

Electronic Supporting information (ESI)

Macro-/mesoporous titania thin films: Analysing the effect of pore architecture on photocatalytic activity using high-throughput screening

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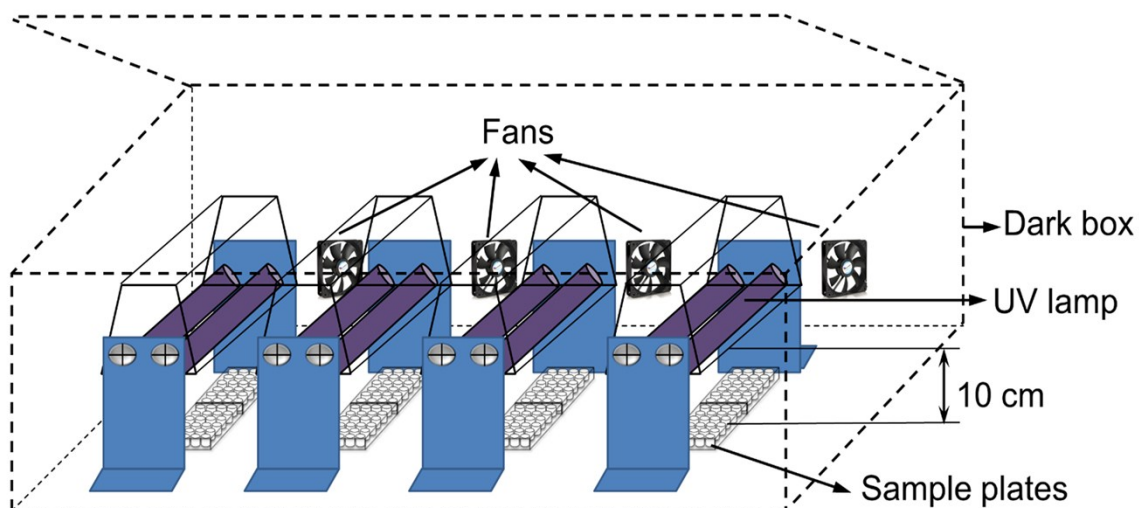
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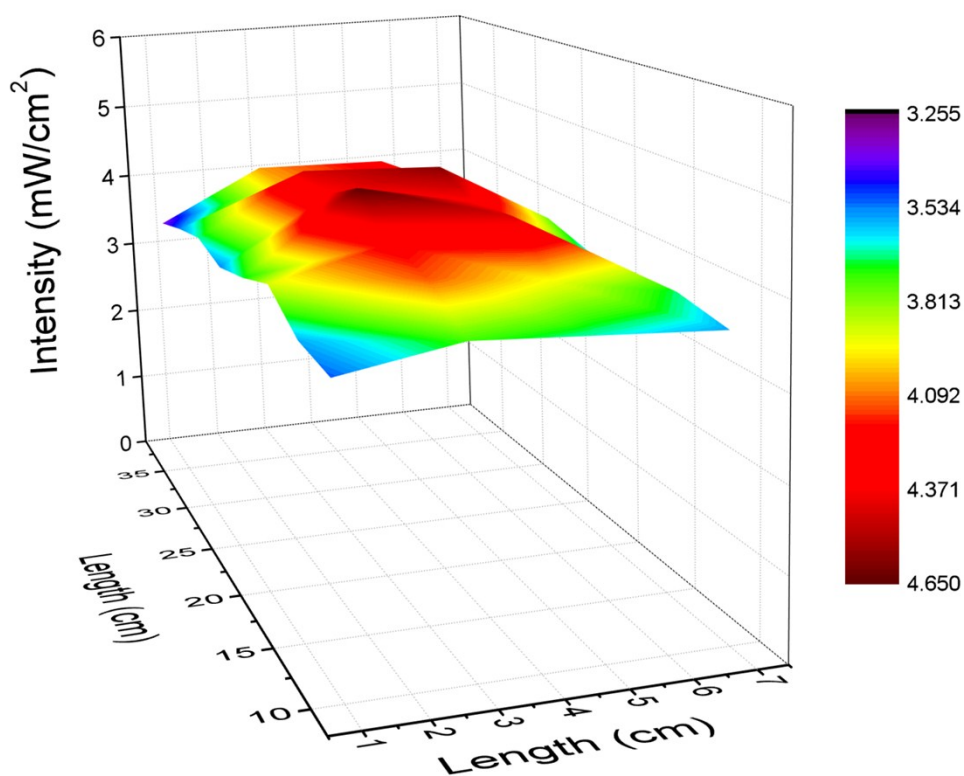
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Table S1. Composition of the reagents used during sol-gel synthesis.

