Supporting information

Current production by bacterial communities enriched from wastewater sludge with different electron donors

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The supporting materials are available free of charge via the Internet at http://pubs.acs.org, which includes supplementary Table 1-2, and Figure S1-S5:

Supplementary Table 1. Current and power densities generated from MFCs fed with different carbon sources, and estimated heat of formation values and percentage conversion to electrical energy.

Supplementary Table 2. Characterization of DGGE bands excised from bacterial community fingerprints (Figure 2A).

Supplementary Figure S1. Side and front view of dual-compartment fuel cell used in the current study (modified from Bretschger et al. 2007). Two pieces of graphite felts (surface area ~7.6 cm^2) were attached to Nafion membrane in anode compartments.

Supplementary Figure S2. Current productions responding to carbon source consumption (HPLC). Fluctuations in volume and thus organic acid concentration were due to evaporation. Arrows indicated when corresponding carbon sources were injected.

Supplementary Figure S3. SEM images showing bacterial biofilms attached on carbon fibers at anode compartment. No.1, MR-1; No. 2-7, enriched bacterial assemblages with lactate, succinate, NAG, acetate, formate and uridine respectively. Images labeled **b** were a higher magnification image of the highlighted area in images labeled **a**.

Supplementary Figure S4. Reduction of HFO (A) and Fe-citrate (B), and current production (C) by new isolated *Shewanella* sp. MFC 2, 6, and 14. Arrows indicated when carbon sources were injected.

Supplementary Figure S5. Color version for Figure 1, showing the current production measured from two independent anode electrodes as shown in Supplementary Figure S1.

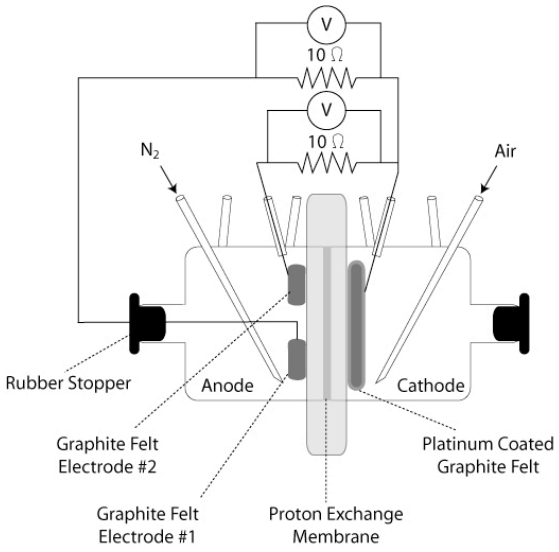
Supplementary Table 1. Current and power densities generated from MFCs fed with different carbon sources, and estimated heat of formation values and percentage conversion to electrical energy.

MFC No.	Inoculums	Carbon source	Max. current density resulting from injection of carbon source @ 2 mM ($\mu A/cm^2$)	Max. power density based on linear polarization sweep (mW/m^2)	Estimated heat of formation, $\Delta H°_f$ (kcal / mol)	Max. electrical energy from carbon source injection @ 2mM (kcal / mol)	conversion %
1	MR1	lactate	8.9	13.0	-136.3	0.072	0.053
2	sludge	lactate	68.9	107.3	-136.3	1.049	0.770
3	sludge	succinate	100.5	67.2	-180.0	1.387	0.771
4	sludge	NAG	127.9	149.7	-232.3	2.363	1.017
5	sludge	acetate	193.5	221.1	-95.4	2.494	2.614
6	sludge	formate	39.9	98.0	-90.7	0.137	0.151
7	sludge	uridine	62.0	233.5	-92.4	2.302	2.492

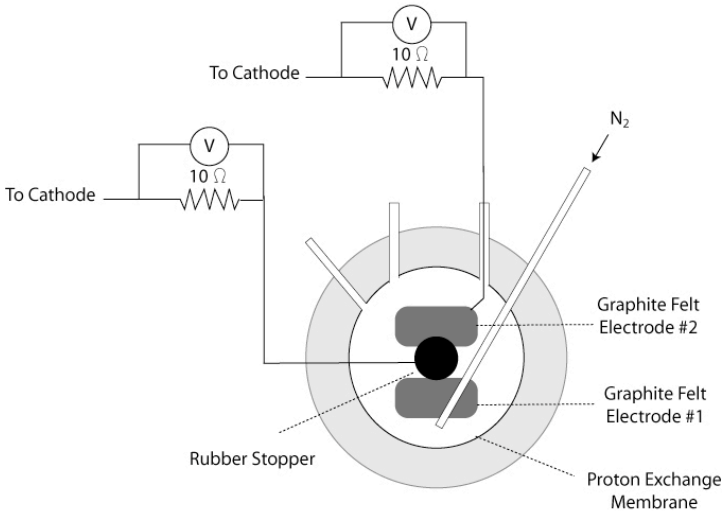
Supplementary Table 2. Characterization of DGGE bands excised from bacterial community fingerprints (Figure 2A).

