Punic coin (MONSA-2)

Alloy nature: bronze.
Locus of finding: S. Antioco (Italy).
Burial area: marine environment.
Corroding agent: chloride.
Nature of the artefact and historical context: Punic coin (III-IV cent. BC).
Archaeological context: the locus of finding was first a Punic settlement and then, a Roman city..
Manufacturing technique: the manufacturing process consisted in the hammering, between an immobile and a mobile die, of a heated bronze blank produced by casting using ceramic bivalve tier moulds.
Degradation state: the artefact degradation state is severe and active with presence of bronze disease.
Cleaning and conservation condition: the artefact did not have previous conservation treatments, soil traces have been removed by washing (distilled water)

Chemical composition of the patina* (%)

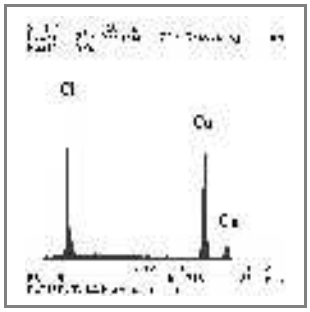
CuO	SnO_2	ZnO	Al_2O_3	SiO_2	CaO	FeO	MgO	K_2O	TiO_2
75.12	1.69	0.28	0.66	20.39	0.24	0.31	0.73	0.29	0.36

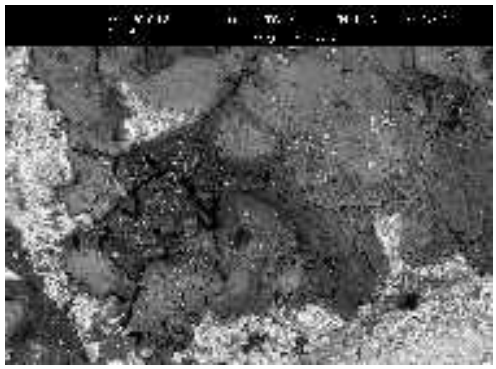
**Sulphur was not detected, chlorine was not calculated*

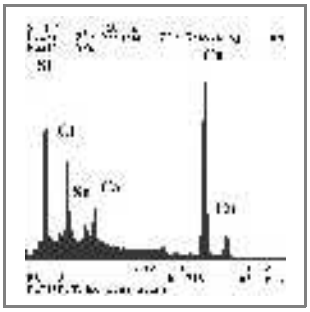
Chemical composition of the alloy (wt %)