Sample	Solution composition (molar ratio)				Polymer mass (g)		
	TBT	DEA	H ₂ O	Ethanol	PEG	PVP	F127
Control	1	1	1	25	0	0	0
1PEG-0PVP-0F127	1	1	1	25	1.0	0	0
2PEG-0PVP-0F127	1	1	1	25	2.0	0	0
3PEG-0PVP-0F127	1	1	1	25	3.0	0	0
1PEG-0.5PVP-0F127	1	1	1	25	1.0	0.5	0
1PEG-1PVP-0F127	1	1	1	25	1.0	1.0	0
1PEG-1.5PVP-0F127	1	1	1	25	1.0	1.5	0
1PEG-2PVP-0F127	1	1	1	25	1.0	2.0	0
2PEG-0.5PVP-0F127	1	1	1	25	2.0	0.5	0
2PEG-1PVP-0F127	1	1	1	25	2.0	1.0	0
2PEG-1.5PVP-0F127	1	1	1	25	2.0	1.5	0
2PEG-2PVP-0F127	1	1	1	25	2.0	2.0	0
3PEG-0.5PVP-0F127	1	1	1	25	3.0	0.5	0
3PEG-1PVP-0F127	1	1	1	25	3.0	1.0	0
3PEG-1.5PVP-0F127	1	1	1	25	3.0	1.5	0
3PEG-2PVP-0F127	1	1	1	25	3.0	2.0	0
1PEG-1PVP-0.5F127	1	1	1	25	1.0	1.0	0.5
1PEG-1PVP-1F127	1	1	1	25	1.0	1.0	1.0
1PEG-1PVP-1.5F127	1	1	1	25	1.0	1.0	1.5
1PEG-1PVP-2F127	1	1	1	25	1.0	1.0	2.0



(a)



(b)

Fig. S1. (a) Schematic illustration displaying the high-throughput photocatalysis screening setup and (b) mapping of the light intensity typically measured in each of the irradiation areas.

