

## Supporting Information

### **Electrochemical formation and dissolution of an Iodine-Halide coordination solid complex in a nano-confined space**

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## Detailed description for equation 4

For the  $I_2(aq)_{bulk}/I^-(aq)$  redox reaction in reaction S1, the half-redox potential,  $E_{I_2(aq)_{bulk}/I^-(aq)}$  can be expressed as a Nernst equation:



$$E_{I_2(aq)_{bulk}/I^-(aq)} = E_{I_2(aq)_{bulk}/I^-(aq)}^\circ - \frac{RT}{n_{e^-} F} \ln \left( \frac{C_{I^-(aq)}^2}{C_{I_2(aq)_{bulk}}} \right) \quad (S2)$$

where  $n_{e^-}$  is the number of electrons in the redox reaction, which is 2. The half-redox

potential of the  $I_2(aq)_{pore}/I^-(aq)$  redox reaction (reaction S3),  $E_{I_2(aq)_{pore}/I^-(aq)}$ , can also be expressed as:



$$E_{I_2(aq)_{pore}/I^-(aq)} = E_{I_2(aq)_{pore}/I^-(aq)}^\circ - \frac{RT}{2F} \ln \left( \frac{C_{I^-(aq)}^2}{C_{I_2(aq)_{pore}}} \right) \quad (S4)$$

At equilibrium,  $E_{I_2(aq)_{bulk}/I^-(aq)}$  is the same as  $E_{I_2(aq)_{pore}/I^-(aq)}$ . Therefore, the difference between the two half-redox potentials,  $\Delta E$ , can be expressed as:

$$\Delta E = \left\{ E_{I_2(aq)_{bulk}/I^-(aq)}^\circ - E_{I_2(aq)_{pore}/I^-(aq)}^\circ \right\} - \frac{RT}{2F} \ln \left( \frac{C_{I_2(aq)_{pore}}}{C_{I_2(aq)_{bulk}}} \right) \quad (S5)$$

Because  $C_{I_2(aq)_{pore}}/C_{I_2(aq)_{bulk}}$  at equilibrium is  $K_{stab}$ , we can derive equation 4 in the article from equation S5.

### Estimation of specific cell capacitance ( $SC_{cell}$ ), energy density (ED), and power density

#### (PD) in (-)micro-C|NaI(*aq*) with/without NaBr(*aq*)|micro-C(+)

In micro-C|NaI(*aq*) with/without NaBr(*aq*)|micro-C,  $SC_{cell}$  (F g<sup>-1</sup>) was estimated from charge/discharge curves using equation S6:<sup>[1]</sup>

$$SC_{spec, cell} = i \cdot \Delta t / (\Delta V \cdot m) \quad (S6)$$

where  $\Delta V$  is the driven cell potential,  $i$  is the applied current at charge and discharge,  $\Delta t$  is the time during charge and discharge, and  $m$  is the mass of the total micro-C in both the positive and negative electrodes of the symmetric cell.

The  $ED$  (Wh/kg) and  $PD$  (W/kg) of the cell were estimated from discharge curves using:<sup>[2]</sup>

$$ED = \frac{1}{2} SC_{cell} \Delta V^2 \quad (S7)$$

$$PD = ED / \Delta t \quad (S8)$$

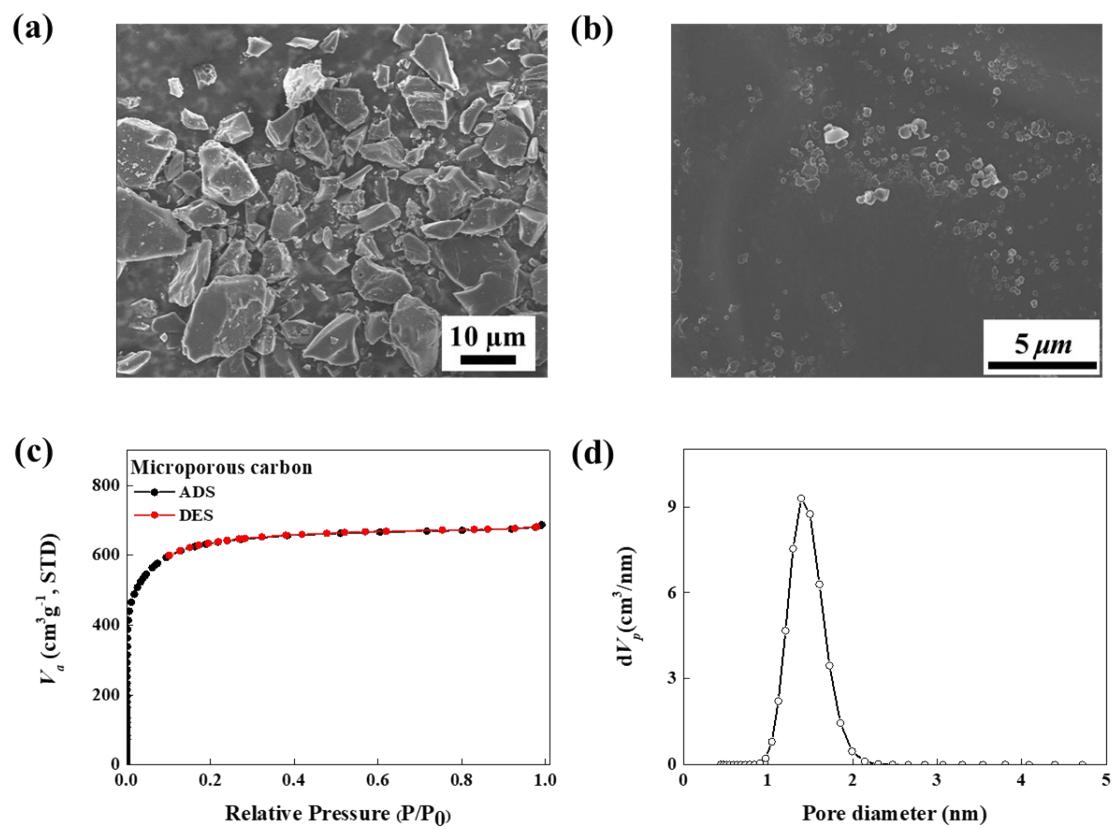
### Estimation of $C_{ZIRB}$ from (-)Zn|0.2 M ZnSO<sub>4</sub> + 10 mM NaI with/without 5 mM

#### NaBr|micro-C(+)

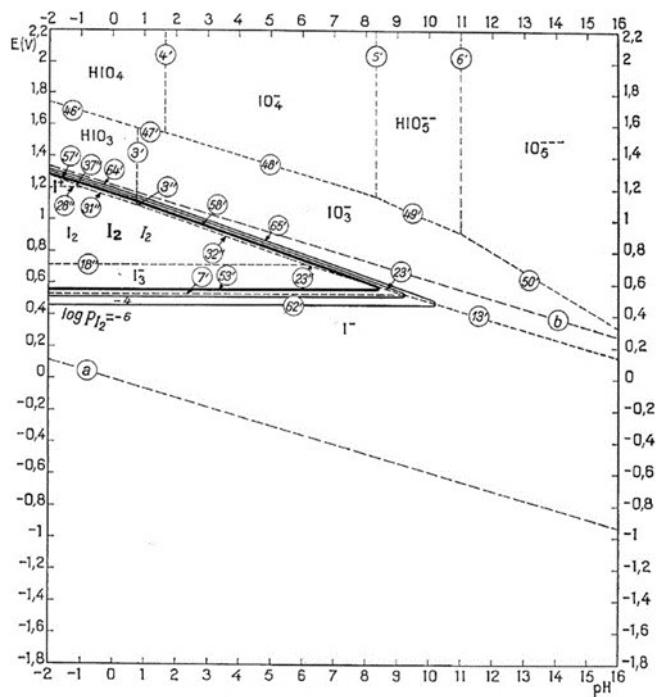
The  $E_{cell}$  vs. capacity curves in Figure 4 were obtained from the  $E_{cell}$  vs.  $t$  curves at constantly applied currents in Figure S11, and the specific capacity of the corresponding electrochemical cells was estimated by:

