Catalytic Ozonation of Reactive Black 5 in Aqueous Solution Using Iron-Loaded Dead Leaves Ash for Wastewater Remediation

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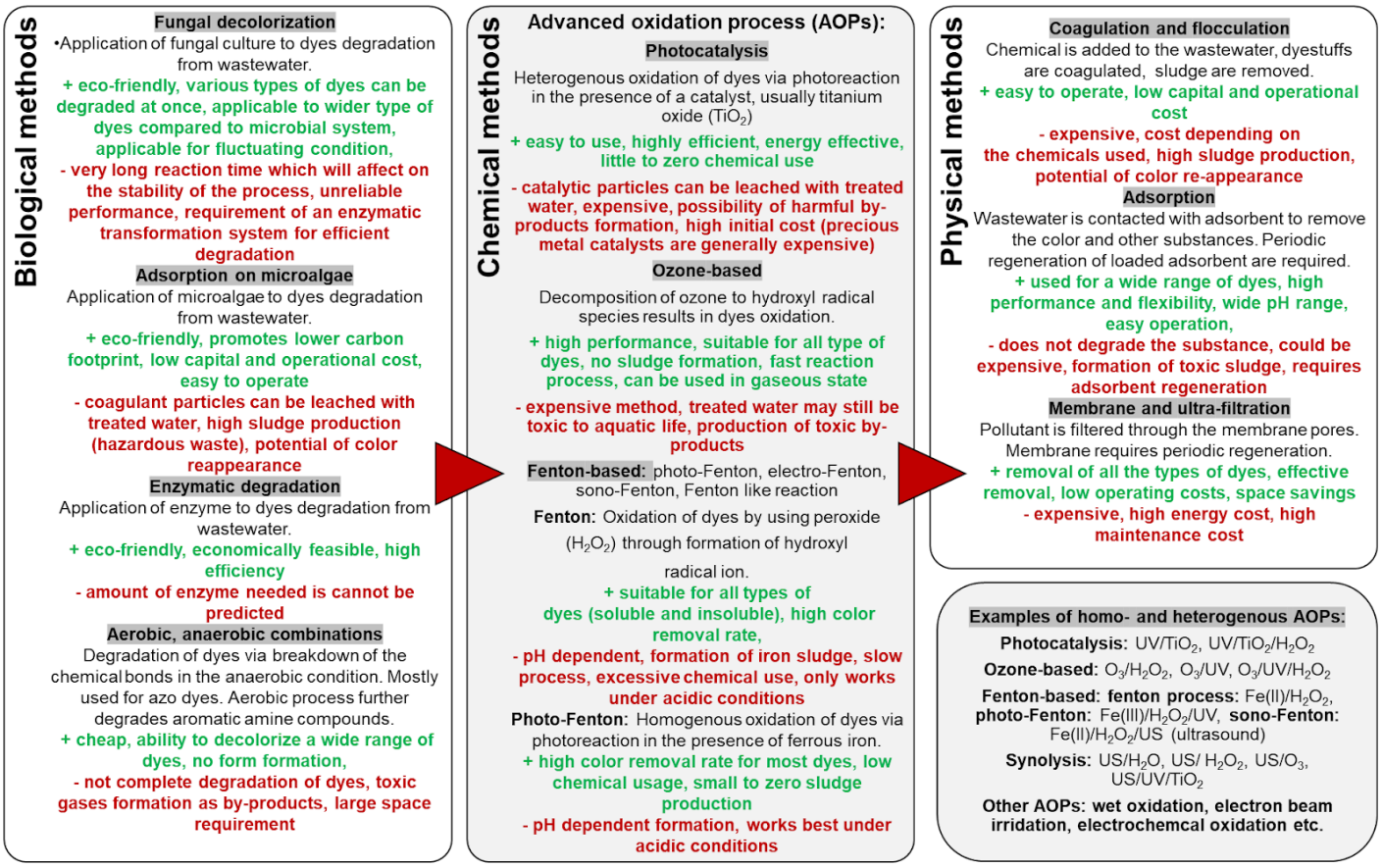
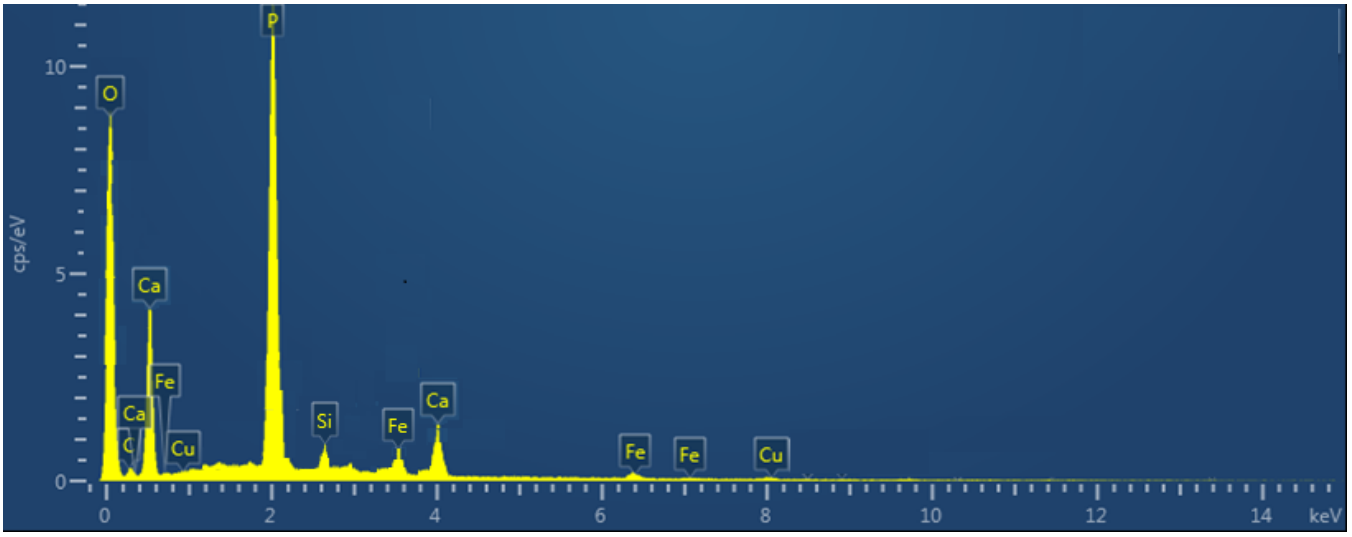


