Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Flexible Cyanometallate Coordination Polymer Electrode for Electrochemical Dual-Mode Seawater Energy Extraction

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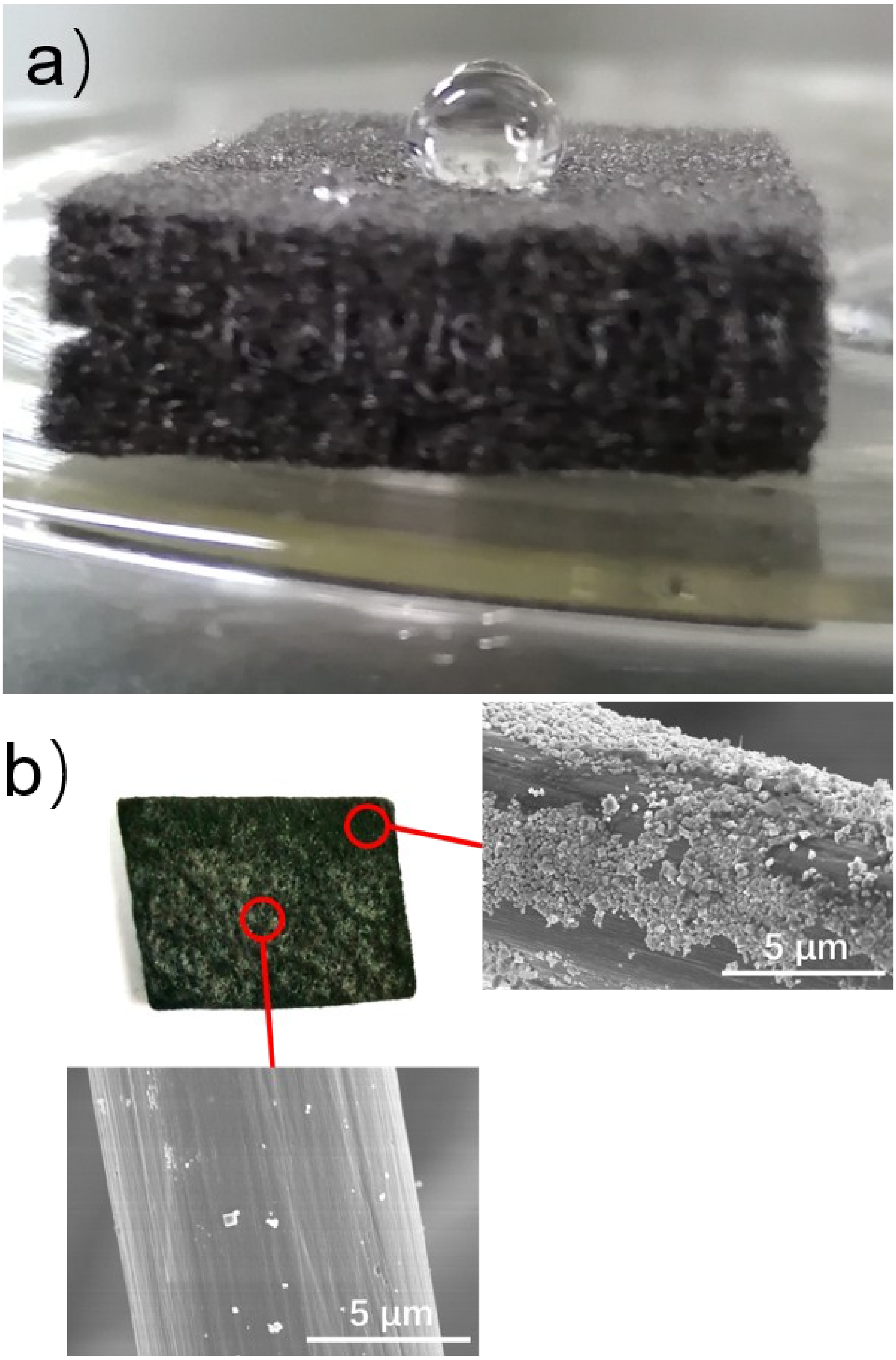

Figure S1. (a) Hydrophobic characteristic of the raw carbon felt. (b) Photographs and SEM images of the composite made by growing PB on the raw carbon felt.