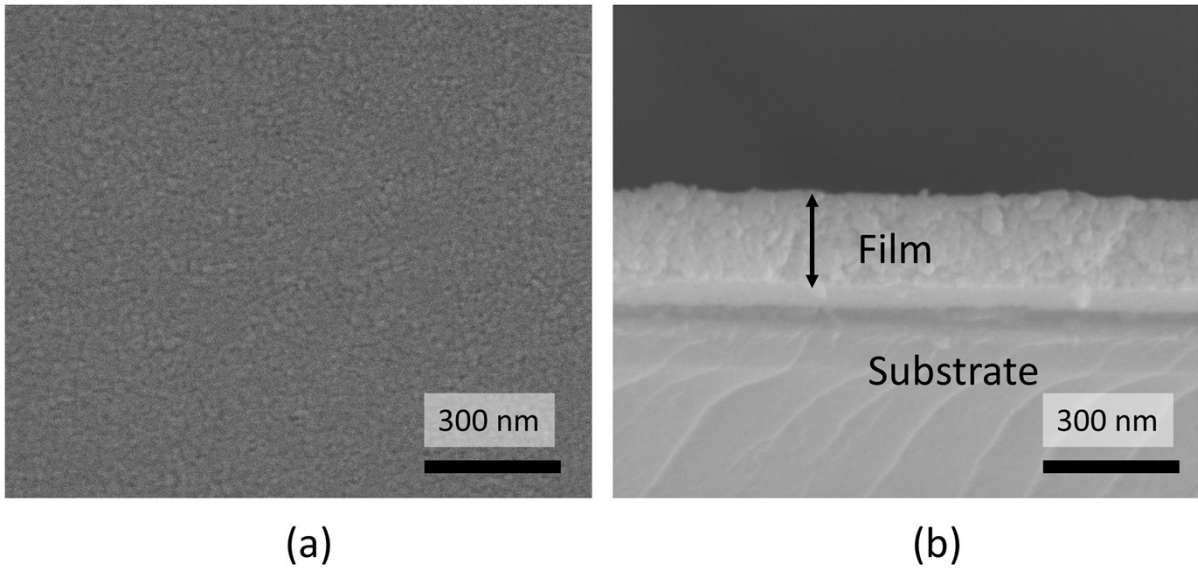


Fig. S2. SEM images showing the (a) surface and (b) cross-section morphology of the control sample.

