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New data on the relationship between alabandite and tellurides from the Sacaramb Au-Ag-Te deposit

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The Sacaramb Au-Ag-Te ore deposit is located in the Metaliferi Mountains, Romania and is well known for its Au-Ag telluride mineralization. More than 100 minerals have been identified at Sacaramb with a total of 14 minerals containing Au, Ag, and Te, in which some of them have their type locality at Sacaramb, including nagyagite([Pb(Pb,Sb)S2][(Au,Te)] , krennerite (Au3AgTe8), and petzite (Ag3AuTe2). Sacaramb is hosted by a calc-alkaline andesitic type body in epithermal low sulfidation veins that were generated by the Neogene volcanism. The general process of ore formation at Sacaramb is vein opening followed by deposition of metal sulfides at depth. Fluid throttling was induced by the vein development in the intermediate interval of the volcanic neck and shear-related brecciation and syn-deformational deposition is characteristic of the veins at Sacaramb.

Many of the Te-minerals are associated with alabandite (MnS) in the Sacaramb Au-Ag-Te ore deposit. Over 50 polished sections were studied from ore samples found in two waste dumps (Sector 2 and Sector 3). Microscopic observations were carried out on a Leitz Wetzlar reflected light microscope and the images were taken using a PANPHOT Leitz Wetzlat reflected light microscope equipped with a Nikon Eclipse E-400 camera. Chemical analyses were performed with a Zeiss Merlin GEMINI II SEM-EDS microprobe, with a working regime: up to 300 na; accelerating voltage 10-20 kV. Two types of associations were observed between alabandite and telluride minerals. The first association observed was in the form of native tellurium, hessite (Ag2Te) and nagyagite inclusions in alabandite; however, in some cases sulfosalts were present as well. The second type of association identified was the presence of native tellurium, sylvanite (AgAuTe4), hessite, and krennerite in the secondary rhodocrosite veins that crosscut the massive alabandite. In this occurrence tellurides are found with these sulfosalts: tetrahedrite, jordanite(Pb14(As,Sb)6S23), dufrenoysite (Pb2As2S5), and bournonite (CuPbSbS3). There is a clear lack of Au-tellurides in alabandite and an abundance of Au-tellurides in the secondary carbonate veins. This indicates that the first telluride phase was rich in Ag and Pb and the second one that came with sulfosalts was rich in Au. At Sacaramb, the reducing environment created by the presence of alabandite permitted the precipitation of tellurides and sulfosalts. Furthermore, the precipitation can be assigned to the compositional changes of the hydrothermal solutions due to boiling, dilution, and cooling.