

# Characteristics of Zinc Deposits in Uzbekistan

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**Abstract:** Large reserves of minerals that ensure the growth of basic sectors of the economy are located in Uzbekistan. Therefore, there is a need to characterize the deposit to utilize it for commercial use. To solve these problems, Uzbekistan, in cooperation with developed countries and authoritative international organizations, is implementing many promising projects. Also, there are two main genetic varieties of ores: hydrothermal-sedimentary and hydrothermal-metasomatic. The first group includes most of the continuous layer-like and lenticular ore bodies of small thickness (0.2-2 m), but of considerable length. Its total proven reserves are about 1.5 million tons of zinc, 700 thousand tons of lead, 180 thousand tons of copper and 2.3 thousand tons of silver.

**Keywords:** Zinc Deposit, Zinc Characters

## Introduction

Uzbekistan has large reserves of minerals that ensure the growth of basic sectors of the economy. To solve these problems, Uzbekistan, in cooperation with developed countries and authoritative international organizations, is implementing many promising projects [1]. One of the investment projects of Almalyk MMC JSC is the project "Processing of polymetallic ores at the deposit of the mining and processing complex of the GOK Khandiza".

Exhalation-sedimentary and metasomatic pyrite-polymetallic deposits play a significant role in the raw material base of the country's polymetallic ores. They are characterized by large reserves, sustained metal content and relatively simple mining operating conditions. In Central Asia, Khandiza is the first industrially valuable pyrite-polymetallic deposit, discovered in the early 60s. Over the past 25 years, exploration work in geologically similar areas of the southwestern spurs of the Gissar Range has revealed many ore occurrences of the pyrite-polymetallic type, mainly of metasomatic genesis, the assessment of the industrial value of which requires a significant investment of time and resources [2-5].

Uzbekistan has been an object of mining since ancient times. Numerous workings and traces of the activity of ancient miners dating back to the 9th-12th centuries. AD, are noted everywhere and testify to the intensive mining here in antiquity of copper, lead, zinc, gold, silver, iron, as well as amethyst, turquoise, etc. Almost all the ore deposits mined by the plant were once discovered in the wake of ancient developments.

Field Khandiza is located in the southwestern spurs of the Gissar Range. The Khandiza deposit is represented by the Main ore deposit, enclosed in the lower horizon of the volcanogenic unit, and a series of ore bodies in dolomites of the terrigenous-carbonate-volcanogenic unit. A feature of the ores of the volcanogenic member is their fine-grained structure, pyrite-polymetallic and essentially polymetallic composition [6]. There are two main genetic varieties of ores:

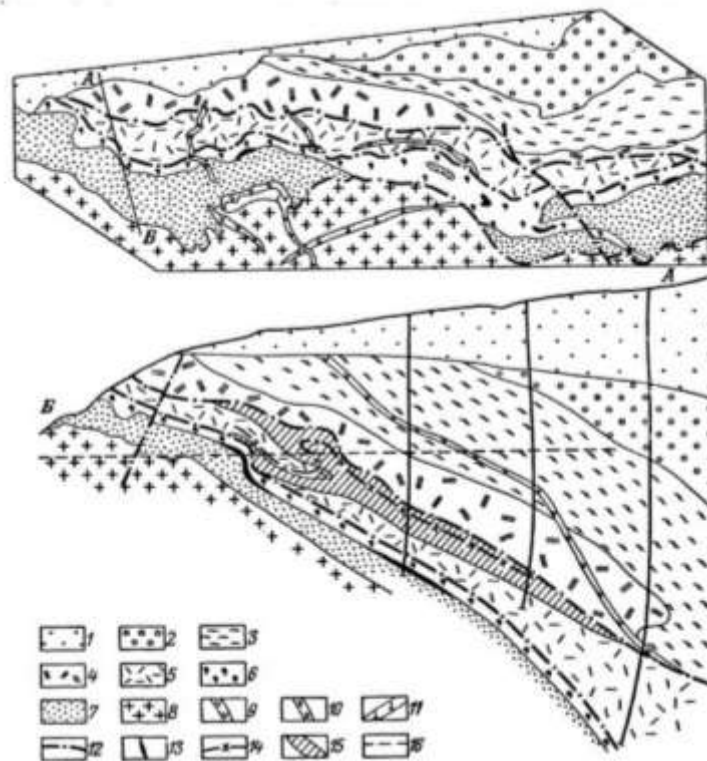
hydrothermal-sedimentary and hydrothermal-metasomatic. The first group includes most of the continuous layer-like and lenticular ore bodies of small thickness (0.2-2 m), but of considerable length. They are characterized by gradational rhythm, signs of the transformation of initially colloform segregations of ore minerals into granular aggregates, globules and framboids of iron disulfide [7-9].

