Sulfide Assemblages and Precious Metal Incorporation in the Ann Mason Copper Porphyry Deposit, Yerington, Nevada

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Introduction:

Objective: To find and regulate the relationships between precious metal bearing minerals in a copper ore at the Ann Mason Copper Porphyry Deposit in order to enhance its value.

Geologic Background: The Ann Mason deposit is a copper porphyry deposit formed from hydrothermal fluids circulating in a crystalline intrusive during the formation of the intrusive. The copper is hosted by sedimentary rocks, quartz monzonite, granite, and quartz monzonite porphyry. The ore is defined as a copper-rich epithermal intrusion containing copper sulfides and precious metals.

Methods:

- Petrographic studies on sixty samples from the Ann Mason Porphyry Copper Deposit were analyzed using a Leica DM 2500 microscope to determine primary and secondary minerals present in the deposit.

Results:

- The thirty samples examined were mainly composed of pyrite, chalcopyrite, bornite, and arsenopyrite. The samples were analyzed using SEM backscatter imaging and EDAX spectra to determine chemical assemblages.

- Table 1: Petrographic and reflected light image of sample EG

- Figure 6: Petrographic and reflected light image of sample EG

- Figure 7: SEM backscatter image and EDAX spectrum of sample EG

Discussion:

- General Trends:

  - No clear trend between lithology and accessory precious minerals
  - Minerals are larger in Cpy-Br zone
  - No minerals in solid solution in sulfides
  - Pb found as a calcite
  - Ag found as a tellurite
  - Sb found as a tellurite
  - Au found more often in Cpy-Br zone
  - Native Au found in pyrite in Py-Cpy zone
  - Pt-tellurides only in the Cpy-Br zone

- Model:

  - PbAgSbS
  - Native Ag
  - Hottite
  - Ag-Pt

- The model suggests that the distribution of minerals and precious metals is controlled by the deposit's geologic structure and hydrothermal activity.