Rare metals in seafloor massive sulfides of Mid-Atlantic Ridge

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200 samples of seafloor massive sulfides (SMS) from three hydrothermal fields (Ashadze, Logatchev and Semenov) discovered at the Mid –Atlantic Ridge (MAR) [1] have been analyzed for rare metals. In comparison with mean values of SMS of the MAR the enrichment of Au, Ag, Co, Ni, Te, Se, Bi, Ge, Ga, Cd, Sb and Sn were detected.

Two forms of rare metals occurrence (minerals and invisible phase) were identified by EMPA and LA-ICP-MS:

Au, Ag and Bi occur only as minerals (**Au$_{0.75}$** **Ag**$_{0.25}$, **Bi$_2$**Te$_2$S)

Te, Se, Co, Ni and Sb form both minerals and invisible phases in main and accessory minerals: (**Co**, Fe, **Ni**)$_9$ S$_8$,; **Sb$_2$** S3; Ni **Te$_2$**; Ag$_2$**Se**; Te up to 1%wt and Se up to 13%wt in galena, Co and Ni up to 1%wt in pyrite, Sb up to 0.5%wt in cobaltine and pyrite.

Ge, Ga and Cd are an invisible phase in sphalerite. Ge 10 – 1110 ppm, Ga 3.5 – 254ppm and Cd 15 -2000ppm.

The chalcopyrite-sphalerite type (Zn-Cu) of SMS associatedwith gabbro-peridotites is the most enriched in rare metals.

High values of rare metals in SMSdeposits of the MAR considerably increase economic interest tomarine minerals as a whole.

[1] G. A. Cherkashev, V. N. Ivanov, V. I. Bel'tenev, L. I. Lazareva, I. I. Rozhdestvenskaya,M. L. Samovarov, I. M. Porosina, M. B. Sergeev, T. V. Stepanova, I. G. Dobretsova, and V. Yu. Kuznetsov. Massive Sulfide Ores of the Northern Equatorial Mid-Atlantic Ridge. Oceanology, 2013, Vol. 53, No. 5, pp. 607–619