Figure S1. Comparison of advantageous and disadvantageous of dyes containing wastewater decolorization [14-15].

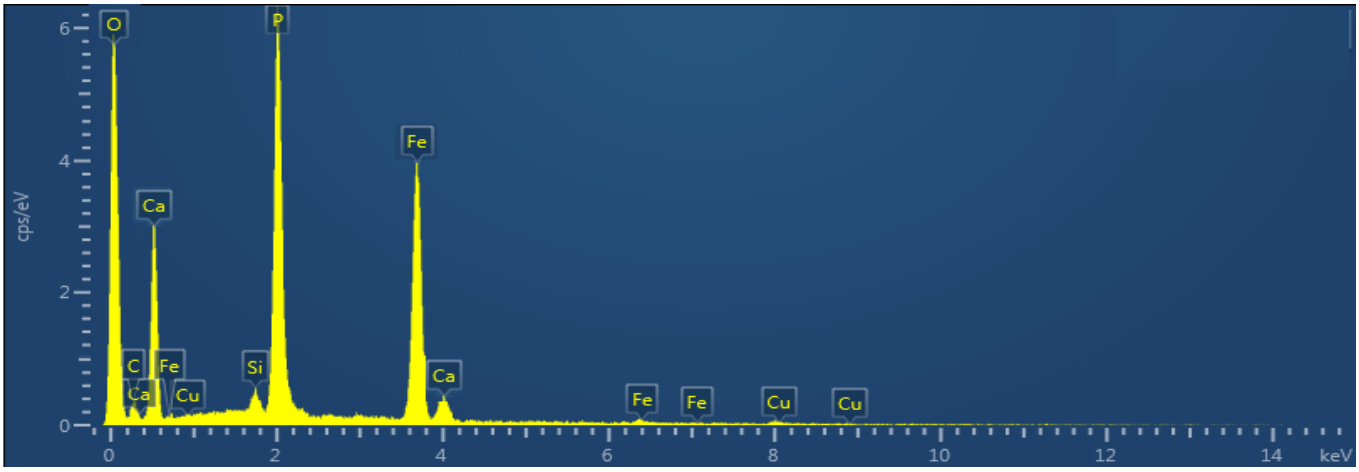
Table S1. The catalytic ozonation process for Reactive Black 5 dye containing wastewater decolorization.

Method	Dye	Results, removal efficiency and other parameters	Ref.
O_3, O_3/UV, O_3/UV/persulfate (PS), and O_3/Ce–Co–O catalyst	Reactive Black 5 C_0=100-1000 mg/L	**O_3/Ce–Co–O:** [1]$\%R_{TOC}$= 96% (60 LPH, pH 7, C_0=100 mg/L, catalyst dose=1 g/L, t_r=80 min)	[29]
		O_3/UV/persulfate: $\%R_{TOC}$= 90% (60 LPH, pH 12, C_0=100 mg/L, UV intensity=66 W, TOC:PS=1:40, t_r=80 min)	
catalytic ozonation O_3/Ag–Co–O catalyst: silver–cobalt composite oxide	Reactive Black 5 C_0=100 mg/L	**O_3 without catalyst**: $\%R_{TOC}$=34% **O_3/Ag–Co–O:** $\%R_{TOC}$=75% (ozone dose=30 mg/min, pH 7, t_r=80 min, catalyst dose=0.5 g/L)	[30]
electro-flocculation, electro-flocculation with catalyst and catalytic ozonation in combination with electro-flocculation catalyst: zeolites modified with $CuMn_2O_4/gC_3N_4$	Reactive Black 5 C_0=30-90 mg/L	**electro-flocculation:** 31.18%, **electro-flocculation with catalyst:** 39.27% **catalytic ozonation with electro-flocculation:** 90.31% (ozone dose=1 mg/min, pH 10, C_0=30 mg/L, catalyst dose=1 mg, t_r=30 min, voltage=10 V)	[31]
O_3 assisted electro-coagulation	Reactive Black 5 C_0=100-400 mg/L	R_{TOC}=94%, $\%R_{COD}$=60% (C_0=100 mg/L, pH 5.5, current density=10 mA/cm^2, salt concentration=5000 mg/L, T=20°C, ozone dose=20 mL/min, interelectrode distance of 1 cm)	[32]

$\%R_{TOC}$ - the total organic carbon (TOC) removal efficiency, $\%R_{COD}$ – the chemical oxygen demand (COD) removal efficiency, C_0 – the initial dye concentration, t_r – the reaction time, T – temperature



(a)



(b)

Figure S2. EDX spectra of (a) DLA and (b) Fe-DLA.