Supplementary Material

Synchronous removal of organic pollutants and phosphorus from emergency wastewater in chemical industry park by plasma-catalysis system based on calcium peroxide

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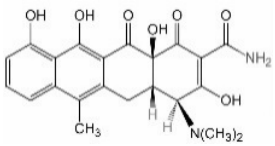
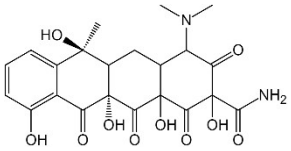
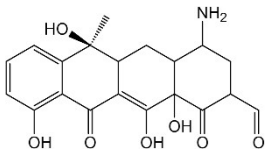
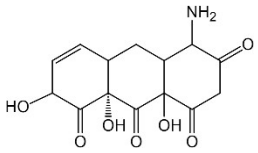
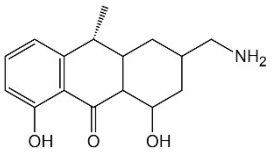
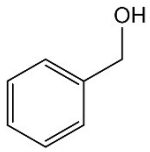
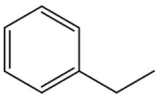
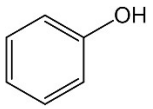
Table S1 Chemical reagent

Name of reagent	Molecular formula	Manufacturer
Tetracycline	$C_{22}H_{24}N_2O_8$	Shanghai Macklin Biochemical Technology Co., Ltd.
Potassium dihydrogen phosphate	KH_2PO_4	Sinopharm Chemical Reagent Co., Ltd.
Calcium peroxide	CaO_2	Shanghai Aladdin Biochemical Technology Co., Ltd.
Isopropyl alcohol	C_3H_8O	Sinopharm Chemical Reagent Co., Ltd.
Triethylene diamine	$C_6H_{12}N_2$	Shanghai Macklin Biochemical Technology Co., Ltd.
p-Benzoquinone	$C_6H_4O_2$	Sinopharm Chemical Reagent Co., Ltd.
Methanol	CH_3OH	Anhui Tedia High Purity Solvents Co., Ltd.
Phosphoric acid	H_3PO_4	Shanghai Macklin Biochemical Technology Co., Ltd.
Terephthalic acid	$C_8H_6O_4$	Shanghai Aladdin Biochemical Technology Co., Ltd.
Sodium indigo disulfate	$C_{16}H_8N_2Na_2O_8S_2$	Shanghai Aladdin Biochemical Technology Co., Ltd.
Oxytitanium sulfate-sulfate hydrate	$TiOSO_4 \cdot xH_2SO_4 \cdot xH_2O$	Shanghai Aladdin Biochemical Technology Co., Ltd.
Ammonium molybdate	$(NH_4)_2MoO_4$	Shanghai Macklin Biochemical Technology Co., Ltd.
Ascorbic acid	$C_6H_8O_6$	Sinopharm Chemical Reagent Co., Ltd.

Table S2 Experimental apparatus

Instrument and equipment	Model	Manufacturer
Liquid Chromatograph	LC-1000	Shandong Lunan Analytical Instrument Co., Ltd.
Electronic Balance	PX224ZH/E	OHAUS Instruments (Changzhou) Co., Ltd.
Conductivity meter	DDS-307A	INASE Scientific Instrument CO., Ltd.
pH meter	PHS-3C	INASE Scientific Instrument CO., Ltd.
Deionized water machine	Biosafer-10R	Thermo Fisher Scientific China Co., Ltd.
Peristaltic pump	BT100-2J	Baoding Lange Constant Flow Pump Co., Ltd.
Experimental power supply	PSPT-2000C	Nanjing Perspeet Electronic Technology Co., Ltd.
Circulating water vacuum pump	SHZ-D (III)	Shanghai Lichen Bangxi Instrument Technology Co., Ltd.
Ultraviolet spectrophotometer	UV-5500PC	Shanghai Metash Instruments CO., Ltd.
Constant temperature magnetic stirrer	B11-3	Shanghai Sile Instrument Co., Ltd.
Digital display blast drying oven	DHG-9053A	Shanghai Jinghong Laboratory Equipment Co., Ltd.
Ultrasonic cleaner	KQ5200E	Kunshan Hechuang Ultrasound Instrument Co., Ltd.
Multi-parameter water quality tester	5B-6C	Shanghai Lianhua Industrial Co., Ltd.

