

● *Electronic Supplementary Information for*

Two-dimensional Graphene Paper Supported Flexible Enzymatic Fuel Cell

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Supporting figures

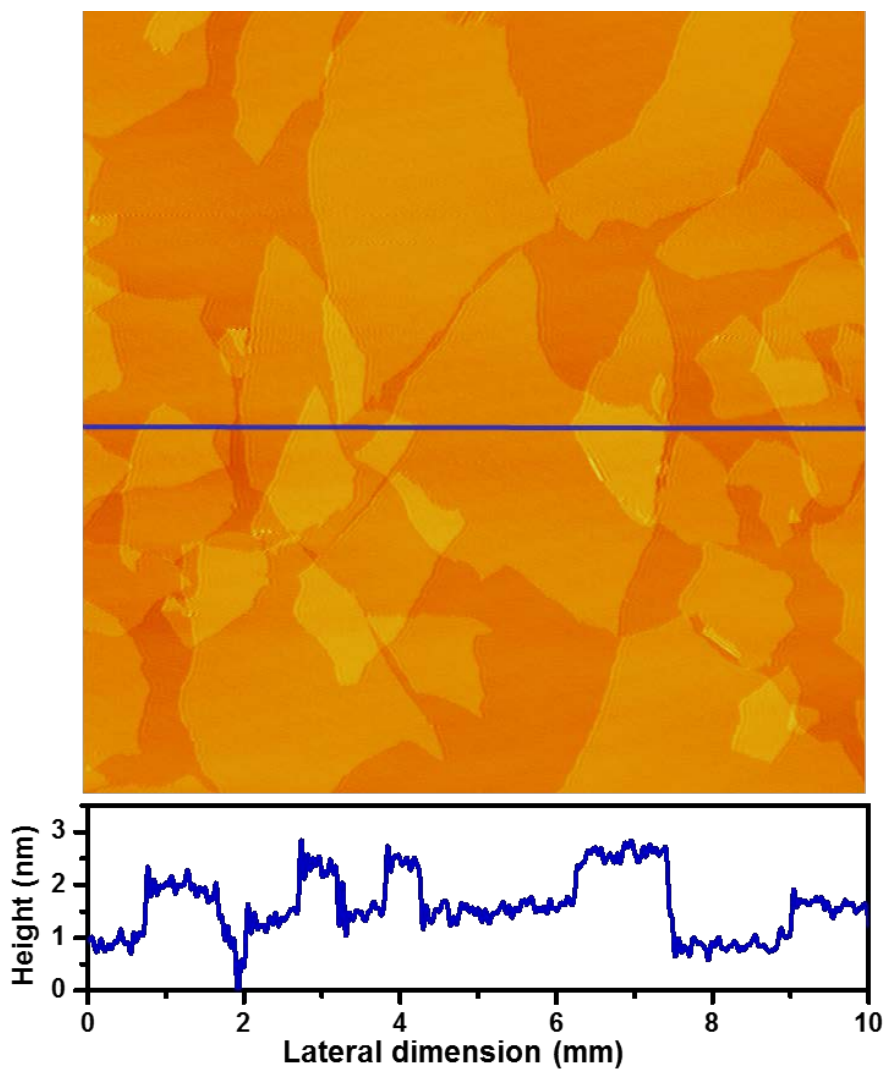


Fig. S1 AFM image and corresponding cross-sectional height profile of GO nanosheets. Image size: 10 $\mu\text{m} \times 10 \mu\text{m}$.

