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SPHENE DEPOSITS OF ZHOVTNEVA MINE IN KRYVYI RIH BASIN

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Zhovtneva mine is one of the many mines developing high-grade iron ore in Kryvyi Rih basin. Administratively this deposit is located in the Pokrovskyi district of Kryvyi Rih. The deposit's geological structure consists of Archaean, Proterozoic and Cenozoic rocks. The productive stratum of the deposit is associated with the Proterozoic formations (the Kryvyi Rih series). The shaft of the mine is located to the east of the productive layer. The ores being located in the Saksagan suite of the Kryvyi Rih series, the horizontal working going from the shaft to the bodies of high grade iron ore open up layers of other suites of the series that underlie the Saxagan suite– the Skeletavska and Novokryvorizka ones.

The formations of the Novokryvorizka series are represented by amphibolites. Among them there are ortho- and para-varieties, those that appeared as a result of the metamorphism of igneous and sedimentary rocks, respectively. Sphene with certain morphological features is a typical representative of igneous rocks, hence its presence shows the types of initial rocks that gave amphibolites as a result of metamorphism. In addition, the presence of the sphene in the rocks shows their potential titanium and phosphorous content. Thus, the study of the sphere, the discovery of its typomorphic features will expand the information on the regional mineralogy of the Kryvbas, and also allows solving some applied tasks.

Sphene in the rocks of the Kryvyi Rih basin is an accessory mineral. It is contained in granites, metamorphic rocks, represented by gneisses and amphibolites, in schists, rarely in hornstones and ores of the Kryvyi Rih series, and also in small amounts it is a part of most metasomatites. As an accessory mineral, it occurs in association with apatite and zircon, sphenes are found in plagioclase granules of the Saksagan type in the northern and central regions of the Kryvyi Rih basin. It is observed in the form of grains of irregular shape of the isometric appearance. The size of individuals varies from 0.05 to 1.0 mm. Rarely wedge-shaped crystals with distinct cleavage occur. The single grains of sphene are also found in quartz-sericite-carbonaceous and quartz-biotite schists within the Lichmann syncline, in combination with zirconium, rutile, tourmaline and cordierite.

Sphene in the deposits of Zhovtneva mine is found in the form of individual crystals, disseminated in amphibolite or grown at the walls of cracks. Granular aggregate are less common grainy. The authors' research was carried out using

stone material, which was selected from amphibolites of the Novokryvorizka suite of the Kryvyi Rih series from mining operations level -1140 m. Microscopic studies of the sphene have shown that a relic character is typical for its individuals. All investigated grains of the sphene have dissolution consequences. The grain size ranges from 0.15 to 0.55 mm. The investigation of micro-hardness of the sphene was carried out according to the standard method with the help of a micro-volume meter PMT-3 in the laboratory of the Department of Geology and Mineralogy of the KNU [2-4]. The pressing time was 25 seconds. load of 70 g. The determined size of the diagonal of the prints fluctuated within 15-19 microns. Determination of the value of the micro-hardness itself in kgf / mm2 was carried out using tables. After that the value was translated into Pa, for that purpose the value from the tables was multiplied by the rounded value of acceleration of free fall of 10 m / s. As a result, it was found that the micro-hardness of the sphene from the Zhovtneva Mine deposit changes in the range 3595,0-5768,0 Pa.

Determination of the reflectance of the sphene was carried out using a microscope "EPIQANT", which is equipped with photocells and which allows numerically determining the reflectivity of minerals. As a result of the research, it was determined that the index of reflectance (R) sphene varies within 18-22%.

Conclusions:

1. According to the morphology of sphene varieties, it is possible to determine their primary magmatic origin, because there are no signs of clastogenic nature such as rounding, directional orientation of the grains, rim of leukoxen.

2. Micro-hardness and reflectivity of the individuals from the Zhovtneva Mine deposit may be taken as typomorphic signs. This thesis can be extended to all manifestations of the sphene, which experienced a complex evolution - the original magmatic origin and imposed metamorphism.

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