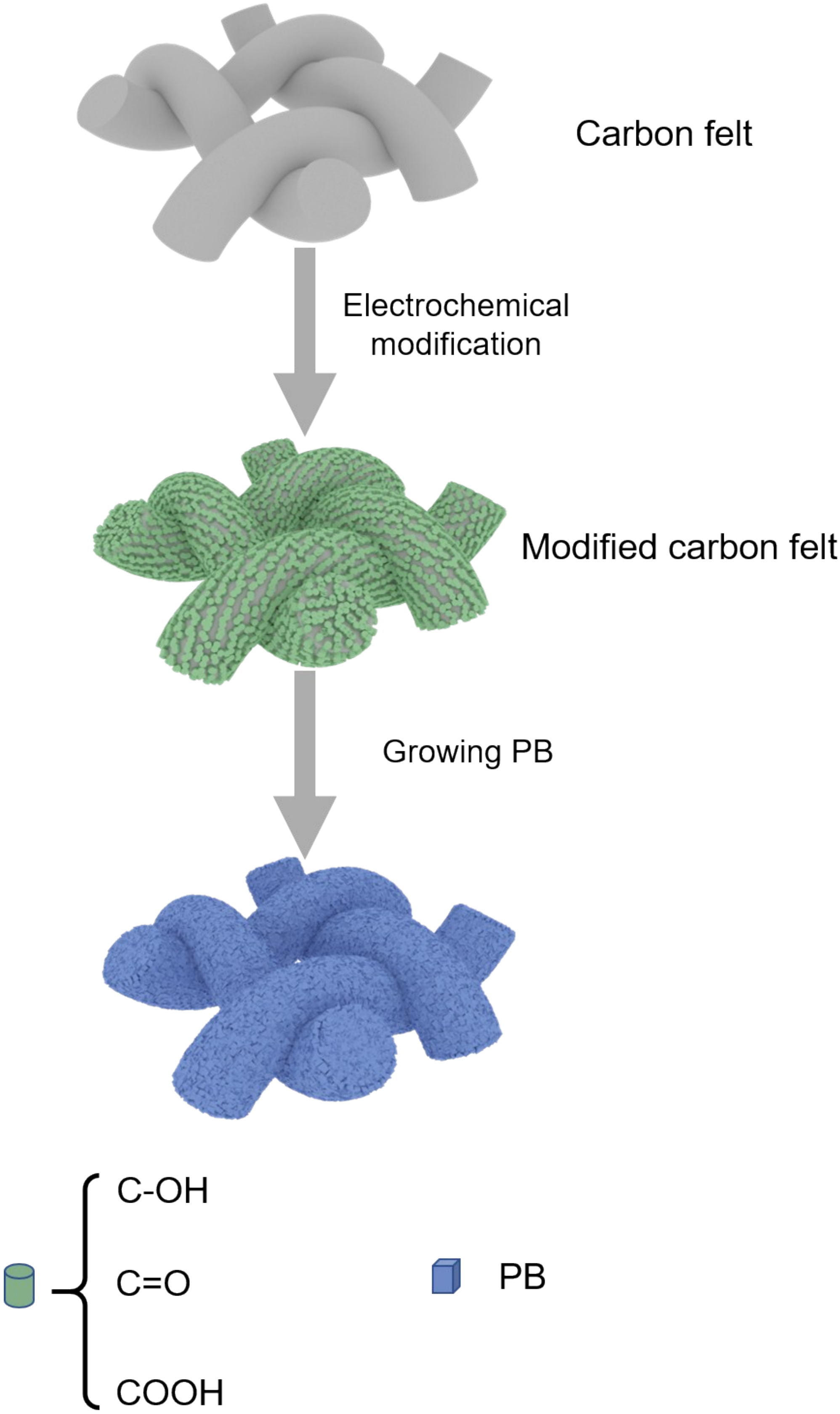

Figure S2. Schematic illustration for deposition of PB film on carbon felt.

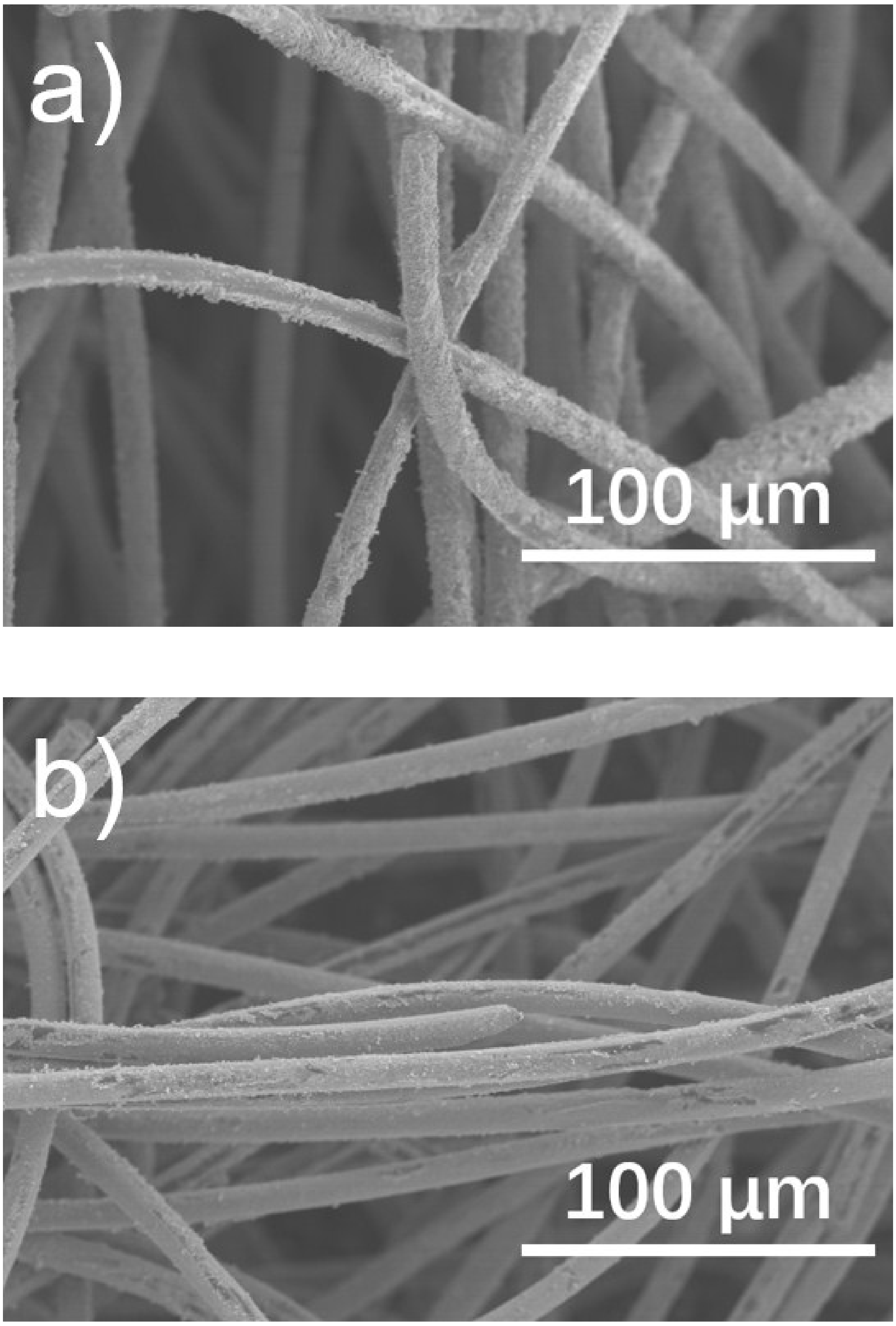

Figure S3. SEM images of the PB film grown on the modified carbon felt. (a) The outside part of the composite. (b) The inside part of the composite.

