

The Piezocatalytic Degradation of Sulfadiazine by Lanthanum-Doped Barium Titanate

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Tabel S1 The k_{obs} and degradation efficiency of the tested groups in this study

Catalysis dosage (g/L)	SDZ concentration (mg/L)	Label	Condition	$k_{obs_average}$ ($\times 10^{-3} \text{ min}^{-1}$)	k_{obs_std} ($\times 10^{-3} \text{ min}^{-1}$)	degradation efficiency (%)
0.5	1	BTO	-	17.51	0.66	65.06%
0.5	2.5	BTO	-	9.35	0.17	44.12%
1	1	BTO	-	30.79	0.20	86.08%
1	10	BTO	-	6.20	0.16	31.50%
1	2.5	BTO	-	13.29	0.51	56.08%
1	5	BTO	-	8.16	0.34	40.17%
1	7.5	BTO	-	7.36	0.29	34.79%
1.5	2.5	BTO	-	18.94	0.56	68.60%
1.5	5	BTO	-	6.28	0.30	31.48%
2	2.5	BTO	-	20.76	0.16	70.36%
2	7.5	BTO	-	4.76	0.10	24.02%
2.5	10	BTO	-	5.64	0.21	28.42%
2.5	2.5	BTO	-	8.43	0.30	38.66%
0	1	BTO	-	0.91	0.13	5.23%
1	1	BTO	no us	1.77	0.05	10.41%
1	1	BTO	pH10	40.19	2.52	90.14%
1	1	BTO	pH4	24.68	1.34	76.55%
1	1	BTO	Cl-	24.33	1.72	76.93%
1	1	BTO	NO3-	26.71	0.79	78.48%
1	1	BTO	Mg2+	25.59	1.08	77.33%
1	1	BTO	Ca2+	25.83	0.61	80.63%
1	1	BTO	SO42-	35.59	0.73	88.65%
1	1	BTO	TBA	19.95	1.24	68.62%
1	1	BTO	p-BQ	4.99	0.34	26.02%
1	1	BTO	EDTA-2Na	23.43	0.44	75.27%
1	1	BTO	FFA	10.06	0.55	45.30%
1	1	BTO	N2	2.01	0.07	12.02%
1	1	BTO	Recycle1	30.49	-	84.54%
1	1	BTO	Recycle2	23.19	-	76.51%
1	1	BTO	Recycle3	20.45	-	71.20%
1	1	BTO	Recycle4	17.53	-	63.51%
1	1	BTO	Recycle5	11.55	-	49.38%
0.5	1	BTO-La	-	16.23	0.48	61.10%
0.5	2.5	BTO-La	-	15.47	0.50	60.36%
1	1	BTO-La	-	37.83	2.77	89.06%
1	10	BTO-La	-	9.62	0.24	43.64%
1	2.5	BTO-La	-	15.73	0.31	60.99%
1	5	BTO-La	-	11.22	0.17	49.37%
1	7.5	BTO-La	-	9.72	0.15	42.77%
1.5	2.5	BTO-La	-	21.13	0.98	70.55%
1.5	5	BTO-La	-	6.26	0.11	30.53%
2	2.5	BTO-La	-	28.26	0.81	81.58%
2	7.5	BTO-La	-	4.20	0.15	22.05%
2.5	10	BTO-La	-	5.73	0.21	28.82%

