Electronic Supporting information

Synthesis of highly crystalline $LaFeO_3$ nanospheres for phenoxazinone synthase mimicking activity

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S1. Calculation of CB and VB potentials for $LaFeO_3$.

La E_{IE} = 538.1 kj/mol ÷ 96.48 = 5.577 eV

E_{EA} = 48 kj/mol ÷ 96.48 = 0.498 eV

χ_{La} = 1/2(5.577+0.498) = 3.0375 eV

Fe E_{IE} = 762.5 kj/mol ÷ 96.48 = 7.9 eV

E_{EA} = 14.78 kj/mol ÷ 96.48 = 0.153 eV

χ_{Fe} = 1/2(7.9 eV +0.153) = 4.02 eV

O E_{IE} = 1313.9 kj/mol ÷ 96.48 = 13.618 eV

E_{EA} = 140.97 kj/mol ÷ 96.48 = 1.461 eV

χ_{O} = 1/2(13.618+1.461) = 7.54 eV

$\chi_{LaFeO3} = (3.0375 \times 4.02 \times (7.54)^3)^{1/5} = 5.54$ eV

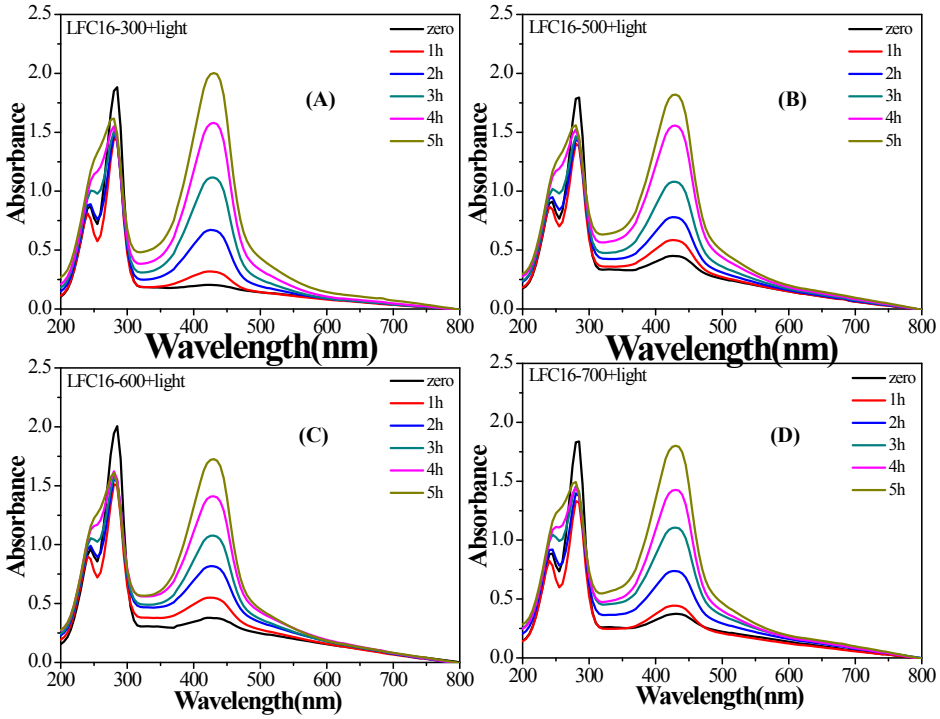

Figure S2. UV/Vis spectra of photocatalytic conversion of OAP over LFC16 at different calcination temperatures (A) 300 °C, (B) 500 °C, (C) 600 °C, and (D) 700 °C in ethanoic solution under nitrogen atmosphere.

