

Supporting information

Uptake of m-xylene and VOCs emission by mineral photocatalytic paints of indoor air building interest

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Table S1: Surface emission fluxes (molecules cm⁻² s⁻¹) of selected VOCs under UV irradiation for reference paint. The standard deviation (s.d) was calculated using twenty experimental data points.

Compounds	0 hour	s.d 0 hour	500 hours	s.d 500 hours	1000 hours	s.d 1000 hours
Formaldehyde	9.49·10 ⁹	9.70·10 ⁸	1.04·10 ¹⁰	7.76·10 ⁸	1.09·10 ¹⁰	8.31·10 ⁸
Methanol	4.26·10 ¹⁰	1.40·10 ⁹	2.48·10 ¹⁰	7.44·10 ⁸	2.53·10 ¹⁰	1.21·10 ⁹
Acetaldehyde	4.92·10 ⁹	3.02·10 ⁸	6.52·10 ⁹	2.60·10 ⁸	8.63·10 ⁹	2.93·10 ⁸
Formic Acid	1.04·10 ¹⁰	3.51·10 ⁸	1.50·10 ¹⁰	5.12·10 ⁸	1.49·10 ¹⁰	8.14·10 ⁸
Acrolein	6.82·10 ⁹	3.97·10 ⁸	6.14·10 ⁹	4.05·10 ⁸	6.07·10 ⁹	6.88·10 ⁸
Acetone + Propanal	1.04·10 ⁹	6.86·10 ⁷	2.34·10 ⁹	1.11·10 ⁸	2.99·10 ⁹	1.56·10 ⁸
Acetic Acid	4.05·10 ¹⁰	1.64·10 ⁹	4.58·10 ¹⁰	1.30·10 ⁹	2.42·10 ¹⁰	6.59·10 ⁸
MVK	4.14·10 ⁸	8.23·10 ⁷	5.90·10 ⁸	7.07·10 ⁷	4.65·10 ⁸	6.36·10 ⁷
Acrylic Acid	9.41·10 ⁸	1.07·10 ⁸	1.65·10 ⁹	1.58·10 ⁸	1.85·10 ⁹	2.45·10 ⁸
Propionic Acid	7.49·10 ⁹	5.45·10 ⁸	1.89·10 ⁹	1.69·10 ⁸	1.82·10 ⁹	1.39·10 ⁸
Benzene	5.40·10 ⁸	1.11·10 ⁸	7.71·10 ⁸	8.94·10 ⁷	4.65·10 ⁸	1.15·10 ⁸
Pentanal + Vinyl Acetate	1.73·10 ⁸	3.15·10 ⁷	3.00·10 ⁸	5.62·10 ⁷	3.12·10 ⁸	5.97·10 ⁷
Butanoic Acid	7.96·10 ⁸	1.02·10 ⁸	9.73·10 ⁸	9.80·10 ⁷	5.02·10 ⁸	6.11·10 ⁷
TMB + Ethyltoluene	2.77·10 ⁸	7.77·10 ⁷	4.94·10 ⁸	9.80·10 ⁷	5.35·10 ⁸	7.79·10 ⁷
Benzoic Acid	6.43·10 ⁷	3.54·10 ⁷	9.84·10 ⁷	3.73·10 ⁷	1.29·10 ⁸	2.89·10 ⁷
Octanal	8.53·10 ⁷	3.17·10 ⁷	1.80·10 ⁸	3.96·10 ⁷	2.78·10 ⁸	6.09·10 ⁷

Table S2: Surface emission fluxes (molecules cm⁻² s⁻¹) of selected VOCs under UV irradiation for paint nanoTiO₂. The standard deviation (s.d) was calculated from twenty points of the experiment.

