

Microstructural study of kelyphite with the use of EBSD

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Kelyphite is a coronitic reaction rim developed around garnet grains. It typically consists of orthopyroxene, clinopyroxene and spinel and sometime contains hydrous phases such as amphibole and chlorite. The kelyphite is a fine-mineral aggregates that has developed by metasomatic reactions between garnet and olivine upon decompression caused by rock ascent from the upper mantle depths. Optical observation infers the presence of topotaxial relationships among constituent minerals. The knowledge on accurate crystallographic relationships among minerals would help us understand the formation and growth mechanism of the kelyphite. We examined the microstructure of kelyphites from a Czech garnet peridotite (at Mohelno), from Moldanubian zone, by means of FE-SEM, EBSD. The kelyphite consists of several subdomains as identified optically. It was confirmed that the pyroxenes and spinel are in a topotaxial relationship just like the pyroxene-spinel symplectite from the Horoman peridotite (Odajima et al, 2008, JMPS). There is no simple crystallographic relationship, however, between the kelyphite minerals and the adjacent garnet. The Opx in the kelyphite have the same orientation as that of coarser Opx developed outside the kelyphite zone and they show some similarities to the olivine orientations adjacent to the kelyphite. It appears that the orientation of garnet crystals is not inherited to the reaction products during the growth of kelyphite and that reaction products minerals grow keeping topotaxial relationships among them. Crystallographic orientation of the kelyphite is probably determined at the stage of initial nucleation by the crystallographic direction of basement phases, such as olivine.