coatings

Supplementary Materials: Assessment of Stone Protective Coatings with a Novel Eco-friendly Encapsulated Biocide

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Table S1. Amount of product applied—the difference of sample weight before and right immediately after the coating application.

Sample	Amount of applied product (kg/m²)		
	Si_Control	Si_TiO_2-NC	Si_TiO_2-MNP
Brick	0.62 ± 0.03	0.92 ± 0.01	0.79 ± 0.04
Mortar	0.70 ± 0.12	0.74 ± 0.01	0.87 ± 0.06
Travertine	0.06 ± 0.02	0.12 ± 0.01	0.14 ± 0.01
Carrara Marble	0.11 ± 0.03	0.17 ± 0.06	0.23 ± 0.01

Table S2. Amount of product retained—the difference of sample weight before and 1 week after the coating application.

Sample	Quantity of dry matter retained (kg/m²)		
	Si_Control	Si_TiO_2-NC	Si_TiO_2-MNP
Brick	0.017 ± 0.001	0.011 ± 0.002	0.028 ± 0.001
Mortar	0.005 ± 0.001	0.070 ± 0.028	0.117 ± 0.009
Travertine	0.003 ± 0.002	0.003 ± 0.001	0.003 ± 0.001
Carrara Marble	0.003 ± 0.001	0.001 ± 0.001	0.003 ± 0.003

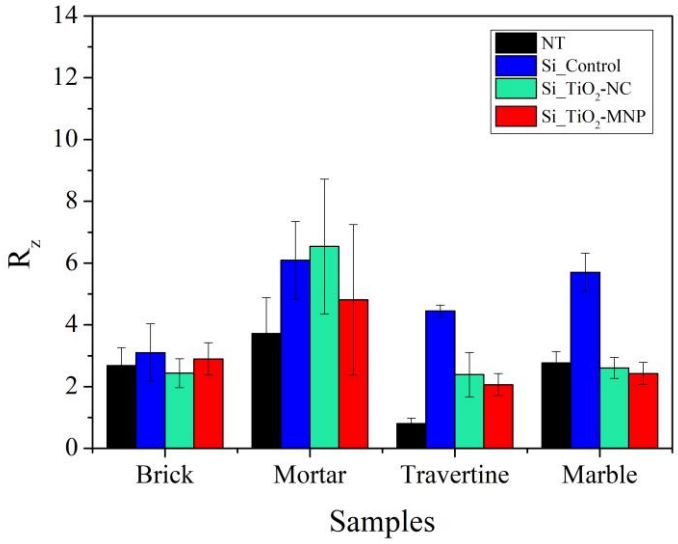

Figure S1. The roughness R_z estimated for both treated and untreated stones (NT).

Table S3. Brightness *L**, red–green chromatic component *a** and yellow–blue chromatic component *b** acquired before and after the coatings application on all stones.

Sample	Color data	Treatment					
		NT	Si_Control	NT	Si_TiO_2-NC	NT	Si_TiO_2-MNP
BR	*L**	59.8 ± 2.1	59.7 ± 1.9	60.3 ± 0.5	61.5 ± 0.9	60.8 ± 0.9	62.3 ± 0.7
	*a**	14.4 ± 0.9	14.3 ± 0.5	14.9 ± 0.5	14.1 ± 0.5	15.2 ± 0.6	14.2 ± 0.4
	*b**	25.3 ± 0.8	24.9 ± 0.7	25.5 ± 0.7	23.4 ± 0.6	25.8 ± 0.8	23.4 ± 0.3
MO	*L**	74.2 ± 2.7	73.3 ± 2.6	75.5 ± 1.9	75.9 ± 2.2	75.7 ± 1.9	76.7 ± 1.8
	*a**	−0.2 ± 0.2	−0.7 ± 0.2	0.1 ± 0.1	0.1 ± 0.1	−0.1 ± 0.1	−0.1 ± 0.3
	*b**	11.1 ± 0.8	11.4 ± 0.6	10.6 ± 0.7	11.1 ± 0.7	10.1 ± 1.2	10.6 ± 1.3
TR	*L**	85.0 ± 2.8	85.3 ± 2.4	86.5 ± 2.7	86.7 ± 3.0	85.9 ± 2.5	85.8 ± 2.9
	*a**	−0.9 ± 0.2	−0.8 ± 0.18	−0.46 ± 0.2	−0.5 ± 0.2	−0.3 ± 1.2	−0.4 ± 0.2
	*b**	2.2 ± 0.7	1.9 ± 0.6	1.9 ± 1.0	1.1 ± 1.2	1.6 ± 0.8	2.1 ± 0.7
MA	*L**	91.8 ± 0.7	92.3 ± 0.8	91.9 ± 0.7	92.1 ± 0.8	92.8 ± 1.1	92.9 ± 1.3
	*a**	−0.8 ± 0.01	−0.7 ±0.01	−0.2 ± 0.03	−0.2 ± 0.1	−0.3 ± 0.1	0.4 ± 0.1
	*b**	2.4 ± 0.4	2.3 ± 0.4	1.4 ± 0.4	2.1 ± 0.5	1.0 ± 0.5	1.8 ± 0.4