2.5	2.5	BTO-La	-	6.47	0.29	32.29%
0	1	BTO-La	-	0.73	0.08	4.39%
1	1	BTO-La	no us	4.32	0.28	23.25%
1	1	BTO-La	pH10	51.55	0.33	95.21%
1	1	BTO-La	pH4	34.77	1.67	87.07%
1	1	BTO-La	Cl-	37.87	1.05	90.33%
1	1	BTO-La	NO3-	37.18	1.56	89.91%
1	1	BTO-La	Mg2+	32.04	1.18	85.11%
1	1	BTO-La	Ca2+	24.91	1.60	76.02%
1	1	BTO-La	SO42-	40.97	0.87	90.80%
1	1	BTO-La	TBA	27.85	1.37	79.87%
1	1	BTO-La	p-BQ	9.75	0.31	44.27%
1	1	BTO-La	EDTA- 2Na	31.12	0.91	85.25%
1	1	BTO-La	FFA	13.60	0.28	56.11%
1	1	BTO-La	N2	1.81	0.07	10.53%
1	1	BTO-La	Recycle1	39.27	-	90.14%
1	1	BTO-La	Recycle2	33.45	-	85.41%
1	1	BTO-La	Recycle3	29.19	-	84.92%
1	1	BTO-La	Recycle4	23.40	-	75.46%
1	1	BTO-La	Recycle5	19.83	-	72.32%

‘-’ in labels means under normal ultrasound activation, ‘-’ in std means no parallel test have been done.

