al^{VI} = 0.55 - 1.1 and Mg = 1.6 - 1.1 a.f.u. and to glaucophane substitution, resulting in and increase of Na between 0.5 and 0.9 a.f.u. at M4-site.

Powder diffraction analysis yielded unit-cell parameters a = 9.869(11) Å, b = 18.104(41) Å, c = 5.315(1) Å, β = 104.70(3)°, V = 919 Å^3 with total Fe = 2.76 a.f.u. As compared with taramite (mboziite) (Fe^{2+} + Fe^{3+} = 4.1 a.f.u., V = 924 Å^3) from a syenite the volume of the amphibole decreases with lower Fe content.

Garnet, associated with taramite has average composition of $Grs_{76}And_{20}Sps_2Alm_2$. It is mostly rimmed by andradite-rich garnet with up to 78 mol% andradite content. Epidote has average $Al_2Fe = [Fe_{tot}/(-2+Al_{tot}+Fe_{tot})]$ ratio of 0.6, but some grains are rimmed by almost pure epidote with $Al_2Fe = 0.93$. The X_{Mg} content in biotite and chlorite are 0.47 and 0.46, respectively.

The surrounding metabasites contain albite, chlorite, epidote and rarely actinolite. Some actinolites that grew in the foliation are rich in Na and have transition to Na-Ca amphibole of winchite composition. Compared to actinolite-bearing rocks, the metabasalts with taramite have higher $FeO_{tot.}$ contents. Phyllites which are mostly in tectonic contacts with the metabasites contain white micas (maximum Si content of 3.3 a.f.u.), chlorite, albite and quartz.

Magnetite-albite oxygen isotope thermometry yields metamorphic temperatures of 412 ± 7°C for the taramite paragenesis. The pressure is estimated at 0.7 - 0.9 GPa on thermodynamic calculations and from the position of these rocks within low grade metabasites and phyllites.