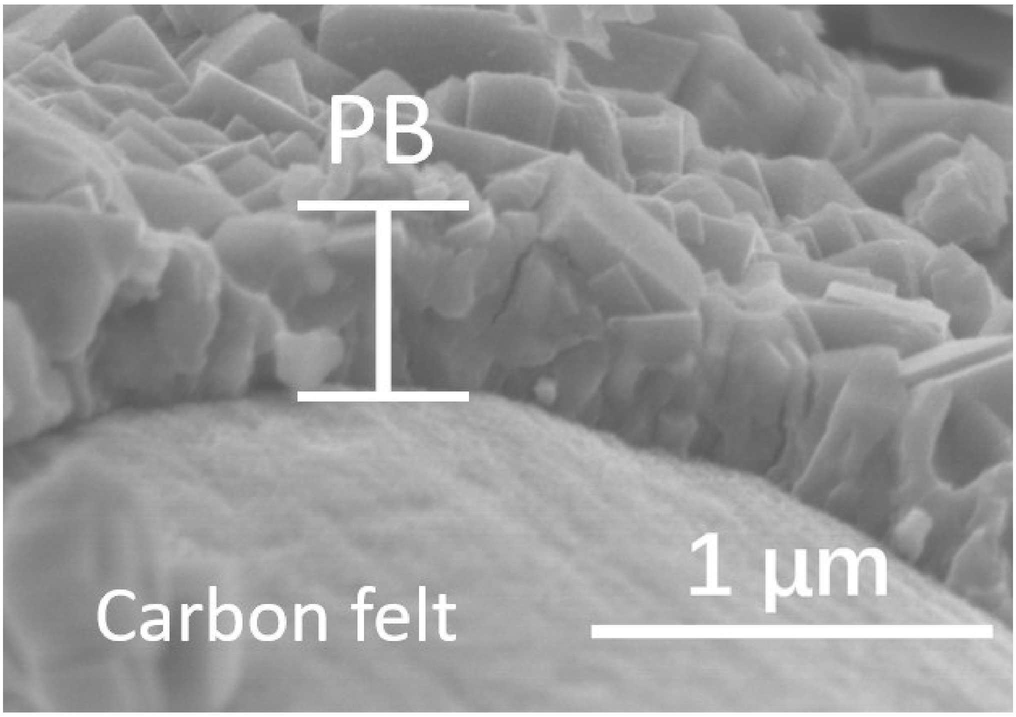

Figure S4. Side view of the grown PB film. The thickness is around 500±50 nm.

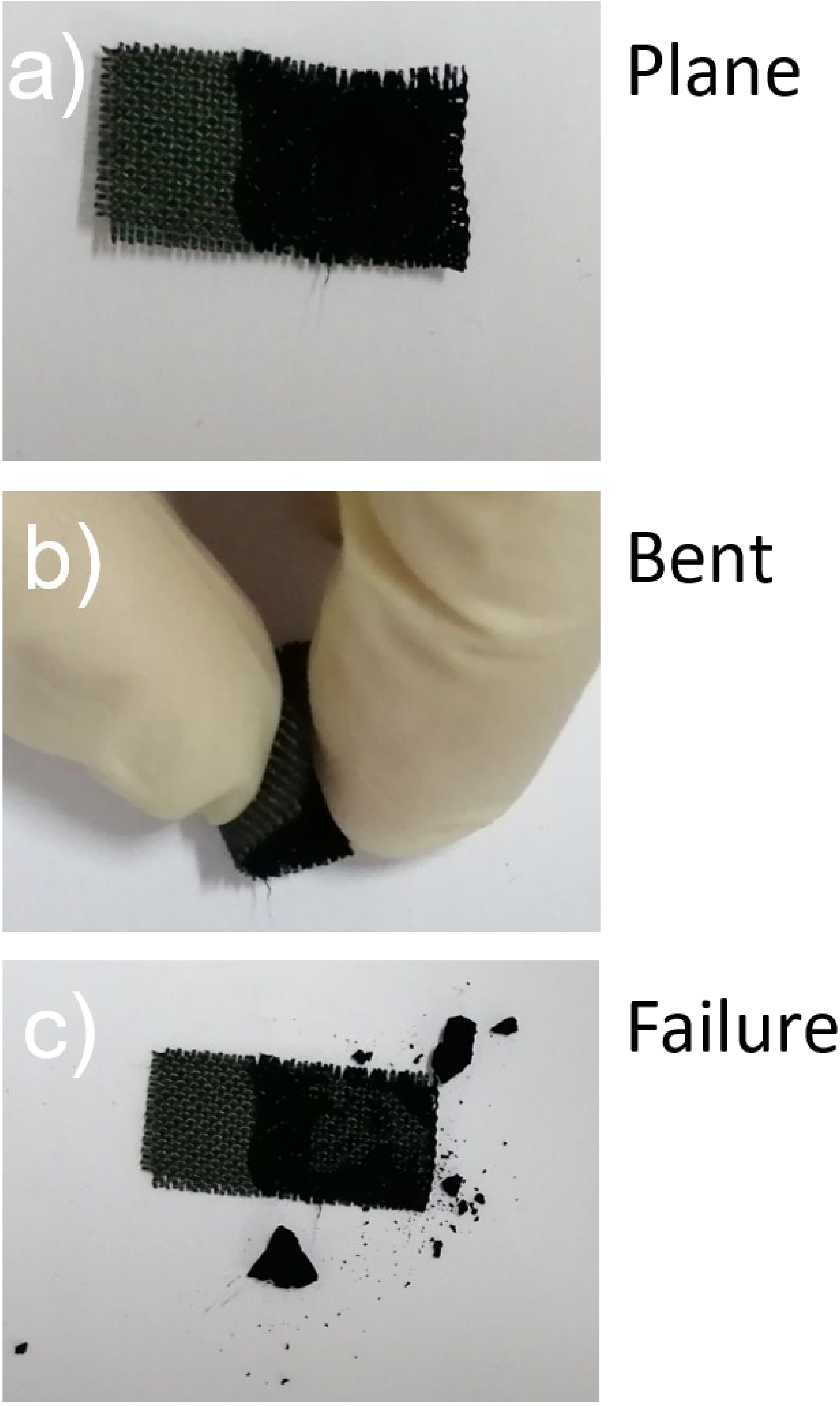

Figure S5. Photographs of the cathode made by bonding PB on the carbon felt after repeated bending tests.