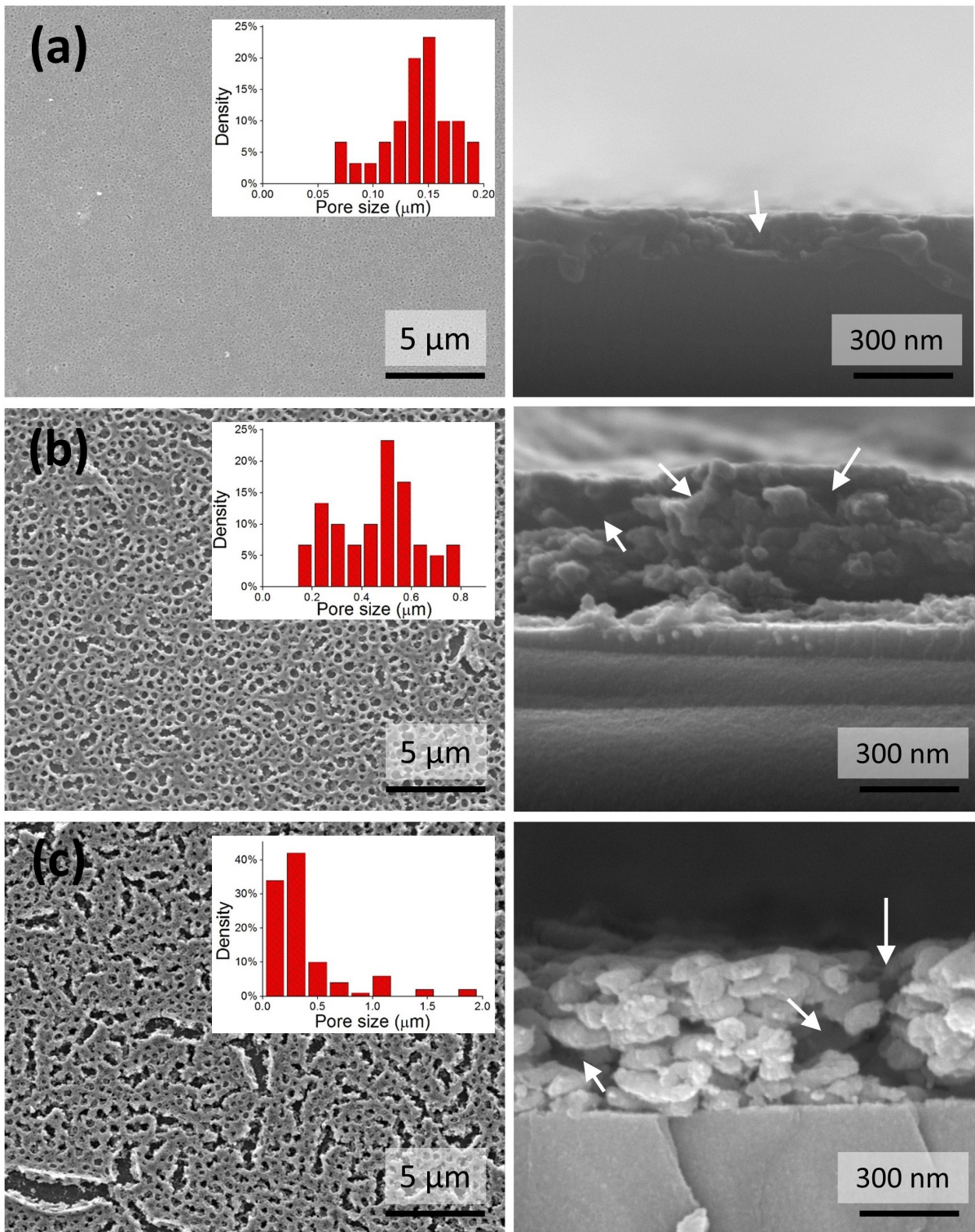


Fig. S3. SEM images showing the surface (left) and cross section view (right) of (a) 1PEG-0PVP-0F127, (b) 1PEG-1PVP-0F127 and (c) 1PEG-1PVP-1F127. Pore size distributions are shown in the insets and the presence of pores are indicated by the white arrows.

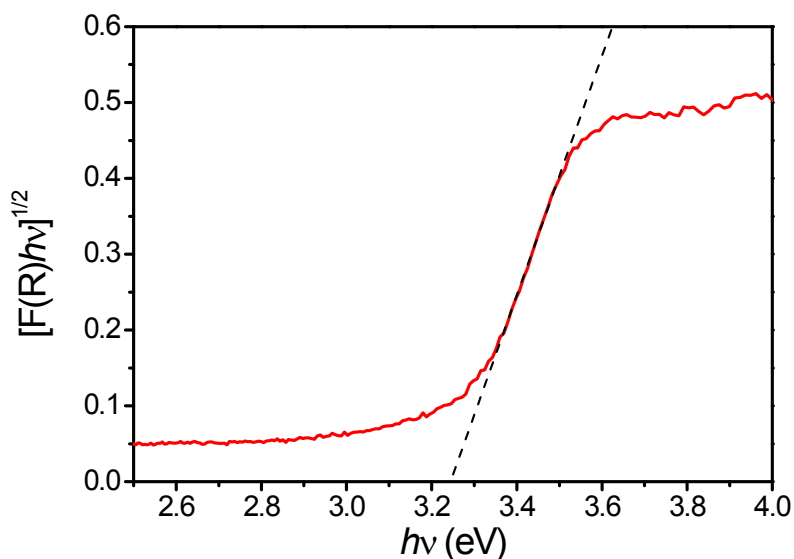


Fig. S4. Transformed Kubelka-Munk plot versus energy of the absorbed light ($h\nu$) for powder sample 1PEG-1PVP-1F127 as transformed from the UV-visible diffuse reflectance spectra. In this calculation, the titania material was assumed to be an indirect semiconductor.^{1,2} The value of the bandgap energy, $E_g \sim 3.22$ eV, was estimated by extrapolation of the fitted straight line tangential curve towards the x-axis.

