

Supporting Information

Controlled Multistep Oxidation of Alcohols and Aldehydes to Carboxylic Acids using Air, Sunlight and a Robust Metalloporphyrin Sensitizer with a pH-switchable Photoreactivity**

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Table S1. Effect of solvent composition on the photo-oxidation of benzaldehyde by $[\text{Sb}(\text{tpp})(\text{OH})_2]^+$ (**1**)^[a]

Entry	Solvent	Conversion into benzoic acid [%]
1	H ₂ O/ Acetonitrile (1:1 v/v)	62
2	H ₂ O/ Acetonitrile (1:3 v/v)	63 ^[b]
3	H ₂ O/ Acetonitrile (3:1 v/v)	47
4	Acetonitrile	55 ^[b]
5	H ₂ O	trace
6	NaN ₃ / H ₂ O / Acetonitrile	trace

[a] 7.8×10^{-7} mol $[\text{Sb}(\text{tpp})(\text{OH})_2]^+$ and 1×10^{-3} mol benzaldehyde after 24 h in 12ml of solvent in the presence of air and light (35000 lx, solar simulator). [b] There are traces of benzene in the product under these conditions.

Table S2. Effect of sensitizer on the photo-oxidation of benzaldehyde ^[a]

Entry	sensitizer	Conversion into benzoic acid [%]
1	Sb(TPP)(OH) ₂ ⁺	48
2	Rose bengal	34
3	Methylene blue	33
4	-	trace

[a] 7.8×10^{-7} mol of sensitizer and 1×10^{-3} mol benzaldehyde after 15 h in 10ml of H₂O/Acetonitrile (1:1 v/v) in the presence of air and light (35000 lx, solar simulator)

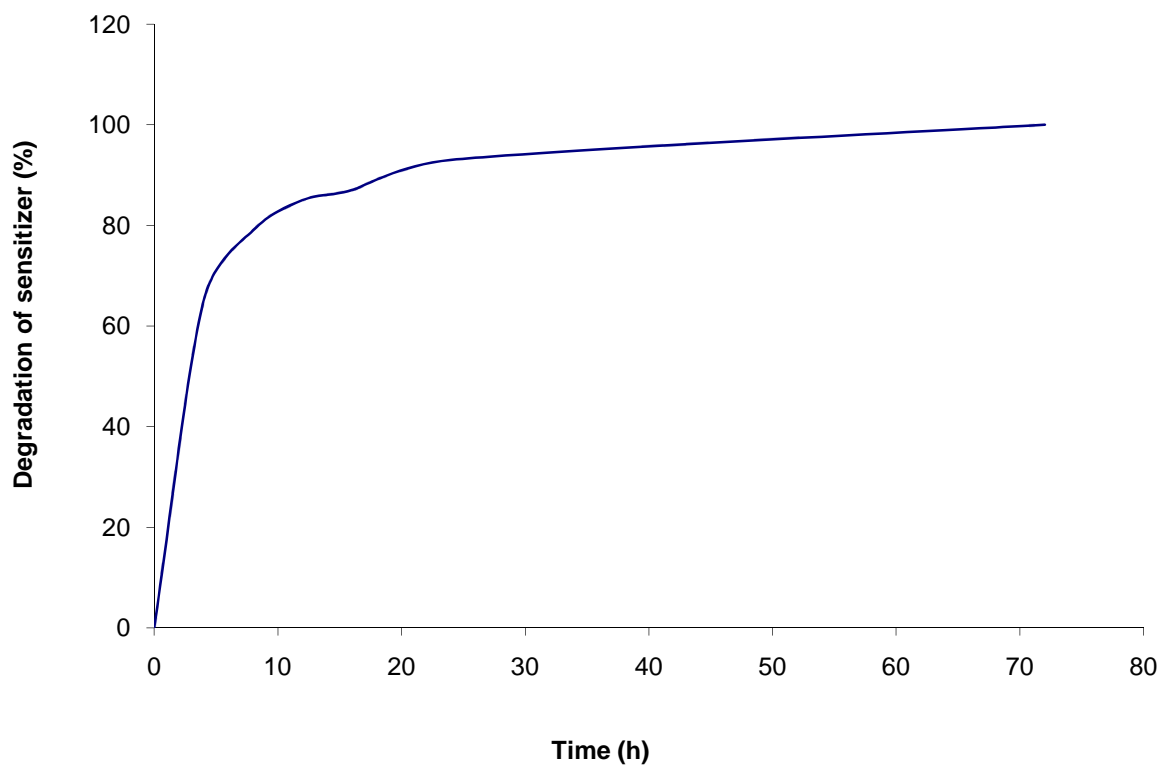


Figure S1. Degradation of $[\text{Sb}(\text{tpp})(\text{OH})_2]^+$ (**1**) versus time of irradiation in $\text{H}_2\text{O}/\text{acetonitrile}$ (1:1 v/v) in the course of the photo-oxygenation of benzaldehyde in the presence of air and light (35000 lx, solar simulator)

