

† **Electronic supplementary information (ESI)**

**Nano-sized iron oxides supported on polyester textile to remove
fluoroquinolones in hospital wastewater**

**Gnougou Nina COULIBALY^a, Sami RTIMI^b, Aymen Amin ASSADI^a, Khalil
HANNA^{a,c*}**

^a *Univ Rennes, École Nationale Supérieure de Chimie de Rennes, CNRS, ISCR –
UMR6226, F-35000 Rennes, France.*

^b *Ecole Polytechnique Fédérale de Lausanne, EPFL-STI-LTP, Station 12, CH-1015 Lausanne,
Switzerland.*

^c *Institut Universitaire de France (IUF), MESRI, 1 rue Descartes, 75231 Paris, France.*

*Corresponding author: Tel.: +33 2 23 23 80 27; khalil.hanna@ensc-rennes.fr

Number of Pages: 7

Number of Figures: 4

Number of Tables: 2

Number of Text: 1

† Electronic supplementary information (ESI)

Text S1: Potential reactions in the FeOx₃/PMS system under irradiation.

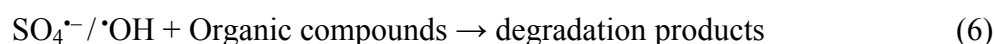


Table S1. Inorganic species and physico-chemical characteristics of SWW and RHW

	SWW	RHW
pH	8.0±0.5	6.8±0.2
Turbidity (NTU)	2±1	196±5
Conductivity (μS cm ⁻¹)	1250±5	1340±5
TOC (mg L ⁻¹)	70±5	50±10
Suspended solid (mg L ⁻¹)	0	20±2
Chloride (mg L ⁻¹)	450±20	620±10
Nitrate (mg L ⁻¹)	35±2	7±2
Sulfate (mg L ⁻¹)	20±2	60±10
Phosphate (mg L ⁻¹)	150±10	60±10

Synthetic wastewater (SWW) were prepared by adding 400 mg L⁻¹ of NaCl, 50 mg L⁻¹ of citric acid, 100 mg L⁻¹ of sucrose and 230 mg L⁻¹ Na₂HPO₄ to tap water (conductivity 408 μS cm⁻¹).

Table S2. Reactivity percentage of radicals with species in solution

Radical	Species and concentration	k'' ($M^{-1} s^{-1}$)	k' (s^{-1})	% of reactivity
HO \cdot	FLU (5 μ M)	1.2×10^{10}	0.6×10^5	2
	t-But (5 mM)	6.0×10^8	3.0×10^6	98
SO $_4^{\bullet-}$	FLU (5 μ M)	1.8×10^9	0.9×10^4	68
	t-But (5 mM)	8.4×10^5	4.2×10^3	32

k'' : second order rate constant and $k' = k'' * [\text{species}]$

% of reactivity indicates the percentage of hydroxyl radicals or sulfate radicals reacted.

