

Supplementary Materials

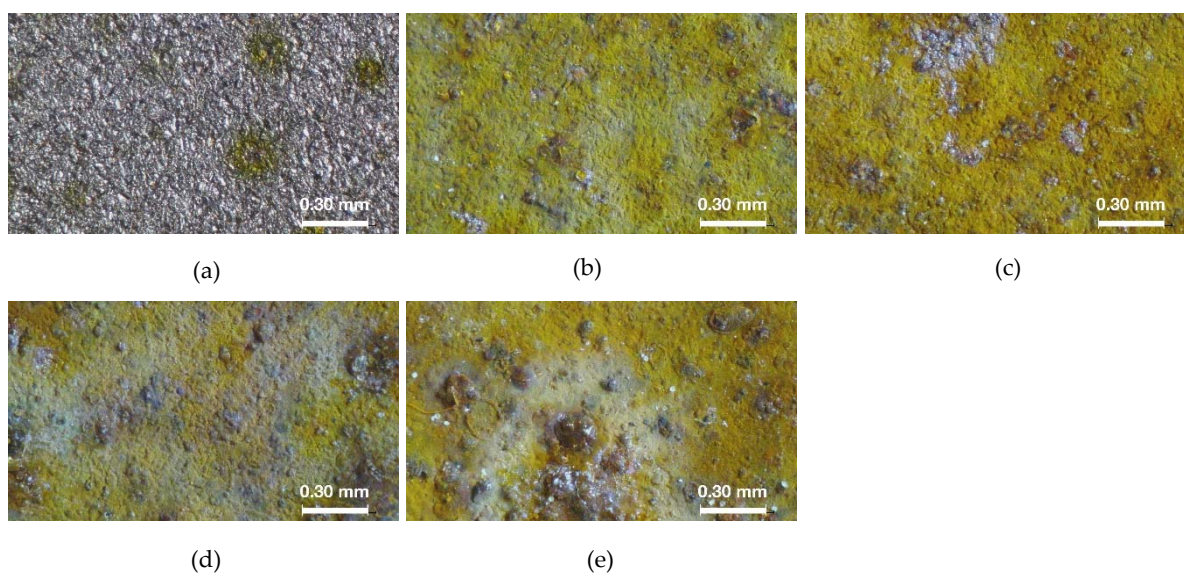


Figure S1. Optical microscope images of H_2O_2 patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S1. Evolution of Lab values with 95% confidence interval as time passes for the H_2O_2 patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	52	1	2.2	0.5	13	2
3 months	33.5	0.4	15.6	0.2	24.4	0.4
6 months	30.2	0.5	17.4	0.4	23.4	0.9
12 months	33.6	0.4	15.4	0.3	20.1	0.4
24 months	33.5	0.7	15.5	0.3	19.5	0.7

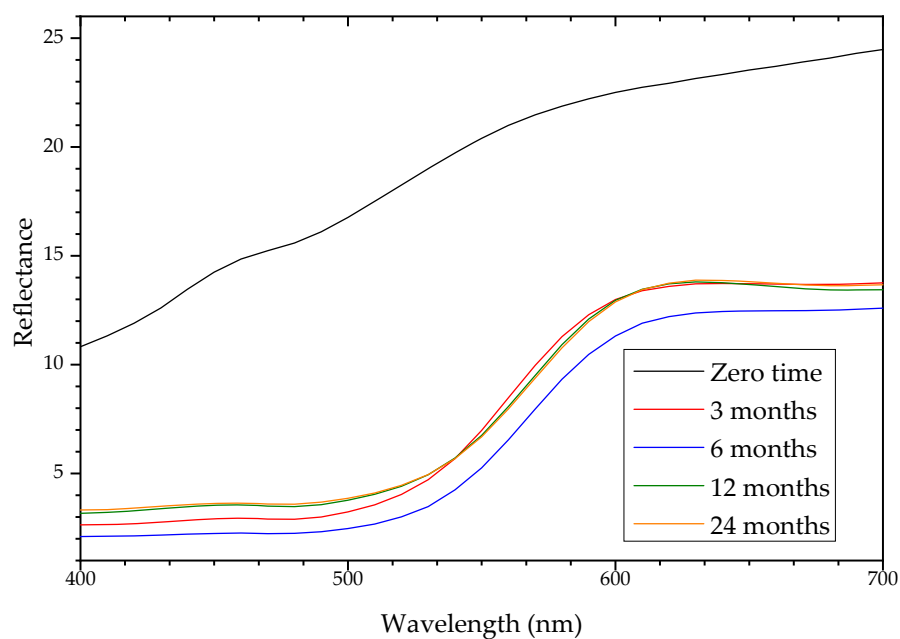


Figure S2. Reflectance spectrum of H_2O_2 patina at different exposure times.

