

Supporting Information

A chemical coating strategy for assembling boron-doped diamond anode towards electrocatalytic degradation of late landfill leachate

Juanmei Zeng^a, Xi Liu^b, Qizhi Chen^c, Dongying Hu^{a,*}

^a State Key Laboratory of Featured Metal Materials and Life-cycle Safety for Composite Structures, School of Resources, Environment and Materials, Guangxi University, Nanning 530004, China

^b Guangxi Environmental Protection Industry Development Research Institute Co., Ltd., Guangxi Key Laboratory of environmental pollution control and ecological restoration technology, Nanning 530007, China

^c Guangxi Huiyuan Manganese Industry Co., Ltd., Laibin 546100, China

* Corresponding author: Dongying Hu;

Email of Dongying Hu: hdy@gxu.edu.cn

Email of Juanmei Zeng: 1184604205@qq.com

Email of Xi Liu: liuxi1217@foxmail.com

Email of Qizhi Chen: 184170581@qq.com

Table S1 List of abbreviations

Full names	Abbreviations
Chemical oxygen demand	COD
Biological oxygen demand	BOD ₅
Biodegradability	BOD ₅ /COD
Total organic carbon	TOC
Ammonia nitrogen	NH ₃ -N
Chloride ions	Cl ⁻
Total nitrogen	TN
Nitrate nitrogen	NO ₃ -N
X-ray diffraction	XRD
Scanning electron microscope	SEM
Energy-dispersive X-ray spectrometer	EDS
Three-dimensional fluorescence spectroscopy	EEM
Gas chromatography-mass spectrometer	GC-MS
Cyclic voltammetry	CV
Nyquist curves	EIS
Linear sweep voltammetry	LSV

Table S2 Correspondence between peak area of fluorescence spectrum and properties of organic matter

Regions	λ_{Ex} (nm)	λ_{Em} (nm)	Category
I	220~250	280~330	Aromatic protein I
II	220~250	230~380	Aromatic protein II
III	220~250	380~500	Fulvic acid
IV	250~280	290~380	Soluble microbial metabolites
V	290~360	380~500	Humic acid substance

Table S3 Analysis of organic species by GC-MS spectra (0 h, 2 h, 4 h and 5 h)

Name	Molecular formula	Molecular weight	Peak time				Peak area				
			0 h	2 h	4 h	5 h	0 h	2 h	4 h	5 h	
3-Nonyn-2-ol	C ₉ H ₁₆ O	140		3.789				0.19			
1,4,6,6-tetramethyl-Cyclohexene	C ₁₀ H ₁₈	138		3.997				0.248			
4 4-Ethyl-1-hexyn-3-ol	C ₈ H ₁₄ O	126		4.27				0.264			
1-Azabicyclo[3.2.1]octan-6-ol	C ₇ H ₁₃ NO	127		5.023				0.084			
3-O-Benzyl-d-glucose	C ₁₃ H ₁₆ O ₄	236		5.071				0.101			
Cyclopentanecarboxaldehyde	C ₆ H ₁₀ O	98		5.225				0.096			
Spiro[3.4]octan-5-one	C ₈ H ₁₂ O	124		5.653				0.09			
Linalool	C ₁₀ H ₁₈ O	154		5.765				0.081			
dichloronitro- Methane	CHCl ₂ NO ₂	130	11.101	5.848	5.854	5.86	0.154	0.064	0.101	0.078	
1-Piperidinecarbonitrile	C ₆ H ₁₀ N ₂	110		6.169				0.056			

1,3-dithian-2-ylphenyl-Methanone,; exo-2,7,7-trimethylbicyclo[2.2.1]heptan-2-ol	C ₁₁ H ₁₂ OS ₂	224		6.294	6.294				0.075	0.107	
5-Hydroxy-4,4,6-trimethyl-7-oxabicyclo [4.1.0]heptan-2-one	C ₁₀ H ₁₈ O	162		6.691					0.089		
2-butyl-1-Octanol	C ₉ H ₁₄ O ₃	170		7.172					0.096		
Tetradecane	C ₁₂ H ₂₆ O	186		7.623	8.591	8.591			0.139	0.047	0.052
2,2-dimethyl-5-(3-methyloxiranyl)-, [2.alpha. (R*),3.alpha.]-(+)- Cyclohexanone	C ₁₄ H ₃₀	198	16.301	8.519	8.525	8.52	0.082		0.083	0.068	0.043
Tricyclo [4.2.2.0(2,5)]deca-7,9-diene-7,8-dicarboxylic acid, 3-cyano-, dimethyl ester	C ₁₁ H ₁₈ O ₂	182		8.626					0.065		
4H-Chromene, 4a,5,6,7,8,8a-hexahydro-2,3,5,5,8a-pentamethyl 2-	C ₁₅ H ₁₅ NO ₄	273		9.089	0.089				0.113	0.065	
Butyloxycarbonyloxy-1,1,10-trimethyl-6,9-epidioxydecalin	C ₁₄ H ₂₄ O	208		9.178					0.071		
2,6,10-trimethyl-Tetradecane	C ₁₈ H ₃₀ O ₅	326		9.309	9.172				0.125	0.065	
2,4-Di-tert-butylphenol	C ₁₇ H ₃₆	240	17.297	9.368	9.368	10.947	0.128		0.071	0.285	0.057
2,5,5,8a-Tetramethyl-4-methylene-6,7,8,8a-tetrahydro-4H,5H-chromen-4a-yl hydroperoxide	C ₁₄ H ₂₂ O	206		9.517	9.516	9.519			0.077	0.089	0.039
3,7,11-trimethyl-1-Dodecanol,; p-Toluic acid, 5-tridecyl ester	C ₁₄ H ₂₂ O ₃	238		9.582					0.089		
7-Methyl-Z-tetradecen-1-ol acetate	C ₁₅ H ₃₂ O	228		9.73	10.787				0.124	0.207	
Disulfide, di-tert-dodecyl	C ₂₁ H ₃₄ O ₂	318		9.772					0.042		
3-hydroxy-Dodecanoic acid	C ₁₇ H ₃₂ O ₂	268	29.174 29.947 30.81	9.896 11.303	10.852	11.06	0.357		0.213	0.219	0.296
2-methyl-4-(1,3,3-trimethyl-7-oxabicyclo [4.1.0] hept-2-yl)- 3-	C ₂₄ H ₅₀ S ₂	402		10.175					0.047		
	C ₁₂ H ₂₄ O ₃	216		10.306	9.309	11.457			0.077	0.059	0.08
	C ₁₄ H ₂₄ O ₂	224		10.46					0.077		