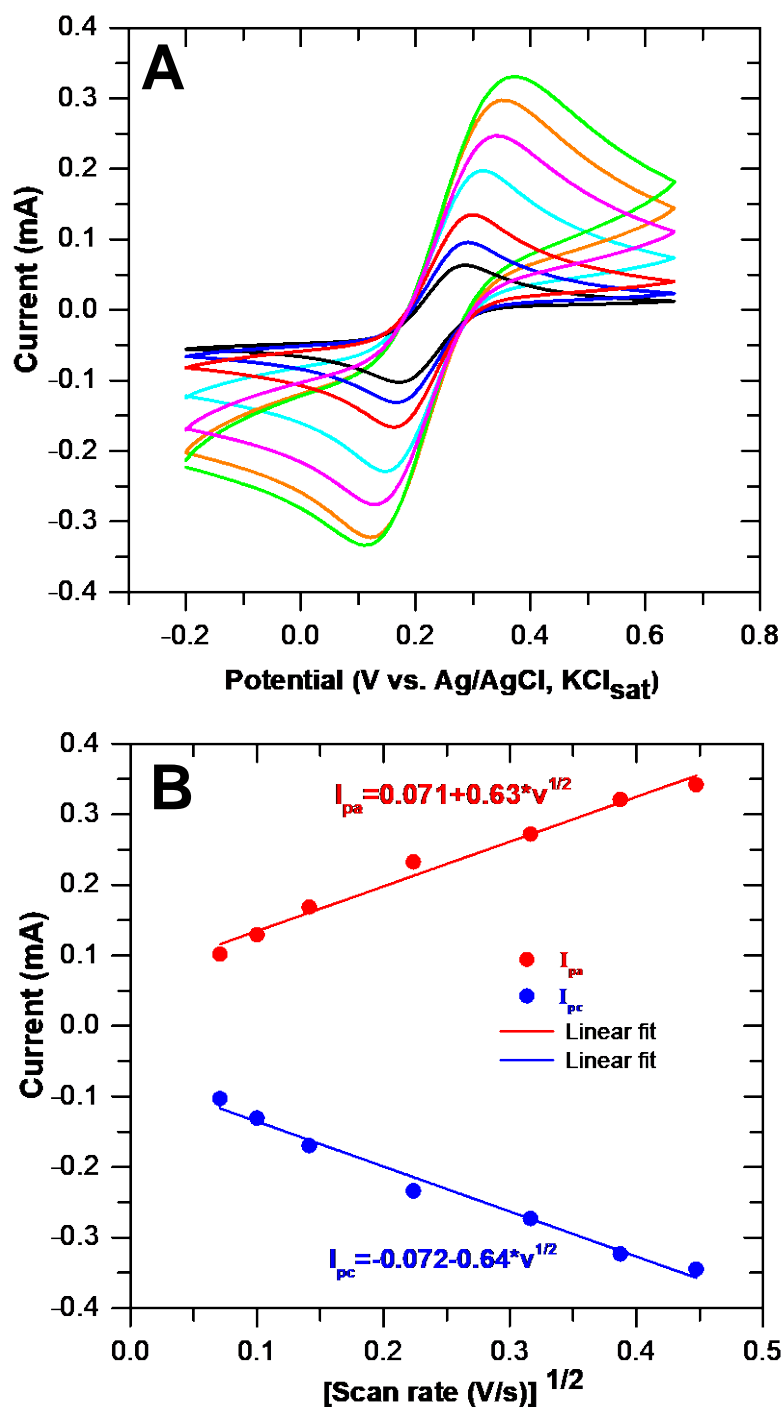


Fig. S2 Electrochemical characterization of GP electrodes using the redox probe $[\text{Fe}(\text{CN})_6]^{3-/4-}$. (A) CVs of GP electrode in 10 mM $\text{K}_3[\text{Fe}(\text{CN})_6]$ with 0.1 M KCl electrolyte. (B) Peak current versus the square root of scan rate. Scan rate: 5, 10, 20, 50, 100, 150, 200 mV/s.

