

Supplementary Materials: The “Restoration of the Restoration”: Investigation of a Complex Surface and Interface Pattern in the Roman Wall Paintings of *Volsinii Novi* (Bolsena, Central Italy)

Claudia Pelosi ^{1,*}, Filomena Di Stasio ², Luca Lanteri ¹, Martina Zuena ³, Marta Sardara ³ and Armida Sodo ³

¹ Laboratory of Diagnostics and Materials Science, DEIM Department, University of Tuscia, Largo dell'Università, 01100 Viterbo, Italy; llanteri@unitus.it

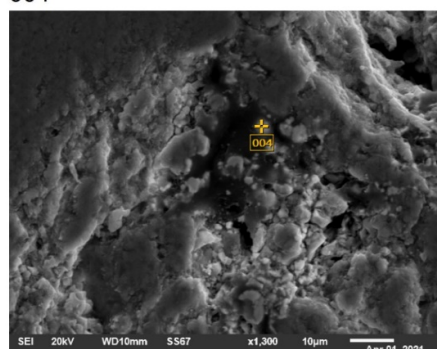
² DIBAF Department, University of Tuscia, Largo dell'Università, 01100 Viterbo, Italy; f.distasio92@gmail.com

³ Science Department, University of Rome 3, Via della Vasca Navale 84, 00146 Roma, Italy; martinazuena@gmail.com (M.Z.); marta.sardara@uniroma3.it (M.S.); armida.sodo@uniroma3.it (A.S.)

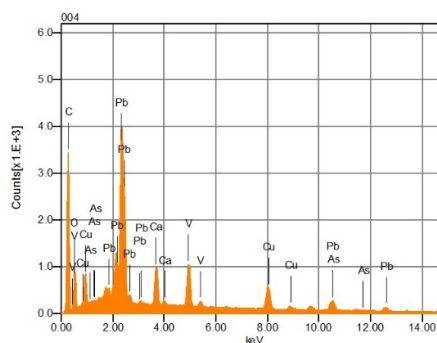
* Correspondence: pelosi@unitus.it; Tel.: +39-0761357673

In this document, the original data from SEM-EDS analysis are shown. In each figure, the detail of the examined point with the EDS spectrum and the detected elements are reported with the relative concentrations.

004



Volt : 20.00 kV
Mag. : x 1,300
Date : 2021/04/01
Pixel : 640 x 480



Acquisition Condition
Instrument : 6010LA
Volt : 20.00 kV
Current : ---
Process Time : T4
Live time : 60.00 sec.
Real Time : 65.25 sec.
DeadTime : 8.00 %
Count Rate : 5490.00 CPS

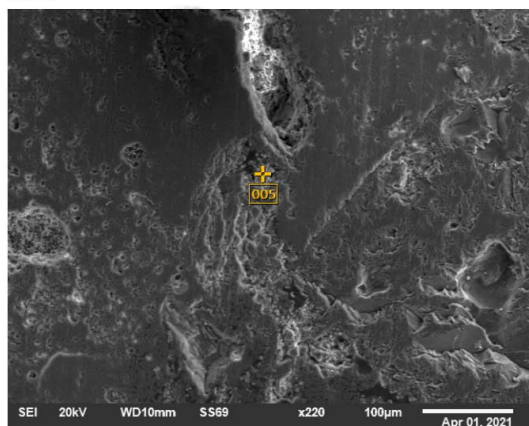
Chemical formula	ms%	mol%	Sigma	Net	K ratio	Line
C	43.47	77.86	0.05	83797	0.0343535	K
O	8.85	11.89	0.14	21914	0.0305109	K
Ca	2.49	1.33	0.06	45493	0.0357188	K
V	5.17	2.19	0.10	58260	0.0677239	K
Cu	8.15	2.76	0.28	39374	0.1147078	K
As	3.59	1.03	1.73	6864	0.0446149	K
Pb	28.27	2.94	0.17	286489	0.3272884	M
Total	100.00	100.00				

