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ISOTOPE U-PB AGE ON SINGLE ZIRCON AND REE DISTRIBUTION IN ROCKS AND ZIRCON FROM PALEOPROTEROZOIC KANDALAKSHA-KOLVITSA COMPLEX (BALTIC SHIELD)

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Kandalaksha-Kolvitsa paleoproterozoic complex located in the N-E part of Baltic shield and consists of three zones. Marginal zone (mesocratic metanorite) lies at the base of the massif. Main zone is composed of leucocratic metagabbro. The upper zone is alteration of mataanorthosite and leucocratic metagabbro. All rocks were subjected to granulate and anorthositic metamorphism.
Age of magmatic crystallization of the massif was determined for the first time, using the U-Pb isotope method for single zircon grains. Three fractions of single zircons from anorthosite of the Kandalaksha massif gave precise U-Pb age of 2435.5 $\pm$ 4.8 Ma.
For the first time REE concentration (WR) was determined using a quadrupole mass spectrometer (Agilent 7500 ce ICP-MS) in the main varieties of rocks of the Kandalaksha-Kolvitsa paleoproterozoic complex.
Anorthosite and leucocratic metagabbros (main zone) are characterized by a flat spectrum distribution of HREE, which were normalized by [1]. The REE pattern is characterized by significant positive anomalies of Eu ((Eu / Eu *)n = 3.72-3.91) in anorthosite and leucogabbros and 7.26 - in ortoamfibolitah. General content of individual elements that are common for this type of rocks: Cen = 5.82-8.54, Ybn = 1.54-1.58, which indicates that the process of crystallization of the rock occurred with predominant accumulation of plagioclase.
According to geochemical and Nd-Sr isotopic data (ISr=0.702 - 0.706, εNd(T) = +1 – (-3)) Kandalaksha Kolvitsa complex, appear to have a general plume source with Paleoproterozoic layered intrusions of the Baltic Shield [2]
Distribution of REE (ELAN-9000 ICP-MS) in zircon have a typical magmatic species: a positive Ce, negative Eu anomaly and HREE flat spectrum. Titanium content in zircons were measured for the calculation of their crystallization temperature with 8350C. These data are evidence of magmatic origin of zircon [3].
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References:
1. Boynton W.V. Cosmochemistry of the rare earth elements: meteorite studies // Ed. Henderson P. Rare earth element geochemistry. Amsterdam: Elsevier. 1984. P. 63–114.
2. Watson E. B., Wark D.A., Thomas J.B. Crystallization thermometers for zircon and rutile // Contrib. Miner. Petrol. 2006. V. 151. P. 413-433.
3. Hoskin P.W.O. and Schaltegger U. The Composition of zirconand igneous and metamorphic petrogenesis // Reviews in mineralogy & geochemistry. 2003. V. 53. P. 27-62.