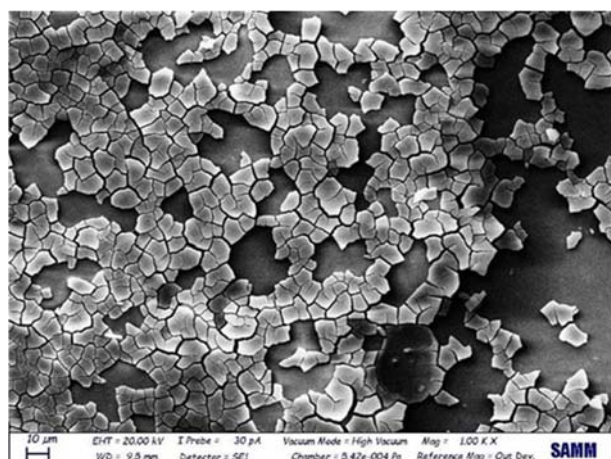
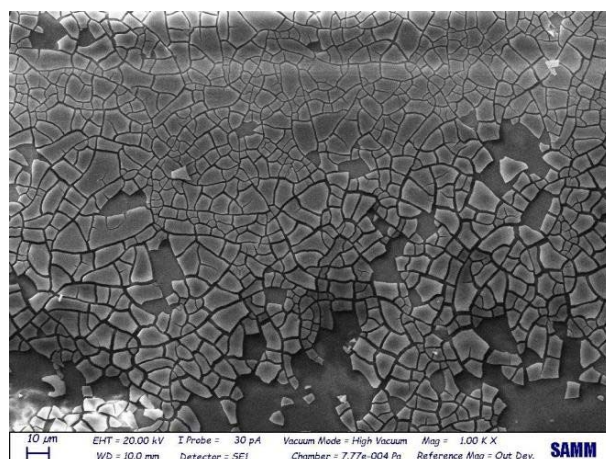


## Supplementary information

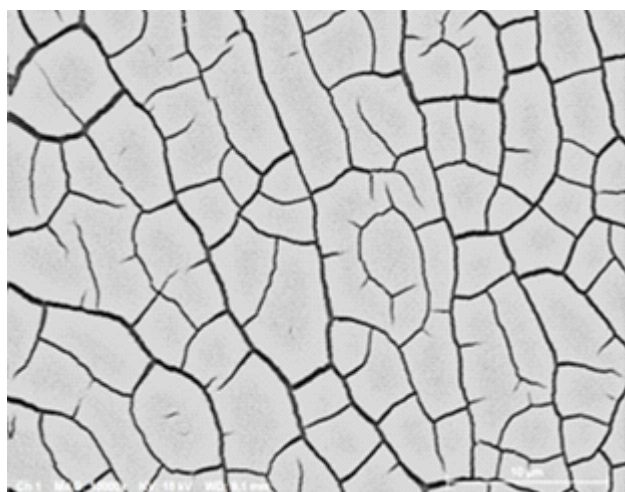


(a)

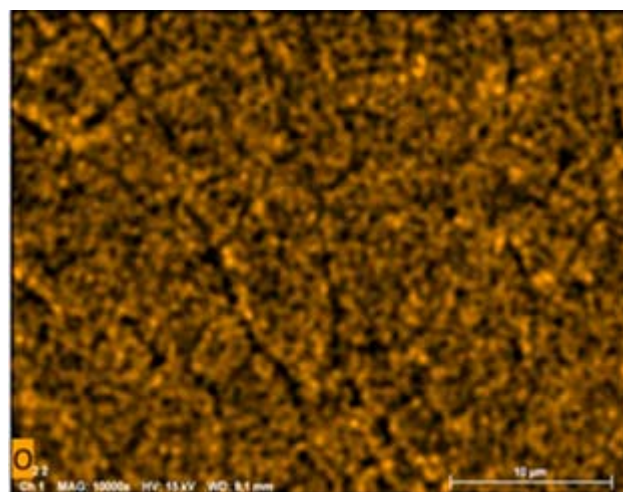


(b)

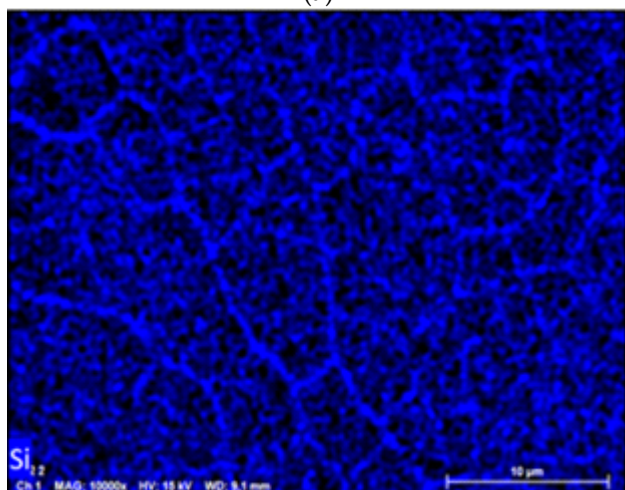
**Figure S1.** Top-view SEM analyses of the TiO<sub>2</sub> coating on glass samples as deposited (a) and after annealing at 500 °C for 2 hours (b). It is possible to notice in both samples that there are some areas in which the TiO<sub>2</sub> coating is lacking.



