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Rejuvenation features evidenced by fluid and melt inclusions from magmatic-hydrothermal systems in the Alpine metallogenetic provinces from Romania: Preliminary approach

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Besides the millenary economic importance of the Alpine metallogenetic provinces in the Carpathian area of Romania, these are also valuable natural laboratories of the magmatic-hydrothermal processes. Rejuvenation could be recognized from large-scale magmatic-hydrothermal events to the fluid and melt inclusions formation. Moreover, many of these processes justified the modern experimental works [1]. These include post-entrapment modification during fissure plane cicatrisation, refilling, migration, dismembering, ripening, dissolution-precipitation, stretching, thermal decrepitation, and necking-down. Their consideration is very important during PVTX properties evaluation. We emphasized that rejuvenation have a determinative role in melt-melt-fluid immiscibility and production of the silicothermal fluids [2] as metal ore collector, carrier and precipitation media in magmatic-to-hydrothermal systems, especially in miarolitic pegmatites and porphyry copper ore deposits. Successive silicate melt influxes intrude crystallized minerals producing new microfissure planes filled with high temperature silicate melt and fluids or refilling older trail assemblages. These are local artifacts, suggesting the great PVTX variability of the trapped melt/fluid phases in miarolitic and veinlets quartz. We emphasized by petrography, microthermometry and Raman spectroscopy the fluid and melt inclusion evidence for the formation of silicothermal (colloidal) fluid phases in the miarolitic pegmatite from Vlădeasa granite (upper Cretaceous) by interaction of the orthomagmatic silicate melt, supercritical fluids and minerals, starting at magmatic temperature (e.g. silicate melt inclusions: Th ≤ 850º - 1072ºC; hydrosaline melt inclusions: Th= 295º- 1070ºC, P ≤ 0.1-7.9 kbar, xNaCl= 0.12 - 0.43, down to lower temperature (e.g. biphasic fluid inclusions: Th= 248º - 430ºC; xNaCl = 0.003 - 0.007, P ≤ 0.1 - 0.3 kbar [3]) by phase separation episodes (immiscibility inside silicothermal fluid matrix), containing variable amount of Na, K, Ca, Mg, Fe, Ti, CO_2, Cl^-, SO_4^{2-}, CO_3^{2-}, PO_4^{3-} a.m.o [4]. Some complementary unexpected homogenization features of $B_{30\text{-}70}$ biphasic silicothermal fluid inclusion are presented as well.

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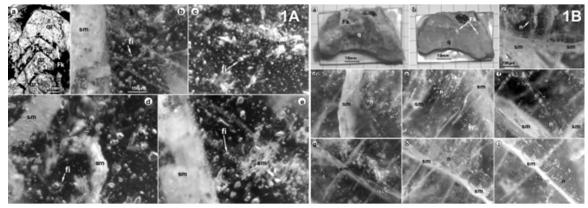

Figure 1. A. Rejuvenation features produced in zoned miarolitic quartz by intrusion of new silicate melt influx in former microfissures, inducing post-entrapment modifications [(transmitted light- **a**, binocular- upper lateral illumination- (**b-i**)]. Notations: qz- quartz zones, Fk- K feldspar ± hematite and magnetite; sm- recrystallized silicate melt forming numerous silicate melt inclusions assemblages (e.g. Th ≤ 850° – 1072°C, high temperature re-equilibration); fi- silicothermal fluid inclusions. **B.** Rejuvenation features in pegmatite quartz associated with feldspar (transmitted light). Notations: q- quartz; Fk- K-feldspar; sm- silicate melt (glass) partly recrystallized; n- neonate fluid inclusions trails formed around the main microfissures (high thermal re-equilibration); a- before polishing, b- double polished slide.

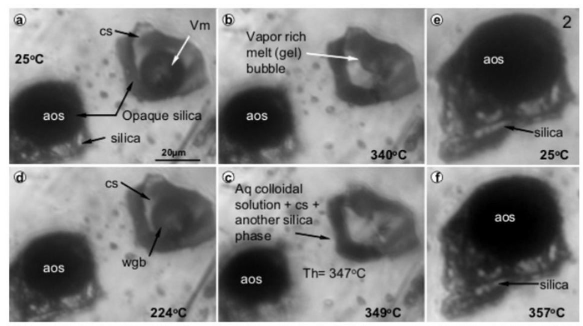

Figure 2. Immiscible silicothermal fluid inclusion microthermometry. Bubble gelation (?) in colloidal aqueous silica + solids. Notations: aos- amorphous opaque silica, wgb- "vapor- rich melt bubble", cs- clathrasil.