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"Bleaching" glycerol in a microfluidic fuel cell to produce high power density at minimal cost

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Table S1. Performance comparison of alcohol fed microfluidic fuel cells.

Author (Year) [Reference]	Category	Electrode type	Fabrication	Additional features	Fuel	Oxidant	Flow rate	Peak potential (mV)	Peak power density (mW cm^{-2})	Open circuit voltage (mV)	Maximum current density (mA cm^{-2})
Arjona (2014) [1]	Liquid/liquid	Flow-by	Multi-layer		EgOH 2 M in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH	183 (anolyte); 50 (catholyte)	210	1.6	0.53 V	6.3
Maya-Cornejo (2015) [2]	Liquid/liquid+gaseous	Flow-through & flow-through + air breathing	Multi-layer	Cu@Pd (anode)	MeOH 0.1 M in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH + air	200 (anolyte); 200 (catholyte)		17.1	610	100
Maya-Cornejo (2015) [2]	Liquid/liquid+gaseous	Flow-through & flow-through + air breathing	Multi-layer	Cu@Pd (anode)	EtOH 0.1 M in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH + air	100 (anolyte); 50 (catholyte)		25.75	670	153.70
Maya-Cornejo (2015) [2]	Liquid/liquid+gaseous	Flow-through & flow-through + air breathing	Multi-layer	Cu@Pd (anode)	EgOH 0.1 M in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH + air	50 (anolyte); 100 (catholyte)		19.95	653	142.55

Maya-Cornejo (2015) [2]	Liquid/liquid+gaseous	Flow-through & flow-through + air breathing	Multi-layer	Cu@Pd/C (anode)	GlOH 0.1 M in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH + air	100 (anolyte); 66.7 (catholyte)		20.43	622	111.95
Maya-Cornejo (2016) [3]	Liquid/liquid+gaseous	Flow-through & flow-through + air breathing	Multi-layer	Cu@Pt/C (anode); Pt/C (cathode)	GlOH 5% in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH + air	33.4	370	23.16	791	104.10
Dector (2013) [4]	Liquid/liquid+gaseous	Flow-by	Multi-layer	Pd/MWCNTs (anode); Pt/C (cathode)	GlOH 0.1 M in 0.3 M KOH	Dissolved O_2 in 0.3 M KOH + air	333.3 (anolyte); 1666.7 (catholyte)		0.70	550	5
Hollinger (2013) [5]	Liquid/gaseous	Flow-by	Multi-layer	Pt/Ru//C (anode); Pt/C (cathode)	1 M MeOH in 1 M H_2SO_4	O_2	300		10.9	~700	~100
Miao (2017) [6]	Liquid/liquid	Microtubular	Monolithic	TiO_2-Pt-RuO_2 (anode); Pt (cathode)	MeOH 2 M in 0.5 M H_2SO_4	Dissolved O_2 in 0.5 M H_2SO_4	0.16	275	257	620	936
Xin (2012) [7]	Liquid/gaseous	AEM		Au/C (anode); 80 °C	GlOH 1M in 2M	O_2	4 10^5		57.9	670	~400

					KOH						
Benipal (2017) [8]	Liquid/gaseous	AEM		PdAg/CNT (anode); 80 °C	GlOH 1M in 6 M KOH	O_2	4 10^3 (anolyte); 2 10^5 (O_2)		277.7	880	~900
Qi (2013) [9]	Liquid/gaseous	AEM		PtCo/CNT (anode); 80 °C	GlOH 3M in 6 M KOH	O_2	4 10^3		268.5	860	~1500
This work	Liquid/Liquid	Flow-through	Monolithic	Pt/C	GlOH 1M in 1M KOH	Bleach in 2 M KOH	100	362	71.2	1000	337.3
This work	Liquid/Liquid	Flow-through	Monolithic	Pt/C; mixed media	GlOH 1M in 1M KOH	Bleach in 1 M H_2SO_4	100	814	315.3	1970	637.8