$$C_{ZIRB} = i \cdot \Delta t / m \quad (S9)$$

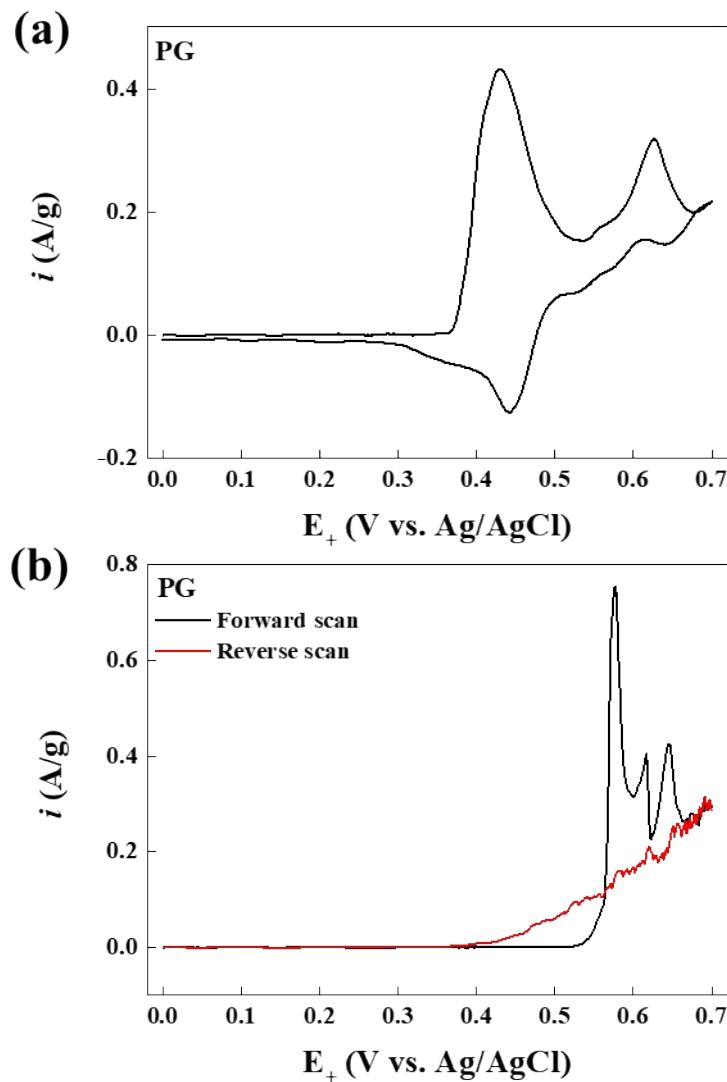
where  $m$  is the mass of micro-C in the cell.



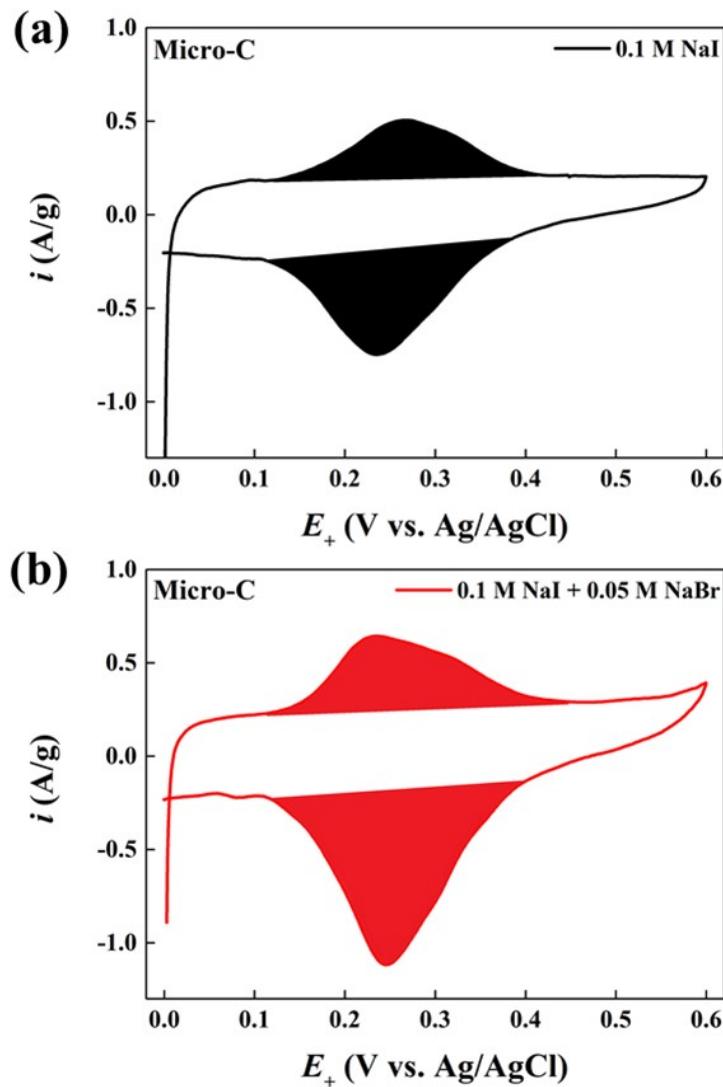
**Fig. S1** The FE-SEM images of (a) micro-C and (b) PG, (c)  $N_2$  ADS and DES and (d) the corresponding pore-size distribution in micro-C.



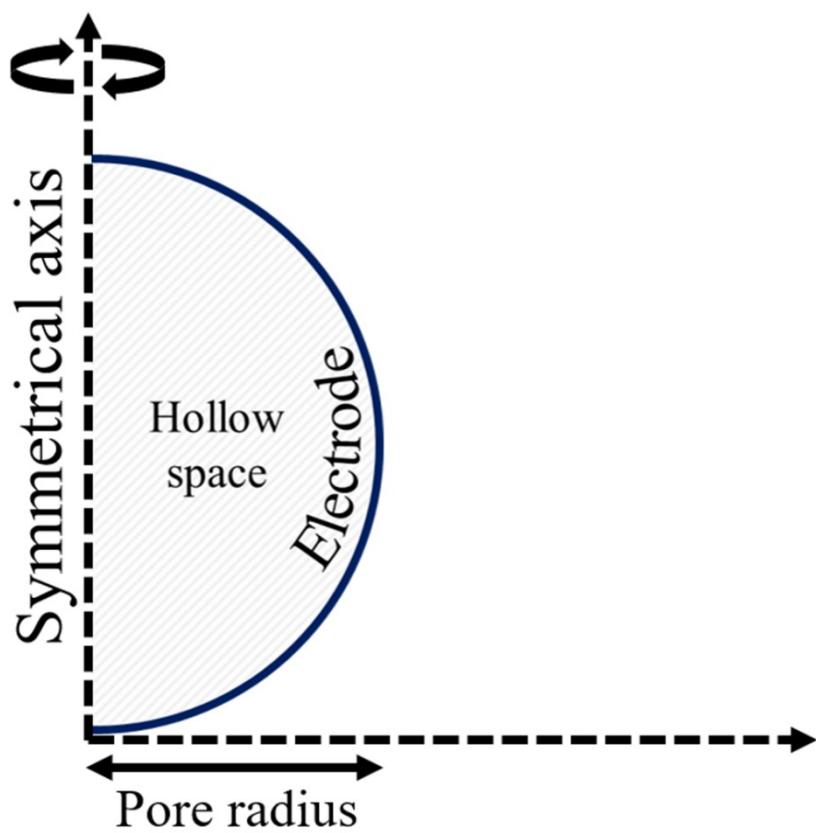
**Fig. S2** Potential vs. pH for an iodine/H<sub>2</sub>O system in an aqueous solution at 25 °C. Reprinted from Frackowiak et al.<sup>[2]</sup> Copyright (2014) with permission from Elsevier.