Table S3 Intermediate products of TC degradation

Products	Formula	m/z	Chemical structure
P1	$C_{22}H_{22}N_2O_7$	428	
P2	$C_{20}H_{17}NO_9$	415	
P3	$C_{20}H_{19}NO_7$	398	
P4	$C_{14}H_{15}NO_7$	308	
P5	$C_{16}H_{19}NO_3$	273	
P6	C_7H_8O	108	
P7	C_8H_{10}	106	
P8	C_6H_6O	94	

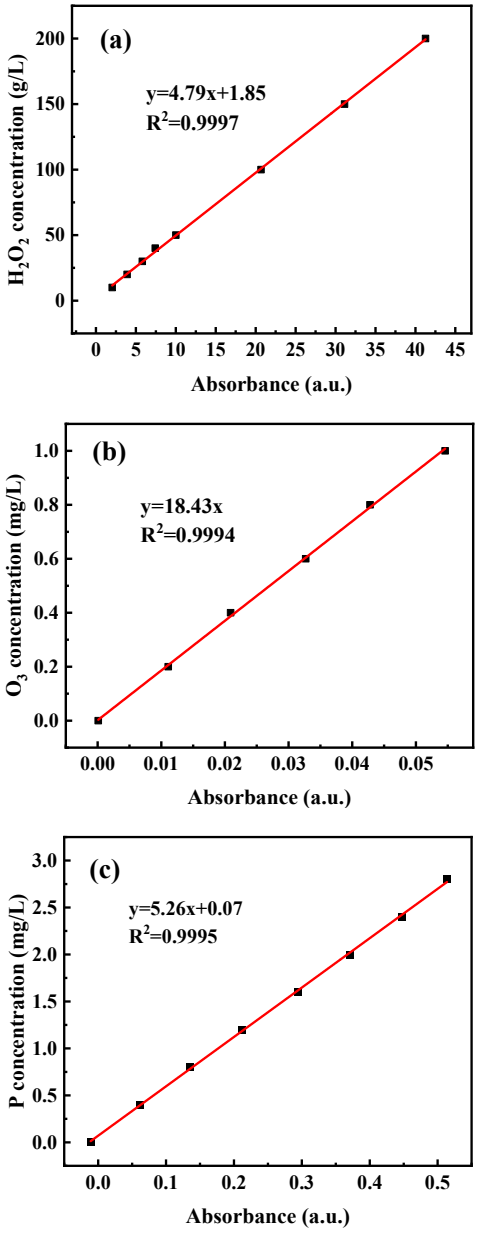


