GOLD-SILVER-TELLURIUM MINERAL ASSEMBLAGES IN DIFFERENT ORE STYLES OF THE SOUTHERN URALS VHMS DEPOSITS

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VMS deposits of the South Urals generally show a continuum in degradation and reworking ranging from pristine steep-sided hydrothermal sulphide mounds to deposits dominated by layered strata of clastic sulphides. Four different deposits with varying degrees of degradation in order of increased reworking: (Yaman-Kasy → Molodezhnoe → Alexandrinskoe → Balta-Tau) have been ranged. The influence of sulphide mound destruction and of sea-floor alteration on mineral assemblages was investigated. In the pristine Yaman-Kasy sulphide mound gold and silver occur as altaite+tellurium+hessite-stuetzite+sylvanite and later galena+native gold+pyrite assemblages in chalcopyrite+isocubanite-rich linings of former chimney conduits. Chalcopyrite-dominated conduit fragments in clastic ore facies contain native tellurium+gold intergrowths. In the weakly reworked Molodezhnoe deposit gold-silver assemblages only occur in sea-floor altered clastic sulphides on the slope of massive sulphide mounds in bornite- and tennantite-rich ores in association with Cu-Ag sul- fides such as jalpaite, mckinstryite, and stromeyerite and rare Au-Ag-tellurides (pet-zite). The Alexandrinskoe deposit is dominated by clastic ores and here native gold and rare hessite occur together with galena in tennantite-sphalerite-dominated veins of the footwall as well as in drusy sphalerite forming conduits of vent chimneys. An assemblage of electrum+galena+tennantite was observed in secondary chalcopyrite in the outer walls of chimneys. Native gold+stromeyerite are common in bornite-rich clastic sulphides while an assemblage of Ag-sulphosalts+electrum is common in barite-rich ores. In the reworked Balta-Tau deposit Ag-sulphosalts+electrum-kustelkite occur often together with tennantite+galena+barite banded ores. Gold-silver-
telluride mineralisation in these VMS deposits changes with degree of reworking from Au-tellurides, and native gold+galena+pyrite in pristine sulphide mounds to electrum+kustelite+Ag-sulphosalts assemblages in the intensely reworked deposits. We suggest that the mineralogy and siting of native gold, silver and tellurium is a consequence of cooling and/or oxidation of hydrothermal fluids and also of seafloor alteration of primary sulfides and tellurides. This research is supported by the European Commission Foundation (project MinUrals INCO COPERNICUS ICA-2- CT-2000-10011)