Applied Science

Article

Enhancing the Photocatalytic Activity of Immobilized TiO_2 Using Laser-Micropatterned Surfaces

Theodoros Giannakis [1,2], Sevasti-Kiriaki Zervou [3], Theodoros M. Triantis [3], Christophoros Christophoridis [3,4,*], Erasmia Bizani [4,5], Sergey V. Starinskiy [1], Panagiota Koralli [1], Georgios Mousdis [1], Anastasia Hiskia [3] and Maria Kandyla [1,*]

[1] Theoretical and Physical Chemistry Institute, National Hellenic Research Foundation, 48 Vasileos Constantinou Avenue, 11635 Athens, Greece; thgiannakis@eie.gr (T.G.); staris@eie.gr (S.S.); pkoralli@eie.gr (P.K.); gmousdis@eie.gr (G.M.)
[2] Department of Physics, National and Kapodistrian University of Athens, University Campus, Zografou, 15784 Athens, Greece
[3] Photo-Catalytic Processes and Environmental Chemistry Laboratory, Institute of Nanoscience and Nanotechnology, NCSR DEMOKRITOS, Neapoleos 27, Agia Paraskevi, 15341 Athens, Greece; s.zervou@inn.demokritos.gr (S.-K.Z.); t.triantis@inn.demokritos.gr (T.M.T.); a.hiskia@inn.demokritos.gr (A.H.)
[4] Greener than Green Technologies S.A., 13 Ilission St., Kifisia, 14564 Athens, Greece
[5] Analytical Chemistry Laboratory, Chemistry Department, National and Kapodistrian University, University Campus, Zografou, 15784 Athens, Greece; eribizani@chem.uoa.gr
* Correspondence: c.christoforidis@inn.demokritos.gr (C.C.); kandyla@eie.gr (M.K.)

Table S1. : MS/MS detection parameters of atrazine and its TPs, 2.4.6-trichlorophenol and bisphenol-a.

Compound	Precursor ion (*m*/*z*)	Product ion (*m*/*z*)	Collision energy (eV)
Atrazine	216.0 $[M+H]^+$	104.0	31
		174.0	17
Atrazine-d5 (IS)	221.1 $[M+H]^+$	179.0	17
2-hydroxy-4.6-diamino-s-triazine (OAAT)	128.0 $[M+H]^+$	62.0	30
		98.0	30
2-hydroxy-4-hydroxy-6-amino-s-triazine (OOAT)	129.0 $[M+H]^+$	86.0	30
		98.0	30
2.4.6-thihydroxy-s-triazine (OOOT)	130.0 $[M+H]^+$	69.0	30
		86.0	30
2-chloro-4.6-diamino-s-triazine (CAAT)	146.0 $[M+H]^+$	68.0	30
		104.0	30
2-chloro-4-amino-6-(ethylamino)-s-triazine (CAET)	174.0 $[M+H]^+$	104.0	31
		132.0	17
2-chloro-4-(isopropylamino)-6-amino-s-triazine (CIAT)	188.0 $[M+H]^+$	104.0	25
		146.0	15
2-hydroxy-4-(isopropylamino)-6-(ethylamino)-s-triazine (OIET)	198.0 $[M+H]^+$	86.0	24
		114.0	22
2.4.6-Trichlorophenol	196.9 $[M-H]^-$	161.0	25
Bisphenol-a	227.0 $[M-H]^-$	93.0	44
		133.1	31
		211.1	34
		212.1	20