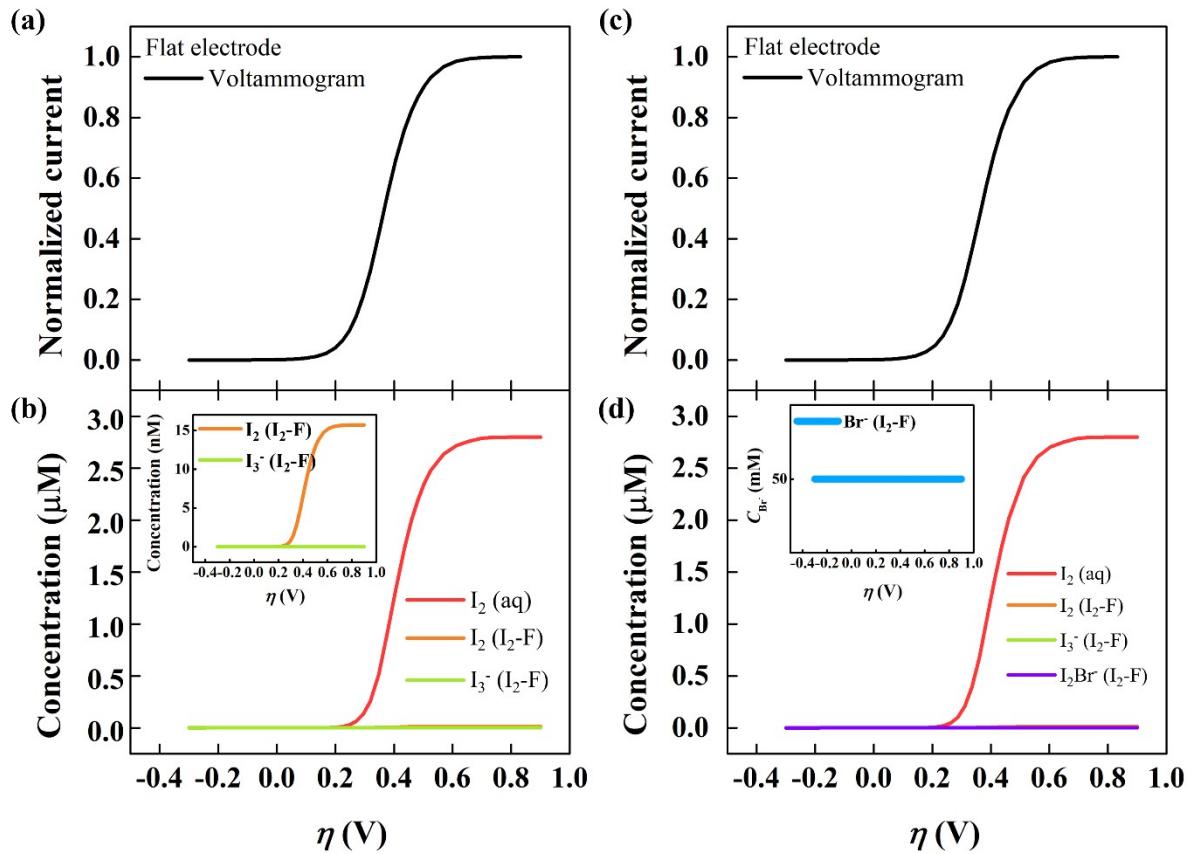
**Fig. S3** CVs from (a) (-)micro-C|0.1 M NaI|PG(+) and (b) (-)micro-C|0.05 M NaBr|PG(+) at 2 mV s<sup>-1</sup>.



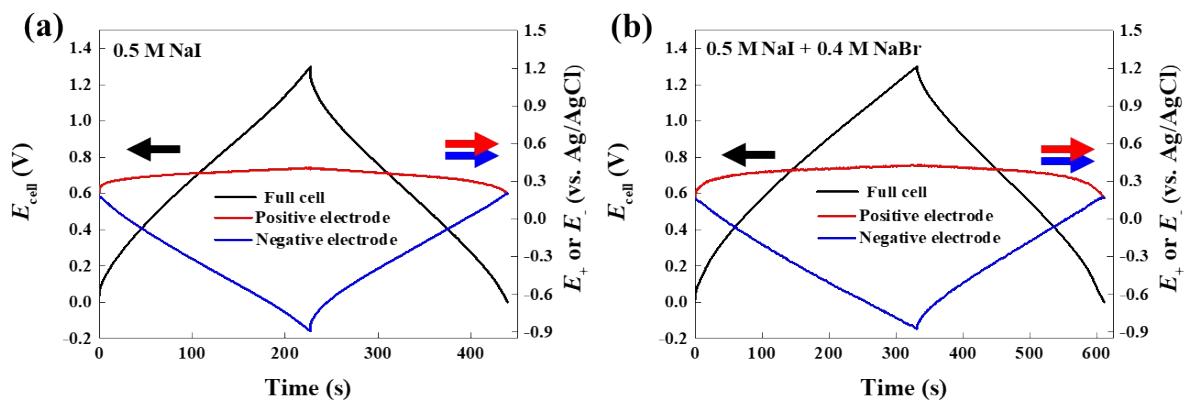
**Fig. S4** The integrated area to estimate  $Q_{\text{Ox}}$  and  $Q_{\text{Red}}$  from CVs on a micro-C measured in (-)micro-C|0.1 M NaI(aq) (a) without/(b) with 0.05 M NaBr(aq)|micro-C(+), respectively.



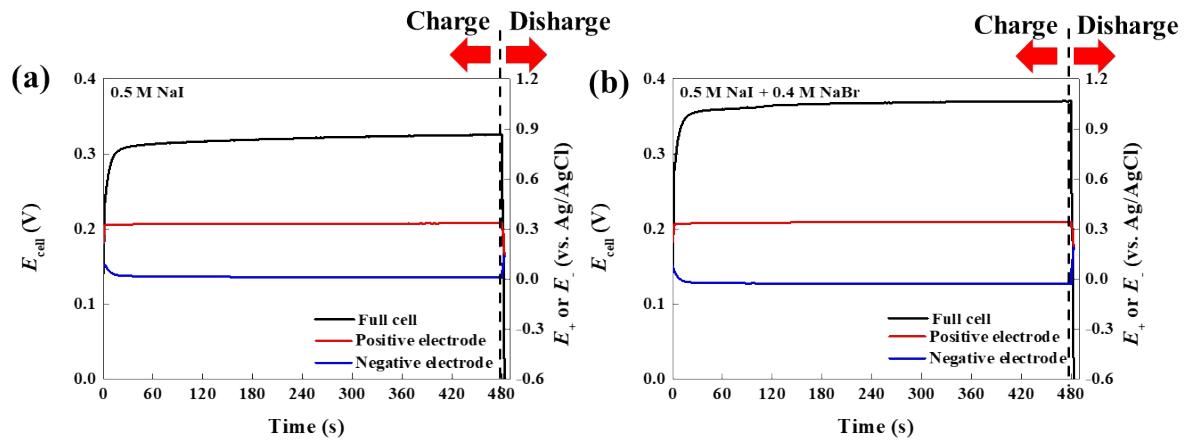
**Fig. S5** 2D axial symmetric domain of the simulation for the theoretical model.



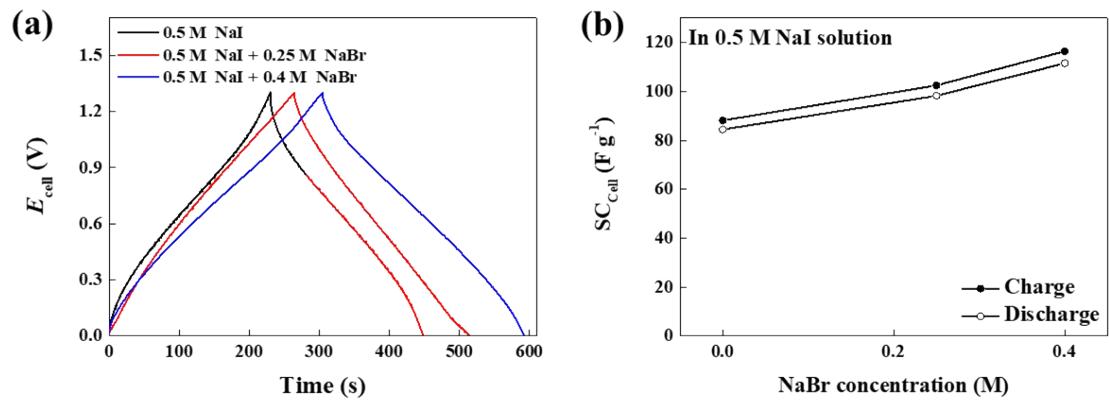
**Fig. S6** (a, c) Simulated steady-state voltammograms associated with electro-oxidation of  $I^-$  in a solution containing (a)  $I^-$  only, and (c)  $I^-$  and  $Br^-$ . (b, d) Corresponding concentration profiles of each species vs.  $\eta$  at the electrode surface in the voltammogram from a solution with (b)  $I^-$  only and (d)  $I^-$  and  $Br^-$ .