JEOL EDS System

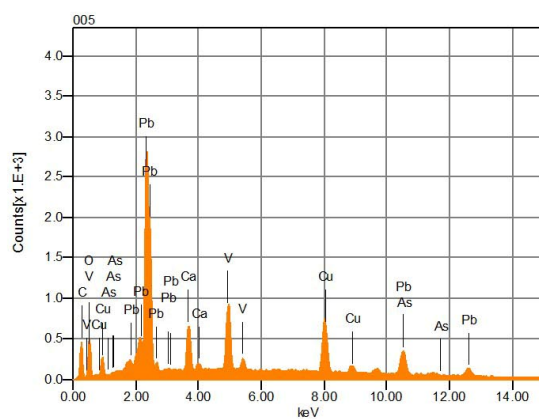
JEOL

Figure S1. EDS spectrum and concentration of the elements detected in point 4 of area 1, sample P7.

005



Volt : 20.00 kV
 Mag. : x 220
 Date : 2021/04/01
 Pixel : 640 x 480



Acquisition Condition
 Instrument : 6010LA
 Volt : 20.00 kV
 Current : ---
 Process Time : T4
 Live time : 60.00 sec.
 Real Time : 63.70 sec.
 DeadTime : 6.00 %
 Count Rate : 3663.00 CPS

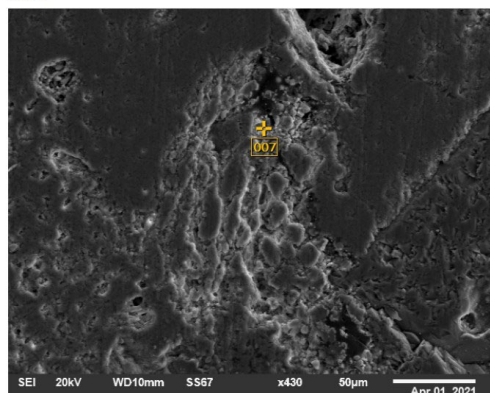
Chemical formula	ms%	mol%	Sigma	Net	K ratio	Line
C	14.27	48.91	0.06	11034	0.0045237	K
O	6.05	15.57	0.09	11747	0.0163548	K
Ca	3.28	3.37	0.06	32340	0.0253918	K
V	7.94	6.42	0.09	50294	0.0584635	K
Cu	18.22	11.80	0.24	51896	0.1511885	K
As	11.25	6.18	1.46	12799	0.0831852	K
Pb	38.99	7.75	0.16	202389	0.2312112	M
Total	100.00	100.00				

JEOL EDS System

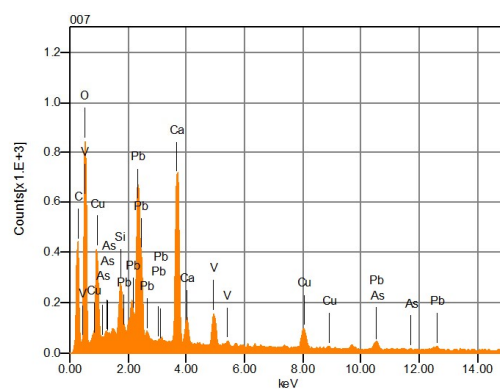
JEOL

Figure S2. EDS spectrum and concentration of the elements detected in point 5 of area 1, sample P7.

007



Volt : 20.00 kV
 Mag. : x 430
 Date : 2021/04/01
 Pixel : 640 x 480



Acquisition Condition
 Instrument : 6010LA
 Volt : 20.00 kV
 Current : ---
 Process Time : T4
 Live time : 10.61 sec.
 Real Time : 11.85 sec.
 DeadTime : 11.00 %
 Count Rate : 7066.00 CPS