Figure S1. Standard curve: (a) H_2O_2; (b) O_3; (c) phosphorus solution

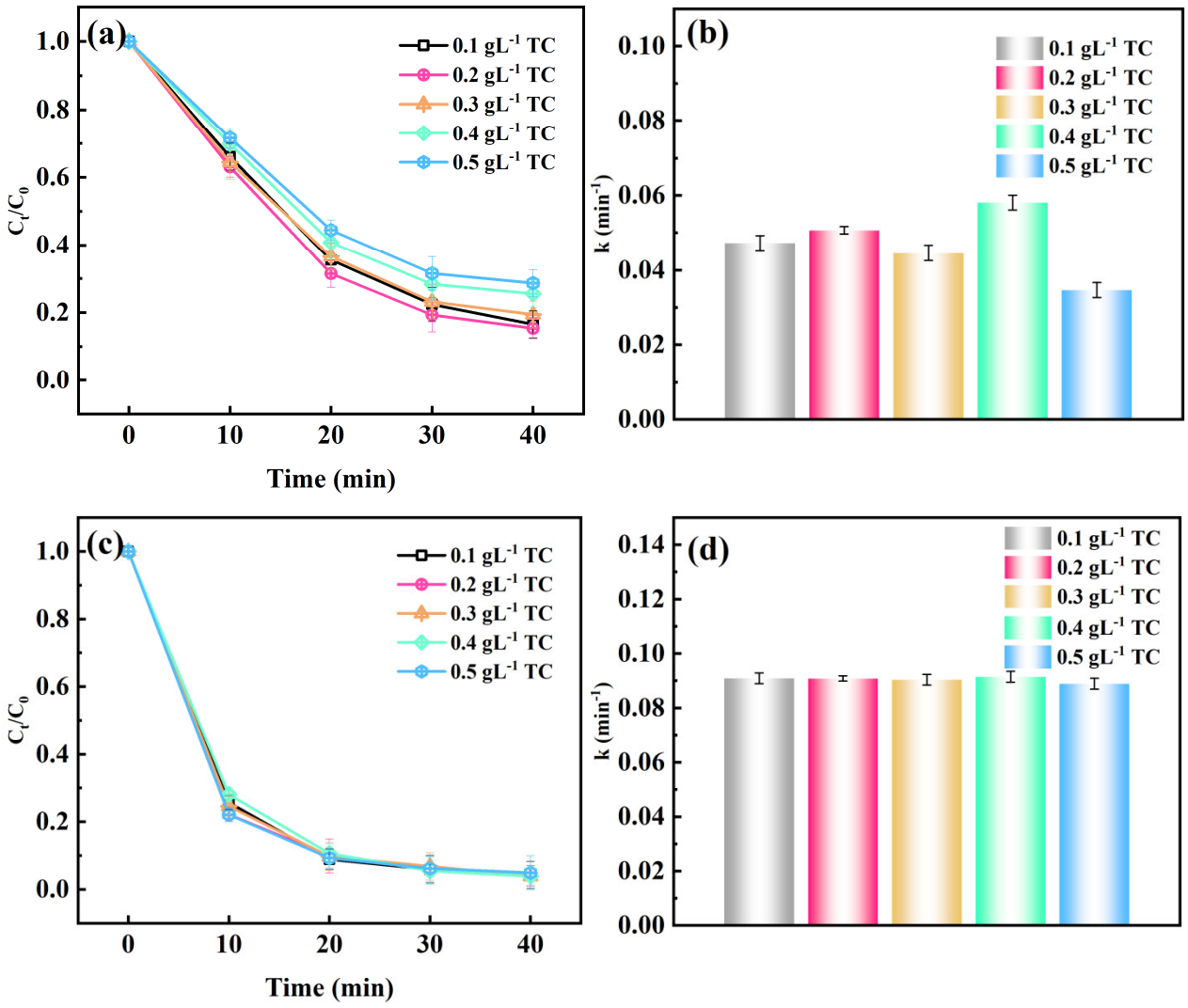


Figure S2. Effect of initial concentration of TC: (a) TC degradation curve; (b) TC kinetic constant; (c) phosphorus removal curve; (d) phosphorus kinetic constant