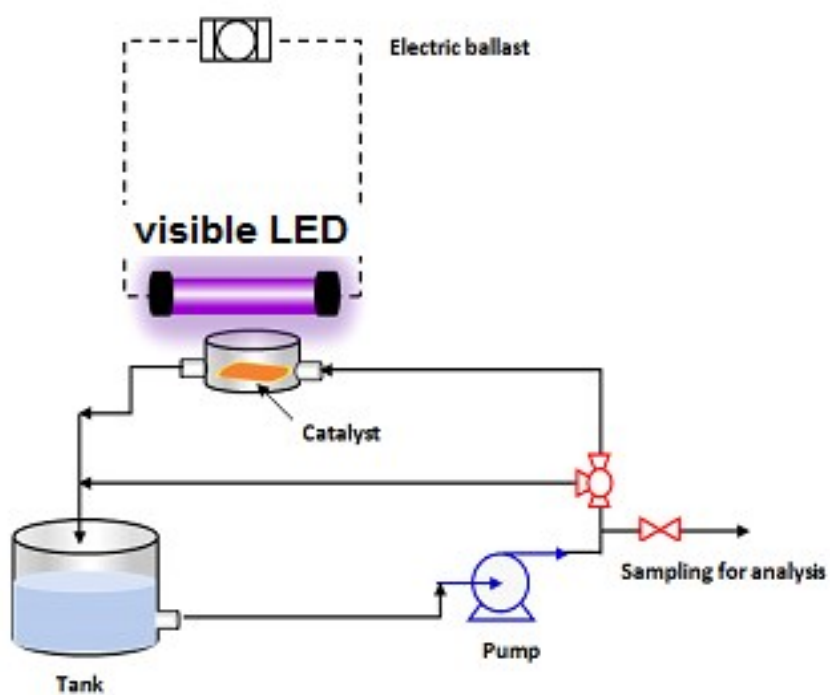


Fig. S1. Schematic diagram of recirculation glass reactor system

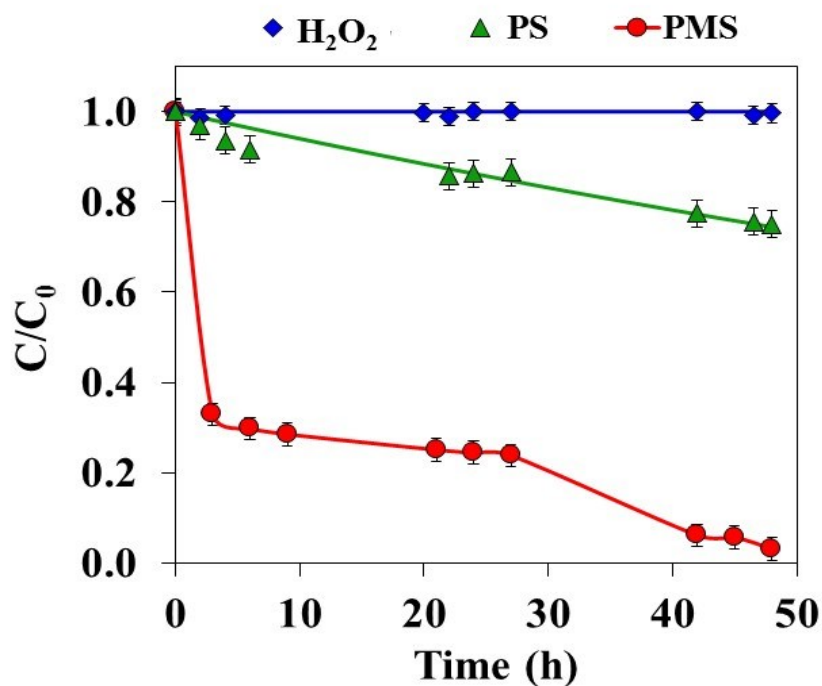


Fig. S2. Effect of oxidant on FLU removal with catalyst $FeOx_3$ under visible irradiation. Experimental conditions: $[FeOx_3] = 0.26 \text{ g m}^{-2}$ on PES, $[FLU]_0 = 5 \text{ }\mu\text{M}$, visible reaction time = 48 h, $pH_0 = 7.0 \pm 0.2$, $V = 200 \text{ mL}$, recirculation flow rate = 325 mL min^{-1} , $[H_2O_2]_0 = [PS]_0 = [PMS]_0 = 0.5 \text{ mM}$. Abbreviations: FLU = flumequine, PS = persulfate, H_2O_2 = hydrogen peroxide, PMS = peroxymonosulfate, $FeOx_3$ corresponding to 3% O_2 in the sputtering chamber. For PMS, the solid line is only a visual guide.