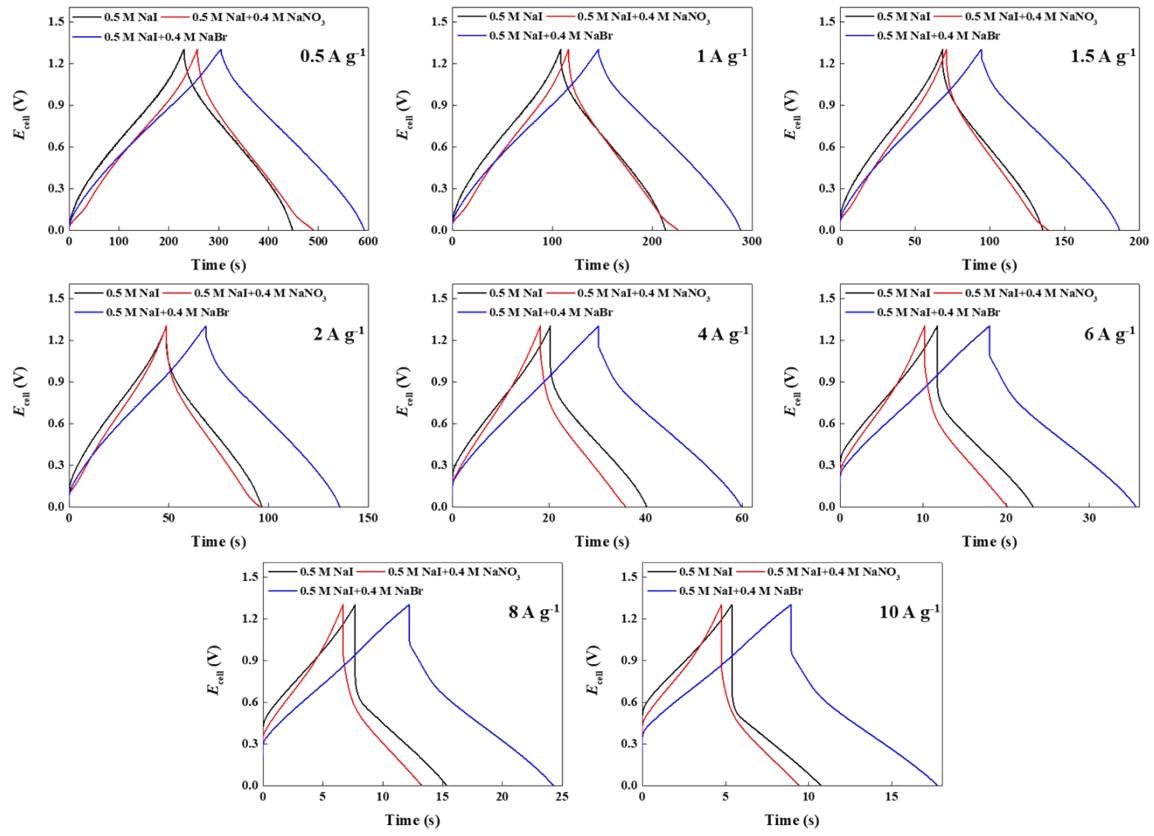
**Fig. S7** The reproducibility test of  $E_{\text{cell}}$  (black),  $E_+$  (red), and  $E_-$  (blue)-profiles vs.  $t$  at  $0.5 \text{ A g}^{-1}$  from (a) (-)micro-C|0.5 M NaI|micro-C(+) and (b) (-)micro-C|0.5 M NaI + 0.4 M NaBr|micro-C(+).



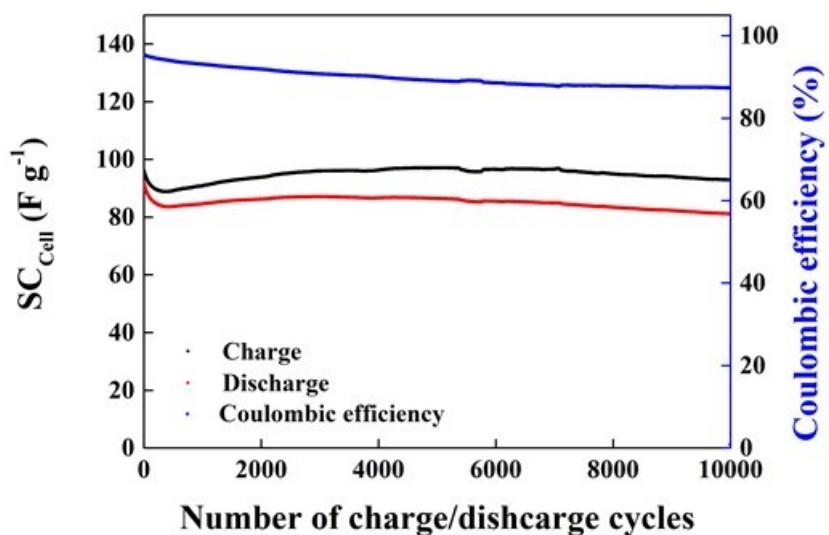
**Fig. S8**  $E_{\text{cell}}$  (black),  $E_+$  (red), and  $E_-$  (blue)-profiles as a function of  $t$  at constantly applied  $0.5 \text{ A g}^{-1}$  to the two electrochemical cells configured as (a) micro- $\text{C}|0.5 \text{ M NaI}|PG$  and (b) micro- $\text{C}|0.5 \text{ M NaI} + 0.4 \text{ M NaBr}|PG$ , respectively.



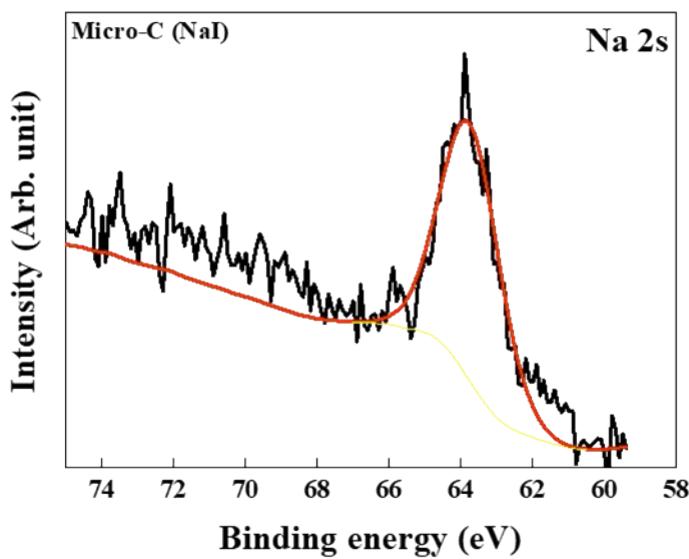
**Fig. S9** (a) The charge/discharge profiles vs.  $t$  and (b)  $SC_{\text{cell}}$  at  $0.5 \text{ A g}^{-1}$  from the symmetric cells containing  $0.5 \text{ M NaI}$  with different concentration of  $\text{Br}^-$ .



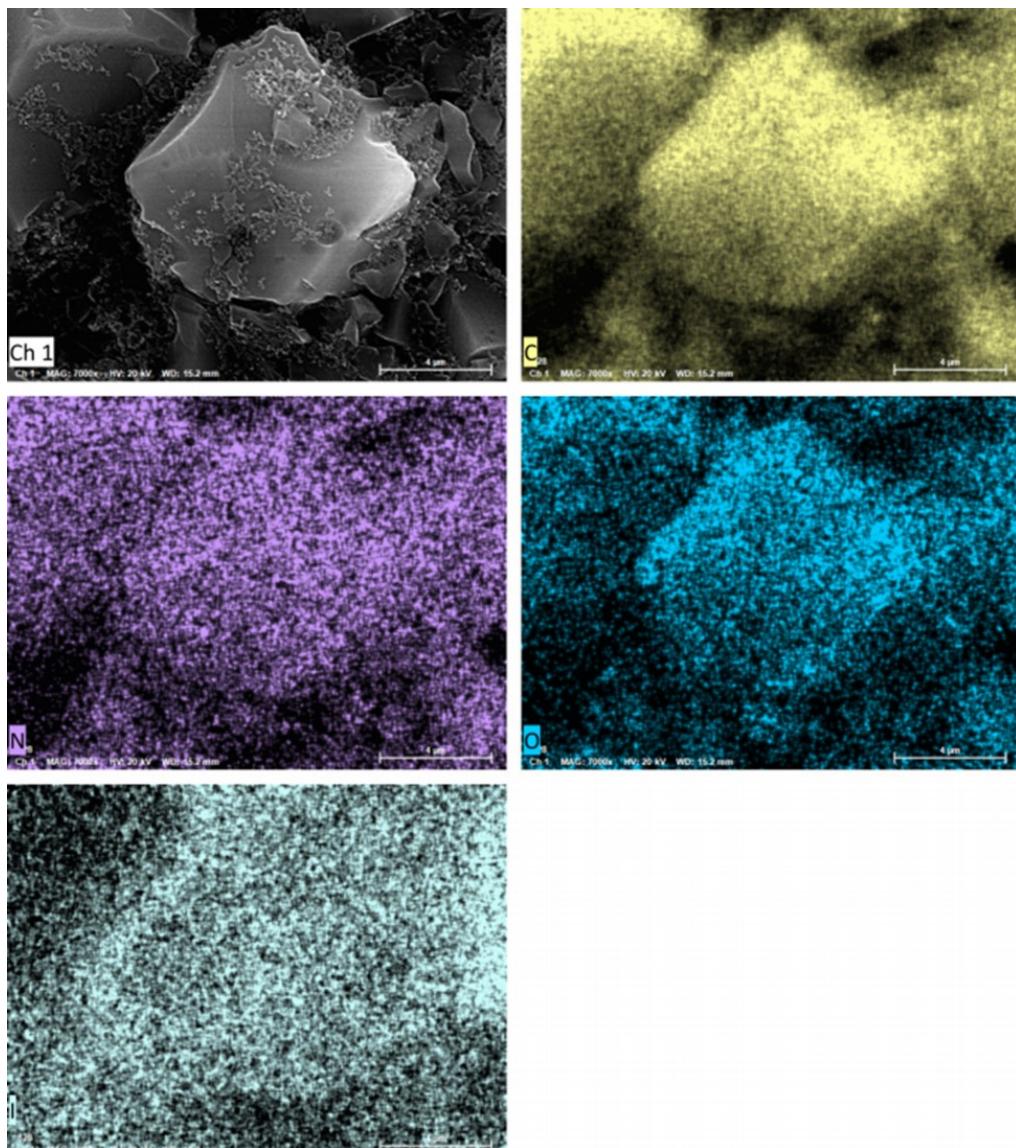
**Fig. S10**  $E_{\text{cell}}$  vs.  $t$  curves at different current densities from (-)micro-C|0.5 M NaI|micro-C(+) (black), (-)micro-C|0.5 M NaI + 0.4 M NaBr|micro-C(+) (blue), and (-)micro-C|0.5 M NaI + 0.4 M NaNO<sub>3</sub>|micro-C(+) (red).