BR: brick; MO: mortar; TR: travertine; MA: Carrara marble;.

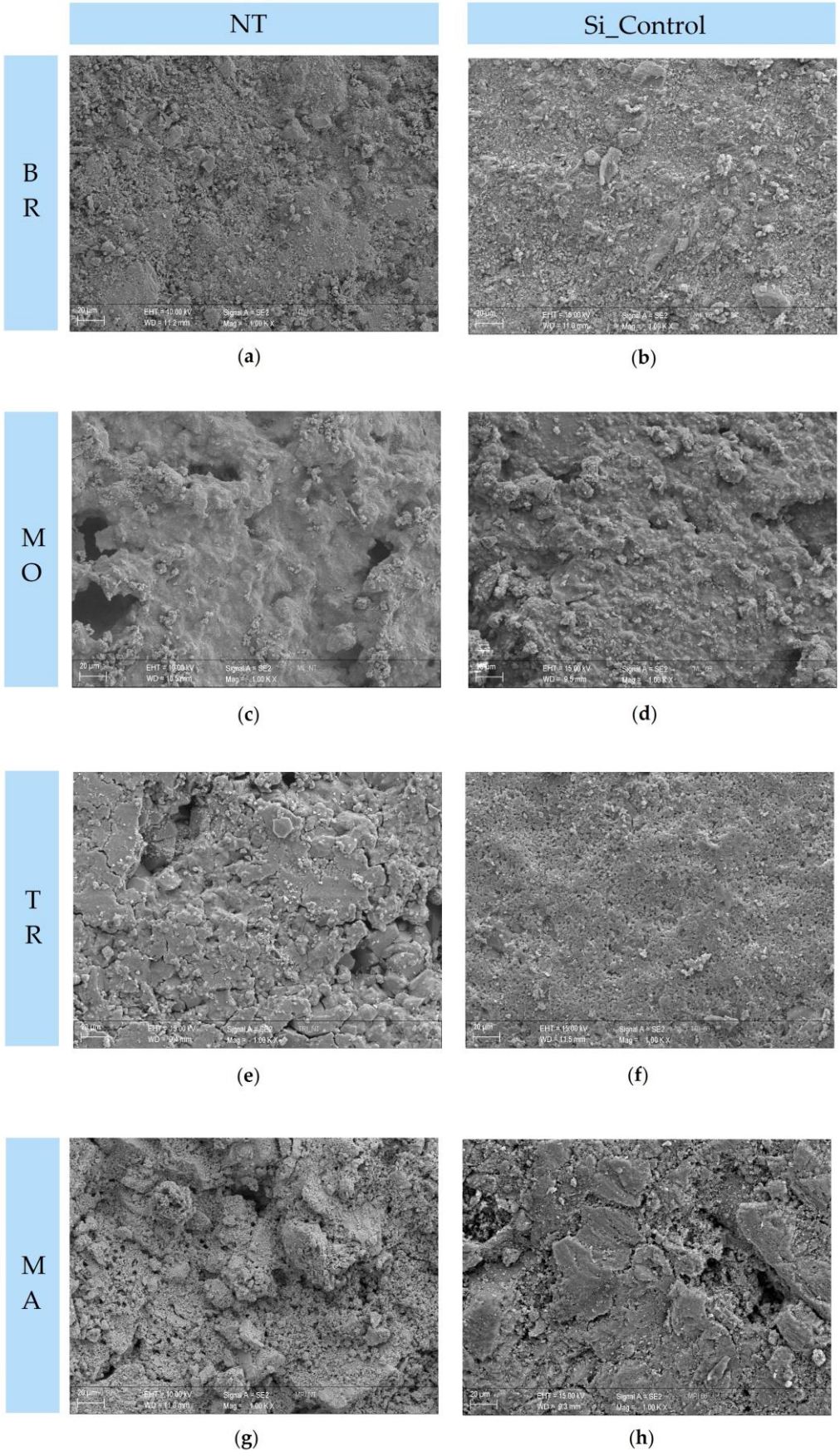

Figure S2. SEM images (1000×) of untreated samples and treated with empty coating: brick (BR) (**a**, **b**), mortar (MO) (**c**, **d**), travertine (TR) (**e**, **f**) and Carrara marble (MA) (**g**, **h**).

