

SUPPORTING INFORMATION

Degradation of organic dyes via bismuth silver oxide initiated direct oxidation coupled with sodium bismuthate based visible light photocatalysis

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SUMMARY

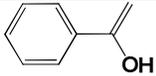
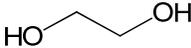
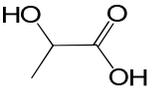
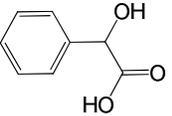
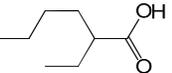
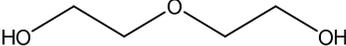
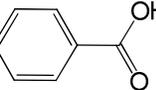
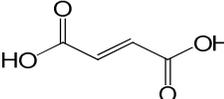
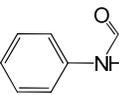
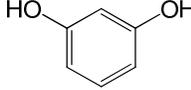
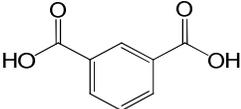
Table S1. Comparison of Crystal Violet (CV) degradation intermediates identified by GC/MS in direct oxidation (DO) and visible light photocatalytic (PC) processes, respectively.

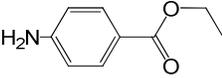
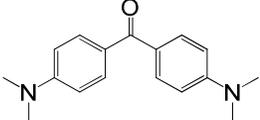
Figure S1. Chemical Structure of Crystal Violet (CV).

Figure S2. Effect of Crystal Violet (CV) concentration on the intensity of the DMPO-¹O₂ adduct electron spin resonance (ESR) signal in the direct oxidation (DO) process (a) and DMPO-•OH adduct ESR signal in the visible light photocatalytic (PC) process (b). Experimental conditions: bismuth silver oxide formed from 0.1g NaBiO₃•2H₂O used in DO process and 0.1g NaBiO₃•2H₂O used in PC process; CV concentration is 30, 100 and 200 mg/L, respectively; reaction time for both DO and PC process was 2 min.

Figure S3. Mineralization comparison of three different methods (separately utilized direct oxidation (DO) process, separately utilized visible light photocatalytic (PC) process and sequentially utilized DO and PC processes) on treating 100 mL different high concentrations of organic dye solution over the same total reaction time. Experimental conditions: bismuth silver oxide formed from 0.2g NaBiO₃•2H₂O used in DO process and 0.2g NaBiO₃•2H₂O used in PC process in both separate and combined processes. The concentrations of various dye solutions are 500 mg/L of Safranin T, 200 mg/L of Azure B, 150 mg/L of Malachite Green, 75 mg/L of Crystal Violet and 250 mg/L of Alizarin Red, respectively.

Table S1. Comparison of Crystal Violet (CV) degradation intermediates identified by GC/MS in direct oxidation (DO) and visible light photocatalytic (PC) processes, respectively.

Products	Rt (min)	Structure (before derivation)	DO	PC
1	6.06		√	√
2	6.39		√	√
3	6.91		√	√
4	7.60		√	√
5	7.95		√	N/A
6	8.76		√	√
7	8.89		√	√
8	9.42		N/A	√
9	9.59		√	√
10	9.96		√	√
11	10.51		√	√
12	10.86		√	√
13	12.20		√	N/A
14	15.17		N/A	√