Band ID	Bacterial groups	Closely related sequence from GenBank	Accession No.	Identity (%)	Source
a1, p13	Beta	*Azovibrio* sp. R-25062	AM084040	98	activated sludge
a2	Delta	*Geobacter sulfurreducens*	U13928	99	surface sediments
		Uncultured *Geobacter* sp.	FJ262541	99	single chamber MFCs
		Uncultured DGGE band	EF506576	99	two-chamber sludge MFCs
		Uncultured bacterium MFC-GIST313	EU704572	99	butyrate-fed MFCs
a3	Beta	*Azonexus caeni*	AB166882	98	wastewater sludge
a4, p11	Alpha	*Aquaspirillum* sp. AHL 4	AY379976	99	activated sludge
a5, a9	Delta	Uncultured bacterium MFC-A	FJ262566	100	single-chamber MFCs
		Uncultured bacterium MFC-G8	FJ262546	100	single-chamber MFCs
a6, p1	Beta	Burkholderials bacterium TP243	EF636173	100	freshwaer pond sediments
a7	Beta	Uncultured bacterium MFC-GIST321	EU704559	98	butyrate-fed MFCs
a8	Beta	Uncultured bacterium MFC-GIST321	EU704559	96	butyrate-fed MFCs
p2, p12	Firmicutes	Uncultured bacterium TANB18	AY667253	99	groundwater
p3	Firmicutes	Uncultured bacterium 18-5	AB425299	99	biosolid waste
p4	Delta	Uncultured bacterium MFC-A	FJ262566	96	single-chamber MFCs
p5	Beta	*Aquitalea* sp. 5YN1-3	EU594330	91	Korean wetland
p6, p14	Beta	*Ideonella* sp. O-1	AB557644	89	N/A
		Uncultured bacterium APS41	FJ375503	89	MFCs
p7	Bacteroidetes	Uncultured bacterium KD1-125	AY218551	85	gut of termites
p8	Bacteroidetes	Uncultured bacterium	AY537432	99	gut of zebrafish
p9	Bacteroidetes	Uncultured DGGE band D17-14	DQ906137	99	swine lagoon slurry
p10	Beta	Uncultured Rhodocyclaceae bacterium	AM159316	93	rice rhizosphere
s1, s5	Beta	*Diaphorobacter* sp. Phe82	AB489905	100	cavity groundwater
		Uncultured bacterium	AB286395	100	activated sludge
s2	Bacteroidetes	Uncultured bacterium Run-S64	AB247474	100	activated sludge
s3, s7	Gamma	Uncultured bacterium	DQ201870	99	wastewater treatment plant
s4	Firmicutes	*Clostridium* sp.	FM865920	100	environmental samples
s6	Gamma	Uncultured bacterium	FJ535006	100	activated sludge
		Uncultured Xanthomonadales bacterium	EU639124	100	thermophilic MFCs

N/A: not available.

