5.7.P08

Mantle geochemistry and consruction in Mirninsky field

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PT data for mineral concentrates from Mir (MIR) and International'naya (INT) kimberlite pipes based on CPx [1,2] and garnet [3] show fife units (Ga-Sp PXt 15-20kbar); Gar – LHz, (25-32 kbar), Cr-PXt, PHL –Lhr, Wbs, Ecl at 40-45 kbar; heated branch 45-62 kbar and hot geotherm (62-70kbar). For (INT) hot Ga-Cpx intergrowths. Middle part of PX geotherm refer to 35 mv/m2, garnet geotherms - to 40 mv/m2. INT CPx-Gar display HFSE minima Ilmenite HFSE peaks refer to lower REE . Spinels are LREE rich. Cr-rich garnets are S-type, Pb peaks are common for garnets but not for all pyroxenes. U peaks means subduction melt-fluid percolation. In Mir Phl - bearing Lhz and Cr –Pxt are LILE enriched. Grants RFBR : 99-05-65688, 03-05-64146

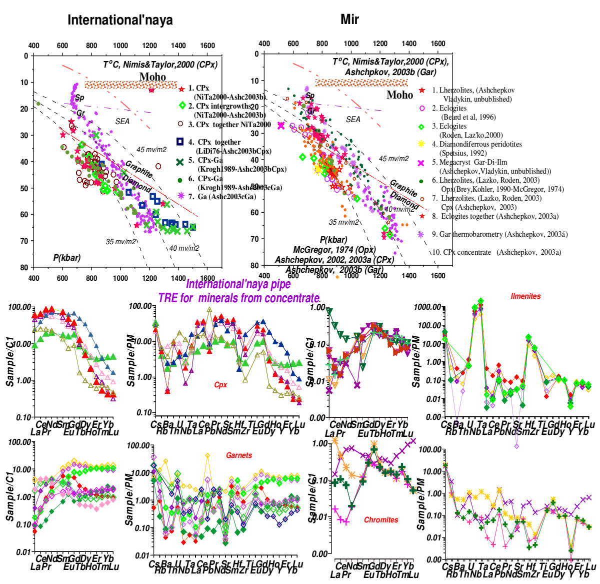

Figure 1. TP conditions for INT and Mir pipes
Figure 2. TRE for minerals from INT concentrate

References

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5.7.P09

Melt inclusion study of olivine from scoria and mantle xenoliths, Chaîne des Puys, Massif Central, France

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The Chaîne des Puys is the youngest magmatic province of the French Massif Central, which is part of the West-European Rift system, and consists of around a hundred young well-preserved volcanoes. The origin of the intraplate alkaline lavas of this volcanic system are not well constrained. Basaltic lavas can be found, but their composition indicates that they have evolved from primary magmas as a result of fractionation and crystallisation processes. Therefore our aim is to unravel the evolution of the alkaline series from the Chaîne des Puys, by comparing the element composition of minute amounts of melt preserved as quenched glass inclusions trapped in olivine phenocrysts from mantle xenoliths and associated basaltic scoria.

Type I melt inclusions occur as primary isolated inclusions hosted by olivine phenocrysts extracted from scoria of several volcanoes. Major element analyses of these inclusions suggest that the magma evolution is very limited and possibly controlled by fractional crystallisation. Heating stage experiments performed at ambient pressure on partially crystallised primary melt inclusions suggest CO_2 oversaturation of the trapped melt, and an entrapment temperature between 1210°C and 1250°C ±10°C. Daughter mineral analyses indicate a Ti-and Ca-rich basaltic paragenesis, which correspond well with the paragenesis of erupted basalts from this volcanic chain. Trace-element analyses performed by LA-ICP-MS display homogeneous, enriched patterns, similar to those characterizing oceanic island and continental basalts. They have high concentration of LILE and LREE/HREE ratios. Such trace-element feature are typical of OIB showing EM(1-2)-type isotopic signatures and thought to reflect the involvement of recycled continental and/or sedimentary components.

Type II melt inclusions are trapped in olivine phenocrysts in ultramafic xenoliths. These xenoliths are associated with the above-mentioned basalts and could therefore supply us with direct information about the chemistry of the naturally occurring mantle-derived melts. The chemical composition of these mantle melts is nepheline and olivine normative. They contain ~ 58%wt SiO_2, ~ 20%wt Al_2O_3, ~ 6%wt Na_2O, ~ 3%wt K_2O, < 3% FeO, < 3% MgO and > 3000 ppm Cl and are also oversaturated in CO_2. The comparison between these 2 types of melt will not only enable us to discuss the evolution of these melts, but possibly help constraining the potential source(s) that contribute to this volcanic system.