

## Supporting Information

# High Power Density Microbial Fuel Cell with Flexible 3D Graphene-Nickel Foam as Anode

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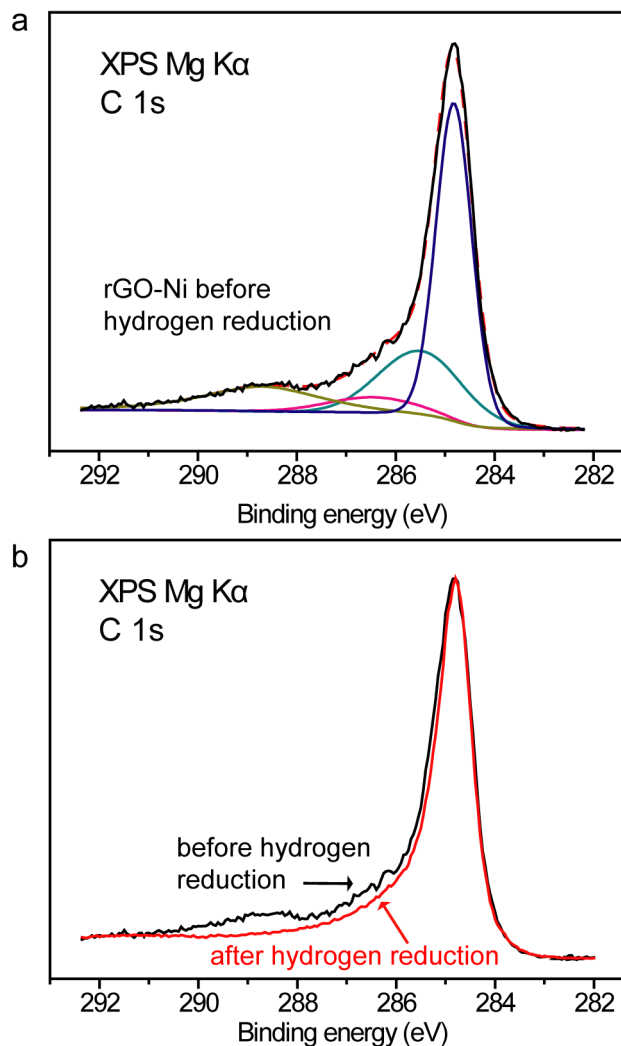
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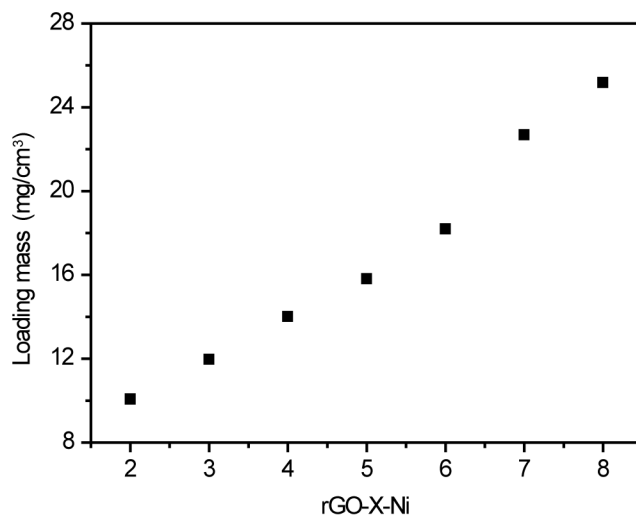
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## Supplementary Figures