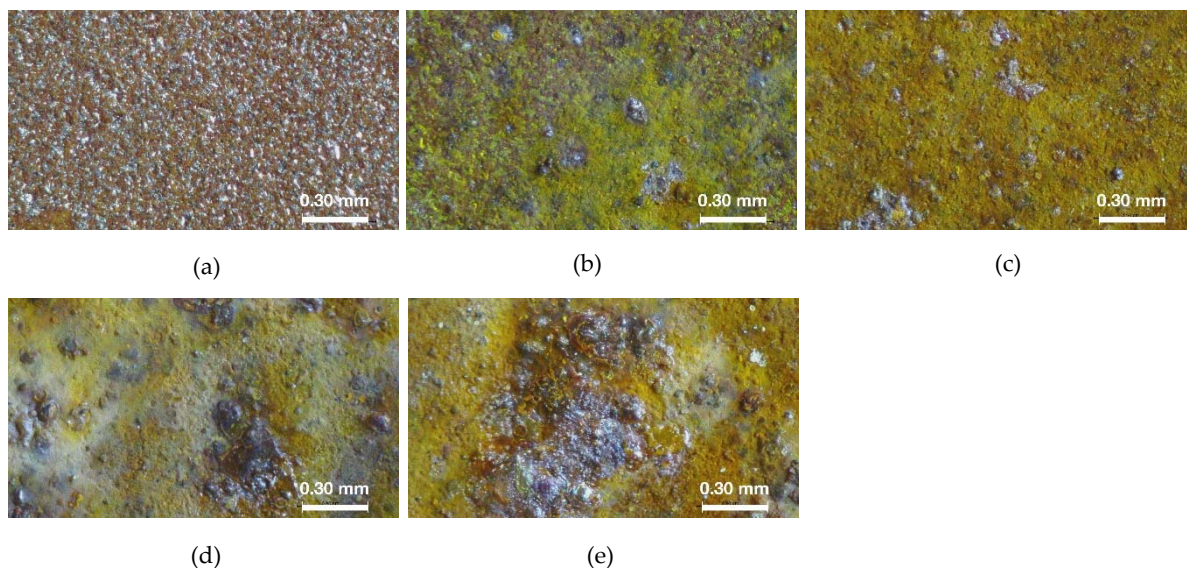


Figure S3. Optical microscope images of CH_3COOH patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S2. Evolution of Lab values with 95% confidence interval as time passes for the CH_3COOH patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	43	2	8.4	0.9	11.2	0.7
3 months	30.3	0.8	14.4	0.5	20	1
6 months	28.5	0.5	16.8	0.3	22.9	0.6
12 months	32.9	0.8	15.2	0.3	20.1	0.6
24 months	32.3	0.4	16.3	0.3	20.5	0.6

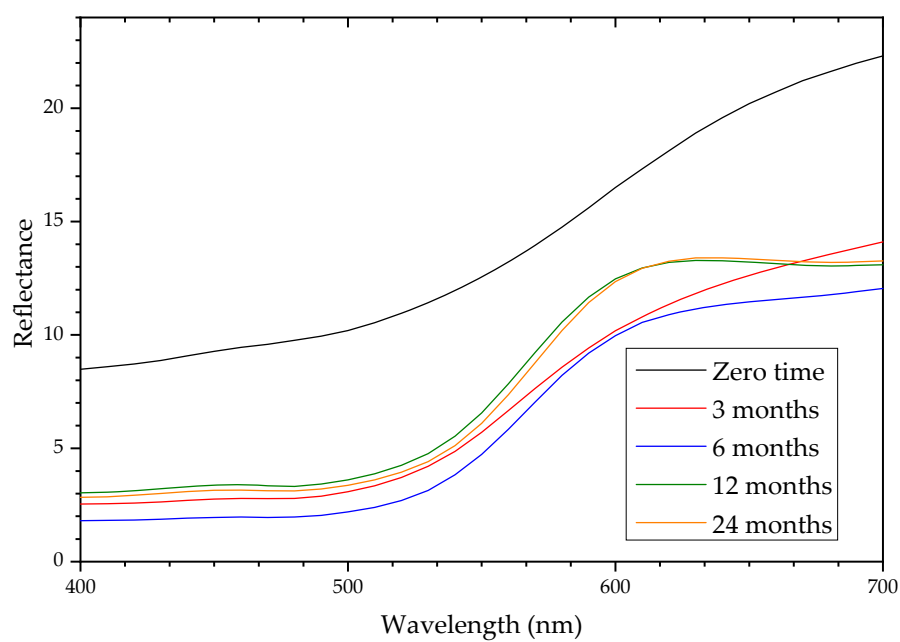


Figure S4. Reflectance spectrum of CH_3COOH patina at different exposure times.

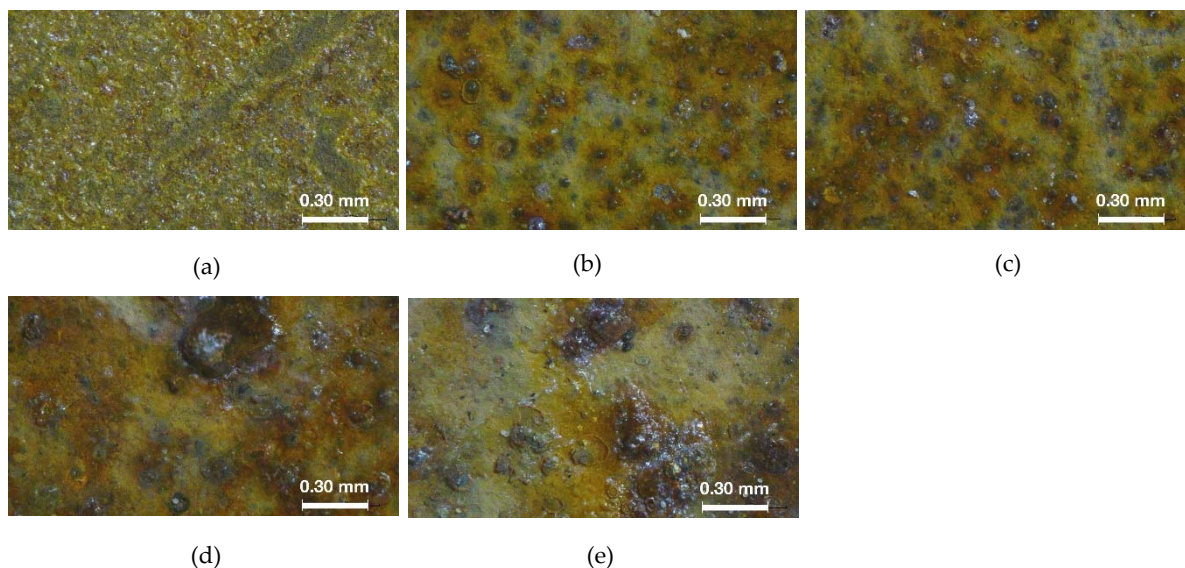


Figure S5. Optical microscope images of H_2SO_4 patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S3. Evolution of Lab values with 95% confidence interval as time passes for the H_2SO_4 patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	36	1	12.6	0.5	20.8	0.9
3 months	34.6	0.5	16.7	0.5	24.7	0.6
6 months	33.6	0.6	17.0	0.5	24.2	0.7
12 months	32.3	0.6	15.8	0.3	18.5	0.5
24 months	34.1	0.6	15.4	0.4	19.2	0.7

