SUPPLEMENTARY INFORMATION

A multidisciplinary study unveils the nature of a Roman ink of the I century AD

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Supplementary Figure S1: Archaeological context. Grave goods of civic tomb XII, as exposed at the Museo Nazionale Atestino of Este, Padua, Italy. The grave good is composed by a big funerary clay urn, some jewels, a couple of *unguentaria*, some potteries and a lamp.
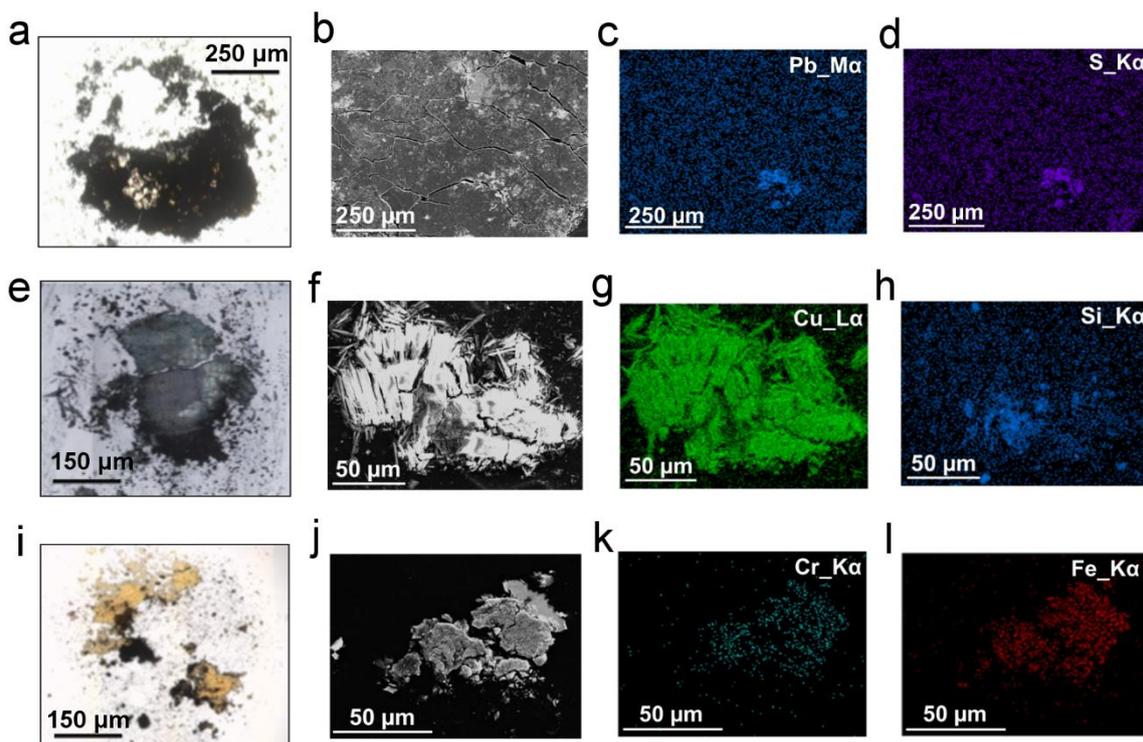
Supplementary Figure S2: XANES Linear Combination Fitting (LCF) analysis of the Ink spectrum performed using the Athena software package.