Buten-2-ol											
Geranyl isovalerate	C ₁₅ H ₂₆ O ₂	238		10.567					0.113		
N, N'-Bis (Carbobenzyloxy)- lysine methyl(ester)	C ₂₃ H ₂₈ N ₂ O ₆	428		10.727					0.047		
6-(3-Hydroxy-but-1- enyl)-1,5,5-trimethyl 7- oxabicyclo [4.1.0] heptan-2-ol	C ₁₃ H ₂₂ O ₃	226		10.787					0.095		
tert-Hexadecanethiol	C ₁₆ H ₃₄ S	258	17.535	10.941	10.235	12.027	0.095	0.071	0.077	0.138	
2-methyl-1- Hexadecanol	C ₁₇ H ₃₆ O	256	20.241	11.451			0.085	0.106			
2,3-dimethyl-5- trifluoromethyl- Phen- 1,4-diol	C ₉ H ₉ F ₃ O ₂	206		12.235					0.064		
4-[2-isopropyl-5- methyl-5-(2-methyl-5- oxocyclopentyl) cyclopentenyl]- 2- Butanone	C ₂₀ H ₃₂ O ₂	304		12.3	12.3	12..3		0.077	0.189	0.077	
Fumaric acid, 2- ethylhexyl tridec-2-yn- 1-yl ester	C ₂₅ H ₄₂ O	358		12.573					0.065		
7,9-Di-tert-butyl-1- oxaspiro (4, 5) deca- 6,9-diene-2,8-dione	C ₁₇ H ₂₄ O ₃	276	23.805	12.627	12.627	12.663	0.064	0.095	0.279	0.068	
n-Hexadecanoic acid 1,2- Benzenedicarboxylic acid, butyl 8- methylnonyl ester	C ₁₆ H ₃₂ O ₂	256	24.191	12.763	12.763	12.769	0.13	0.095	0.201	0.084	
Octadecanoic acid	C ₂₂ H ₃₄ O ₄	362		12.87					0.095		
Hexadecanamide	C ₁₈ H ₃₆ O ₂	284	26.542	14.039	14.039	14.039	0.089	0.071	0.116	0.137	
1,4- Benzenedicarboxylic acid, bis(2- hydroxyethyl) ester	C ₁₆ H ₃₃ NO	259	26.781	14.188	14.188	14.194	0.095	0.095	0.172	0.083	
(Z)- 9-Octadecenamid	C ₁₂ H ₁₄ O ₆	254	26.998	14.36	14.372	14.384	0.146	0.131	0.232	0.131	
Octadecanamide	C ₁₈ H ₃₅ NO	95		15.286	15.286	15.286		0.148	0.225	0.142	
Hexadecanoic acid, 2- hydroxy-1- (hydroxymethyl)ethyl ester	C ₁₈ H ₃₇ NO	283		15.387	16.039		0.117	0.142	0.185	0.107	
Z-5-Methyl-6- heneicosen-11-one	C ₁₉ H ₃₈ O ₄	330		16.039	16.039	7.178		0.101	0.195		
Oleic acid, 3-	C ₂₂ H ₄₂ O	322		16.265	16.265	16.111 16.396		0.166	0.314	0.160	
	C ₃₉ H ₇₆ O ₃	592		17.09		15.98		0.093		0.065	

