Supplementary Materials: Degradation products on Byzantine glasses from Northern Tunisia

Valeria Comite [1], Martina Andreoli [2] Davide Atzei[3], Donatella Barca[4], Marzia Fantauzzi[3], Mauro Francesco La Russa[4], Antonella Rossi[3], Vittoria Guglielmi[1] and Paola Fermo [1*]

Table S1. Quantitative composition in atomic percentage of the surface of all samples considered in this investigation is here presented. The composition of the various points is also listed. Accuracy is estimated to be ± 10%.

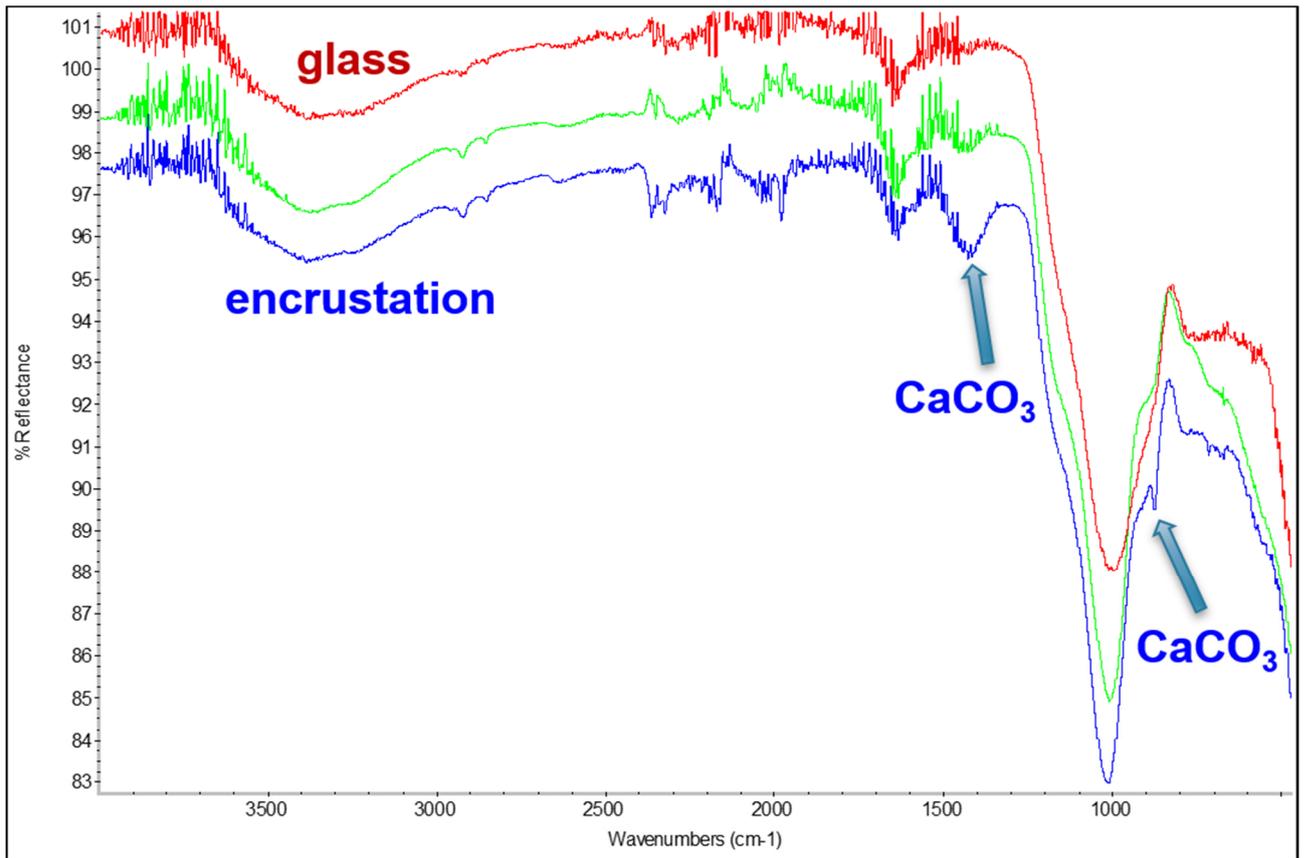|	GLB002			GLR011		GLR014	
	Unaltered	Altered	Iridescent patina	Unaltered	Iridescent patina	Unaltered	External crust
Si	24	17.3	29.1	23	27	23	30
O	61	66.6	62.0	65	63	62	61.4
Al	3	5.6	5.0	4	5	4	5
Ca	4	6.1	2.3	4	4	6	2.2
Na	7	3.8	1.5	4	1	2	1
K	2	-	-	-	-	-	-
Fe	-	0.6	0.1	-	-	0.6	0.4
Co	-	-	-	-	-	0.2	-
Mn	-	-	-	-	-	1.2	-