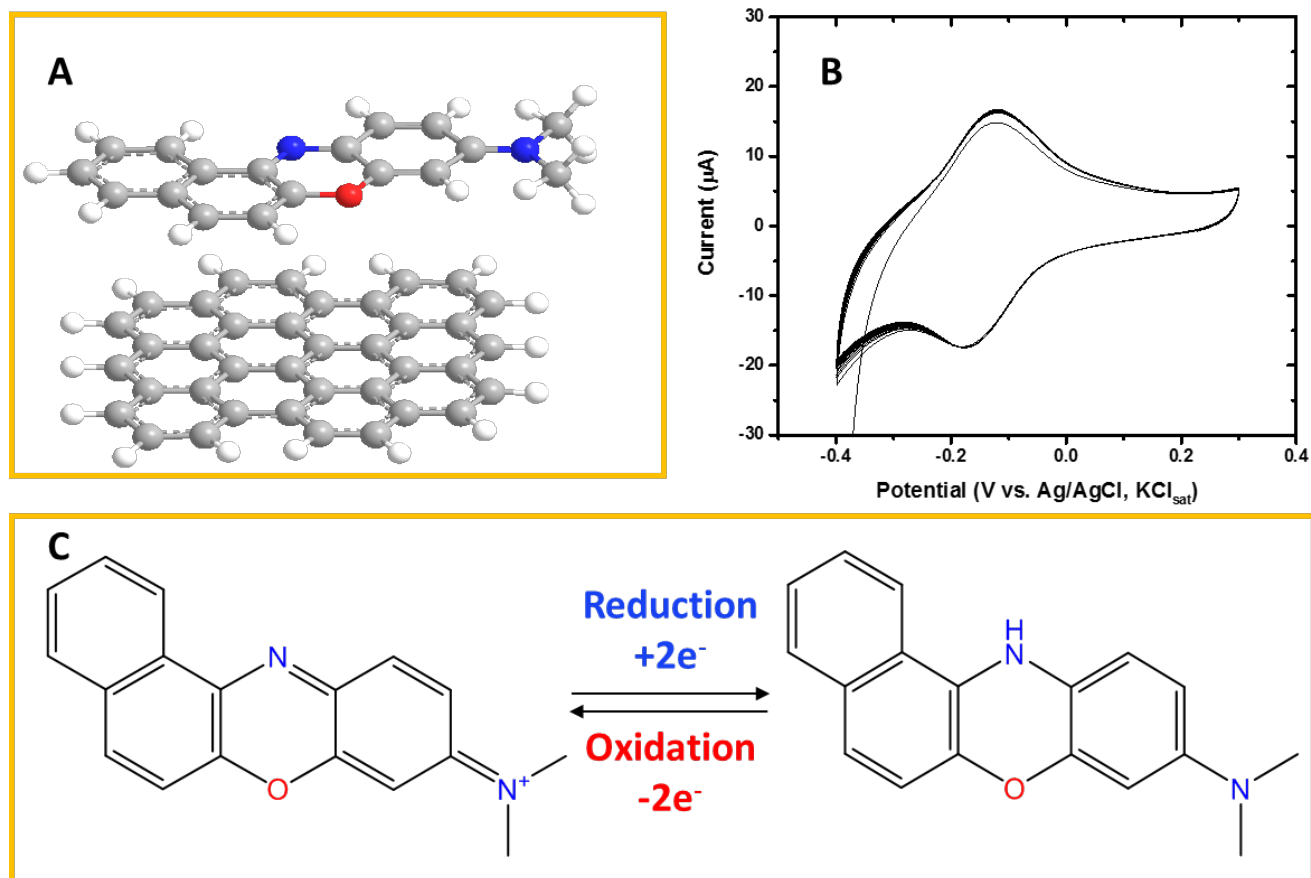


Fig. S3 (A) Schematic illustration of the π - π stacking interaction between a MB molecule and graphene paper surface to adsorb MB. (B) CVs of MB modified graphene electrode in phosphate buffer (10 mM, pH 7.0) with 20 successive scans recorded at a scan rate of 100 mV/s. (C) The structures of oxidized and reduced MB.