(octadecyloxy) propyl ester								
(Z)- 13-Docosenamide	C ₂₂ H ₄₃ NO	337		17.405	17.404		0.07	0.237
Stearic acid, 3-(octadecyloxy) propyl ester	C ₃₉ H ₇₈ O ₃	594		18.117	17.333		0.172	0.083
3,6,13,16-tetraoxatricyclo[16.2.2.2(8,11)]tetracos-8,10,18,20,21,23-hexaene-2,7,12,17-tetrone	C ₂₀ H ₁₆ O ₈	384		18.829			0.270	
2-Propenoic acid, butyl ester	C ₇ H ₁₂ O ₂	128		6.642	3.753		0.198	0.226
(1 α ,2 β ,6 α)- dicyclo[4.1.0]heptan-2-ol	C ₇ H ₁₂ O	112			3.985			0.083
3-(3-hydroxy-1-propenyl)-Cyclopentanone	C ₈ H ₁₂ O ₂	140			4.008	4.009		0.184 0.148
1-(2,2-dimethylcyclopentyl)-Ethanone	C ₉ H ₁₆ O	140			4.287	4.282		0.291 0.243
1-Cyclohexene-1-methanol	C ₇ H ₁₂ O	112			4.501			0.119
4-Butoxy-2-butanone	C ₈ H ₁₆ O ₂	144			4.673			0.303
Acetic acid, dichloro-, heptyl ester	C ₉ H ₁₆ Cl ₂ O ₂	227			5.023	5.024		0.1 0.091
Glutaconic acid	C ₅ H ₆ O ₄	130			5.077			0.113
2-Nitrohept-2-en-1-ol	C ₇ H ₁₃ NO ₃	159			5.368			0.16
Acetophenone	C ₈ H ₈ O	120			5.496	5.469		0.106 0.073
2-methoxy- Phenol	C ₇ H ₈ O ₂	124			5.676			0.107
4-(1,1-dimethylethyl)-Pyridine	C ₉ H ₁₃ N	135			5.759	5.736		0.095 0.047
tetrahydro-4-oxo-3-Thiophenecarboxylic acid, methyl ester	C ₆ H ₈ O ₃ S	160			6.092			0.089
Dodecane	C ₁₂ H ₂₆	170	10.069		6.679	6.685	0.132	0.077 0.066
Decanal	C ₁₀ H ₂₀ O	156			6.762			0.077
Oxybis [dichloro-Methane	C ₂ H ₂ Cl ₄ O	184			7.712			0.078
1,3-bis(1,1-dimethylethyl)-Benzene	C ₁₄ H ₂₂	190	13.892		7.279		0.095	0.133
Benzene	C ₁₃ H ₂₈	184			7.623	7.629		0.095 0.089
4-Hydroxyimino-6-hydroxy-4,5,6,7-tetrahydrobenzofuraza	C ₁₄ H ₃₀	198			8.525			0.065

n								
2,6-	Pyridinedicarboxylic acid	C ₇ H ₅ NO ₄	167		8.769			0.089
	4,6-di-tert-Butyl-m-cresol	C ₁₅ H ₂₄ O	220		9.089			0.071
	trans-2-Hexadecenoic acid	C ₁₈ H ₃₀ O ₅	326		9.172			0.083
	m-Toluic acid, 2-butyl ester	C ₁₂ H ₁₆ O ₂	192		9.772			0.077
	1-Benzoxirene-2,5-dione, 4-(3-oxobutyl) hexahydro -3,3,4-trimethyl	C ₁₃ H ₁₈ O ₄	238		9.873			0.083
	Hexadecane	C ₁₆ H ₃₄	226	19.379	10.175	10.181	0.095	0.053 0.042
	4-Ethylbenzoic acid, 6-ethyl-3-octyl ester	C ₁₉ H ₃₀ O ₂	290		10.567			0.071
	2,5-Octadecadiynoic acid, methyl ester	C ₁₉ H ₃₀ O ₂	100		10.727			0.065
	9-Hexadecenoic acid	C ₁₆ H ₃₀ O ₂	254		11.582	12.081		0.237 0.077
(E)-	10-Heptadecen-8-ynoic acid, methyl ester	C ₁₈ H ₃₀ O ₂	278		11.926			0.318
	Phthalic acid, butyl undecyl ester	C ₂₃ H ₃₆ O ₄	370		12.241			0.368
	Phthalic acid, ethyl octadecyl ester	C ₂₈ H ₄₆ O ₄	446		12.537	12.579		0.184 0.077
	Phthalic acid, butyl tridecyl ester	C ₂₅ H ₄₀ O ₄	404		12.876			0.202
	4-ethyl-4-methyl-2-pentadecyl-1,3-Dioxolane	C ₂₁ H ₄₂ O ₂	326		14.829			0.184
	2-bromo- Octadecanal	C ₁₈ H ₃₅ BrO	347		15.624			0.228
	12-Methyl-E, E-2,13-octadecadien-1-ol	C ₁₉ H ₃₆ O	280		15.748			0.157
	(3β,5Z,7E)- 9,10-Secocholesta-5,7,10(19)-triene-3,24,25-triol	C ₂₇ H ₄₄ O ₃	416		16.39			0.166
	3,6,13,16-tetraoxatricyclo[16.2.2.2(8,11)]tetracos-8,10,18,20,21,23-hexaene-2,7,12,17-tetrone	C ₂₀ H ₁₆ O ₈	384		18.835	18.841		0.244 0.281
	19.043 19							
	n-Hexyl acrylate	C ₉ H ₁₆ O ₂	156		3.777			0.196
	(1-Allylcyclopropyl)methanol	C ₇ H ₁₂ O	112		3.991			0.101