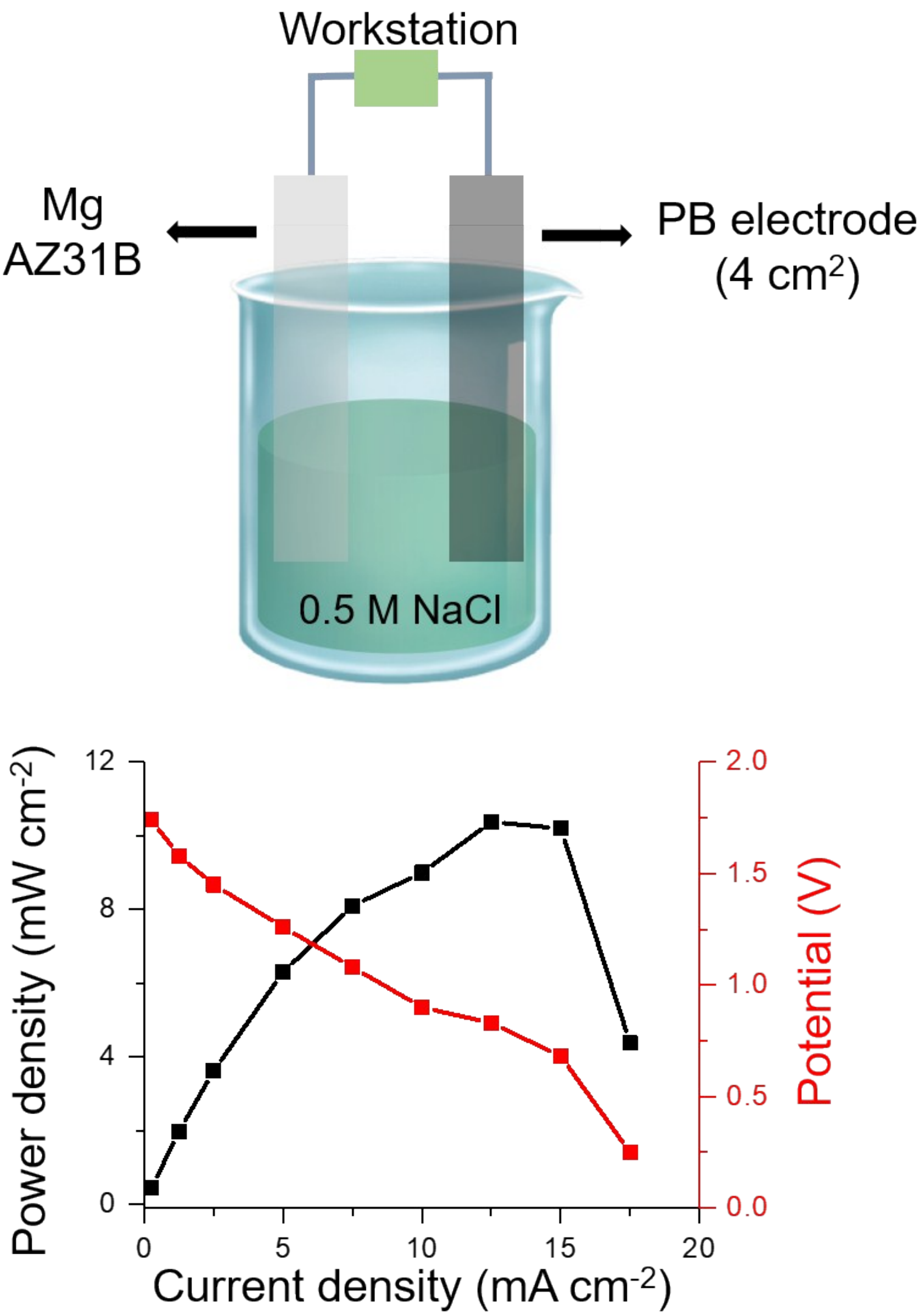

Figure S6. Electrochemical test of the cathode made by growing PB film on the carbon felt. Mg alloy (AZ31B) is used as the anode. The plots below illustrates the output power density and potential change in correspondence to the current densities.

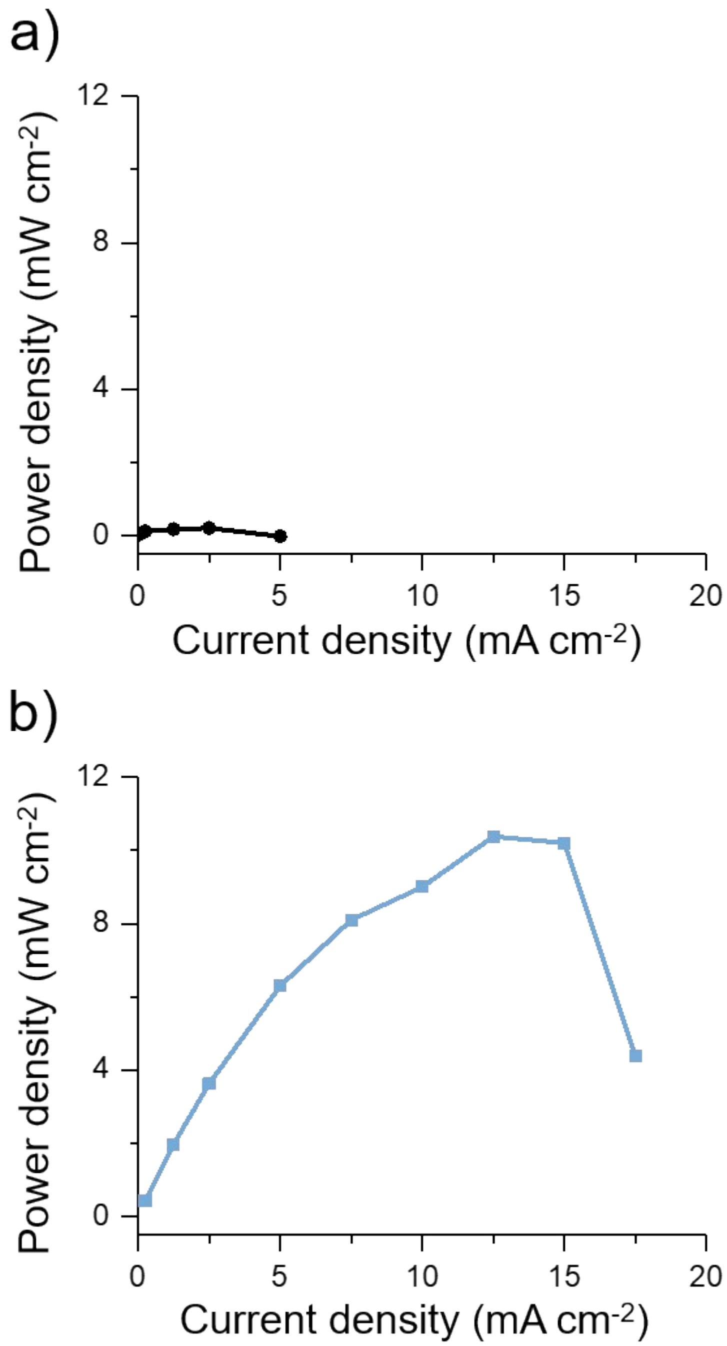

Figure S7. Output power density versus current density curves with different cathodes. (a) The cathode made by the carbon felt only. (b) The cathode made by growing PB film on the carbon felt.

