

Age and conditions of formation of barite-polymetallic ores of Zmeinogorsky ore district (Ore Altai, Russia)

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Wallrock metasomatites and ores from Zmeinogorsky district deposits (Zmeinogorskoe, Zarechenskoe, Strizhkovskoe) have been sampled for age and formation processes studies. Stockwork ore bodies and veins are located within Early and Middle Devonian volcano-sedimentary rocks.

There are quartz-chlorite-sericite, quartz-chlorite and quartz-sericite metasomatites. Sericite has been sampled in order to study the beginning of ore formation processes. According to the results of $\text{Ar}^{40}/\text{Ar}^{39}$ dating of sericite, the ore formation began about $390\text{--}397\pm 3$ Ma; this corresponds to the peak of granitoid magmatism at the Ore Altai, when granitoids of Zmeinogorsky complex formed.

The ores belong to few different types changing each other throughout the cross section (from bottom to top): pyrite-chalcopryrite, pyrite-chalcopryrite-polymetallic, polymetallic and barite-polymetallic ores. Main minerals are pyrite, sphalerite, chalcopryrite, galena. Secondary minerals include tetrahedrite and tennantite, bornite and chalcocite. Rare minerals include gold and silver amalgams, hessite, native tellurium, native silver, electrum, jalpaite and polybasite. According to the results of sulfur isotopic composition study in sulfides ($0\text{--}+3.7\text{‰}$) there were both mantle and crustal sources. Ore formation temperature varied from 260°C in the beginning to 90°C in the end as it can be concluded from fluid inclusions study results.

Funding: The study has been supported by Russian Mega-Grant № 14.Y26.31.0012; was also carried out at the expense of the State Task of the Ministry of Science and Higher Education of the Russian Federation (project No. 0721-2020-0041).