

BUST OF AN APPLIQUE 2005.054.F00265.1 – QUARTERNARY BRONZE ALLOY – ROMAN TIMES – SWITZERLAND

Artefact name Bust of an applique 2005.054.F00265.1

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Url /artefacts/337/

∨ The object



Fig. 1: Bust of an applique as found (left picture) and the bust (right picture),

Credit HE-Arc CR, M.Arnautou.

∨ Description and visual observation

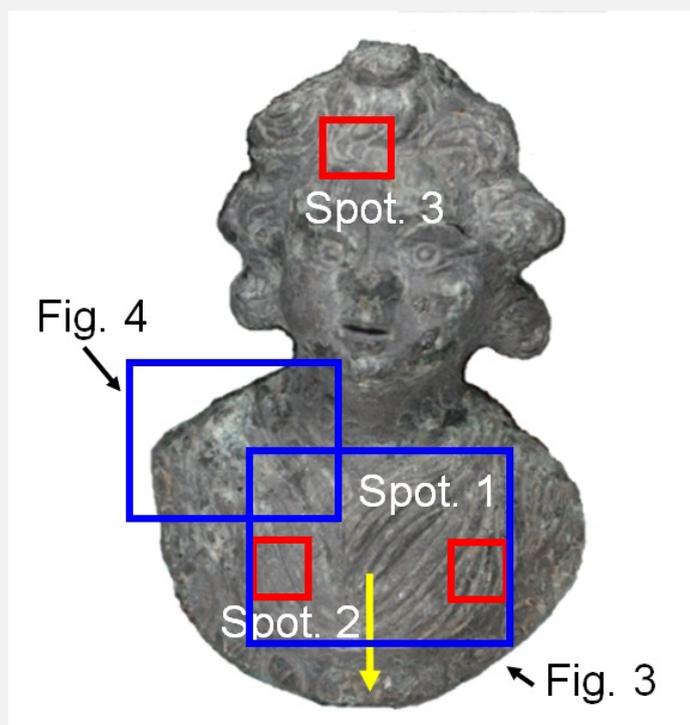
Description of the artefact	Bust representing a love figure from a bronze applique (Fig. 1), covered by a thin dark-grey patina and scattered green corrosion products. Dimensions: L = 6 cm; W = 3.5 cm; T = 3 cm.
Type of artefact	Applique
Origin	Augst BL, Augusta Raurica, Insula 27, Roman villa, Avenches, Vaud, Switzerland
Recovering date	Excavation 2005
Chronology category	Roman Times
chronology tpq	<input type="text" value="753"/> B.C. ▾
chronology taq	<input type="text" value="476"/> A.D. ▾
Chronology comment	Roman Times

Burial conditions / environment	Soil
Artefact location	Museum Augusta Raurica, Avenches
Owner	Museum Augusta Raurica, Avenches
Inv. number	2005.054.F00265.1
Recorded conservation data	Not conserved

Complementary information

Nothing to report.

Study area(s)



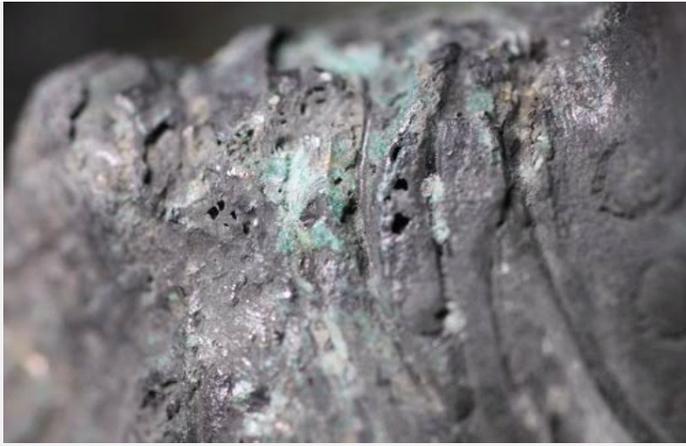
Credit HE-Arc CR, M.Arnautou.



Credit HE-Arc CR, M.Arnautou.