Benzaldehyde	C ₇ H ₆ O	106		4.418		0.071
2-methyl-1-Hexen-3-yne	C ₇ H ₁₀	94		4.513		0.113
2-Nitrohept-2-en-1-ol	C ₇ H ₁₃ NO ₃	159	8.904	4.673	0.191	0.152
N- α ,N- ω -Di-cbz-L-arginine	C ₂₂ H ₂₆ N ₄ O ₆	410		5.089		0.1
Pentanedinitrile	C ₅ H ₆ N ₂	94		5.347		0.087
4-(1,1-dimethylethyl)-Pyridine	C ₉ H ₁₃ N	135		5.748		0.063
Benzyl nitrile	C ₈ H ₇ N	117		6.181		0.062
1,3-dithian-2-ylphenyl-Methanone	C ₁₁ H ₁₂ OS ₂	224		6.3		0.086
Carbon Tetrachloride	CCl ₄	154	12.499	6.585	0.085	0.072
[(hexadecyloxy)methyl]-Oxirane	C ₁₉ H ₃₈ O ₂	298		7.178		0.098
4-(2,4,4-Trimethylcyclohexa-1,5-dienyl)-but-3-en-2-one	C ₁₃ H ₁₈ O	190		7.279		0.119
1,2-Ethanediol, monobenzoate	C ₉ H ₁₀ O ₃	166		8.769		0.069
4-methyl- Benzoic acid, 2-methylpropyl ester	C ₁₂ H ₁₆ O ₂	192		9.778		0.077
Pentadecyl decanoate	C ₂₅ H ₅₀ O ₂	382		10.638		0.089
Tetradecanoic acid	C ₁₄ H ₂₈ O ₂	228		11.368		0.043
Z-(13,14-Epoxy)tetradec-11-en-1-ol acetate	C ₁₆ H ₂₈ O ₃	268		11.825		0.066
Phthalic acid, butyl tetradecyl ester	C ₂₆ H ₄₂ O ₄	418		12.241		0.053
Phthalic acid, ethyl octadecyl ester	C ₁₆ H ₂₂ O ₄	278		12.87		0.083
Oleic Acid	C ₁₈ H ₃₄ O ₂	282		13.909		0.083
4,4'-(1-methylethylidene) bis-Phenol	C ₁₅ H ₁₆ O ₂	288	26.833	14.3	0.111	0.089
Z-5-Methyl-6-heneicosen-11-one	C ₂₂ H ₄₂ O	322		16.111		0.160
(15 β ,16E)-16,17,20,21-tetrahydro-16-(hydroxymethyl)-18,19-Secoyohimban-19-oic acid	C ₂₁ H ₂₄ N ₂ O ₃	352		16.265		0.142
bis (ethylene ketal)-Adamantane-2,6-dione	C ₁₄ H ₂₀ O ₄	252		16.55		0.101
1,1'-[1,3-propanediylbis(oxy)]	C ₃₉ H ₈₀ O ₂	580		17.224		0.081

bis- Octadecane					
2,2,4-Trimethyl-3-(3,8,12,16-tetramethylheptadeca-3,7,11,15-tetraenyl)-cyclohexanol	C ₃₀ H ₅₂ O	428		17.636	0.065
1,1-Dimethyl-3-chloropropanol	C ₅ H ₁₁ ClO	122.5	4.779		0.179
2,3-dichloro-2-methyl-Butane	C ₅ H ₁₀ Cl ₂	141	5.117		0.432
1,2-Ethanediol, monoacetate	C ₄ H ₈ O ₃	104	5.626		0.173
N,N-Dimethylacetamide	C ₄ H ₉ NO	87	6.092		0.196
1,1-Dichloro-2,3-dimethylcyclopropane	C ₅ H ₈ Cl ₂	139	6.341		0.249
1,4-dichloro-2-Butanol	C ₄ H ₈ Cl ₂ O	109.5	8.321		0.212
1-Chloro-2-ethoxy-2-methoxy-propane	C ₆ H ₁₃ ClO ₂	86.5	8.708		0.145
1,1-dichloro-2-chloromethyl-2-methyl- Cyclopropane	C ₅ H ₇ Cl ₃	173.5	9.168		0.185
2,3-dichloro-2-methyl-Propanal	C ₄ H ₆ Cl ₂ O	141	9.584		0.154
1,2,3-trichloro-2-methyl- Propane	C ₄ H ₇ Cl ₃	161.5	9.746		0.19
2-Chloromethyl-1,3-dichloro-2-methylpropane	C ₅ H ₉ Cl ₃	288.5	10.185		0.148
2,3-dichloro-2,3-dimethyl-Cyclopropane carboxylic acid, anhydride with hypochlorous acid	C ₆ H ₇ Cl ₃ O ₂	288.5	10.519		0.111
6-methyl- Octadecane	C ₁₉ H ₄₀	248	10.969		0.164
(isocyanomethyl)-Benzene	C ₈ H ₇ N	117	11.763		0.106
N, N'-di-benzoyloxy-Hexanediamide	C ₂₀ H ₂₀ N ₂ O ₆	384	12.081		0.101
2-(2,4-dichlorophenoxy)-Ethanol	C ₈ H ₈ Cl ₂ O ₂	207	12.277		0.122
2,3-Dichloro-7-methylenebicyclo[2.2.1]heptane	C ₈ H ₁₀ Cl ₂	177	12.785		0.053
2,5-dichloro- Phenol, acetate	C ₈ H ₆ Cl ₂ O ₂	205	13.944		0.111
1,1-dichloro-1-Propene	C ₃ H ₄ Cl ₂	111	13.14		0.079
2,4-dimethyl-	C ₉ H ₁₀ O	196	13.225		0.117

