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Research Article

PETROGRAPHIC DESCRIPTION OF GRANITOID COMPLEXES OF TURBAY MOUNTAINS (EASTERN BUKANTOV)

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ABSTRACT
The article presents the results of research on determining the petrographic characteristics of the intrusive rocks of saritov granodiorite-adamellite-granite, southbay monzonite-syenite-granosyenite complexes, which are widely developed in the Turbay area of the Bukantov Mountains. The saritov complex, which is considered the main mineral in the studied area, consists of several phases, which formed intrusive stocks of different sizes in the granodiorite-ademellite-granite-leucogranite series.

INTRODUCTION
Revealing the importance of magmatism in the determination of endogenous mineralization of individual areas during metallogenic research, including mineralogical-petrographic, geochemical study of intrusive formations, is of great theoretical and practical importance for field science (Abdullaev, Khamrabaev, etc.) (Abdullaev, 1967; - Yudalevich, 1981; Isoh *et al.,* 1975). Based on these principles, below are the results of research on determining the petrographic characteristics of intrusive rocks in the Bukantov Mountains of Western Uzbekistan.

MATERIALS AND METHODS
In addition to traditional field and laboratory research methods, modern "Nikon ECLIPSE LV100N POL" digital polarizing microscope was used during the determination of mineralogical, petrographic geochemical properties of rocks.

Brief Geological Description and Culture of the Area
Bukantov Mountains are located in the northern part of Central Kyzylkum in the South Bukantov subzone of the Bukantov structural formation zone (Biske, 1996). The rocks in this area are composed of carbonaceous volcanogenic-sedimentary layers of the Kokpatas suite (PR_3 kp), which make up the layer of folded structures of the Caledonian-Hercynian stage of tectogenesis, and cover rocks (clay, siltstone, sandstone) of alpine folded structural deposits that are unconformable to them. The research area is located in the South-Bukantov structural formation zone and corresponds to the slopes of the foothills of the passive edge of the Kyzylkum-Nurota microcontinent.
Intrusive bodies are widespread in Bukantov Mountains and they are derivatives of several complexes: Bukantov hyperbasite-gabbro-plagiogranite complex Pz_1b, Kokpatas montsodiorite-granodiorite complex C_3k, Olintov granodiorite-adamellite-granite complex C_3-P_1, Southboy montzonite-syenite-granosienite complex C_3- P_1st, saritov granodiorite-adamellite-granite complex C_3-P_1s, Central Bukantov diorite dike complex Ps, southern Tien-Shan alkaline gabbroid complex - T_{2-3} ju (Dolgopolova, 2016; Isoh *et al.,* 2016). Saritov granodiorite-adamellite-granite complex C_3-P_1s. The main ore in the studied area is the Saritov complex and the following intrusives were manifested - Saritov (1.30 x 0.6 km), Saridjoy (0.5 x 0.5 km), Turbay (4.0 x 4.0 km), Southbay stock (0.3 x 0.4 km), Katirtas small intrusive veins, stocks and numerous dykes.
In the Saritov intrusive, the main phase consists of adamellites and adamellitic porphyries. Porphyry fragments are clearly distinguished in the endocontact parts. Granitoids are light gray, massive in texture, porphyry in structure.
The accessory phase is characterized by a lighter color of the rocks, smaller grain size, and the presence of a large amount of potassium feldspar. The structure of the rocks is porphyry, hypidiomorphic-grained

(potassium feldspar, quartz, plagioclase, biotite) and micropegmatite main mass. Porphyry fragments (1.6 x 0.7 mm) are associated with potassium feldspar of micropegmatite structure and plagioclase of variable-zonal structure. The composition of the main phase rocks An_{53} - An_{20} and additional phase rocks An_{42} - An_{25} is zonal from the center of the crystal to the edge (Karabaev, 2018; - Seltmann, 2011; Isoh *et al.*, 2011).

The mineral composition of the granitoid main phase is quartz (25-31%), plagioclase (35-46%), potassium feldspar (10-24%), biotite (10-16%), accessories (1-3%); additional phase - quartz (31-33%), plagioclase (33-35%), potassium feldspar (23-28%), biotite (1.7-7.3%), accessory minerals (1.7-7, 3%).

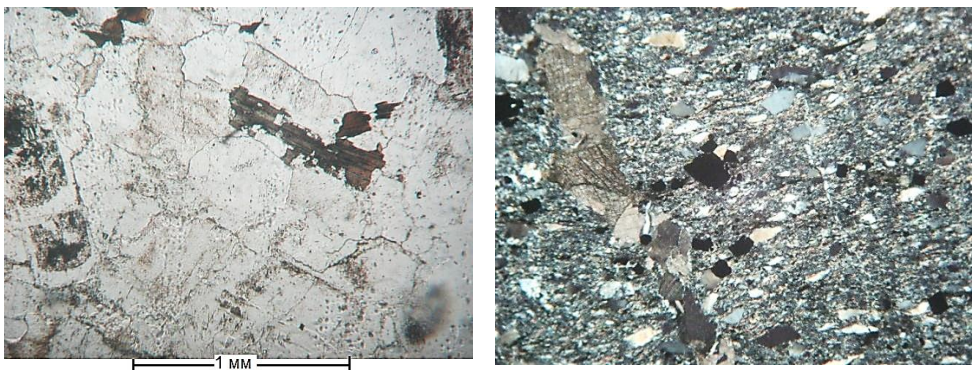
The endocontact facies consists of amphibole-pyroxene and pyroxene porphyry plagiogranites. The structure of the rocks in the main mass is porphyritic, and the grains have a granophyric structure. Mineral composition of plagiogranites: zonal plagioclase (27%), brown chert (10%), pyroxene (6.7%), quartz (2-3%), sphene (1.8%); the main mass is quartz and oligoclase (52.2%).