Fig.2: Location of areas of visual observation in blue, of sampling in yellow and of analyses (XRF) in red,

Fig. 3: Dark patina located on Fig. 2 (blue square),

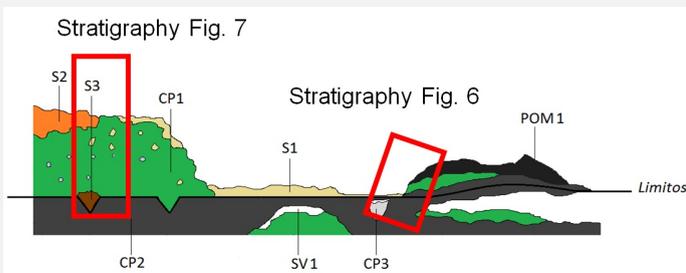


Credit HE-Arc CR, M.Arnautou.

Fig. 4: Porous zone located on Fig. 2 (blue square),

Binocular observation and representation of the corrosion structure

The schematic representation below gives an overview of the corrosion layers encountered on the bust from a first visual macroscopic observation.



Credit

Fig. 5: Stratigraphic representation based on visual observation and visualization of the stratigraphies of Figs. 6 and 7.

MiCorr stratigraphy(ies) – Bi

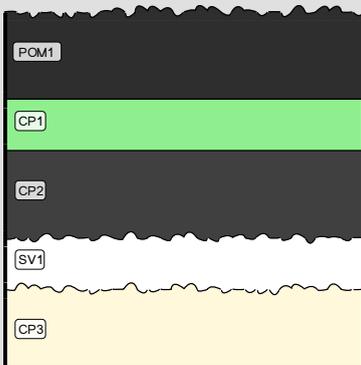


Fig. 6: Stratigraphic representation of the object in cross-section using the MiCorr application. This representation can be compared to Fig. 5.

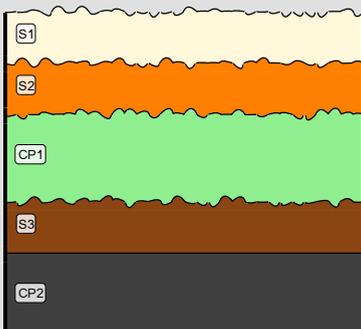


Fig. 7: Stratigraphic representation of the object in cross-section using the MiCorr application. This representation can be compared to Fig. 5.

Sample(s)

Description of sample	The sample is a scale (1 x 1 mm) of the dark-grey patina taken from the bottom part of the bust (Fig.2).
Alloy	Quarternary bronze alloy
Technology	Hollow cast, chiselled
Lab number of sample	None
Sample location	None
Responsible institution	None
Date and aim of sampling	2013, study of the corrosion layer

Complementary information

Nothing to report.

Analyses and results

Analyses performed:

XRF, SEM/EDS. XRF was carried out with portable X-ray fluorescence spectrometer (NITON XL3t 950 Air GOLDD+ analyser, Thermo-Fischer®, mode "General metal", acquisition time: 20/20/20s).

Non invasive analysis

Metal

The metal has not been examined.

Microstructure	None
First metal element	Cu
Other metal elements	Zn, Sn, Pb

Complementary information

Nothing to report.

The metal is probably a quaternary bronze (Cu-Pb-Sn-Zn) according to the qualitative XRF analysis performed on the surface of the bust. The high amount of lead is probably due to its diffusion towards the metal surface caused by exposure to high temperatures. The dark patina (CP2) has developed from a smooth layer to voluminous green crusts (CP1) corresponding to a type 1 corrosion according to Robbiola and al. 1998. The artefact has been excavated from a burial context characterized by burnt soil, which could explain the formation of the black patina (tenorite will form at temperatures above 300/400°C). A green corrosion has developed in the porous blisters of the dark layer. The limit of the original surface is located at the interface of the dark smooth corrosion and the green adherent corrosion product. In certain areas the limit of the original surface has been elevated from its original position.

References

References on object and sample

References object

1. B. Pfäffli : Ausgrabungen in Augst im Jahre, 2005.
2. E. Künzl, S. Künzl, Das römische Prunkportal von Ladenburg, Stuttgart, 2003.

References on analytic methods and interpretation

3. L. Robbiola, J.M. Blengino and C. Fiaud, Morphology and mechanisms of formation of natural patinas on archeological Cu-Sn alloys, in Corrosion science. Vol. 40, n° 12, pp. 2083-2111, 1998.
4. D. A. Scott, Copper and bronze in art: corrosion, colorants, conservation, Los Angeles, 2002.