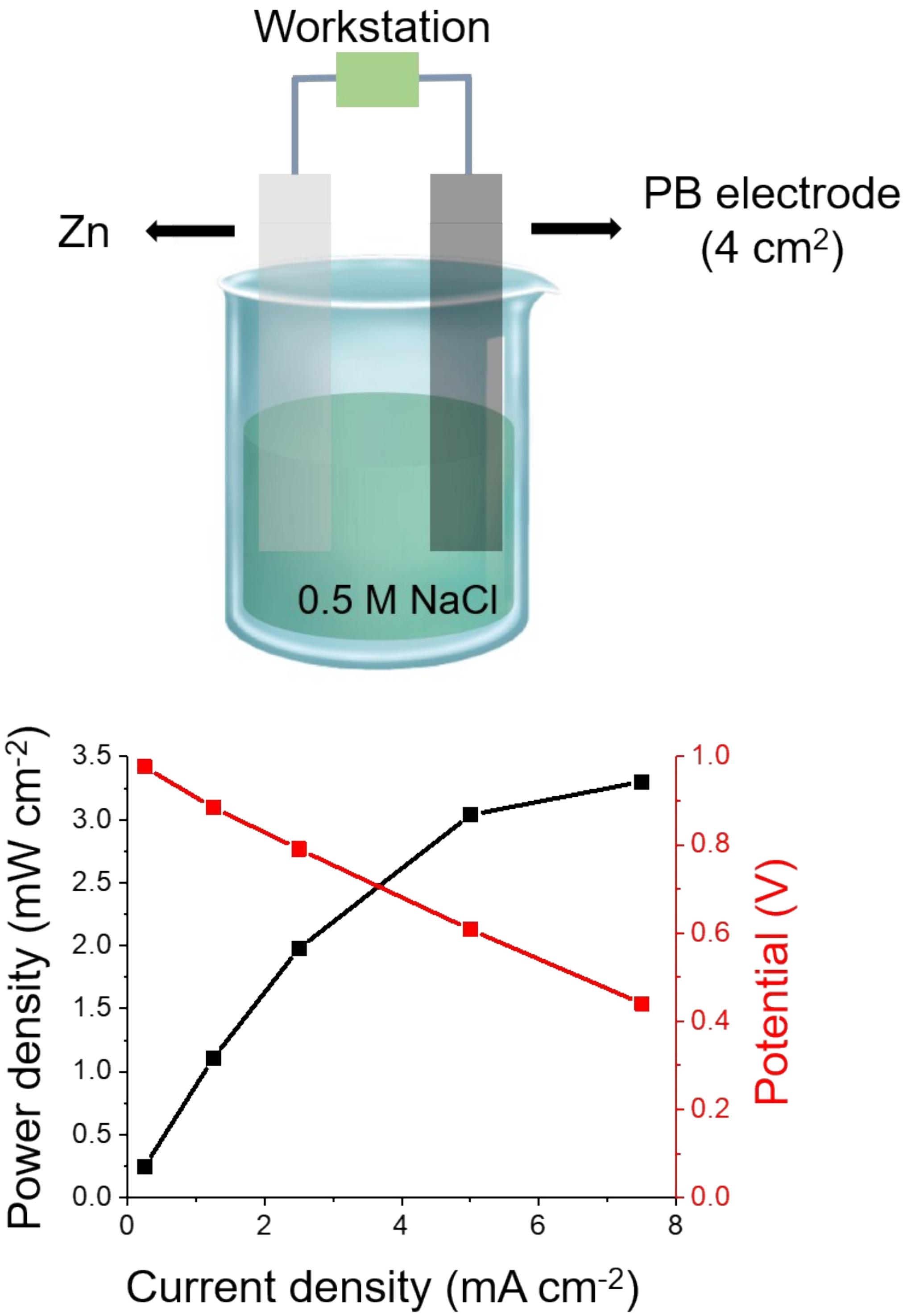

Figure S8. Electrochemical test of the cathode made by growing PB film on the carbon felt. Zn is used as the anode. The plots below illustrates the output power density and potential change in correspondence to the current densities.

