

## *Supplementary Material*

# **Bimetallic Metal-Organic Framework-derived Carbon Nanotube-based Frameworks for Enhanced Capacitive Deionization and Zn-air Battery**

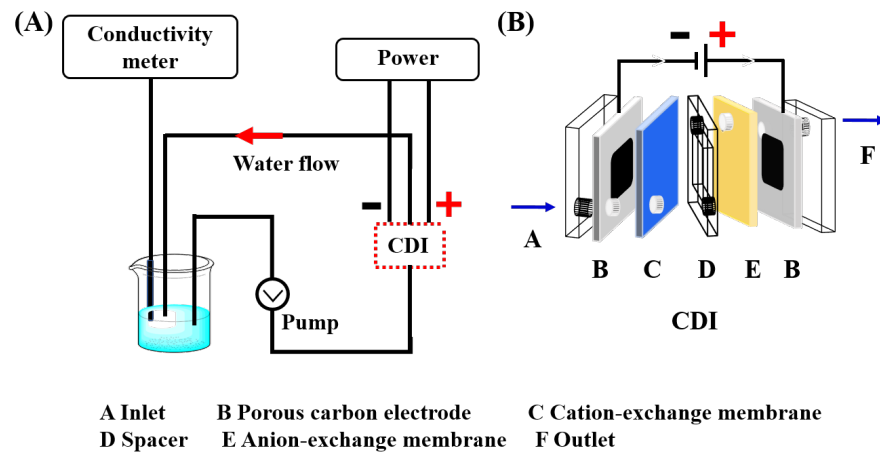
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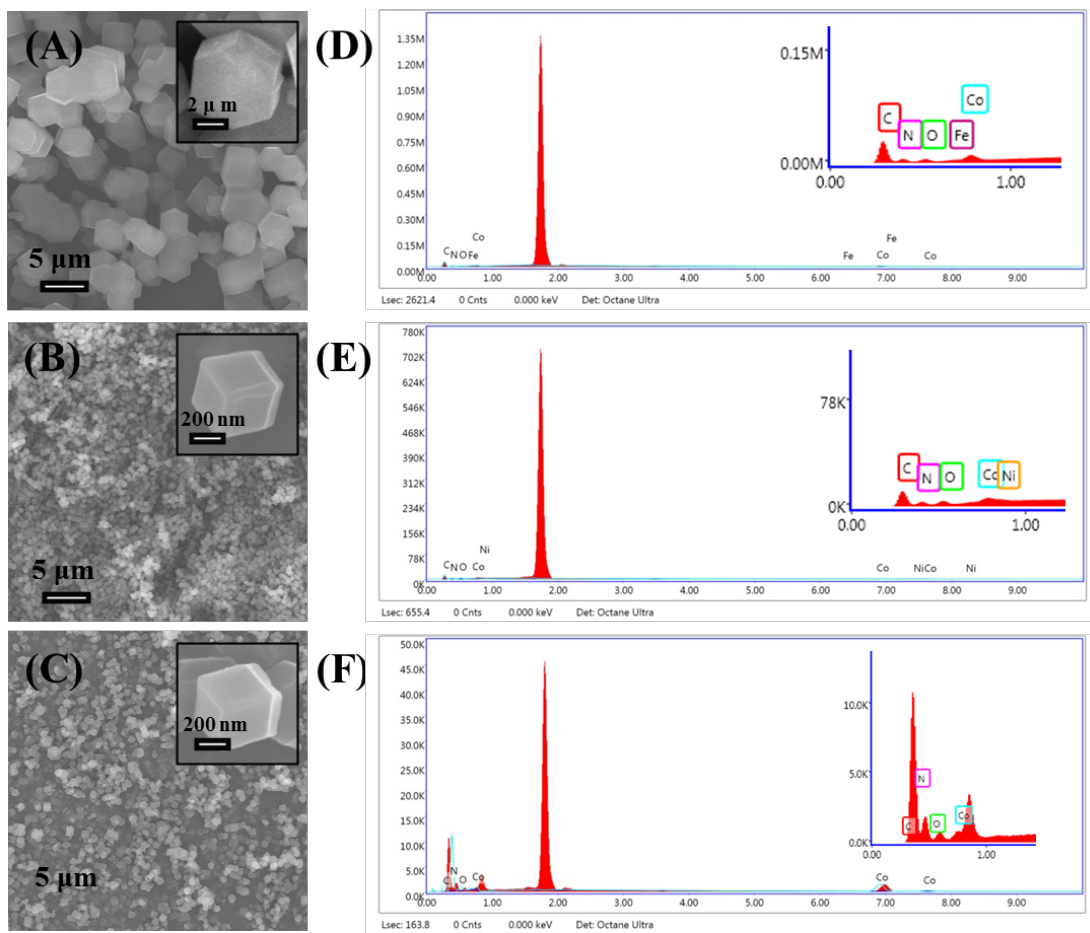
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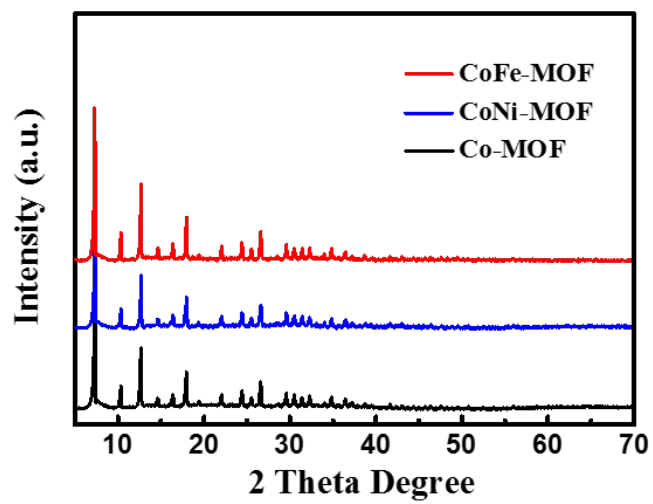
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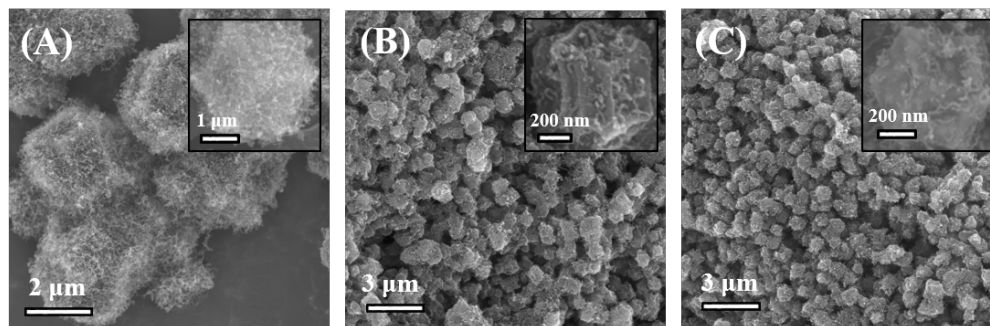
**FIGURE S1** | Scheme for the experimental setups of (A) CDI process and (B) the CDI cell.



