BEUDANTITE $[PbFe^{3+}_3(AsO_4)(SO_4)(OH)_6]$ – SEGNITITE $[PbFe^{3+}_3(AsO_4)_2(OH)_6]$ SOLID SOLUTION FROM LIKAS-KŐ, VELENCE HILLS, HUNGARY

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Beudantite is a Pb-Fe arsenate with sulphate substitution, in a ratio As:S near to 1:1 (in atomic %) (SZYMANSKI, 1988), while segnitite has the same composition but without (or with minor amount of) sulphate substitution (BIRCH *et al.,* 1992). We studied the changes in the arsenate:sulphate ratio with scanning electron microscope (SEM) equipped with wavelength dispersive X-ray spectrometer (WDX). The samples were collected from the Likas-kő area, Velence Hills (Hungary), where in the oxidation zone of an enargite mineralization several secondary minerals were formed. The members of the beudantite-segnitite series are quite common arsenates in this area with characteristically yellow, brown or even black euhedral crystals. In most of the analyzed aggregates arsenates show zonality, epitaxial crystallization together with other minerals (e.g., jarosite, Fig. 1). The samples could be classified into two groups within the beudantite-segnitite solid solution series according to their sulphate content. At Type 1 the arsenate:sulphate ratio is near to the ideal 1:1 of beudantite (Fig. 1), while at Type 2 this ratio is higher than 1.5:0.5 of the sulphate-containing segnitite (Fig. 2). Beside Fe, in most samples we could also measure Al in variable amount (Table 1).

References

BIRCH, W.D., PRING, A. & GATEHOUSE, B.M. (1992): American Mineralogist, 77: 656–659.
SZYMANSKI, J.T. (1988): Canadian Mineralogist, 26: 923–932.

Table 1. *Mean compositions of beudantite-segnitite solid solution according to the WDX analyses (in atomic %). Sample* ***a****: average of 5 spot analyses; Sample* ***b****: average of 12 spot analyses; Sample* ***c****: average of 13 spot analyses; Sample* ***d****: average of 9 spot analyses. These values are the lowest (****a*** *and* ***c****) and highest (****b*** *and* ***d****) measured sulphate contents in each type. The last line of the table shows the arsenate:sulphate ratio, calculated from atomic percentage, normalized for 2.*

	Type 1		Type 2	
	a	***b***	***c***	***d***
Fe+Al	44.97+5.73	45.39+3.69	35.81+13.09	47.94+1.65
Pb	17.24	17.21	17.89	17.38
As	19.52	16.58	28.65	24.3
S	12.32	17.13	4.55	7.58
arsenate:sulphate ratio	*1.23:0.77*	*0.98:1.02*	*1.73:0.27*	*1.52:0.48*

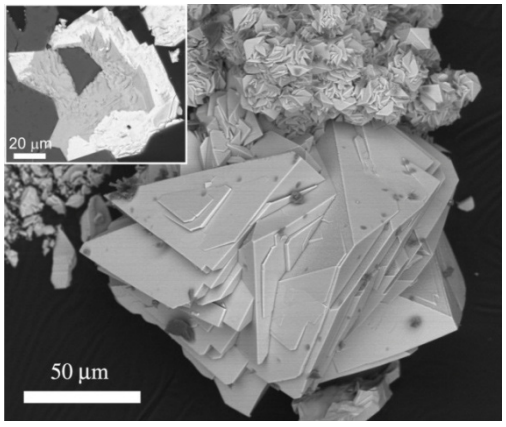

Fig. 1. *SEM image of a rhombohedral crystal aggregate. On the top left its cross section shows that around a jarositic core the beudantite shell was formed.*

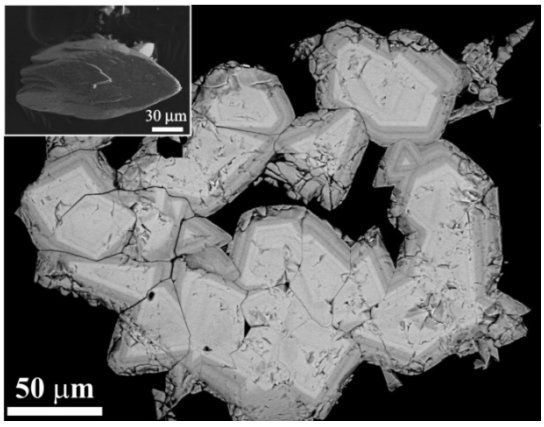

Fig. 2. *Cross section SEM image of sample* ***c*** *where around the segnitite core a 10–20 µm wide plumbogummite shell was grown. On the top left the scalenohedral morphology could be seen.*