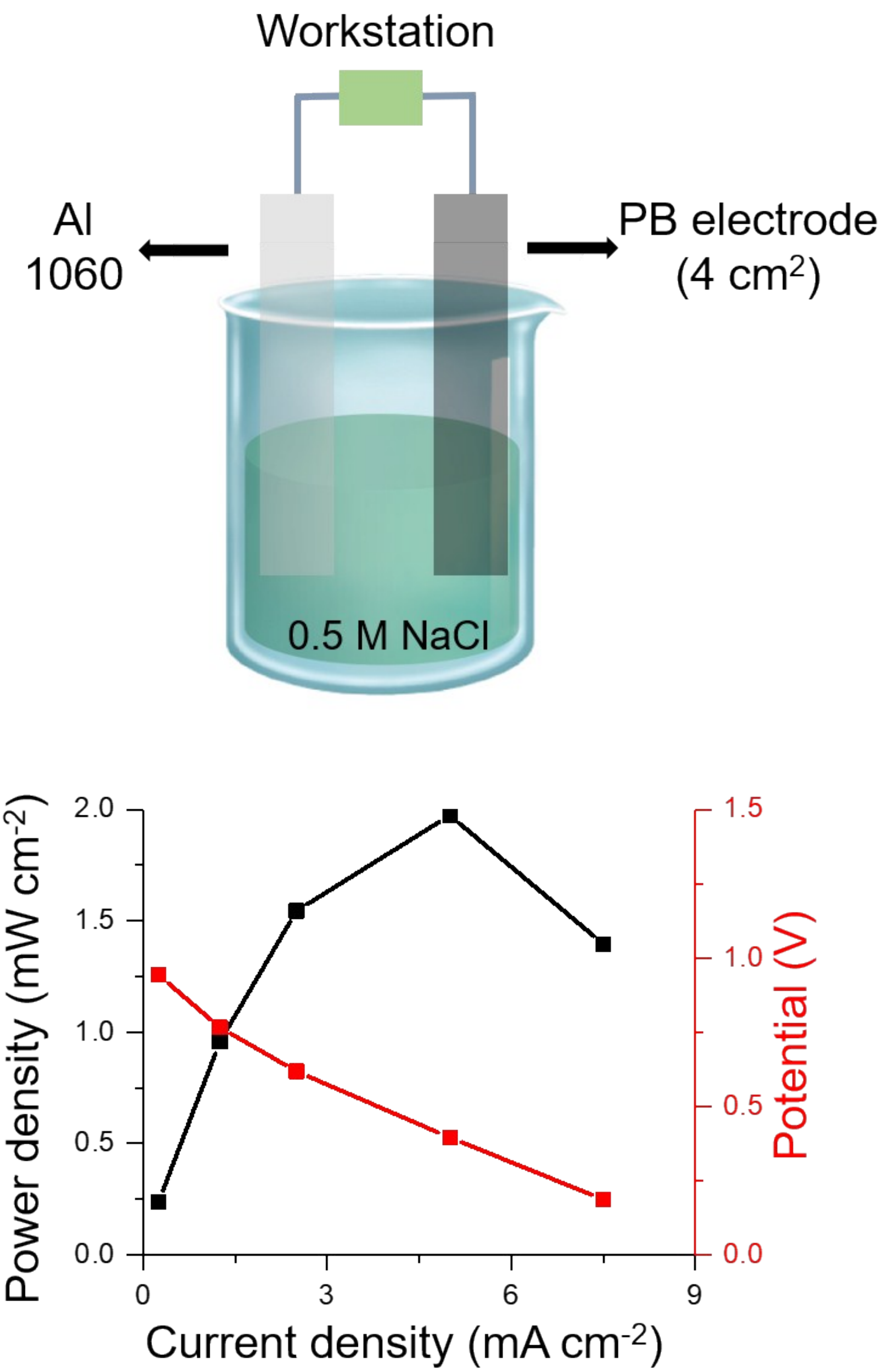

Figure S9. Electrochemical test of the cathode made by growing PB film on the carbon felt. Al alloy (1060) is used as the anode. The lower figure illustrates the output power density and potential change in correspondence to the current densities.

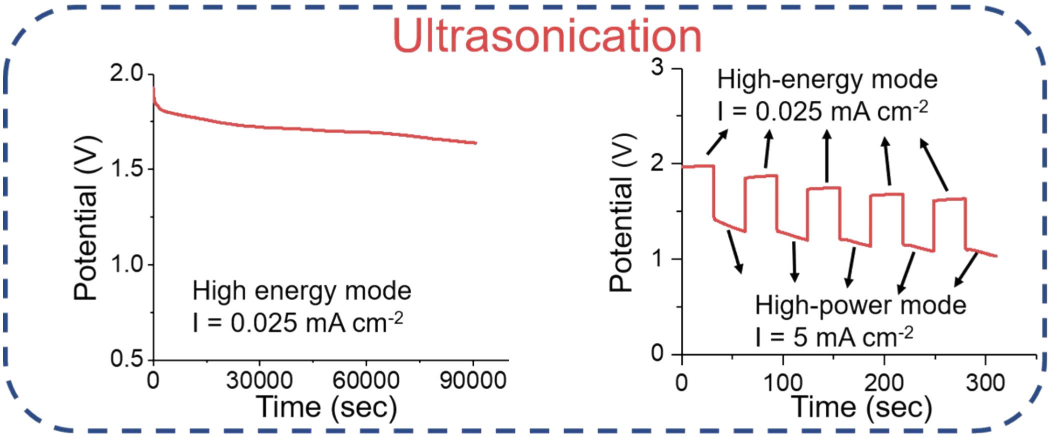

Figure S10. Performance of the system when ultrasonication (53 kHz) was used to mimic random water flow. Left figure illustrates the performance in a high-energy working mode. Right figure presents the behavior during mode switching.

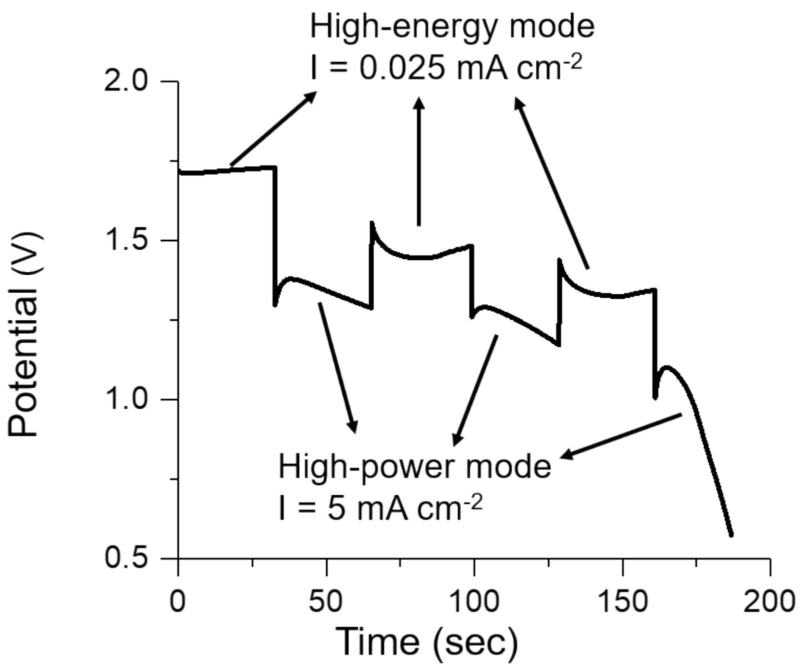

Figure S11. Mode-switching of the system using the electrode formed by bonding PB with the carbon felt after repeated bending tests.