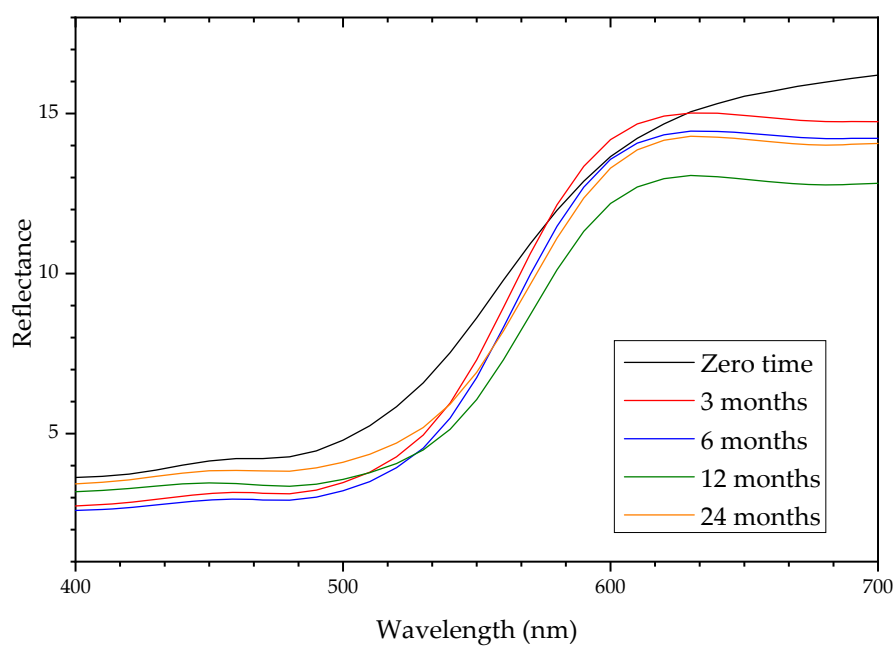


Figure S6. Reflectance spectrum of H_2SO_4 patina at different exposure times.

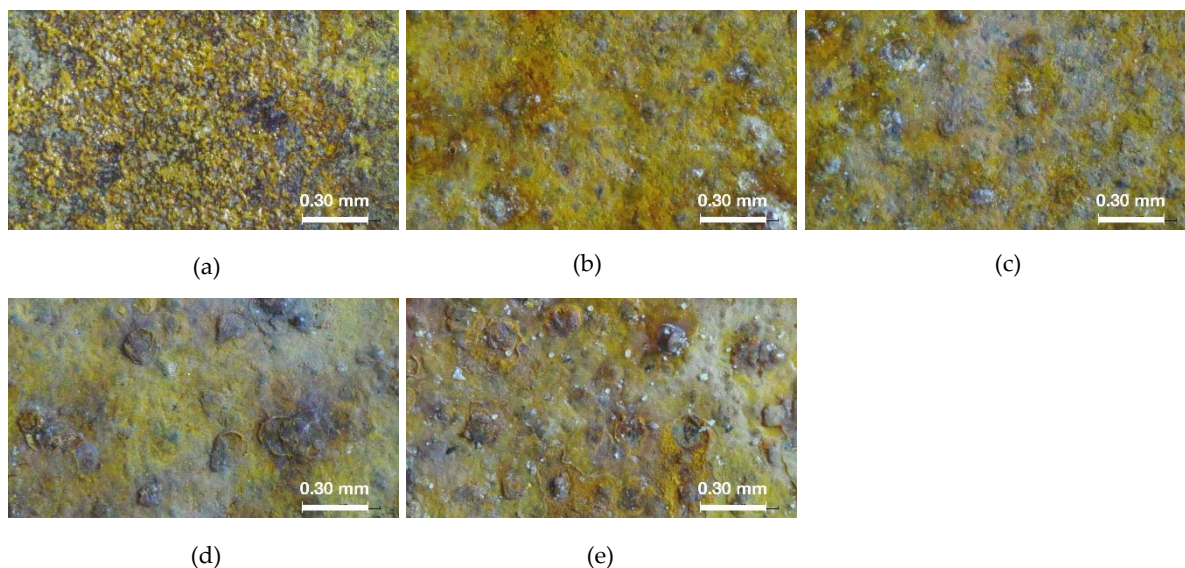


Figure S7. Optical microscope images of NaHSO_3 patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S4. Evolution of Lab values with 95% confidence interval as time passes for the NaHSO_3 patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	35.2	0.6	17	1	23	1
3 months	32.6	0.5	16.2	0.3	22.5	0.5
6 months	32.1	0.5	16.7	0.3	23.1	0.4
12 months	33.2	0.6	15.3	0.3	18.6	0.5
24 months	33.8	0.6	14.6	0.5	18.3	0.7

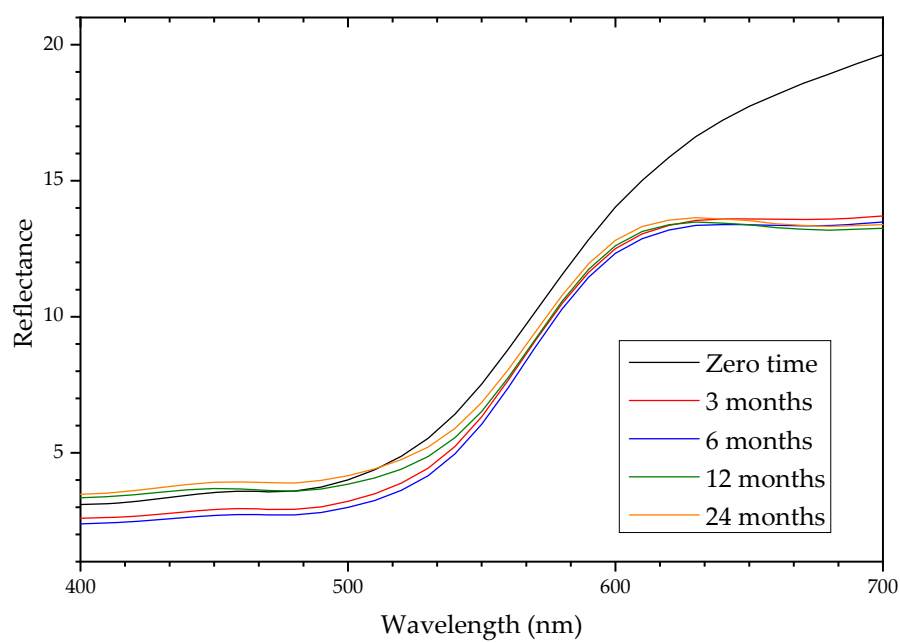


Figure S8. Reflectance spectrum of NaHSO_3 patina at different exposure times.

