

## SANIDINE TWINS FROM ZVEGOR, REPUBLIC OF MACEDONIA

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### Introduction

Sanidine crystals were collected from quartz latite rocks east of the village Zvegor, in eastern part of the Republic of Macedonia. Morphology of these crystals was already described, but so far, among these crystals, only Carlsbad twins were observed (ŠIJAKOVA-IVANOVA *et al.*, 2011). X-ray powder diffraction analysis of these crystals confirmed the sanidine crystal structure (ŠIJAKOVA-IVANOVA *et al.*, 2011).

### Experimental

Representative crystals were chosen for a goniometric measurement, which was done by two-circle reflecting goniometer. Crystallographic forms {010}, {110}, {130}, {001}, { $\bar{1}11$ }, { $\bar{2}01$ } and {021} were identified using axial ratio a:b:c = 0.6585:1:0.5554 (GOLDSCHMIDT, 1897).

### Results

According to observation and measurements performed, together with the already observed Carlsbad twins (ŠIJAKOVA-IVANOVA *et al.*, 2011), two new types of twins have been discovered. First, there are twins according to Manebach twin law, where twin plane is (001) and second, (110) Prism law, where twin plane is (110). Among all twins present, Carlsbad twins

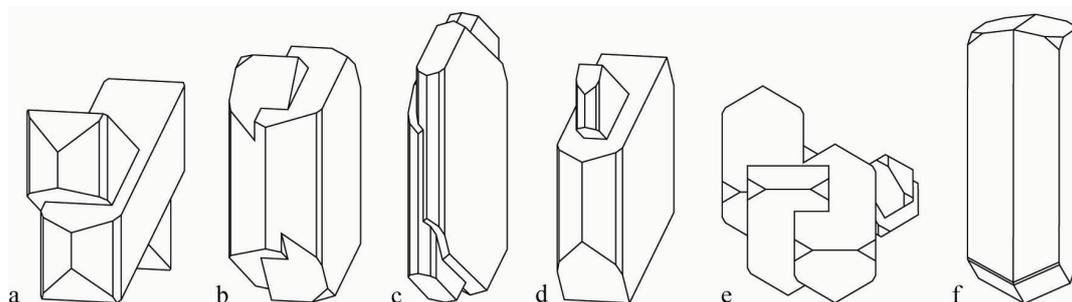
are most abundant. Left- (Fig. 1a, b, c) and right-handed Carlsbad twins are almost equally present. In several cases just one twinning formation a left- or a right-handed twinning is present (Fig. 1d). A complex multiple twinning is also observed, where Carlsbad twins are between themselves grown according to (110) Prism twin law (Fig. 1e). Manebach twins are elongated along [100] (Fig. 1f).

### Discussion and conclusion

Although all these types of twins are already mentioned in literature (SMITH, 1974), twins according to (110) Prism law are not so common, and, therefore, their finding is notable.

### References

- GOLDSCHMIDT, V. (1897): Krystallographische Winkeltabellen. Springer, Berlin, 432 p.  
 SMITH, J.V. (1974): Feldspar minerals, 2: 303–398.  
 ŠIJAKOVA-IVANOVA, T., ČOBIĆ, A., ŽIGOVEČKI GOBAC, Ž., ZEBEC, V. & BERMANEC, V. (2011): 2<sup>nd</sup> International Workshop on the UNESCO-IGCP Project: "Anthropogenic effects on the human environment in the Neogene basins in the SE Europe", 1–5.



**Fig. 1.** Sanidine twins. (a) Left-handed Carlsbad twins; (b) Left-handed Carlsbad twins: twinned crystals flattened along [010]; (c) Left-handed Carlsbad twins: twinned crystals elongated along [001]; (d) Carlsbad twins: a left- and a right-handed twinning in a just one twinning formation; (e) complex multiple twinning: Carlsbad twins grown according to (110) Prism law; (f) Manebach twins.