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ON UNUSUAL AMPHIBOLE METASOMATITES TEBINBULAK INTRUSION

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ABSTRACT

In the Tebinbulak intrusion composed of ultrabasic and basic, in some places with alkaline gradient composition rocks found amphibole rocks probably of metasomatic origin and belonging to thweitazite, characteristic for felitized hybrid rocks. They resulted from the interaction of the main basaltoid magma of the studied intrusion with the intervening Middle Paleozoic acidic sequence. The rocks may also indicate a connection with them of iron-ore, chromite, platinoid, and rare-metal mineralization.

Tebinbulak gabbro-peridotite massif of the Sultan-Uvais Ridge identified by V.V. Baranov, K.M. Kramskaya, J.S. Visnesky (1978) as Tabinbulak-peridotite-pyroxenite-gabbro complex according to their data summarized all the existing characteristics of former researchers [1] is a unique object to clarify the origin of various, possibly not yet established and described rocks of magmatic and post-magmatic stages of formation of intrusive.

This intrusive massif is located in the halo of the impact of the Urusay deep submeridional fault separating the Sultanuvaia and Sheikhdjaila, structural-formational zones with different dynamics of the sequence of formation of magmatic and post-agmatic rock varieties.

The geological and petrographic features in the intrusive were characterized in order of their ascending sequence.

They also include rocks formed by the interaction of intruded magma with the host sedimentary-volcanogenic metamorphosed strata of the Middle Paleozoic plagioclase-mica hornblende marbleized limestones, skarns containing garnet, rutile, tourmaline, apatite and other ore-forming minerals. Absolute age of the rocks of the intrusion by F.A. Askarov according to A.F. Sviridenko - 298-299 million years G.G. Lihaydov (350-378 million years in the amphiboles); According to V.F. Kazakevich gabbro-diorites are 306-330 million years old. The main types of magmatic formations are peridotites, pyroxenites, tebingitesgornoblendites, gabbroids, gabbro-pegmatites, gabbro-syenites, albite veins.

It is assumed that the appearance of gabbro-syenites is associated with the intrusion of later granitoids Jamansay intrusion, not related to Tebinbulak peridotite, pyroxenite-gabbro complex.

Allowed interaction of granitoid magma of the Jamansai complex, among which are not rare inclusions and block xenoliths of gabbroidsTebinbulak massif. Partial dissolution of fusible mineral components of the main magma contacts leads to increased alkalinity of the granitoid melt with the formation of hybrid gabbro-syenites with magmatic replacement of gabbroids introduced later by granitoid magma.

It was found that peridotites remain among the pyroxinite in a variety of forms, sometimes having with them gradual contacts [2]. Pyroxinite almost always surrounds lenticular bodies of peridotite.

Observed fact that peridotites when in contact directly with the host rocks they undergo intense serpentinization. Quantitative ratios of olivine during wound serpentinization were described by us [3].

In the intrusive pyroxinites occupy significant areas of the massif, they have in different parts different ratios of pyroxenes with corresponding optical different properties, the most pure pyroxenites consisting of pyroxene-augite usually surround the peridotite bodies. The transition from peridotite to pyroxinite is accompanied by formation of significant amounts of hornblende, the amount of which in some places exceeds half of the pyroxinite area. At the same time the formation of two-pyroxene pyroxenesverites by optical properties occurs, which is associated with the gradual evolution of the composition of the infiltrating magma in accordance with the Bowen reaction scheme.

Further pyroxenites are replaced by amphibolites, where amphibole as well as pyroxene according to the thermochemical effect contributes to the appearance of monoclinic amphiboles, actinolite, tremolite and hornblende due to the formation of stable hydrogen hydroxide in their composition.

The transition of pyroxenite into mining blendites consisting mainly of amphibole leads to a change in the ratio of petrogenic and ore elements.
The transformation of the magmatic system occurs as a result of the activity of alkaline (Na, K) and acidic (Si, Al, Ti) components synchronously with an increase in the chemical activity of two-valent basic elements (Ca, Mg, Fe). All this leads to formation of secondary minerals of the above mentioned elements - epidote, calcite, zoisite, irenite and other minerals accompanied by their hydroxides, oxides (magnetite, hematite, goethite and hydrogoethite, ilmenite and other minerals) in crystalline and colomorphic states.

Identified in the Tebinbulak intrusion rocks such as tibinites, hornblendites and gabbroids with their vein facies (pegmatites, albite veins) are described in sufficient detail [4] and shown their relationships i.e. role in the formation of titanomagnetite mineralization of this intrusion.

Not without interest data left by the late V.K. Panosuchenko on amphibole metasomatic late-magmatic association of amphiboles established during the survey studies on the southern contact of the main rocks of the Tebinbulak intrusion in the alignment of the Urusay fault.

