

Supporting information on:

Cooperative assembly synthesis of mesoporous SrTiO₃ with enhanced photocatalytic properties

*Buğra E. Kayaalp¹, Young Joo Lee¹, Andreas Kornowski², Silvia Gross^{3,4}, Massimiliano
D'Arienzo⁵ and Simone Mascotto^{1*}*

¹Institut für Anorganische und Angewandte Chemie, Universität Hamburg, Martin-Luther-King
Platz 6, D-20146 Hamburg, Germany

²Institut für Physikalische Chemie, Universität Hamburg, Grindelallee 117, D-20146 Hamburg,
Germany

³Dipartimento di Scienze Chimiche, Università degli Studi di Padova, via Marzolo, 1, I-35131,
Padova, Italy

⁴Istituto per l'Energetica e le Interfasi, IENI-CNR and INSTM, UdR Padova, via Marzolo, 1, I-
35131, Padova, Italy

⁵Dipartimento di Scienza dei Materiali, INSTM, Università di Milano-Bicocca, via R.Cozzi, 55,
I-20125, Milano, Italy

AUTHOR INFORMATION

Corresponding Author

* simone.mascotto@chemie.uni-hamburg.de

UV lamp specifications

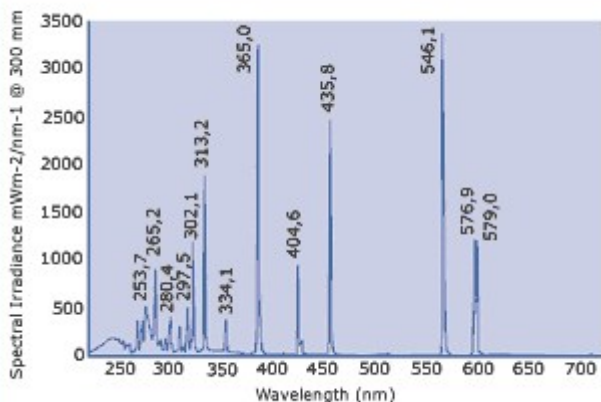


Figure S1: Spectral irradiance of the high pressure HPK 125 W (msscientific Chromatographie-Handel GmbH) mercury lamp used.

The lamp provides maximum energy at 365 nm, with substantial radiation also at 435, 313, 253 and 404 nm. In addition, there is a continuum from 200 to 600 nm, peaking at 260 nm with approximately 20 % of the maximum energy measured in the line spectrum.

Figure S1 depicts the spectral irradiance of the source at 30 cm distance from the surface. Hence, an effective irradiance of ca. 30 Wm⁻²nm⁻¹ at the surface of the photocatalytic reactor was calculated, taking 365 nm as the highest lamp emission wavelength as reference and considering the source-to-reactor distance of 10 cm.

Calculation of the band gap of the materials

Table S1: Linearization parameters of the fits in the Tauc plots

Sample	Adj. R-Square	Pearson's r	Intercept	Slope	E_g
no template	0.9995	0.9998	-10.140	3.166	3.20
10 : 1	0.9997	0.9998	-15.648	4.830	3.24
5 : 1	0.9997	0.9999	-13.751	4.243	3.24
2 : 1	0.9999	0.9995	-16.413	5.024	3.27
1 : 1	0.9999	0.9999	-12.604	3.854	3.27
np_SrTiO ₃	0.9994	0.9997	-10.966	3.313	3.31

Photocatalytic dye degradation

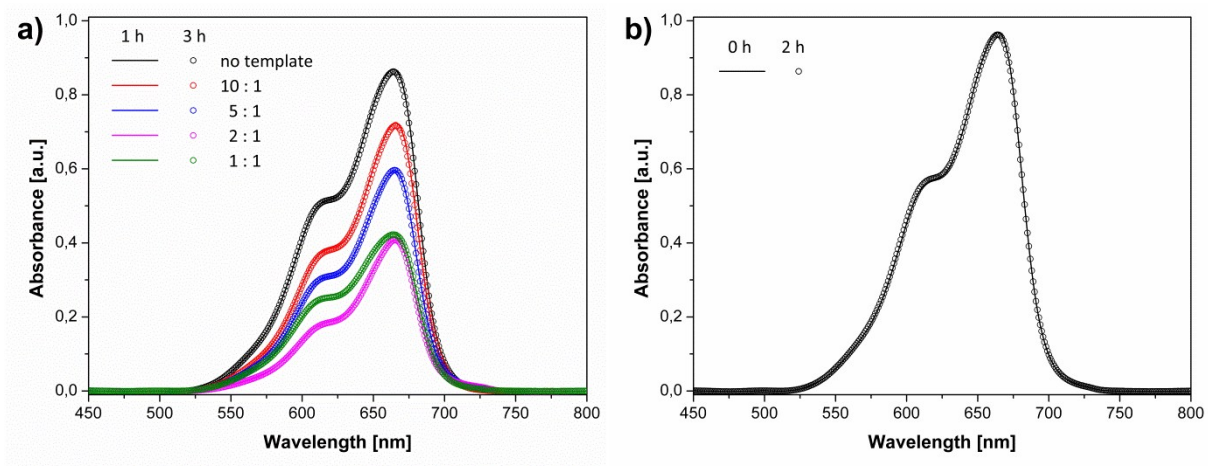


Figure S2: Dark stirring plots of the dye solution with catalyst at different adsorption times (a); Plots of the dye solution without catalyst at different irradiation times (b).

The dark stirring plots demonstrate that dye adsorption reached saturation after 1 hour (Figure S2a). Moreover, no spontaneous degradation of the dye occurs after 2 hours of UV irradiation (Figure S2b), meaning that the conversion in presence of SrTiO₃ is a pure catalytic effect.

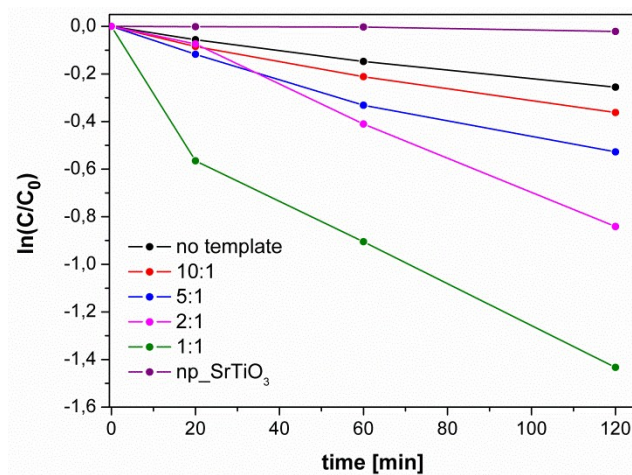


Figure S3: Plots of $\ln(C/C_0)$ calculated from the experimental dye concentration vs. time