**Fig. S11** Cycle stability of (-)micro-C|0.5 M NaI + 0.4 M NaBr|micro-C(+) at 4 A g<sup>-1</sup>.

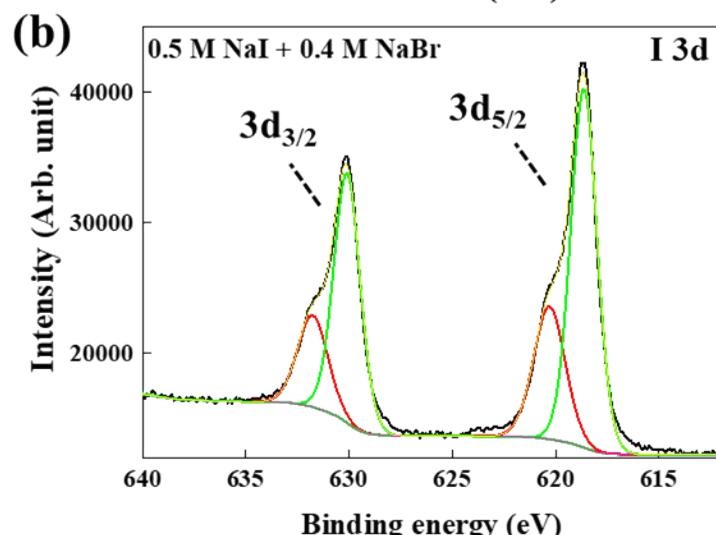
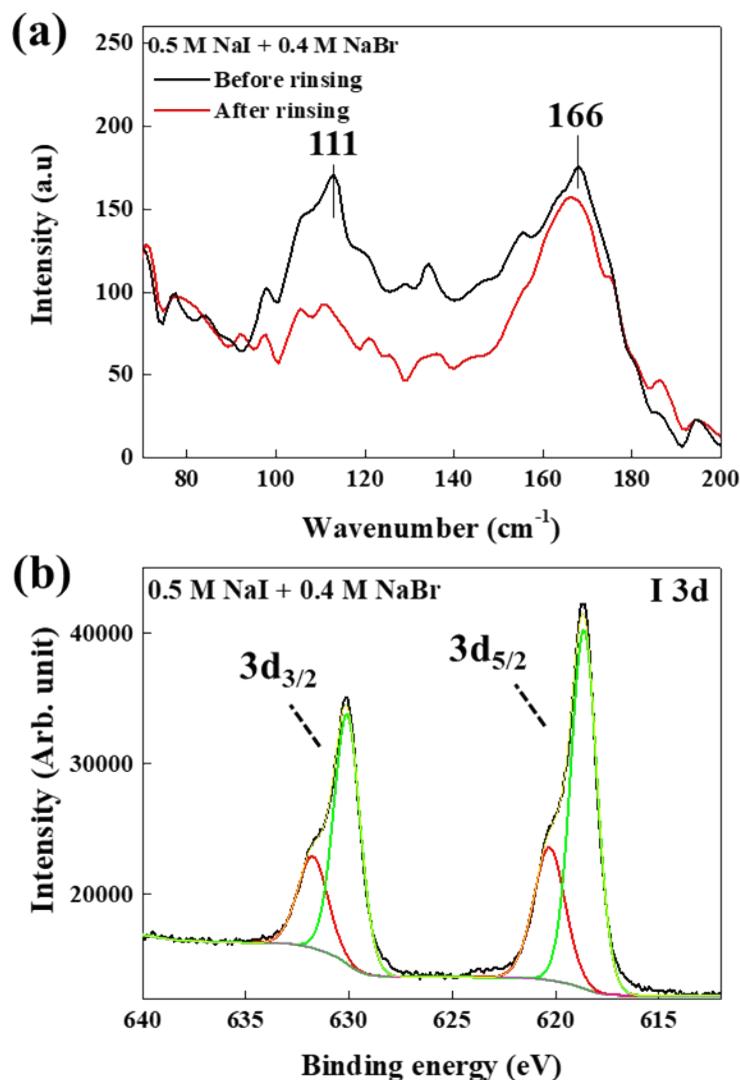


**Fig. S12** Deconvoluted high-resolution Na 2s XPS spectrum from micro-C serving as the positive electrode after charging to  $E_{\text{cell}} = 1.3$  V at  $0.5 \text{ A g}^{-1}$  from (-)micro-C|0.5 M NaI|micro-C(+).