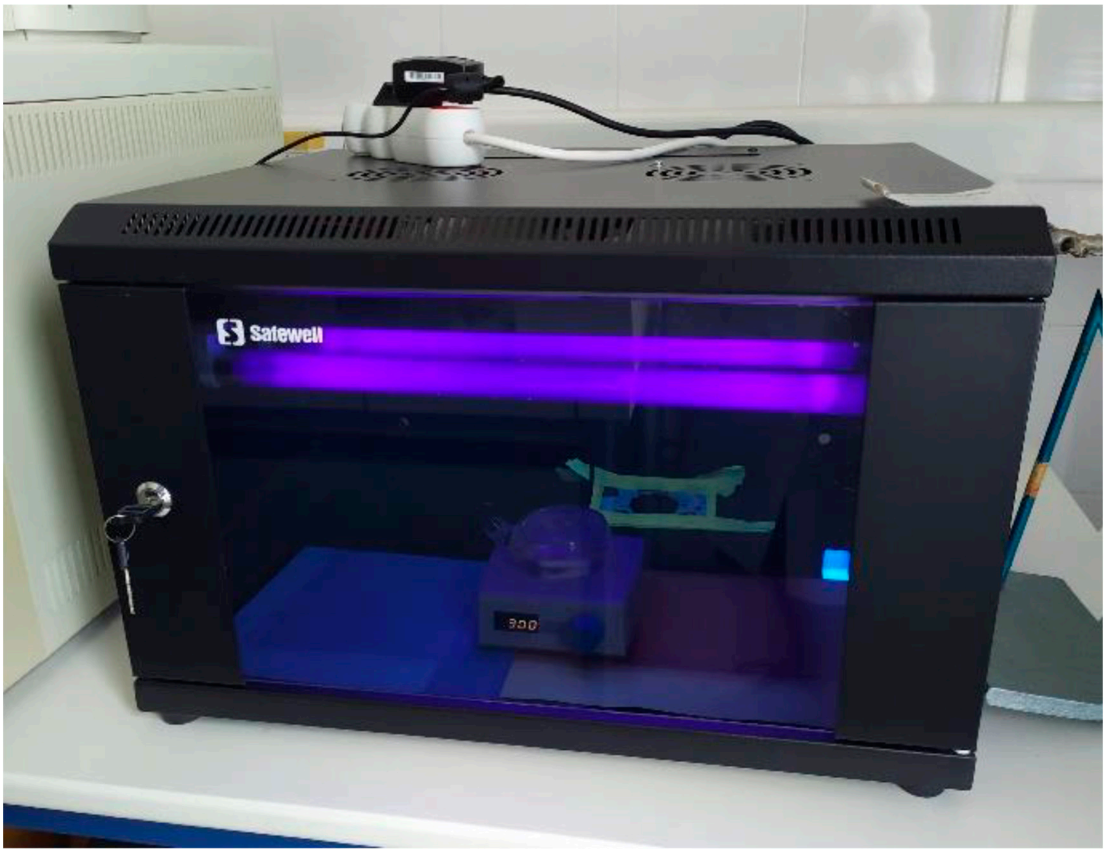

Figure S1. Illumination box equipped with UVA lamps.