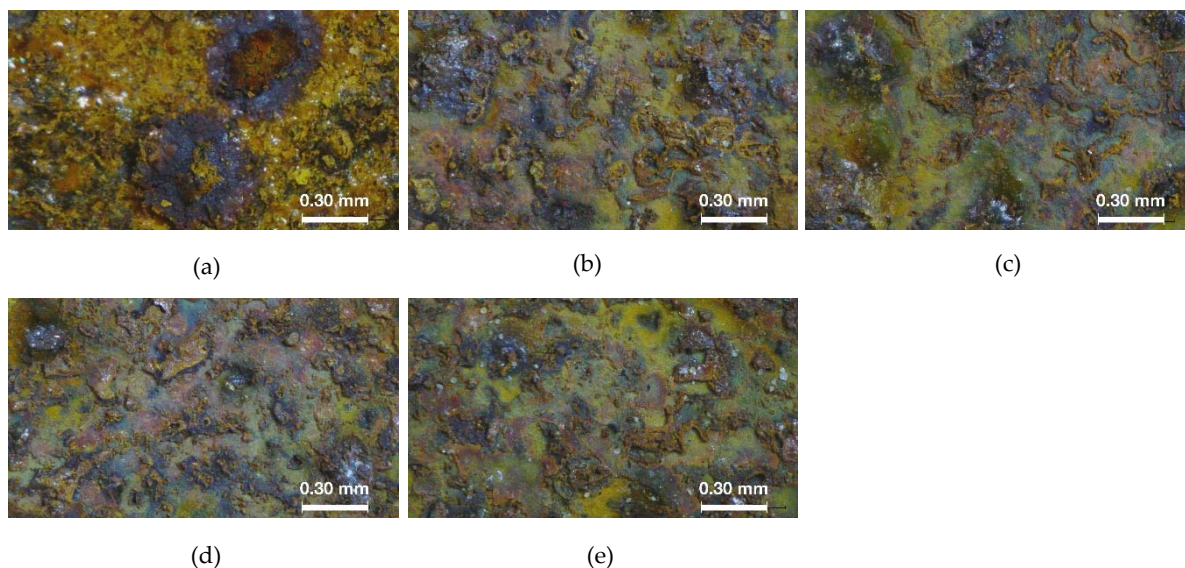


Figure S9. Optical microscope images of FeCl₃ patina at different exposure times: (a) zero time (i.e. prior to atmospheric exposure); (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S5. Evolution of Lab values with 95% confidence interval as time passes for the FeCl₃ patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	32.0	0.6	14.9	0.4	19.3	0.7
3 months	33.6	0.4	12.6	0.4	13.7	0.5
6 months	33.9	0.3	11.4	0.5	14.0	0.5
12 months	31.5	0.4	12.6	0.4	13.9	0.5
24 months	31.7	0.8	13.9	0.6	17.4	0.5

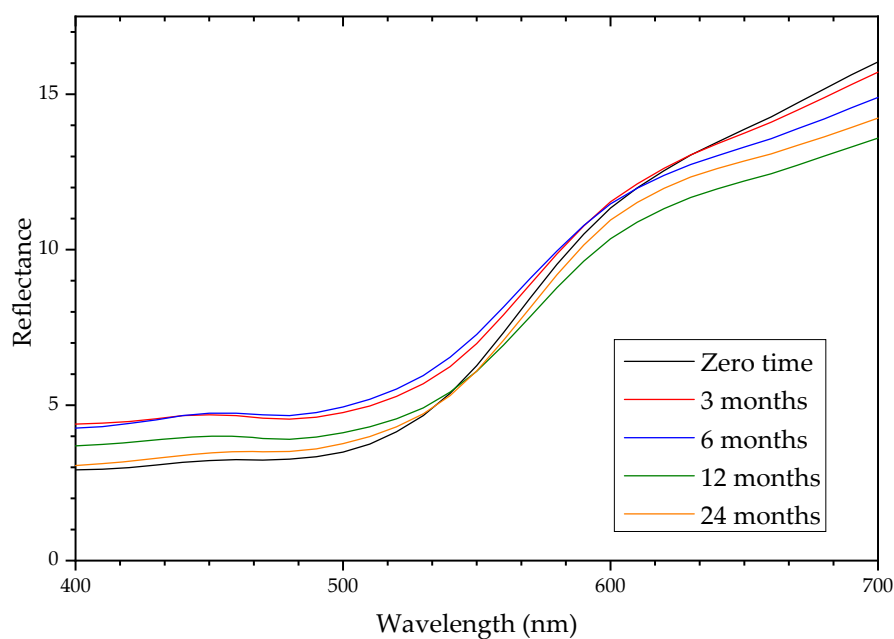


Figure S10. Reflectance spectrum of FeCl₃ patina at different exposure times.

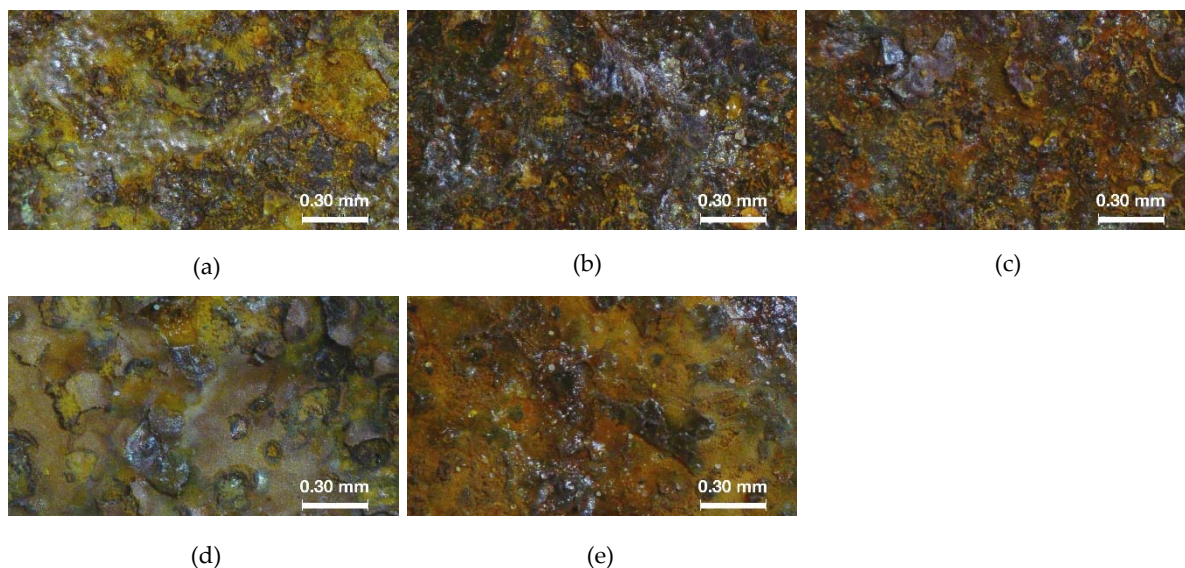


Figure S11. Optical microscope images of $\text{Fe}(\text{NO}_3)_3$ patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S6. Evolution of Lab values with 95% confidence interval as time passes for the $\text{Fe}(\text{NO}_3)_3$ patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	31	1	14.5	0.7	19.7	0.8
3 months	33.4	0.8	13	1	16	1
6 months	29.1	0.7	13.1	0.6	14	1
12 months	30.0	0.7	12.9	0.5	16.0	0.7
24 months	30.1	0.8	12.1	0.6	14.8	0.9