In the Southbay field, the main phase consists of fine- to medium-grained amphibole-biotite granodiorites and medium-grained weakly porphyritic biotite trondjemites (plagiogranites), which acquire a porphyritic texture near the contact. Granodiorites have a dark gray porphyry structure, medium to fine grained texture. Granodiorites consist of zoned plagioclase (55-60%), quartz (15-20%), potassium feldspar (5-10%), biotite (10-15%), amphibole (5-7%), accessory sphene. The main phase consists of trondemites. The structure of the rocks is hypidiomorphic-granular, prismatic-grained, in the endocontact zone the structure is porphyry (fig. 1).

a. b. c.

Figure 1. Mineralogical and petrographic characteristics of granodiorites of the main phase in the Southbay mine: a – without analyzer; b, c - with analyzer.

The accessory phase consists of light gray, fine-grained, biotite adamellites. Porphyry inclusions make up about 70% of the rocks and are composed of zonal plagioclase (An_{38} - An_{25}), xenomorphic quartz and biotite. The main mass consists of quartz-plagioclase-potassium feldspar, fine-grained biotite. The composition of the rock is plagioclase (35-45%), quartz (25-30%), potassium feldspar (20-25%), biotite (5-10%), accessory minerals (3-5%;). The texture of the rocks is massive, the structure is porphyry (fig. 2).



a. b.

Figure 2. Mineralogical and petrographic characteristics of adamellites in the additional phase in the Southbay mine: a – without analyzer; b – with analyzer.

The composition of the Turbay intrusive (6 km west of the Turbay mine) consists mainly of granodiorite and granite, and the central part consists of two-mica and leucocratic granites (Karabaev, 2018). Mainly, granodiorite-porphyries, adamellite-porphyries, granite-porphyries are found on the earth's surface in the form of small magmatic bodies in the form of stocks and dikes (in the south, east and northeast of the Turbay mine).
The intrusions are close to isometric in shape, irregularly located host rocks and steep (50-70^{o}) contacts are observed.
Stems and veins are distinguished by their complex morphology, well-developed magmatic bodies are formed at the borders of various vertical faults, which have the appearance of apophyses. As the depth increases, the size of magmatic bodies increases. Based on the results of the geological-geophysical modeling of the Turbay area (Ushakov, 1991; Umarkhojaev, Balashov, 1999), it is estimated that the intrusive bodies merge at a depth (1-2 km) and become a single base.
In the rocks, plagioclase is distinguished from potassium feldspar, biotite and chert. The amount of dark colored minerals is in the range of 5-10%.
Veined granite-porphyries and leucogranites have a texture of fine and irregular grains, weak porphyry structure. Composition: quartz (34-38%), weakly zoned plagioclase An_{28-24} (30-35%), potassium feldspar, orthoclase, microcline (25-31%), biotite (0.6-2%), ore and additional - pyrite, sphene, apatite (0.5-1%;). The structure of the rock is porphyry, the texture is massive (fig. 3).