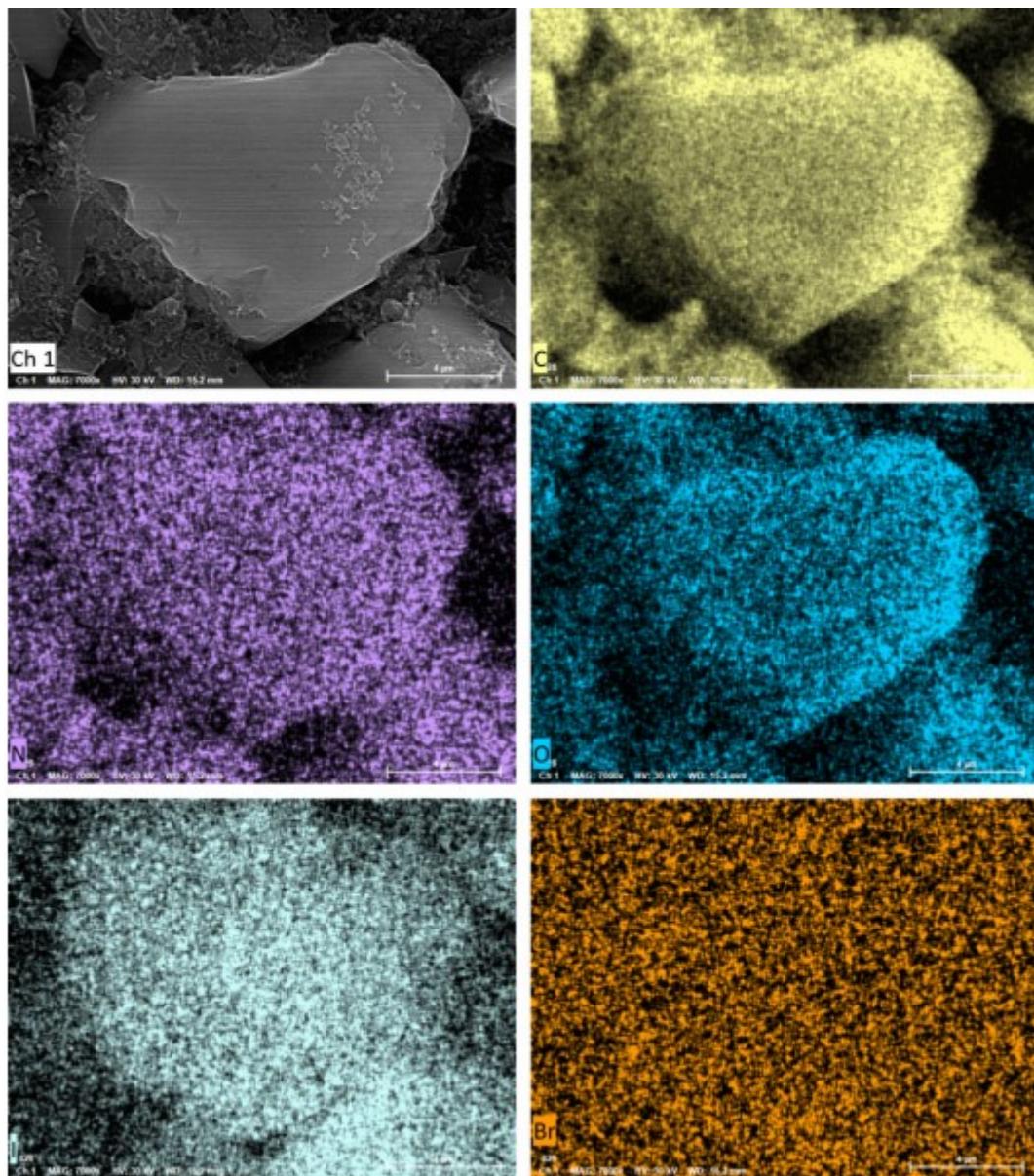


Element	At. No.	Netto	Mass [%]	Mass Norm. [%]	Atom [%]	abs. error [%] (3 sigma)	rel. error [%] (3 sigma)
C	6	1120130	62.54	63.08	84.33	19.57	31.29
N	7	31650	8.79	8.87	10.17	3.31	37.62
O	8	21097	2.21	2.23	2.24	0.96	43.46
I	53	979952	25.61	25.83	3.27	2.24	8.75
		<b>Sum</b>	<b>99.15</b>	<b>100.00</b>	<b>100.00</b>		

**Fig. S13** SEM images and corresponding EDS elemental mapping from micro-C serving as positive electrodes in (-)micro-C|0.5 M NaI|micro-C(+) cell after charging to  $E_{cell} = 1.3$  V. The micro-C were analyzed after rinsing with DI water.



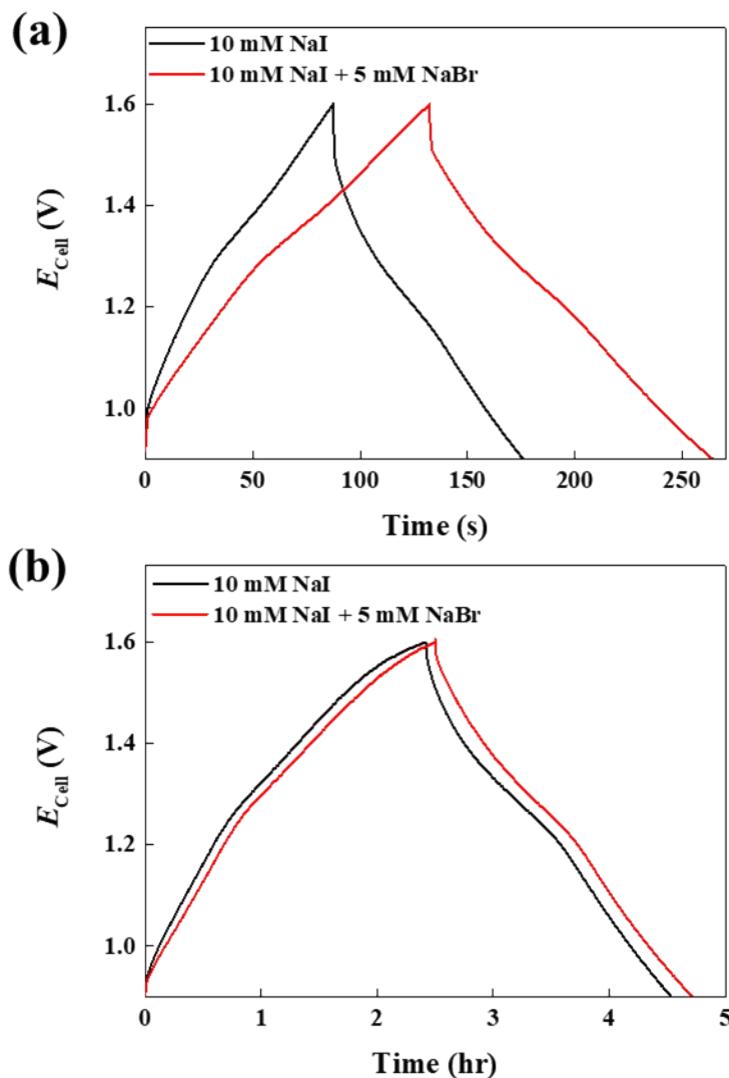
**Fig. S14** (a) Raman spectra and (b) a deconvoluted high-resolution I 3d XPS spectrum from micro-C serving as positive electrodes after charging to  $E_{\text{cell}} = 1.3$  V at  $0.5 \text{ A g}^{-1}$  from (-)micro-C|0.5 M NaI + 0.4 M NaBr|micro-C(+).



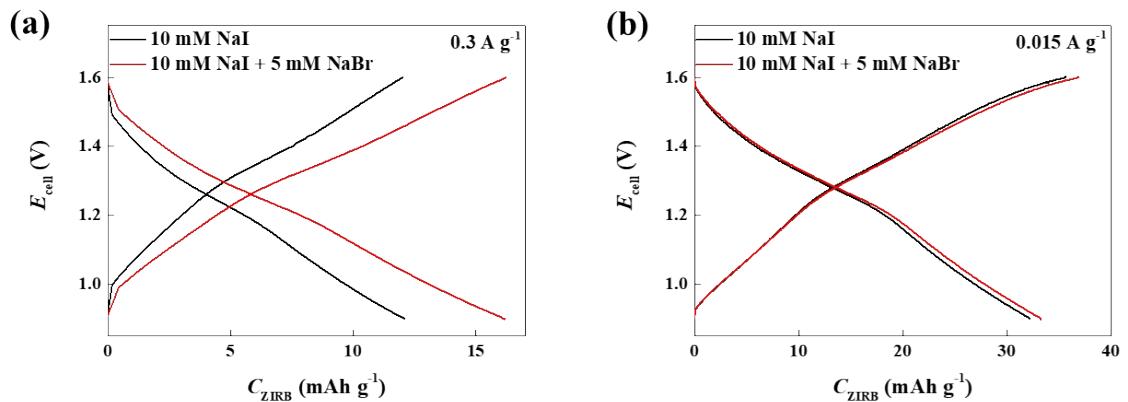
Map

Element	At. No.	Netto	Mass [%]	Mass Norm. [%]	Atom [%]	abs. error [%] (3 sigma)	rel. error [%] (3 sigma)
C	6	1197266	54.29	55.10	82.14	16.98	31.27
N	7	45228	8.29	8.41	10.75	3.03	36.60
O	8	27711	1.98	2.01	2.25	0.86	43.25
I	53	4634944	33.97	34.47	4.86	2.94	8.65
Br	35	0	0.00	0.00	0.00	0.00	1.33
		<b>Sum</b>	<b>98.52</b>	<b>100.00</b>	<b>100.00</b>		

