

## "Electrum": Chemical Composition and Depositional Environment

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"Electrum" from different types of Au-Ag deposits in the Korean Peninsula, Romania and Japan was studied. They include vein (epithermal, hypo/mesothermal), stratabound massive sulfide (Kuroko and Besshi types), skarn and alaskite types. They are also divided into two types: sulfide-rich and sulfide-poor. The sulfide-rich deposits mainly occur in young (chiefly Tertiary and Cretaceous) volcanic rocks (andesitic and rhyolitic), while the sulfide-poor deposits occur in sedimentary rocks (mainly black shale), gneiss and regionally metamorphosed rocks, which are usually old, ranging from Precambrian to Cretaceous. Usually, the age of host rocks for the sulfide-poor deposits are older than those for the sulfide-rich deposits. The characteristics features of the sulfide-rich and sulfide-poor deposits in mineralogical, geochemical and geological viewpoints are summarized.

The factors controlling the Ag content of "electrum" are suggested as follow:

- (1) The factors controlling the Ag content of "electrum" precipitating from ore-forming fluids in which Au thiocomplexes, Au chloride complexes and Ag chloride complexes predominate, are considered to be temperature,  $a_{H_2S}$ ,  $a_{S_2}$ ,  $a_{O_2}$ ,  $a_{Cl^-}$ , pH and  $\frac{Ag}{Au}$ .
- (2) Among these factors, the Ag content correlates inversely with temperature, salinity and pH.
- (3) The Ag content of "electrum" varies in accordance with coexisting minerals (argentite, hessite, naumannite, pyrite, arsenopyrite, pyrrhotite etc.). This suggests that other factors ( $a_{O_2}$ ,  $a_{S_2}$ ,  $a_{Se_2}$ ,  $a_{Te_2}$ ,  $\frac{S}{Se}$ ,  $\frac{Te}{As}$ ,  $\frac{Bi}$  etc.) may also affect the Ag content of "electrum".
- (4) Physicochemical features of epithermal and hypo/mesothermal ore-forming fluids responsible for the Au-Ag mineralization are estimated. They are summarized as follows:
  - (i)  $\frac{Au}{Ag}$  is  $10^{-1}$ - $10^{-2}$  for both ore-forming fluids. This range is similar to or slightly higher than the average Au/Ag of crustal rocks.
  - (ii) The temperature,  $a_{S_2}$ ,  $a_{O_2}$  and salinity are distinctly different. Temperature of epithermal ore-forming fluids is lower than that of hypo/mesothermal ore-forming fluids.