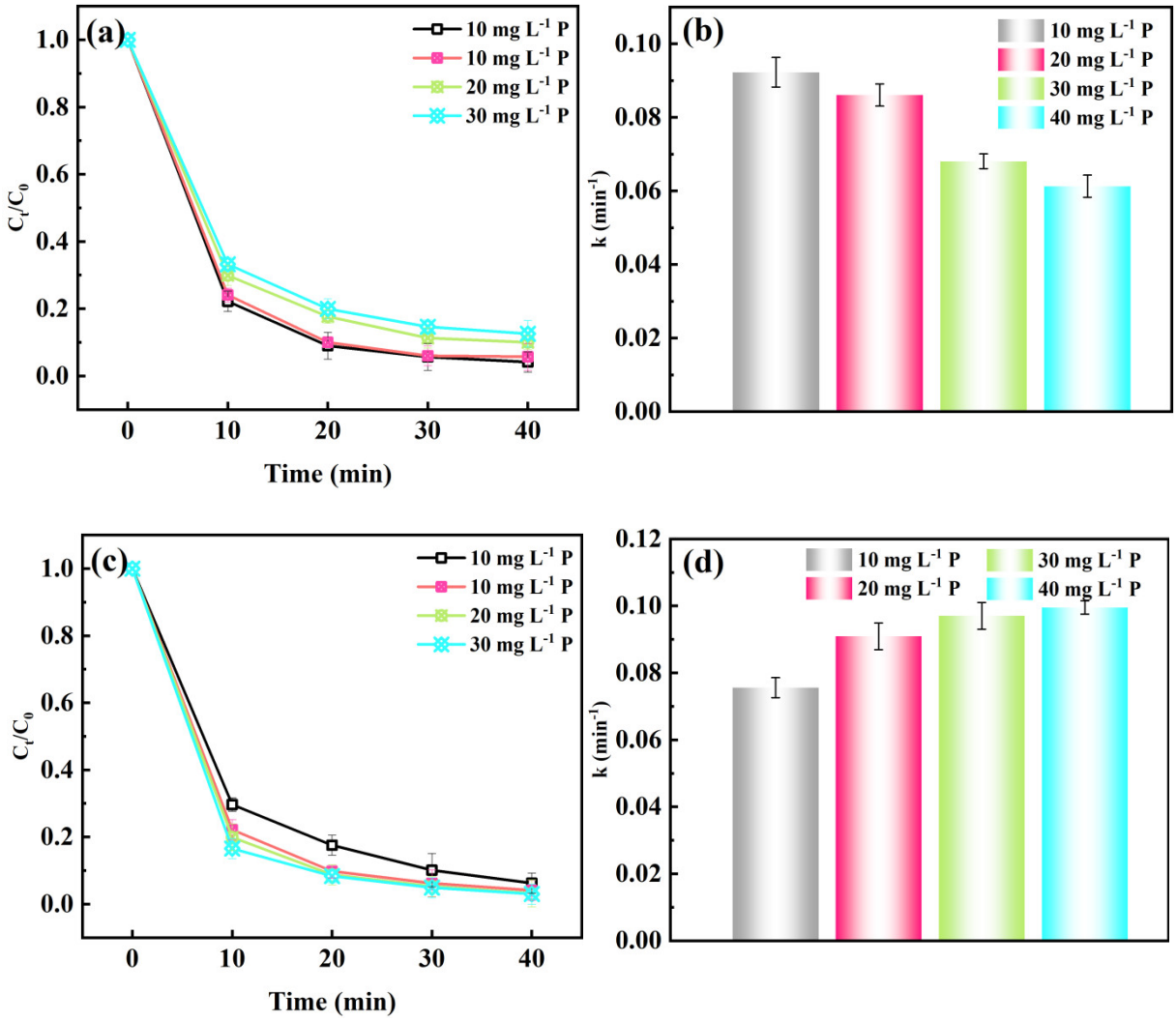


Figure S3. Effect of initial phosphorus concentration: (a) TC degradation curve; (b) TC kinetic constant; (c) phosphorus removal curve; (d) phosphorus kinetic constant