One significant rock consisting of monoclinic amphibole, as described by the author, is given below:

Slip 11-58.

The structure is porphyroblast, the main mass is fine-grained, represented by coalescence of aggregates of zoisite, calcite, quartz, and monoclinic amphibole grains. The rock is complex (volumetric %):

Mon. Amphibole-50
zoisite-30
calcite-10
Quartz-10

The study of the rock under a binocular and optical microscope showed that it is composed of dark green - spots to light green - prisms of porphyroblasts of monoclinic amphibole (actinolite), between which fine-grained aggregates of zoisite - quartz-carbonate composition (Fig. 2), replacing amphiboles are developed. The fine-grained cohesive aggregate grains are macroscopically, in general, white, grayish-white in color. Quartz is grayish-white, transparent, translucent; zoisite aggregates are grayish-white, translucent. Zoisite aggregates are represented by fine-grained clusters, among which zoisite prism porphyroblasts with longitudinal shading stand out. Quartz and calcite aggregates fill interstitial spaces between minerals of the bonding mass, with calcite forming poikiloblasts with inclusions of monoclinic amphibole and zoisite excretions (Figs. 1, 5).

Porphyroblasts of monoclinic amphibole prisms 1.0x1.2 mm, 1.2x1.4 mm, 2.0x3.0 mm in concatenation or as individuals (Figs. 3, 10). The interference coloration is yellow-red-green, blue-green II order, elongation is positive, the angles of extinction relative to elongation (by extension of cleavage) are up to 20°, there are sections with two cleavage systems (Fig. 3), the angles between the latter are about 56° (Fig. 2,3) in parallel nicoles of grayish-greenish hue. monoclinic amphibole is referred to actinolite.

Along the grain boundary and microcracks, zoisite aggregates are developed, predominant in the fine-grained aggregate of the quartz-calcite-zoisite bonding mass in intergrowth with fine-grained actinolite segregations (Fig. 6). The morphology of the grains is closer to tabular, with individual individuals forming larger elongated porphyroblastic prisms with cleavage cracks along the elongation (Figs. 4, 9). The size of zoisite grains is 016x0.2 mm, 0.06x0.08 mm to 0.4x0.35 mm in prisms. Interference coloration of zoisite is grayish-brownish, in grains where anomalous ink-blue coloration is shown, zonal color distribution is noted - to the periphery to shades of yellowish, purplish color (Fig. 5-6).Elongation can be + and - (prevails), the angle of extinction in most is close to 0°. According to the elongation in porphyroblasts amphibole clear cleavage cracks.

There are sections with transverse cracks in zoisite - fading in such sections is direct relative to elongation and cleavage cracks.

As indicated above, intergranular areas are made by quartz aggregates (Figs. 2, 4), acalcite forms cloak-like silicoblasts with inclusions of earlier minerals, namely monoclinic

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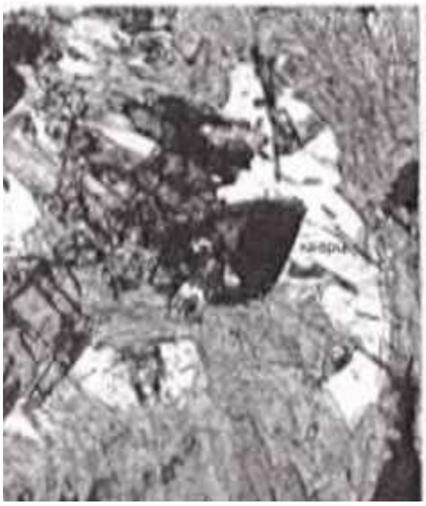


sample 11-58, magnification 160x, Nichol+. Figure 1 shows calcite cladding with inclusions of zoisite aggregates (lower left) and monoclinic amphibole; Figure 2 shows quartz-amphibole-zoisite aggregate. Quartz and calcite are late mineral associations.

Figs. 3-4, sample 11-58, magnification 160x, nicoli + and parallel. In Fig. 1, the aggregate porphyroblasts of monoclinic amphibole (actinolite?), Fig. 4 aggregates of zoisite, calcite amphibole and quartz

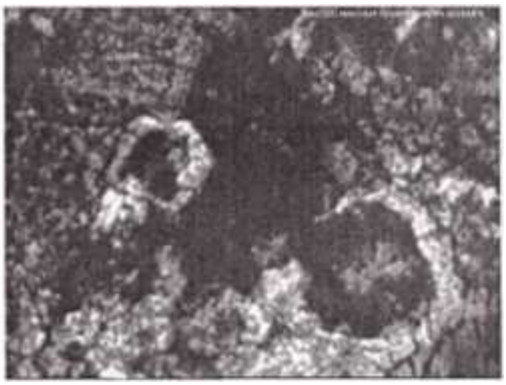


Fig. 5-6, sample 11-58, magnification 160x and 500x, nikoli+. Grains of epidote-zoisite isometric slices) with anomalous interference coloration, zoning in color distribution was shown.