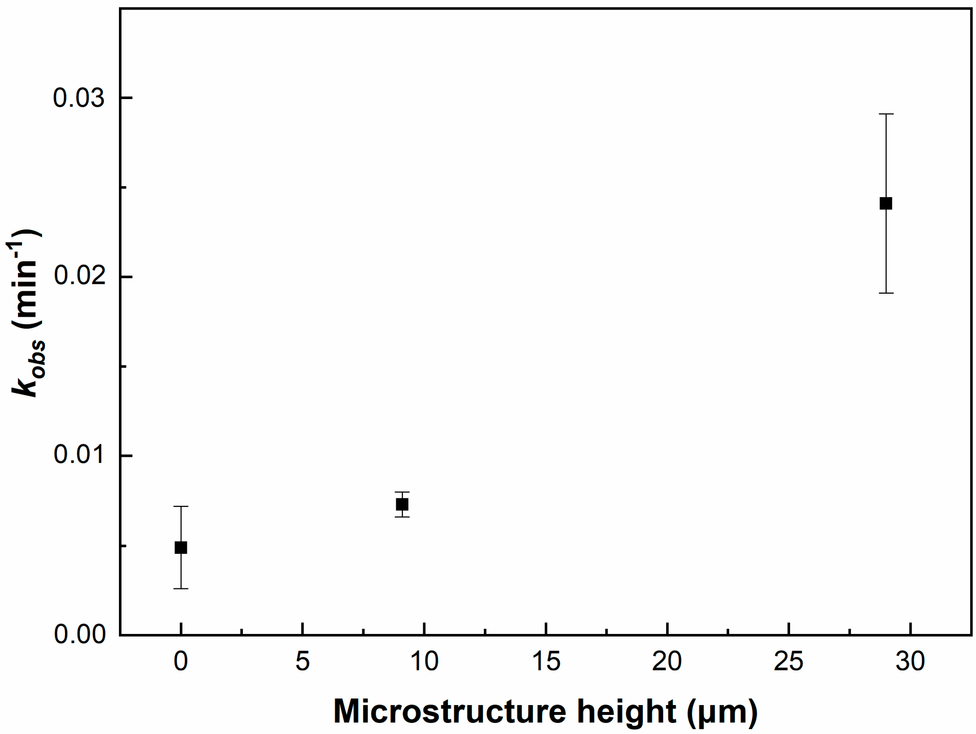

Figure S2. Dependence of photocatalytic rate constant on substrate microstructure size.

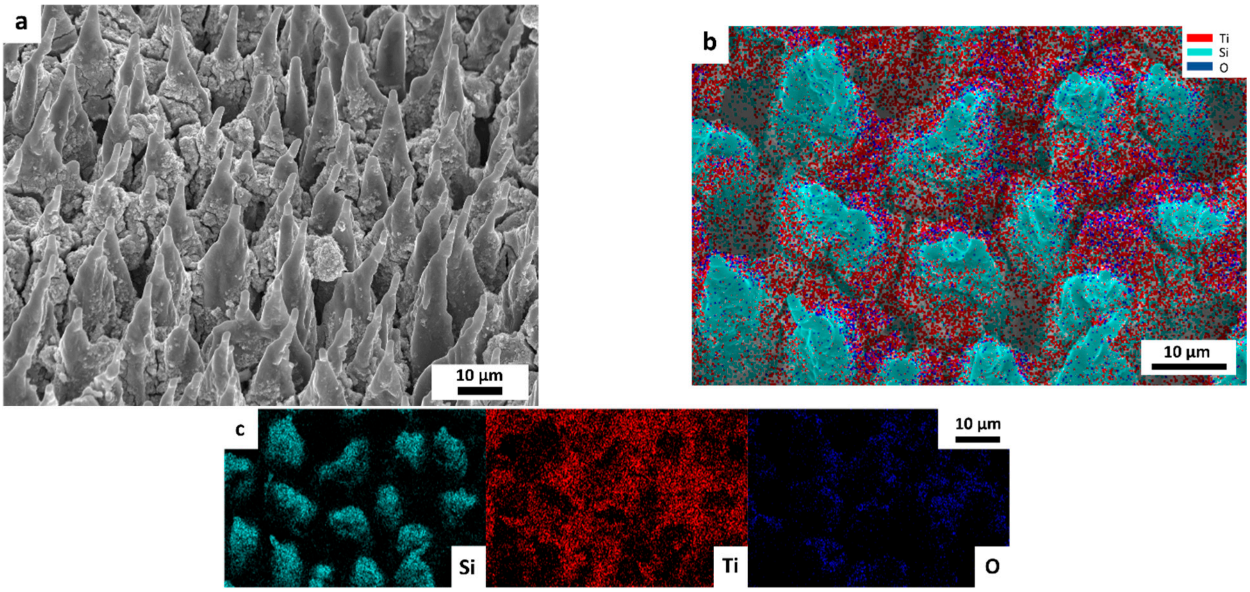

Figure S3. (a) SEM image at side (45°) view and (b) layered EDX image of TiO_2 + Degussa film on silicon microcones. (c) Mapping distribution of elements.