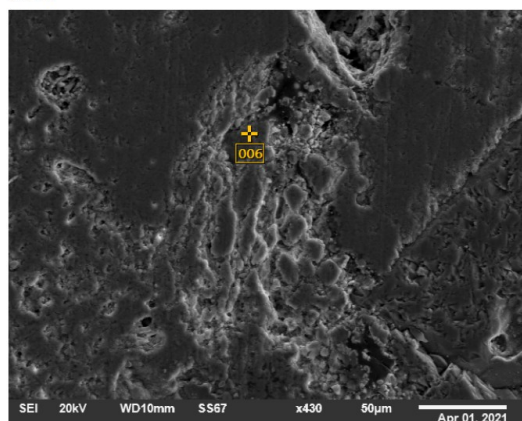
Chemical formula	ms%	mol%	Sigma	Net	K ratio	Line
C	25.02	45.20	0.06	10489	0.0243173	K
O	30.91	41.92	0.12	20611	0.1622774	K
Si	1.65	1.27	0.05	7682	0.0217281	K
Ca	9.44	5.11	0.07	39930	0.1772938	K
V	3.14	1.34	0.11	7827	0.0514529	K
Cu	5.59	1.91	0.33	5958	0.0981519	K
As	3.86	1.12	2.03	1622	0.0596126	K
Pb	20.39	2.14	0.20	45444	0.2935878	M
Total	100.00	100.00				

JEOL EDS System

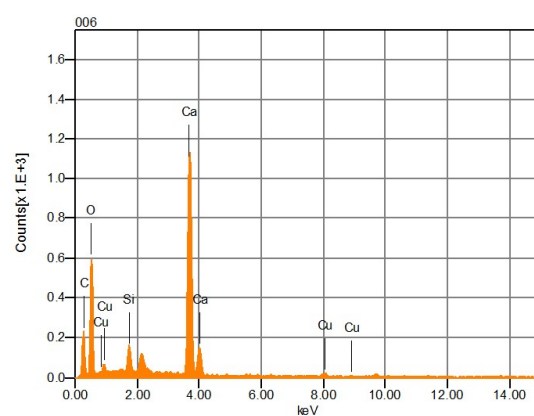
JEOL

Figure S3. EDS spectrum and concentration of the elements detected in point 7 of area 1, sample P7.

006



Volt : 20.00 kV
 Mag. : x 430
 Date : 2021/04/01
 Pixel : 640 x 480



Acquisition Condition
 Instrument : 6010LA
 Volt : 20.00 kV
 Current : ---
 Process Time : T4
 Live time : 7.92 sec.
 Real Time : 8.52 sec.
 DeadTime : 6.00 %
 Count Rate : 4872.00 CPS

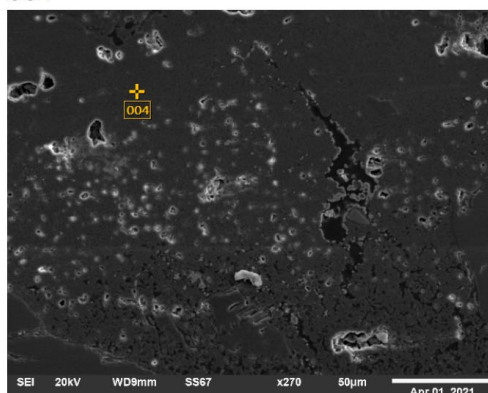
Chemical formula	ms%	mol%	Sigma	Net	K ratio	Line
C	17.02	25.81	0.07	5378	0.0167036	K
O	53.35	60.73	0.24	15560	0.1641218	K
Si	1.74	1.13	0.08	4560	0.0172803	K
Ca	25.83	11.74	0.11	63378	0.3769804	K
Cu	2.05	0.59	0.60	1076	0.0237386	K
Total	100.00	100.00				

JEOL EDS System

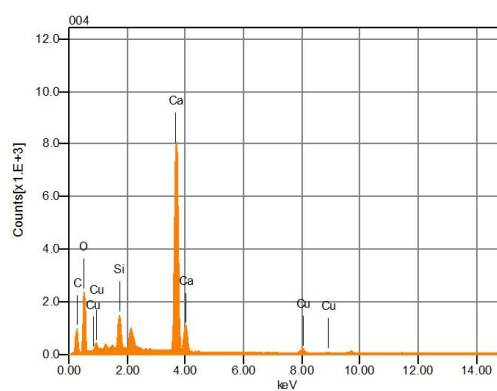
JEOL

Figure S4. EDS spectrum and concentration of the elements detected in point 6 of area 1, sample P7.