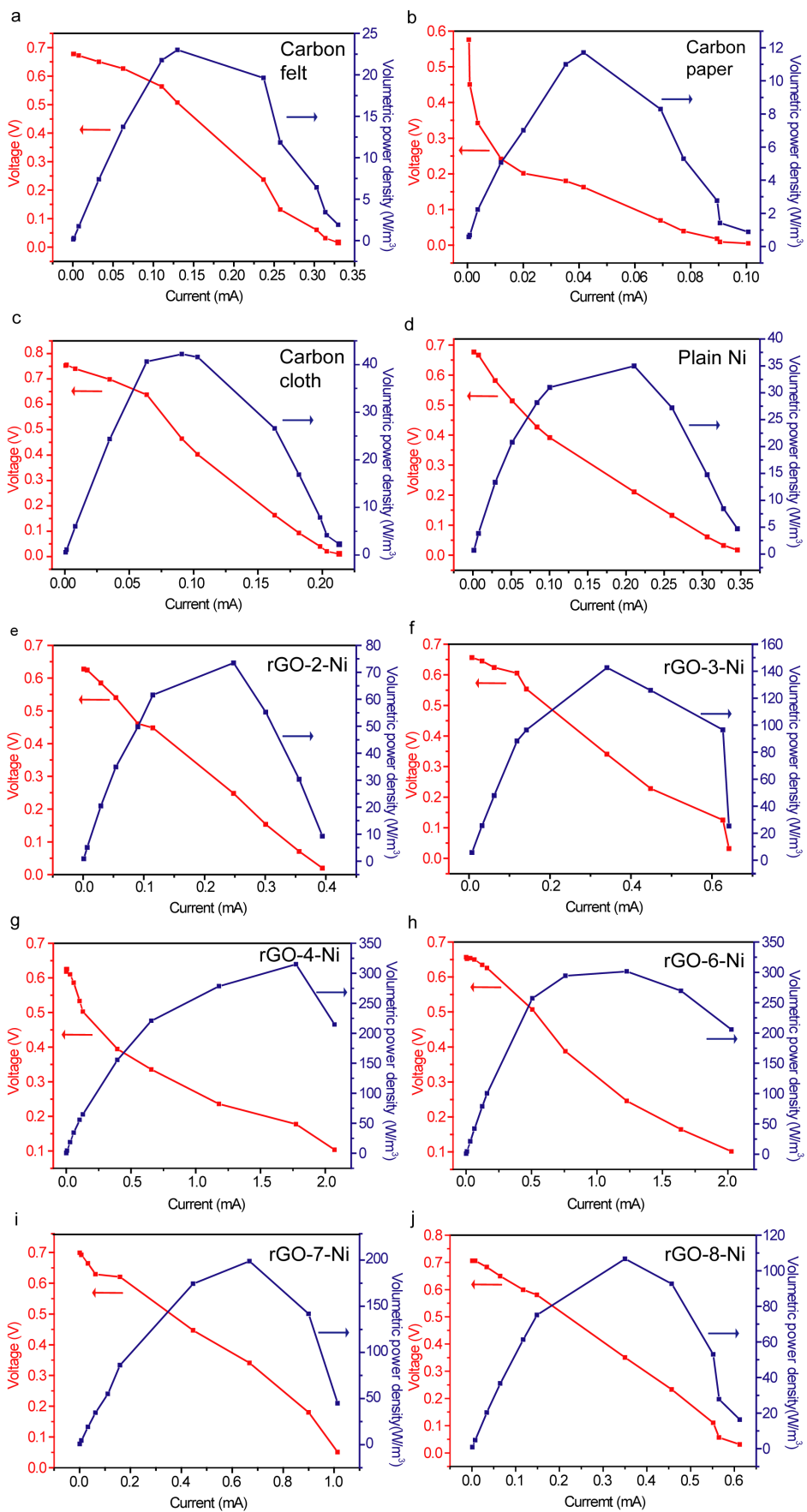
**Figure S1.** (a) XPS C 1s spectrum of rGO-Ni foam before hydrogen reduction. The black curve is the experimental result. The red dashed curve is the summation of four synthetic peaks centered at 284.7 eV (green curve), 285.5 eV (blue curve), 286.2 eV (pink curve), and 288.9 eV (yellow curve). (b) Normalized C 1s XPS spectra collected for rGO-Ni foam before and after hydrogen reduction.



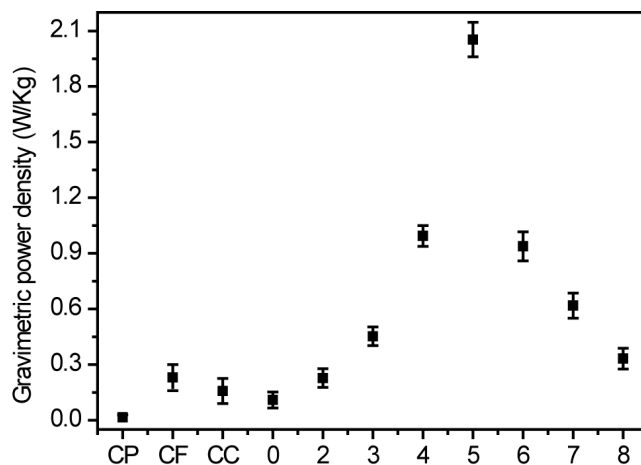
**Figure S2.** The amount of rGO loading plots as a function of the number of loading cycles.