Figure S1. ATR IR spectra obtained on degraded glass regions (green and blu solid lines) and on unaltered glass (red line) for sample GLB002.
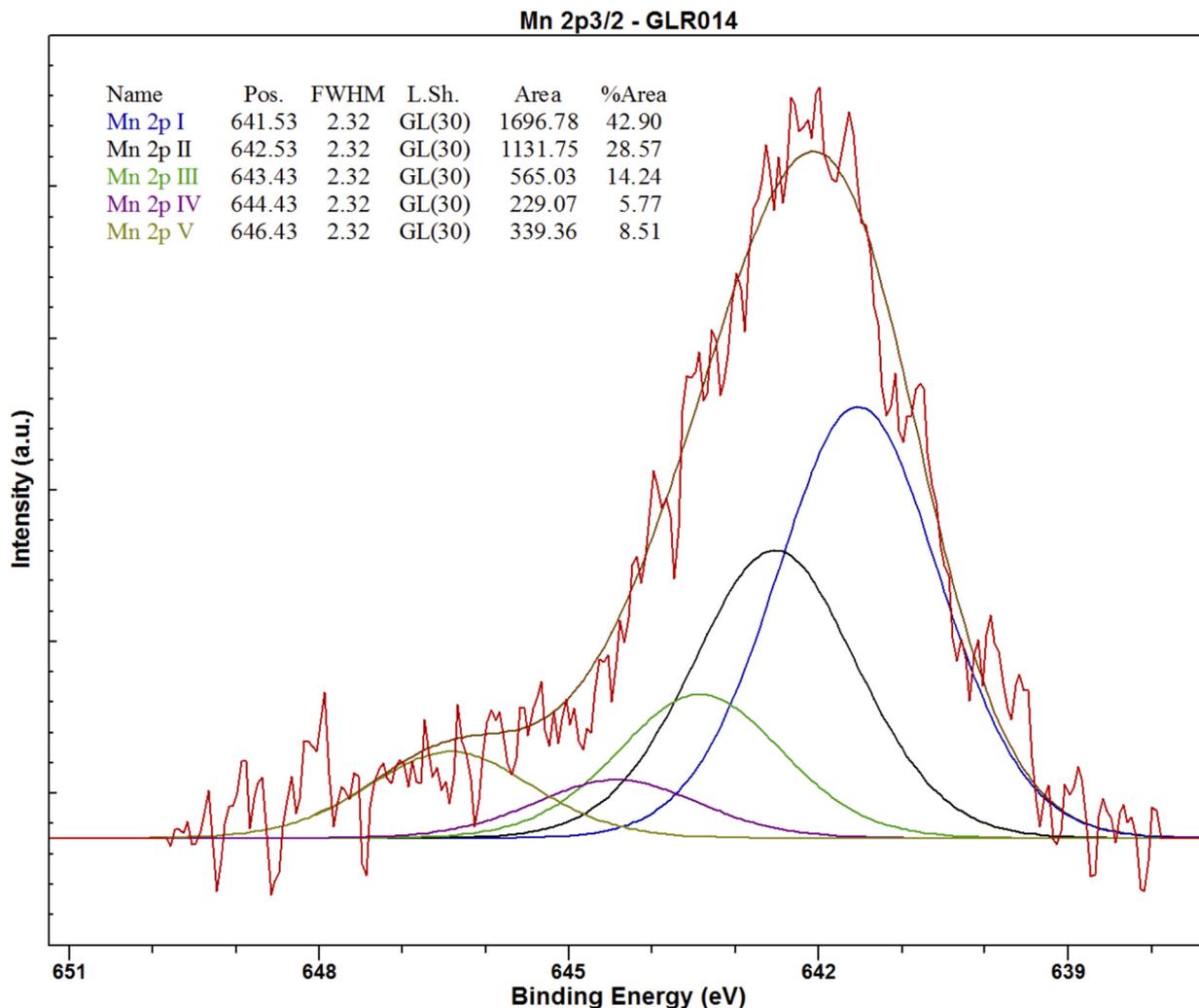
Figure S2. Mn 2p$_{3/2}$ peaks recorded in point 1 of sample GLR 014 .

