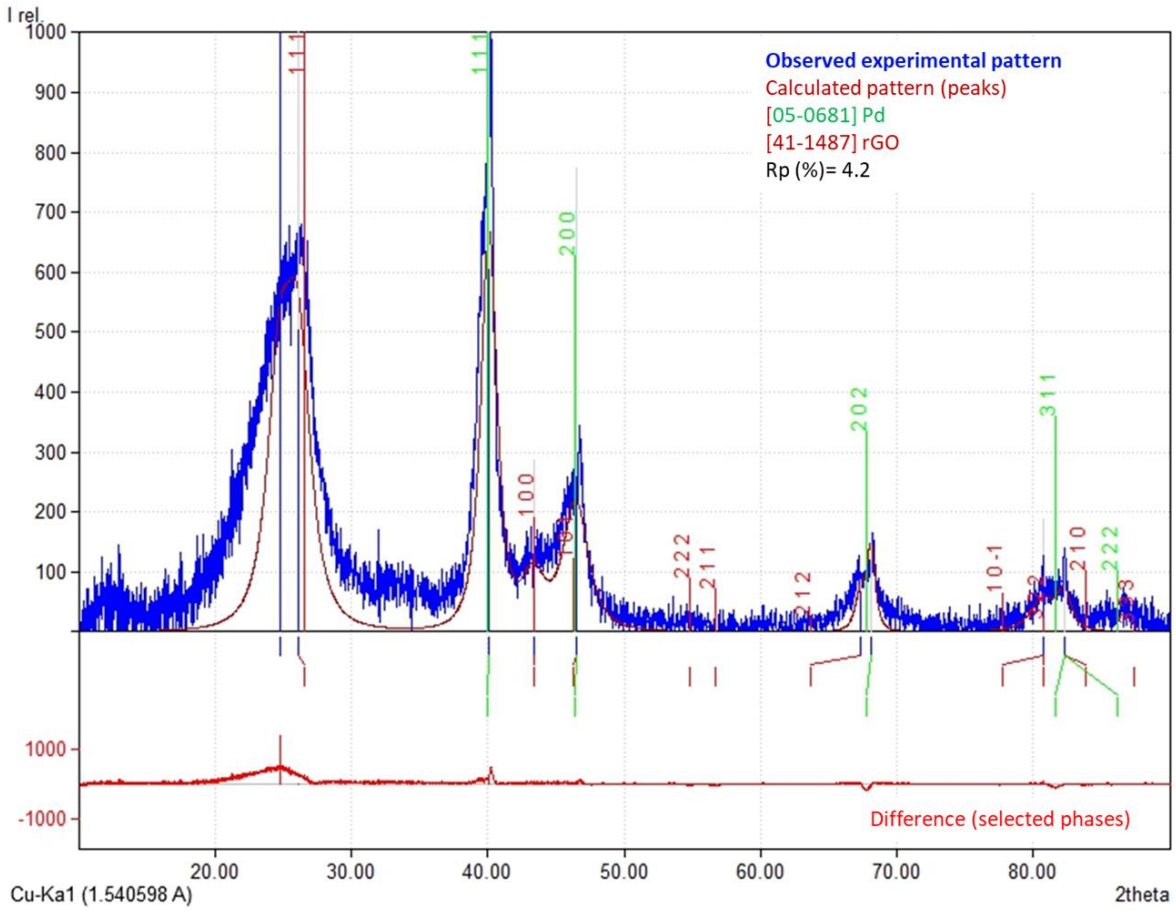
April 6, 2023

Supplementary information

1. Rietveld refinement of XRD diffraction



Entry	Formula sum	Name	Quant.(%)
41-1487	C	rGO	88.9
05-0681	Pd	Palladium	11.1

Fig. S1 Rietveld refinement Pd/rGO.

