



CRM of Ukraine Database Supplements

Mineral target:	Mezhyrichne deposit
Commodity:	Titanium

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Location. The Mezhyrichne placer deposit of ilmenite is located at the interfluvium of the Irsha River and its right tributary, the Trostyanitsya River, in the area of the Isakivka, Yemilivka, Huta Dobrynska and Zabrane villages of the Volodar-Volyn district of the Zhytomyr region.

Research: Geological prospecting work on the deposit was started in 1953, as a result of which the sand reserves were approved by the decision of the DKZ of the USSR (protocol No. 2757 of August 8, 1959). The prospecting of the deposit was carried out in 1973, 1977 (protocols of the Central Committee of Mingeo of the Ukrainian SSR dated March 2, 1973 and Central Committee of the Ministry of the Interior of the USSR No. 1246 dated March 23, 1977). In 2016, a geological and economic assessment of titanium ore reserves was carried out (protocols dated 04.09.2016 No. 3622-DSK and 31.01.2017 No. 3813-DSK). In 2018, a repeated geological and economic reassessment of titanium ore reserves was carried out (protocol of the DKZ of Ukraine No. 4419-DSK from June 14-25, 2018).

The deposit has been recorded by the State Inventory since 1960 and consists of sections - Serednya, Emilivska, Yurska, Osynova, Bukinska and Isakivska, and Pivdenna. The deposit is developed by two companies. Serednya, Emilivska, Yurska, Osynova and Bukinska sites – by the SE "United Mining and Chemical Company", "Irshanskiy Mining and Processing Plant" branch; Isakivska and Pivdenna sites – by the "Mezhyrichenskiy GZK" LLC.

Geological characteristics. The geological structure of the deposit includes continental and marine sediments of different ages, which lie on the kaolin crust of the weathering of the mafic rocks, and in the places of its erosion - directly on the bedrock. Alluvial-deluvial deposits of the Upper Jurassic and Lower Cretaceous form industrial ilmenite placers and are confined to valley-like dips in the relief of the crystalline basement. The lower structural floor is represented by the mafic rocks of the gabbro-anorthosite formation, the weathering crust - Meso-Cenozoic sediments, the upper structural floor - Meso-Cenozoic sediments.

The deposit comprises seven separate areas of placers stretched in a submeridional direction. Their total length along strike is 12 km, the width of the placer in the industrial part varies from 160-600 m to 920-1320 m, the average thickness of the productive layer varies from 5.8 to 9.7 m, the thickness of peat - from 6.6 to 10.1 m. The ratio of peat to the thickness of the industrial deposit is 1:1.

The productive layer of the deposit consists of Middle Jurassic-Lower Cretaceous continental sediments, which include alluvial-deluvial sands (of average thickness 7.5 m), secondary kaolins with a thickness of 0.5 to 12.0 m and sand-chert sediments from 0 to 5.0 m.

The productive rocks are underlain by the weathering crust, which is represented by primary kaolins and chert. Their thickness rarely exceeds 6-10 m with an equal ratio of kaolins and chert.

Overburden is mainly represented by Upper Cretaceous marine sands, Paleogene-Neogene alluvial sands, and Quaternary sands and sandstones. The thickness of overburden varies from 3.0 m to 27.0 m, in places from 5 to 20 m.

Mineralogical composition of ore sands: the main minerals are quartz (45-62%), clay-hydromica formations and feldspars, which are present in a small amount from signs to the first percent.

The main ore mineral containing titanium is ilmenite, the content of which varies widely, and according to technological tests, it ranges from 4.69 to 8.96%. The granulometric content of ilmenite is characterized by the predominant fraction 1-0.25 mm (70%). The hardness of ilmenite is 5-6, the specific gravity is 4.7 to 4.14.

Chemical composition of ores:

TiO ₂	Fe ₂ O ₃	FeO	SiO ₂	MgO	MnO	Nb ₂ O ₅	Ta ₂ O ₅	V ₂ O ₅	CaO	Cr ₂ O ₃	P ₂ O ₅	SO ₃	Al ₂ O ₃
55.0	23.76	24,27	0.74	0.86	0.52	0.024	0.008	0.26	0.01	0.05	0.14	0.58	0.85

The final product of the primary enrichment of ore sands of the deposit is crude ilmenite concentrate. It contains at least 50% ilmenite, 35 to 45% quartz, and 2 to 10% kaolinized feldspar. Ilmenite concentrate is used for the production of pigment titanium by the sulfuric acid method, to a lesser extent - for the production of titanium sponge and ferrotitanium alloys.

In 2002, VC "Geologist" (protocol of DKZ No. 688 dated 20.09.2002) conducted a radiation-hygienic assessment at the Mezhyrichne ilmenite deposit (sites Emilivska, Serednya, Yurska, Osynova, Bukinska).

According to the measurements of the exposure dose of gamma radiation and the determination of the value of the total specific activity of radionuclides, the mineral commodity of the Mezhyrichne deposit in the subsoil is characterized by a low level of radioactivity according to DBN B.1.4-1.01-97 "Regulated radiation parameters". The ilmenite concentrate, which is obtained by the method of enriching the productive layer of a mineral by the value of the total specific activity of radionuclides, meets the requirements of NRB-97 "Radiation Safety Standards of Ukraine" for mineral dyes and glazes. In general, the Mezhyrichne deposit belongs to the I group in terms of the level of radioactivity of the mineral in the subsoil, because it is completely composed of rocks with a low content of radionuclides. There are no toxic substances in the rocks.

Hydrogeological conditions are characterized by the presence of the following aquifers: in Quaternary alluvial and upper glacial sediments; in Tertiary sediments; in Upper Jurassic and Lower Cretaceous sediments; in the flooded zone of the crystalline basement.

Hydrogeological conditions. The industrial deposit is located below the groundwater level. Submarine hydroglacial sands and even-grained gravel sands of the Upper Jurassic - Lower Cretaceous are the most saturated with water.

The areas of the Mezhyrichne deposit are classified into 2 groups according to the complexity of the geological structure in accordance with the Classification of Mineral Reserves and Resources of the State Mineral Resources Fund.

Information about mineral resources and reserves is confidential.