The distribution of sedimentary-diagenetic pyrite is noted in the terrigenous-carbonate-volcanogenic member of the ore-localizing sequence of the Khandiza pyrite-polymetallic deposit. Globules, framboids and lenticular aggregates of pyrite "are found in almost all varieties of ore-bearing rocks and ores and are especially common in the rocks of the lower horizon of the volcanogenic sequence among tuff-siliceous and siliceous rocks. This pyrite is most widely developed in massive banded pyrite-polymetallic varieties with typical sedimentary rhythm and gradual transitions into host rocks" [10].

The complex pyrite-polymetallic deposit Khandiza was formed in the Lower Carboniferous time and is part of the South-West Hissar pyrite-polymetallic province [eleven].

According to textural and structural features, massive, brecciated and vein-disseminated ores are distinguished. By quantitative ratio, pyrite is the predominant mineral. The main industrial minerals are chalcopyrite, sphalerite and galena. In addition to the minerals listed above, fahlore is present in significant amounts. In the ores of the Khandiza deposit, along with the commercial contents of lead, copper, zinc, there are also associated elements that, to one degree or another, are of practical importance in connection with their associated extraction: gold, silver, bismuth, cadmium, selenium, tellurium, gallium, germanium, thallium [12-13].

The reserves of the Khandiza deposit are approved in category C1 + C2 in the amount of 20918.68 thousand tons. The reserves of category C1 are: ore - 20420.66 thousand tons with the content of metals in it: zinc - 1349.47, lead - 671.23, copper - 173.1 thousand tons, silver - 2333.9, cadmium - 8469.92, gold - 7.064 tons [14](Fig.1.).



**Fig. 1. Scheme of the geological structure of the Khandiza field**

1- Meso-Cenozoic rocks; 2 - terrigenous deposits of the Namurian stage; 3-7 - Visean stage: 3 - terrigenous-sedimentary member, 4-5 - volcanogenic member - upper (4) lower (5) tuffaceous horizons, 6-7 - volcanogenic-sedimentary member - carbonate-siliceous (6) and volcanogenic - terrigenous (7) horizons; 8 - deposits of the Devonian - Cambrian; 9 - syenite-dzoritite porphyrites; 10 - dacitic porphyrites; 11 - liparitic porphyries; 12 - discontinuous violations; 13 - pyrite ores; 14 - marker horizon of ash tuffs and tuffites; 15 - pyrite-polymetallic ores; 16 - the position of the horizon of the main adit.

## Conclusion

Experts of the State Committee for Geology of Uzbekistan call the Khandiza deposit in the Surkhandarya region a storehouse of polymetals. Its total proven reserves are about 1.5 million tons of zinc, 700 thousand tons of lead, 180 thousand tons of copper and 2.3 thousand tons of silver. According to the international classification of the Joint Committee on Ore Reserves, the deposit contains 14.4 million tons of ore with a grade of 134 g/t silver, 7.24 g/t zinc, 3.5 g/t lead, 0.86 g/t copper and 0.38 g/t of gold. In addition, Khandiza ore contains selenium, indium and cadmium along the way. At current prices on the world market, the reserves of the deposit are estimated by experts at about 4.5 billion dollars.

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