European Mineralogical Conference
Vol. 1, EMC2012-633, 2012
European Mineralogical Conference 2012

Preliminary data on Au-Ag mineralization from Rosia Montana epithermal deposit, Apuseni Mountains, Romania

E. L. Iatan (1,2), Gh. C. Popescu (1), and B. Guy (3)

(1) University of Bucharest, Faculty of Geology and Geophysics, Department of Mineralogy, Bucharest, Romania (luisaiatan@yahoo.com), (2) Institute of Geodynamics "Sabba S. Stefanescu" of Romanian Academy, Bucharest, Romania, (3) Ecole Nationale Superieure des Mines, Saint Etienne, France

Rosia Montana Au-Ag deposit is located in the northeastern part of the South Apuseni Mountains (Romania), in the Rosia-Bucium metallogenetic district, within so called the "Golden Quatrilaterum". It is one of the largest Au-Ag deposits of Europe, being discovered during Roman times, known under the name of Alburnus Maior. The estimated reserves are at 214.9 million tons, with average contents of 1.46 g/t Au and 6.9 g/t Ag, representing 10.1 million ounces (314 t) Au and 47,6 million ounces (1480 t) Ag (as from Rosia Montana Gold Corporation).
This deposit is a breccia hosted low to intermediate sulfidation epithermal system, spatially related to the Rosia Montana dacite bodies intruded during Neogene, being followed by hydrothermal activity.
Alterations are widespread, four major types being distinguished with macroscopic observations and optical microscopy on transmitted light: adularia-sericit, silicification, propylitic and argillic.
During optical microscopy observations on polished sections in reflected light, we could separate the following ore minerals: gold, electrum (Au-Ag alloy), pyrite, chalcopyrite, galena, sphalerite, marcasite, tetrahedrite. As gangue minerals occur quartz, carbonates (calcite, rhodocrosite) and adularia.
Following reflected-polarized light microscopy to identify the ore-mineral assemblages, the polished sections were studied with a Scanning Electron Microscope (SEM) JEOL 6400 equipped with a PGT EDX system. The study was focused on Au-Ag ore that was identified in samples collected from Orlea gallery, northern part of Rosia Montana.
The Au-Ag alloys present three different variable compositions as follows: 1. gold rich alloy where Au concentration range between 65-89%; 2. Alloy with almost equal Au-Ag concentration, with Au ranging between 45-55% and 3. Silver rich alloy where Au concentration is between 22-37 %.
The SEM elemental mapping showed that the concentration of the two precious metals is variable inside a grain but with no clear pattern.
We could separate the following mineral associations in which precious metals occur: Au-Ag alloy with pyrite and sphalerite, gold in sphalerite, Au-Ag alloy with chalcopyrite and pyrite, Au-Ag alloy in carbonates, gold in pyrite and gold and gold-silver tellurides in pyrite.
The existence of the variable composition of Au-Ag can be tentatively explained by chemical changes of the hydrothermal fluids from which ore minerals were precipitated.
This work was supported by the strategic grant POSDRU/89/1.5/S58852, Project "Postdoctoral program for training scientific researches" cofinanced by the European Social Found within the Sectorial Operational Program Human Resources Development 2007-2013".