THE BERAUNITE PROBLEM

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Basic iron phosphates of transition metals belong to the most perplexing mineral phases (MOORE, 1969, 1970). Although they are known for a long time and have a relatively simple chemical composition, their detailed study brings a number of surprises. A typical example is beraunite, known for science for almost two centuries. This mineral was first described by BREITHAUPT (1840, 1841) on a sample from the Hrbek mine near Svatá Dobrotivá in Central Bohemia, where it occurs in dark red, semi-transparent tabular to prismatic crystals. Chemical analysis performed at that time showed that it is a hydrated basic iron phosphate, in which trivalent iron is present exclusively.

Structural analysis based on X-ray diffraction has been applied in mineralogy from the first half of the 20th century. During the systematic study of phosphates it was found that some green acicular phases considered to be dufrénite have the pattern identical with beraunite (FRONDEL, 1949). The "green" and "red" beraunites were considered to be varieties of the same mineral species. Subsequent solution of the role of ferrous iron in the structure and its effect on colour was followed by nomenclatural proposals (MOORE & KAMPF, 1992). Current valid names for these minerals are eleonorite for the "red" trivalent iron phase, and beraunite for the "green" mixed-valence compound (CHUKANOV *et al.*, 2017).

As this state does not correspond to the original description of beraunite, new analyses of the original Breithaupt's specimen stored in the Mining Academy in Freiberg and of analogous historical samples from National Museum Prague were performed. The results show the identity of beraunite with the mineral eleonorite described by CHUKANOV *et al.* (2017).

The currently confused nomenclature of iron dominant members of the beraunite series is an example of the situation where the description of new minerals is not supported by the thorough study of type samples and an original literature. A possible solution of this "beraunite problem" is discreditation of eleonorite, preservation the original name beraunite for the "red" trivalent phase, and giving a new mineral name to the "green" mixed-valence member of the series.

Fig. 1. Beraunite from the Hrbek mine, Svatá Dobrotivá (St. Benigna), Beroun, Bohemia, Czech Republic. A sample from the 19th century, National Museum Prague. FOV 0.5 mm. Photo L. Vrtiška.

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