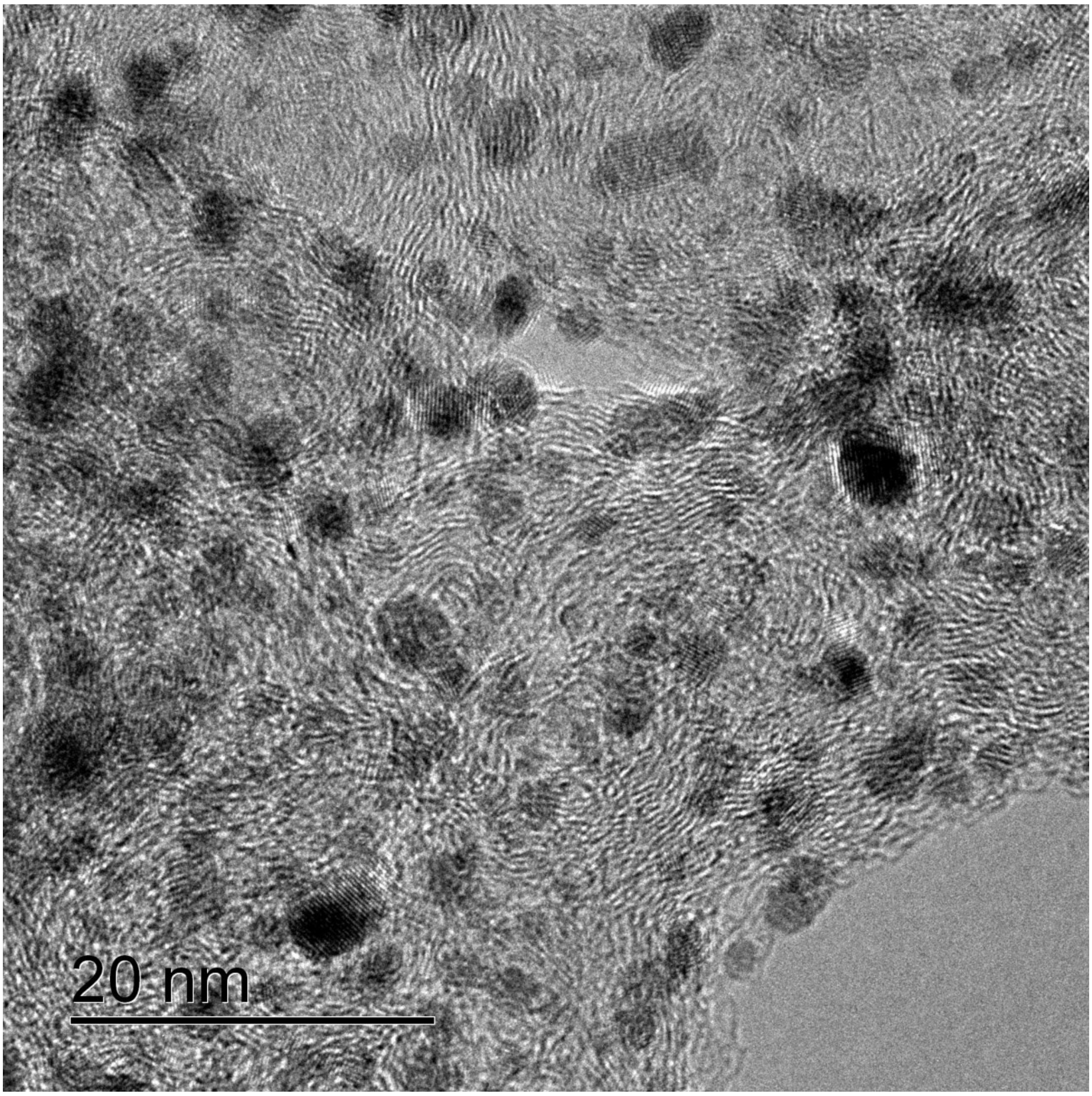

Figure S1. Representative transmission electron microscopy image of Pt/C nanoparticles.