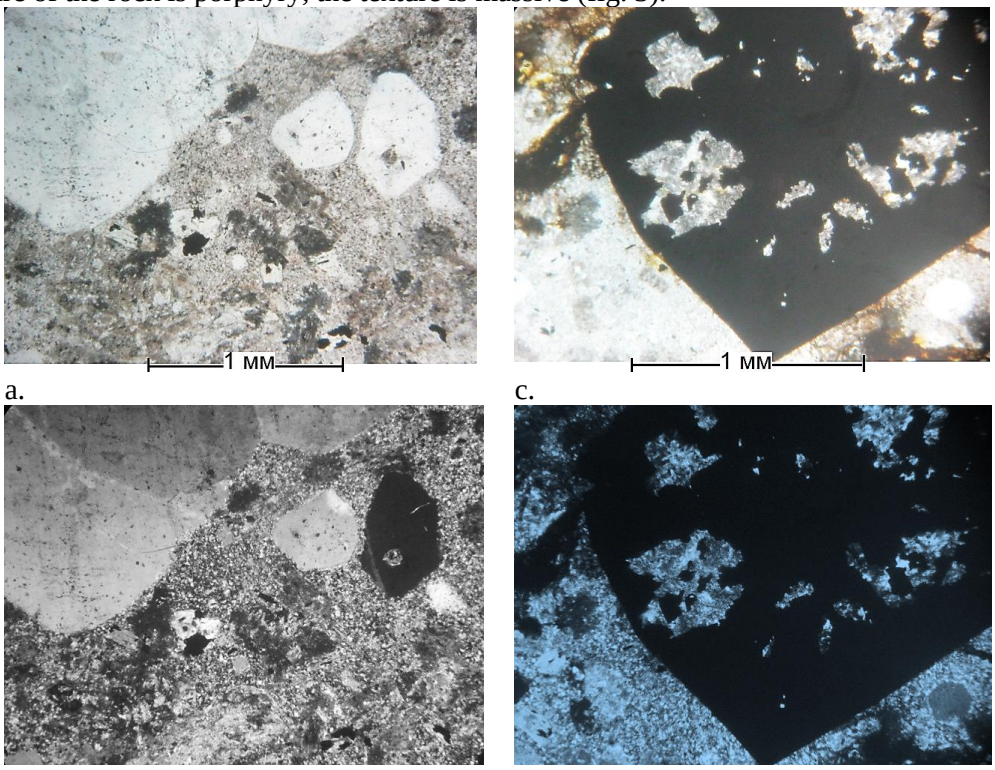


Figure 3. Mineralogical and petrographic characteristics of medium-grained granite porphyries in the Turbay mine: a, b – without analyzer; c, d - with analyzer.

In the Saritov mine, granitoids formed a small stocky body. They are observed biotite-amphibole plagiogranites consisting of quartz (40.4%), plagioclase (55%), potassium feldspar (0.4%), biotite and amphibole (3.7%), ore minerals (0.5%). The structure of the rocks is porphyry, hypidiomorphic-granular, with inclusions of plagioclase and quartz in potassium feldspar.
Chemically, the granitoids of the Saratov complex form a continuous series from quartz diorites (tonalites) to adamellites. The level of SiO_2 values and Rb/K_2O ratio in phase granitoids correspond to medium-potassium (potassium-alkaline) rocks of the complex tonalite-granodiorite series; complex with low magnesium and phosphorus.

According to F.K. Divaev, different phases and vein rocks of the Southbay (Saridjoy) intrusive, which formed the main phases of the Saritov complex in separate intrusive rocks, were formed at the meso-abyssal depth, and the Saritov intrusive was formed at the hypabyssal depth (Seltmann, 2011).
Southbay monzonite-syenite-granosyenite complex C_3-R_1st. The Southbay complex formed a stock of the same name in the area, which consists of rocks of different composition: subalkaline gabbro and gabbro-montzonites, which constitute the main phase of the intrusive (southwestern part of the stock); monzonites, montsodiorites (enzocontacts); quartz syenites, granosyenites (central part of the stock). Among the additional phase rocks, quartz syenite and granosyenite are the most common. Macroscopically, they are composed of the same coarse-medium-grained, pink-gray, gray-green rocks. Composition: microcline-microperthite (50-60%), plagioclase (20-25%), biotite (10-15%), quartz (7-10%). Plagioclase forms sericite, chlorite and calcite from biotite. The structure of rocks is hypidiomorphic - granular. Porphyry separations (up to 15 mm). Porphyry fragments are composed of more potassium feldspar (45-50%), less oligoclase and quartz (5-12%). The main mass consists of quartz, plagioclase, green chert, and biotite. The amount of quartz in the rock is up to 15%.
Red-brown and brown-green chert and brown biotite showed dark minerals in igneous rocks of different phases. Diopside is less common in gabbro and gabbro-montzonites. The composition of plagioclase varies depending on the basicity of the rocks: An_{54-46} (gabbro-montzonites, monzonites and dyke formations of various compositions), An_{42-28} (montsodiorites, melanocrate syenites) An_{31-20} (in quartz syenites and granosyenites). The amount of potassium feldspar is variable - from rare grains to large masses. The structure of rocks changes according to its composition - monzonite, prismatic (gabbro, gabbro-montzonites; montsodiorites, syenites); prismatic-grained and hypidiomorphic-grained (quartz syenites, granosenites); less myrmekite and micropegmatite structures are noted.

CONCLUSION

Magmatic complexes of different compositions and ages are widely developed in the Turbay area of the Eastern Bukantov Mountains: saritov granodiorite-granite complex, southbay monzonite-syenite-granosienite complex, and the Central Bukantov dyke complex of various compositions. The saritov complex, which is considered the main mineral in the studied area, consists of several phases, which formed intrusive stocks of different sizes in the granodiorite-ademellite-granite-leogranite series.
The main phase of the Southbay complex consists of subalkaline gabbro and gabbro-montzonites, the secondary phase of montsodiorites is quartz syenites and granosyenites. The dykes are of different composition, the most common of which are the products of the Central Bukantov dyke complex. They are divided into melanocratic (lamprophyre) and leucocratic (diorite, quartz diorite-porphyrite) groups.
Among these intrusive formations, the saritov complex can be used as a predictive criterion for the separation of prospective areas for gold and rare metal mineralization in the area, and the central bukantov dyke complex - gold and gold-silver mineralization.

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