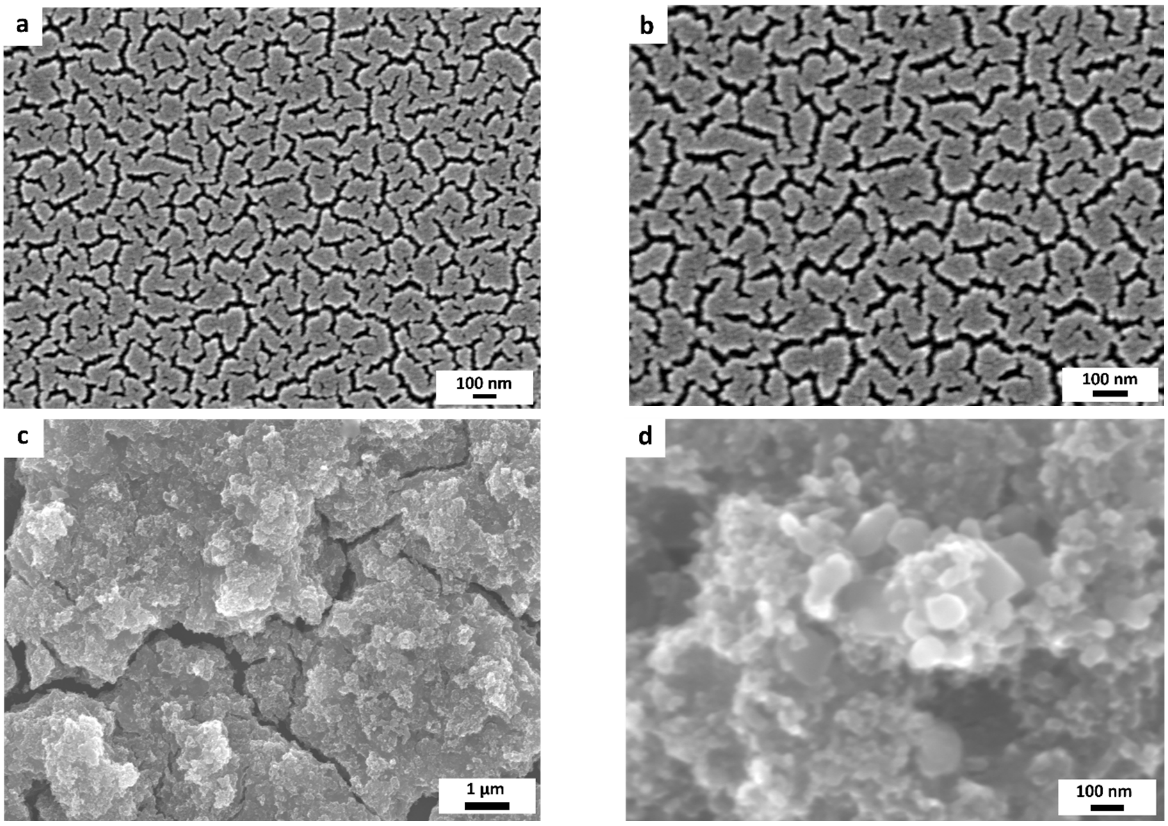

Figure S4. SEM images of (a),(b) TiO_2 and (c),(d) TiO_2 + Degussa thin films on flat silicon substrates after photocatalysis experiments.

