
Abstract. — A first finding of helvite in Elba pegmatites is reported. The mineral occurs in the vugs of a Li-Cs rich miarolitic pegmatite up to 2 cm in diameter, associated with polychrome tourmaline, spessartine, petalite and pollucite. Polymetallic (Fe, Cu, As, Ti) ore minerals concentrations are also present hosted in massive pegmatite. A limited chemical variation between the core and rim of helvite crystals has been observed. The Fe component (danalite) ranges between 21.1 and 20.8% and the Zn component (genthelvite) ranges between 1.6 and 1.1%. The unit-cell parameter is \( a = 8.257(5) \) Å. During the evolution of the pegmatite, helvite crystallized in cavities as a late phase, when the pegmatite was still a closed system. Structural and mineralogical evidence indicates that subsequent hydrothermal circulation opened the rock system, and partially altered the helvite crystals.

Key words: Helvite; Pegmatite evolution; Elba Island.

1. Introduction

Aplites and pegmatites occur as swarms and networks of dykes and veins in the peripheral part of the M.te Capanne upper-tertiary granodioritic intrusion (Poli et al., 1989 and references therein), Elba Island, Italy. Some Li-Cs-rich pegmatite dykes are present along the eastern contact of the pluton, hosted not only in the peripheral part of the intrusion, but also in the surrounding rocks.

Some quarries were operated for at least fifty years prior to 1909 for the exploitation of druse minerals (Sinkankas, 1981). In the last fifteen years some mineral collectors, working in dumps of the old quarries or in new pegmatites, produced samples in which many rare mineral species were recently determined (Orlandi et al., 1990; Auriisicchio et al., 1993 and reference therein).

In 1991 and 1992, some samples of helvite were collected in an aplite-pegmatite dyke (N2 Dyke, in Pezzotta, 1993), hosted in granodiorite South of the «La Speranza»

356 F. PEZZOTT

pegmatite (D’Achiardi, 1906), near the cemetery of S. Piero in Campo. This is the first finding of this mineral in Elba. Helvite occurs as partially altered tetrahedral crystals, up to 2 cm across, in miarolitic cavities together with many other accessory phases. In this study, chemical and X-ray diffraction data of helvite, together with outlines of the structure and mineralogy of the pegmatite dyke, are reported. In addition, the occurrence of chalcopyrite, covellite, pyrrhotite, marcasite and magnetite is, in Elba pegmatites, here described for the first time.

2. DESCRIPTION OF THE OCCURRENCE

The dyke in which helvite was found belongs to a group of pegmatites and aplites in an area located South of the cemetery of S. Piero in Campo village (fig. 1). Some dykes of this group were quarried in the past (Cava Pisani-La Speranza dyke: D’Achiardi, 1906). The pegmatite under study, which outcrops in a small river, is eight meters long, has a maximum thickness of two meters, strikes N-S and dips 20°-45° W. The host rock is a K-feldspar megacrystic granodiorite. Hornfelses of the thermometamorphic aureole of the pluton occur a few metres East of this outcrop.

2.1. Structure of the pegmatite.

The main portion of the dyke displays a complex three dimensional asymmetric internal zoning. The terminations of the intrusive body consist of a network of small aplite-pegmatite veins filling fractures and enclosing blocks of the host granite.

The internal structure and mineralogy of the dyke is typical of shallow depth, rare metal, Li-Cs bearing pegmatites (Pezzotta, in preparation), classified in Rudenko et al. (1975) (see also: Jahns, 1982; Cerny, 1982; London, 1986; Stern et al., 1986). In a vertical section of the dyke, the more significant features are: a coarse grained upper part, relatively rich in perthitic and graphic K-feldspar, and an aplitic lower part, irregularly stratified and enriched in albite. In the intrusive body, pluridecimetric enclaves of layered aplite, partially digested and tourmalinized granite and biotitic hornfels are also present. The pegmatitic part is characterized by the presence of miarolitic cavities, mostly a few centimetres across, but exceptionally up to one meter in the largest dimension.

Quartz, plagioclase, K-feldspar, Fe-biotite and tourmaline are the main constituents of the rock. Besides, lepidolite can be abundant near the pocket areas, and sekaninaite, in micrographic intergrowth with quartz, is present in the transition zone between the aplitic and the pegmatitic zone (Orlandi and Pezzotta, 1993). Graphic intergrowths with quartz of albite, tourmaline and garnet, as well as K-feldspar and sekaninaite, can be present in the pegmatitic zone.

2.2. The pegmatite mineralogy.

Over thirty mineral species were determined in the dyke. The distribution and composition of accessory phases contributes to define the complex three dimensional