Three-dimensional Carbon Nanofiber-based Anode for Apparently High Generated Current and Power from Air-cathode Micro-sized MFC

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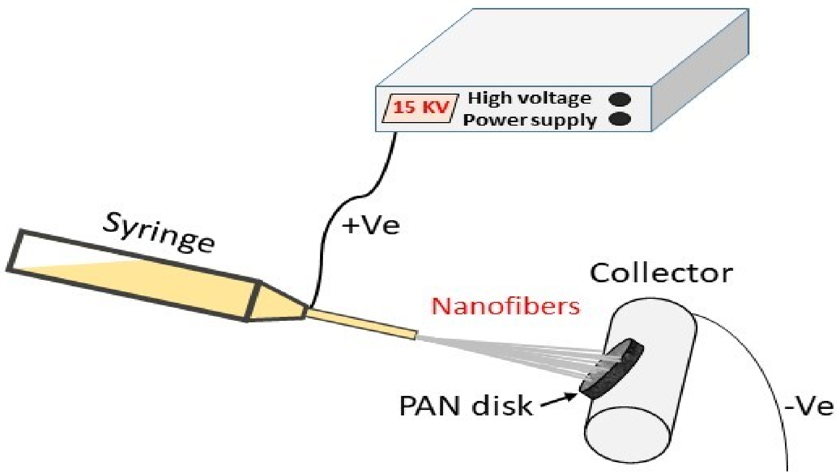


Figure S1. Schematic representation of the utilized electrospinning setup using the PAN disk as a collector.

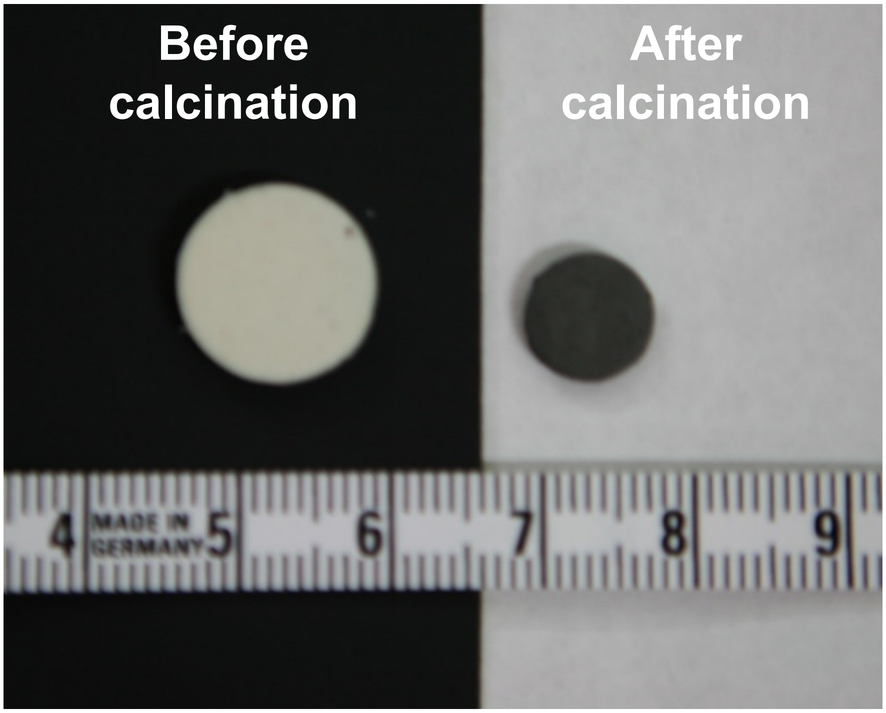


Figure S2. Photographs of the prepared CNFs-attached graphite disk before and after calcination.

Table S1. Comparison between the µL-MFC performance in this work and reported studies

MFC configuration	**Anode materials**	**Anode volume (µL)**	**Catholyte**	P_{max} *(mWm⁻²)*	I_{max} *(mAm⁻²)*	**Sustainability (hours, mode)**	**Ref**
Single chamber	CNFs	19.6	Air	8100	44900	205, Bat.	**This work**
Dual chamber	Graphene	50	Ferricyanide	5610	15510	336, Con.	1
Dual chamber	Glod/ silver	39.3	Ferricyanide	7720	17700	84, Con.	2
Dual chamber	Toray paper	16	Phos. buffer	20.8	87.5[a]	5, Bat.	3
Dual chamber	PMMA	90	Ferricyanide	N/A	80	312, Bat.	4
Single chamber	Graphene	25	Air	6	1190	240, Bat.	5
Single chamber	Graphene	25	Air	8	488	240, Bat.	5
Single chamber	MWCNTs	75	Air	19.36	880	360, Bat.	6
Single chamber	Gold	75	Air	2.96	156	260, Bat.	6
Single chamber	Nickel	75	Air	1.12	39.6	360, Bat.	6
Dual chamber	Gold	15.5	Ferricyanide	44	260	100, Cont.	7
Dual chamber	MWCNTs	1.25	Ferricyanide	19.6	0.0059[a]	50, Bat.	8
Dual chamber	Gold	435	Ferricyanide	15.9	150	18.3, Cont.	9
Dual chamber	Gold	50	Ferricyanide	330	22.4[a]	80, Cont.	10
Dual chamber	Gold	0.3	Phos. buffer	N/A	25.42	15, Cont.	11
Dual chamber	Gold	25	Air	29	2148	50, Bat.	12
Dual chamber	Gold	4.5	Ferricyanide	47	330	900, Cont.	13
Dual chamber	Carbon cloth	5	Ferricyanide	N/A	100	100, Cont.	14
Dual chamber	Gold	1.5	Ferricyanide	1.5	130	180, Cont.	15
Dual chamber	Gold	Na	Ferricyanide	1.15	37	17, Bat.	16
Dual chamber	Gold	15	Ferricyanide	4.012	3.02	1, Bat.	17
Dual chamber	Gold	16	Ferricyanide	0.023	150	1.3, Bat.	18
Single chamber	Gold	10	Air	N/A	0.038	2-3, Bat.	19