Benzaldehyde				
2,6-dichloro-2,5-				
Cyclohexadiene-1,4-	$C_6H_2Cl_2O_2$	177	13.442	0.127
dione				
1,1,3,3-tetrachloro-2-				
methyl- Propane	$C_4H_6Cl_4$	196	13.51	0.055
5-ethyl-5-methyl-				
Decane	$C_{13}H_{28}$	184	14.289	0.077
2,3,5,8-tetramethyl-				
Decane	$C_{14}H_{30}$	198	14.453	0.09
p-tert-butyl- Phenol	$C_{10}H_{14}O$	150	14.575	0.042
Ascaridole epoxide	$C_{10}H_{16}O_3$	184	14.765	0.092
2,4,6-trichloro- Phenol	$C_6H_3Cl_3O$	131.5	15.618	0.103
Dodecanal;	$C_{12}H_{24}O$	184	16.476	0.139
E-2-Hexenyl benzoate	$C_{13}H_{16}O_2$	204	16.666	0.079
2,6-Dichloro-4-(1,1-				
dimethylethyl)phenol	$C_{10}H_{12}Cl_2O$	219	18.334	0.099
4-chloro-2,6-bis(1,1-				
dimethylethyl)- Phenol	$C_{14}H_{21}ClO$	240.5	18.589	0.079
2,5-dichloro-1,4-				
Benzenediol	$C_6H_4Cl_2O_2$	179	18.945	0.207
(E)- 10-Heptadecen-8-				
ynoic acid, methyl	$C_{18}H_{30}O_2$	278	19.487	0.148
ester				
4-amino-2,3,6-				
trichloro- phenol	$C_6H_4Cl_3NO$	212.5	19.86	0.159
9-hexyl- Heptadecane	$C_{23}H_{48}$	324	20.739	0.09
1-(5-Ethyl-				
tetrahydrofuran-2-yl)-				
3,3-dimethyl-butan-2-	$C_{12}H_{22}O_2$	198	20.839	0.064
one				
2,6,10,14-tetramethyl-				
Hexadecane	$C_{20}H_{42}$	282	20.972	0.085
Heptacosane	$C_{27}H_{56}$	380	22.142	0.207
1,2-				
Benzenedicarboxylic	$C_{17}H_{24}O_4$	292	23.54	0.101
acid, monononyl ester				
Phthalic acid, bis(7-				
methyloctyl) ester	$C_{26}H_{42}O_4$	418	24.292	0.175
12-Methyl-E, E-2,13-				
octadecadien-1-ol	$C_{19}H_{36}O$	280	29.645	0.093
3-ethyl-5-(2-				
ethylbutyl)-				
Octadecane	$C_{26}H_{54}$	366	29.878	0.154
E, E, Z-1,3,12-				
Nonadecatriene-5,14-	$C_{19}H_{34}O_2$	294	30.196	0.136
diol				
2-((2H-benzotriazo)-2-				
yl)-4-(1,1,3,3-	$C_{20}H_{25}N_3O$	323	30.974	0.143
tetramethylbutyl)				

phenol cis-9,10- Epoxyoctadecanamide	$C_{18}H_{35}NO_2$	297	32.621	0.228
--	--------------------	-----	--------	-------

Table S4 Change analysis of organic species (0 h, 2 h, 4 h, 5 h)

Organic species	Electrolytic time	0 h	2 h	4 h	5 h
Aromatic hydrocarbons		7	5	6	4
Straight-chain alkanes		13	3	4	2
Cycloalkane		3	3	1	3
Straight-chain olefins		1	0	2	0
Cyclic olefins		0	1	1	0
Esters		9	11	12	8
Alcohols and phenols		13	8	3	0
Ketoaldehydes		5	7	6	4
Amides		5	4	0	0
Other		7	5	4	3

Table S5 Five-step determination of chlorine content in water under different operating factors (current density: $90 \text{ mA} \cdot \text{cm}^{-2}$)

	pH=7, 5 h	$A/V=4.25 \text{ m}^{-1}$, 5 h	$A/V=5.67 \text{ m}^{-1}$, 5 h
ClO_2	0.45	0	0
ClO_2^-	0	8.07	0
ClO_3^-	943	1414	486
Cl_2	21	41	4

