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Twinned adularia from Latinka, Eastern Rhodopes, Bulgaria

Адуларови срастъци от Латинка, Източни Родопи, България

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Extraordinary penetrating adularia twins from Latinka pegmatite locality are the subject of the recent study (Fig. 1). They are owned by the Earth and Man National Museum, where a rich collection of these crystals is stored (more than 150 specimens). The minerals have been collected in the 90s of the 20th century from the pegmatite locality Latinka, which is situated near the village of the same name in the Eastern Rhodopes, Bulgaria. The place is well known to Bulgarian lapidaries for the smoky quartz, adularia and garnet crystals with gem quality. In addition to the smoky quartz, skeletal plagioclase and thin epidote needles are common in the observed paragenesis. For the first time in this locality have been identified small ideomophic crystals of titanite, up to 2 mm long.

Adularia is a transparent colourless variety of orthoclase with more ordered structure obtained in a low-temperature condition. The composition and structural state of such crystals are an object of interest more than 50 years. Wright and Steward (1968) are the first who reported a systematic investigation of X-ray and optical properties of alkali feldspar. A number of authors have subsequently studied the crystal-structural varieties of orthoclase (Collerson, 1976; Černý, Chapman, 1984, etc.). In particular the composition and structure of the orthoclase from the Latinka pegmatites were studied by Pejtcheva et al. (1994). They report that studied feldspars are of the “orthoclase” type according to the classification of Wright and Steward (1968). Within a monoclinic symmetry, from the outer to the inner parts of the veins, the degree of Al/Si ordering decreases. The content of Na is also decreased by K and Pb and traditional presence of Sr and Ba was observed.

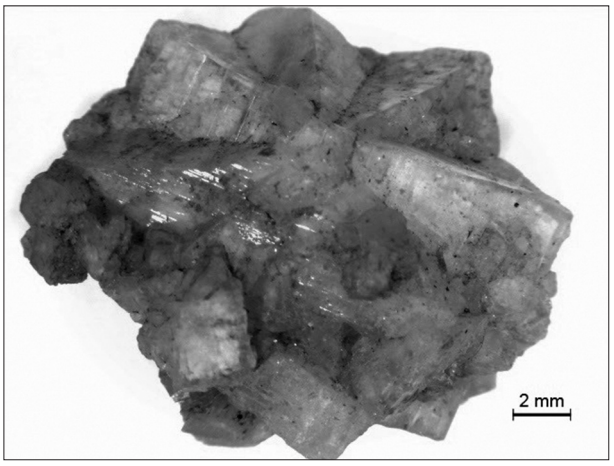

Fig. 1. Microphotography of twinned adularia crystals from Latinka, Eastern Rhodopes, Bulgaria

Orthoclase is a monoclinic mineral, C 2/m, a = 8.554 Å, b = 12.970 Å, c = 7.207 Å, β = 116.01° with a perfect cleavage on {001}, good on {010} (Colville, Ribbe, 1968). Twinnings are common as Carlsbad, Baveno, Manebach and a number of very rare and unreliable laws. They are object of interest since a long time ago (Drugman, 1938). But observed morphology, although ubiquitous in the specimens studied, is extremely rare in nature. As far as I know the only orthoclase with a similar appearance are those from Cape Lime Company’s Dolomite Quarry, Vredendal, South Africa from Steve Sorrell Collection.

In fact, the morphology of the separate crystals from Latinka is simple – principally they are

composed of {110} and {101} like the crystals of Pejtcheva et al. (1994) reported. But the twins observed are more complicated. They are composed of {100}, {010} and {001}, several mm to 3 cm in diameter, the most common being between 1.5 and 2 cm. The formed shapes have been called "asterisks" by the discoverers. They consist of 8 naturally penetrated crystalline edges from several different units with outer right angles and inner angles of about 120°. Twinning axis passes through the body diagonal of the orthoclase pseudo-rhombohedra, id est about axis [111].

Three generations of alkali feldspar are distinguished in the studied samples: the first consists of larger (up to 7–8 cm) orthoclase crystals with matt faces, habit type Zillertal with {110}, {010}, {001} and {101}. The second generation are the "asterisks" that have been already mentioned. And the third are small translucent adularia crystals with simple morphology – Felsönabya type made of {110} and {101}. It is undoubtedly a continuous hydrothermal process with several changes in crystallization conditions with a gradual decrease in temperature and at the same time an increase in saturation which led to the formation of these unique natural phenomena. The specific reason that led to the widespread crystallization of these twins in the second stage of orthoclase formation is interesting, but it is unlikely to be fully clarified.

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