Photo-Activation of Persulfate and Hydrogen Peroxide by Humic Acid Coated Magnetic Particles for Bisphenol a Degradation

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The determination of Fe released in solution

The total iron was determined by reducing the Fe(III) to Fe(II) with ascorbic acid and complexing the Fe(II) with phenanthroline in acidic conditions (buffer pH=3: H_3PO_4 1 mM, NaH_2PO_4 3 mM). The Fe(II) was determined in the same way, without the reduction step, and Fe(III) was obtained as the difference between total iron and Fe(II). The calibration was performed using a commercial standard solution of Fe(III). Spectrophotometric analyses were performed using a Varian CARY 100 Scan double-beam UV–vis spectrophotometer, using quartz cuvettes with 1 cm path length.

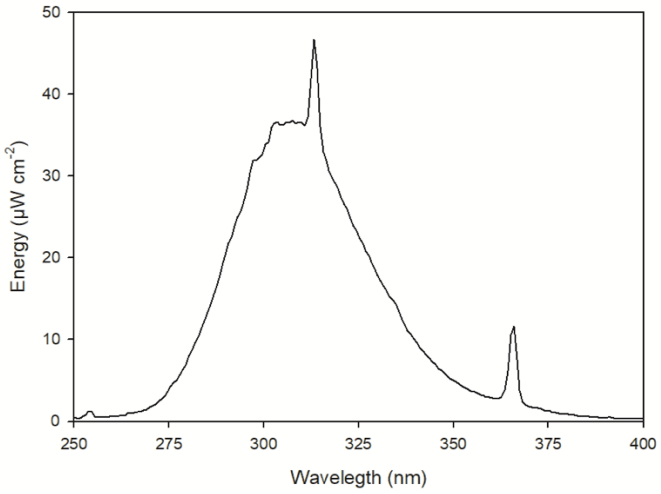

Figure S1. Emission spectrum of four Sankio denki G15T8E lamps reaching the solution surface.

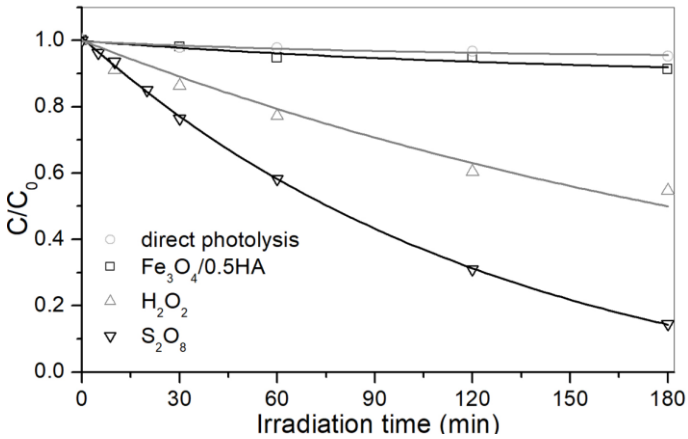

Figure S2. BPA degradation (C_0 = 20 µM) under different conditions: direct photolysis; effect of light activation of Fe_3O_4/0.5HA (100 mg/L); effect of light activation of H_2O_2 (1 mM) and $S_2O_8^{-2}$ (1 mM).

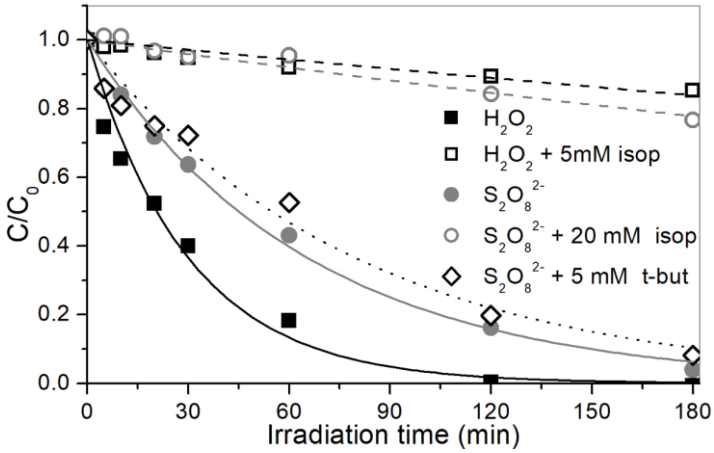

Figure S3. Effect of addition of isopropanol and *t*-butanol on BPA degradation in the presence of 100 mg/L of Fe_3O_4/0.5HA and 1 mM of H_2O_2 at pH 3 or 1 mM of $S_2O_8^{2-}$ at pH 6.

