- # Supplementary Material (ESI) for Chemical Communications
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Supporting Information

MS "Aluminium(III) adsorption: a soft and simple method to prevent TiO_2 deactivation during salicylic acid photodegradation"

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Experimental Section

Procedure for the extraction of the poisoning substances

Poisoning substances were deposited on bare TiO₂ during salicylic acid photodegradation ($[SA]_0 = 1.0 \cdot 10^{-3} \text{ M}$, pH₀ = 3.0). The deactivated TiO₂ catalyst was filtered after 2 hours of irradiation, washed gently with water, and then added to an NaOH aqueous solution at pH = 9.0. The obtained basic suspension was sonicated for 10 minutes. Next, the catalyst was separated from the resulting yellowish liquid phase by filtration. The filtrated aqueous solution was acidified to pH=2.0 by adding diluted aqueous HCl solution. After this, water was evaporated at room temperature under air/N₂ flow. 10 mL of methanol were used to solve the solid residue and the unsolved NaCl was separated by filtration. This last step was repeated one more time. The organic solvent was obtained.

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a)



Fig. S1. a)Time course of the remaining concentration of salicylic acid (SA) as well as the generated intermediates during UV-illumination of an aqueous solution of SA ($[SA]_0=2.50\cdot10^{-4}$ M) in the presence of TiO₂ (1.5 g L⁻¹); pH₀=3.0; T=25.0°C. b) The same that in a) but with previous adsorption of Al(III). In both cases the lines are intended as visual guides. Note the two different concentration scales used for SA and detected intermediates.

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Fig. S2. ¹H-NMR spectrum of the species extracted from deactivated TiO_2 . Solvent: D_2O . Signals corresponding to the –CH and –CH₂ groups of the 1,3-dioxanol ring related structure.

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Fig. S3. ¹³C- NMR and DEPT-135 of the species extracted from deactivated TiO₂. Solvent: D₂O. Signals corresponding to the -CH and $-CH_2$ groups of the 1,3-dioxanol ring related structure observed in the ¹H-NMR.

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Fig. S4. ESI-MS spectrum of the species extracted from deactivated TiO₂. Note that to obtain the mass of the organic fragments the atomic mass of sodium must be substracted.

Acquisition Paramaters

Instrument: esquire3000 (BRUKER) Ion polarity: Positive Ion source typer: ESI Dry Temp (Set): 300 °C HV Capillary: 3700 V # Supplementary Material (ESI) for Chemical Communications # This journal is © The Royal Society of Chemistry 2005



Fig S5. ATR-FTIR spectra of salycic acid adsorbed on bare TiO₂ and on TiO₂ modified by adsorbed Al(III) $(TiO_2/Al).$