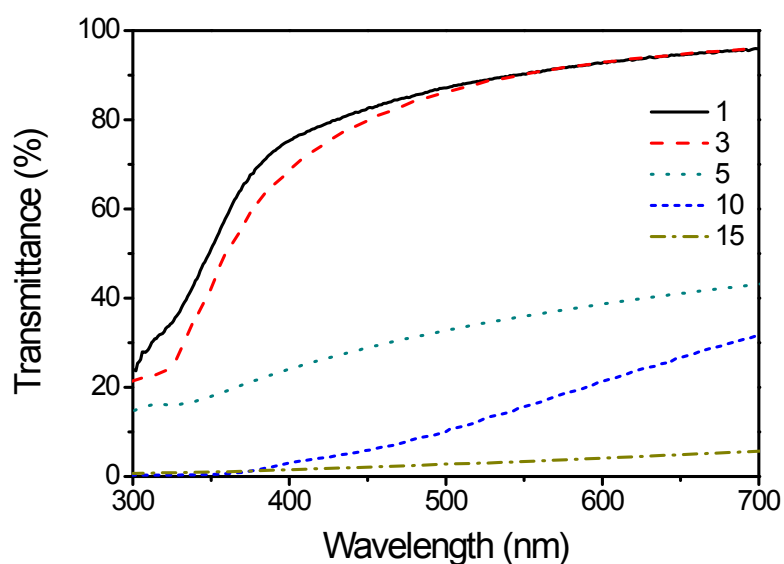


Fig. S5. UV/vis transmission spectra of P25 films prepared from P25 slurry spin-coated onto coverslips with 1, 3, 5, 10 or 15 coating cycles.

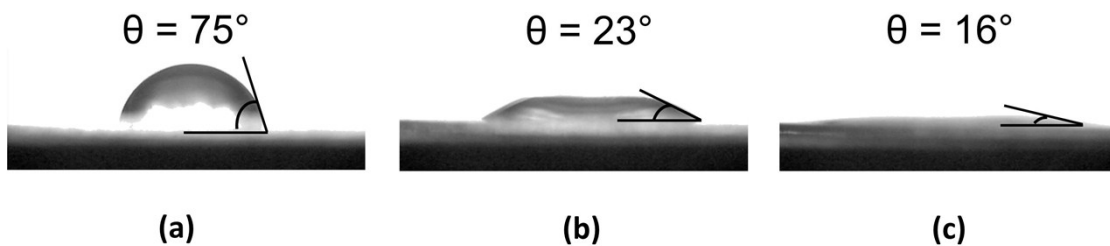


Fig. S6. Photographic images of water droplets 2 min after contact with the surface of the (a) blank coverslip, (b) control or 1PEG-0PVP-0F127 (the image is typical for both) and (c) 1PEG-1PVP-1F127.