15	15.37		N/A	√
16	15.61		N/A	√
17	27.29		√	√

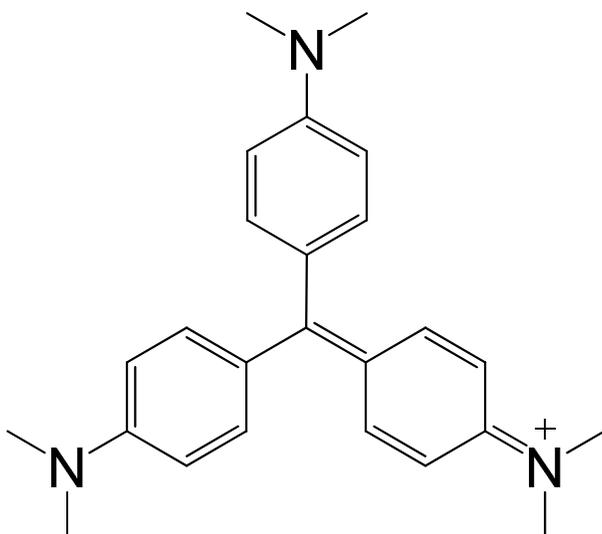


Fig. S1

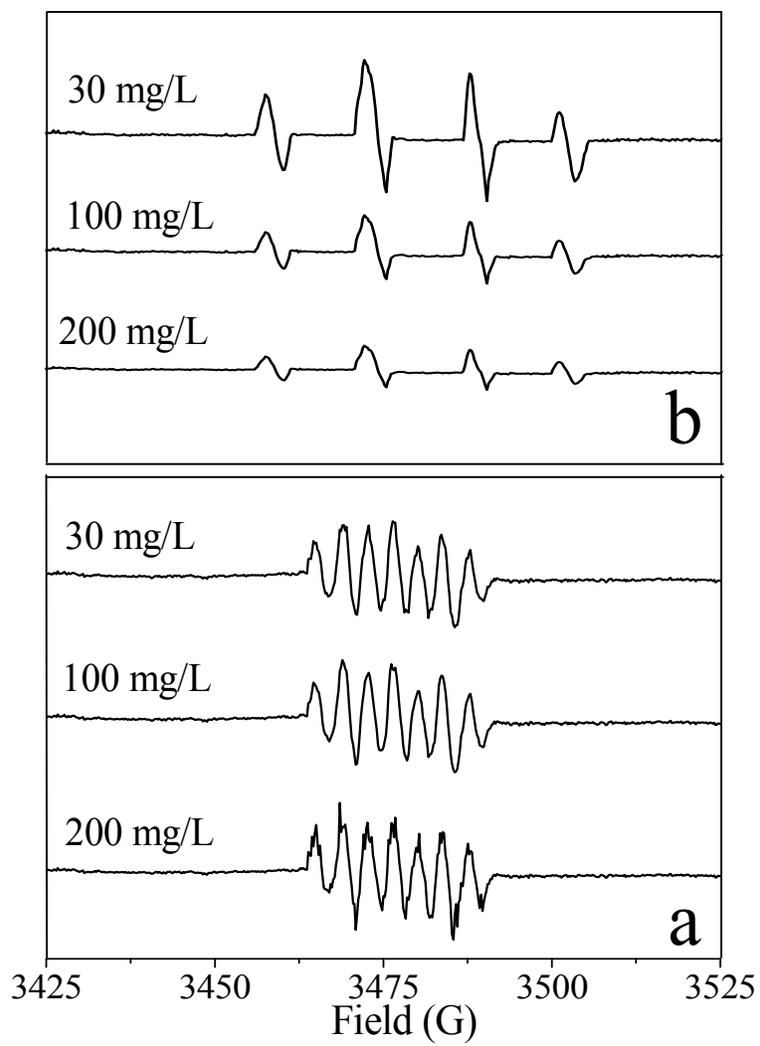


Fig. S2

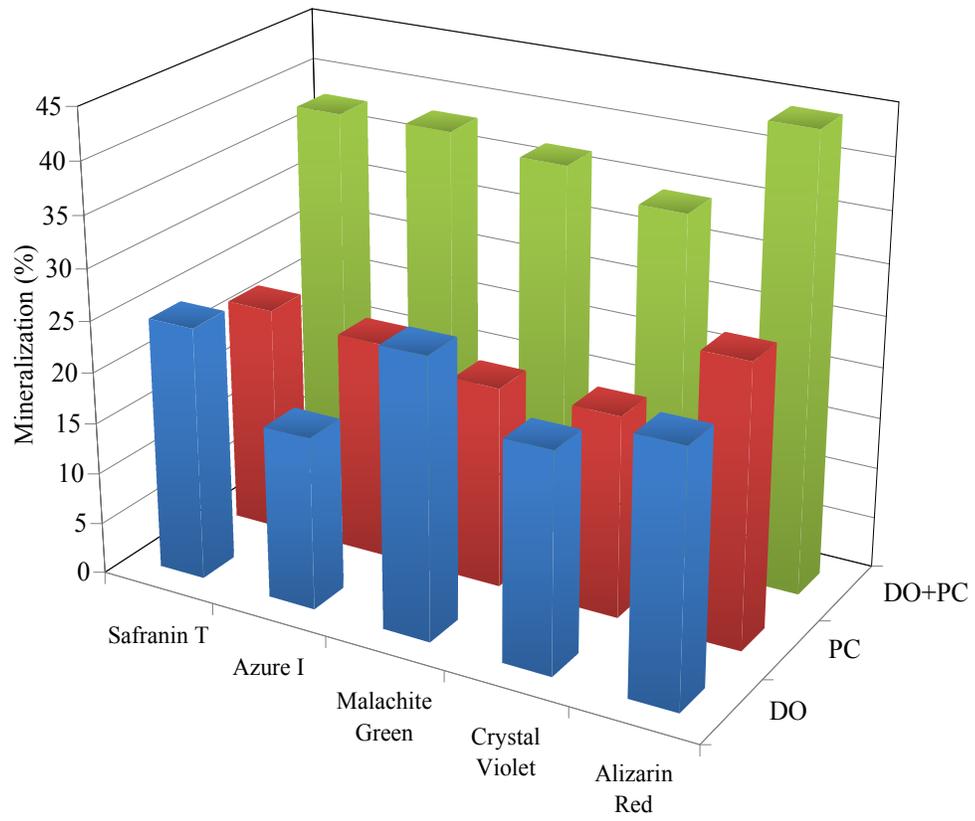


Fig. S3