Gold in seafloor massive sulfide from Semyenov field of Mid-Atlantic Ridge

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This study presents mineralogy and geochemistry of gold bearing SMS of ultramafic-hosted field Semyenov – 2. Massive sulfides, sulfide breccias and crusts with sulfide clusts from survey area correspond to Cu, Cu-Zh, Zn-Cu and Fe-S geochemical enrichment. Theses samples have varying concentration of gold, average is 30 ppm (n=25), the highest content reaches 158 ppm. By comparison, the average gold content in the massive sulfides from the Mid-Atlantic ridge is 3,2 ppm (n=950). Along with that, we observed following content of Ag – 450 ppm, Te – 81 ppm and Bi – 17 ppm. Sulfide minerals are presented by chalcopyrite, sphalerite, wurtzite and secondary copper sulfides. Gangue minerals are amorphous silica, aragonite essentially and barite is rare. There are native gold identified in Cu-rich sulfide with Ag and Bi. Also calaverit, sylvanite are found. In Cu-Zn and Zn-Cu samples, gold occurs in electrum and calaverit more rarely. There are not gold occurrence in Fe-S sulfides. The highest gold content was identified as finely dispersed (colloidal?) aggregates in aragonite crust and amorphous silica cement of breccia. The formation of gold corresponds to different stages of ore-forming process and it is intimately connected with changes in environment conditions (T, pH, Eh).

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