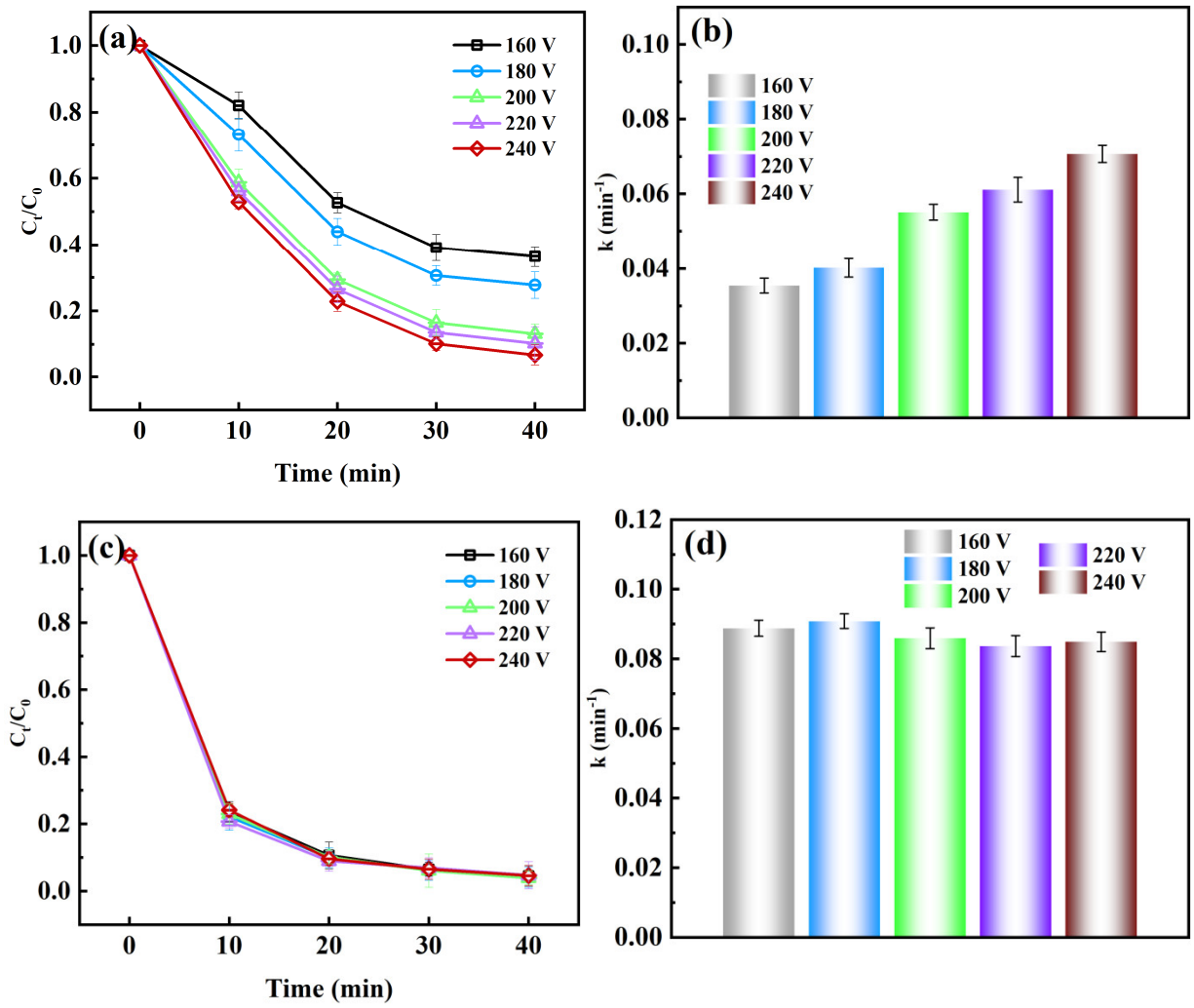


Figure S4. Effect of discharge voltage: (a) TC degradation curve; (b) TC kinetic constant; (c) phosphorus degradation curve; (d) phosphorus kinetic constant

