

## Paragenetic meaning of the Bi- and Ag-rich phases from the Panasqueira lode system (Portugal)

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A recent extensive underground sampling program [NewOres, ERA-MIN project] allowed a detailed study of minerals forming the lodes exploited in the Panasqueira world-class W-Sn deposit. It is now clear that the main ore stages consist of multiple depositional events of several minerals, indicating a cyclic development of suitable conditions for their growth, conceivably related to magmatic-hydrothermal rejuvenation events affecting different sectors of the lode system and providing significant chemical inputs. The Bi- and Ag-rich phases are paradigmatic examples of this recurrent evolution during the sulphide stage of lode formation. Three assemblages can be distinguished on the basis of textural relationships: (1) Bi<sup>0</sup> exsolutions in *Apy* resulting from *Lo* breakdown; (2) fine-grained intergrowths of Bi<sup>0</sup> I + bismuthinite I + matildite I ± canfieldite I ± Ag-rich *Gn* I, enclosed by the prevailing *Ccp*, stannite I, *Po*, *Py* and *Sp* aggregates; and (3) Bi<sup>0</sup> II + bismuthinite II + matildite II ± canfieldite II ± pavonite ± ikunolite ± benjaminite ± an unidentified Ag-sulphide phase (4Ag:3S) ± *Gn* II (Ag-poorer than *Gn* I), filling veinlets together with carbonates and a last *Ccp* generation that intersect (Ag-)stannite II; these veinlets crisscross a late generation of *Tpz* and *Ms* (tracing a fracture-controlled permeability increase that took place after the dominant sulphides formation). EPMA data show that none of these Bi- and Ag-rich phases deviate considerably from their ideal compositions, but the systematic measurement of several minor elements shows that different generations of the same phase have distinct minor elements fingerprints; yet, As and Sb contents are always meaningless. This new data, together with what is reported in [1], show that Bi- and Ag-rich phases are quite common in the lodes of the Barroca Grande sector, and differ from the Ag(Sb)-rich mineral assemblages recognised in the Vale da Ermida sector [2].

[1] Wimmers, D. (1985) *Min. Mag.* **49**: 745-748.

[2] d'Orey, F. (1967) *Com. Serv. Geol. Portugal* **52**: 117-167