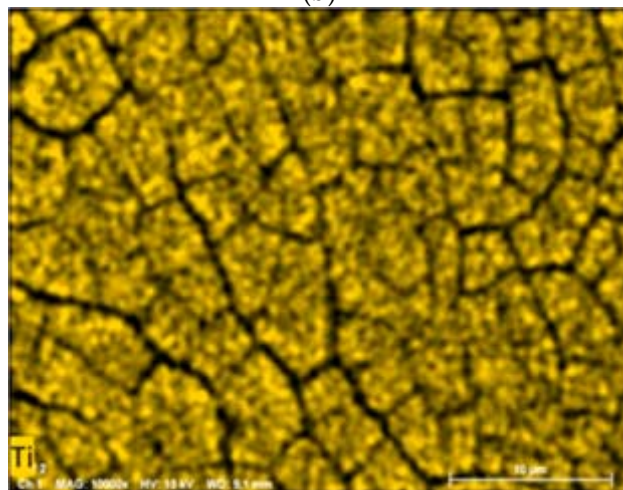
(a)



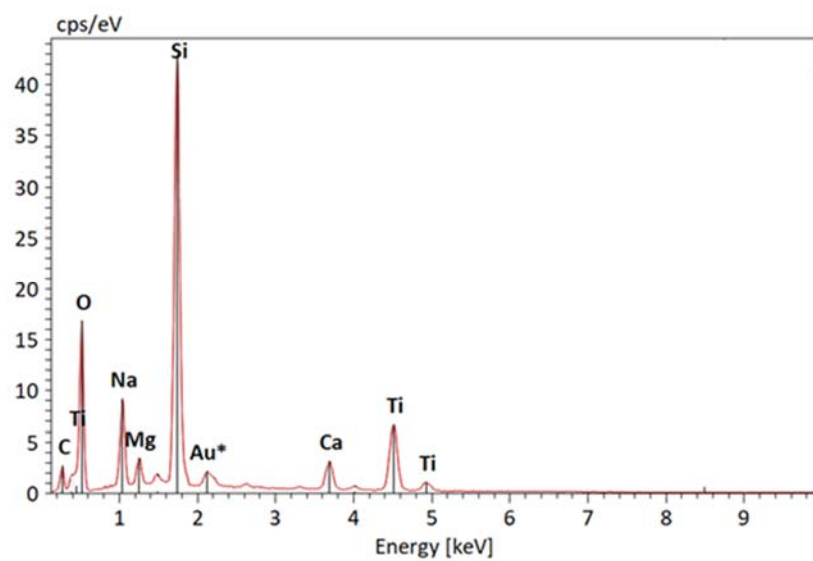
(b)



(c)

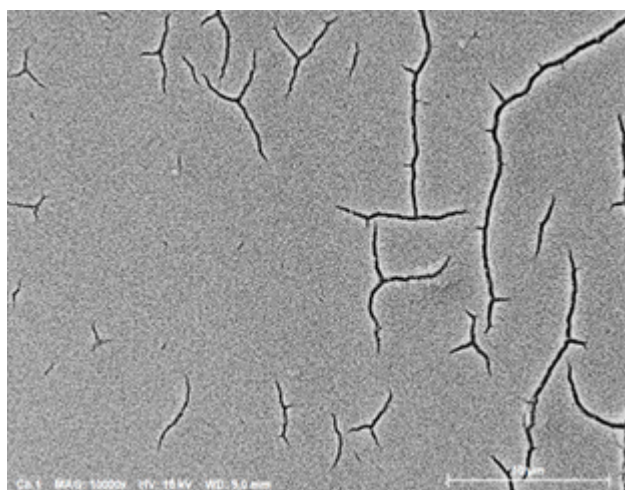


(d)