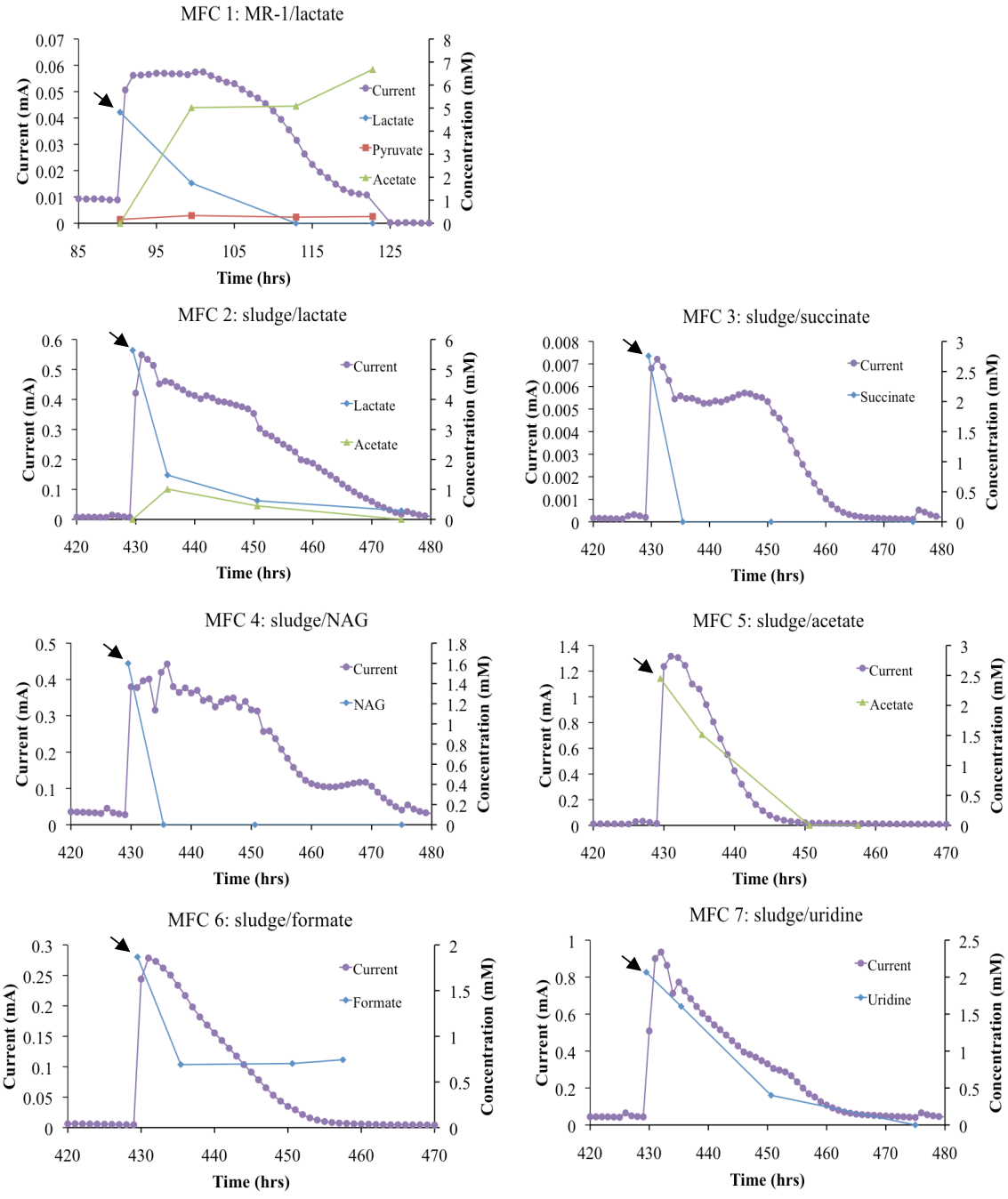


Side View

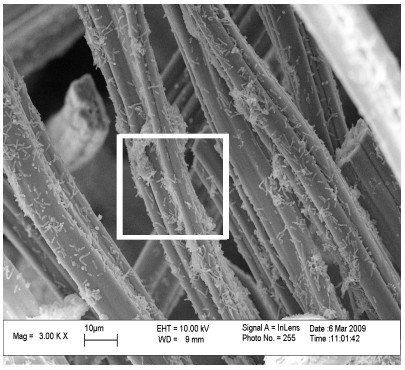


Front View

Supplementary Figure S1



Supplementary Figure S2



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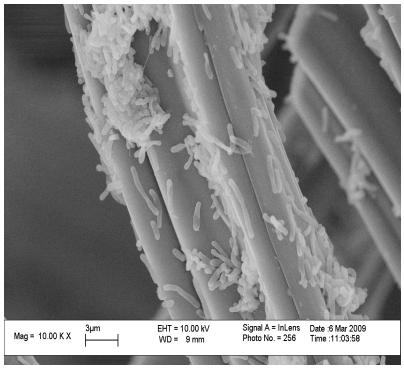