The chemical state of Mn was determined taking into account the multiplet structure of core p-vacancy levels [Gupta, R.P. and Sen, S.K. (1975), Calculations of multiplet structure of core p-vacancy levels. Physical Reviews B, 10, 71–79]. The intensity ratio, the FWHM ratios and the energy separation among the multiplet peaks were constrained taking into account the results of the calculations reported in Gupta and Sen, 1975 and are in agreement with the results reported for Mn4+ in M. C. Biesinger, B. P. Payne, A. P.Grosvenor, L.W.M.Lau, A. R.Gerson, R.St.C.Smart , Applied Surface ScienceVolume 257, Issue 7, 15 January 2011, Pages 2717-2730 .
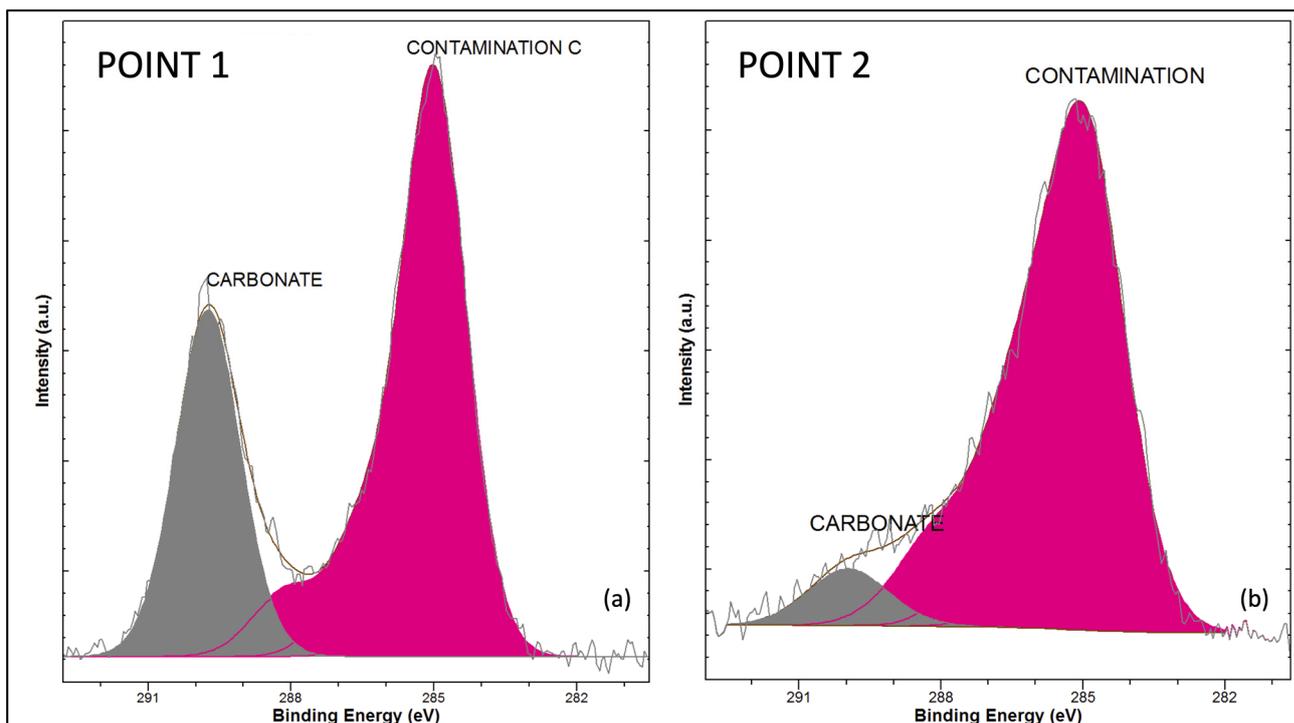
Figure S3. C 1s peaks recorded in point 1 and in point 2 of sample GLR 014 (**a** and **b** respectively).