FLUID INCLUSION STUDY OF FLUORITE-BEARING PEGMATITES FROM VLASTEJOVICE, CZECH REPUBLIC

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The Moldanubian Unit of the Bohemian Massif contains abundant iron-bearing skarn bodies, the origin of which (contact skarns vs. regionally metamorphosed Fe-bearing sedimentary/sedimentary-exhalative layers) has been a matter of many disputes (see Pertold et al. 1997, and references therein). Skarns, at many localities, are intruded by numerous small-sized pegmatite dykes. This paper presents the preliminary results of fluid inclusion studies of the magmatically grown fluorite from a pegmatite intruding the magnetite-bearing skarn at Vlastějovice (ca. 80 km SE from Prague).

Three basic types of pegmatites, with respect to their mineral assemblages and internal structure, were recognized here by Vavřín (1962). The most frequent type consists of oligoclase + K-feldspar + quartz (quartz-1) + fluorite + hornblende ± garnet. Accessory phases are allanite, sphene, and apatite. The other pegmatite types differ in the relative proportions of major minerals (K-feldspar/oligoclase ratio) and in the variable presence of tourmaline (schorl and elbaite) and in accessories (zircon and U-Th bearing-minerals).

The fluorite, of variable violet color or colorless, is either intimately intergrown with feldspars, garnet and quartz (hieroglyphic-like texture), or more frequently fills in irregular pockets, in the mm to cm size range, in the coarsely grained quartz-feldspar matrix. No growth zones were distinguished in fluorite on a microscopic scale. In cold-stage cathodoluminescence it shows a homogeneous low dark-blue luminescence, with a few irregular light-blue centers/patches. In polarized light, numerous tiny fractures (usually only up to 0.1mm thick) filled in by quartz (quart-2) can be observed in fluorite, but not in the associated quartz-1 and feldspars. Fluorite fracture-surfaces show etch features (partial dissolution of fluorite possibly associated with quartz-2 precipitation).

Three types of aqueous fluid inclusions were distinguished in fluorite: 1) polyphase liquid-rich fluid inclusions (5-20 μm in size) containing several solid phases; 2) liquid-rich fluid inclusions (5-50 μm) with sparse solid phases and 3) two-phase liquid-rich fluid inclusions (5-30 μm) with no solids. These are further abbreviated as FS1, FS2 and FS3 types. They all look more secondary, than pseudosecondary, as some fluid inclusion trails crosscut both the fluorite grains and quartz-2 filled fractures. No ambiguous primary inclusions were found either in the quartz, or in the fluorite.

The solid phases in FS1 (1 to 5 phases) and in FS2 (1 to 2 phases) inclusions are usually anhedral, less frequently hexagonal-, square-shaped, or tabular. They are colorless, transparent, and one, or two of them are always anisotropic, while the other (-s) are not. Rare opaque phases (wire-like) were identified in some FS1 inclusions.

The microthermometric characteristics are in general similar, however the homogenization temperatures and salinities tend to decrease from FS1 to FS3. The first melting was difficult to observe at –35 to –46 °C. The last ice crystal melted at –5.6 °C to –0.1°C, however most of the data occupy the interval from –5.6 to –3.0 °C. The salinities, based on Tm-ice, correspond to 8.7 – 0.3 wt. % eq. NaCl. The measured homogenization temperatures (Th) correspond to L+V to L homogenization of the aqueous phase (230-170 °C (FS1), 180-150 °C (FS2) and 150-110 °C (FS3)). Some of the FS1 inclusions could have higher homogenization temperatures, however, the inclusions at temperatures >240 °C start to decrepitate. No dissolution/melting features were observed on the solid phases present in FS1 and FS2 inclusions, during heating of the inclusions till the moment of their decrepitation.

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