Supplementary Materials for

Enhancement of Peroxydisulfate Activation for Complete Degradation of Refractory Tetracycline by 3D Self-Supported MoS_2/MXene Nanocomplex

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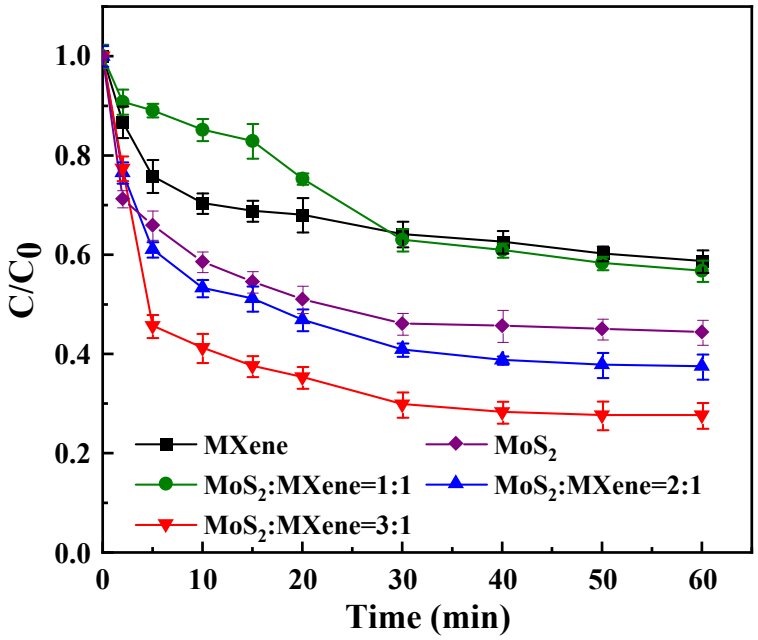


Figure S1. Effect of different materials on the degradation efficiency of TC.

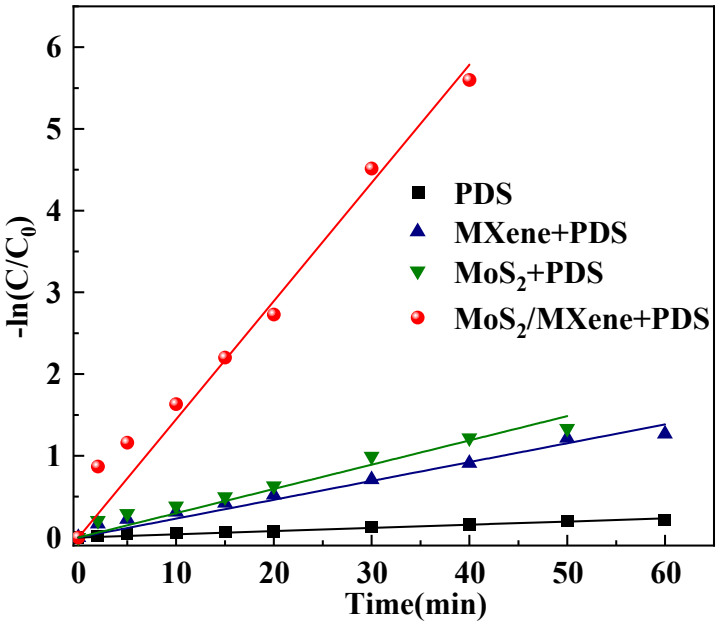


Figure S2. Kinetic fitting models for different materials/systems.

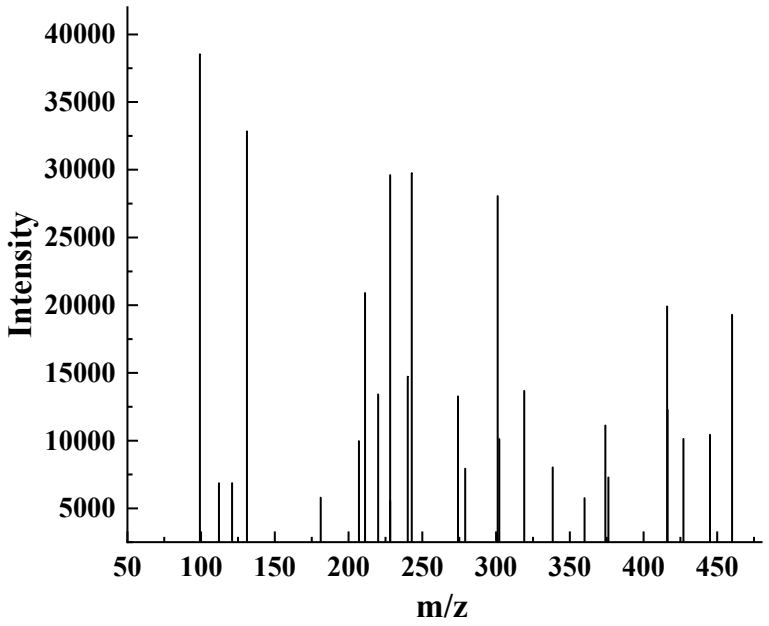


Figure S3. MS full scan spectra of intermediates in TC degradation in the MoS_2/MXene/PDS system by LC-MS.