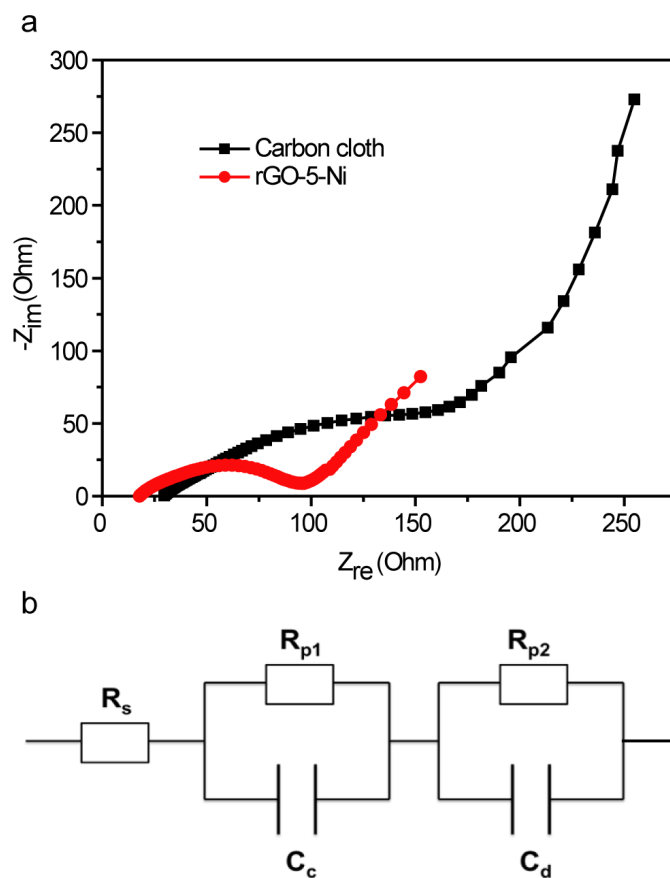
**Figure S3.** Digital picture shows the structurally collapsed rGO-8-Ni foam. rGO-Ni electrodes became fragile after repeating the loading process for 6 times or above due to the chemical dissolution of nickel in acidic GO aqueous solution (pH ~5)



**Figure S4.** Polarization (red symbol) and power (blue symbol) curves collected for MFC device operated with different anode materials. (a) Carbon felt. (b) Carbon paper. (c) Carbon cloth. (d) Plain nickel foam and (e-j) rGO-X-Ni composite structures prepared under different number of rGO loading cycles ( $X = 2, 3, 4, 6, 7, 8$ ).



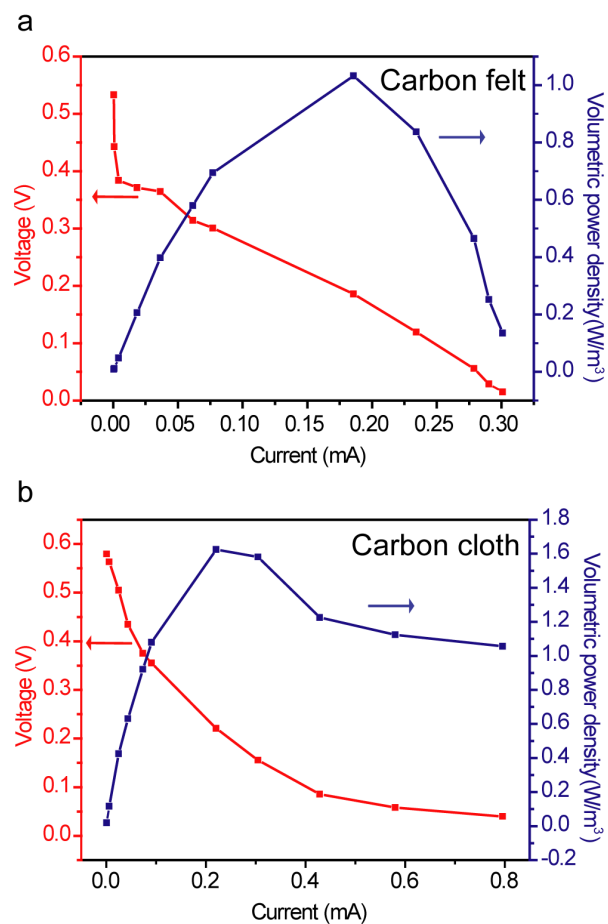
**Figure S5.** Maximum gravimetric power densities calculated for MFC devices with rGO-X-Ni electrodes as anodes. Maximum gravimetric power densities of MFC devices with plain nickel foam, carbon paper (CP), carbon felt (CF), and carbon cloth (CC) electrodes as anodes are also added for comparison. The error bars show the deviation of maximum power densities for at least three devices.



**Figure S6.** (a) Nyquist curves of the EIS tests for traditional carbon cloth electrode and rGO-5-Ni electrode. (b) Equivalent circuit for EIS data fitting.

**Table S1.** The fitting parameters of EIS data for the MFCs with rGO-5-Ni and carbon cloth electrode

	rGO-5-Ni ( $\Omega$ )	Carbon cloth ( $\Omega$ )
$R_s$ (solution resistance)	21.9	35.6
$R_{p1}$ (charge transfer resistance)	66	113
$R_{p2}$ (diffusion resistance)	207	2211



**Figure S7.** Polarization (red symbol) and power (blue symbol) curves collected for MFC with carbon felt anode and carbon cloth anode. The volumetric power densities were calculated based on the volume of anode chamber (~25 mL).