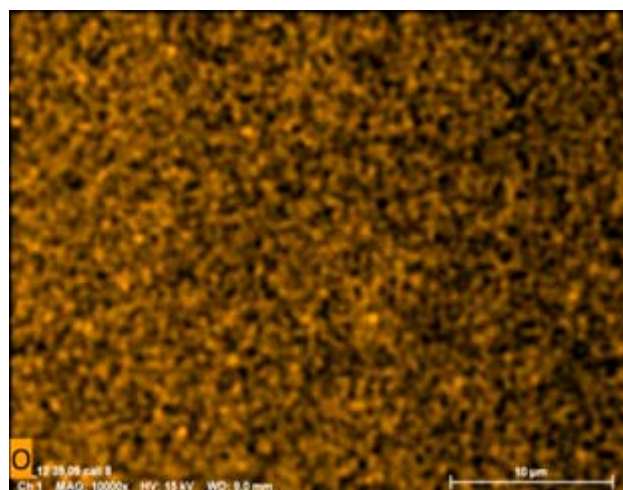


(e)

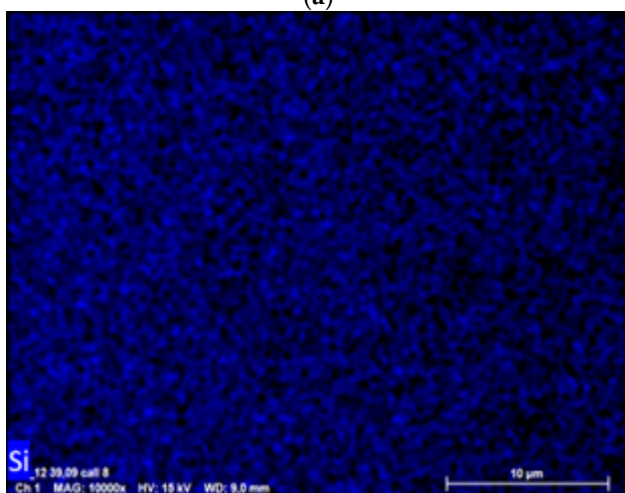
**Figure S2.** (a) Top-view SEM analysis of the TiO<sub>2</sub> coating on glass substrate as deposited. (b) EDS oxygen map. (c) EDS silicon map. (d) EDS titanium map. (e) EDS analysis of the area shown in (a).



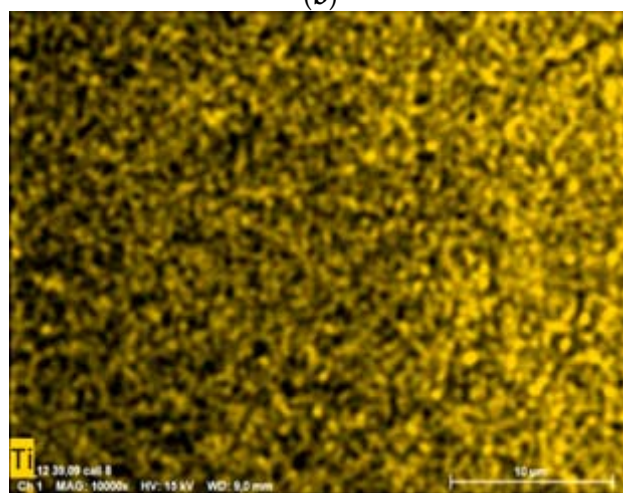
(a)



(b)

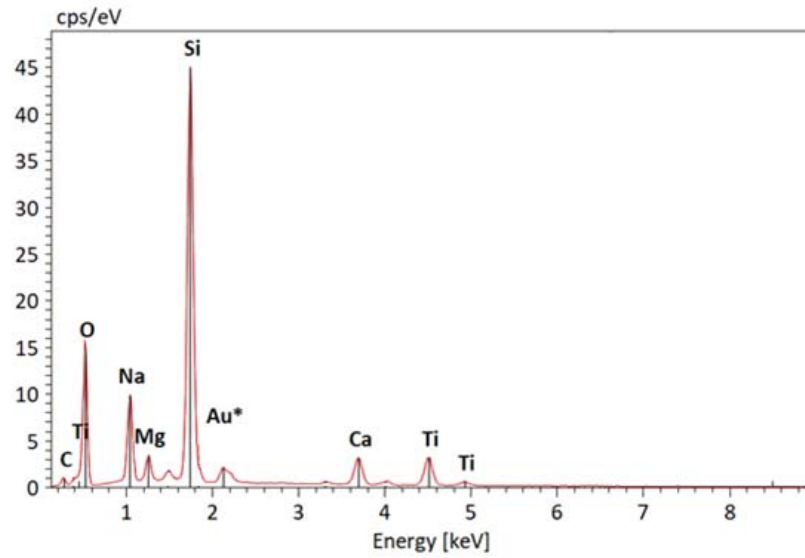


(c)