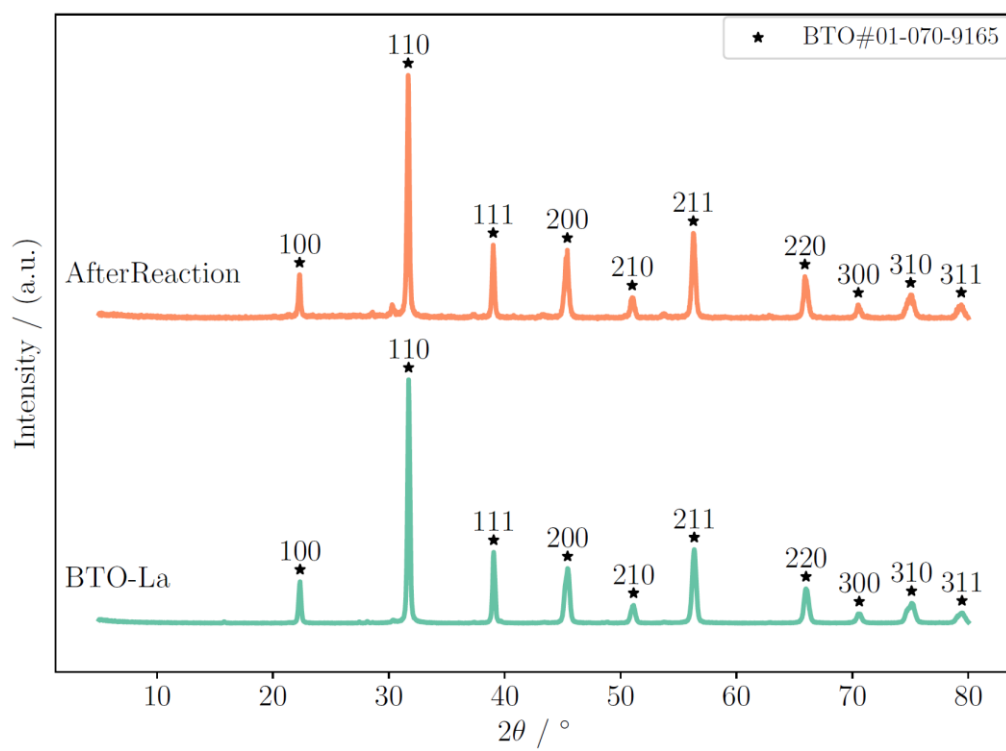
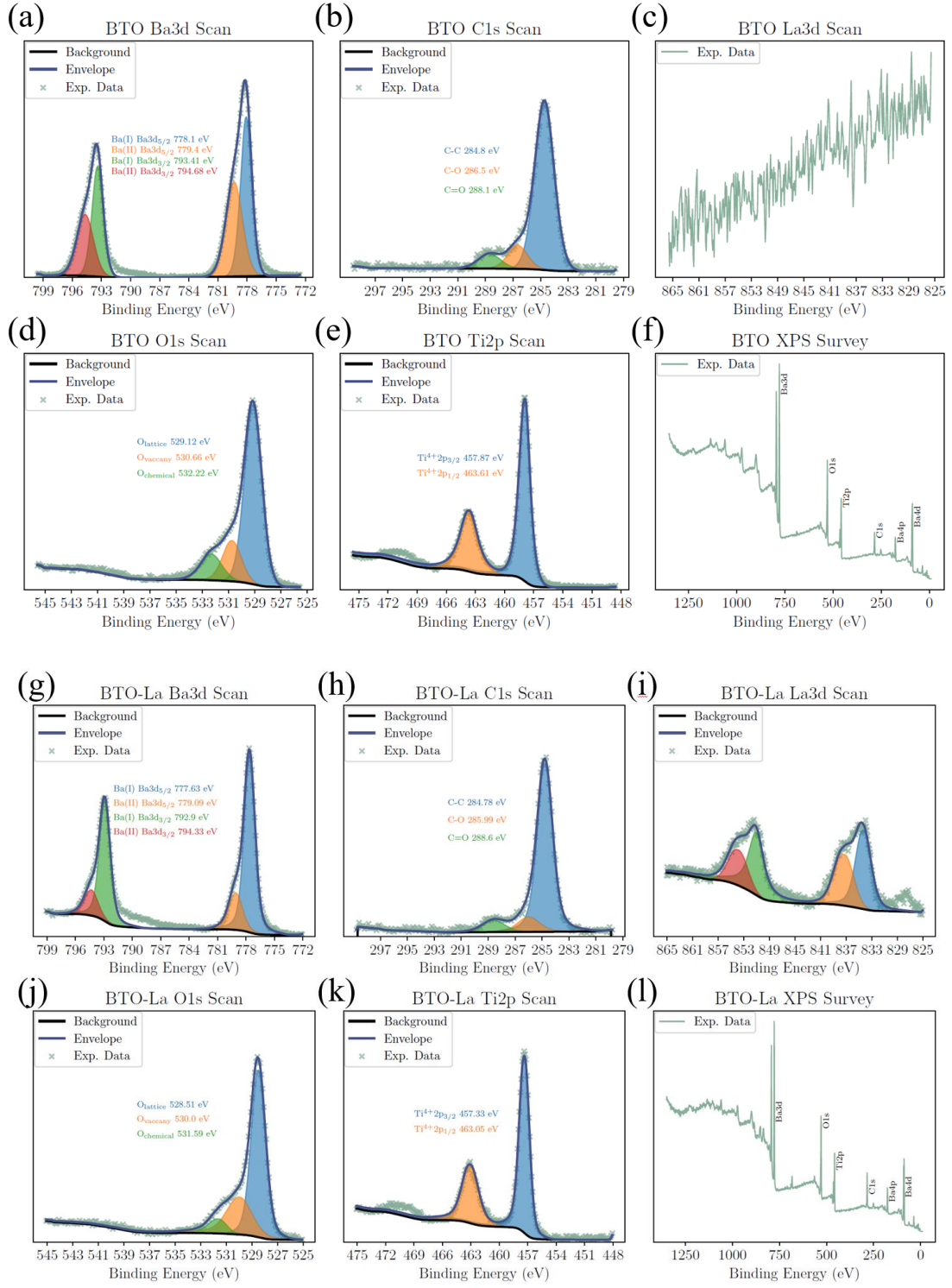


Figure S1. XRD patterns of as-prepared and after-recycle-reaction of BTO-La.



