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New unconventional type of zircon mineralization

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Algaminskoe deposit belongs to one of the three well-known zircon sites in the ores of which major zirconium minerals - baddeleyite and zircon are both present together in assemblage. It occurs in the eastern Siberian platform in the zone of conjunction with Yudomo-Maiskii cratonic-margin trough northeast of Ingiliiskii massif and is located in the rocks of Yudomskaya suite of Vendian-Cambrian age formed predominantly of marmorized and organogenic dolomite and sandstone. Ore bodies are confined to cavernous quartzous dolomite

Two types of ores can be distinguished: almost massive ledge ore forming cutting veins and stock-work zones in dolomite marbles of horizontal bedding, that is so called "hard" ores and earthy powder sediments in karst horizons of marble, which fall into the category of "loose" ores.

The ores of Algaminskoe deposit have not been equally covered by detailed studies. For hard ores, more complete information on composition and structure is available, including the character of ore minerals interrelation and their actual composition.

The rocks show various types of structure: from powder and earthy to brecciform, massive, vein, porous and cavernous. The texture is predominantly granoblastic from coarse-grained to fine-grained, locally sandstones show relicts of clastic texture. In rocks secondary mineral formation is noted in the form of patches of carbonate in fine small crystals and aggregates of fine-grained quartz.

Zirconium dioxide is concentrated in the material with the size of less than 2.5 mm. Therefore this material is of practical interest. In this case a marked trend is noted to the accumulation of useful component in the material of size less than 0.05 mm, which, in fact, is the initial ore product enriched before (mud concentrate) the yield of which amounts up to 17,1 %.

The features of ZrO₂ distribution presented by mineral phases occurring for the major part in the finely-dispersed ore material allowed us to determine the complex of mineralogical methods of research (high-resolution optic and analytical electron microscopy, X-ray graphic and micro X-ray spectral analysis) with the use of which it was possible to reveal the characteristics of ore aggregates, to determine their composition and to establish granular composition and morphometric characteristics of zircon and baddeleyite.

Useful ore minerals are presented by baddeleyite and zircon, which occur in the form of individual grains, colloform effusions and compound aggregates.

Mineralogical characteristics of ore are responsible for the difficulties of their further processing. The prospects of processing those ores are likely to be associated with hydrometallurgical treatment and

producing zirconium dioxide as commercial output. However zircon-baddeleyite concentrates of enrichment of Algaminskoe deposit are characterized by increased activity. Consequently without preliminary deactivation of the concentrates under investigation, their further processing to obtain zircon concentrate is not advisable since in the process radio nuclides would concentrate in the products of processing.