004



Volt : 20.00 kV
Mag. : x 270
Date : 2021/04/01
Pixel : 1280 x 960



Acquisition Condition
Instrument : 6010LA
Volt : 20.00 kV
Current : ---
Process Time : T4
Live time : 60.00 sec.
Real Time : 64.30 sec.
DeadTime : 7.00 %
Count Rate : 4583.00 CPS

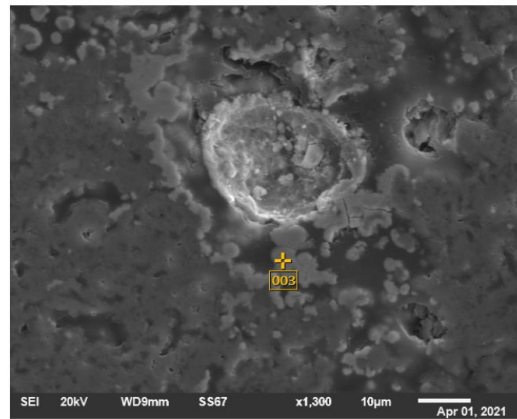
Chemical formula	ms%	mol%	Sigma	Net	K ratio	Line
C	14.63	24.39	0.09	22849	0.0093671	K
O	43.95	54.99	0.34	58722	0.0817571	K
Si	3.25	2.31	0.10	46446	0.0232318	K
Ca	34.07	17.02	0.13	462495	0.3631313	K
Cu	4.11	1.29	0.72	11967	0.0348642	K
Total	100.00	100.00				

JEOL EDS System

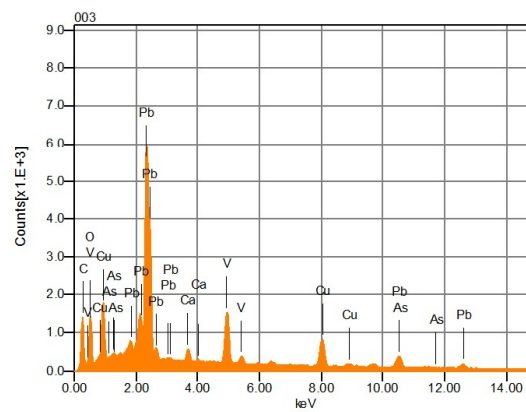
JEOL

Figure S5. EDS spectrum and concentration of the elements detected in point 6 of area 1, sample P8.

003



Volt : 20.00 kV
Mag. : x 1,300
Date : 2021/04/01
Pixel : 640 x 480



Acquisition Condition
Instrument : 6010LA
Volt : 20.00 kV
Current : ---
Process Time : T4
Live time : 60.00 sec.
Real Time : 67.59 sec.
DeadTime : 12.00 %
Count Rate : 7425.00 CPS

Chemical formula	ms%	mol%	Sigma	Net	K ratio	Line
C	20.83	58.97	0.08	32128	0.0131712	K
O	8.94	19.00	0.13	29933	0.0416755	K
Ca	1.08	0.92	0.08	18524	0.0145439	K
V	7.77	5.19	0.13	86247	0.1002578	K
Cu	11.19	5.99	0.35	55824	0.1626295	K
As	5.89	2.68	2.08	11830	0.0768879	K
Pb	44.30	7.27	0.22	428667	0.4897141	M
Total	100.00	100.00				

JEOL EDS System

JEOL

Figure S6. EDS spectrum and concentration of the elements detected in point 3 of area 2, sample P8.

