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Sn and Cu in melt inclusions of the Albernoa felsic volcanic centre, Iberian Pyrite Belt, Portugal: seeking the missing (magmatic) link

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The Iberian Pyrite Belt (IPB), in the south of Portugal and Spain, hosts several of the largest volcanic-hosted massive sulfide deposits ever known, in a Late Devonian to Lower Carboniferous bimodal-siliciclastic volcanic-sedimentary succession. The architecture of the felsic volcanic centres includes lavas/domes, pyroclastic units and intrusions, defining lava-cryptodome-pumice cone volcanoes (Rosa, C. et al., 2007). Recent lead, strontium, neodymium and osmium isotope data suggest that, besides leaching of metals from the only partially known footwall volcanic and meta-sedimentary sequences, direct magmatic metal contributions may have been significant in some IPB ore-forming systems (Relvas et al., 2006; and references therein). However, direct evidence for this is still lacking and the magmatic link is still to be established.

The composition of melt inclusions in the IPB felsic volcanic rocks provides a direct indication of their magmatic metal contents, thus speaking to the potential role of magmatic fluids as an additional metal source in this metallogenic province. We are investigating, by SEM imaging coupled with EDS qualitative analysis, melt inclusions trapped in representative samples of several felsic volcanic centers of the IPB, either hosting mineralization or not. Of particular interest are the felsic volcanic successions in the Neves Corvo and Serra Branca areas, both of which are mineralized, and Al-

bernoa, a volcanic center where no sulfide mineralization or ore-related hydrothermal activity is known. Alteration and deformation has greatly influenced the quality and preservation of the melt inclusions. Nevertheless, our first results for melt inclusions found in the least-altered samples clearly indicate that magmatically-sourced metals could have contributed to the ore-metals budget of some IPB deposits.

Primary quartz phenocrysts in rhyodacites of the Albernoa volcanic centre contain opaque devitrified melt inclusions. These melt inclusions contain small precipitates with significant quantities of Sn and Cu with lesser Cl and S, showing that, at the time of melt entrapment during quartz phenocryst growth, the magmatic source beneath the volcanic centre contained high contents of Sn and Cu. These results have significant implications for interpreting the origin of the high-grade Sn and Cu ores in the Neves-Corvo deposit.

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