SULFIDE INCLUSIONS IN ULTRAMAFIC XENOLITHS FROM TUVA (SOUTH SIBERIA)

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In this work we present detailed study on petrographic and geochemical features of sulfide inclusions occurring in spinel peridotite and spinel pyroxenite xenoliths from Sangilen Plateau, Tuva (South Siberia/North Mongolia). The xenoliths outcropped in Late Ordovician alkali basalts, $^{39}Ar/^{40}Ar$ ages ranging between 448-441 Ma (VOLKOVA *et al.,* 2004). The spinel peridotites are mainly protogranular, but in some cases equigranular texture types are also found (MERCIER & NICOLAS, 1975). The peridotites are olivine- and orthopyroxene-rich lherzolites and harzburgites. The pyroxenite suites are orthopyroxene-rich spinel websterites and orthopyroxenites. Their texture is mainly igneous according to their fractional crystallization related origin.

Sulfide inclusions are found in the peridotite and pyroxenite series in several textural appearances. The great majority of sulfides is interstitial (type-i), however some were found enclosed (type-e) in orthopyroxene, clinopyroxene and olivine (Fig. 1a & 1b). The shape of both type-i and type-e sulfide inclusions are rounded or irregular. Their size ranges from 100 to 150 μm (type-i), whereas type-e is generally smaller (50-100 μm) (Fig. 1a & 1b). Furthermore, small spherical blebs or inclusions along healed fractures (5-20 μm) and grain boundaries (5-10 μm) were also found, addressed as type-f sulfides.

Type-i, type-e and type-f sulfide inclusions consist of chalcopyrite, pentlandite and/or pyrrhotite/monosulfide solid solution (MSS) (Fig. 1a & 1b).

The major element chemical composition and textural appearance of sulfide inclusions suggests that type-e is clearly primary inclusions, however type-i have identical composition and texture and therefore also assumed to be primary ones. The type-f sulfides are clearly secondary inclusions. Primary inclusions were trapped during the crystallization of rock-forming minerals, whereas secondary inclusions are thought to be subsequent remnants of primary inclusions.

The main aim of this study is to compare the chemical composition and textural appearance of sulfide inclusions in order to gain more information on deep lithospheric processes beneath the studied area.

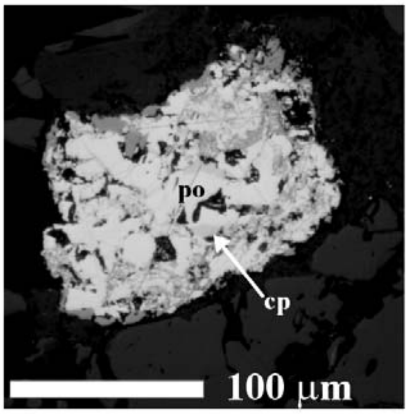

Fig.:1a: interstitial (type-i) sulfide inclusion (cp: chalcopyrite, po: pyrrhotite)

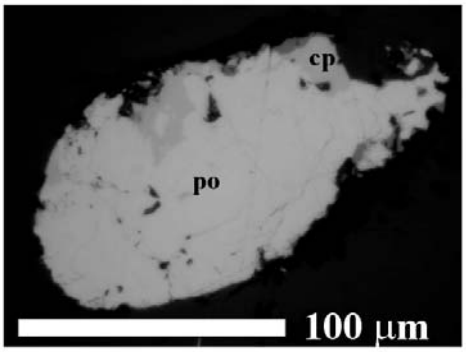

Fig.:1b: enclosed (type-e) sulfide inclusion (cp: chalcopyrite, po: pyrrhotite)

References

MERCIER, J-C. C. & NICOLAS, A. (1975): Journal of Petrology, 16: 454–487.

VOLKOVA, N., EGOROVA, V., IZOKH, A. & SHELEPAEV, R. (2004): 32nd International Geological Congress, Florence, Abstract Volume, 1154.