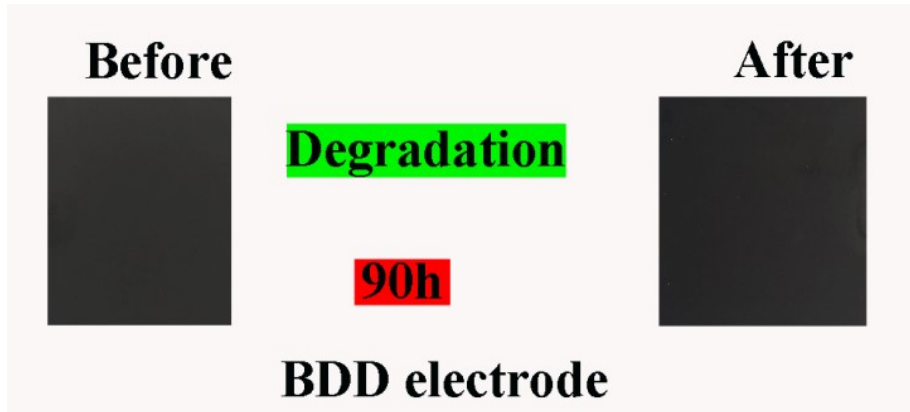


Figure S1 Comparison of morphology before and after degradation

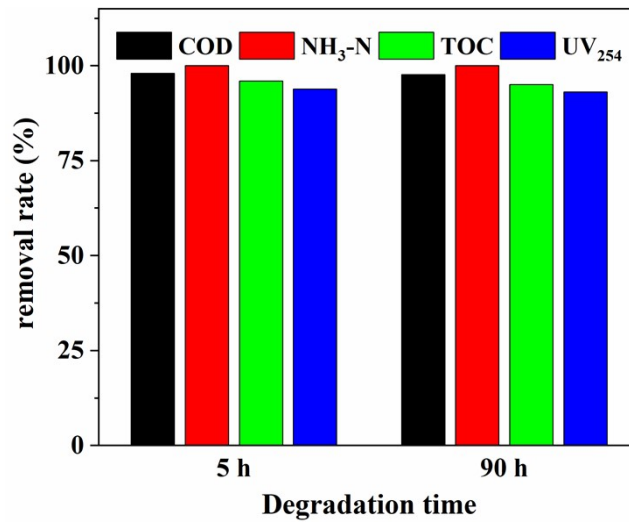


Figure S2 Comparison of performance of landfill leachate degraded by BDD electrode for 5 h and 90 h

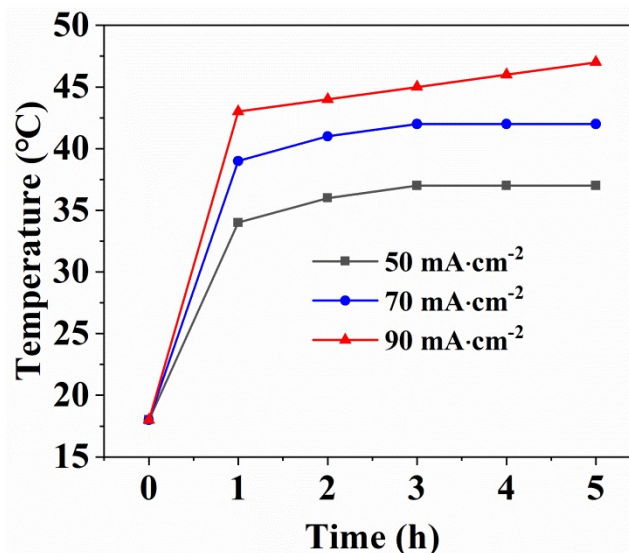


Figure S3 Temperature changes with time at different current densities

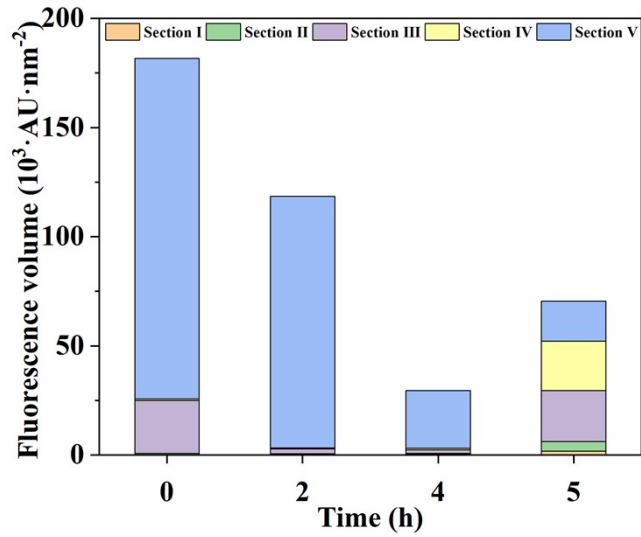


Figure S4 Fluorescence volume distribution in different regions at different processing times

