

## Supporting Information

# Thin interfacial film spontaneously produces hydrogen peroxide: mechanism and application on perfluorooctanoic acid degradation

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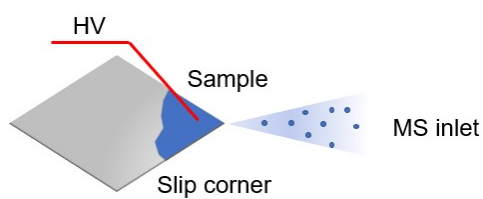


Figure S1. Scheme of droplet spray ionization mass spectrometry (DSI-MS)

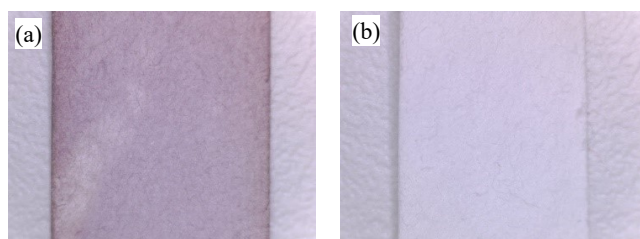


Figure S2. Photographs of the potassium iodide starch test strip immersed water (a) with  $\text{H}_2\text{O}_2$  and (b) without  $\text{H}_2\text{O}_2$

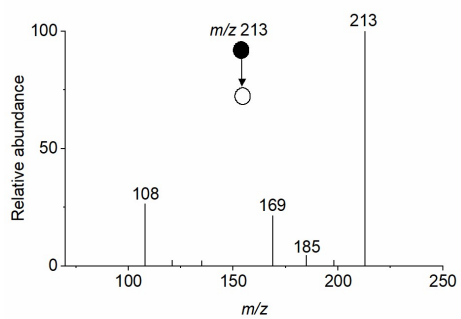


Figure S3. MS/MS spectrum of peaks at  $m/z$  213

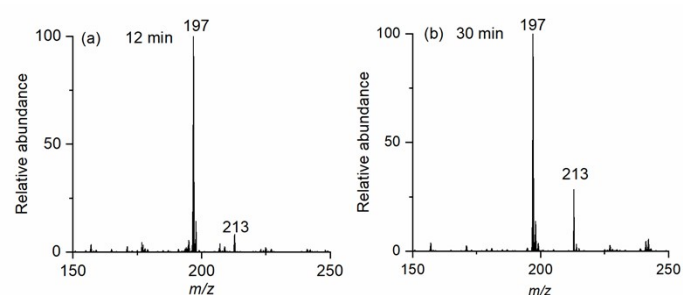


Figure S4. Mass spectrum of thin film containing 2-hydroxybenzophenone (100  $\mu\text{M}$ ) at different reaction time: (a) 12 min; (b) 30 min

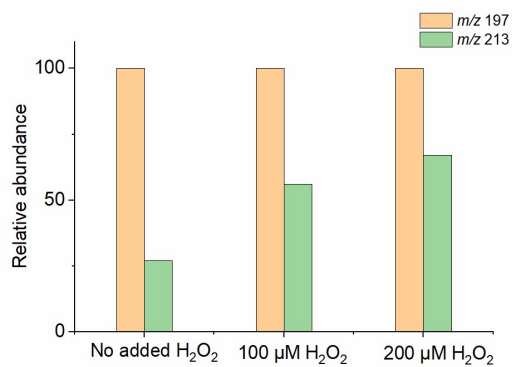


Figure S5. Comparison of relative abundance of 2-hydroxybenzophenone ( $m/z$  197) and oxidation product ( $m/z$  213) with and without added  $\text{H}_2\text{O}_2$  in thin film reactor

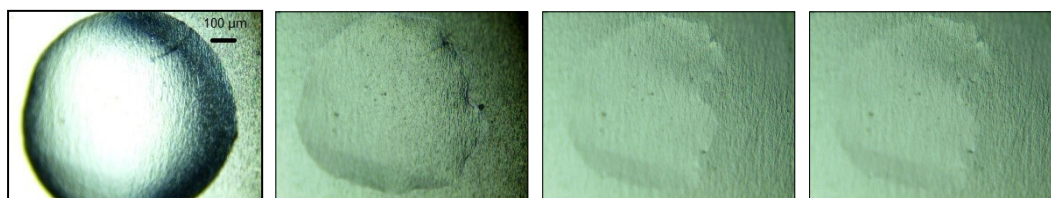


Figure S6. Photographs of the solution casted for thin film: (a) 0 min, (b) 7 min, (c) 10 min, (d) 30 min

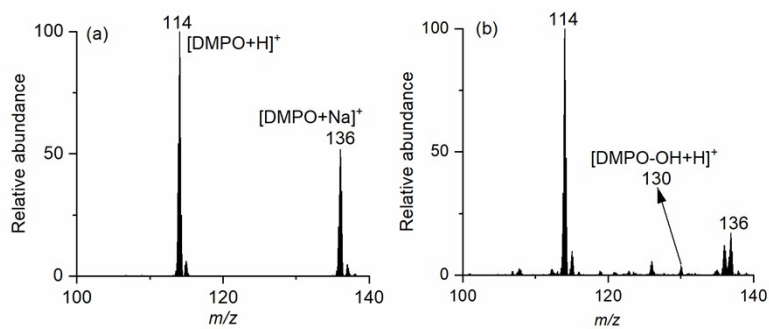


Figure S7. Mass spectra of (a) DMPO in bulk experiment and (b) DMPO in thin films

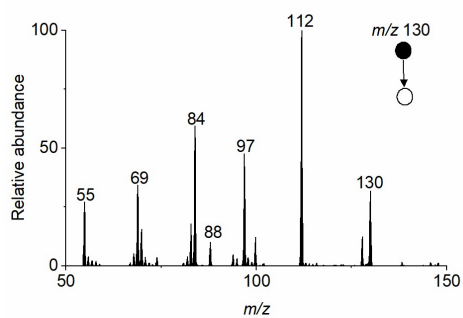


Figure S8. MS/MS spectrum of  $m/z$  130

Table S1. Identification of products obtained during PFOA degradation

Detected ion	assignment	formula	Relative ratio (30 min)
$m/z$ 413	[M-H] <sup>-</sup>	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>6</sub> COOH	40.1
$m/z$ 363	[M-H] <sup>-</sup>	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>5</sub> COOH	32.5
$m/z$ 313	[M-H] <sup>-</sup>	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>4</sub> COOH	46.3
$m/z$ 263	[M-H] <sup>-</sup>	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>3</sub> COOH	41.4
$m/z$ 213	[M-H] <sup>-</sup>	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>2</sub> COOH	84.5
$m/z$ 163	[M-H] <sup>-</sup>	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>1</sub> COOH	100
$m/z$ 113	[M-H] <sup>-</sup>	CF <sub>3</sub> COOH	74.5