coatings

Supplementary Materials: Preliminary Investigation of Sequential Application of Different Calcium Oxalate Solutions for Carbonate Rock Conservation

Jianrui Zha [1], Yaoqi Gu [1], Shuya Wei [1,*], Huarui Han [2], Ankun Wang [3] and Qinglin Ma [4,*]

[1] Institute of Cultural Heritage and History of Science and Technology, University of Science and Technology Beijing, Beijing 100083, China
[2] Institute of Archaeology, Chinese Academy of Social Sciences, Beijing 100101, China
[3] Henan Provincial Institute for the Conservation of Architectural Heritage, Zhengzhou 450002, China
[4] International Joint Research Laboratory of Environmental and Social Archaeology, Shandong University, Qingdao 266237, China
* Correspondence: sywei66@hotmail.com (S.W.); qinglinma226@126.com (Q.M.); Tel.: +18701318128 (S.W.)

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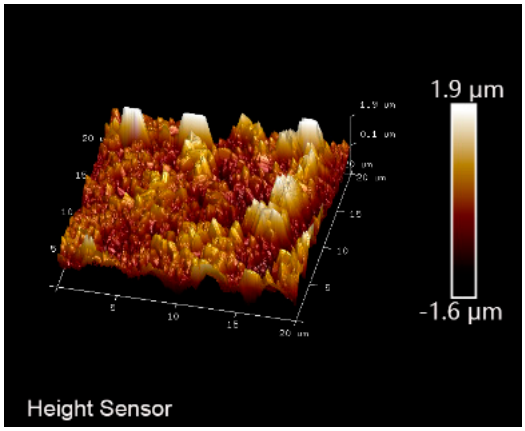

Figure S1. The AFM of dolomite marble after ammonium oxalate solution treatment.

The Figure S1 illustrates the influence of ammonium oxalate solution, which product irregular calcium oxalate crystal. These results are agreement with previous reports.

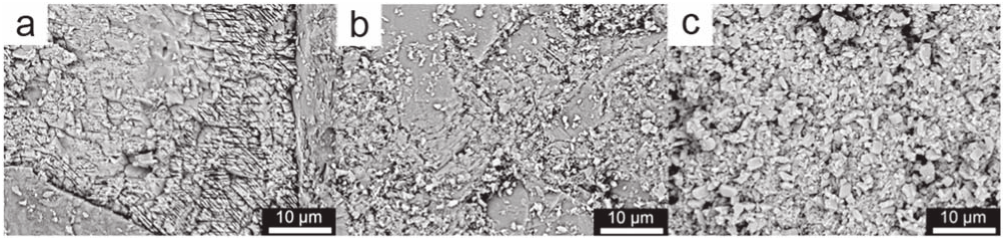

Figure S2. SEM images of (**a**) Marble, (**b**) Sample 'SF', (**c**) Sample 'PF' after immersion tests for 6 h.

The Figure S2 shows the acid resistance of the protective film. The marble surface etching severely after acid attack (Figure 3a), while calcium oxalate coating still presented on sample 'SF' surface, although it looks patchy (Figure 3b). Moreover, for the sample 'PF', the coating appears to be intact (Figure 3c). The protective film offers valuable protection for marble against acid dissolution.

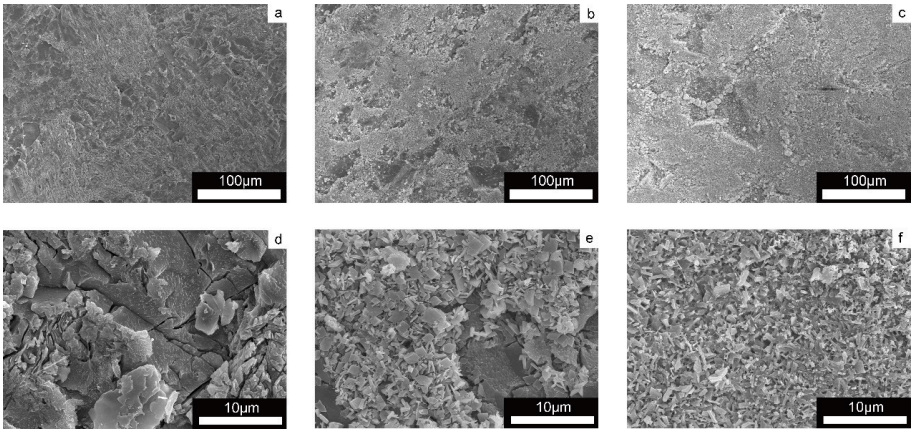

Figure S3. SEM images after UT (**a**,**d**), AO (**b**,**e**) and 0.02 mol/L CA (**c**,**f**) were treated with 750 mL acid solution(HNO_3 : H_2SO_4 = 1:1), with an initial pH of 4.0.

The Figure S3 illustrates the simulated acid rain (HNO_3 : H_2SO_4 = 1:1) resistance results, which indicate that the two-step deposition of the $CaC_2O_4 \cdot H_2O$ film is effective against acid dissolution due to the increased substrate coverage.