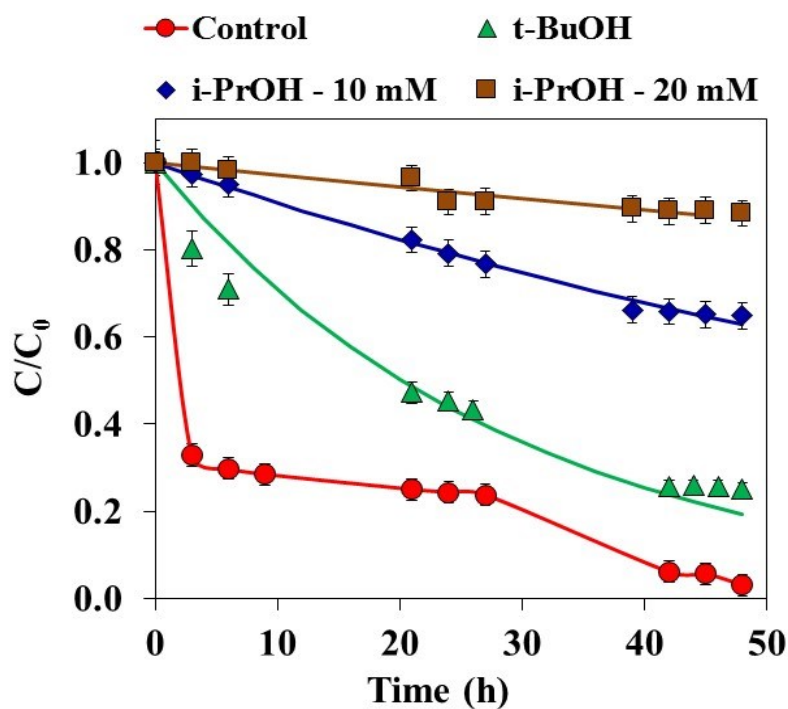


Fig. S3. Effect of radicals scavengers on FLU removal. Experimental conditions: $[\text{FLU}]_0 = 5 \mu\text{M}$, $[\text{PMS}]_0 = 0.5 \text{ mM}$, $[\text{FeOx}_3] = 0.26 \text{ g m}^{-2}$ on PES, reaction time = 48 h, $[\text{i-PrOH}]_0 = 10 - 20 \text{ mM}$, $[\text{t-BuOH}]_0 = 5 \text{ mM}$, visible reaction time = 48 h, $\text{pH}_0 = 7.0 \pm 0.2$, $V = 200 \text{ mL}$, recirculation flowrate = 325 mL min^{-1} . Abbreviations: FLU = flumequine, PMS = peroxymonosulfate, t-BuOH = tert-Butyl alcohol, i-PrOH= isopropanol, FeOx_3 corresponding to 3% O_2 in the sputtering chamber. For the control test, the solid line is only a visual guide.

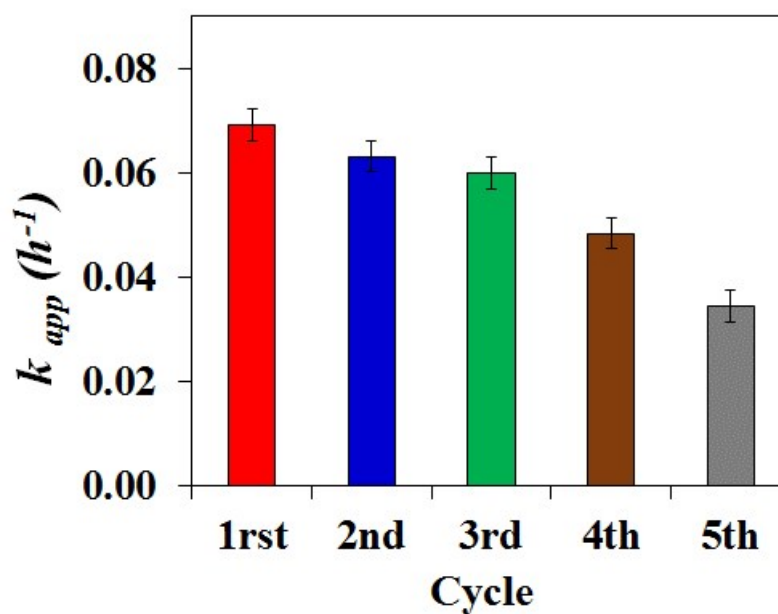


Fig. S4. FLU removal rate constant in RHW using FeOx₃-PES for five successive oxidation runs. Experimental conditions: [FLU]₀ = 5 μM, [PMS]₀ = 3 mM, [FeOx₃] = 0.26 g m⁻² on PES, pH₀ = 7.0 ± 0.2, reaction time = 48 h, recirculation flow rate = 325 mL min⁻¹. Abbreviations: FLU = flumequine, PMS = peroxymonosulfate, RHW = Real Hospital Wastewater, FeOx₃ corresponding to 3% O₂ in the sputtering chamber.