Table S1. Calculate the crystallite size from XRD data using ritveald refinement

K	λ (Å)	peak	2θ (°)	FWHM B(°)	FWHM error rate	FWHM B(°)	θ (rad)	L (nm)
0.9	1.5406	1	24.740000	2.1237	0.09791	2.02579	0.215897228	4.01
		2	26.120000	2.1237	0.09791	2.02579	0.22794	4.03
		3	40.090000	1.3983	0.09791	1.30039	0.349851249	6.50
		4	46.46	2.1878	0.09791	2.08989	0.405439985	4.14
		5	67.31	0.9076	0.09791	0.80969	0.58739056	11.79
		6	80.69	2.1711	0.09791	2.07319	0.704153087	5.03
		7	82.25	1.2293	0.09791	1.13139	0.717766655	9.32
							General average	**6.40 nm**

Table S2. Calculate the microstain and dislocation density from XRD data using ritveald refinement

Microstrain	Dislocation density
δ ε × 10-3	ε nm-2 × 10-3
2.032262	62.04065366
2.149538	61.70440162
2.226096	23.64613718
4.097372	58.43871378
2.636602	7.197485727
8.046667	39.56039018
2.688935	11.50862458
3.411067	49.13039748

Table S3. Calculate the parameter of the crystallographic from XRD data using COD Data

Peaks	d[Å]	Int.	h	k	l
Pd	2.2563	100.00	1	1	1
	1.9540	460.5	2	0	0
	1.3817	245.2	2	2	0
	1.1783	263.7	3	3	1
rGO	1.6735	100	0	0	2
	1.0404	5.5	0	0	4

2. Use of Pd/rGO for Urea air-breathing Microfluidic Fuel Cell

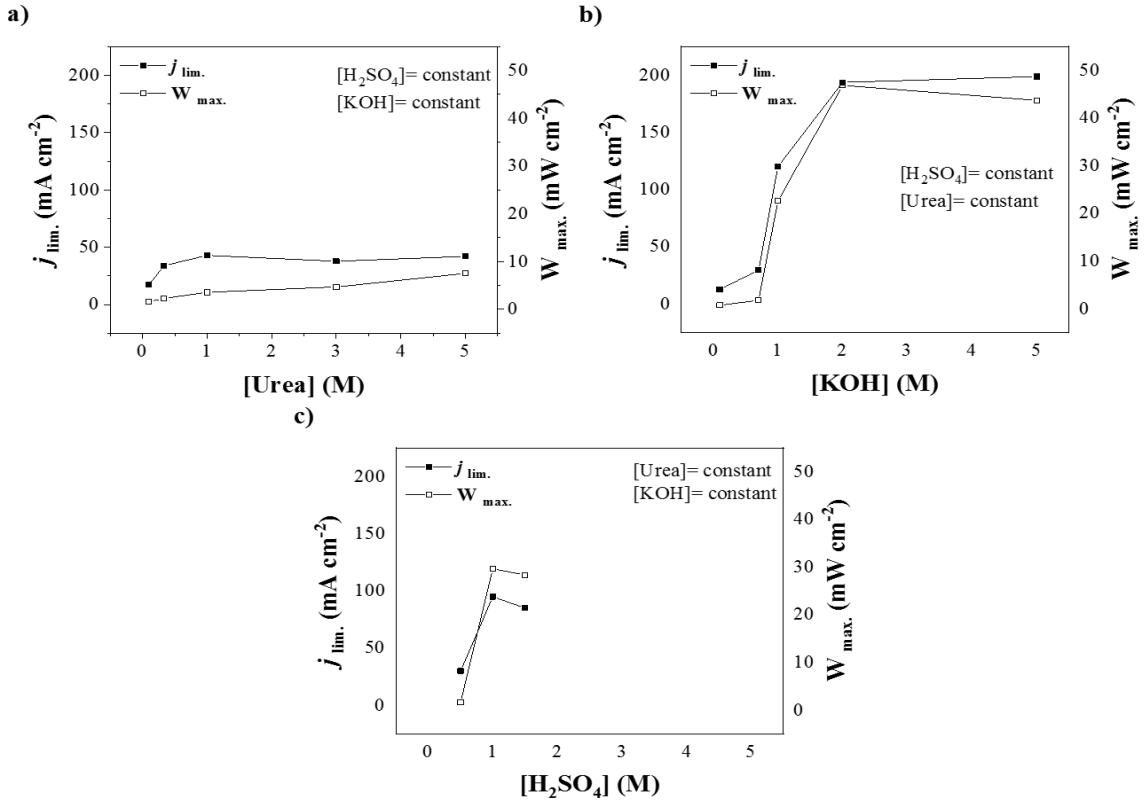


Fig. S2 Limit current density and maximum power density for a) Urea concentration variation, b) anolyte concentration variation and c) catholyte concentration variation.

Thank you very much in advance for your kind consideration to our work.
Sincerely yours,

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