Compounds	0 hour	s.d 0 hour	500 hours	s.d 500 hours	1000 hours	s.d 1000 hours
Formaldehyde	1.15·10 ¹⁰	8.05·10 ⁸	5.64·10 ¹⁰	2.62·10 ⁹	5.29·10 ¹⁰	2.01·10 ⁹
Methanol	4.19·10 ¹⁰	1.65·10 ⁹	4.11·10 ¹⁰	1.36·10 ⁹	3.51·10 ¹⁰	1.43·10 ⁹
Acetaldehyde	6.86·10 ⁹	3.24·10 ⁸	4.52·10 ¹⁰	1.09·10 ⁹	5.28·10 ¹⁰	1.30·10 ⁹
Formic Acid	1.03·10 ¹⁰	5.27·10 ⁸	2.05·10 ¹⁰	7.30·10 ⁸	1.95·10 ¹⁰	7.46·10 ⁸
Acrolein	6.56·10 ⁹	5.37·10 ⁸	1.05·10 ¹⁰	3.88·10 ⁸	8.82·10 ⁹	4.30·10 ⁸
Acetone + Propanal	1.34·10 ⁹	1.10·10 ⁸	6.62·10 ⁹	2.63·10 ⁸	4.57·10 ⁹	2.15·10 ⁸
Acetic Acid	5.07·10 ¹⁰	3.70·10 ⁹	7.54·10 ¹⁰	1.74·10 ⁹	3.99·10 ¹⁰	1.06·10 ⁹
MVK	4.44·10 ⁸	9.71·10 ⁷	1.47·10 ⁹	1.19·10 ⁸	1.16·10 ⁹	1.87·10 ⁸
Acrylic Acid	1.13·10 ⁹	1.53·10 ⁸	5.81·10 ⁹	4.10·10 ⁸	3.37·10 ⁹	2.07·10 ⁸
Propionic Acid	9.07·10 ⁹	6.09·10 ⁸	9.19·10 ⁹	5.94·10 ⁸	9.01·10 ⁹	7.65·10 ⁸
Benzene	7.40·10 ⁸	1.33·10 ⁸	1.28·10 ⁹	1.67·10 ⁸	8.93·10 ⁸	1.68·10 ⁸
Pentanal + Vinyl Acetate	1.87·10 ⁸	4.50·10 ⁷	1.41·10 ⁹	1.11·10 ⁸	8.91·10 ⁸	1.11·10 ⁸
Butanoic Acid	8.42·10 ⁸	1.22·10 ⁸	1.90·10 ⁹	1.73·10 ⁸	7.38·10 ⁸	8.07·10 ⁷
TMB + Ethyltoluene	2.87·10 ⁸	7.84·10 ⁷	8.09·10 ⁸	1.48·10 ⁸	6.30·10 ⁸	1.45·10 ⁸
Benzoic Acid	4.64·10 ⁷	1.37·10 ⁷	1.73·10 ⁸	4.79·10 ⁷	1.42·10 ⁸	4.73·10 ⁷
Octanal	1.19·10 ⁸	4.39·10 ⁷	9.44·10 ⁸	1.63·10 ⁸	1.30·10 ⁹	1.69·10 ⁸

Table S3: Surface emission fluxes (molecules cm⁻² s⁻¹) of selected VOCs under UV irradiation for paint PEG 3350. The standard deviation (s.d) was calculated using twenty experimental data points.