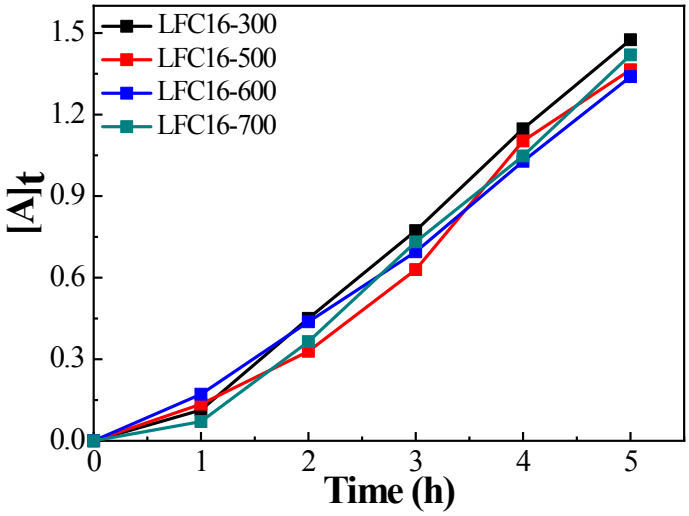

Figure S3. Analysis of absorbance time dependence in ethanol/water under nitrogen atmosphere using $LaFeO_3$ synthesized at different annealing temperatures under solar irradiation.

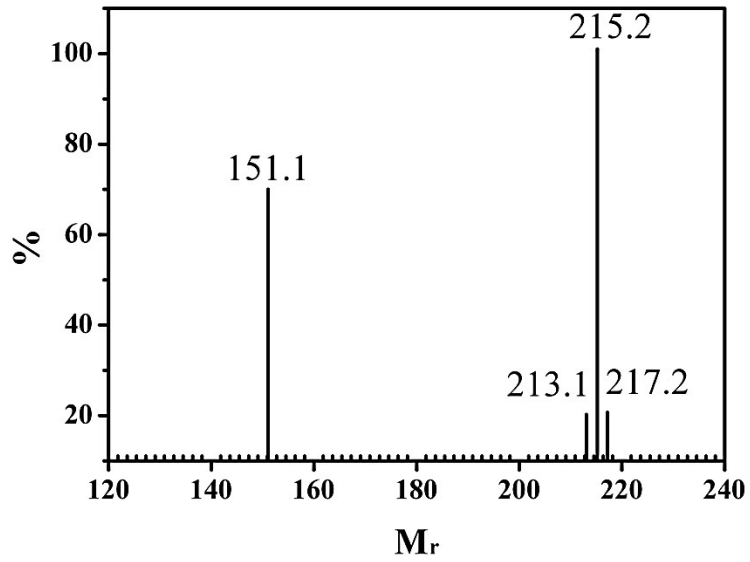

Figure S4. Mass spectra of isolated oxidation reaction products of *o*-aminophenol.

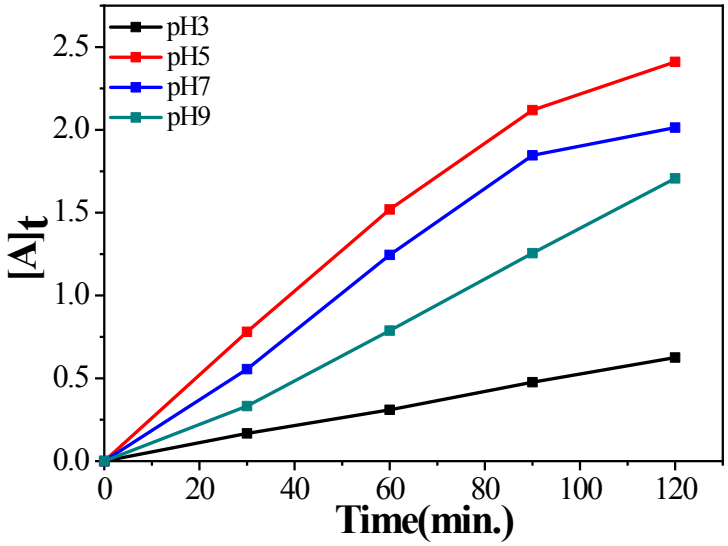

Figure S5. Effect of solution pH on the photocatalytic conversion of OAP to APX over LFC4 in acetonitrile/water solvent under nitrogen atmosphere under solar irradiation.