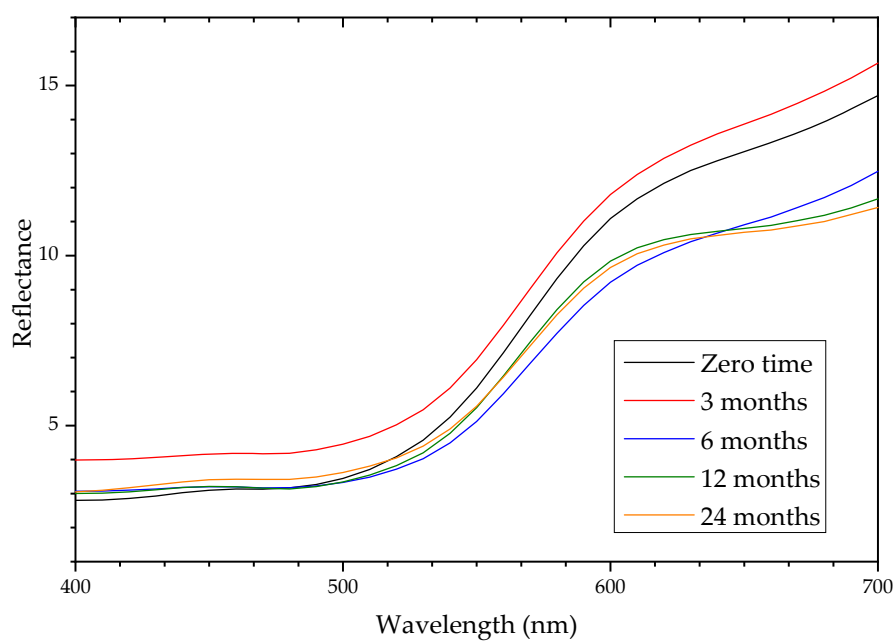


Figure S12. Reflectance spectrum of $\text{Fe}(\text{NO}_3)_3$ patina at different exposure times.

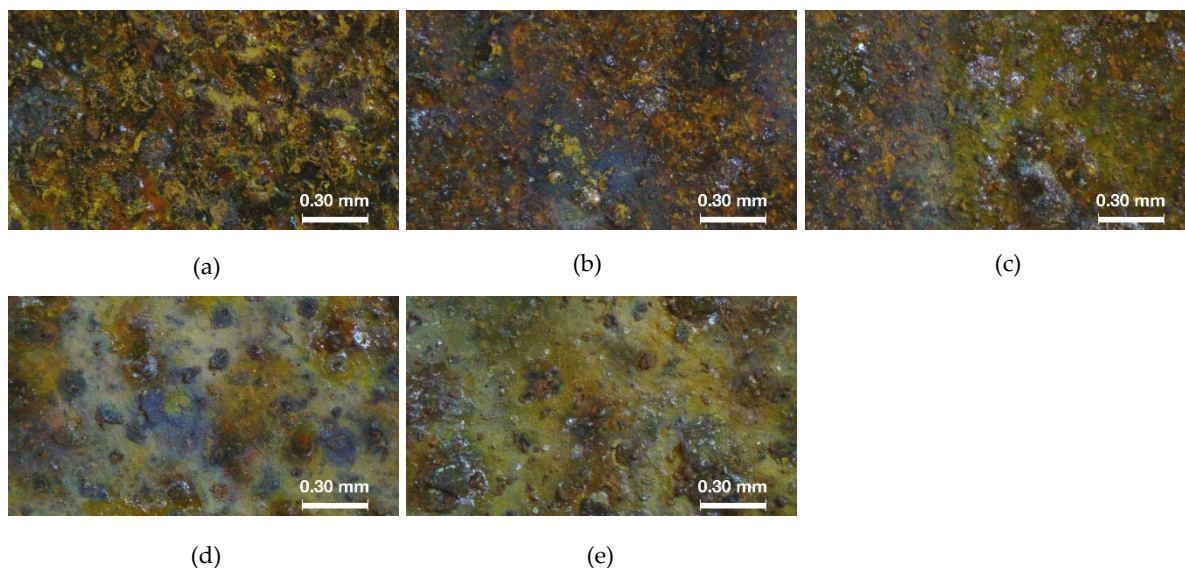


Figure S13. Optical microscope images of HCl patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S7. Evolution of Lab values with 95% confidence interval as time passes for the HCl patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	25.8	0.5	13.2	0.6	14.6	0.5
3 months	28.2	0.7	11.0	0.7	10.4	0.8
6 months	28.5	0.4	10.4	0.5	10.1	0.7
12 months	33.7	0.9	11.0	0.5	15.2	0.9
24 months	33.4	0.7	11.8	0.7	17.3	0.9

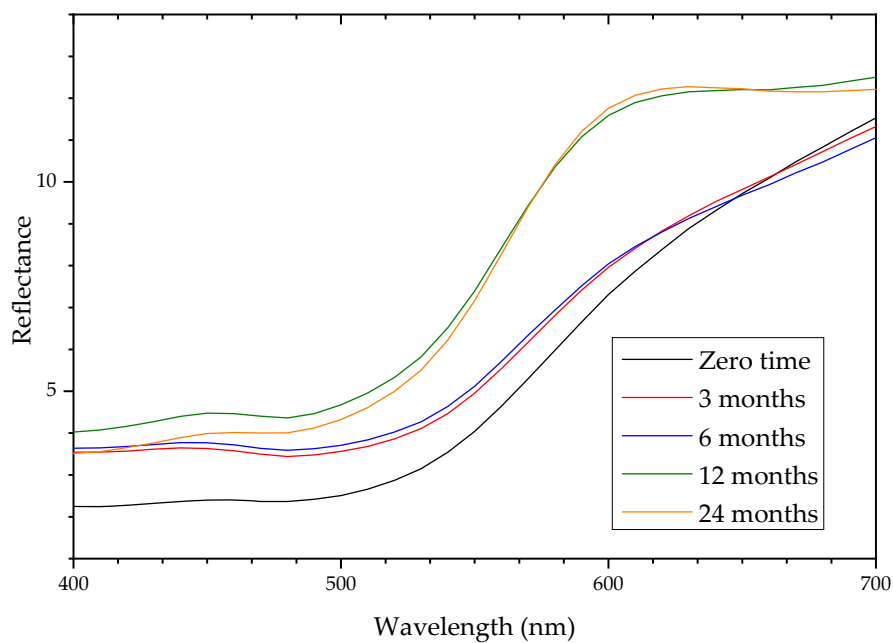


Figure S14. Reflectance spectrum of HCl patina at different exposure times.

