

BIO-MARKERS DETECTED BY PYROLYSIS (PY-GC/MS) IN EARLIEST COPPER METALLURGY (c. 5000 Cal BP) IN THE SOUTH-WESTERN IBERIAN PYRITE BELT (HUELVA, SPAIN)

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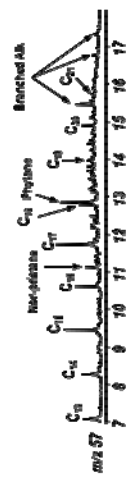
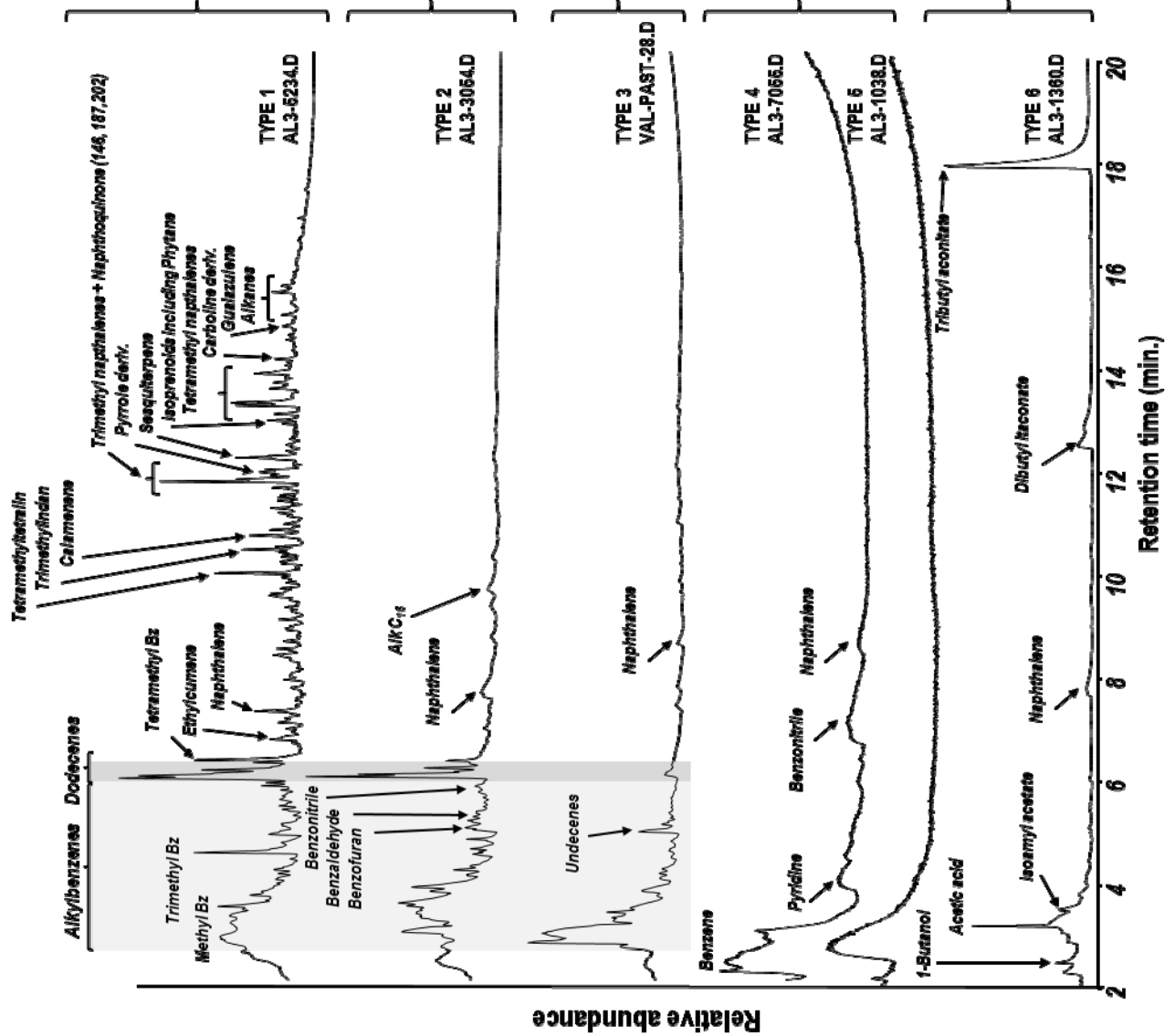
Located at the centre of the foremost mining district on the Iberian Peninsula (the South-Western Iberian Pyrite Belt), the settlement of Cabezo Juré (Alosno, Huelva, Spain), some 2 ha in area, represents the occupational model that structures the organisation of this mining territory (Nocete, 2006). The excavation of over 50% of its surface, fourteen radio-carbon dating taken through its building sequence and a systematic and integral study of its site, show that there were two stages in its occupation (Nocete et al., 2011).

The first stage (Phases I, II, and III) has a time-scale covering the first three quarters of the Fifth millennium Cal BP and shows a settlement exclusively dedicated to mining and metallurgical activities that is fortified and has a local source (< 1 km) of copper ores with the technology for complex copper-working (furnaces, tuyères, crucibles, slag, smelting hammers, artefacts partway through the production process, etc.) and a marked technical and spatial division of labour (workshop areas in copper ore reduction and refined material samples) that involves all of its area and population. This suggests a copper factory with an intensive full-time production. The more recent stage, (Phase IV) with a time scale that puts it between the Fifth and Fourth millennia BP, shows a small agrarian population with metallurgical activities on a domestic (part-time in a household level) scale with very little technological development (no furnaces, tuyères or crucibles) for the production of copper and metal artefacts in the settlement-summit.

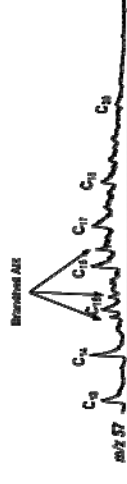
In this work organic remains found in a variety of household pottery vessels are studied using analytical pyrolysis (Py-GC/MS) at 500° C. A description of the molecular assemblages found in the different artifact types is given, as well as a tentative interpretation of possible uses based upon the different pyrolysis patterns found.

REFERENCES

- Nocete. *Antiquity* 80, 646-654 (2006)
Nocete et al. *J. Archaeol. Sci.* 38, 3278-3295 (2011)



Complex organic sample from a small cup. Abundance of terpenes and alkylnaphthalens compatible with the presence of resins and essential oils. Possible medical or ritual uses.



Corresponds to a sieves/strainer vessel. Presence of N compounds probable from proteins/polypeptides and a high abundance of unsaturated hydrocarbons (C_{12:1}) of unclear origin (fat: glyceride side chains?). Possible dairy (cheese) production.

House ware pot. presence of an alkyl serie (C₁₃-C₂₀), residues of pyrogenic material and no N compounds.

House ware plates. Residues of pyrogenic materials and N compounds probable from proteins.

Patern compatible with a polyvinylidene chloride (PVDC). Contaminated sample probable un-appropriated wrap.