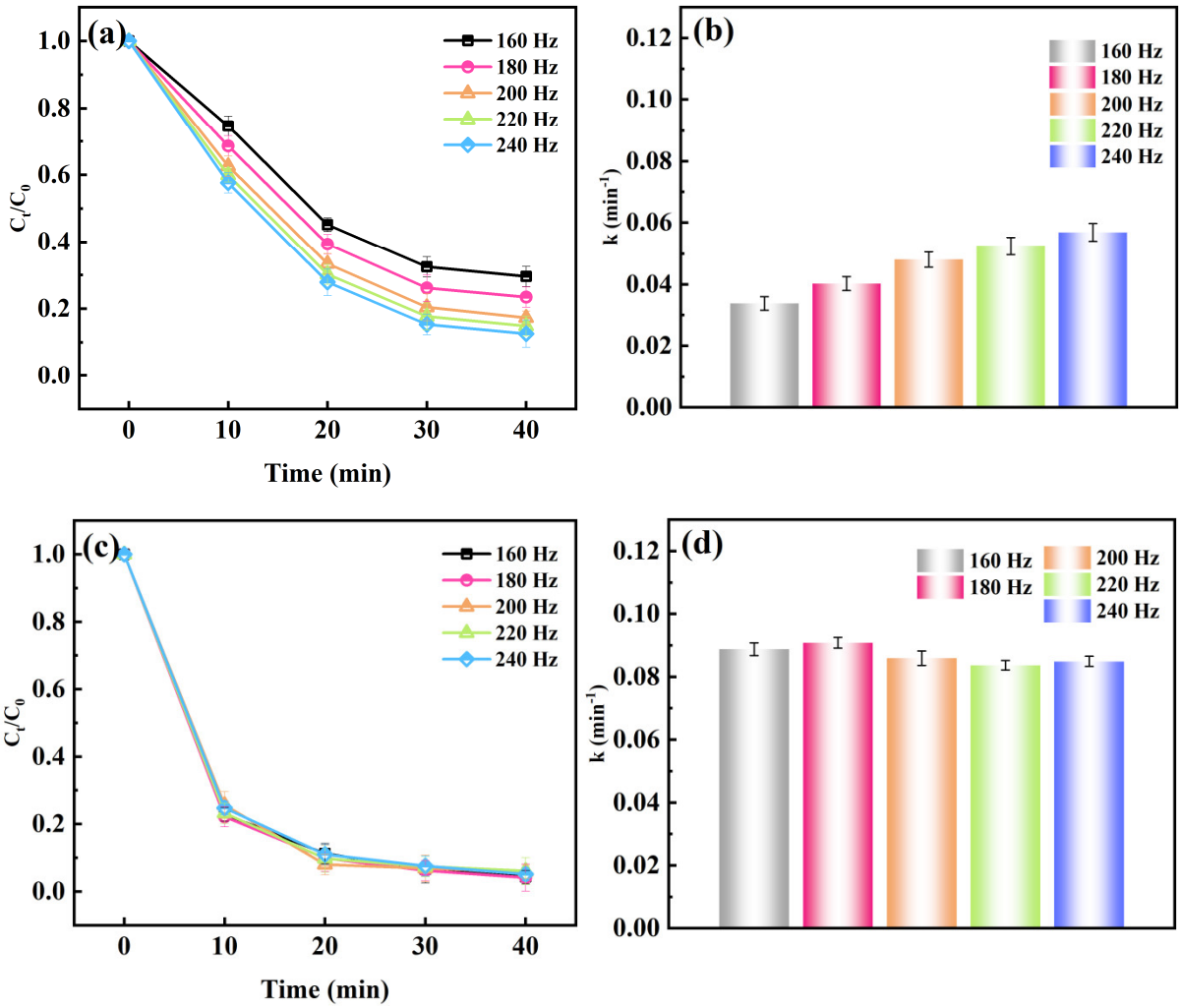


Figure S5. Effect of discharge frequency: (a) TC degradation curve; (b) TC kinetic constant; (c) phosphorus removal curve; (d) phosphorus kinetic constant