Supplementary Figure S3: a-b. optical and SEM images of an ink particle; c-d. EDX maps for Pb Mα and S Kα. Pb and S co-localize and can represent a trace of Anglesite ($PbSO_4$); e-f. optical and SEM images of a green flake; g-h. EDX maps for Cu Lα and Si Kα. The sample is mainly composed by Cu; i-j. optical and SEM images of an orange flake; k-l. EDX maps for Cr Kα and Fe Mα. Cr and Fe co-localize and can represent an iron chromium oxide (FeO,Cr_2O_3 or $FeCr_2O_4$).
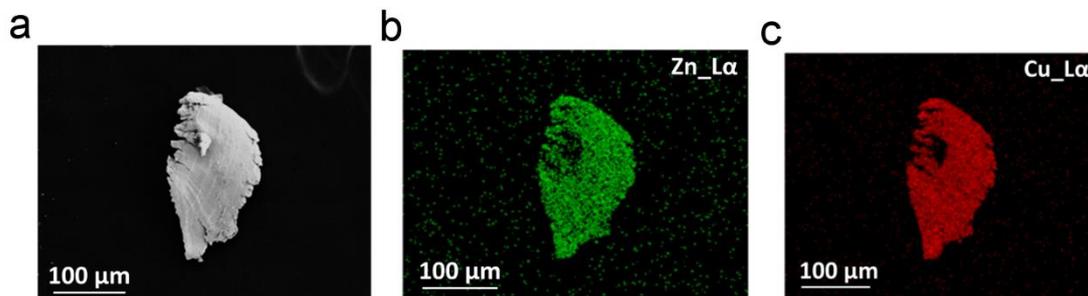
Supplementary Figure S4: a) SEM image of a metallic flake recovered in the ink powder; b-c) EDX maps for Zn Lα and Cu Lα.
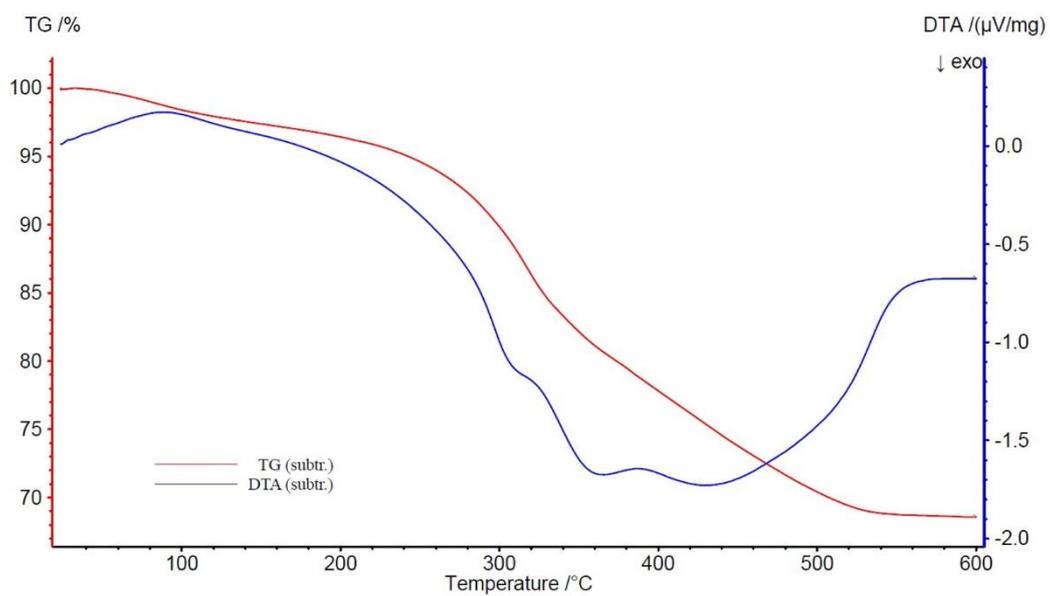
Supplementary Figure S5: TGA-DTA curves.
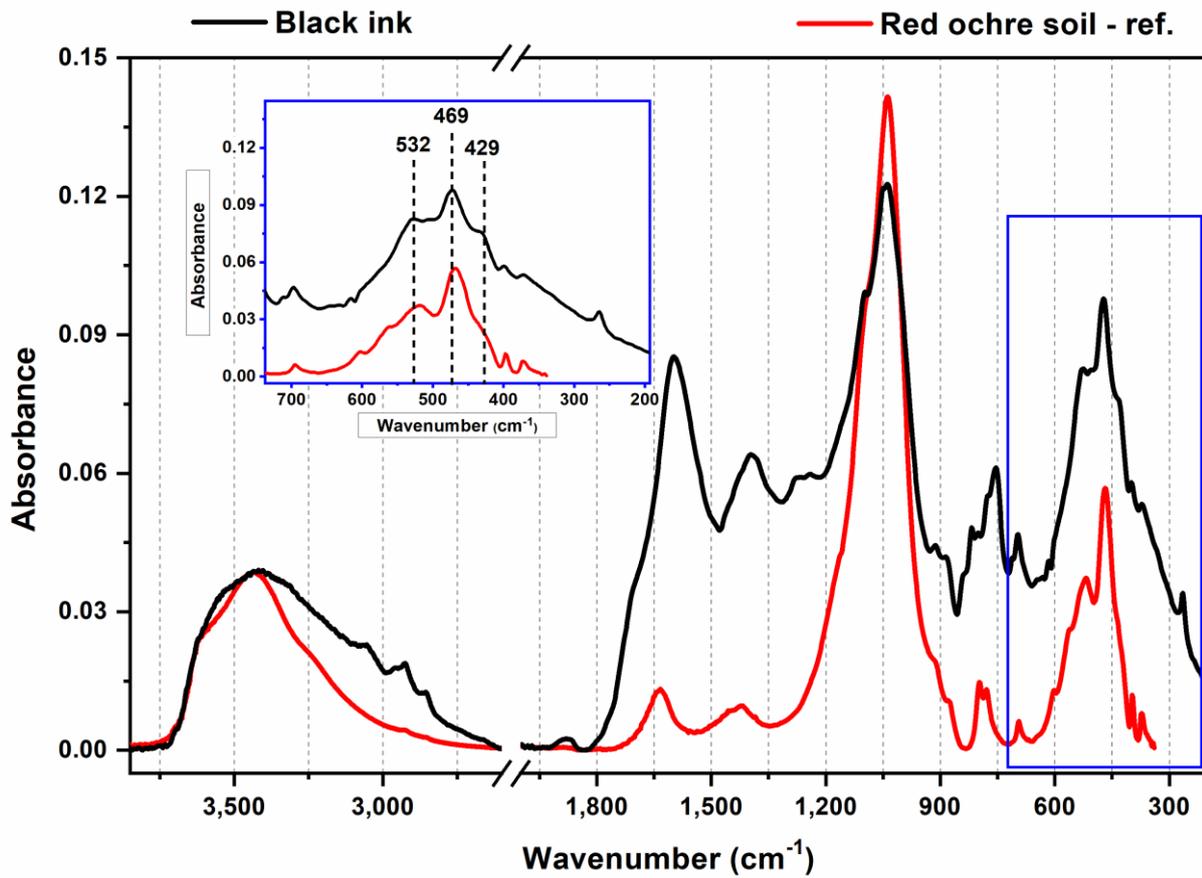
Supplementary Figure S6: Infrared spectra of ink (black line) compared with a red ochre reference spectrum. In the inset, the region at lower wavenumbers. The peaks attributed to the presence of iron oxides are highlighted.