

Pseudomorphic hematite after ore clasts of gossanites of the Molodezhnoe Cu-Zn massive sulfide deposit (South Urals)

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The structural and mineralogical features of pseudomorphic hematite after ore clasts are considered for gossanites (products of complete submarine oxidation of massive sulfide ores), which form the sedimentary halos at the flanks of the Molodezhnoe Cu-Zn massive sulfide deposit, South Urals (Fig.). Submarine oxidation of Te-, Bi-, Pb-, Hg- and Ag-rich sulfide clasts was accompanied by the formation of pseudomorphic hematite with relict structural features. The most common fine-grained, reniform collomorphic, framboidal and crystalline-grained (with growth zoning) pseudomorphs correspond to the clasts of hydrothermal crusts, fauna shells, outer zone and axial channel of smoker chimneys and pyrite crystalline aggregates with growth zoning. LA-ICP-MS analysis of hematite pseudomorphs demonstrates highly variable (ppm): Te (0.04–981), Bi (0.49–236), Ag (0.05–52.79), Pb (139–1415), and Se (0.73–65.43) contents.

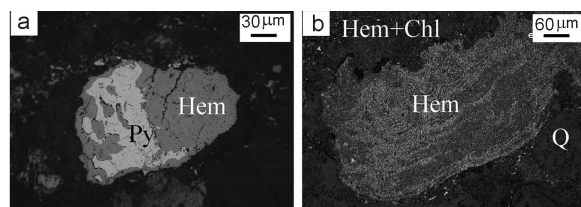


Fig. a – partially oxidized pyrite clasts and b – pseudomorphs of a colloform-reniform structure in gossanites: Py – pyrite, Hem – hematite, Chl – chlorite, Q – quartz.

During oxidation, the trace elements were removed and precipitated in form of authigenic tellurides (tellurobismutite, tsumoite, hessite, volynskite, coloradoite), sulphotellurides (tetradymite), native tellurium, and Se-bearing galena in both pseudomorphs and quartz–chlorite–hematite matrix. The formation of tellurides in gossanites is caused by low Te mobility under oxidizing conditions of halmyrolysis–diagenesis due to its greater affinity with iron hydroxides.