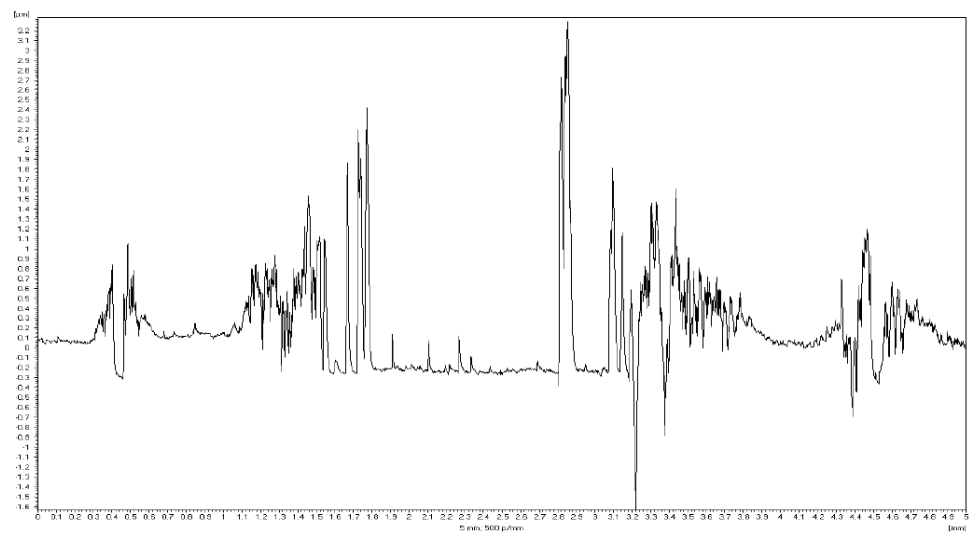
(d)



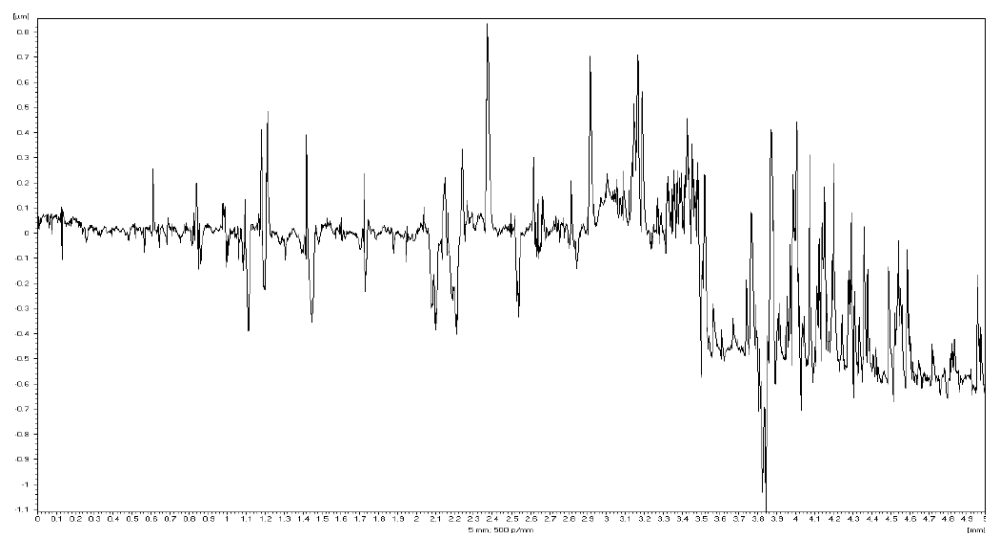


(e)

**Figure S3.** (a) Top-view SEM analysis of the TiO<sub>2</sub> coating on glass substrate after annealing at 500 °C for 2 hours. (b) EDS oxygen map. (c) EDS silicon map. (d) EDS titanium map. (e) EDS analysis of the area shown in (a).

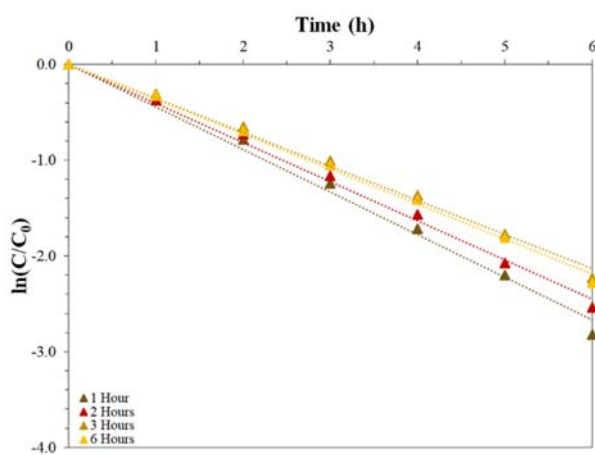


(a)