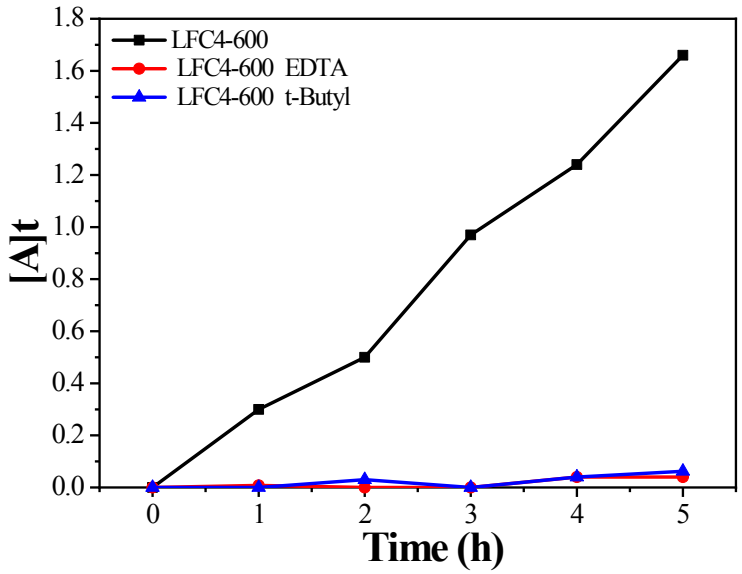

Figure S6. Effect of scavenger on the photocatalytic conversion of OAP to APX over LFC4-600 in acetonitrile/water solvent under nitrogen atmosphere under solar irradiation.

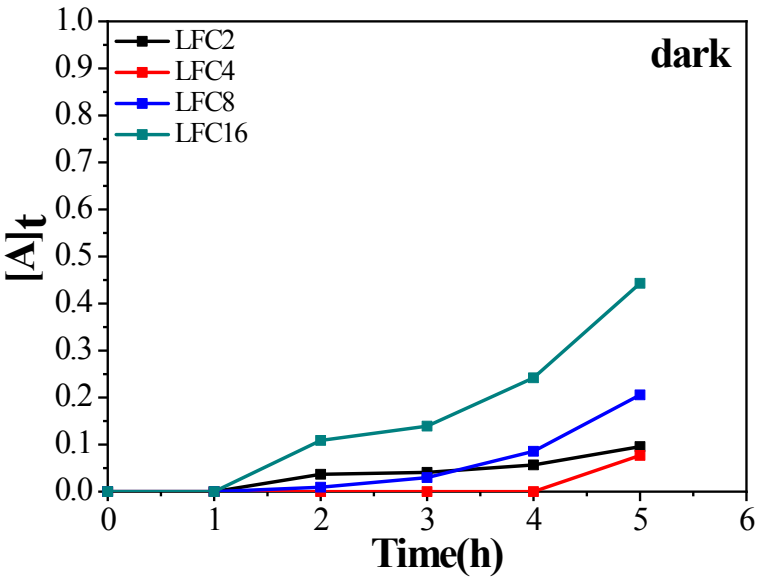

Figure S7. Analysis of absorbance time dependence in acetonitrile/water under nitrogen atmosphere using $LaFeO_3$ synthesized in dark.

