Paleoprotherozoic PGE-bearing anorthosite of Kandalaksha massif (Baltic shield): U-Pb and Sm-Nd data

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The aim of this research was to study the isotope U-Pb age of zircon and rutile and Sm-Nd (rock forming and sulphide minerals) in Kandalaksha anorthosite massif. In marginal zone firstly have been obtained the presence of sulphide mineralization with PGE [1].

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 mataanorthosite and leucocratic metagabbro. All rocks were subjected to granulate metamorphism.

Two fractions of single zircons from anorthosite of the massif gave U-Pb age 2450± 3 Ma. Leucocratic gabbro-norite were dated by U-Pb on single zircon, with age up to 2230±10 Ma. This age is the time of granulite metamorphism according to data of [2]. 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 400-450°C [3], thus cooling of the massif to these temperatures was about 1.7 Ga. These data suggested two stages of metamorphic transformations of the massif.

Three stages of metamorphism are distinguished by Sm-Nd investigation. Isotope Sm-Nd dating on Cpx and WR gives the age of 2311 Ma which considered as high pressure granulite metamorphism. Moreover Cpx-Pl Sm-Nd data gave 1908 Ma of low pressure granulite metamorphism. New Sm-Nd measurements of Grt-Rt yielded the age 1687 Ma of the last metamorphic alterations in Kandalaksha anorthosite massif. Model Sm-Nd T_{DM} ages of the leucocratic gabbro-norite are 2.79 Ga with positive εNd (+0.32). It means that the source of gabbro-norite was primary (juvenile) mantle reservoir.

All investigations are devoted to memory of academician PAS F. MItrofanov.

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