

# **Is there a eutectic mixture of the halite daughter phase with sulphate± carbonate± phosphate± borate± fluoride in the hydrosaline melt inclusions from porphyry Cu-Au (±Mo) deposits in Metaliferi Mountains, Western Romania?**

IOAN PINTEA<sup>1</sup>, ELENA LUISA IATAN<sup>2</sup>, SORIN SILVIU UDUBASA<sup>3</sup>, ION BERBELEAC<sup>2</sup> AND EDUARD GHINESCU<sup>1</sup>

<sup>1</sup>Geological Institute of Romania

<sup>2</sup>Institute of Geodynamics of Romanian Academy

<sup>3</sup>University of Bucharest, Department of Mineralogy

Presenting Author: [ipinteafincls@yahoo.com](mailto:ipinteafincls@yahoo.com)

Hydrothermal molten salt in SCWO (supercritical water oxidation) as a green solvation technology seems to be a good choice in hydrometallurgy, as long as hydrosaline melt inclusions are ubiquitous in porphyry Cu-Au-Mo, pegmatite, and skarn deposits worldwide. These inclusions contain, amongst others, a mixture of salt I and salt II types together with sulfides and oxides in an immiscible silicate rich mixture which polymerized in silicon-like clathrasils. The salt daughter phase shows retrograde solubility during heating at around 140°C in H<sub>2</sub>O-NaCl-KCl system [1] and around 350°- 450°C in the hydrosaline melt inclusions (this study). During quenching, the former halite daughter phase renucleated as multiple solid nanoparticles coagulating in 2-3 subgrains recomposing in the end as a eutectic mixture. This behavior is also characteristic in H<sub>2</sub>O-NaCl and H<sub>2</sub>O-NaCl-Na<sub>2</sub>SO<sub>4</sub> systems, in the SCWO experiments almost within the same temperature intervals, obviously because of the common ion effect [2], [3]. A deep eutectic between NaCl and CaSO<sub>4</sub> was mentioned by [4] when studied the solubility of anhydrite in the H<sub>2</sub>O-NaCl solutions (CaSO<sub>4</sub>, up to 37 wt% at 1 bar). This means that our halite recorded temperature, in terms of NaCl wt.% equiv. would be lower, and this would change the fluid phase equilibria of the trapping P-V-T-X conditions.

## *References:*

[1] Sublett, Gonzales & Bodnar (2018), *Geochim. Cosmochim. Acta*, 235, 173-188.

[2] Voisin, Erriguible & Aymonier (2019), *J. of Supercritical Fluids*, 152 -104567.

[3] Voisin, Erriguible & Aymonier (2020), *Sci. Adv.* 2020; 6: eaaz7770.

[4] Newton & Manning (2005), *J.of Petrol.*, 46, 701-716.