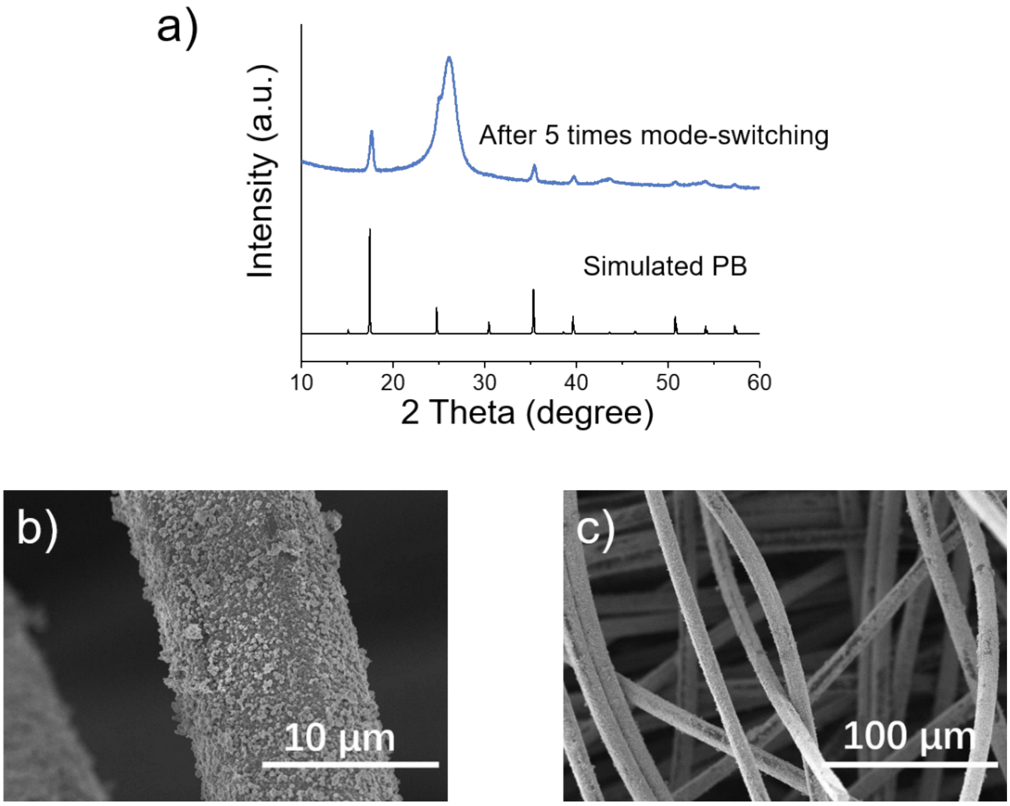

Figure S12. Characterizations of the PB electrode after 5-time mode-switching tests. (a) XRD profile. (b) and (c) SEM images.

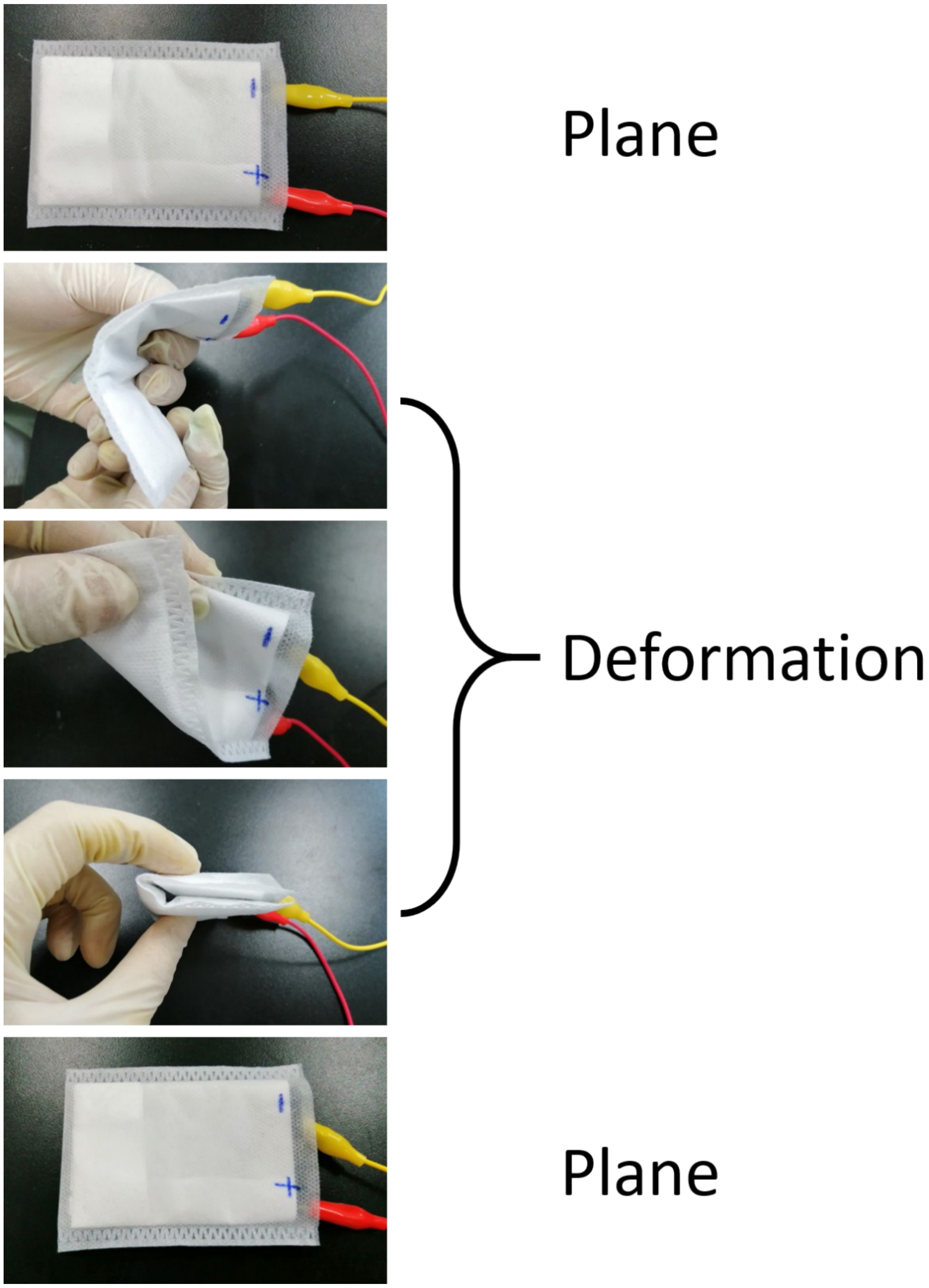

Figure S13. A prototype flexible battery was assembled by using the flexible PB electrode, aluminum foil, separator and non-woven fabrics.

