

METAMORPHIC MINERALIZATION IN MASSIVE SULFIDE DEPOSITS

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Many of the known massive sulfide deposits of various types and age underwent tectonic dislocations and metamorphic transformations of different origin and degree. In addition to modifying morphology of ore bodies and developing metamorphic ore textures and structures, these processes usually lead to formation of new metamorphic rare minerals both in ores and wall rocks. Their formation appears to be a result of at least three main processes, namely: 1. Decomposition of the primary minerals. For example, the appearance of newly formed minerals of arsenic (arsenopyrite and loellingite) and antimony (breithauptite, nisbite, ullmannite, gudmundite, berthierite, and bournonite, boulangerite, meneghinite) instead of decomposed tennantite-tetrahedrite minerals is clearly seen in the metamorphosed ores. 2. Mobilization of dispersed admixture elements with the formation of their own (proper) mineral forms: Ge - germanite, renierite, V - shcherbinaite, karelianite, and nolanite, U - uraninite, Sn - stannite, stannoidite, mawsonite, tellurocanfieldite, and cassiterite, Mo - molybdenite and sulfide of lead and molybdenum. 3. Dispersal of constitutional ore-forming elements (Ba, Zn) resulting in the appearance of Ba-silicates (hyalophane-celsian, anandite, cymrite) and Zn-containing oxides and silicates (gahnite, staurolite, muscovite, etc.) All the above-mentioned minerals were found by the authors in the highly metamorphosed deposits in Scandinavia (the Main Sulfide Belt), Karelia, Rudny Altai (the Irtysh Shear Zone), and the northern Baikal region.