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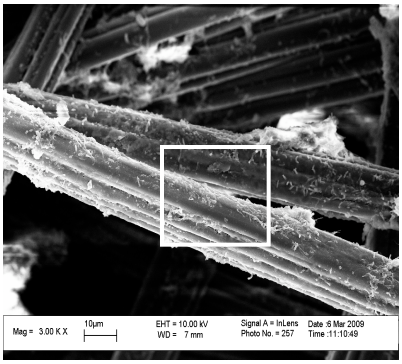

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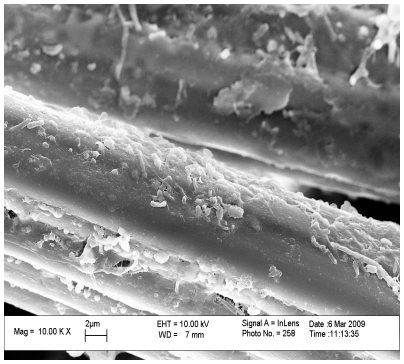

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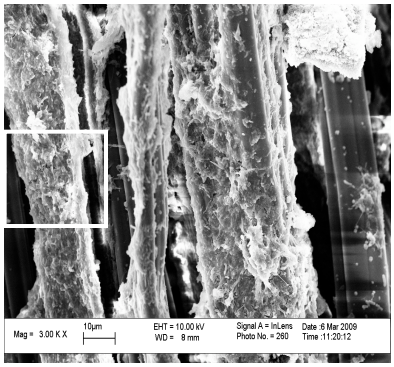

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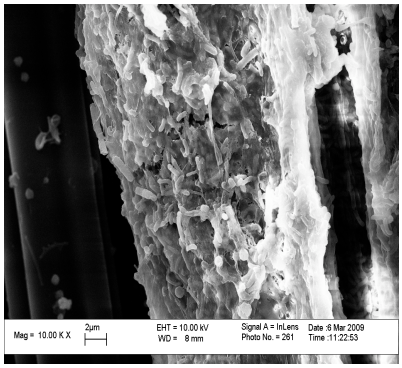
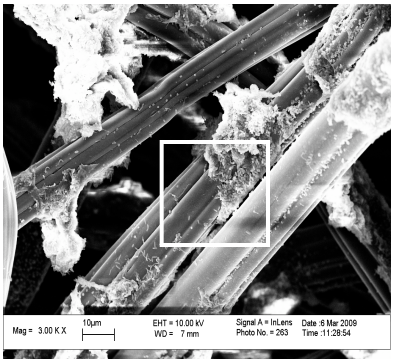


3b

Supplementary Figure S3



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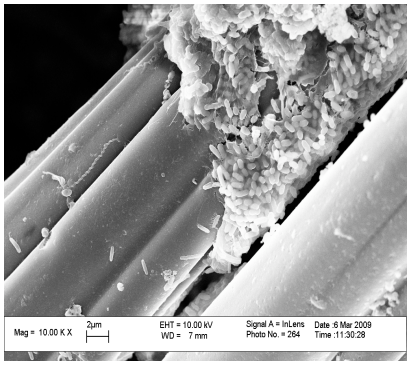

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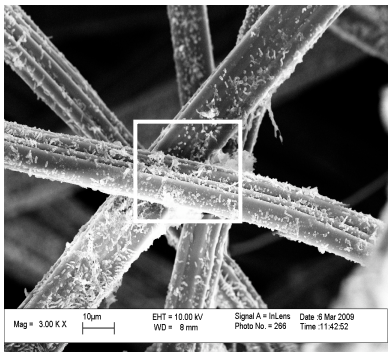

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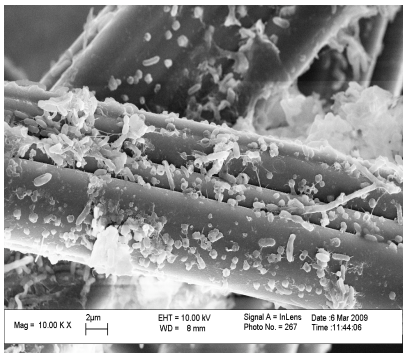

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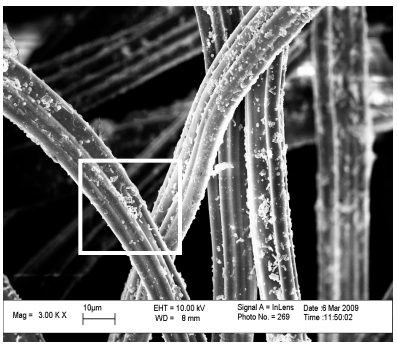

