

MASSIVE SULFIDE DEPOSITS AS A SIGNIFICANT SOURCE OF PRECIOUS METALS

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Analysis of the data base obtained proves that most of complex massive sulfide deposits of various types and age are enriched in gold and silver, some of them manifesting the subeconomic content of platinum-group elements. The Cyprus-type deposits show the lowest Ag and Au grades (8-34 and less than 1 g/t, respectively) and the highest Au/Ag ratio (above 0.05 in 50% of deposits). The Besshi-type deposits are usually characterized by less than 1 and 4-60 g/t of Au and Ag, respectively, and high Au/Ag ratio (0.011-0.067). The substantial Au and Ag concentrations are found in almost all the Urals-type Cu-Zn deposits, 10% of them containing above 50 g/t Ag, and just 20% containing above 1 g/t Au ($Au/Ag = 0.006-0.174$). The Kuroko-type Cu-Zn-Pb-Ba deposits appear to be the most valuable sources of precious metals, as they are on average larger in reserves and are characterized by the highest content of gold and silver in ore (from some dozens to 600 g/t Ag and up to 7 g/t Au) and very low Au/Ag ratio (0.0002-0.283). The bulk of Ag and Au in massive sulfide deposits is confined to the upper portions of conformable ore bodies. The Ag-bearing galena and other sulfides, native elements, electrum, Ag and Au tellurides, etc. are the principle gold and silver minerals. Platinum group elements mineralization is represented mainly by melonite varieties. In the largest metallogenic provinces of Russia and Kazakhstan (the Urals and the Rudny Altai), some major massive sulfide deposits (150 Mt of ore) are comparable to large properly gold and silver deposits (up to 200-300 t of Au and 2000-2500 t Ag) in gold and silver reserves and play an important role in gold mining, contributing significantly to the total production of gold in these two countries.