International Journal of Geology, Earth & Environmental Sciences ISSN: 2277-2081
An Open Access, Online International Journal Available at http://www.cibtech.org/jgee.htm
2020 Vol. 10(2) May-August, pp.41-43/Kirezidi and Hamrayev
Research Article

DISTRIBUTION OF RARE EARTH ELEMENTS IN DYKES OF THE PIRMIRAB DEPOSIT OF THE CHADAK ORE FIELD

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ABSTRACT
The Chadak ore field is located on the southern slope of the eastern tip of the Kuramin Mountains, in the Namangan Region, which includes the Pirmirab and Guzaksai gold and silver deposits, as well as a number of ore occurrences of gold and other minerals. Submeridional faults carry signs of endogenous activity, expressed by metasomatites and vein formations with gold. The ore field is composed of volcanogenic (60%) and intrusive (about 30%) rocks. Ore-bearing rocks are regionally propylized, which is associated with post-volcanic processes. An analysis of the content of impurity elements in rocks, obtained by the ICP-MS method and recalculated for concentration clarks, showed that the contents of elements such as Sn, Hf, Nb, Mo, W, Se, Sb, As, Yb, Lu in all samples are increased relative to Clarke. The values of Re, Bi, Te, As exceed clark several times. The content of the remaining elements is much less.

Keywords: *Dike, Ongonite, Trachidolerite, Lamprophyre, Rare-Earth Elements*

INTRODUCTION
Distribution of rare and scattered elements in volcanic rocks is important for understanding the features of their formation. To this end, we studied the distribution of the content of rare-earth elements in dikes of the basic and acidic composition of the Pirmirab deposit of the Chadak ore field.

MATERIALS AND METHODS
In the process of performing the work, collection, processing, analysis of literary and stock materials on geology, material composition of rocks and ores of the Chadak ore field were carried out. Field studies were conducted with the aim of sampling from ongonite, trachidolerite and lamprophyric dikes to determine the content of rare earth elements in them. The chemical composition of the samples was determined by the method of induction-coupled plasma with mass spectrometric analysis in “Central laboratory" state enterprise under the State Geology Committee of the Republic of Uzbekistan (Tashkent) according to the method described in (Olive, 2001). Processing of analytical data was performed applying Microsoft Exel 2013 software.

RESULTS AND DISCUSSION
The Chadak ore field is located on the southern slope of the eastern tip of the Kuramin Mountains in the middle course of Chadak River, in the territory of Namangan region [Golovanov., 2001]. Geological formations of the ore field belong to the hercynian structural floor, blocked in the southeast by alpine deposits of Fergana Valley. The area is composed of volcanogenic (60%) and intrusive (about 30%) rocks.
The ore field is confined to the Chadak near-fault depression (Arapov, 1983) and is located in the zone of the powerful Kumbel-Ugam fault, at its intersection with the northeastern North-Fergana deep fault.
The ore field includes the Pirmirab and Guzaksay gold and silver deposits, as well as several of ore occurrences of gold and other minerals. We studied the rocks of dyke formations of the Pirmirab deposit and conducted a comparative assessment between them.

Ongonite dikes in appearance resemble leucocratic acidic effusive rock. The structure of the rocks is porphyry. The bulk of micro- and cryptocrystalline, spherulitic, quartz – feldspar composition. Porphyry precipitates are represented by acid plagioclase (albite-oligoclase, oligoclase), potassium feldspar, quartz, fluorite microseparations and biotite. The breed is similar to the subvolcanic analogue of lithium fluoride rare-metal-bearing granitoid, in which the amount of albite and oligoclase exceeds the amount of orthoclase. Quartz represented by pea-like discharge.

Dike formations of trachidoleritic composition in the ore field are widely developed. The dykes stretch in the Pirmirab field northwest, with 40-45 cm thickness. Macroscopically, these are rocks of black, brownish-gray or greenish-gray color, of dense afanite or fine-grained composition, sometimes with rare phenocrysts of white and greenish plagioclases. Under a microscope, the rock consists of randomly oriented plagioclase sheets (0.2-2 mm), the space between which is filled with augite, chlorite developing, apparently due to denitrification of the primary glassy mass of a small amount of quartz and ore mineral; rarely present apatite and sphene.

Lamprophyr dykes are represented by dark gray to black lamprophyre with inclusions of calcite and sericite. The width of the dikes reaches 1 m. They mainly break through granosyenites with large crystals of orthoclase.

Below are the results of mass spectrometric determination of the content of rare-earth elements in rock samples of dykes of the Pirmirab deposit, selected during field studies and presented in the form of a table (Table 1). Based on the results of mass spectrometric analysis, recalculations were made for the average contents of the rare-earth elements of dikes of ongonites, trachidolerites, and lamprophyres, and the diagram was constructed based on these results (Voitkevich *et al.*, 1970) (Fig. 1).