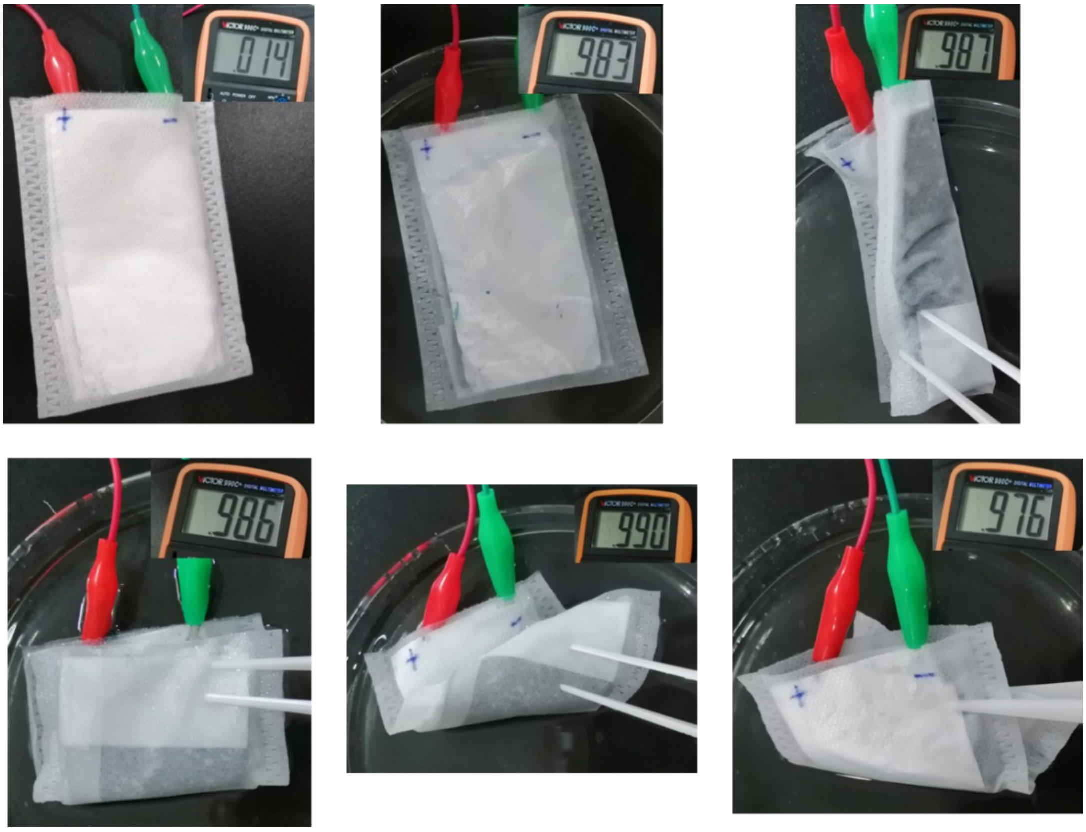

Figure S14. The open-circuit voltage of the flexible battery can be maintained after deformation deformation when immersed in simulated seawater.

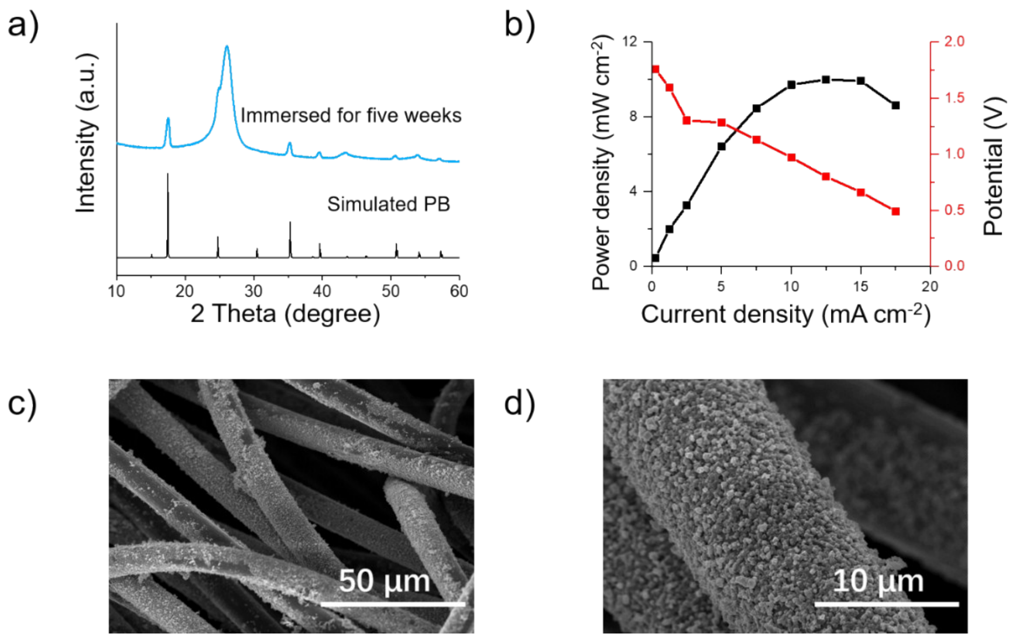

Figure S15. Characterizations of the flexible PB electrode after immersed in seawater for five weeks. (a) XRD profile. (b) Output power density and potential change corresponds to the current densities. (c and d) SEM images of the PB electrode.

Table S1. Comparison of the power density and theoretical energy density of high energy mode and high power mode.

Electrodes	Working mode	Power density (mW cm^{-2})	Theoretical energy density (Wh kg^{-2})	Cathode material
Mg/PB	High energy	0.21	3960	O_2
Mg/PB	High power	7.7	67.5	PB
Al/PB	High energy	0.041	2980	O_2
Al/PB	High power	1.875	50	PB
Zn/PB	High energy	0.031	1086	O_2
Zn/PB	High power	1.38	37.5	PB