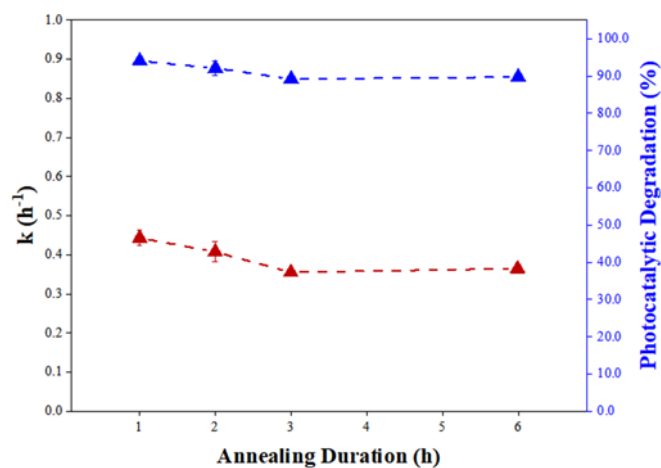


(b)

**Figure S4.** Laser profilometry on coated glass samples as deposited (a) and after annealing at 500 °C for 2 h (b).

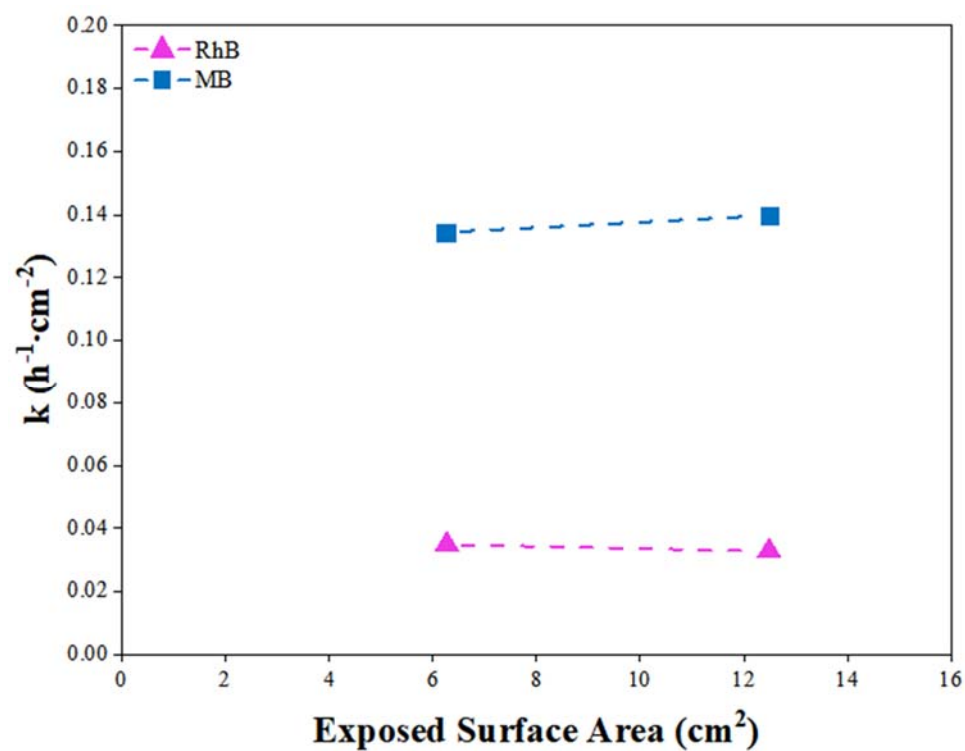


(a)

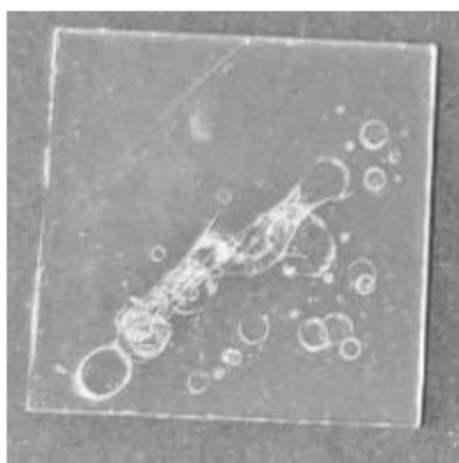


(b)

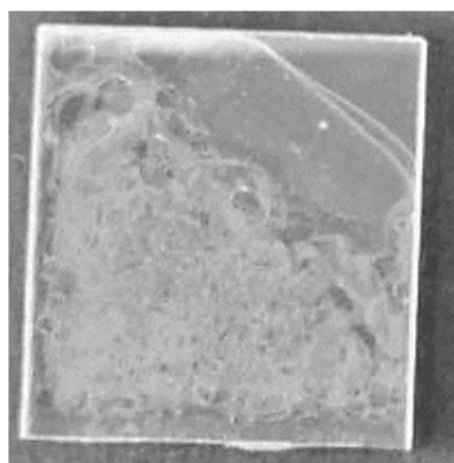
**Figure S5.** (a) Kinetics of RhB photocatalytic degradation for different annealing durations. (b) Effect of annealing duration on the photocatalysis kinetics and on the photocatalytic degradation percentage.