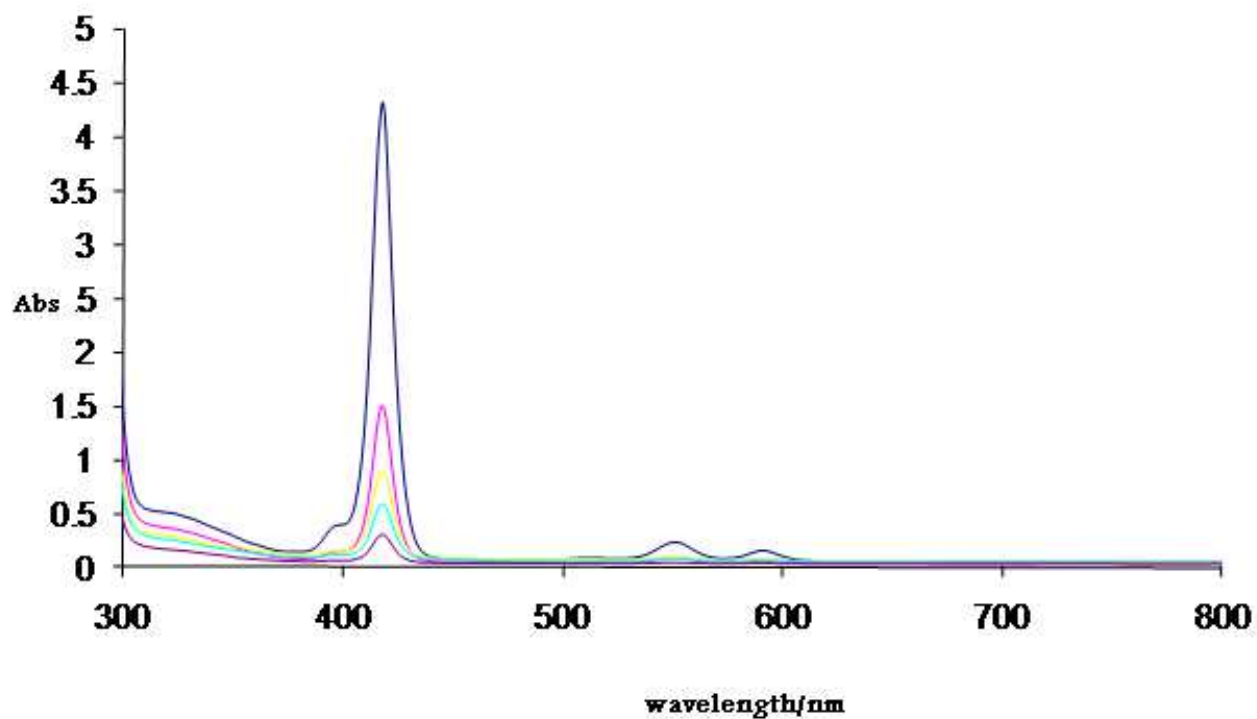


Figure S2. Bleaching of the absorption spectrum of [Sb(tpp)(OH)₂]⁺ (1) in the presence of light (35000 lx, solar simulator) after 0, 4, 8, 12, 16 and 24 h reaction times of ¹O₂ generation and photo-oxidation of benzaldehyde to benzoic acid.

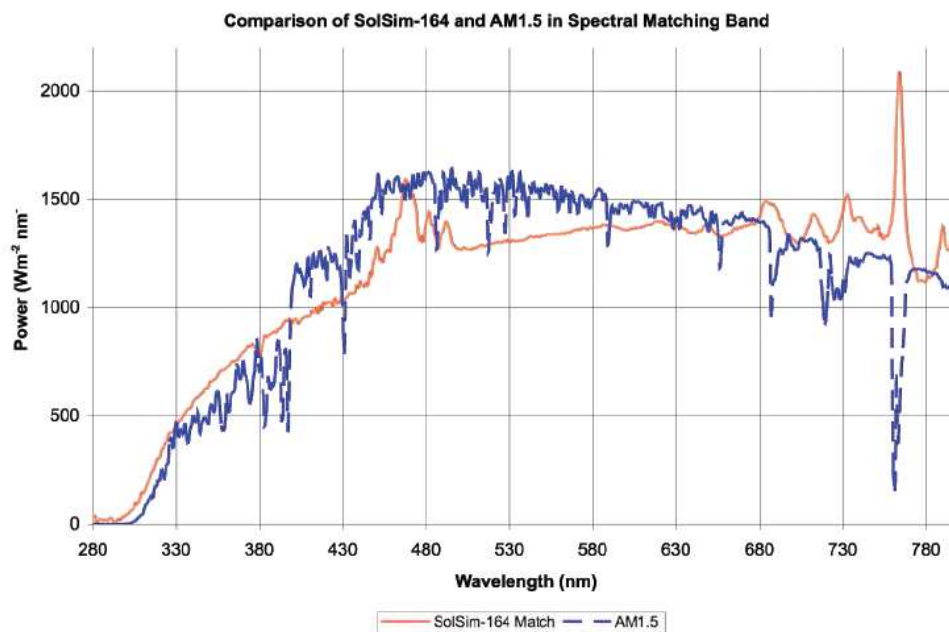


Figure S3. Comparison of the spectral power distribution of the solar simulator used (Luzchem photoreactor SolSim 164) and AM 1.5 sunlight exposure conditions.