

Isotope age of the rare metal pegmatite formation in the Kolmozero-Voron'ya greenstone belt (Kola region of the Fennoscandian shield): U-Pb (TIMS) microlite and tourmaline dating

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The Kolmozero-Voron'ya greenstone belt is located in the central suture zone, which separates the Murmansk block from the Central-Kola and the Keivy blocks. The belt is represented by volcano-sedimentary rocks of Archaean age of 2.9-2.5 Ga. Rare metal pegmatites (Li, Cs with accessory Nb, Ta, and Be) occur among amphibolite and gabbroid intrusions in the northwestern and southeastern parts of the belt. According to the Rb-Sr data, the age of pegmatites was considered to be 2.7 Ga. Until recently there was no generally accepted point of view on the origin of pegmatites. Now we have isotopic data for a range of rock complexes that could pretend to be parental granites for the rare metal pegmatites. These are granodiorites with the zircon age of 2733 ± 1 Ma, and microcline and tourmaline granites, which Pb-Pb isochronal age on tourmaline from the tourmaline granite located near the deposit is estimated to be 2520 ± 70 Ma. The pegmatite field of the Vasin Myl'k deposit with the lepidolite-albite-microcline-spodumene-pollucite association is located among amphibolites in the northwestern part of the belt. The deposit is represented by subparallel low-angle zoned veins up to 220 m long and 5 m thick dipping in the southeastern direction at an angle of 10° to 30° . The minerals of the columbite-tonalite group from Vasin Myl'k deposit include microlite, simpsonite, and torolite, and are the oldest among different minerals represented by several generations in pegmatites under consideration. Zircons from the pegmatites are mostly represented by crystals with the structure affected by the action of fluids that put certain restrictions on its use as a geochronometer of the crystallization process. Microlite from the pegmatite taken from the dump of a prospecting drill hole was used for U-Pb (TIMS). The mineral is represented by 0.5–1.0 mm long euhedral octahedral crystals. It is brown in color, and transparent. The microlite crystals were preliminarily cleaned from surface contamination being placed the ultrasonic bath with the 7N HNO₃ solution. The discordia constructed for seven measured microlite weights is characterized by upper intercepts with concordia at 2454 ± 8 Ma, which probably reflects the time of rare metal pegmatite crystallization, coeval with the age of tourmaline granites. Taking into consideration the obtained U-Pb age of microlite, it may be assumed that the tourmaline granites dated back to 2520 ± 70 Ma served as the most probable parental rocks for rare metal pegmatites of the Vasin-Myl'k deposit. The work is supported by RFBR № 16-05-00367, № 16-05-00427 and project № 0231-2015-0005