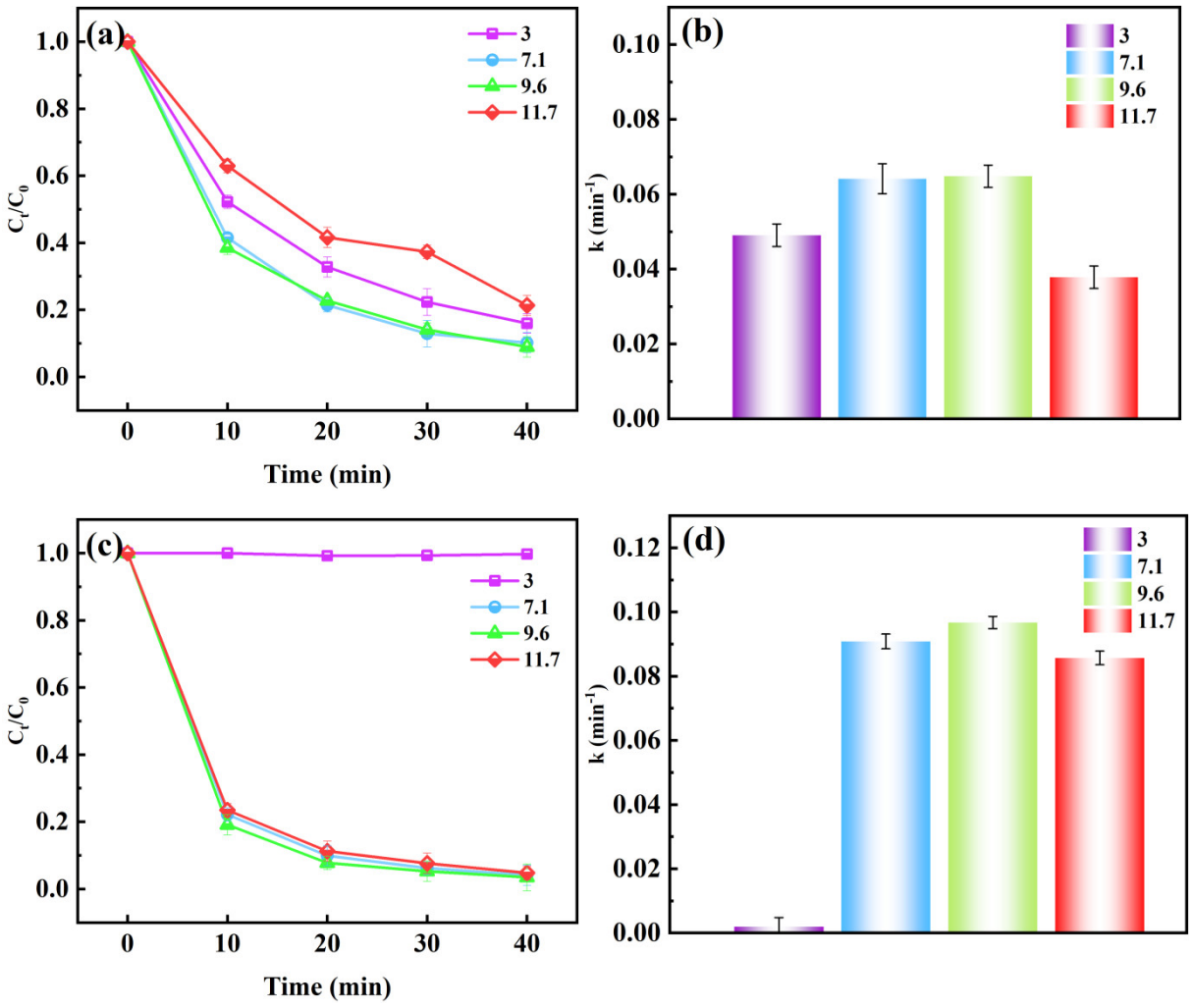


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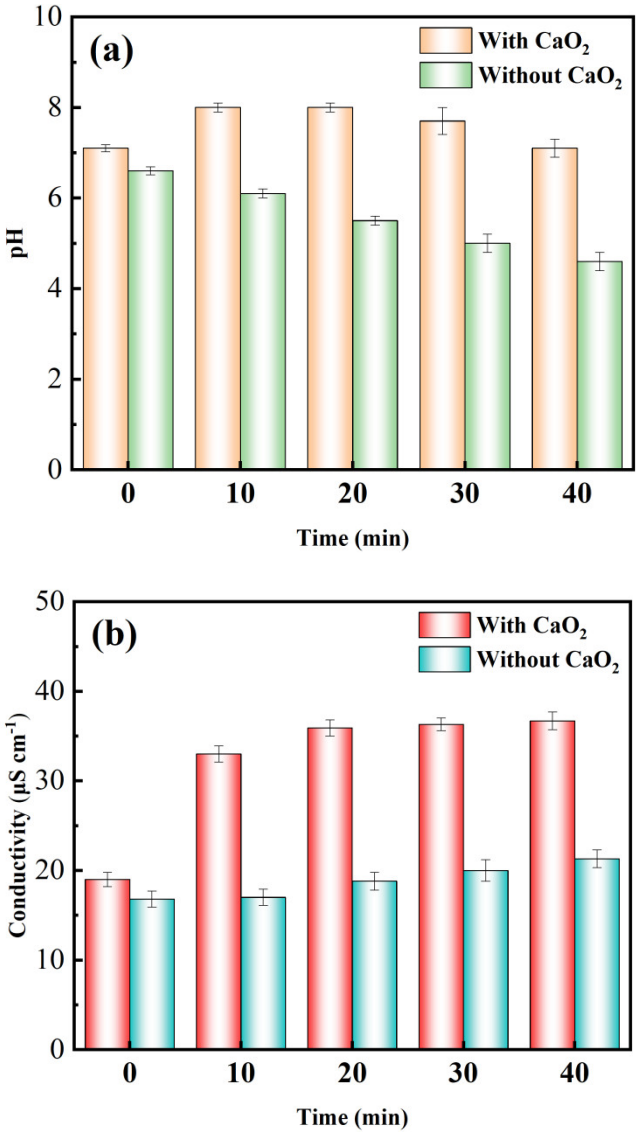