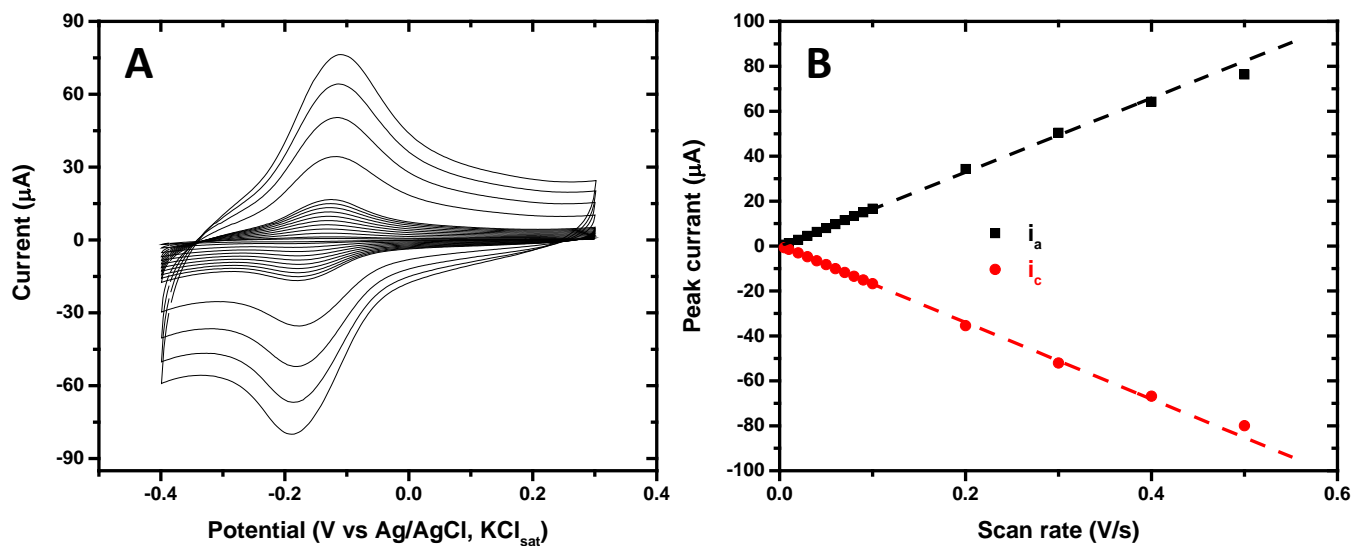


Fig. S4 (A) CVs of MB modified graphene paper electrodes with different scan rates in phosphate buffer (10 mM, pH 7.0). (B) Linear relation between the peak current and scan rate up to 0.4 V/s. Scan rates: 0.005, 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.1, 0.2, 0.3, 0.4, 0.5 V/s.

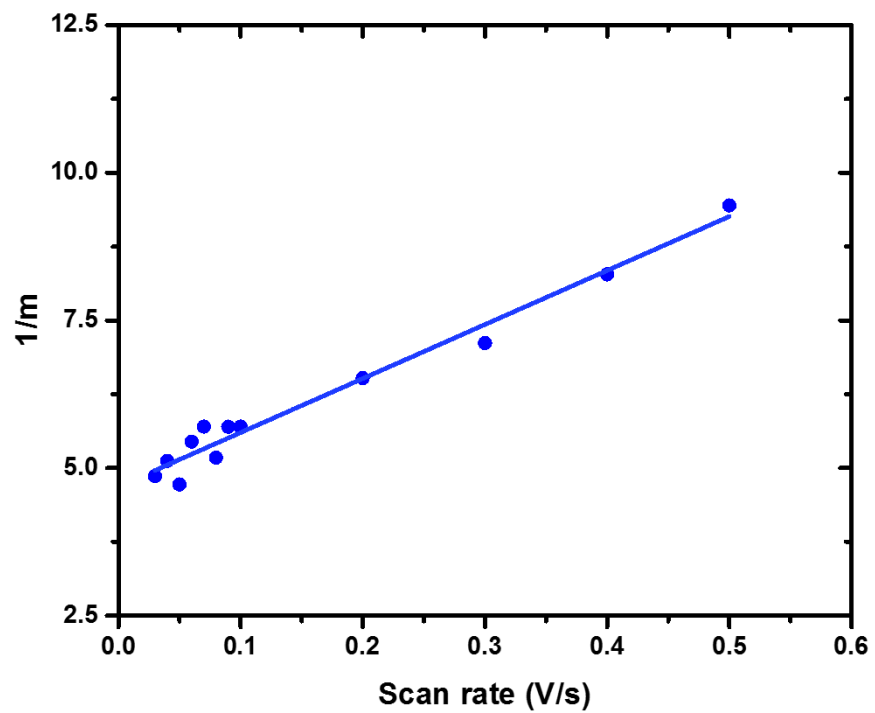


Fig. S5 Plot of $1/m$ vs scan rate using the data obtained in the scan rate range 0.03 to 0.5 V/s. The solid line is the best linear fit.

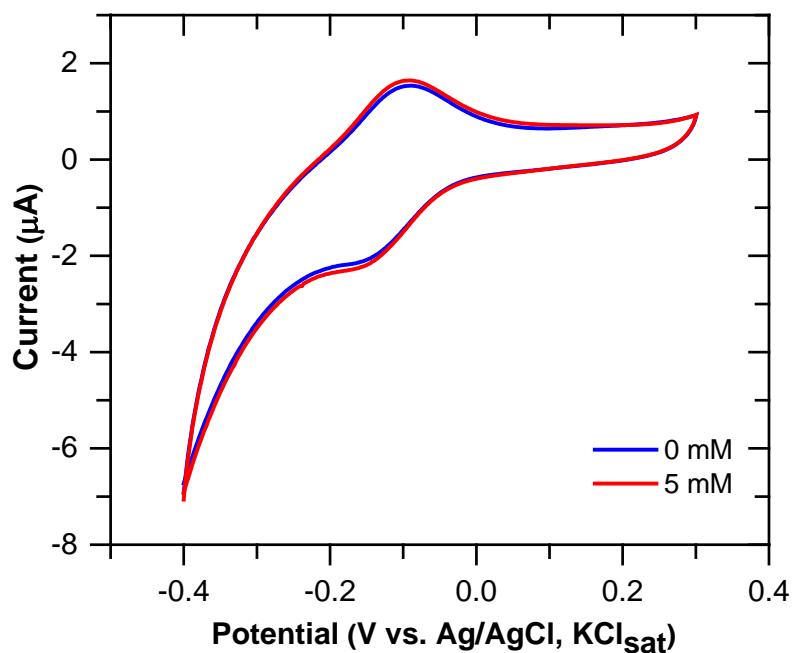


Fig. S6 CVs of MB modified graphene paper electrode in the absence (black curve) and presence of 5 mM glucose (red curve) in phosphate buffer (10 mM, pH 7.0). Scan rate: 5 mV/s.