**Figure S6.** Effect of coated sides on the photocatalysis kinetics of RhB and MB per unit of area.

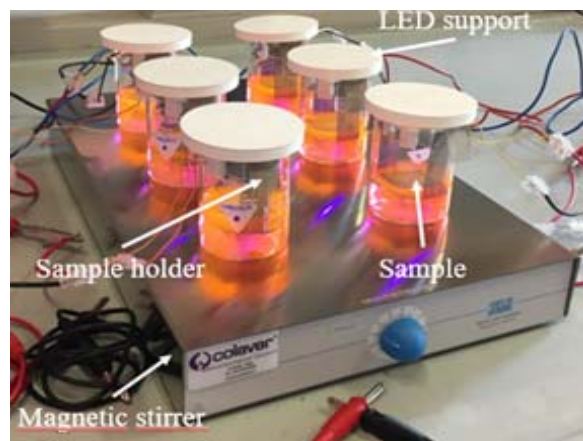
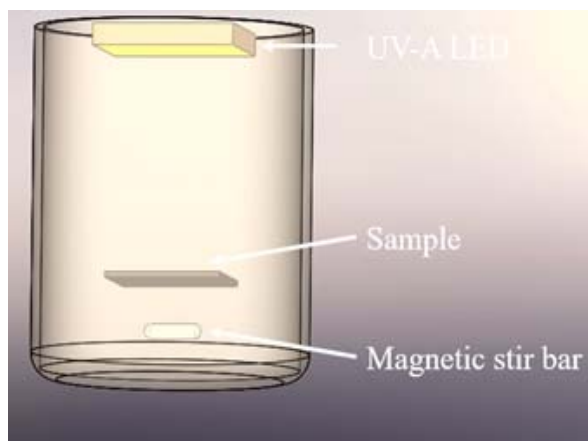


(a)



(b)

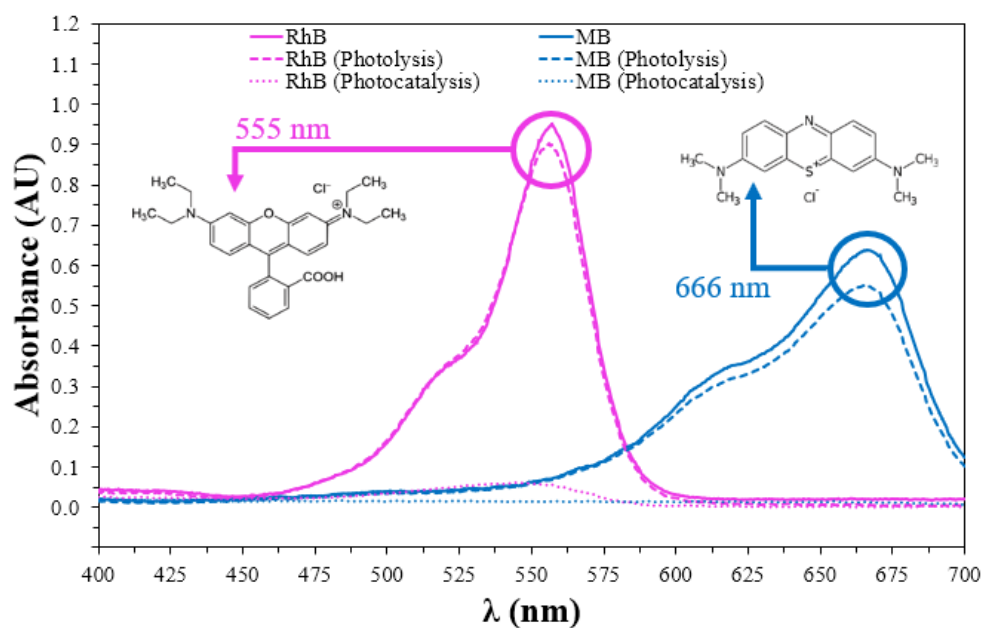
**Figure S7.** Visual aspect of TiO<sub>2</sub> coatings on glass substrate as deposited (a) and after annealing (b)



(a)

(b)

**Figure S8.** (a) Schematic representation of the batch reactor used in the present research. (b) Photo of the batch reactor used in the present research.



**Figure S9.** Absorbance spectra of aqueous single-dye solutions ( $10^{-5}$  M) in the visible range before the degradation process, after 6 hours of photolysis and after 6 hours of photocatalysis under UV-A light. The impact of the photolysis process on the total photodegradation process is about 0.9% for RhB and 1.6% for MB.

**Table S1.** Measured colorimetric parameters for different number of dips. The condition selected as reference is reported underlined.