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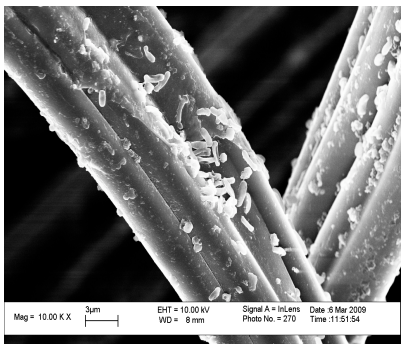

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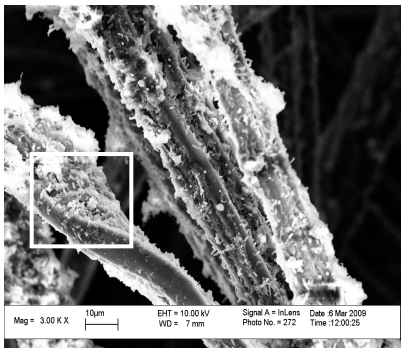

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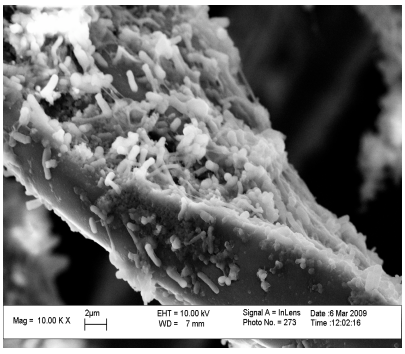
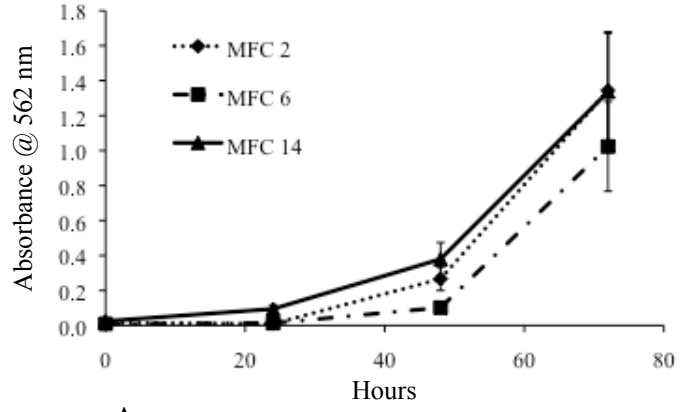
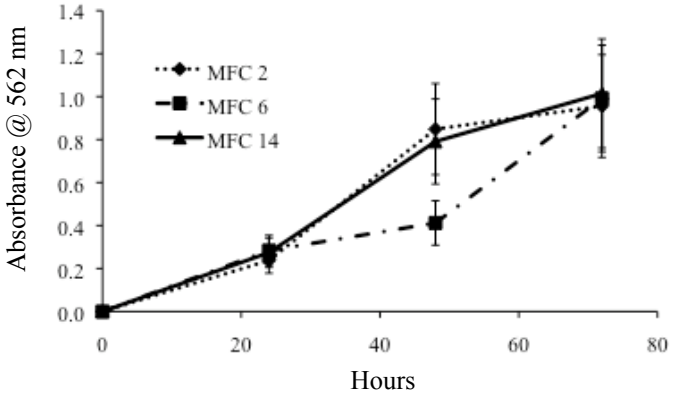


7b

Supplementary Figure S3 cont.