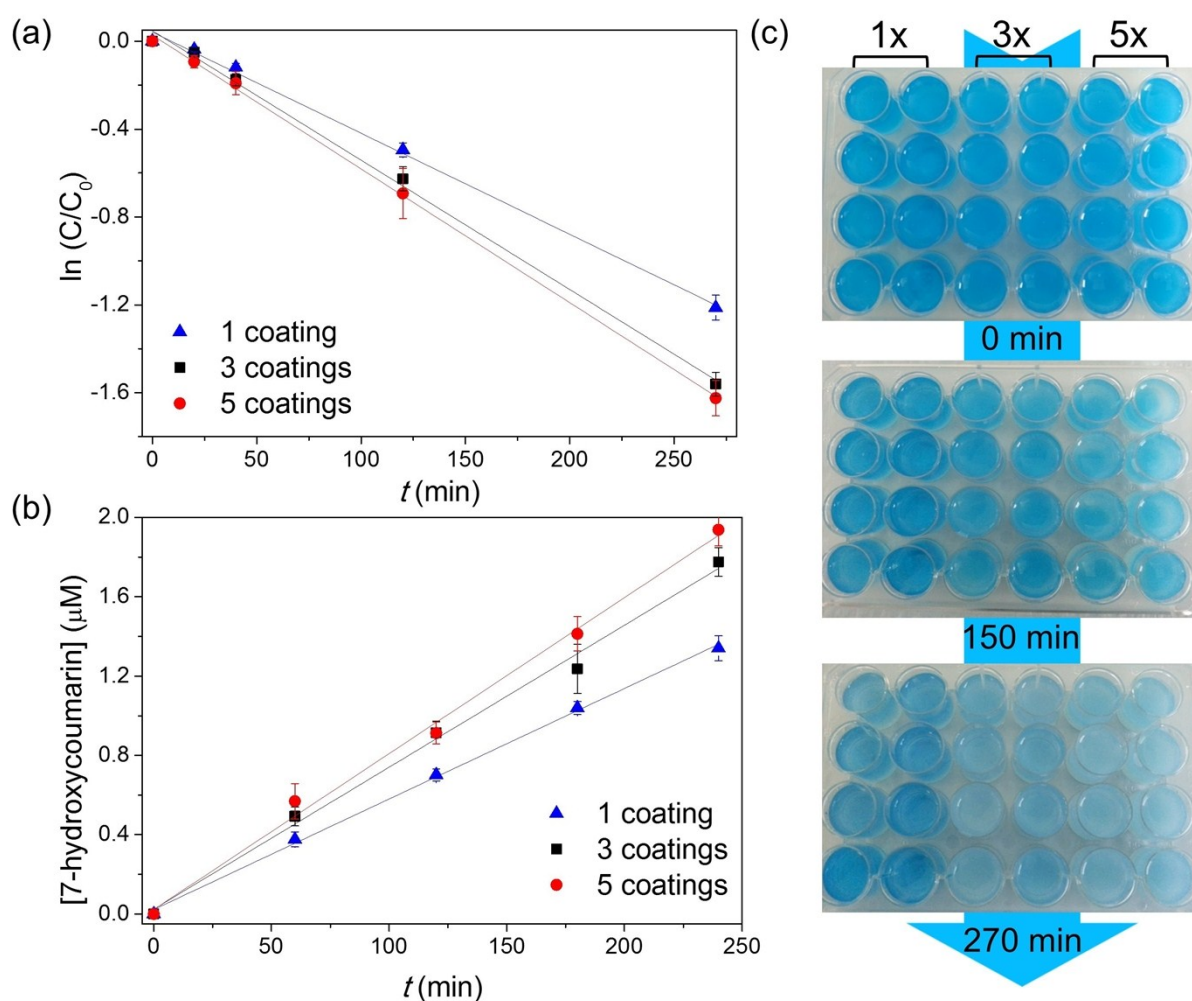


Fig. S7 Photocatalytic activity of P25 films with different numbers of coatings as shown by the (a) photodegradation of MB, (b) concentration of 7-hydroxycoumarin, and (c) photographs of MB decolouration following irradiation at certain time (the number of coatings is indicated at the top column of wells).

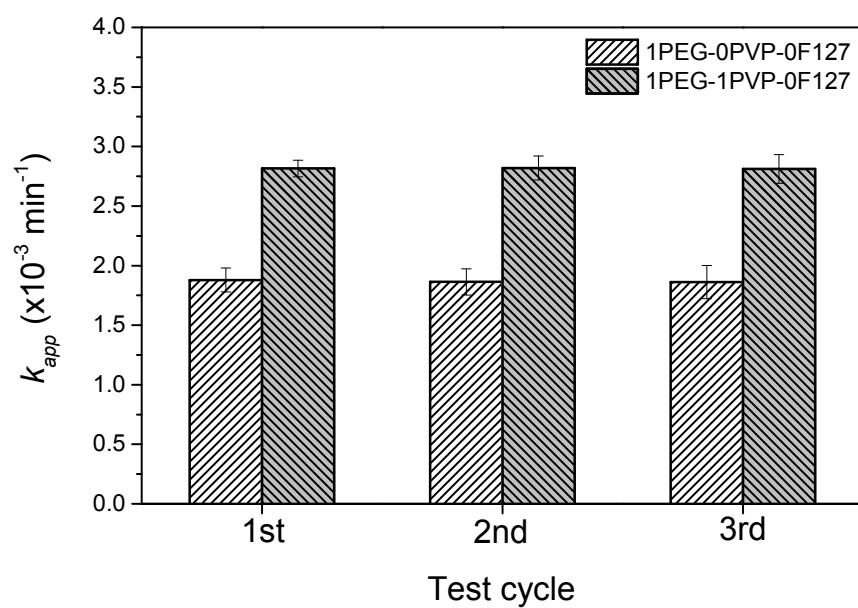


Fig. S8 Repeated MB photodegradation tests under UV light for 1PEG-0PVP-0F127 and 1PEG-1PVP-0F127.

References

1. B. Karvaly and I. Hevesi, *Naturforsch. Teil A*, 1971, **A 26**, 245.
2. J. Tauc, Grigorov.R and A. Vancu, *Phys. Status Solidi*, 1966, **15**, 627.