Figure S7. Changes of (a) pH; (b) Conductivity during degradation

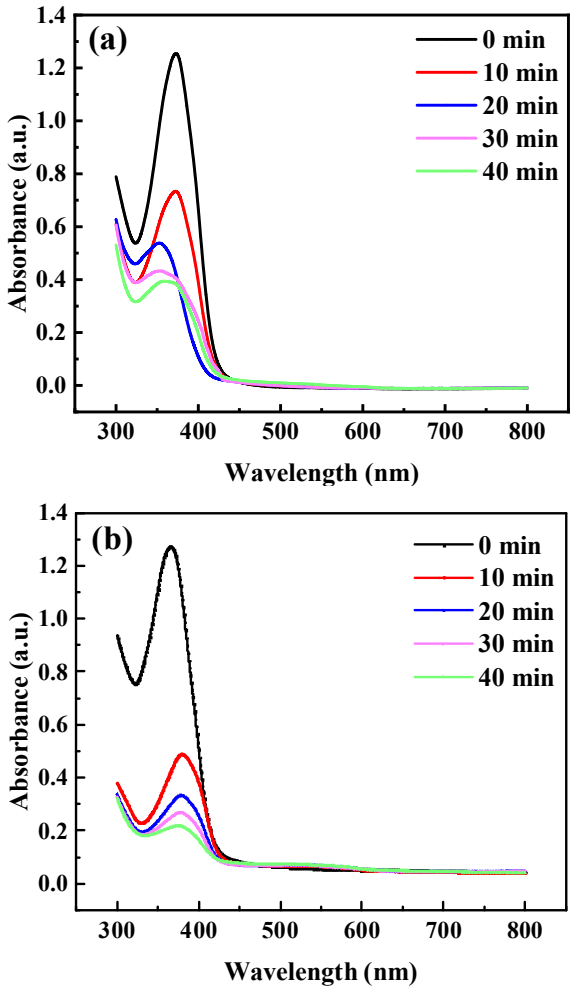


Figure S8. UV-Vis spectra: (a) without CaO_2; (b) with CaO_2

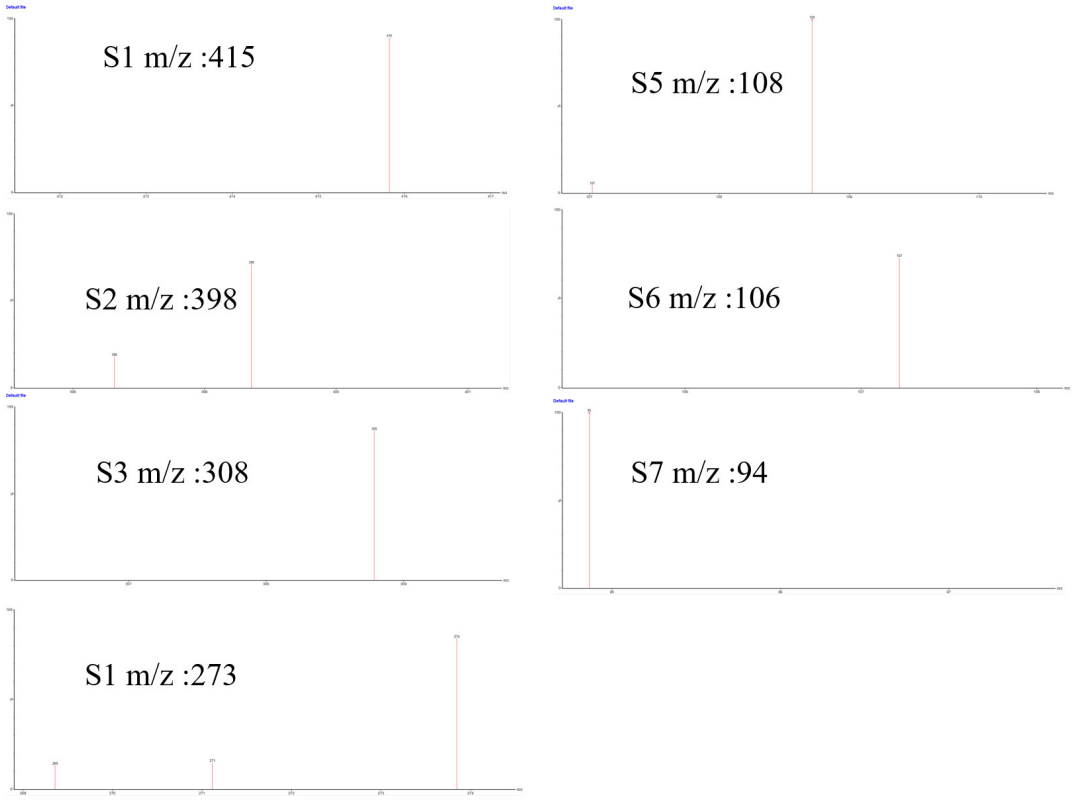


Figure S9. Mass spectrum of the intermediate products (ES+)