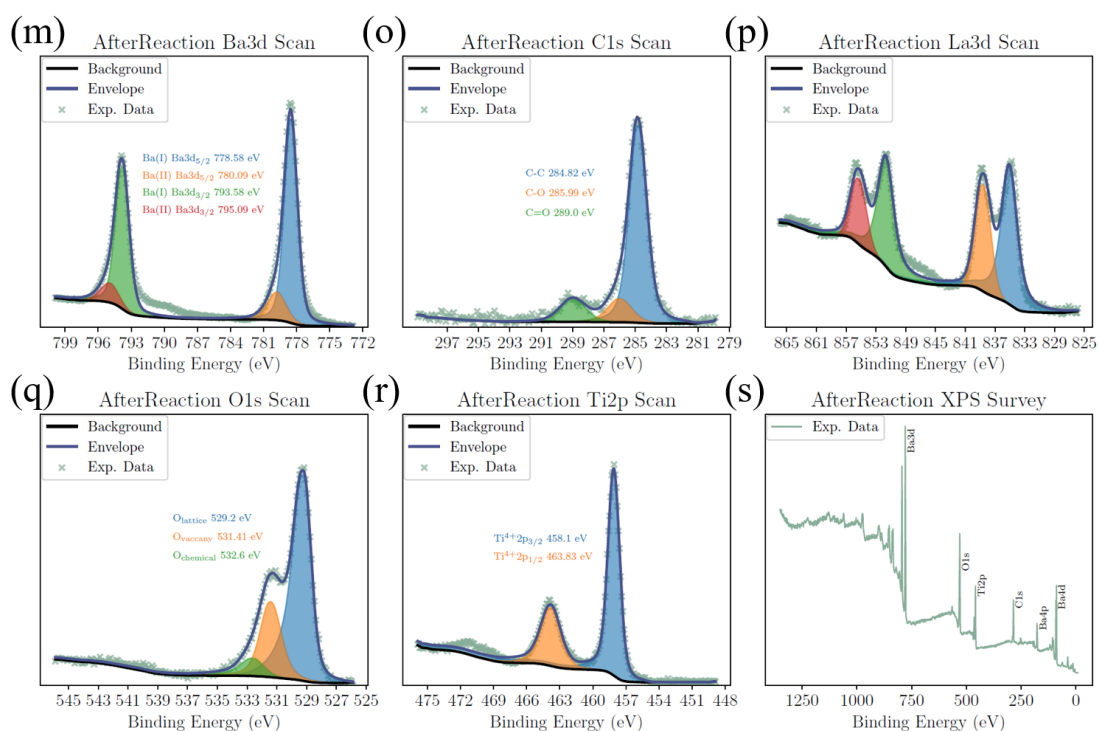


Figure S2. XPS survey and fine scan of as-prepared BTO (a-f), BTO-La(g-l) and after-recycle-reaction of BTO-La (m-s).

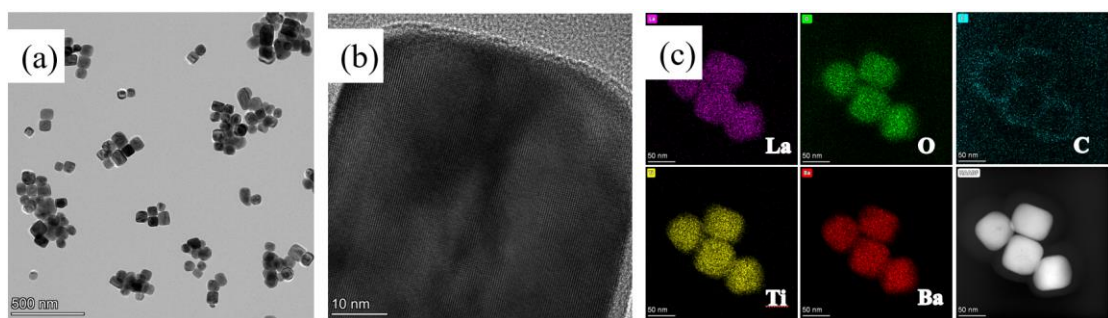


Figure S3. HR-TEM graphs at low (a) and high (b) magnification, and EDS mapping of after-recycle-rection of BTO-La (c)