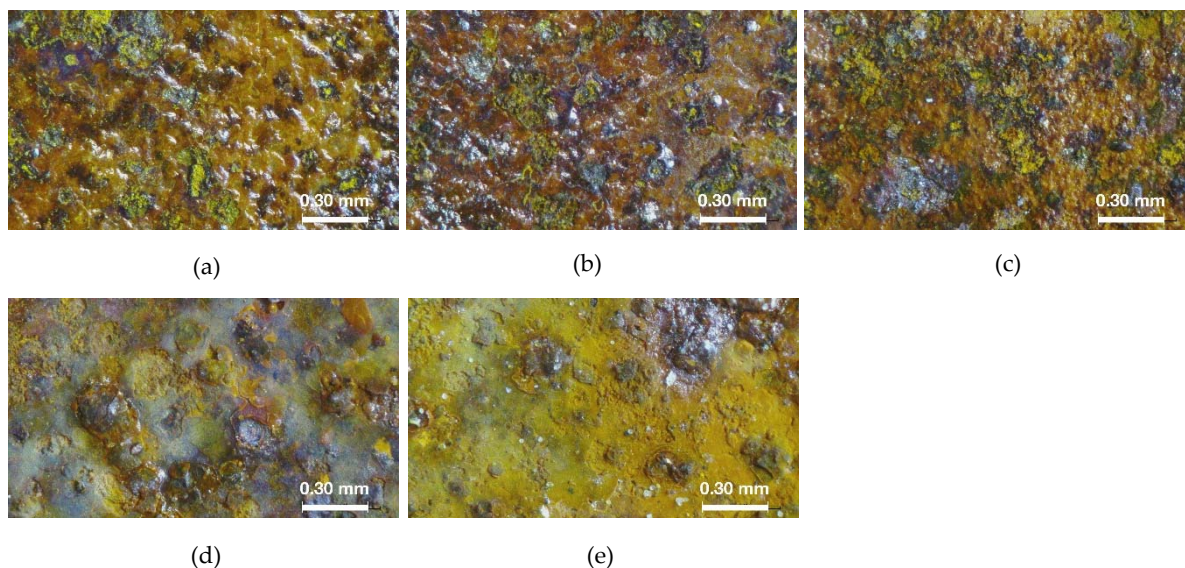


Figure S15. Optical microscope images of HNO₃ patina at different exposure times: (a) zero time; (b) 3 months; (c) 6 months; (d) 12 months and (e) 24 months.

Table S8. Evolution of Lab values with 95% confidence interval as time passes for the HNO₃ patina.

Time	L*	L* error	a*	a* error	b*	b* error
Zero	34	1	14.8	0.8	15	1
3 months	32.5	0.9	13.6	0.6	12.0	0.8
6 months	29.1	0.7	15	1	14	1
12 months	30.5	0.8	12.3	0.5	15.8	0.8
24 months	32.0	0.9	14.2	0.5	17.9	0.8

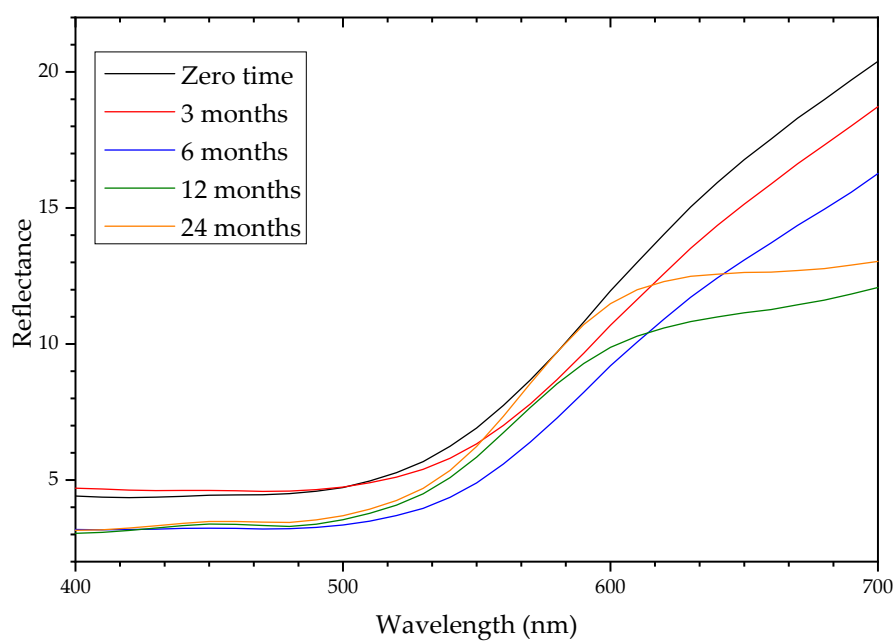
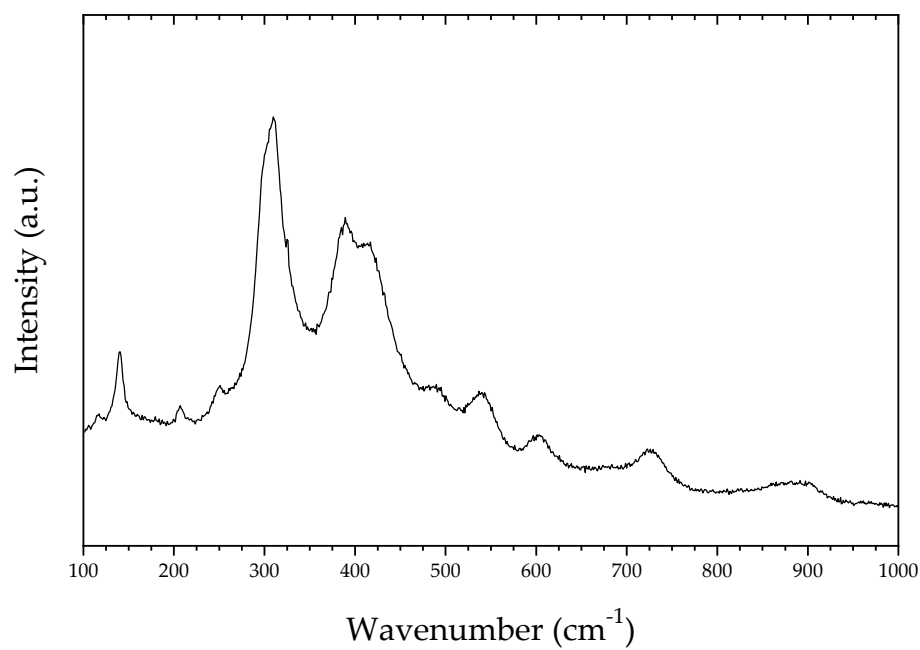


Figure S16. Reflectance spectrum of HNO₃ patina at different exposure times.