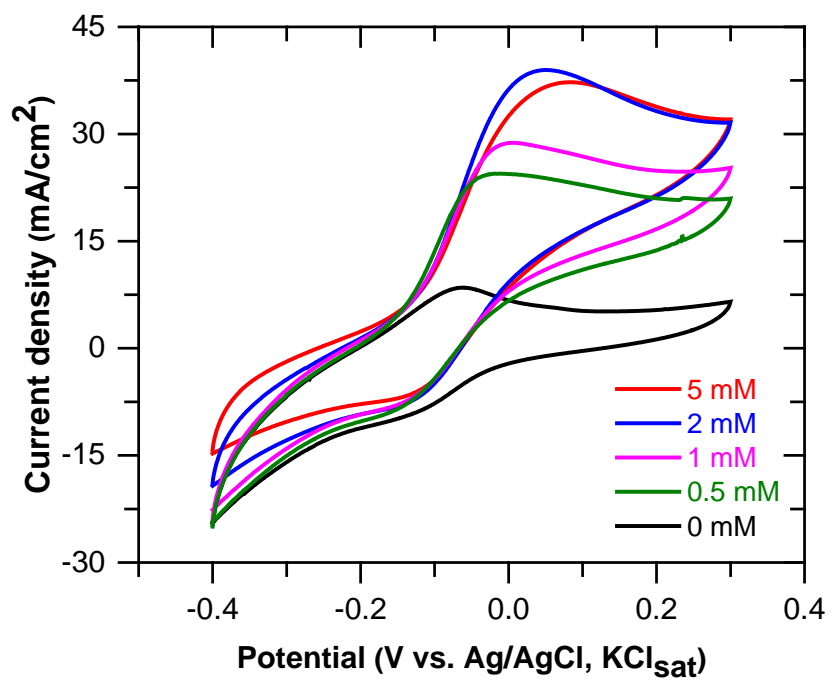


Fig. S7 CVs for electrocatalytic oxidation of glucose at GDH bioanode in phosphate buffer (10 mM, pH 7.0) with various concentrations of glucose. Scan rate: 5 mV/s

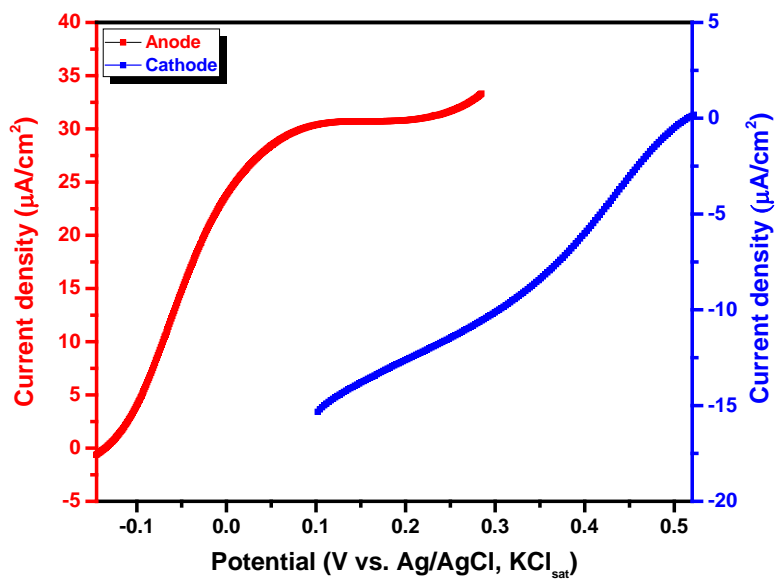


Fig. S8 LSVs for the bioanode and biocathode in air-saturated phosphate buffer (10 mM, pH 7.0) with 6.4 mM glucose. Scan rate: 5 mV/s