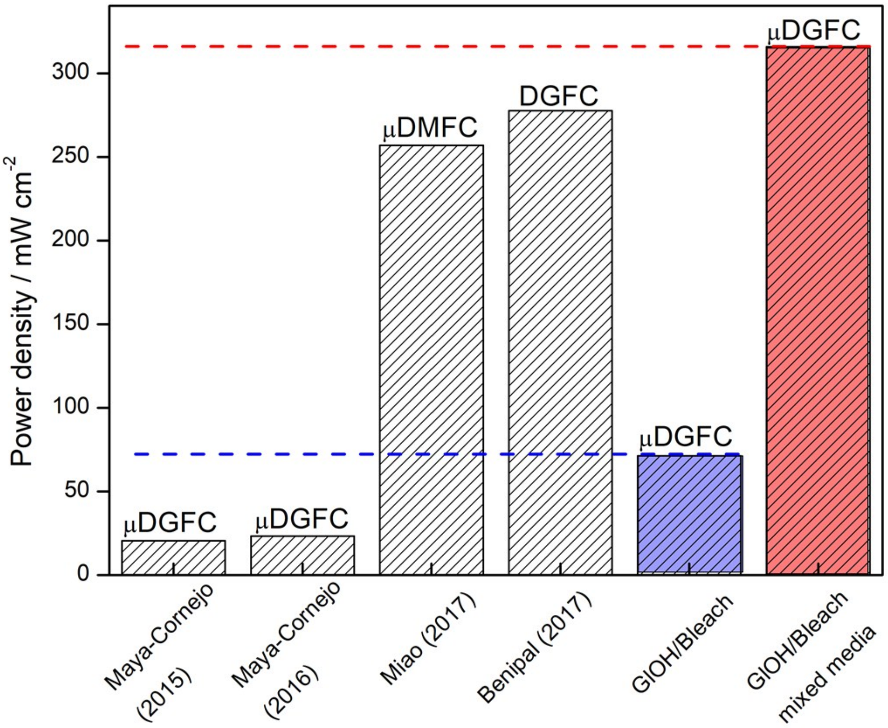

Figure S2. Power density performance of the most active glycerol microfluidic fuel cells (μDGFC), alcohol fed microfluidic fuel cell (μDMFC), glycerol fuel cells (DGFC), and the present work (blue and red bars).

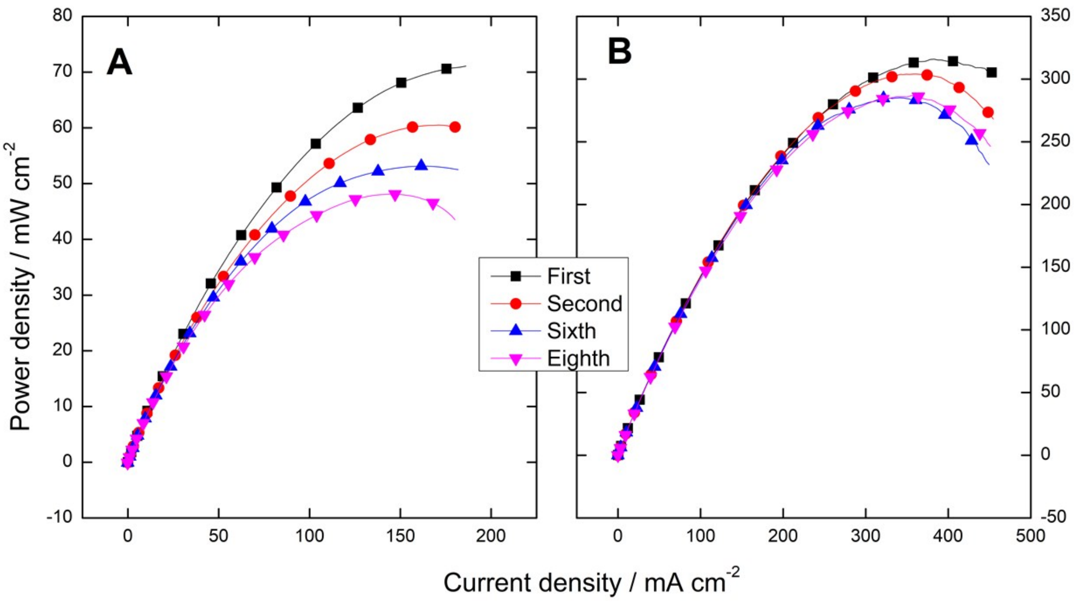

Figure S3. Successive power density curves for the GlOH/Bleach microfluidic fuel cell in (a) all-alkaline and (b) mixed media with Pt/C/CP as anode and cathode. Polarization curves were measured with 1 M glycerol in 1 M KOH as anolyte and bleach in 2 M KOH (all-alkaline) or 1 M H_2SO_4 (mixed media) as catholyte. All solutions were N_2-saturated and supplied at a flow rate of 100 μL min^{-1}.

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