

GEOCHEMISTRY OF ULTRAPOTASSIC ROCKS FROM GORNY ALTAI (SOUTH SIBERIA)

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In Gorny Altai the Early Paleozoic arc-trench system (Watanabe et al., 1994) reactivated by extensive faulting at Mesozoic time outcrops. The later rifting process is characterized by the emplacement of subvolcanic alkaline basaltic rocks. The magmatism was characterized by its explosive nature and formation of pipes and dikes. The alkaline igneous bodies outcrop at areas where minette is the dominant rocks (Obolenskaya, 1971,1983). Within one of these areas, near Mongolian Altai, we are observed ultrapotassic rocks composition of which close to that of lamproites. Petrographically, rocks studied are strongly porphyritic and composed of abundant phenocrysts of phlogopite (~2 % TiO₂, 11-12 % Al₂O₃) and fine-grained groundmass that contain K-feldspar, pseudoleucite (?), brown mica (~5 % TiO₂, 11 % MgO, 18 % FeO), oxide and relicts of olivine and clinopyroxene replaced by carbonate. The study of minette by XRF spectrometry and INAA is showed the next levels of petrogenic (wt.%) and rare elements (ppm): SiO₂ 44.6-53.7, TiO₂ 1.1-1.8, Al₂O₃ 9.3-11, Fe₂O₃ 2-3, FeO 2.4-5.1, MnO 0.1-0.2, MgO 7.6-11 (mg 69-76), CaO 4.4-7.1, Na₂O 0.3-1.5, K₂O 4.8-9.2 (K₂O/Na₂O 3.7-30.4), P₂O₅ 1-2, Sc 18-40, V 190-315, Cr 502-1000, Co 20-54, Ni 280-640, Ba 1100-4711, Sr 426-1610, Rb 219-467, Y 26-42, Zr 374-824, Nb 2-8, Cs 10-32, Hf 12-29, Ta 0.8-1.5, Th 61-94, La 73-150, Ce 170-360, Nd 100-200, Sm 15-24, Eu 5-9, Gd 11-24, Tb 1-2, Yb 1.6-2.3, (La/Yb 38-68). According to most accepted criteria (Mitchell & Bergman, 1991), the analytic data shows the correlation of the ultrapotassic rocks from Gorny Altai with some kind of lamproite clan. The studied rocks are very close to phlogopite-rich lamproites from SE Spain (Venturelli et al., 1984) and lamproite-like rocks (cocites) from North Vietnam (Polyakov et al., 1997). Distinct features of ones are the low content of titanium, potassium and some incompatible elements related to the increase in aluminium content. All the above mentioned features are not common for typical rocks of clan. However, it may be explained due to the special condition in which these rocks were generated, such as the relative low pressure for a mantle melting (Panina, 1997) or the magma mixing (lamproitic + shoshonitic) and also the crustal contamination during emplacement of the ultrapotassic magma at a subduction zone or its uplift in the footwall of thrust-folded belts (Venturelli et al., 1984, 1988; Nelson et al., 1986; Mitchell & Bergman, 1991). The geological setting of studied rocks is in accord with that of Mediterranean type of lamproites.