

OLD MINING SITES AND DUMPS RECOGNITION BY FLUID INCLUSION CHARACTERISTICS IN QUARTZ, RUDE, NW CROATIA

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The ore deposit of Rude is situated within the Dinaric geotectonic unit, 25 km NW from Zagreb. It is a complex SEDEX type ore deposit consisting of a feeder zone with siderite, Cu, Pb, Zn sulfides, barite and quartz and a stratiform ore (siderite, hematite, barite, quartz, gypsum and anhydrite). The host rocks are Upper Paleozoic clastics overlain by Scythian sandstones and shales (ŠINKOVEC, 1971). The ore zone is beneath a thick cover of Mesozoic sediments, including Cretaceous melange with masses of spilites and pillow lavas in allochthonous position. Inter-pillow spaces are filled with secondary quartz.

Mining was abandoned in the sixties, therefore research of the ore deposits is possible only on minerals from old dumps and streams draining the mining area. Fluid inclusion study revealed the presence of two different generations of quartz, one is related to the mineralization itself and another to the Mesozoic pillow lava formation. Fluid inclusion data from pillow lavas bear the following characteristics:

Quartz contains the following types of inclusions: 1. monophase, (L), 2. liquid-rich, (L+V) and 3. vapor-rich, (V+L), with possible addition of some CO₂ or methane. Cryometric measurement data confirm the presence of the H₂O-NaCl-CaCl₂ type fluids.

Temperature of the hydrohalite melting are in two ranges: between -38.5 – -35.1 °C and between -30.0 – -27.6 °C. The situation is similar with temperature of the last melting of ice; first maximum between -15.5 – -13.1 °C and the lower between -7.0 – -4.1 °C. The three component diagram of the H₂O-NaCl-CaCl₂ system also separates these two groups. These indicate the mixing of highly concentrated ore bearing hydrothermal fluid with less saline fluids, sea water or pore water trapped during the emplacement of the pillows.

Homogenization temperature is around 105–115 °C, occasionally as high as 155 °C, indicating low temperature of the hydrothermal solutions. It differs greatly from the expected chemistry and thermal characteristics of the fluids from the ore bearing minerals, and offers a possibility to distinguish ore bearing and country rock quartz (PALINKAŠ, 1989). The data can be used for the exploration of forgotten and unknown historical mining sites in the area and the evaluation of the extent of old mining activity.

References

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