

CRM of Ukraine Database Supplements

Mineral target:	Kruta Balka deposit
Commodity:	Tantalum and lithium ores

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Location: The deposit is located in the Berdyansk district of the Zaporizhzhya region, 22 km north of the city of Berdyansk.

Site area : 0.08 km².

Research: In 1973-1974, the "Artemgeologiya" Trust of the Priazovska GRE conducted prospecting and evaluation works for tantalum within the Sorokinska tectonic zone, based on the results of which an approximate calculation of the resources of the "Kruta Balka" deposit was carried out to the P1 category.

Degree of development: Not being developed. During research and industrial development, it is recommended to investigate the possibility of extracting, first of all, niobium and lithium, as well as other components that are present in tantalum-lithium ores.

Geological characteristics. The surface of the district is a slightly undulating plain, gently sloping to the south in the direction of the Sea of Azov. The lowest absolute elevations in the valley of the Berda River are 5-10 m. The relative elevation of the relief is insignificant in the range of 20-40 m.

The tectonics of the region is quite complex. The Azov massif was formed during the several large cycles of tectogenesis, which are divided by time. The main of these cycles: Precambrian, Paleozoic, and Meso-Cenozoic correspond to specific sequences - lower, middle, and upper structural floors.

A number of coarse plicative structures of the first order and discontinuous faults stand out in the area of works. In the southwest of the district, there is a large anticlinal structure of the first order - Saltychanskiy anticlinorium, which is limited by the Korsakska zone of deep faults of the Korsakskiy synclinorium, located in the extreme western part of the Azov massif. Saltychanskii anticlinorium is composed of deeply metamorphosed rocks of the Western Pryazovska Series.

To the east of the Saltychanskiy massif is the Central-Azovska Syncline, which is a first-order structure. The synclinal structure is composed of rocks of the Central-Priazovska Series. It is separated from the middle massif by a graben structure of the first order - the Sorokinska tectonic zone, which is a discontinuous graben-like structure of the first order of the block structure.

The Sorokinskiy graben is a structure that delimits the areas of development of Archean volcanogenic and volcanogenic-sedimentary rocks of the Western Pryazovska Series and primary sedimentary formations of the Central Pryazovska Series of the Lower Proterozoic.

In the Proterozoic period, discontinuous structures of a higher order, mainly submeridional, sublatitudinal, and northeastward, were developed, which determined the complex block structure of the Sorokinska zone. A dense network of multidirectional faults created favorable conditions for the penetration of pegmatoid melts, which caused the formation of fields of rare metal pegmatites confined to the Sorokinska zone.

The "Kruta Balka" pegmatite field is located on the right side of the stream of the same name at a distance of 1 km from its mouth and is structurally confined to the central part of the Sorokinska tectonic zone.

The "Kruta Balka" deposit is confined to numerous flat-lying en-echelon pegmatite veins, which are traced to a depth of 250 m. The thickness of the veins varies from a few tens of centimeters to 50-60 m and more. The veins were traced up to 600 m along the strike and up to 250 m along the dip.

Pegmatites are characterized by fairly clear zoning, while 40-60% of the total volume of pegmatites is composed of a zone of quartz-albite-spodumene composition.

For albite pegmatites, zoning is expressed only in individual veins, where zones of medium- and coarse-grained quartz- albite pegmatite, large-sheet muscovite, blocky microcline, and blocky quartz are found.

In albite-spodumene pegmatites, quartz- albite and quartz-albite- spodumene zones, a zone of blocky microcline and a zone of blocky quartz are distinguished.

In all pegmatite bodies, replacement phenomena are widely developed: albitization and greisenization with the formation of quartz- muscovite and albite replacement complexes, which causes complex metasomatic zoning in some pegmatite bodies.

The nature of the distribution of rare metals and the enrichment of individual areas with tantalum, lithium and other elements at the Kruta Balka deposit is determined by the internal zonal structure of pegmatites and the material composition of individual zones. The content of rare elements varies widely: tantalum pentoxide - 0.008-0.4%; niobium pentoxide - 0.006-0.024%; tin - 0.0028-0.005%; lithium oxide - up to 5.5%, rubidium oxide up to 1%; cesium oxide - up to 0.1%.

The mineral composition of rare metal pegmatites is diverse. Minerals of the columbite-tantalite group are predominant in pegmatites. Taking into account the mineralogical and chemical composition of pegmatites, as well as the distribution of rare metals, three types of ores are distinguished within the deposit: tantalum, tantalum-lithium, and cesium.

Tantalum-lithium ores are the most widespread and are characterized by a quartz-albite- microcline composition. At the same time, the amount of spodumene varies widely from 10 to 72.5%, which is 25-30% on average. This type of ore is characterized by high concentrations of tantalum pentoxide (up to 0.05%) and lithium oxide (up to 5.5%) and represents the greatest practical interest for complex industrial use.

Information about mineral resources and reserves is confidential.