Number Of Dips	Step	$L^*$	$a^*$	$b^*$	$\Delta L^*$	$\Delta a^*$	$\Delta b^*$	$\Delta E^*$
1	Bare	92.38	-1.02	0.98	/	/	/	/
	Post 1 dip	91.70	-1.05	1.42	-0.68	-0.03	0.44	0.81
	Post 2 dips	/	/	/	/	/	/	/
	Post 3 dips	/	/	/	/	/	/	/
	Post Calcination	88.78	-0.90	2.00	-2.92	0.15	0.58	2.98
	Post Photocatalysis	90.30	-0.62	1.84	1.52	0.28	-0.16	1.55
	Overall Prior Photocatalysis	/	/	/	-3.60	0.12	1.02	3.74
	Overall Post Photocatalysis	/	/	/	-2.08	0.40	0.86	2.29
2	Bare	92.19	-1.21	0.77	/	/	/	/
	Post 1 dip	91.96	-1.20	0.83	-0.23	0.01	0.06	0.24
	Post 2 dips	87.46	-1.22	0.82	-4.50	-0.02	-0.01	4.50
	Post 3 dips	/	/	/	/	/	/	/
	Post Calcination	85.98	-1.10	0.25	-1.48	0.12	-0.57	1.59
	Post Photocatalysis	85.95	-1.20	1.53	-0.03	-0.10	1.28	1.28
	Overall Prior Photocatalysis	/	/	/	-6.21	0.11	-0.52	6.23
	Overall Post Photocatalysis	/	/	/	-6.24	0.01	0.76	6.29
3	Bare	92.39	-1.14	0.96	/	/	/	/

Post 1 dip	89.28	-0.84	1.84	-3.11	0.30	0.88	3.25
Post 2 dips	84.70	-1.35	1.11	-4.58	-0.51	-0.73	4.67
Post 3 dips	84.90	-1.45	0.72	0.20	-0.10	-0.39	0.45
Post Calcination	85.88	-1.42	0.27	0.98	0.03	-0.45	1.08
Post Photocatalysis	85.36	-1.23	1.60	-0.52	0.19	1.33	1.44
<i>Overall Prior Photocatalysis</i>	/	/	/	-6.51	-0.28	-0.69	6.55
<i>Overall Post Photocatalysis</i>	/	/	/	-7.03	-0.09	0.64	7.06

**Table S2.** Measured colorimetric parameters for different dipping speeds. The condition selected as reference is reported underlined.

Dipping Speed	Step	L*	a*	b*	$\Delta L^*$	$\Delta a^*$	$\Delta b^*$	$\Delta E^*$
60 mm·min <sup>-1</sup>	Bare	92.79	-1.11	0.81	/	/	/	/
	Post 1 dip	92.59	-1.16	0.87	-0.20	-0.05	0.06	0.21
	Post 2 dips	90.07	-1.11	1.00	-2.52	0.05	0.13	2.52
	Post Calcination	87.48	-1.05	1.37	-2.59	0.06	0.37	2.62
	Post Photocatalysis	88.90	-1.02	1.32	2.42	0.03	-0.05	2.42
	<i>Overall Prior Photocatalysis</i>	/	/	/	-5.31	0.06	0.56	5.34
	<i>Overall Post Photocatalysis</i>	/	/	/	-3.89	0.09	0.51	3.94
120 mm·min <sup>-1</sup>	Bare	92.19	-1.21	0.77	/	/	/	/
	Post 1 dip	91.96	-1.20	0.83	-0.23	0.01	0.06	0.24
	Post 2 dips	87.46	-1.22	0.82	-4.50	-0.02	-0.01	4.50
	Post Calcination	85.98	-1.10	0.25	-1.48	0.12	-0.57	1.59
	Post Photocatalysis	85.95	-1.20	1.53	-0.03	-0.10	1.28	1.28
	<i>Overall Prior Photocatalysis</i>	/	/	/	-6.21	0.11	-0.52	6.23
	<i>Overall Post Photocatalysis</i>	/	/	/	-6.24	0.01	0.76	6.29
180 mm·min <sup>-1</sup>	Bare	92.42	-1.43	0.56	/	/	/	/
	Post 1 dip	89.74	-0.96	1.61	-2.68	0.47	1.05	2.92
	Post 2 dips	85.57	-1.62	1.00	-4.17	-0.66	-0.61	4.27
	Post Calcination	85.50	-1.07	0.10	-0.07	0.55	-0.90	1.06
	Post Photocatalysis	87.67	-0.99	1.30	2.17	0.08	1.20	2.48
	<i>Overall Prior Photocatalysis</i>	/	/	/	-6.92	0.36	-0.46	6.94
	<i>Overall Post Photocatalysis</i>	/	/	/	-4.75	0.44	0.74	4.83
240 mm·min <sup>-1</sup>	Bare	92.64	-1.22	0.76	/	/	/	/
	Post 1 dip	90.65	-1.05	1.97	-1.99	0.17	1.21	2.34
	Post 2 dips	86.59	-1.24	1.54	-4.06	-0.19	-0.43	4.09
	Post Calcination	84.17	-1.17	0.85	-2.42	0.07	-0.69	2.52
	Post Photocatalysis	84.24	-1.02	1.02	8.07	0.15	0.17	8.07
	<i>Overall Prior Photocatalysis</i>	/	/	/	-8.47	0.05	0.09	8.47
	<i>Overall Post Photocatalysis</i>	/	/	/	-8.40	0.20	0.26	8.52

**Table S3.** Measured colorimetric parameters for different annealing temperatures. The condition selected as reference is reported underlined.