[a]: Estimated from the polarization.
Bat: batch.
Cont: continuous.
I_{max}: maximum current.
N/A: not available.
P_{max}: maximum power.

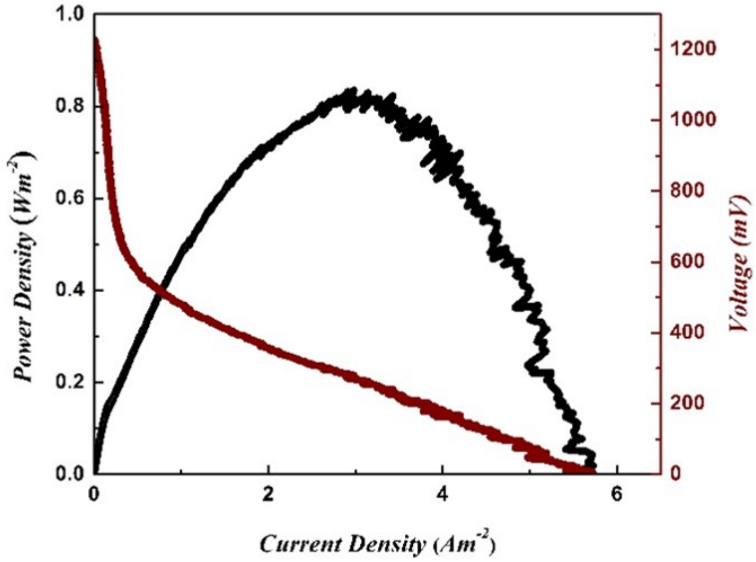
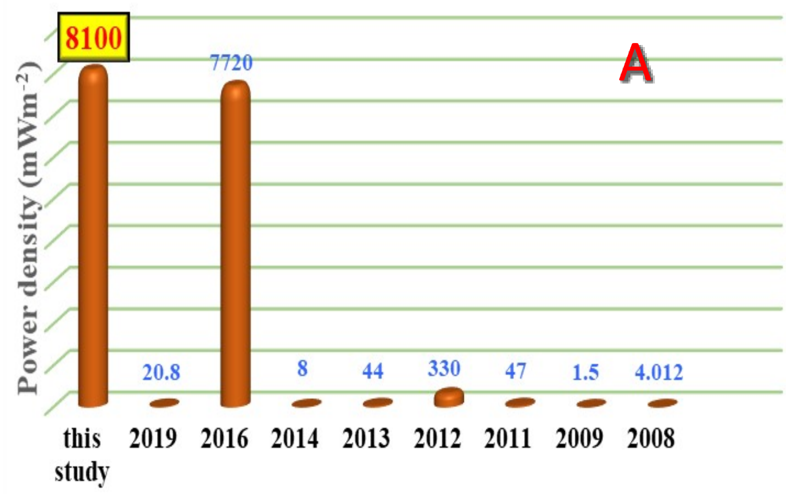


Figure S3. Quasi-stationary polarization and power curve for µL-MFC10 after 30 min operation time, revealing a rapid startup with a valuable power density (0.83 Wm-2 at 2.98 Am-2).



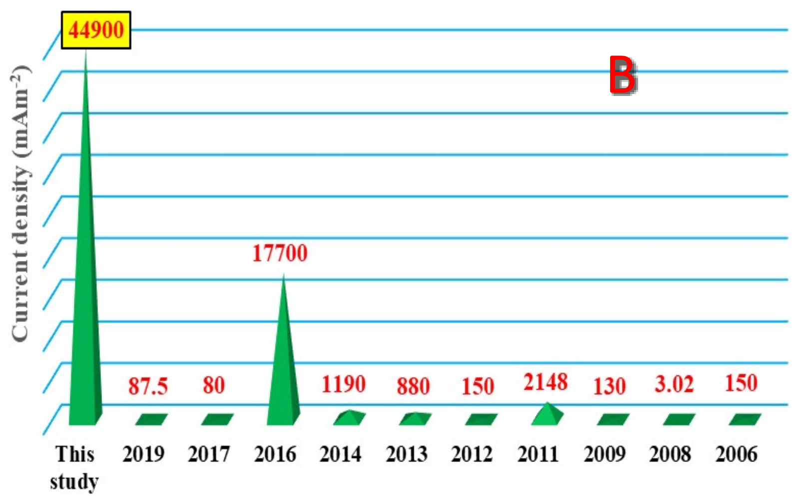


Figure S4. Comparison between the power and current outputs of this work and previously proposed µL-MFCs (A & B respectively), see table S1 for more comaprison details.