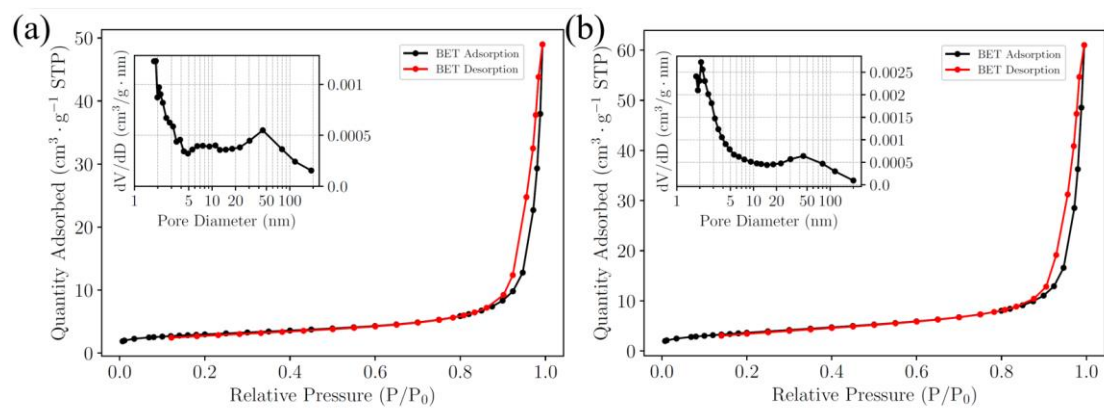


Figure S4. Nitrogen adsorption-desorption isotherms and insets (the corresponding pore size distribution curves) of BTO (a) and BTO-La (b)

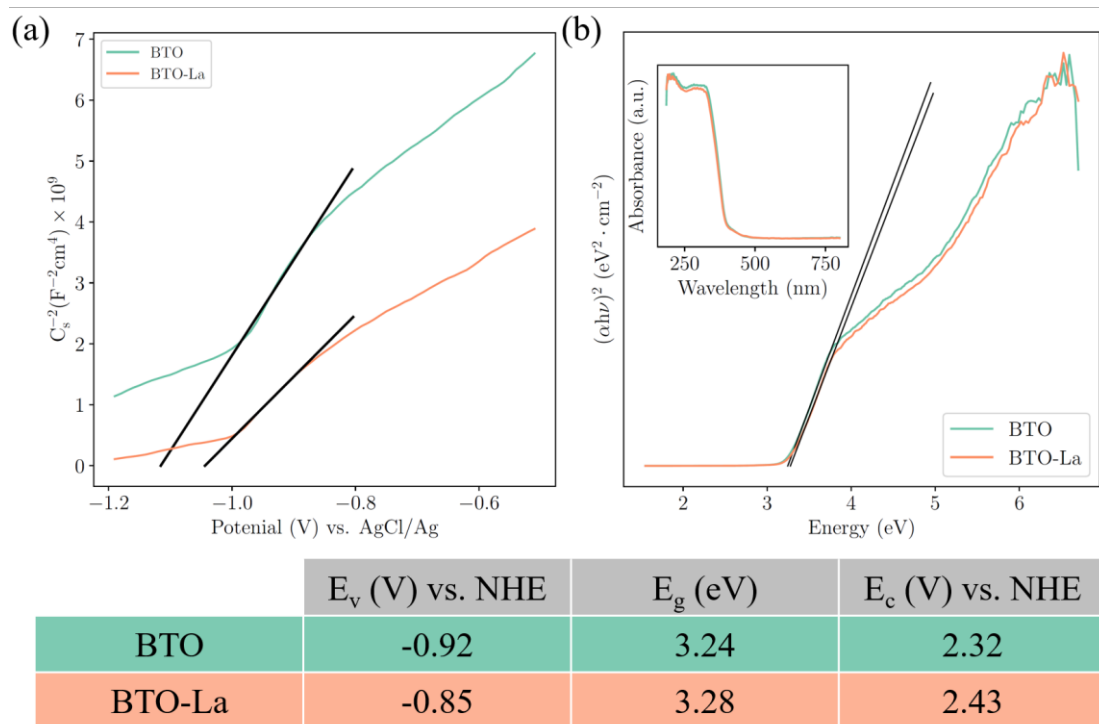


Figure S5. Mott-Schottky curves (a) and Tauc plot (b) result of BTO and BTO-La. The inset in (b) is absorbance while performing UV-DRS test. Corresponding columns of table below the plots are valance position, band gap and conduction position.

