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P75 - Geological Information on Transylvanian Native Gold Using micro-PIXE

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Very small samples (hundreds of microns) of native gold from Rosia Montana (Apuseni Mts) and from Cavnic (Baia-Mare district) were scanned by micro-PIXE to obtain information on electrum structure - values of ratio $Ag/(Au + Ag)$, on presence of Au and Ag minerals (Te and Sb compounds) –many as micro-inclusions and on other characteristic elements as Hg. Rosia Montana is one of the oldest and most interesting gold deposit with both veins and stockworks. Cavnic deposit is located in the eastern part of the Carpathian belt, one of Europe's major metallogenic provinces. Analyzed samples are from recovery obtained by inhabitants from landfills of former mining plants. Micro-PIXE analyses were performed at LNL AN2000 accelerator from Legnaro and at AGLAE Louvre Accelerator in Paris. On Rosia Montana samples we detected micrometric areas (5 μ m X 5 μ m) rich in Ag and Sb and without Au, Sb/Ag ratio being 1/5-6, indicating the presence of stephanite - Ag_5SbS_4 . In one sample we detected the micro-presence of mercury, suggesting Hg could be used as a "fingerprint" for Rosia Montana gold deposit. On Cavnic-Roata samples, to investigate Au and Ag minerals, we analyzed areas of approx. 50 microns diameter. The study was focused on Sb and Te presence and on the variation of $Ag/(Au+Ag)$ ratio which characterize electrum's metallogeny. The ratio varies from 0.221 to 0.395 - average value of 0.27, with big differences from point to point illustrating electrum's inhomogeneities. Ratio values are significantly lower than those given for neighbour mines Cavnic-Boldut 0.47-0.53, but approaching over Nistru data - 0.25 or rather Herja - 0.36. An interpretation in terms of electrum metallogeny is discussed. One micro-area revealed an important presence of Te (16657 ppm), a significant presence of Sb (2861 ppm) and an increase of Ag content ($Ag=32.75\%$ versus $Au=50.05\%$), indicating the presence of a Ag telluride containing also Sb. The high As content (6.64%) could indicate benleonardite - $Ag_8(Sb,As)Te_2S_3$ highlighted in Kremnica, Slovakia. A comparison with a micro-mineralogical study using a SEM (Scanning Electron Microscope) associated with EDX (Energy-dispersive X-ray spectroscopy) facility is presented. Some cassiterite (Sn oxide) micro-grains extracted from Valea Pianului alluvial gold samples were also analyzed and traces of Zr, Nb, Ta, W were identified.

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