Compounds	0 hour	s.d 0 hour	500 hours	s.d 500 hours	1000 hours	s.d 1000 hours
Formaldehyde	9.61·10 ⁹	8.08·10 ⁸	4.46·10 ¹⁰	1.73·10 ⁹	4.73·10 ¹⁰	2.44·10 ⁹
Methanol	4.37·10 ¹⁰	1.06·10 ⁹	2.99·10 ¹⁰	1.32·10 ⁹	3.73·10 ¹⁰	1.37·10 ⁹
Acetaldehyde	5.80·10 ⁹	3.05·10 ⁸	2.80·10 ¹⁰	9.20·10 ⁸	4.95·10 ¹⁰	1.94·10 ⁹
Formic Acid	1.08·10 ¹⁰	4.43·10 ⁸	1.41·10 ¹⁰	5.63·10 ⁸	1.83·10 ¹⁰	4.99·10 ⁸
Acrolein	6.49·10 ⁹	4.04·10 ⁸	6.90·10 ⁹	4.57·10 ⁸	9.33·10 ⁹	4.42·10 ⁸
Acetone + Propanal	1.25·10 ⁹	8.68·10 ⁷	5.78·10 ⁹	2.45·10 ⁸	3.17·10 ⁹	1.72·10 ⁸
Acetic Acid	5.93·10 ¹⁰	1.66·10 ⁹	5.50·10 ¹⁰	1.36·10 ⁹	4.45·10 ¹⁰	1.15·10 ⁹
MVK	4.95·10 ⁸	8.04·10 ⁷	1.08·10 ⁹	1.27·10 ⁸	1.34·10 ⁹	1.72·10 ⁸
Acrylic Acid	1.14·10 ⁹	1.71·10 ⁸	3.78·10 ⁹	2.80·10 ⁸	3.34·10 ⁹	2.87·10 ⁸
Propionic Acid	8.12·10 ⁹	3.31·10 ⁸	6.01·10 ⁹	3.70·10 ⁸	1.80·10 ¹⁰	1.53·10 ⁹
Benzene	8.26·10 ⁸	7.39·10 ⁷	1.02·10 ⁹	1.29·10 ⁸	1.00·10 ⁹	1.35·10 ⁸
Pentanal + Vinyl Acetate	1.80·10 ⁸	4.50·10 ⁷	8.16·10 ⁸	8.54·10 ⁷	7.54·10 ⁸	7.75·10 ⁷
Butanoic Acid	7.97·10 ⁸	9.51·10 ⁷	1.26·10 ⁹	1.29·10 ⁸	7.24·10 ⁸	1.22·10 ⁸
TMB + Ethyltoluene	2.95·10 ⁸	7.94·10 ⁷	6.68·10 ⁸	1.21·10 ⁸	5.60·10 ⁸	1.18·10 ⁸
Benzoic Acid	3.82·10 ⁷	1.95·10 ⁷	1.09·10 ⁸	2.61·10 ⁸	1.24·10 ⁸	3.86·10 ⁷
Octanal	1.11·10 ⁸	4.41·10 ⁷	6.64·10 ⁸	1.30·10 ⁸	1.23·10 ⁹	1.72·10 ⁸

Table S4: Surface emission fluxes (molecules cm⁻² s⁻¹) of selected VOCs under UV irradiation for paint CNC. The standard deviation (s.d) was calculated using twenty experimental data points.