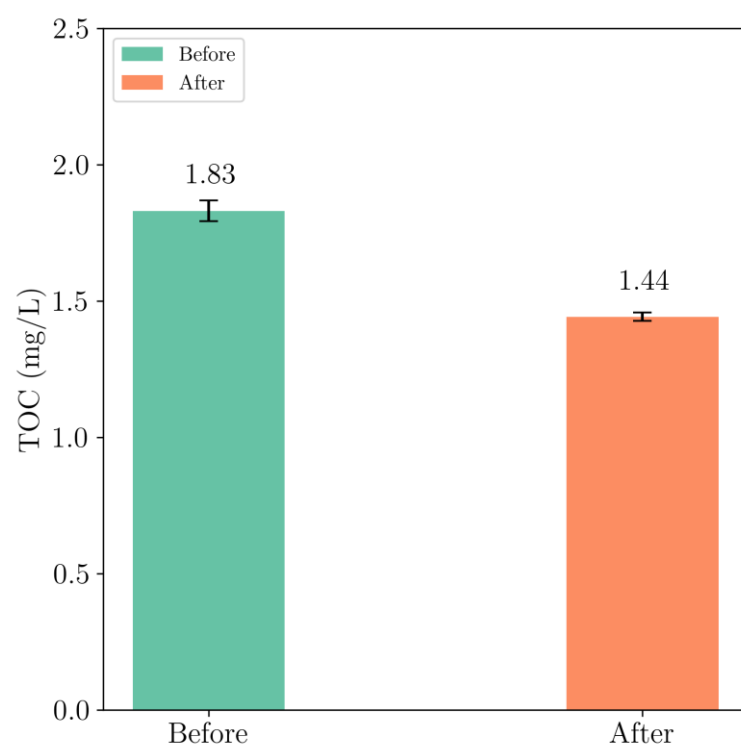


Figure S6. TOC of experimental solution before and after reaction with 1 mg/L SDZ and 1 g/L BTO-La

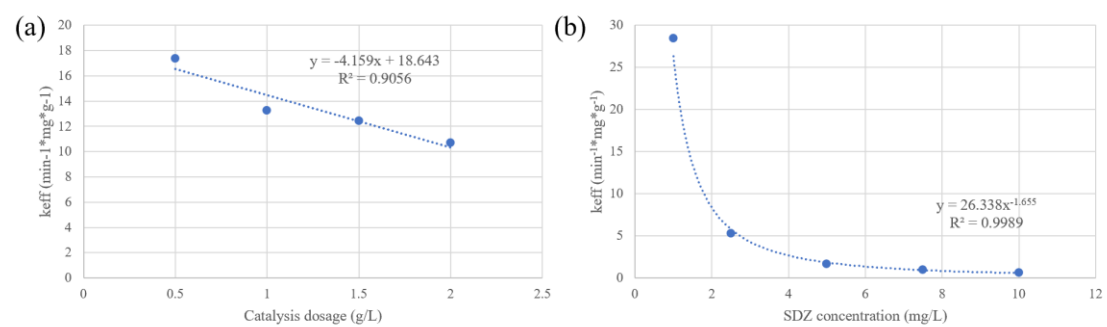


Figure S7. Correlation between k_{eff} and catalysis dosage (a); SDZ concentration (b).

