Trace Minerals in Fe-Cu and Fe-Zones, Ocna de Fier Fe-(Cu) Skarn Deposit, Romania. II: Evidence for Ore Genesis from Bi-Sulphosalts in Magnetite-Hematite Ores

[1]CIOBANU, C.L. and [2]COOK, N.J. [1]Bucharest, Romania, [2]Geological Survey of Norway, N-7491 Trondheim, Norway

Analagous to cupriferous ores in the Cu-zone (Ciobanu and Cook, this volume), valuable information concerning timing and conditions of ore deposition can be gained from trace mineral assemblages in magnetite-hematite ores from the Fe-zone. Pockets in such ores contain Cu-Pb- and Ag-Pb-Bi-sulphosalts (bismuthinite derivatives, lillianite homologues, makovickyite, hodrushite, galenobismutite, cosalite, berryite and a phase resembling synthetic AG; $Cu_{2.5}Pb_{12}Bi_{38}S_{88}$). Two new bismuthinite derivatives are observed: $CuPbBi_7S_{12}$, intermediate between gladite and pekoite and $Cu_{0.33}Pb_{0.33}Bi_{7.67}S_{12}$, between pekoite and bismuthinite. High substitution levels (Cu and Pb in makovickyite, Ag and Pb in hodrushite, Ag in cosalite) are noted, but fluctuate within individual grain aggregates, reflecting preservation of compositional domains, upon which decomposition and re-equilibration are superimposed. Primary domains are ascribed to oscillatory, local-scale changes in composition at crystallisation sites. High Cu and Ag in heyrovskyite crystals, as well as symplectitic decomposition intergrowths thereof, are interpreted similarly. Since bismuthinite derivatives are unable to adjust to incremental compositional change by substitution, fluctuations in composition are accommodated by development of complex skeletal, vermiform and lamellar intergrowths These are typically stoichiometric in later decomposition products, but disordered intergrowths of ordered superstructures (O/D) are retained in preserved domains. Textures among fine intergrowths in the Bi_2S_3-rich part of the $CuPbBiS_3$-Bi_2S_3 series are oscillatory zoning patterns. Bismuthinite derivatives are well-suited to retain evidence for fluctuating compositional trends during prolonged cooling.