



Classification, U-Pb (TIMS) age and sources of the Kolmozero-Keivy rare-element pegmatites (NE Baltic Shield)

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Kolmozero-Keivy zone, NE Baltic shield, is composed mainly from basic-intermediate-acid metavolcanic suites of 2.83-2.87 Ga age and metamorphosed at amphibolitic facies during 1.8-1.7 Ga. Younger igneous events are represented by voluminous intrusions of 2.73 Ga plagio-microcline granites and of 2.65 Ga peralkaline A-type granites, and small stocks of 2.52 Ga tourmaline granites.

Four pegmatite fields with total amount of more than 100 bodies are confined to Kolmozero subzone. The pegmatites intrude amphibolites and rarely associated gabbro-anorthosite and are of 50-700m long and of 10-35m thickness. The Kolmozero pegmatites are of complex type, spodumene subtype with Li, Cs, Be, Ta, Sn geochemical signature and belong to LCT family by classification of Cerny and Ercit [1]. They crystallized at relatively high pressure (3-4 kbar) with peraluminous S-type granite as the source magma. The Vasin Myl'k pegmatite field with the lepidolite–albite–microcline–spodumene–pollucite association is located among amphibolites in the northwestern part of the Kolmozero zone. The minerals of the columbite–tantalite group from Vasin Myl'k field include microlite, simpsonite, and torolite, and are the earliest within the rare-element mineral sequence. Microlite from the pegmatite taken from the dump of a prospecting drill hole was used for U–Pb (TIMS) age determination. The discordia constructed for seven measured microlite samples is characterized by upper intercept with concordia at 2454 ± 8 Ma, which probably reflects the time of rare-element pegmatite crystallization, coeval with the age of tourmaline granites.

Several tens of pegmatite bodies from Keivy subzone are confined to inner and outer apical parts of peralkaline granite intrusions. They are of few tens meters long and of several meters thickness, sometimes are of oval and irregular shape (so-called quartzolites). Keivy pegmatites are subdivided on quartz–microcline, quartz–feldspar–astrophyllite and quartz–(magnetite–aegirine–arfvedsonite) mineral species. Most abundant rare-element minerals are zircon, fergusonite, gadolinite, chevkinite, britholite, aeshinite, thorite. Keivy pegmatite are of gadolinite type with Y, HREE, Zr, Ti, Nb>Ta, F signature indicating on its NYF nature. Undoubtedly peralkaline A-type granites are the source of Keivy pegmatites, that is confirmed by the same age of pegmatitic zircon – 2656 Ma. Keivy pegmatites formed at moderate pressure (1.5-3.7 kbar).

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References:

[1] Cerny P., Ercit T.S. The classification of granitic pegmatites revisited. *The Canadian Mineralogist*, 2005, vol. 43, pp. 2005-2026.