A



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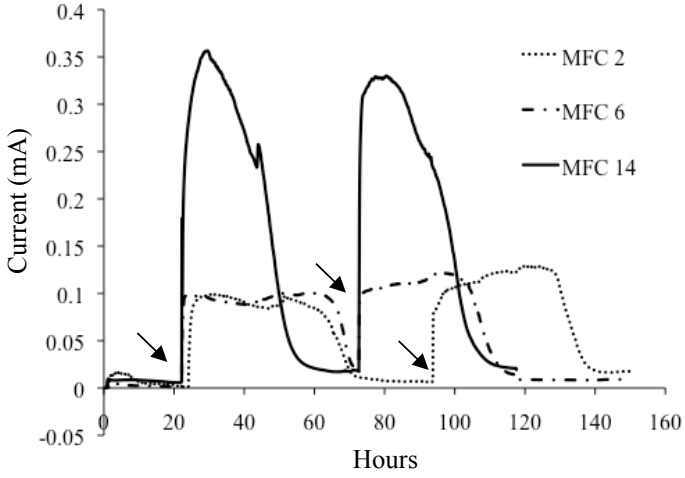
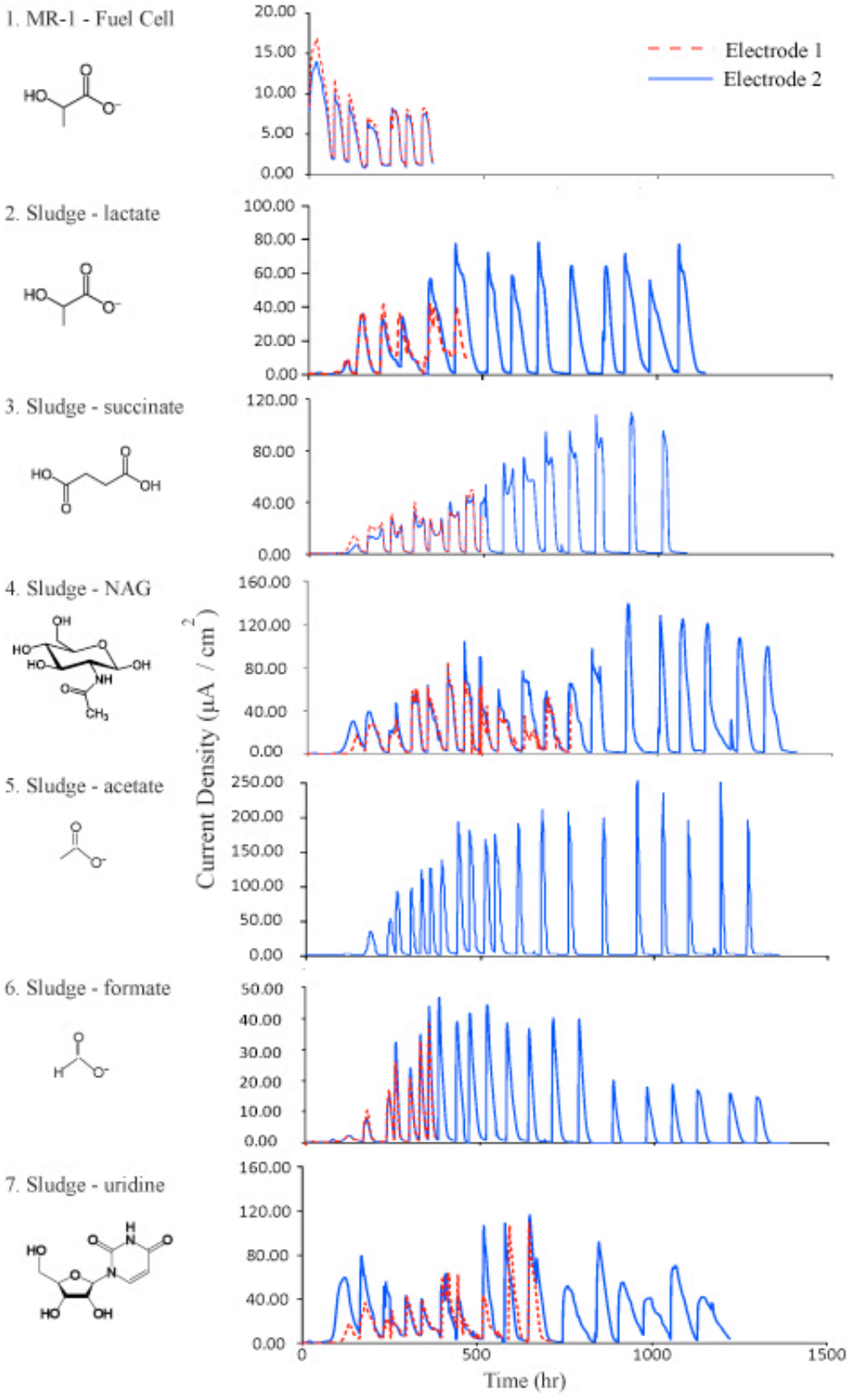


C

Supplementary Figure S4



Supplementary Figure S5