Annealing T	Step	L*	a*	b*	$\Delta L^*$	$\Delta a^*$	$\Delta b^*$	$\Delta E^*$
Room T	Bare	92.02	-1.41	0.66	/	/	/	/
	Post 1 dip	91.59	-1.51	1.27	-0.43	-0.10	0.61	0.75
	Post 2 dips	88.70	-1.05	1.93	-2.89	0.46	0.66	3.00
	Post Calcination	/	/	/	/	/	/	/
	Post Photocatalysis	87.76	-1.07	2.19	-2.94	-0.02	0.26	2.95
	Overall Prior Photocatalysis	/	/	/	-3.32	0.36	1.27	3.57
	Overall Post Photocatalysis	/	/	/	-4.26	0.34	1.53	4.45
60 °C	Bare	92.54	-1.22	0.88	/	/	/	/
	Post 1 dip	91.75	-1.14	1.42	-0.79	0.08	0.54	0.96
	Post 2 dips	86.67	-0.98	1.71	-5.08	0.16	0.29	5.09
	Post Calcination	84.96	-0.95	1.63	-1.71	0.03	-0.08	1.71
	Post Photocatalysis	84.86	-0.85	1.52	-0.10	0.10	-0.11	0.18
	Overall Prior Photocatalysis	/	/	/	-7.58	0.27	0.75	7.62
	Overall Post Photocatalysis	/	/	/	-7.68	0.37	0.64	7.72
100 °C	Bare	92.50	-1.16	0.74	/	/	/	/
	Post 1 dip	91.40	-1.10	1.00	-1.10	0.06	0.26	1.13
	Post 2 dips	87.63	-1.03	1.79	-3.77	0.07	0.79	3.85
	Post Calcination	87.67	-0.90	2.00	0.04	0.13	0.21	0.25
	Post Photocatalysis	85.18	-1.12	1.43	-2.49	-0.22	-0.57	2.56
	Overall Prior Photocatalysis	/	/	/	-4.83	0.26	1.26	5.00
	Overall Post Photocatalysis	/	/	/	-7.32	0.04	0.69	7.35
300 °C	Bare	92.51	-1.48	0.56	/	/	/	/
	Post 1 dip	91.39	-1.52	0.98	-1.12	-0.04	0.42	1.20
	Post 2 dips	86.21	-1.48	1.17	-5.18	0.04	0.19	5.18
	Post Calcination	85.62	-1.41	1.21	-0.59	0.07	0.04	0.60
	Post Photocatalysis	85.91	-1.18	1.34	0.29	0.23	0.13	0.39
	Overall Prior Photocatalysis	/	/	/	-6.89	0.07	0.65	6.92
	Overall Post Photocatalysis	/	/	/	-6.60	0.30	0.78	6.65
500 °C	Bare	92.19	-1.21	0.77	/	/	/	/
	Post 1 dip	91.96	-1.20	0.83	-0.23	0.01	0.06	0.24
	Post 2 dips	87.46	-1.22	0.82	-4.50	-0.02	-0.01	4.50
	Post Calcination	85.98	-1.10	0.25	-1.48	0.12	-0.57	1.59
	Post Photocatalysis	85.95	-1.20	1.53	-0.03	-0.10	1.28	1.28
	Overall Prior Photocatalysis	/	/	/	-6.21	0.11	-0.52	6.23
	Overall Post Photocatalysis	/	/	/	-6.24	0.01	0.76	6.29
600 °C	Bare	92.53	-1.44	0.76	/	/	/	/
	Post 1 dip	92.05	-1.18	1.07	-0.48	0.26	0.31	0.63
	Post 2 dips	86.47	-1.29	1.56	-5.58	-0.11	0.49	5.60



Post Calcination	84.21	-0.91	0.64	-2.26	0.38	-0.92	2.47
Post Photocatalysis	85.07	-1.39	1.28	0.86	-0.48	0.64	1.17
<i>Overall Prior Photocatalysis</i>	/	/	/	-8.32	0.53	-0.12	8.34
<i>Overall Post Photocatalysis</i>	/	/	/	-7.46	0.05	0.52	7.48