



New data for paleoproterozoic PGE-bearing anorthosite of Kandalaksha massif (Baltic shield): U-Pb and Sm-Nd ages

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The aims of this researches were to study the isotope U-Pb age of zircon and rutile and Sm-Nd (rock forming and sulphide minerals) on Kandalaksha anorthosite massif due to study of polymetamorphic history. In marginal zone firstly have been obtained the presence of sulphide mineralization with PGE (Chashchin, Petrov, 2013). Kandalaksha massif is located in the N-E part of Baltic shield and consists of three parts. Marginal zone (mesocratic metanorite) lies at the base of the massif. Main zone is composed of leucocratic metagabbro. The upper zone is alteration of metaanorthosite and leucocratic metagabbro. All rocks were subjected to granulite polymetamorphism. Two fractions of single grains from anorthosite of the massif gave precise U-Pb age, which is equal to 2450 ± 3 Ma. Leucocratic gabbro-norite were dated by U-Pb method, with age up to 2230 ± 10 Ma. This age reflects the time of granulite metamorphism according to data of (Mitrofanov, Nirovich, 2003). Two fractions of rutile have been analyzed by U-Pb method and reflect age of 1700 ± 10 Ma. It is known that the closure temperature of U-Pb system rutile is $400-450$ ° C (Mezger et.al., 1989), thus cooling processes of massif rocks to these temperatures was about 1.7 Ga. These data reflect one of the stages of metamorphic alteration of the massif. Three stages of metamorphism are distinguished by Sm-Nd method. Isotope Sm-Nd dating on Cpx-WR line gives the age of 2311 Ma which suggested of high pressure granulite metamorphism. Moreover Cpx-Pl line reflect the age 1908 Ma of low pressure granulite metamorphism. Also two-points (Grt-Rt) Sm-Nd isochrone yield the age 1687 Ma of the last metamorphic alterations in Kandalaksha anorthosite massif. Model Sm-Nd age of the leucocratic gabbro-norite is 2796 Ma with positive ϵ_{Nd} (+0.32). It means that the source of gabbro-norite was mantle reservoir.

All investigations are devoted to memory of academician PAS F. Mitrofanov which was a leader of scientific school for geology, geochemistry and metallogenesis of ore deposits. The studies are contribution by RFBR OFI-M 13-05-12055, 13-05-00493, Department of Earth Sciences RAS (programs 2 and 4), and IGCP-SIDA 599.