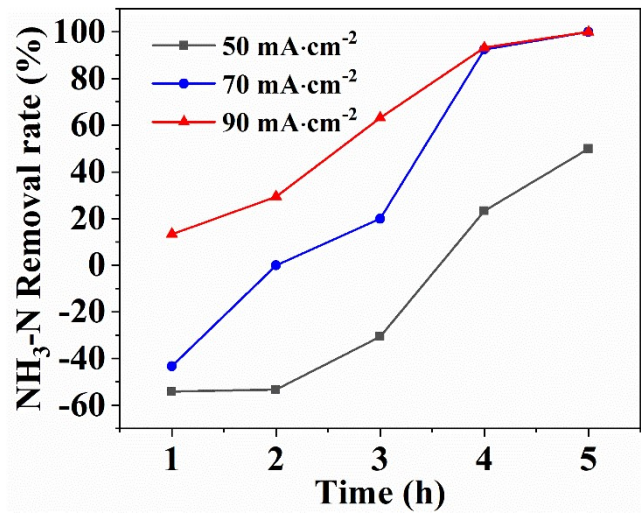


Figure S5 Effect of different current density and degradation time on NH₃-H removal rate

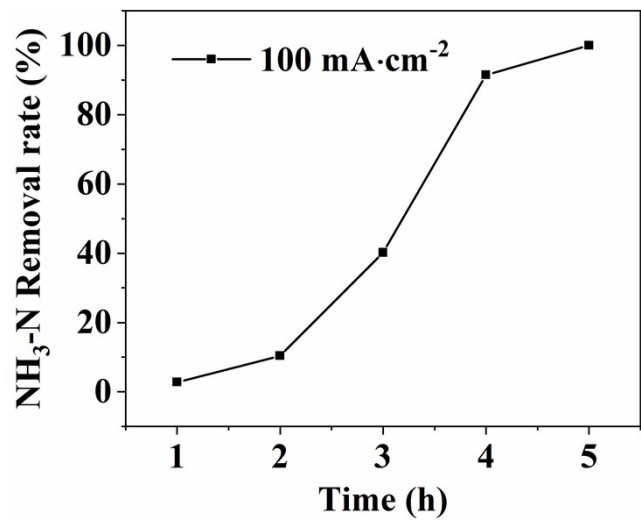


Figure S6 Effect of degradation time on NH₃-H removal rate (current density: 100 mA·cm⁻²)

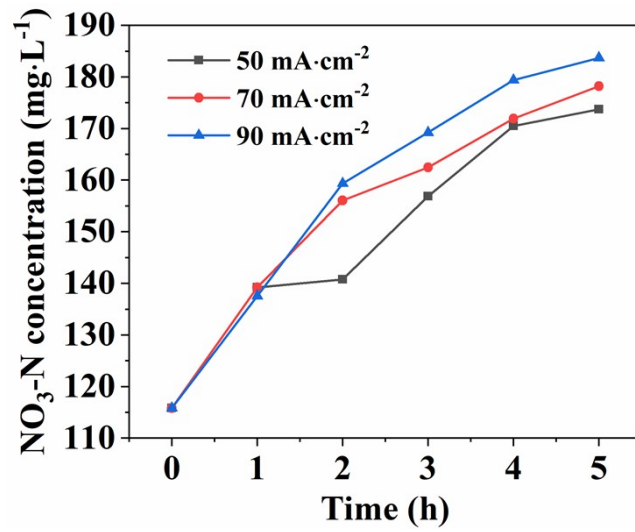


Figure S7 Effect of different current densities and degradation time on NO₃-N concentration

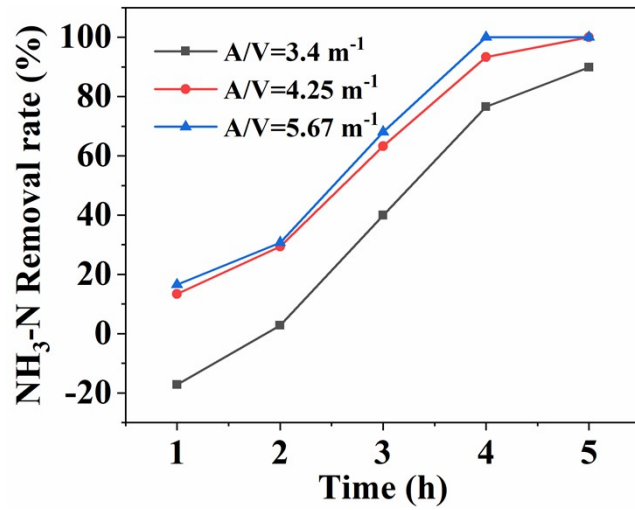


Figure S8 Effect of different A/V values and degradation time on NH₃-N removal rate

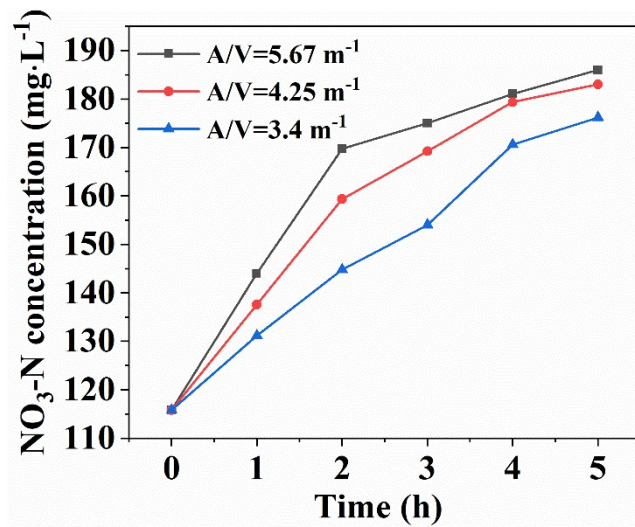


Figure S9 Effect of different A/V values and degradation time on NO₃-N concentration