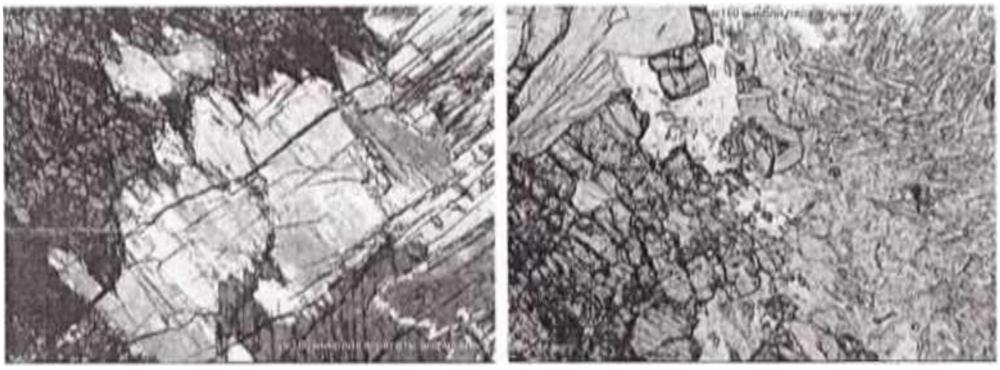
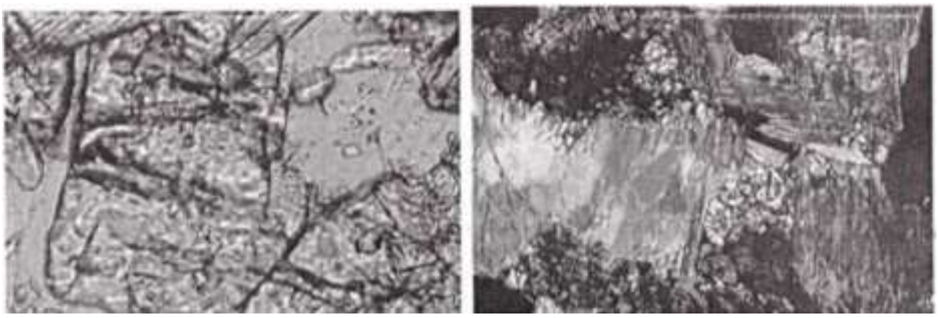


Fig. 7-8, sample 11-58, magnification 160x, nikoli+. Zoisite-quartz-carboite aggregate developed between actinolite porphyroblasts.



Figs. 9-10. sample 11-58. magnification 500x and 160x. the nicoli are parallel and +, In Fig. 9-table-prismatic zoisite grains with transverse cleavage cracks, in Fig. 10- prisms-porphyroblasts of monoclinic amphibole among zoisite aggregates.

CONCLUSIONS

Thus, from the above data, we can conclude that the Tebinbulak intrusion in the Sultanuvais Ridge with rich mineralization represented by ores of the Kachkanar Ridge type of the Ural Mountains is an object of industrial interest.

Geological and mineralogical features of the material composition have not yet been fully studied. Revealing of peculiarities of mineral composition and their physical and chemical parameters of the ore occurrence will contribute to discovery of new technological types of ores. Revealing the role of late magmatic transformations in ore deposit concentration has a clear theoretical interest.

The description of peculiar amphibole metasomatites left by V.P. Ponasyuchenko, which appeared as a result of twitositization of basic rocks due to the reactionary interaction of the intruded basic magma with the host environment can be evaluated as a search sign to detect the continuation of iron ore mineralization at the northern end of the intrusion located under the sedimentary cover. This requires further case studies of the intrusion.

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Аннотация

Мусаев А, Ташпулатов Ш, Туракулов А [Понасюченко В.К.]

О необычных амфиболовых метасоматитах Тебинбулакского интрузива.

В Тебинбулакском интрузиве сложенного породами ультраосновного и основного, местами с щелочным уклоном состава встречены амфиболовые породы вероятно метасоматического происхождения и относящегося к твейтазитам, характерным для фелитизированным гибридным породам.

Они возникли в результате взаимодействия основной базальтоидной магмы изученного интрузива с вмещающей толщей среднего палеозоя кислого состава.

Также породы могут указать связь с ними железорудной, хромитовой, платиноидной, редкометальнойрудной минерализацией.