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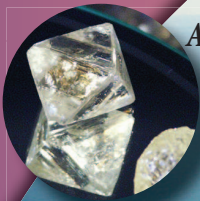
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ABSTRACT BOOK

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PETROLOGY OF THE VAKIJVARI SYENITE INTRUSIVE COMPLEX AND THEIR OREFIELD CHARACTERISTIC (LESSER CAUCASUS, GURIA REGION, GEORGIA)

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The Caucasus represents a Phanerozoic orogen formed along the Euro-Asian north continental margin, in a NW-SE direction, between the Black and Caspian seas. Currently, it is an expression of continental collision between the Arabian and Eurasian lithospheric plates. Three major units are distinguished in the Caucasian construction: 1) the Greater and 2) the Lesser Caucasus fold-thrust systems and 3) the Inner Caucasian microplate [1]. The Lesser Caucasus is the southern most expression of the Caucasus orogen, which in SW part is constructed of Paleogene-Neogenian the Achara-Trialeti fold-thrust belt and which is considered as a back-arc rift trough [2].

Guria subtropical region is situated in the west part of the Achara-Trialeti fold-thrust belt across the Black Sea and built up by Eocenenian volcanogenic-sedimentary and intrusive formations. Vakijvari syenite intrusive complex is located in the central part of the region, near the Vakijvari village and represents one of the largest plutonic body of the Achara-Trialeti fold-thrust belt. The biggest outcrop of this complex is exposed in the r. Bjuja gorge, which occupies 15 km² area on the modern erosional level. Comparatively smaller bodies crop out in the gorges of the tributaries of this river. Erosional outcrops of the mentioned bodies are separated from each other by Middle Eocene volcanogenic-sedimentary country rocks (dated faunistically). As for the age of this intrusion rocks, it was recently dated by U-Pb method in the Department of Geosciences of Taiwan National University and it corresponds to 46.77±0.81 Ma (Middle Eocene). Based on this age, it turns out that volcanic activity was at once followed by plutonic activity, though so far it has been considered that the injection of plutonic magma took place in Upper Eocene [2].

Vakijvari intrusive complex is mainly of subalkaline syenetic composition and comprises pyroxene-biotite and hornblende-bearing varieties, though biotite-pyroxene monzonites are observed as well. These are mainly coarse-grained rocks, which contain pyroxene (egirin-avgit), hornblende, potassium feldspar, oligoclase, biotite and magnetite. Accessory minerals are apatite and sphene. Pyroxene-biotite syenites are constructed the major part of Vakijvari intrusive complex are mainly alkaline rocks. Their chemical composition is changeable and varies on average within the following limits: SiO₂ = 56.5-61.5%, Al₂O₃ = 16.2-17.7%, Fe₂O₃ = 2.5-4.3%, FeO = 2.2 - 4.8%, CaO = 4.2 - 6.7%, Na₂O = 3.4 - 5.1%, K₂O = 3.8- 5.9%. It should be mentioned, that in contact with volcanogenic-sedimentary rocks of Vakijvari intrusive complex, strong postmagmatic hydrothermal alteration zones are developed. On some areas of these zones ore mineralization occurrences are observed, forming Vakijvari orefield in combination.

Vakijvari orefield (70 km²) within their boundaries are represented by 10 gold containing ore occurrences, which could be united into three groups according to their spatial position and composition. In particular, Shemokmedi (Gonebis-kari, Jakhua, Gvarda tions), Pampaleti (Pampaleti, Tsikhisubani, Lashisgele), Vakijvari (Chachuasgele, Chkhikva, Nasakhlebi, Koris-bude) groups. Result of analyses of conducted geological activities in Vakijvari ore field show that, gold-bearing ore manifestations are singled out quartz-copper-polimetallic, iron ore-pegmatitic, sulphur-pyrite, copper-molybdenum-porphyry and low sulfidation ore occurrences. All ore occurrences in this ore field are spatially and genetically related to endo and exocontact areas of Vakijvari intrusive complex.

Prognostication of total resources of Vakijvari ore field was made by Z.Chkhikvishvili and his colleagues [3]. According to these data iron reserves of P₂ category is 11.8 mln.t., P₂+P₁ is 13.2 mln.t. In this ore field prognostic resources for P₃ category gold is 136 t, silver – 430 t, copper – 2322 thousand tones, lead – 750 thousand tones, zinc -1135 thousand tones, molybdenum – 20.000 tomes, cobalt – 5 thousand tones, bismuth - 25 thousand tones. It's difficult to make comments on other metals, but the fact that Vakijvari ore field contains giant reserves of iron, is proved by the Guria coast of the Black Sea. Here beaches are totally covered by iron bearing sand e.g. magnetite beach of the famous resort Ureki.

By us in Vakijvari orefield group were carried out special investigations of radioactive elements in the Acme Analytical Laboratories (Vancouver, Canada) by ICP-ES analysis, using 1F15 method. In this ore field anomalous contents of uranium haven't been found, though tree significant anomalies of thorium were exposed : Nasakhlebi-1 (Th-185 g/t), Nasakhleb-2 (Th-237 g/t) and Chkhikva (Th-428 g/t). As it is known, like uranium and plutonium, it can be used as fuel in nuclear reactors. However, compared with these elements, thorium has quite a number of priorities: is more widely spread; in comparison with uranium its extraction is rather cheap; is less radioactive; full annihilation of its waste is possible; produces 2-3 times more energy than uranium. Due to such unique properties and the present complicated energy situation, thorium is considered as the green energy of the future [4]. Nowadays the world's developed countries, including India and China, are working on a project for modernized nuclear reactor and it is planned that in the nearest 10 years thorium reactors will fully replace uranium reactors.

Thus, as we can see Vakijvari orefield is complex ore element bearing and if we take into consideration its scales, developed infrastructure and favourable natural conditions, then we should consider it as perspective economic object, requiring further detailed investigation.

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