

3.6.P04

Fluorite source of the El Pilote Deposit, Coahuila, Mexico

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The Cerro Pilote fluorite deposit is located east of the Encantada-Buenavista MVT fluorite district in Coahuila State, Mexico. The local geology comprises (1) Albian reef limestones overlain by Cenomanian mudstone-wackestones and (2) felsic volcanic domes of Tertiary age. The emplacement of intrusive rocks is structurally controlled and crosscut the MVT fluorite ore bodies. In northern Mexico the fluorite deposits belong to two types: MVT and magmatic-related. The Cerro Pilote fluorite deposit is a skarn usable as the good example of the magmatic-related type.

This deposit is made up by a lateral succession of (1) a rhyolitic dome crosscut by a stockwork of purple fluorite, (2) an endoskarn composed by zoned garnet (andradite to grossularite), pyroxene (Wo_{100} to $Wo_{50}En_{50}$), calcite, and green fluorite, (3) a several hundred m-wide exoskarn composed by green and white fluorite, pyroxene ($Wo_{48}En_{41}Fs_5$), garnet (Ad_{100} to $Ad_{20}Grs_{80}$), albite, tremolite, Mn-calcite, and ilvaite, and (4) saccharoidal marble in transition to the unaltered reef limestone, crosscut by veins made up by white fluorite. The trace-element composition in fluorites from the El Pilote and the Encantada-Buenavista MVT deposits reveals the same very low relative abundances comparable to sediment-hosted fluorites [1].

A fluid inclusion study was done on both prograde and retrograde alteration events. Microthermometric measurements and RAMAN analysis indicate, for the prograde event, the occurrence of hot and hypersaline fluids (up to 400°C and >40 wt.% NaCl eq.), low concentrations of CH_4 and CO_2 in the vapor phase. These inclusions contain up to five solids: rutile, calcite, halite, nahcolite and an unidentified mineral. The daughter minerals (halite and nahcolite) were solubilized between 120 and 411°C, before the homogenization of the vapor phase to the liquid. Salinity and Th in the retrograde fluids range 0 to >40 wt.% NaCl eq. and 120 to 330°C, respectively, and no gases other than water vapor were detected in the vapor phase.

The above evidence suggest that this uncommon type of skarn deposit does not represent a distinct mineralization event (magmatic-derived) in the Encantada-Buenavista MVT district. Rather than this, it is the superposition of a barren hydrothermal event that reconcentrated volatilized F by a buoyant rhyolitic dome, from a pre-existing fluorite bodies.

References

[1] Hill G.T., Campbell A.R. and Kyle P.R. (2000) *JGR* **68**, 1-20.

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Contribution to ore fluid chemistry of Bleiberg Pb-Zn deposit (Austria) and affiliated deposits

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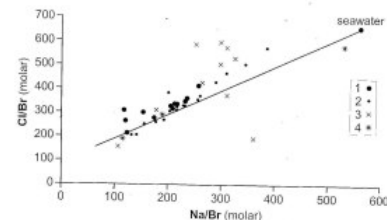
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Bleiberg (Carinthia, Austria) and other Pb-Zn deposits in the Eastern und Southern Alps (Radnig, Raibl, Topla) are hosted by Triassic carbonates. They are classified as Alpine type (APT). These deposits are characterized by low-temperature mineralisation, isotopically light sulfide sulfur and homogeneous lead isotope composition displaying B(leiberg)-type Pb-Pb-model age. The origin of metals by ascending brines is accepted generally. Fine-grained crystals hamper microthermometrical studies. Fluid inclusions in late stage crystals are overwhelmingly very small and monophasic. Moreover, the rock temperature increased during the burial up to 130°C or higher.

Crash & Leach method and ion-chromatography analysis were used to analyse alkali metals and halogenides. The Na-Br-Cl data of Bleiberg deposit and affiliated deposits correspond with the seawater evaporation trajectory. Many samples indicate that ion-exchange of Na has occurred with other cations. Limestone from the lagoonal facies at Bleiberg shows enhanced Cl and Br data, while barren rocks of the reef facies tend to the Cl/Br ratio of seawater. At Bleiberg deposit, the Cl/Br (mol) ratios of all samples vary from 158 to 576 (seawater ratio 655). Botryoidal (stalactitic) sphalerite from Bleiberg and Raibl show a slight increase of the Na/Br ratios indicating Na loss in products of diagenetic fluids. This is confirmed by Na/Br ratio from barren calcites of the post-ore mineralisation. These calcites do not plot along the evaporitic trajectory, and reveal scattered Na/Br ratios.

Eluates from carbonate rocks contain higher concentrations of J than those from sulphide ores. Eluates from ores are poor on J. Only late stage botryoidal sphalerite displays weak enrichment of J. Dolomitic rock from the crest facies reveals significantly lower J and Cl/J (mol) values than the Wetterstein limestone from the lagoonal facies. Positive correlation of Al and J is remarkable in this limestone.



Appreviations: 1) ores, 2) mineralized rocks, 3) gangue calcite, 4) rock reef-facies