Compounds	0 hour	s.d 0 hour	500 hours	s.d 500 hours	1000 hours	s.d 1000 hours
Formaldehyde	8.81·10 ⁹	8.18·10 ⁸	1.09·10 ¹⁰	8.23·10 ⁸	1.18·10 ¹⁰	1.15·10 ⁹
Methanol	5.93·10 ¹⁰	2.65·10 ⁹	2.85·10 ¹⁰	1.27·10 ⁹	2.93·10 ¹⁰	9.64·10 ⁸
Acetaldehyde	5.57·10 ⁹	3.10·10 ⁸	6.42·10 ⁹	3.35·10 ⁸	1.11·10 ¹⁰	3.25·10 ⁸
Formic Acid	1.04·10 ¹⁰	6.40·10 ⁸	1.36·10 ¹⁰	5.30·10 ⁸	2.09·10 ¹⁰	7.11·10 ⁸
Acrolein	6.14·10 ⁹	3.35·10 ⁸	5.88·10 ⁹	3.85·10 ⁸	8.86·10 ⁹	3.56·10 ⁸
Acetone + Propanal	2.50·10 ⁹	2.53·10 ⁸	1.59·10 ⁹	9.57·10 ⁷	2.60·10 ⁹	1.29·10 ⁸
Acetic Acid	3.89·10 ¹⁰	2.06·10 ⁹	3.09·10 ¹⁰	9.45·10 ⁸	4.07·10 ¹⁰	1.03·10 ⁹
MVK	3.79·10 ⁸	7.50·10 ⁷	5.27·10 ⁸	7.48·10 ⁷	8.80·10 ⁸	9.72·10 ⁷
Acrylic Acid	1.17·10 ⁹	1.61·10 ⁸	1.56·10 ⁹	1.17·10 ⁸	3.56·10 ⁹	2.11·10 ⁸
Propionic Acid	5.18·10 ⁹	4.63·10 ⁸	1.20·10 ⁹	1.79·10 ⁸	2.50·10 ⁹	2.17·10 ⁸
Benzene	6.76·10 ⁸	1.65·10 ⁸	5.07·10 ⁸	1.21·10 ⁸	8.28·10 ⁸	1.10·10 ⁸
Pentanal + Vinyl Acetate	1.99·10 ⁸	5.18·10 ⁷	3.12·10 ⁸	4.59·10 ⁷	1.42·10 ⁹	1.26·10 ⁸
Butanoic Acid	6.23·10 ⁸	1.17·10 ⁸	8.15·10 ⁸	1.32·10 ⁸	1.65·10 ⁹	1.35·10 ⁸
TMB + Ethyltoluene	3.23·10 ⁸	1.11·10 ⁸	4.89·10 ⁸	1.06·10 ⁸	5.50·10 ⁸	8.74·10 ⁷
Benzoic Acid	4.24·10 ⁷	2.92·10 ⁷	7.07·10 ⁷	3.32·10 ⁷	1.75·10 ⁸	5.12·10 ⁷
Octanal	9.34·10 ⁷	3.76·10 ⁷	2.27·10 ⁸	7.18·10 ⁷	3.30·10 ⁸	8.61·10 ⁷

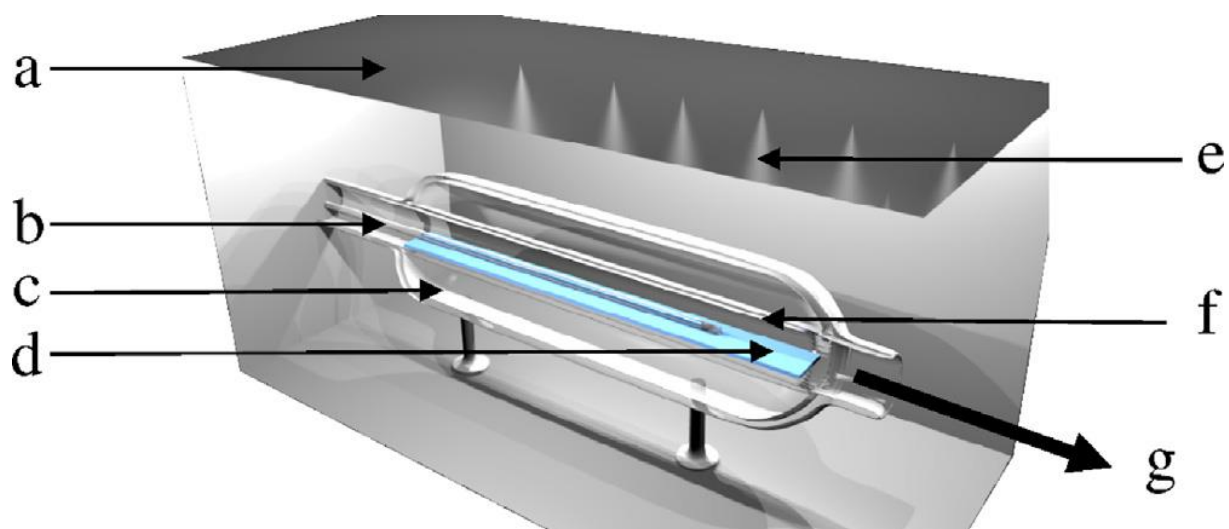


Fig. S1. 3D-skatch of (a) stainless steel box, (b) mobile injector, (c) double wall thermostated glass envelope, (d) glass plate covered with the paint, (e) UV lamps (f) the flow tube photo-reactor, and (g) exit of the flow gas to the PTR-MS analyzers.