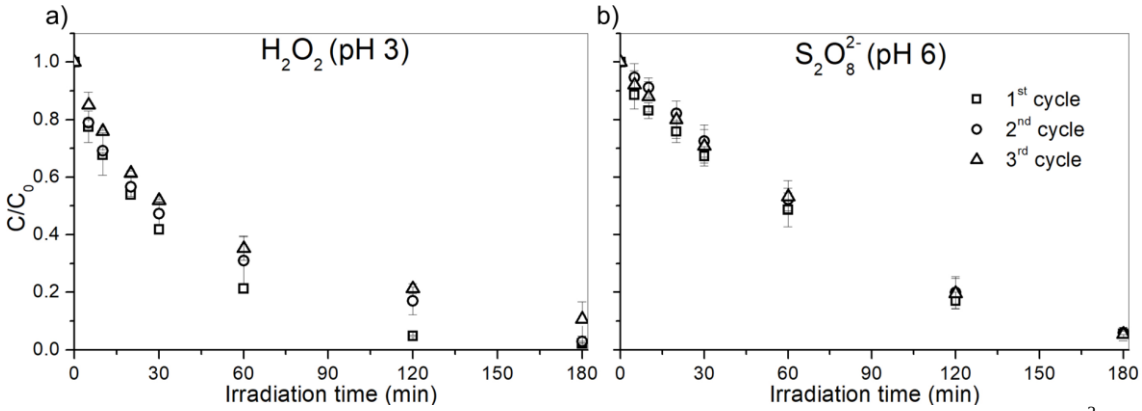

Figure S4. Reusability of catalyst for BPA degradation: a) 1 mM of H_2O_2 at pH 3; b) 1 mM of $S_2O_8^{2-}$ at pH 6.

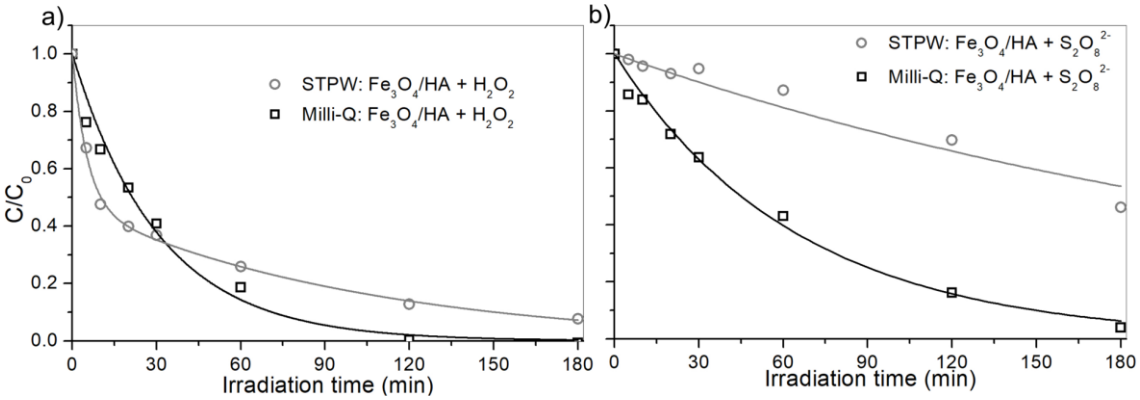

Figure S5. BPA degradation in STPW in the presence of 100 mg/L of catalyst: a) 1 mM of H_2O_2 at pH 3; b) 1mM of $S_2O_8^{2-}$ at pH 6. Note that in the case of STPW with H_2O_2 the fitting curve has not a kinetic meaning, but it is reported only to help following the BPA degradation.

Table S1. Kinetic constants (min^{-1}) calculated in the presence of H_2O_2 (1 mM) and $S_2O_8^{-2}$ (1 mM) activated by bare Fe_3O_4 and Fe_3O_4/0.5HA (100 mg/L) at different pH under irradiation.

	H_2O_2		**$S_2O_8^{2-}$**	
	Fe_3O_4	**Fe_3O_4/0.5HA**	**Fe_3O_4**	**Fe_3O_4/0.5HA**
pH 3	0.0146	0.0318	0.0214	0.0323
pH 4	0.0039	0.0055	0.0151	0.0177
pH 6	0.0011	0.00152	0.0088	0.0154
pH 6.5	-	-	0.0062	0.0076