(a)

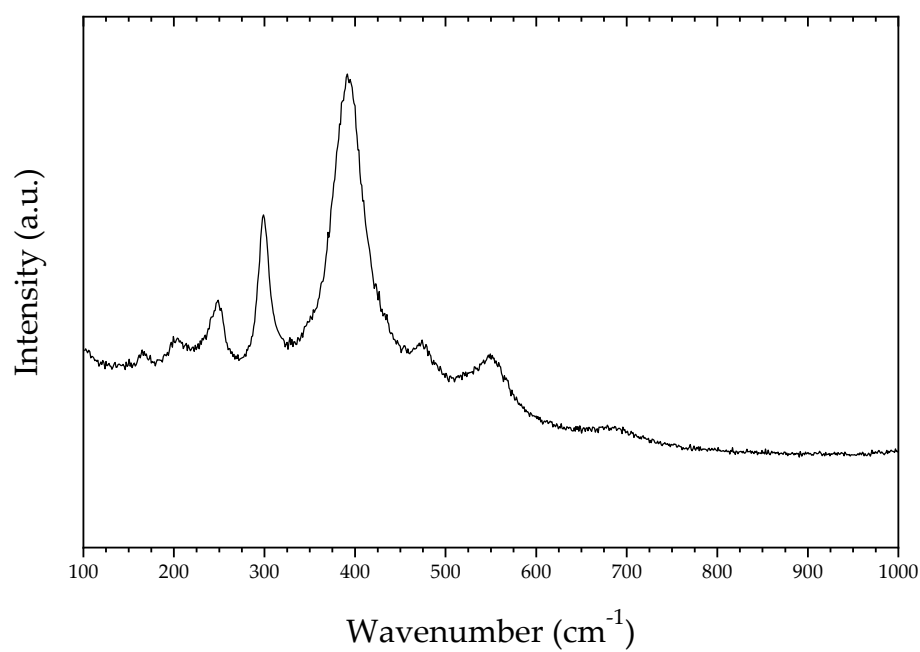


(b)

Figure S17. Akanageite section of the accelerated patina developed with FeCl_3 at zero time i.e. prior to atmospheric exposure (a) optical microscope image (b) Raman spectrum of the selected area.

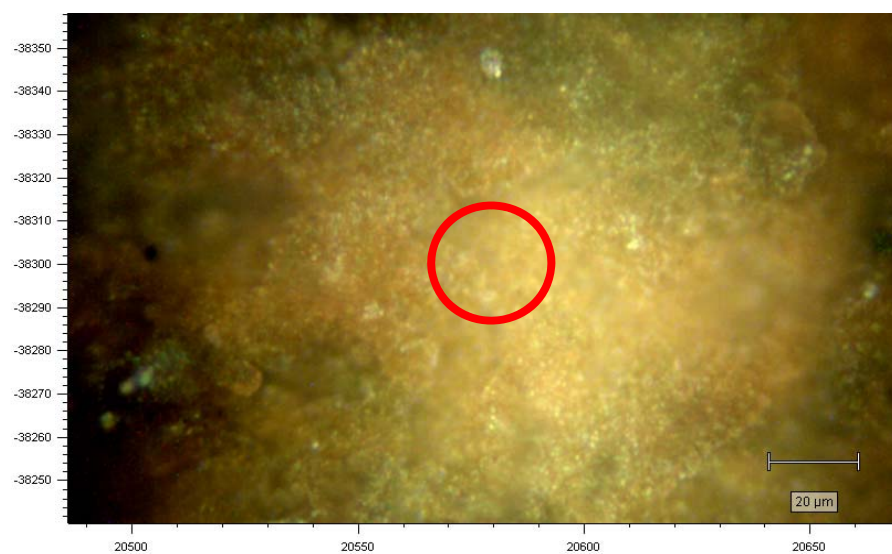


(a)

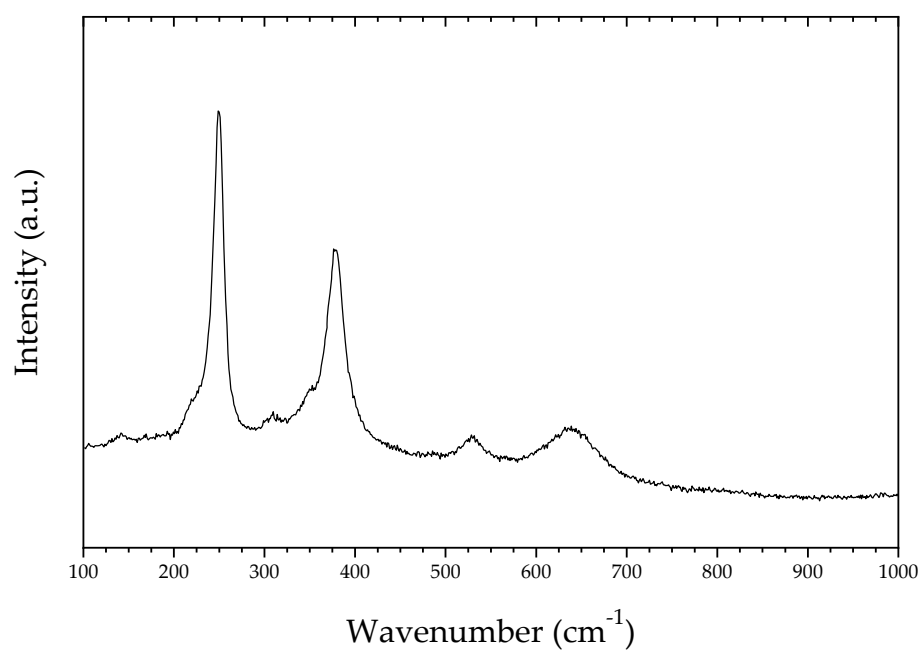


(b)

Figure S18. Goethite section of the accelerated patina developed with $\text{Fe}(\text{NO}_3)_3$ at zero time i.e. prior to atmospheric exposure (a) optical microscope image (b) Raman spectrum of the selected area.