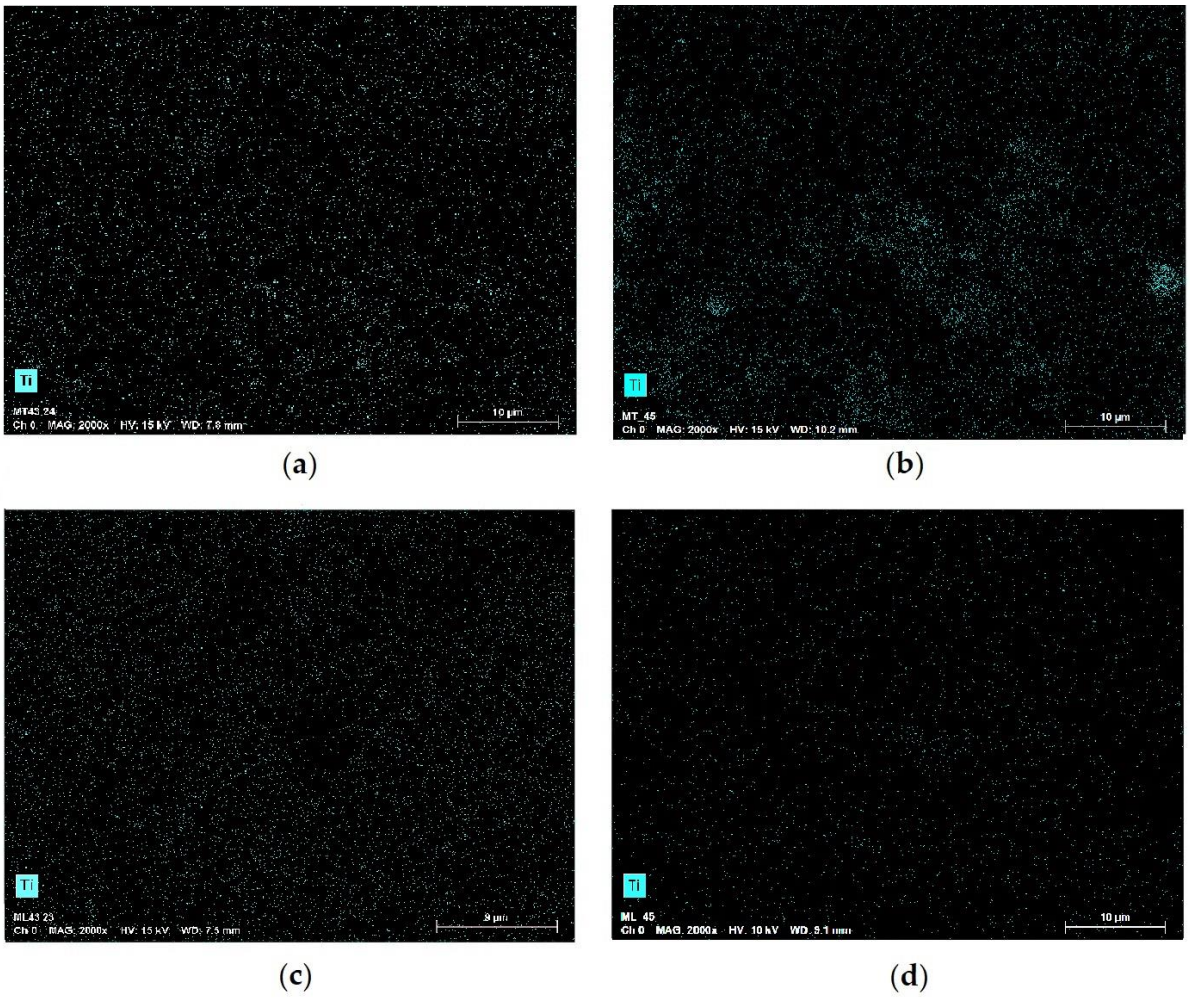

Figure S3. EDS-XFR Ti mapping acquired from brick and mortar: (**a**) brick treated with Si_TiO_2-NC, (**b**) brick treated with Si_TiO_2-MNP, (**c**) mortar treated with Si_TiO_2-NC and (**d**) mortar treated with Si-TiO_2-MNP.