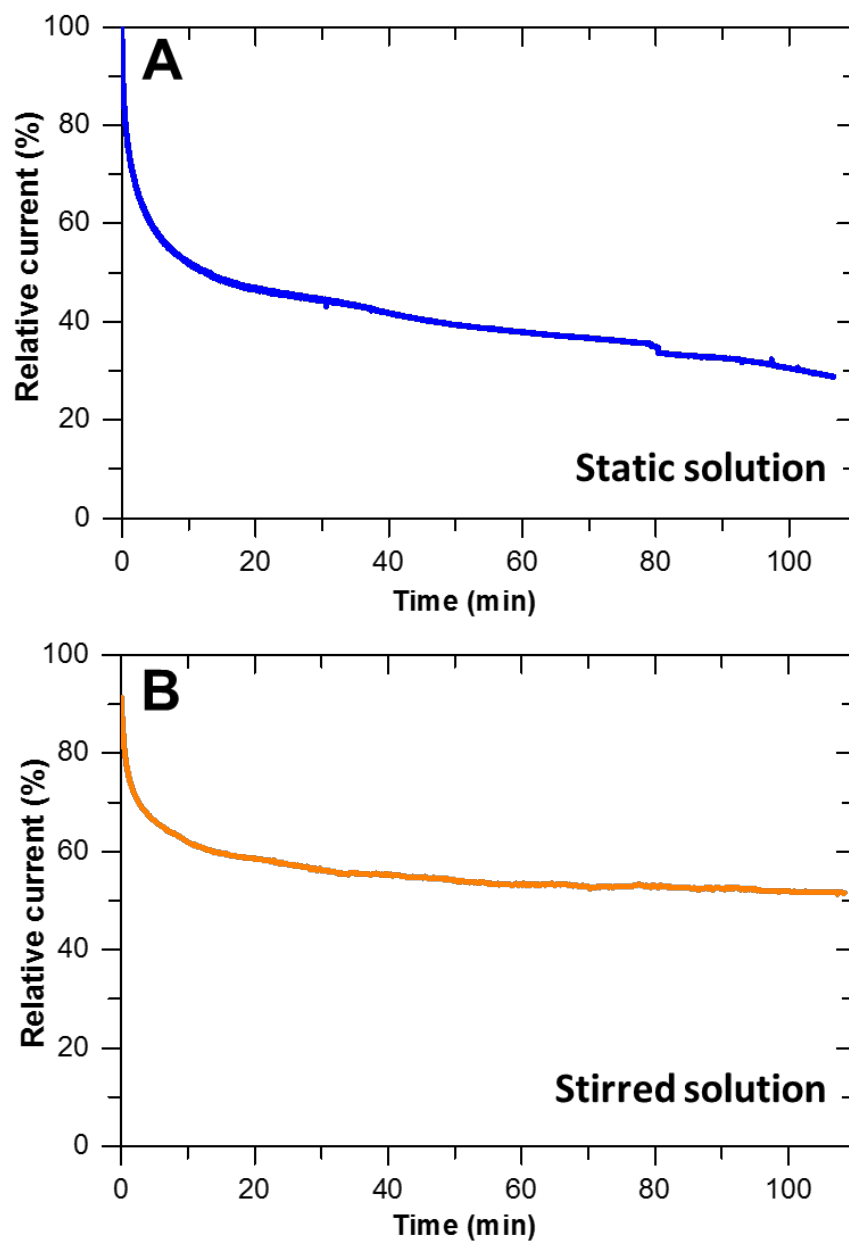


Fig. S9 Stability tests of the EBFC in (A) a static solution and (B) a stirred solution. The current was recorded at the maximum power output potential in an oxygen-saturated phosphate buffer (10 mM, pH 7.0) containing 5 mM glucose.

Table S1. The power density output of EBFCs before and after bending to various angles.

Bending angles	0°	30°	60°	90°	120°	150°	180°
Internal resistance (Ω)	1.03×10^5	0.99×10^5	1.06×10^5	1.08×10^5	1.10×10^5	0.95×10^5	1.02×10^5
P_{initial} ($\mu\text{W}/\text{cm}^2$)	3.94	4.08	3.75	3.76	3.97	3.81	4.02
P_{x° ($\mu\text{W}/\text{cm}^2$)	3.62	3.81	3.42	3.49	3.64	3.57	3.73
$P_{x^\circ}/P_{\text{initial}}$	91.88%	93.38%	91.2%	92.82%	91.69%	93.7%	92.79%
Normalization	100%	101.63%	99.26%	101.02%	99.79%	101.98%	100.99%