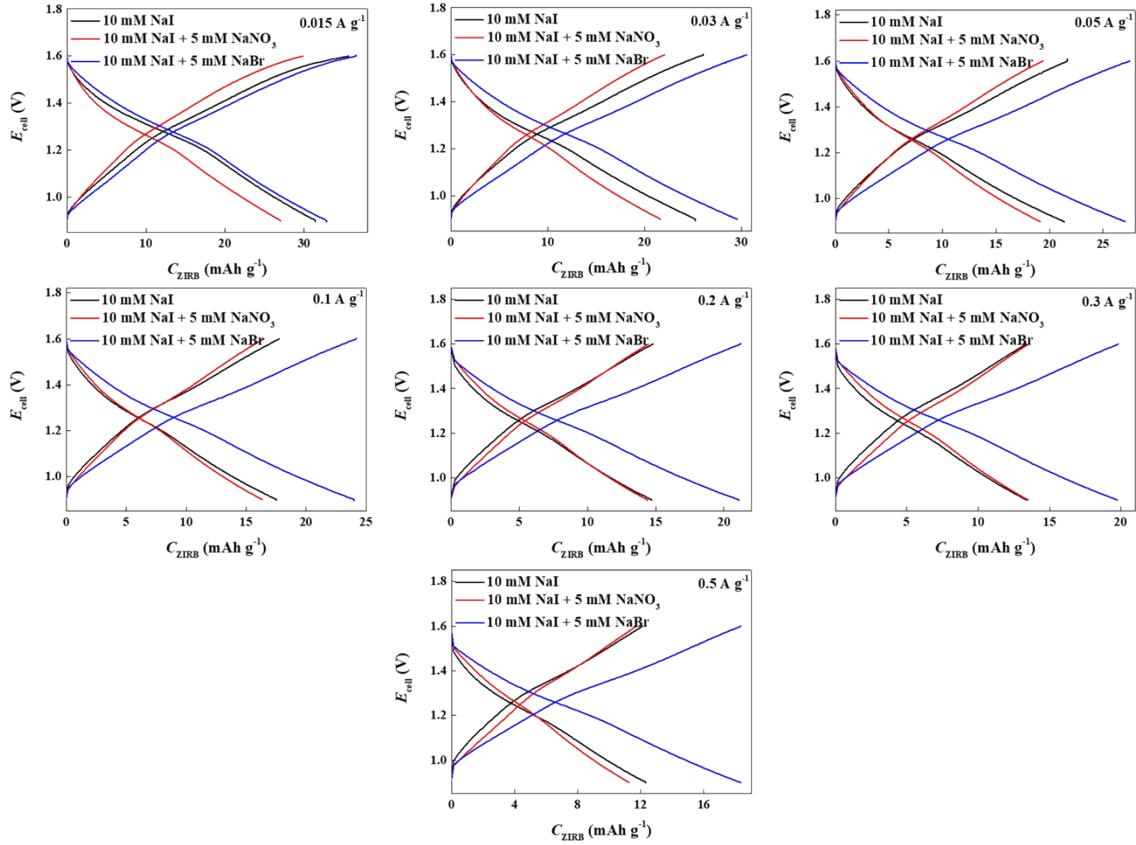
**Fig. S15** The SEM images and corresponding EDS elemental mapping from micro-C serving as positive electrodes in (-)micro-C|0.5 M NaI with 0.4 M NaBr|micro-C(+) cell after charging at 0.5 A g<sup>-1</sup> to  $E_{cell} = 1.3$  V. The micro-C were analyzed after rinsing with DI water.



**Fig. S16**  $E_{\text{cell}}$  vs.  $t$  curves in the ZIRB containing 10 mM NaI with (red)/ without (black) 5 mM NaBr at (a)  $0.3 \text{ A g}^{-1}$  and (b)  $0.015 \text{ A g}^{-1}$ .



**Fig. S17** The reproducibility test of  $E_{\text{cell}}$  vs.  $C_{\text{ZIRB}}$  curves in a model ZIRB containing 10 mM NaI with (red)/without (black) 5 mM NaBr at (a)  $0.3 \text{ A g}^{-1}$  and (b)  $0.015 \text{ A g}^{-1}$ .



**Fig. S18**  $E_{\text{cell}}$  vs.  $C_{\text{ZIRB}}$  curves in model ZIRBs at various current densities from  $(-\text{Zn}|0.2 \text{ M ZnSO}_4(aq) + 10 \text{ mM NaI}(aq) | \text{micro-C}(+) \text{ (black)}$ ,  $(-\text{Zn}|0.2 \text{ M ZnSO}_4(aq) + 10 \text{ mM NaI}(aq) + 5 \text{ mM NaNO}_3(aq) | \text{micro-C}(+) \text{ (red)}$ , and  $(-\text{Zn}|0.2 \text{ M ZnSO}_4(aq) + 10 \text{ mM NaI}(aq) + 5 \text{ mM NaBr}(aq) | \text{micro-C}(+) \text{ (blue)}$ , respectively.

**Table S1.** Reactions and corresponding parameters for a simulation without  $\text{Br}^-$ , with results displayed as simulated voltammograms and corresponding concentration profiles in Figure 2b-c and Figure S6a-b, respectively.

Reactions	Parameters
$\text{I}^\cdot + \text{e}^- \rightleftharpoons \text{I}(\text{aq})$	$E_{\text{eq}} = 0.3 \text{ V}$ , $k^0 = 0.1 \text{ cm/s}$ , $\alpha = 0.5$
$2\text{I}^\cdot \rightleftharpoons \text{I}_2(\text{aq})$	$K_{\text{eq},(6)} = 200$
$\text{I}_2(\text{aq}) \rightleftharpoons \text{I}_2(\text{I}_2\text{-F})$	$K_{\text{eq},(7)} = 1000$
$\text{I}(\text{I}_2\text{-F}) + \text{I}_2(\text{I}_2\text{-F}) \rightleftharpoons \text{I}_3^-(\text{I}_2\text{-F})$	$K_{\text{eq},(8)} = 724$
Relevant time-dependent diffusion equations	
(1) $\frac{\partial C_{\text{I}^\cdot}}{\partial t} = D_{\text{I}^\cdot} \left[ \frac{\partial^2 C_{\text{I}^\cdot}}{\partial r^2} + \frac{2}{r} \frac{\partial C_{\text{I}^\cdot}}{\partial r} \right] - 2k_{f,\text{eq},(6)} C_{\text{I}^\cdot}^2 + 2k_{b,\text{eq},(6)} C_{\text{I}_2(\text{aq})}$	
(2) $\frac{\partial C_{\text{I}^-(\text{I}_2\text{-F})}}{\partial t} = D_{\text{I}^-(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{I}^-(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2}{r} \frac{\partial C_{\text{I}^-(\text{I}_2\text{-F})}}{\partial r} \right] - k_{f,\text{eq},(8)} C_{\text{I}_2(\text{I}_2\text{-F})} C_{\text{I}^-(\text{I}_2\text{-F})} + k_{b,\text{eq},(8)} C_{\text{I}_3^-(\text{I}_2\text{-F})}$	
(3) $\frac{\partial C_{\text{I}_2(\text{aq})}}{\partial t} = D_{\text{I}_2(\text{aq})} \left[ \frac{\partial^2 C_{\text{I}_2(\text{aq})}}{\partial r^2} + \frac{2}{r} \frac{\partial C_{\text{I}_2(\text{aq})}}{\partial r} \right] + k_{f,\text{eq},(6)} C_{\text{I}^\cdot}^2 - k_{b,\text{eq},(6)} C_{\text{I}_2(\text{aq})}$	
(4) $\frac{\partial C_{\text{I}_2(\text{I}_2\text{-F})}}{\partial t} = D_{\text{I}_2(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{I}_2(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2}{r} \frac{\partial C_{\text{I}_2(\text{I}_2\text{-F})}}{\partial r} \right] + k_{f,\text{eq},(7)} C_{\text{I}_2(\text{aq})} - k_{b,\text{eq},(7)} C_{\text{I}_3^-(\text{I}_2\text{-F})}$	
(5) $\frac{\partial C_{\text{I}_3^-(\text{I}_2\text{-F})}}{\partial t} = D_{\text{I}_3^-(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{I}_3^-(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2}{r} \frac{\partial C_{\text{I}_3^-(\text{I}_2\text{-F})}}{\partial r} \right] + k_{f,\text{eq},(8)} C_{\text{I}_2(\text{I}_2\text{-F})} C_{\text{I}^-(\text{I}_2\text{-F})} - k_{b,\text{eq},(8)} C_{\text{I}_3^-(\text{I}_2\text{-F})}$	
Initial condition, completing the definition of the problem	
$t = 0$ , $C_{\text{I}^-(\text{I}_2\text{-F})} = C_{\text{I}_2(\text{aq})} = C_{\text{I}_2(\text{I}_2\text{-F})} = C_{\text{I}_3^-(\text{I}_2\text{-F})} = 0$ , $C_{\text{I}^\cdot} = 100 \text{ mM}$	
$D_{\text{I}^\cdot} = D_{\text{I}^-(\text{I}_2\text{-F})} = D_{\text{I}_3^-(\text{I}_2\text{-F})} = 1.47 \times 10^{-5}$ , $D_{\text{I}_2(\text{I}_2\text{-F})} = 1.72 \times 10^{-5}$	
$D_{\text{I}_2(\text{I}_2\text{-F})} = 3.00 \times 10^{-8} \text{ cm s}^{-1}$	



**Table S2.** Reactions and the Corresponding parameters for a simulation with  $\text{Br}^-$ , with results displayed as simulated voltammograms and corresponding concentration profiles in Figure 2d-e and Figure S6c-d, respectively.