Table S1. The elemental weight percentages and atomic percentages of MoS_2/MXene were calculated by EDX spectroscopy.

Element	Weight %	Atomic %
C	8.42	26.14
O	5.68	13.23
Mo	47.79	18.58
S	32.18	37.43
Ti	5.94	4.62

Table S2. The fitting parameters of kinetic models of TC degradation by MoS_2/MXene/PDS.

Materials/Systems	Equations	k(min $^{-1}$)	R^2
PDS	y=0.0039x	0.0039	0.992
MXene/PDS	y=0.0231x	0.0231	0.988
MoS_2/PDS	y=0.0297x	0.0297	0.983
MoS_2/MXene/PDS	y=0.1447x	0.1447	0.991

Table S3. The reaction rate constants of radicals with the corresponding scavenger.

Free Radical Species	Scavenger	Rate Constant (k) (M^{-1} s^{-1})
$SO_4^{\bullet-}$/•OH	Ethanol (EtOH)	(1.6-7.7) ×10^7/ (1.2-2.8) × 10^9
	Methanol (MeOH)	(1.6-7.7) × 10^7/9.7 × 10^8
	Tert-butanol (TBA)	(4.0-9.1) × 10^5/ (3.8 -7.6) × 10^8
$O_2^{\bullet-}$	Benzoquinone(p-BQ)	3.0 × 10^{10}

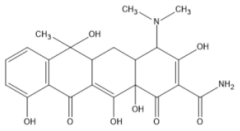
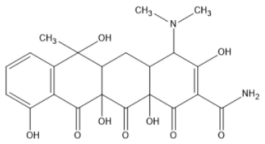
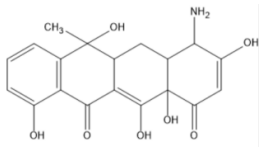
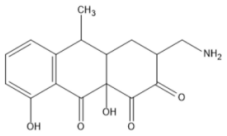
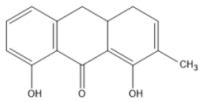
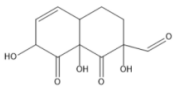
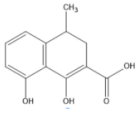
Table S4. The Elemental peak positions and contents of fresh and used MoS_2/MXene

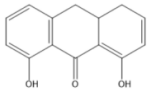
	Fresh		Used	
Elements	Peak Positions	Contents (%)	Peak Positions	Contents (%)
C 1s	285.1eV	66.62	284.8 eV	56.32
O 1s	532.2 eV	15.77	530.9 eV	23.20
Mo 3d	228.4 eV	5.31	228.4 eV	6.85
S 2p	161.8 eV	9.29	161.9 eV	9.13
Ti 2p	456.1 eV	3.01	458.7 eV	4.49

Table S5. The group percentages of fresh and used MoS_2/MXene.

Samples	C (%)			O (%)			Mo (%)		S (%)	
	C-C	C-O	Ti-C	C-O	Ti-O	C=O	Mo^{4+}	Mo^{6+}	S^{2-}	S_2^{2-}
Fresh	32.57	5.45	1.59	16.52	5.61	5.93	5.93	0.07	15.37	0
Used	41.41	11.21	0	9.88	8.57	3.99	4.54	0.86	12.63	0.67

Table S6. Liquid-phase mass spectrometry (LC-MS) analysis of intermediates and possible structural formulae.

Number	m/z	Supposed Structure
TC	446	
P11	460	
P12	374	
P13	302	
P14	242	
P15	240	
P16	220	

P17	228	
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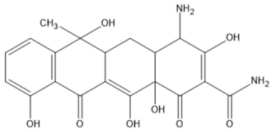
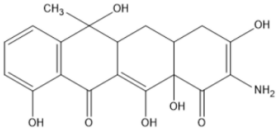
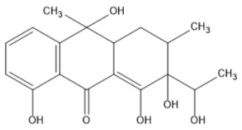
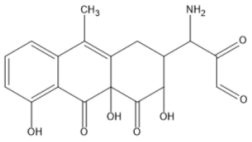
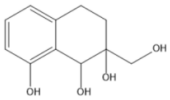
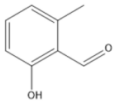
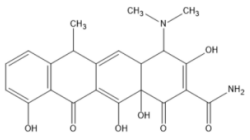
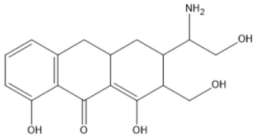
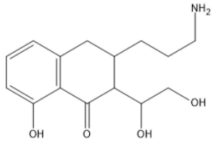
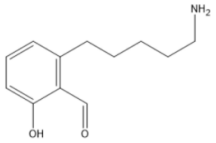
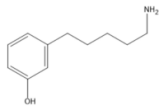
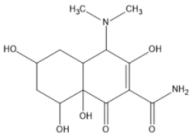
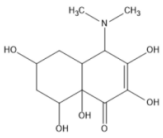
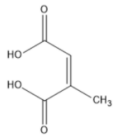
P21	416	
P22	376	
P23	338	
P24	360	
P25	211	
P26	121	
P31	427	
P32	319	
P33	279	
P34	207	

P35	181	
P36	301	
P37	274	
P38	131	
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