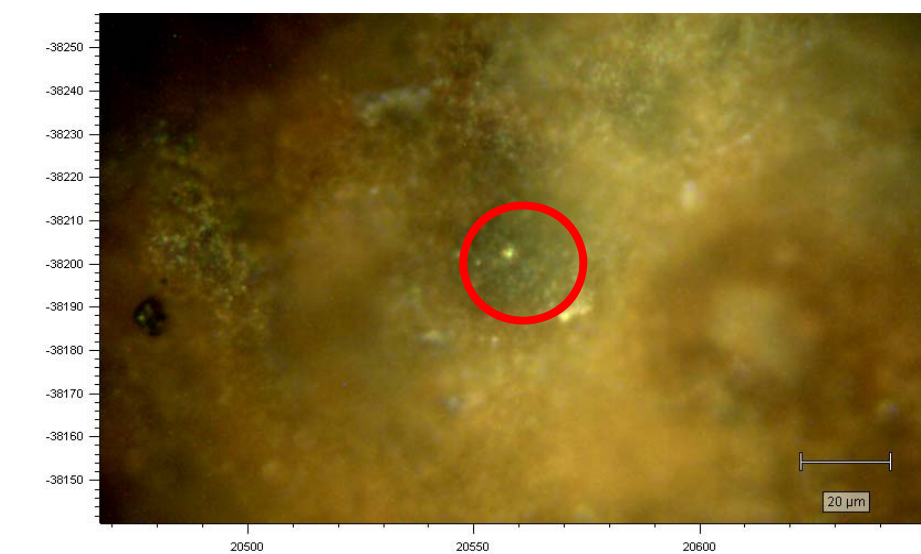


(a)

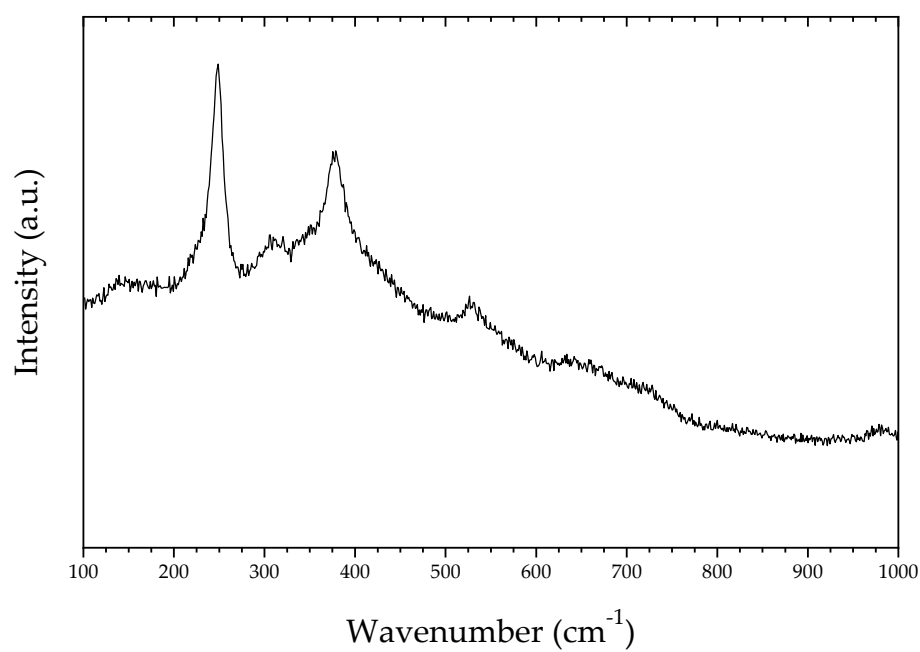


(b)

Figure S19. Light lepidocrocite section of the accelerated patina developed with H₂SO₄ after 3 months of atmospheric exposure (a) optical microscope image (b) Raman spectrum of the selected area.



(a)



(b)

Figure S20. Dark lepidocrocite section of the accelerated patina developed with H₂SO₄ after 3 months of atmospheric exposure (a) optical microscope image (b) Raman spectrum of the selected area.

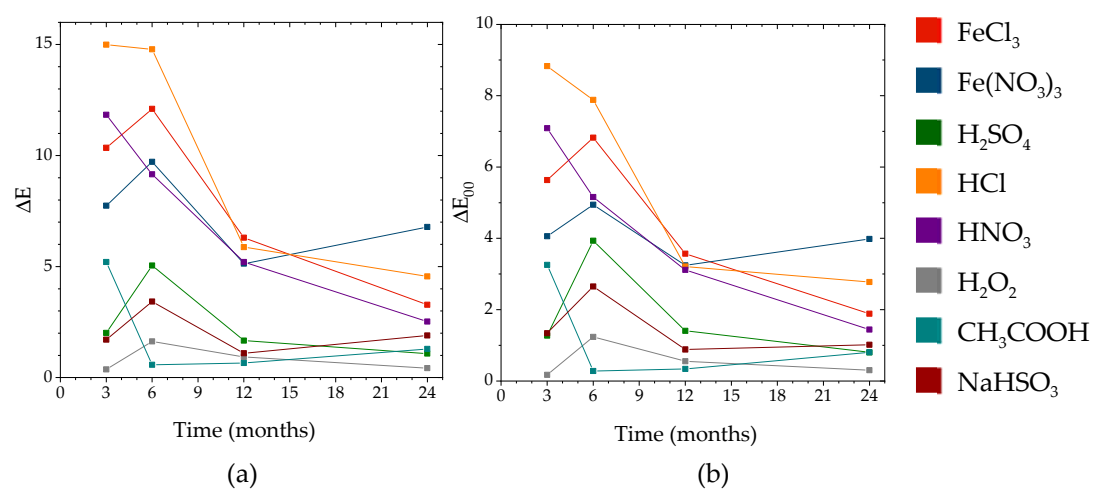


Figure S21. (a) ΔE and (b) ΔE_{00} values comparing natural patina with accelerated patinas over time for 24-month period of atmospheric exposure.