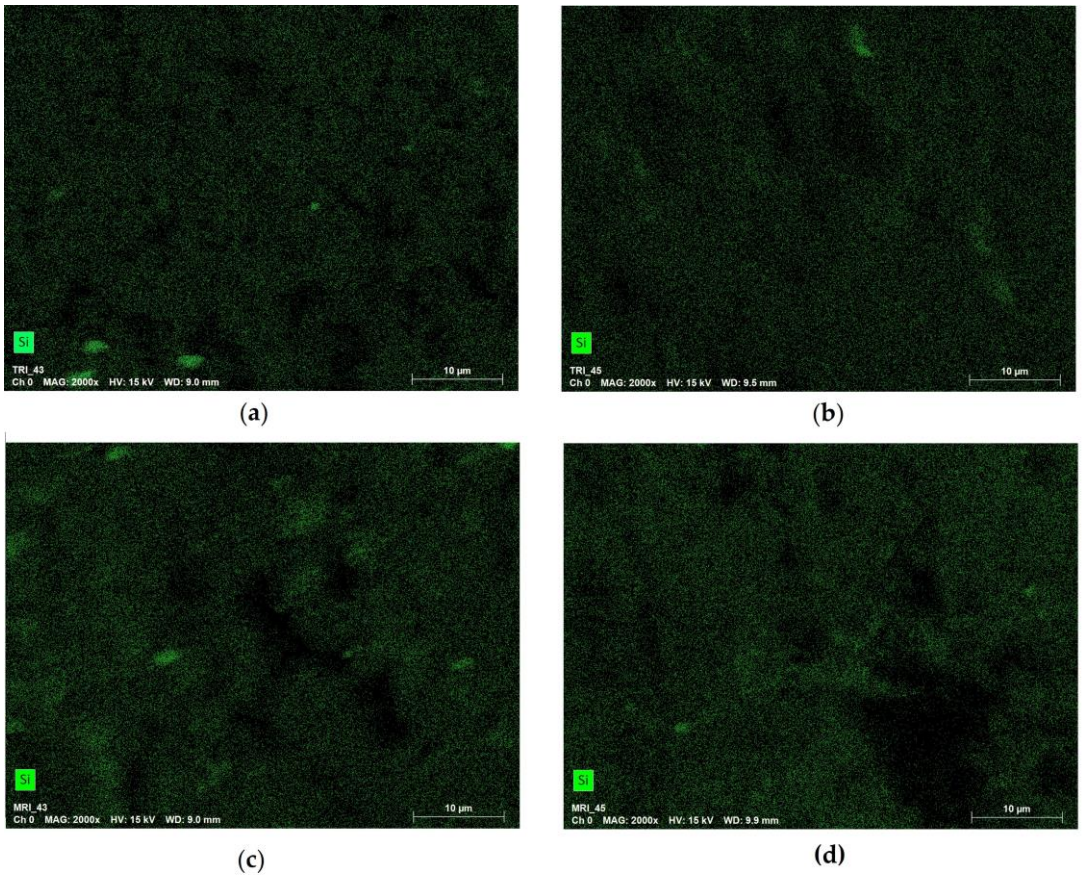

Figure S4. EDS-XFR Si mapping acquired from travertine and Carrara marble: (**a**) travertine treated with Si_TiO_2-NC, (**b**) travertine treated with Si_TiO_2-MNP, (**c**) Carrara Marble treated with Si_TiO_2-NC and (**d**) Carrara marble treated with Si-TiO_2-MNP.