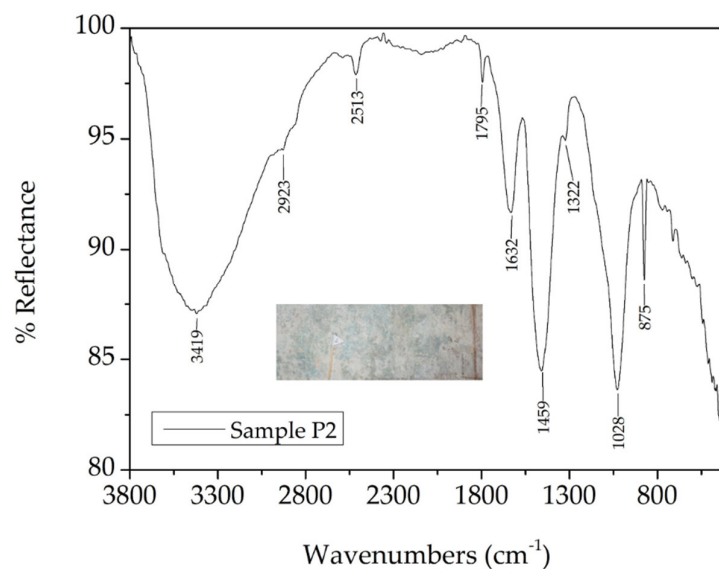


Figure S7. FTIR spectrum of sample P2.

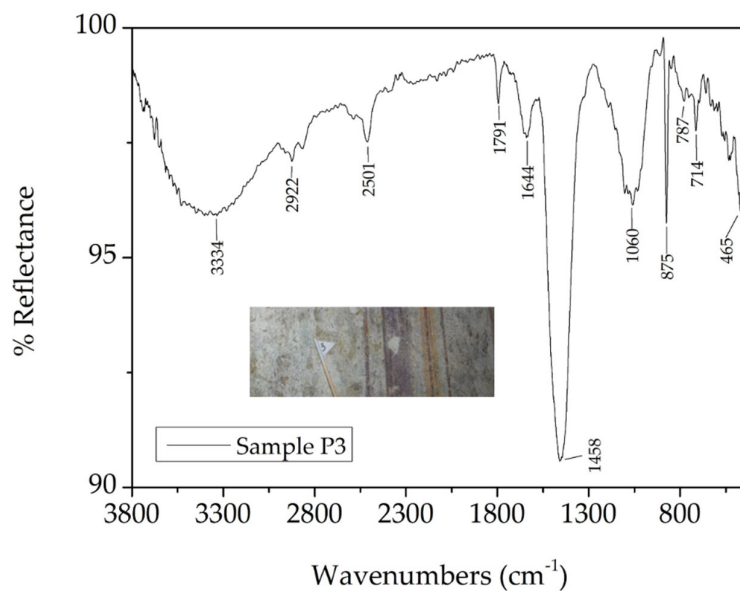


Figure S8. FTIR spectrum of sample P3.

Table S1. Results of XRF analysis. The detected elements are reported in decrescent order of counts.

Point and colour	Detected elements
X1, brown	Ca, Fe, Sr, Cu, Pb
X2, orange-red	Ca, Fe, Sr, Cu, Pb
X3, amaranth	Ca, Fe, Sr, Pb
X4, red	Ca, Fe, Sr, Pb, Cu
X5, green	Ca, Fe, Cu, Sr, Pb
X6, yellow	Ca, Fe, Pb, Cu, Sr
X7, green	Cu, Ca, Pb, Fe, Sr
X8, red	Ca, Fe, Cu, Sr, Pb, Ti
X9, blue	Ca, Cu, Fe, Pb, Sr
X10, orange	Ca, Cu, Pb, Fe, Sr
X11, brown violet	Ca, Fe, Cu, Pb, Sr

X12, light blue	Ca, Cu, Fe, Sr, Pb, Ti
X13, yellow	Ca, Fe, Sr, Cu, Pb, Ti
X14, amaranth	Ca, Fe, Sr, Pb, Cu
X15, green	Ca, Fe, Pb, Cu, Sr
X16, green	Ca, Fe, Cu, Sr, Pb, Ti
X17, green-blue (restoration)	Ca, Ti, Cr, Fe
X18, green-blue (original)	Ca, Cu, Fe, Pb, Sr, Ti
X19, red	Ca, Fe, Pb, Cu, Sr
X20, yellow	Fe, Ca, Cu, Pb, Sr
X21, green	Ca, Cu, Pb, Fe, Sr
