Supporting file

Impact of Self-fabricated Graphene-Metal Oxide Composite anodes on Metal Degradation and Energy Generation via Microbial Fuel Cell

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Table S1: Comparative analysis of previously published research and the current work in MFC.

Electrode		Type of fuel cell	Organic substrate	Inoculation source	Current density (mA/cm^2)	Power density	Reference
Anode	**Cathode**						
Carbon veil	Carbon veil	DMFC	Landfill leachate	Leachate and sludge	0.0004	188.91 ± 19.48 $\mu W/m^2$	[1]
Graphite fiber brush	Pt wire	DMFC	Macroalgae, Ulva lactuca	Mixed culture	0.025	0.98 mW/m^2	[2]
Graphite plates	Graphite plates	DMFC	Malt extract, yeast extract and glucose	Pure culture of *E. cloacae*	0.067	19.2 μW	[3]
Carbon cloth	Carbon cloth	SMFC	Brewery wastewater	Full strength brewery wastewater	0.2	205 mW/m^2	[4]

Multiple carbon fibers	Activated carbon/polytetrafluoroethylene (PTFE)/Pt/ stainless steel	SMFC	Beer brewery wastewater	Anaerobic mixed consortia	0.18	264 mW/m^2	[5]
Graphite rods	Graphite rods	DMFC	Chocolate industry wastewater	Activated sludge	0.302	-	[6]
GO	Graphite rod	MFC	Food waste	Synthetic wastewater	28.94	0.69 mW/m^2	**Present work**
GO-ZnO	Graphite rod	MFC	Food waste	Synthetic wastewater	38.15	1.05 mW/m^2	**Present work**

DMFC= Double chamber microbial fuel cell; SMFC= Single chamber microbial fuel cell; BMFC= Benthic microbial fuel cell.

Table S2: A comparison of the degradation of metal ions using various anodes in MFC.

Metals	**Initial concentration (ppm)**	**Anode material**	**Cathode material**	**Inoculation source**	**Organic substrate**	**Degradation efficiency (%)**	**Reference**

Cr (VI)	20	Graphite felt	Graphite felt	Anaerobic digester sludge	Glucose	79	[7]
Cr (VI)	100	Non-wet proof plain carbon cloth	Non-wet proof plain carbon cloth	Anaerobic sludge	-	99	[8]
Cd (II)	100	Graphite granules	Carbon felt	Contaminated soil	Sodium acetate	31	[9]
Pb (II)	900	Graphite granules	Carbon felt	Contaminated soil	Sodium acetate	44.1	[9]

V(V)	200	Carbon fiber felt	Carbon fiber felt	*Dysgonomonas and Klebsiella*	Acetate	60.7	[10]
Cd(II)	50	Graphite felt	Graphite felt	Mixed microbial culture	Acetate	60	[11]
Hg (II)	25	Graphite felt	Graphite felt	Mixed microbial culture	Acetate	55	[11]
Ni (II)	32	Graphite felt	Graphite felt	Mixed microbial culture	Sodium acetate	95	[12]

Cr (VI)	100	Graphite plate	Graphite plate	Anaerobic sludge bed	Sodium acetate	82	[12]
Cr (VI)	-	Graphite brushes	Carbon cloth	Anaerobic sludge	Glucose	99	[13]
U(VI)	680	Graphite felt	Graphite felt	Nuclear waste sludge	Acetate	90	[14]
Cu (II)	500	Carbon felt	Carbon felt	Soil sludge	Glucose	94	[15]
Pb (II)	50	Graphene oxide	Graphite rod	Wastewater	Sweat potatoes wastes	60.33	[16]

Cd (II)	50	Graphene oxide/PANI	Graphite rod	Wastewater	Sweat potatoes wastes	65.51	[16]
Mixture of metal ions	10	GO	Graphite rod	Synthetic wastewater	Food waste	81.20	**Present work**
Mixture of metal ions	10	GO-ZnO	Graphite rod	Synthetic wastewater	Food waste	92.71	**Present work**

Note: The table information was taken from the reference [17] with permission, although its open access article.

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