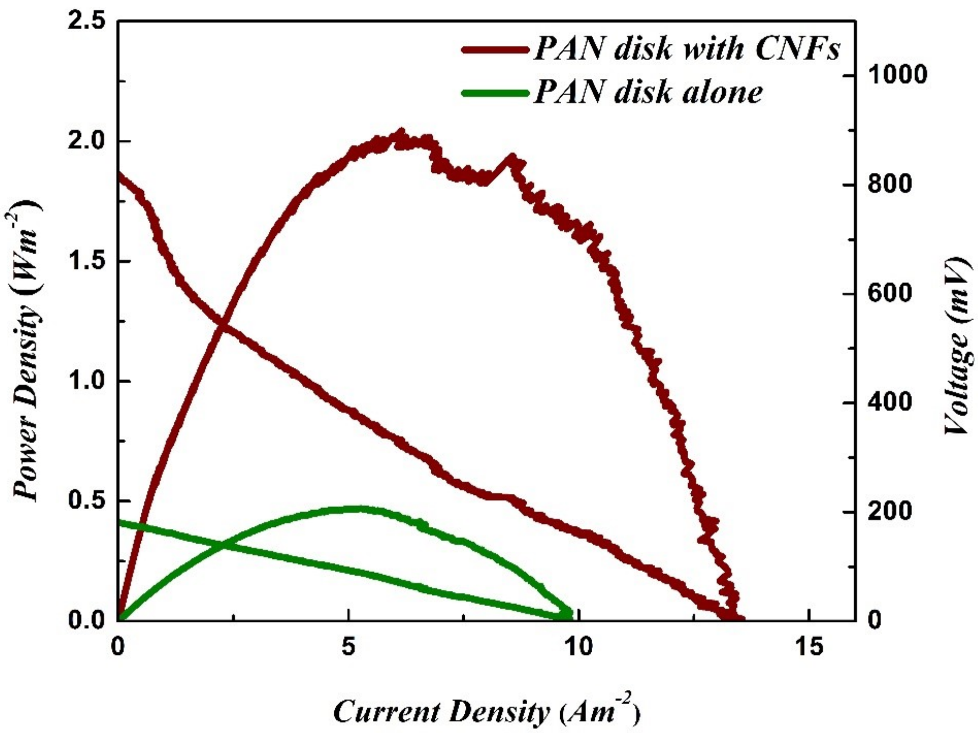


Figure S5. Quasi-stationary polarization and power curve for PAN disk with and without CNFs at 3 h of operation, demonstrating the outperforming of CNFs as anode than PNA disk alone with 4.35 and 1.4 times for the power and current densities, respectively.

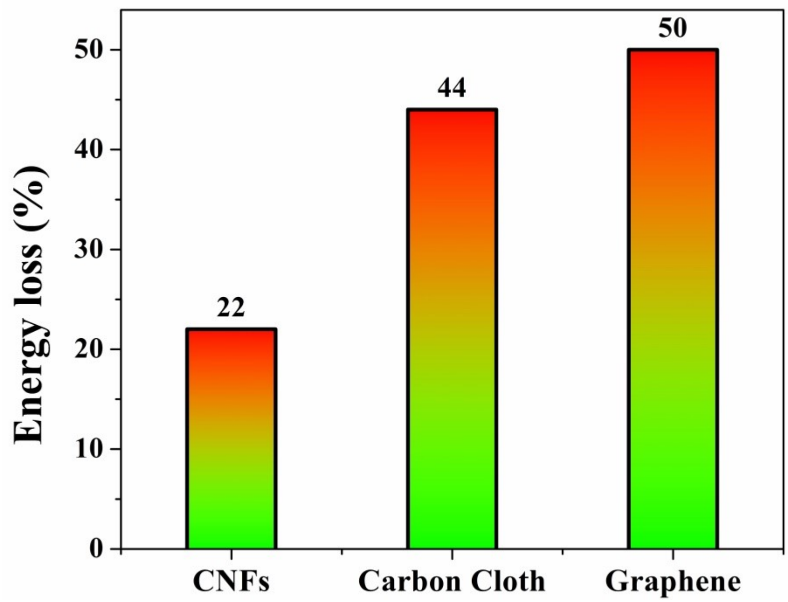


Figure S6. Comparison between the energy loss percentages of CNFs as anode in this work and the previously purposed carbon cloth and graphene[5] based-microscale MFC, where the energy loss decreased for 22% comparing to 44% and 50% for carbon cloth and graphene, respectively.

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