Reactions	Parameters
$\text{I}^\cdot + \text{e}^- \rightleftharpoons \text{I}^\cdot(\text{aq})$	$E_{\text{eq}} = 0.3 \text{ V}$ , $k^0 = 0.1 \text{ cm/s}$ , $\alpha = 0.5$
$2\text{I}^\cdot \rightleftharpoons \text{I}_2(\text{aq})$	$K_{\text{eq},(6)} = 200$
$\text{I}_2(\text{aq}) \rightleftharpoons \text{I}_2(\text{I}_2\text{-F})$	$K_{\text{eq},(7)} = 1000$
$\text{I}_2(\text{I}_2\text{-F}) + \text{I}^\cdot(\text{I}_2\text{-F}) \rightleftharpoons \text{I}_3^\cdot(\text{I}_2\text{-F})$	$K_{\text{eq},(8)} = 724$
$\text{I}_2(\text{I}_2\text{-F}) + \text{Br}^-(\text{I}_2\text{-F}) \rightleftharpoons \text{I}_2\text{Br}^-(\text{I}_2\text{-F})$	$K_{\text{eq},(9)} = 12$
Relevant time-dependent diffusion equations	
(1) $\frac{\partial C_{\text{I}^\cdot}}{\partial t} = D_{\text{I}^\cdot} \left[ \frac{\partial^2 C_{\text{I}^\cdot}}{\partial r^2} + \frac{2\partial C_{\text{I}^\cdot}}{r \partial r} \right] - 2k_{f,\text{eq},(6)} C_{\text{I}^\cdot}^2 + 2k_{b,\text{eq},(6)} C_{\text{I}_2(\text{aq})}$	
(2) $\frac{\partial C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}}{\partial t} = D_{\text{I}_3^\cdot(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2\partial C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}}{r \partial r} \right] - k_{f,\text{eq},(8)} C_{\text{I}_2(\text{I}_2\text{-F})} C_{\text{I}_3^\cdot(\text{I}_2\text{-F})} + k_{b,\text{eq},(8)} C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}$	
(3) $\frac{\partial C_{\text{I}_2(\text{aq})}}{\partial t} = D_{\text{I}_2(\text{aq})} \left[ \frac{\partial^2 C_{\text{I}_2(\text{aq})}}{\partial r^2} + \frac{2\partial C_{\text{I}_2(\text{aq})}}{r \partial r} \right] + k_{f,\text{eq},(6)} C_{\text{I}^\cdot}^2 - k_{b,\text{eq},(6)} C_{\text{I}_2(\text{aq})} -$	
(4) $\frac{\partial C_{\text{I}_2(\text{I}_2\text{-F})}}{\partial t} = D_{\text{I}_2(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{I}_2(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2\partial C_{\text{I}_2(\text{I}_2\text{-F})}}{r \partial r} \right] + k_{f,\text{eq},(7)} C_{\text{I}_2(\text{aq})} - k_{b,\text{eq},(7)} C_{\text{I}_2(\text{aq})} + k_{b,\text{eq},(8)} C_{\text{I}_3^\cdot(\text{I}_2\text{-F})} - k_{f,\text{eq},(9)} C_{\text{I}_2(\text{I}_2\text{-F})} C_{\text{Br}^-(\text{I}_2\text{-F})} + k_{b,\text{eq},(9)} C_{\text{I}_2(\text{I}_2\text{-F})}$	
(5) $\frac{\partial C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}}{\partial t} = D_{\text{I}_3^\cdot(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2\partial C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}}{r \partial r} \right] + k_{f,\text{eq},(8)} C_{\text{I}_2(\text{I}_2\text{-F})} C_{\text{I}_3^\cdot(\text{I}_2\text{-F})} - k_{b,\text{eq},(8)} C_{\text{I}_3^\cdot(\text{I}_2\text{-F})}$	
(6) $\frac{\partial C_{\text{Br}^-(\text{I}_2\text{-F})}}{\partial t} = D_{\text{Br}^-(\text{I}_2\text{-F})} \left[ \frac{\partial^2 C_{\text{Br}^-(\text{I}_2\text{-F})}}{\partial r^2} + \frac{2\partial C_{\text{Br}^-(\text{I}_2\text{-F})}}{r \partial r} \right] - k_{f,\text{eq},(9)} C_{\text{I}_2(\text{I}_2\text{-F})}$	

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$$(7) \frac{\partial C_{I_2 Br^- (I_2 - F)}}{\partial t} = D_{I_2 Br^- (I_2 - F)} \left[ \frac{\partial^2 C_{I_2 Br^- (I_2 - F)}}{\partial r^2} + \frac{2}{r} \frac{\partial C_{I_2 Br^- (I_2 - F)}}{\partial r} \right] + k_{f, eq, (9)} C_{I_2 (I_2 - F)} C_{Br^- (I_2 - F)} - k_{b, eq, (9)} C_{I_2 Br^- (I_2 - F)}$$


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Initial condition, completing the definition of the problem

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$$t = 0, C_{I^- (I_2 - F)} = C_{I_2 (aq)} = C_{I_2 (I_2 - F)} = C_{I_3^- (I_2 - F)} = C_{I_2 Br^- (I_2 - F)} = 0, C_{I^\cdot} = 100 \text{ mM},$$

$$C_{Br^- (I_2 - F)} = \frac{1}{2} C_{I^\cdot}, D_{I^\cdot} = D_{I^- (I_2 - F)} = D_{I_3^- (I_2 - F)} = D_{I_2 Br^- (I_2 - F)} = 1.47 \times 10^{-5},$$

$$D_{I_2 (aq)} = 1.72 \times 10^{-5}, D_{I_2 (I_2 - F)} = 3.00 \times 10^{-8}, D_{Br^- (I_2 - F)} = 1.35 \times 10^{-5} \text{ cm s}^{-1}$$


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**Table S3.** ED at a specific PD from the electrochemical capacitors operated in an aqueous solution with various redox active species.

Redox active species in ECs (Abbreviation if necessary)	Energy density (ED) at power density (PD)	No. of Ref. in the article
NaI + NaBr	26.2 Wh kg <sup>-1</sup> at 327.1 W kg <sup>-1</sup> , 15.9 Wh kg <sup>-1</sup> at 6513.6 W kg <sup>-1</sup>	This work
KSeCN	11.7 Wh kg <sup>-1</sup> at 368.2 W kg <sup>-1</sup> , 3.6 Wh kg <sup>-1</sup> at 3327 W kg <sup>-1</sup>	[48]
H <sub>3</sub> PW <sub>12</sub> O <sub>40</sub>	1.6 Wh kg <sup>-1</sup> at 98.4 W kg <sup>-1</sup>	[49]
Hydroquinone (HQ)	2.5 Wh kg <sup>-1</sup> at 99.4 W kg <sup>-1</sup>	[49]
2, 6-Dihydroxyanthraquinone (2, 6-DHAQ)	8.9 Wh kg <sup>-1</sup> at 119 W kg <sup>-1</sup>	[50]
K <sub>3</sub> [Fe(CN) <sub>6</sub> ]	11.8 Wh kg <sup>-1</sup> at 188 W kg <sup>-1</sup>	[50]
K <sub>3</sub> [Fe(CN) <sub>6</sub> ]	36.9 Wh kg <sup>-1</sup> at 225 W kg <sup>-1</sup>	[51]
Dihydroxyanthraquinone+hydroquinone (DHAQ + HQ)	21.1 Wh kg <sup>-1</sup> at 500 W kg <sup>-1</sup>	[52]
KI	11.56 Wh kg <sup>-1</sup> at 1000 W kg <sup>-1</sup>	[53]
Anthraquinone-2-sulfonic acid sodium (AQS)	19.35 Wh kg <sup>-1</sup> at 1000 W kg <sup>-1</sup>	[53]

## Abbreviations

Aqua-ESSs: aqueous energy storage systems

ZPI-RFB: Zn-polyiodide redox flow battery

ZIRB: Zn-iodine rechargeable battery

I-EC: Iodide redox electrolyte electrochemical capacitor

PG: pyrolytic graphite

micro-c: microporous carbon

I<sub>2</sub>-F: Iodine-Film

$\eta$ : overpotential

$E_{\text{eq}}$ : equilibrium potential

$K_{\text{stab}}$ : stability constant

$K_{\text{eq}}$ : equilibrium constant

$E^{\circ}$ : standard reduction potential

$C$ : concentration

$R$ : gas constant

$T$ : absolute temperature

$F$ : Faraday constant

$n_{e^-}$ : number of electrons

$Q_{\text{ox or Red}}$ : quantitative charge from the voltammetric oxidation and reduction peaks

$E_+$ : half-potential of a positive electrode

$E_-$ : half-potential of a negative electrode

$E_{\text{cell}}$ : cell potential

$E_{\text{oc}}$ : open-circuit potential

$\text{SC}_{\text{cell}}$ : specific cell capacitance

$C_{\text{ZIRB}}$ : specific capacity of ZIRB

ED: energy density

PD: power density

## References

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