

Mineralogy of the Los Frailes Zn, Pb, Cu VHMS deposit (Iberian Pyrite Belt)

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The Los Frailes open pit is located in the south-easternmost part of the Iberian Pyrite Belt. The study of the mineralisation of VHMS type was the principal aim of this work. Study of the polished sections took an important part of this work and four types of ore were distinguished 1) semi-massive pyritic ore, quartz and sphalerite in low amounts 2) massive pyritic ore with low amounts of sphalerite 3) polymetallic "banded" ore of centimetric thickness with a majority of sphalerite and galena 4) pyritic ore associated with chalcopyrite in the stringer zone. The ore 1) and 2) are particularly barren with less than 1% sphalerite. Two types of tetrahedrite were detected by the electron microprobe 1) a Ag-rich associated with quartz 2) a Ag-poor tetrahedrite enriched in copper is much more frequent and is associated with the "banded" ore. Tetrahedrite, equally, is the principal Sb-bearing phase and accessory As-bearing. Arsenopyrite is the principal mineral carrying arsenic and is associated with the two first types of ore.

Genetic aspects one of the deposit were also treated. The principal texture observable through the polished sections was one of replacement. On the opposite the "banded" ore looks like a sedimentary feature, although replacement features are dominant in polished sections. The arsenopyrite geothermometer was applied on the two first types of ore and showed temperatures of crystallisation from 320 to 400°C. Some characteristics of the chemistry and a few hypotheses concerning the origin of the mineralised fluid were made thanks to the sulphur isotopic study of the pyrite crystals. The result of the analyses showed δS values from -2,0 to 5,2‰. These results are in accordance with other measures made on similar ore deposits in the IPB. An isotopic zonation was described as a function of the level of sampling of sulphide lenses.