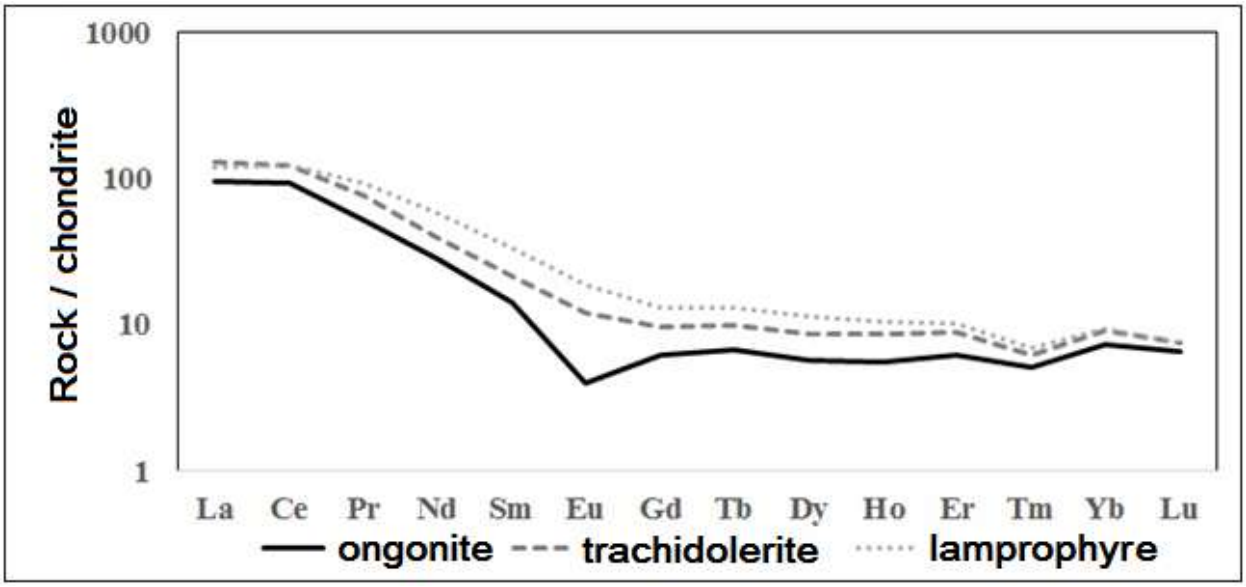

Figure 1: Distribution of rare-earth elements in dykes of the Pirmirab deposit.

Table 1: Rare earth content in dykes of the Pirmirab field, µg/g (ppm)

Element	Ongonite			Trachidolerite				Lamprophyre		
	Ch-80	Ch-81	Ch-82	Ch-84	Ch-88	Ch-102	Ch-103	Ch-101	Ch-104	Ch-105
La	28.3	26.7	31.3	10.2	6.81	47.4	93.1	24.4	36.3	47.1
Ce	44.1	35.8	58.5	23.1	13.4	70.8	141	52.7	58.2	72.2
Pr	5.00	4.23	6.36	2.78	1.37	11.5	14.6	6.37	9.51	11.94
Nd	16.52	13.99	19.88	9.54	4.61	40.4	41.1	23.3	35.2	45.0
Sm	2.81	2.31	3.48	2.63	0.765	7.39	6.17	4.78	7.02	8.13
Eu	0.327	0.329	0.295	1.10	0.075	1.85	0.835	1.08	1.51	1.90
Gd	2.58	2.00	2.94	2.20	0.594	6.29	6.14	4.05	5.31	6.25
Tb	0.328	0.286	0.399	0.318	0.123	0.742	0.812	0.520	0.707	0.740
Dy	1.85	1.82	2.34	2.06	0.816	4.07	5.09	3.42	4.14	4.35
Ho	0.367	0.375	0.409	0.435	0.197	0.743	1.05	0.617	0.789	0.777
Er	1.26	1.14	1.28	1.19	0.632	2.11	3.16	1.90	2.18	2.10
Tm	0.220	0.180	0.208	0.163	0.105	0.248	0.463	0.258	0.318	0.264
Yb	1.55	1.42	1.44	1.29	1.08	1.69	3.13	1.66	1.91	2.08
Lu	0.254	0.207	0.225	0.193	0.174	0.252	0.444	0.219	0.307	0.272

The diagram shows that the dykes studied by us have a very close distribution of rare-earth elements. They are characterized by higher concentrations of light elements with a gradual decrease to average. Medium and heavy elements have approximately equal contents.

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