Mineralogical and geochemical types of pegmatites, their origin within different geodynamic settings in the Olkhon area, Baikal Region of Russia

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In the Olkhon area of the Baikal Region, the Early Paleozoic magmatism derived diverse granitoids within a narrow time span of 500–465 Ma. The pegmatoid granites and pegmatites encompassed by gneiss-granitoids and leucogranites are similar to granitoids in mineral and chemical composition, as well as in the distribution of many rare elements; and their formation is best explained by the magmatic differentiation of the collisional granitoid massifs.

The zoned Ilixin pegmatite vein containing different rare-metal mineralization. The vein contains apographic pegmatite with protolithionite, and the schlieren includes microcline-plagioclase pegmatite with mineralization of samarskite, lepidolite, tourmaline, vorobyevite, bismuthtotantalite and bismuthocolumbite associated with albite, microcline, lepidolite and polychrome tourmaline. The schlieren containing rare-metal minerals is enriched in F, B, Li, Rb, Cs, Ta and Nb (Makagon, Belozerova, 2013). The other pegmatite veins of the Olkhon area (Naryn-Kunta, Ulan-Nur, Aya) belong to the same mineral-geochemical type, they contain characteristic minerals: amazonite, Li-micas (protolithionite, zinnwaldite and lepidolite), as well as topaz, fluorite, monazite, microlite, zircon, cassiterite, apatite, tantaloniobaty, wolframite.

In the Olkhon area, the Tashkinei pegmatite belongs to Be-REE geochemical series (U-Pb age of zircon 390 Ma). This is where the ore and rare-metal minerals appear. They are monazite, xenotime, euxenite, zircon, thortveitite, ittrowolframite, Nb-Ta wolframite, cassiterite. Unlike F-Ta-Y type, the Tashkinei pegmatite is enriched in many lithophile and HFSE elements like W, U, Th, Sn, Sc, however they are strongly depleted in F, B, Li, Ba, Sr and Eu.

The post-collision pegmatites have neither spatial nor genetic affinity to the granites of the same age in the Olkhon area. The mineral-geochemical types of rare-metal pegmatites specify the transition to the Hercynian within-plate magmatism related to the processes of mantle-crustal interaction.

The study was performed with RFBR funding (Grant 19-05-00172).