



Geochemistry and chemical U-Pb dating of U-Th mineralization of the Shkhara crystalline massif, Greater Caucasus, Georgia

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The Greater Caucasus orogenic belt is the northernmost expression of the Caucasus and is linked to the southern margin of the Precambrian Scythian Platform. In its structure two major formations are distinguished: pre-Jurassic crystalline basement and Mesozoic sedimentary formations. The basement complex is thrust over the Lower Jurassic formations along the Main Thrust of the Greater Caucasus (Gamkrelidze et al., 2020).

The Shkhara massif, part of the crystalline basement, is located in the central, highest, elevation portion of the Greater Caucasus at the headwaters of the Enguri River. The massif forms a large ridge 15 km long and 5 km high and is composed predominantly of Lower to mid-Paleozoic biotite gneisses and migmatites and cut through by a granitoid pluton of the Variscan generation. The zircon U-Pb age of granodiorite of the Shkhara pluton corresponds to 316.9 ± 8.8 Ma (Okrostsvaridze et al., 2022a).

U-Th mineralization was discovered in the biotite gneisses and migmatites of the Shkhara massif along the Main Thrust of the Greater Caucasus (Okrostsvaridze et al., 2022b). Uranium and thorium mineralization is associated with uraninite veins and nests, which are formed in biotite plagiogranites and migmatites. The content of Th in this rock varies from 26 to 51 ppm and the content of U changes from 55 to 299 ppm

For the first time, we studied the geochemistry and chemical U-Pb age of Shkhara uraninite veins, on the JXA-8230 electron probe microanalyzer, of the German GeoResearch Center in Potsdam. Geochemical studies have shown that the uranium mineral is high-temperature Th-bearing uraninite that consists of uranium, thorium, lead and yttrium. In these veins, the UO_2 composition varies from 79.5% to 82.6%, ThO_2 – from 6.7% to 8.4%, PbO – from 2.95 to 3.9%, Y_2O_3 – from 1.15 to 3.77%. As for the chemical U-Pb age of the veins, it ranges from 286 to 290 Ma. The analysis of the obtained data shows that the Shkhara uraninite mineralization was formed in post-orogenic extension regime of the Greater Caucasus, which is in full correlation with the vein-type

uranium deposits similar to different regions of the world, including the central European Variscides.

References

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