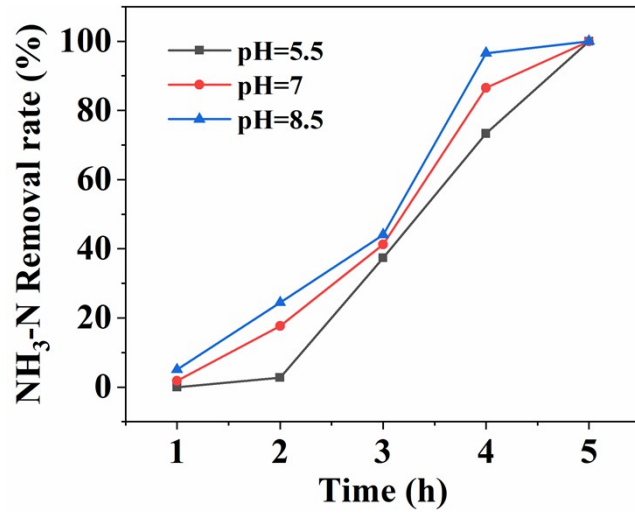


Figure S10 Effect of different initial pH values and degradation time on $\text{NH}_3\text{-N}$ removal rate

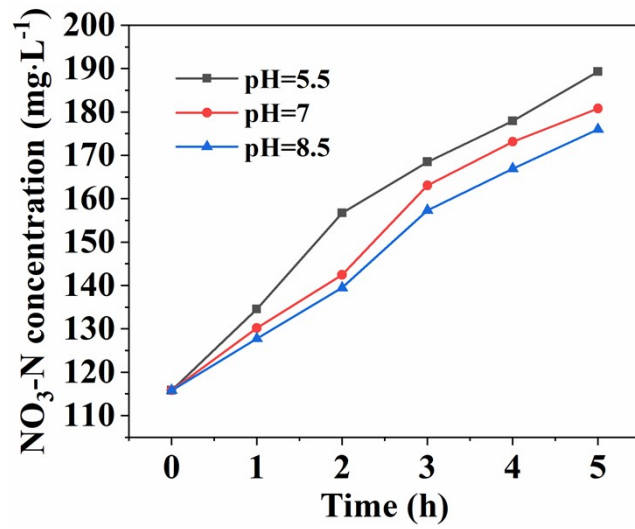


Figure S11 Effect of different initial pH values and degradation time on $\text{NO}_3\text{-N}$ concentration

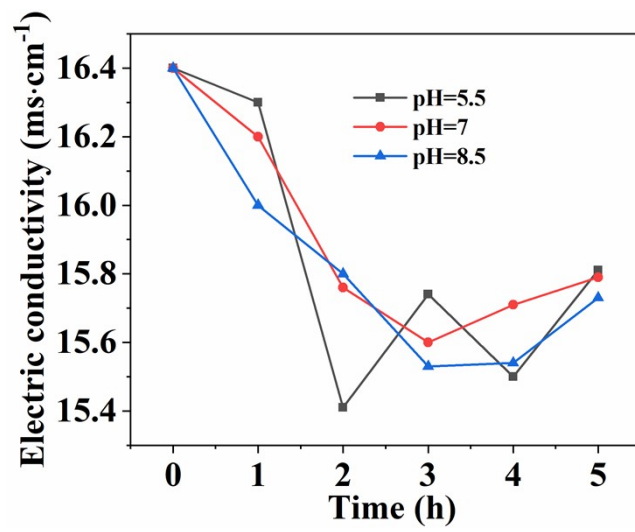


Figure S12 Effect of different initial pH and degradation time on electric conductivity

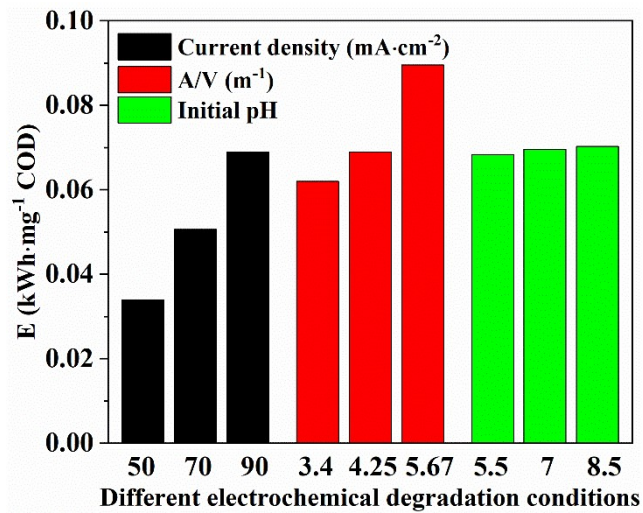


Figure S13 The energy consumption at the reaction time of 5 h varies with different current densities, A/V values, and initial pH values