The most ancient gabbro-anorthosites of the Kola region (Baltic Shield)

N. KUDRYASHOV, A. MOKRUSHIN AND D. ELIZAROV

Geological Institute KSC RAS, Fersman str. 14, Apatity, Murmansk reg., Russia (nik@geoksc.apatity.ru)

The Kola peninsula is the region marked with development of anorthosite magmatism in the NE Baltic Shield. Anorthosites located in the zones of the deep faults dividing large domains, are associated with gabbro and ultramafic rocks. The Archaean gabbro-anorthosites intrusions - Tsaginsky, Achinsky and Medvezhe-Schucheozersky - have the age of 2.7-2.6 Ga [1]. The Patchemvarek and Severny gabbro-anorthosites intrusions are located in the junction zone of the Kolmozero-Voronia greenstone belt and the Murmansk domain. Age data for sedimentary-volcanogenic rocks of the Kolmozero-Voronia belt and Murmansk domain granitoids are 2.8-2.7 Ga. The chemical composition of the Patchemvarek and Severny gabbro-anorthosites is characterised by the low alkalinity, high Mg# and plagioclase (An_{70-85}).

The U-Pb age of the Patchemvarek zircon is 2925±6 Ma, that of the Severny - 2935±8 Ma, which corresponds with the age of the intrusions crystallization. The REE content in the gabbro-anorthosites of these intrusions is Ce_n = 2.2-4.2, Ybn = 1.6-2.6, La/Yb_n = 1.6-2.6, Eu/Eu* = 1.97-2.24. The REE distribution in ultramafic rocks is similar to it, but characterized by the lesser general amount of components Ce_n = 1.2, Yb_n = 1.1, La/Yb_n = 2.8, Eu/Eu* = 1.17. The gabbro-anorthosites with the age of 2.7-2.6 Ga have REE: Ce_n = 6.5-11, Yb_n = 0.5-1.2, La/Yb_n = 4-10, Eu/Eu* = 1.8-3.1. For the gabbro-anorthosites with the age of 2.9 Ga: ε_{Nd} = +2.65, $^{87}Sr/^{86}Sr$ (i) =070102±8. For gabbro-anorthosites 2.7-2.6 Ga: ε_{Nd} = +0.26, $^{87}Sr/^{86}Sr$ (i) =0.70249±6. Different values of the primary isotope relations of $^{143}Nd/^{144}Nd$ and $^{87}Sr/^{86}Sr$ suggest there are two mantle sources. The initial anorthosite magma for the Patchemvarek and Severny intrusions with the age of 2.9 Ga is related to the MORB basalts, typical of initial stages of greenstone belts development. The initial magma of the Tsaginsky, Achinsky and Medvezhe-Schucheozersky intrusions of the 2.7-2.6 Ga belongs to the subalkaline type, their formation occurring in the interplate conditions.

[1] Bayanova (2004) 176.

Hydrothermal alteration of the vein type mineralizations in Çetilli Area, (Ordu, Turkey)

K. KUDUN YOZGAT AND N. TÜYSÜZ

Karadeniz Technical University, Department of Geological Engineering, 61080, Trabzon Turkey (kameryozgat@gmail.com , ntuysuz@ktu.edu.tr)

In this investigation Çetilli (Ordu) hydrothermal alteration of the vein type mineralizations has been studied from the point of geology and geochemistry. The study area is located around middle-north of Turkey. The geology of the study area consist of volcanic, sedimentary and intrusive rock units. Upper Cretaceous aged andesite, basalt and pyroclastics rocks, traciandesite and tufs, volcano-sedimentary sequence and limestone; Paleocene aged limestone, sandstone, claystone, marn, tuff and andesitic dyke; Eocene aged nummulites bearing limestone, andesite, basalt and pyroclastics rocks, monzonite; after the Eocene aged basalt and Quvaterner aged travertine. The andesite, basalt and pyroclastics rocks which aged Upper Cretaceous are cut by many fault systems in E-W, N-E-SW, NW-SE directions. The Çetilli Orebody was formed by hydrothermal solutions arising throughout this fractured and cracked zones. Ore minerals are pyrite, sphalerite, chalcopyrite, galena and nabit gold.

Alteration of Çetilli Mineral Deposit display indistinct spatial zonation. Alteration zones are completely controlled by fault systems. Alteration types are observed silicification, calcification, zeolitization, clay, sericitization, limonization, hematization and pyritization. Chloritization and epidotization are observed cut distal part of veins. Alteration minerals are mainly quartz; lesser calcite, dickite, nacrite, ankerite, dolomite, kaolinite and a bit barite. The mass change calculations based on the Al and Zr determined to be immobile indicate a 19 % volume increase in the ore zones, mainly due to addition of Si(24.45g/100g), Ca(1.06g/100g), K(0.61g/100g) and ore forming elements.

[1] Böhkle, J. K. (1989). *Econ. Geology*, **84**, 291-327. [2] Huston, D.L. (1993). *J. Of Geoch. Expl.*, **48**, 277-307