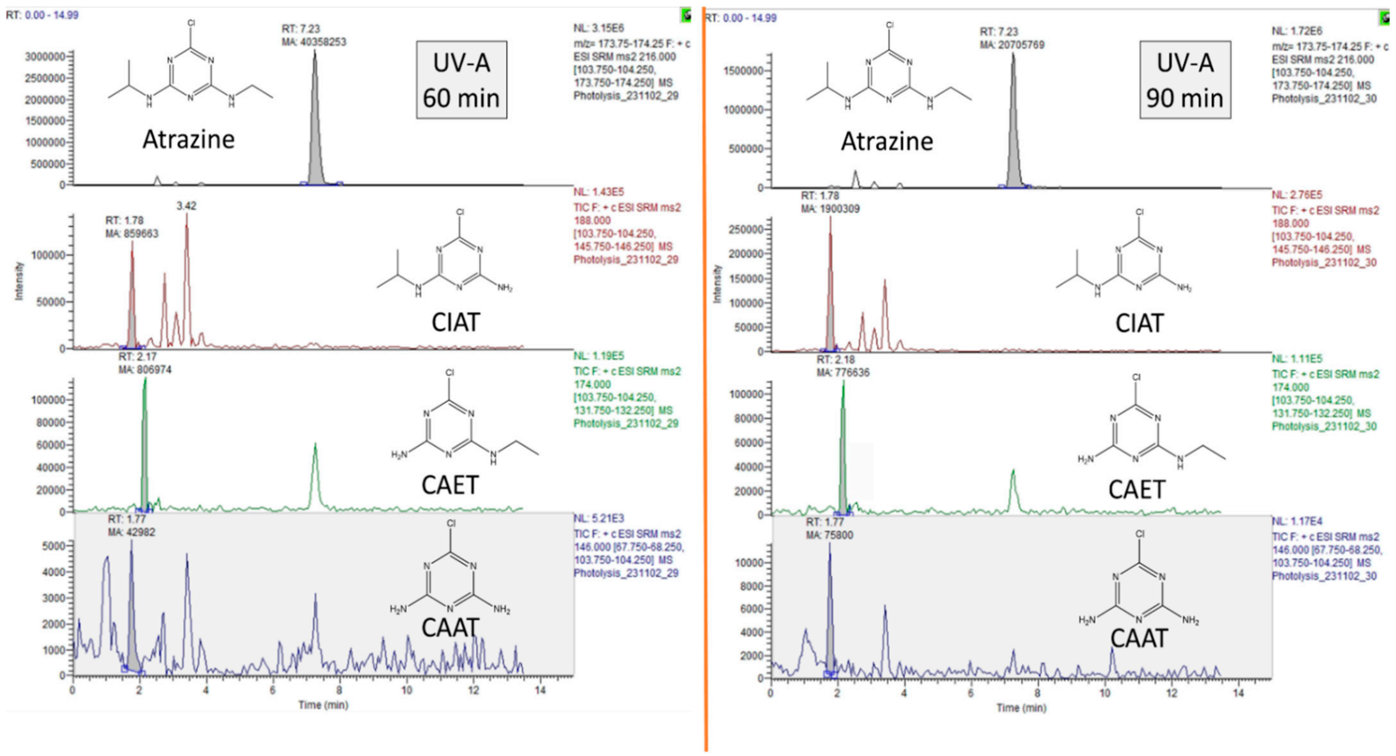

Figure S5. MRM chromatograms of atrazine and its transformation products that formed during the photocatalysis under UV-A irradiation (λmax = 365 nm) at 60 and 90 min, in the presence of M-Si-solgel photocatalytic surface.