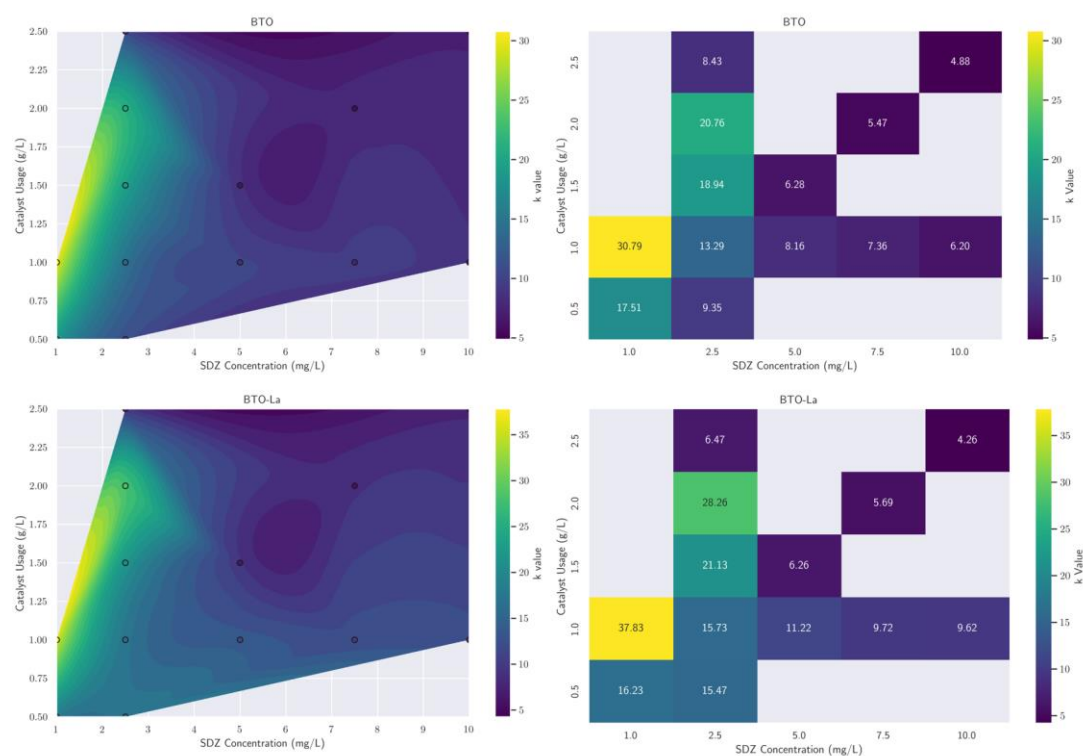


Figure S8. Heatmap of k as the function of SDZ concentration and catalyst dosage (left column) and actual test point (right column).

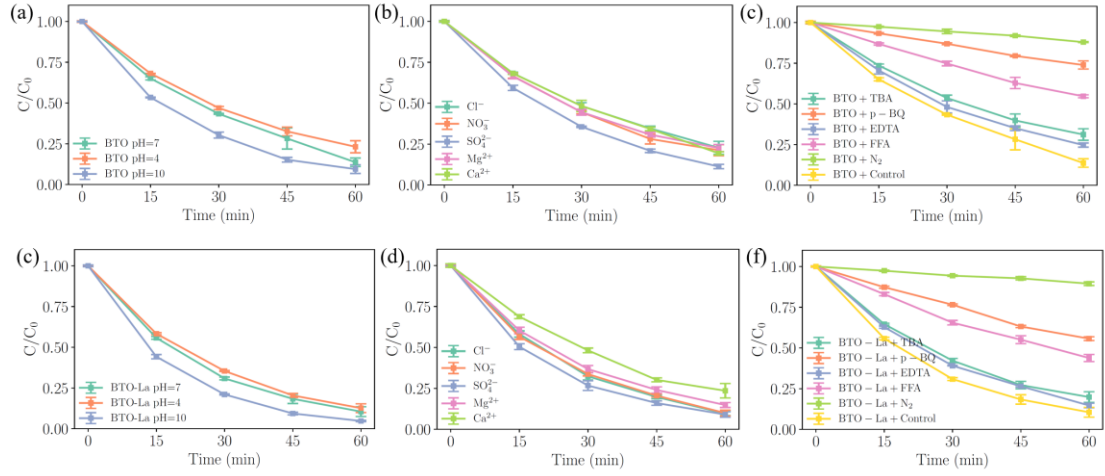


Figure S9. The degradation process of SDZ with BTO under various pH (a); background constituent (b); radical scavengers (c); with BTO-La; under various pH (e); background constituent (d); radical scavengers (f)