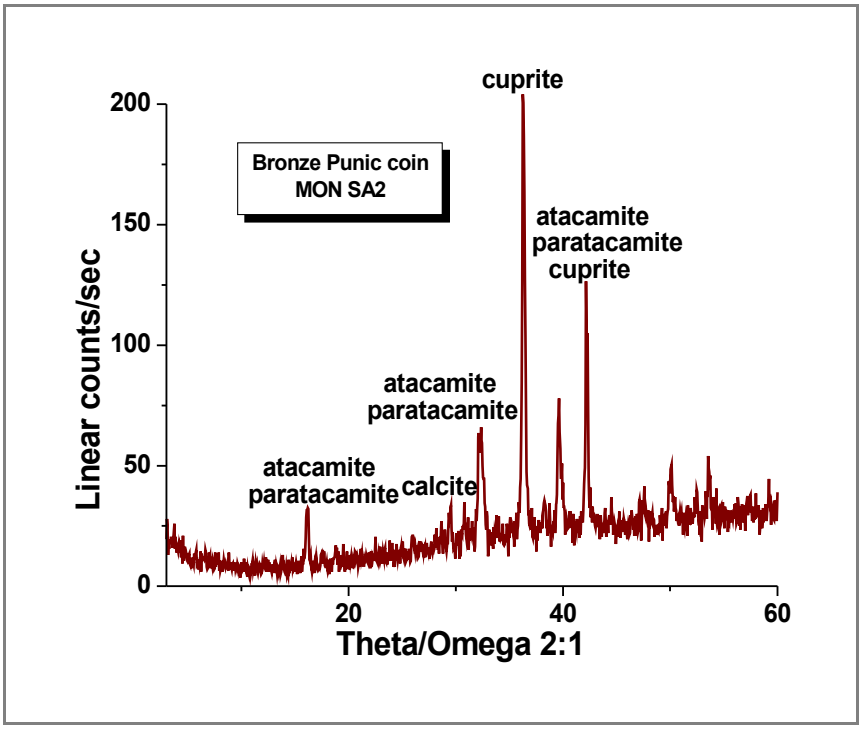
Cu	Sn	Zn	Fe	S
90.73	7.96	0.74	0.24	0.31

Surface micro-chemical and morphological nature of the patina

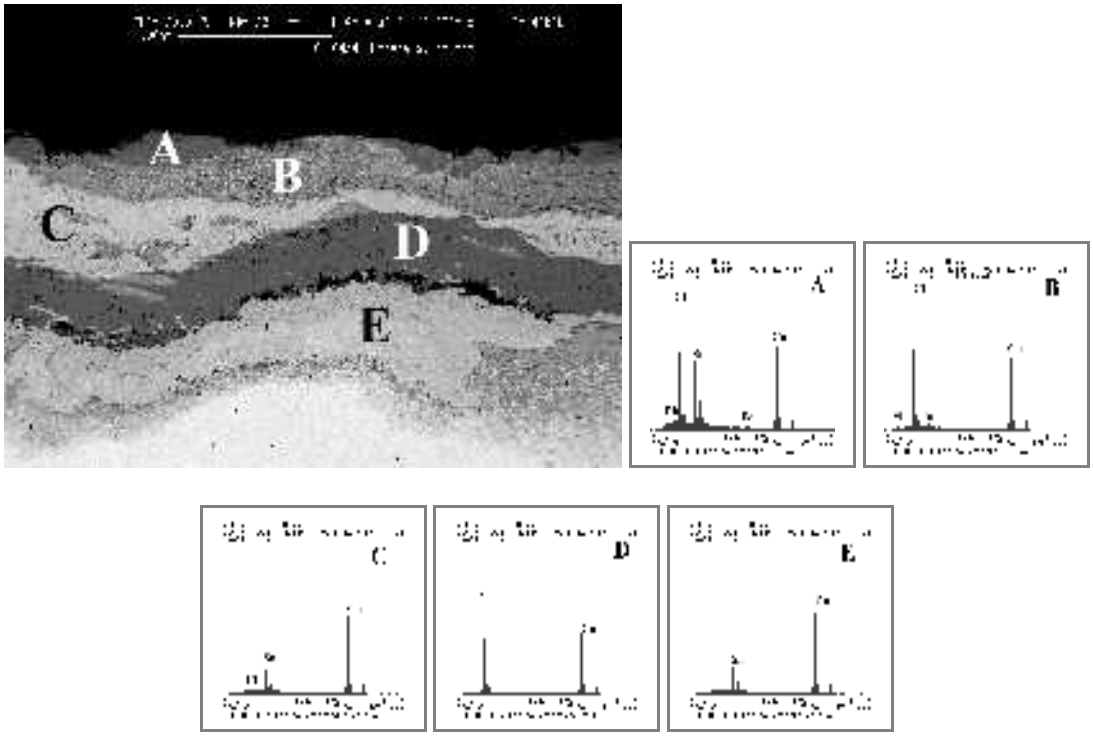




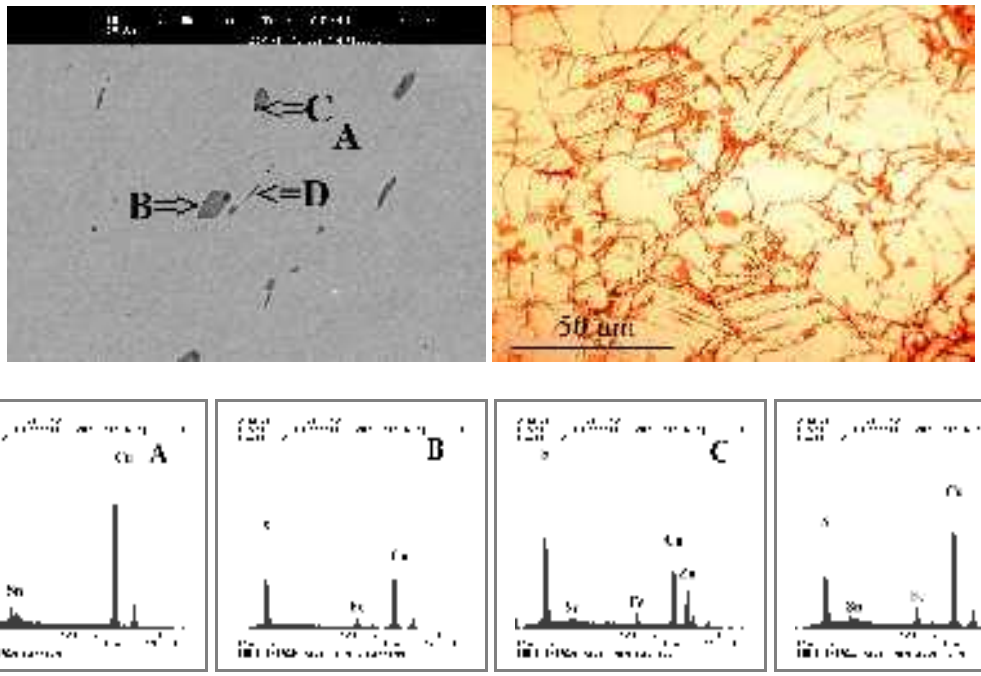




Micro-chemistry and micro-structure of the cross-sectioned patina and alloy



Stratified layers of corrosion products with a large presence of CuCl compounds partially transformed in atacamite or its polymorphs.



SEM image (on the left) shows the presence of sulphide particles scattered in the matrix. OM image (on the right) shows the presence of intergranular corrosion phenomenon along the grain boundaries as well as of large thermally recrystallized equiaxial grains, twins and slip lines that have been preferentially attacked by corrosion. The large equiaxic grains indicate the occurrence of repeated cycles first of mechanical work carried out by hammering and then of annealing thermal treatments thus inducing the crystallization and the growth of the flattened grains.