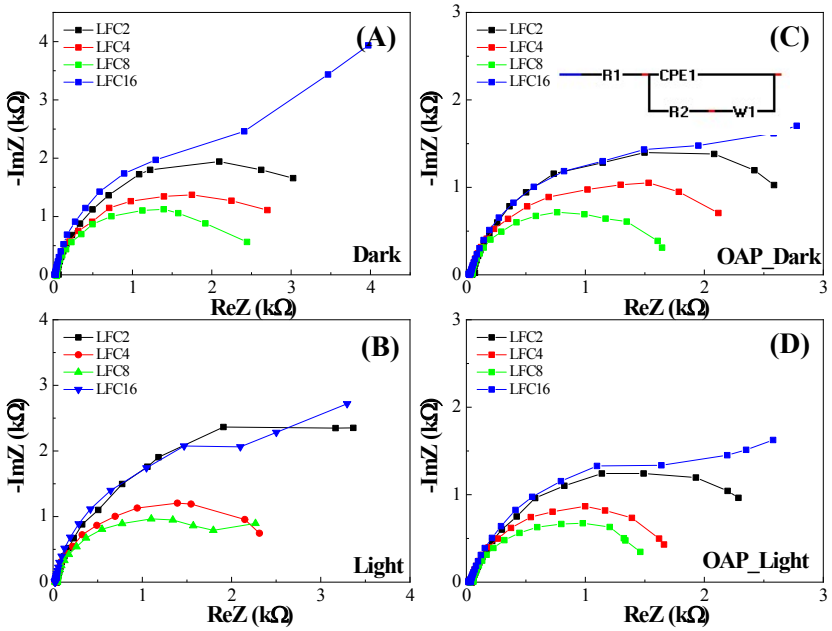

Figure S8. Nyquist plot of $LaFeO_3$ in (A, and B) absence and (C, and D) presence of 0.5 mM OAP in 0.1 M Na_2SO_4 at E_{DC} = 0.5 V vs. Ag/AgCl, E_{AC} = 10 mV (peak to peak) and frequency range of 100 kHz to 3 Hz.

Table S8. Electrochemical impedance analysis of $LaFeO_3$ samples.

	LFC2				LFC4				LFC8				LFC16			
	Dark	Light	OAP Dark	OAP Light	Dark	Light	OAP Dark	OAP Light	Dark	Light	OAP Dark	OAP Light	Dark	Light	OAP Dark	OAP Light
R1 (Ω)	28	30	40	35	24	23	23	21	26	28	33	40	20	24	23	20
R2 (kΩ)	4	4	3.1	2.75	3.1	2.6	2.1	1.85	2.45	2.1	1.6	1.5	3.2	4.4	2.7	2.6
W (Ωs^{-1})	17	80	3	22	17	9	25	20	13	9	13	8	185	60	70	60
P1 (μF)	0.02	0.01	0.016	07, .013	0.02	0.018	0.02	0.02	0.02	0.018	0.014	0.018	0.013	0.02	0.012	0.012
n1	0.93	0.9	0.93	0.88	0.93	0.93	0.91	0.89	0.93	0.93	0.9	0.89	0.97	0.93	0.91	0.9

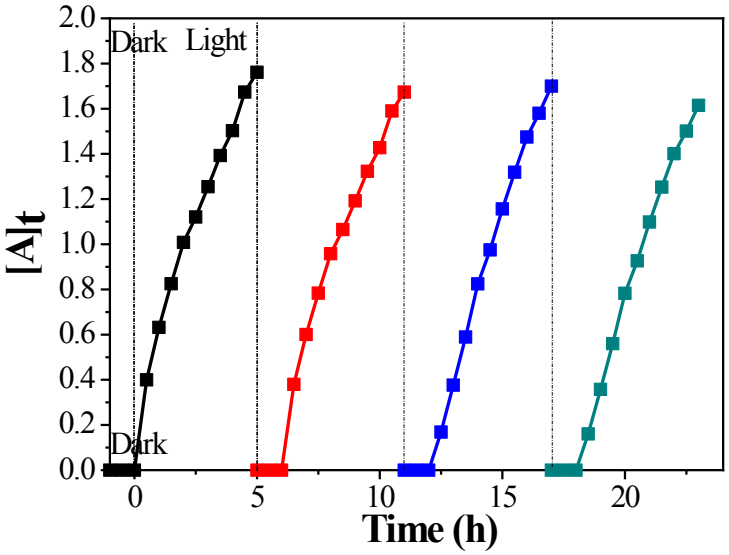

Figure S9. Reusability of LFC4 for photocatalytic conversion of OAP in acetonitrile/water under nitrogen atmosphere.