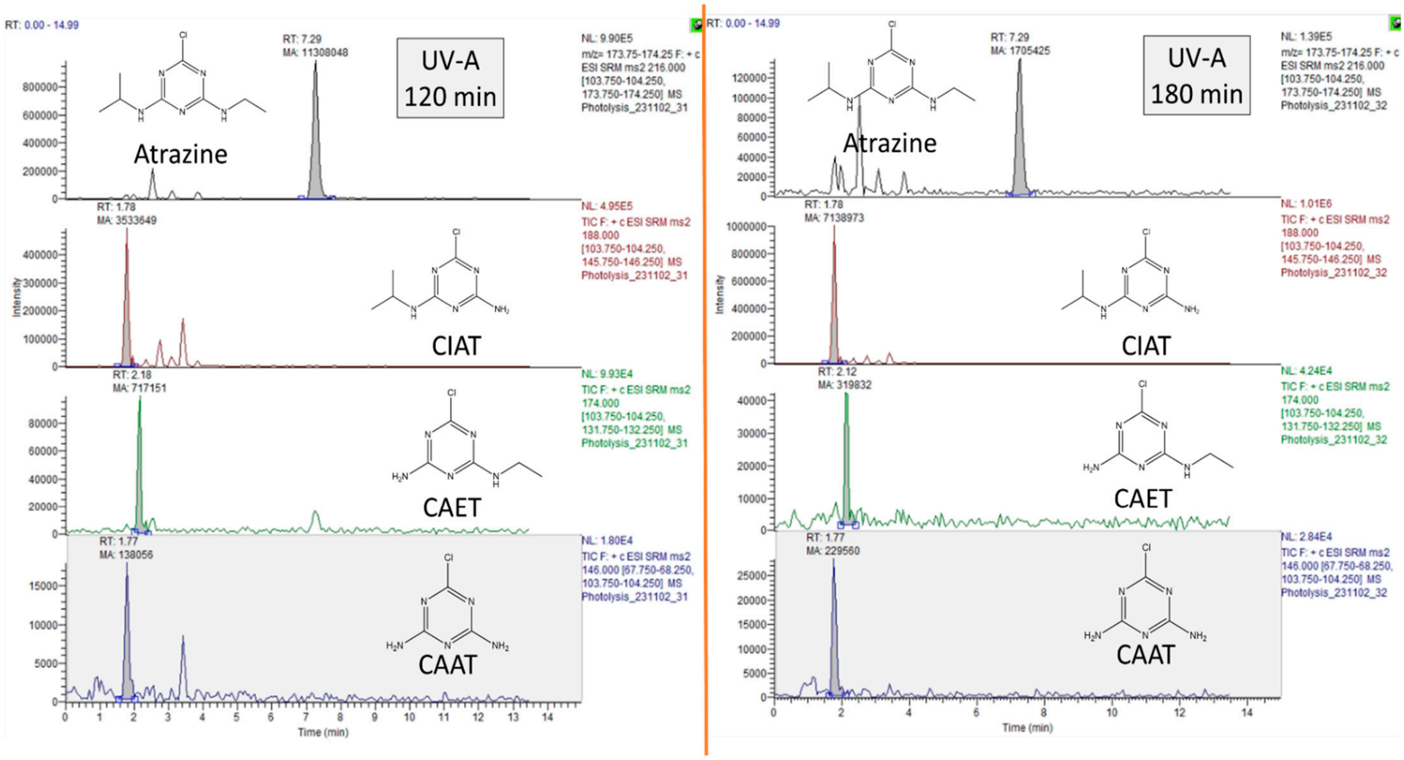

Figure S6. MRM chromatograms of atrazine and its transformation products that formed during the photocatalysis under UV-A irradiation (λmax = 365 nm) at 120 and 180 min, in the presence of M-Si-solgel photocatalytic surface.

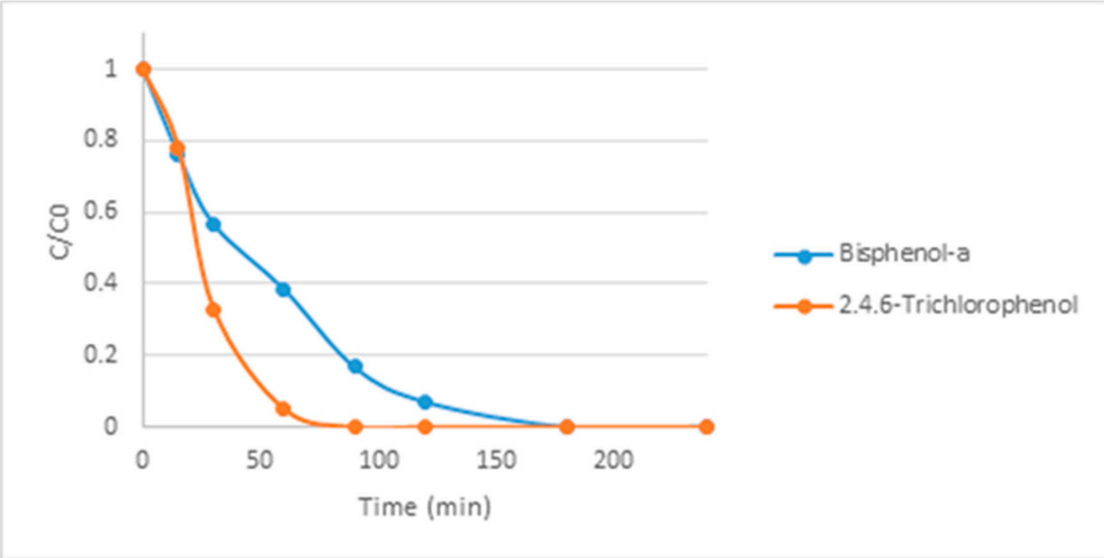

Figure S7. Photocatalytic degradation of bisphenol-a (C_o=0.131 μmol/L) and 2,4,6-triclorophenol (C_o=0.152 μmol/L) under UV-A irradiation using the photocatalytic surface M-Si-solgel.