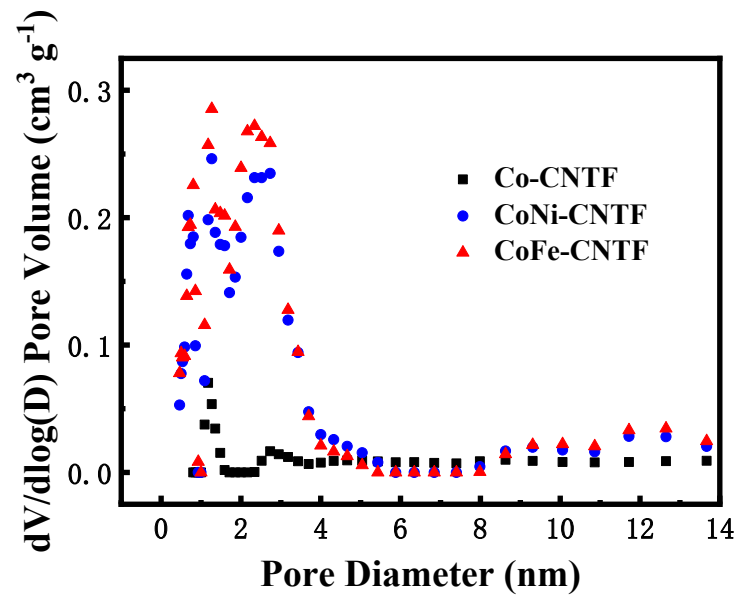
**FIGURE S2** | (A)-(C) SEM images of CoFe-MOF, CoNi-MOF and Co-MOF crystals. (D)-(F) The corresponding EDX spectra of CoFe-MOF, CoNi-MOF and Co-MOF crystals.



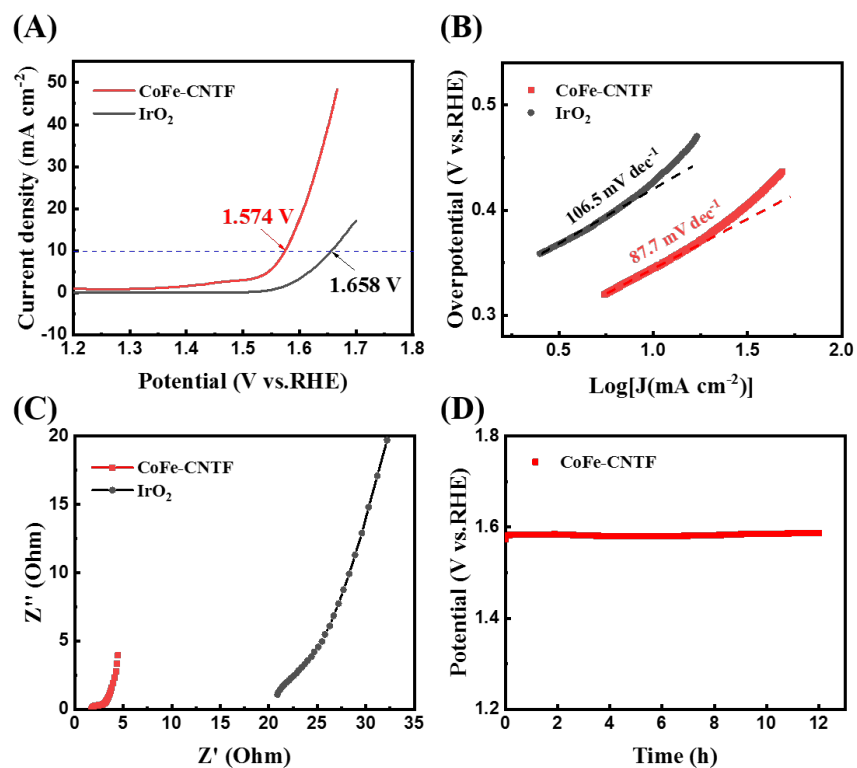
**FIGURE S3** | XRD patterns of CoFe-MOF, CoNi-MOF and Co-MOF crystals.



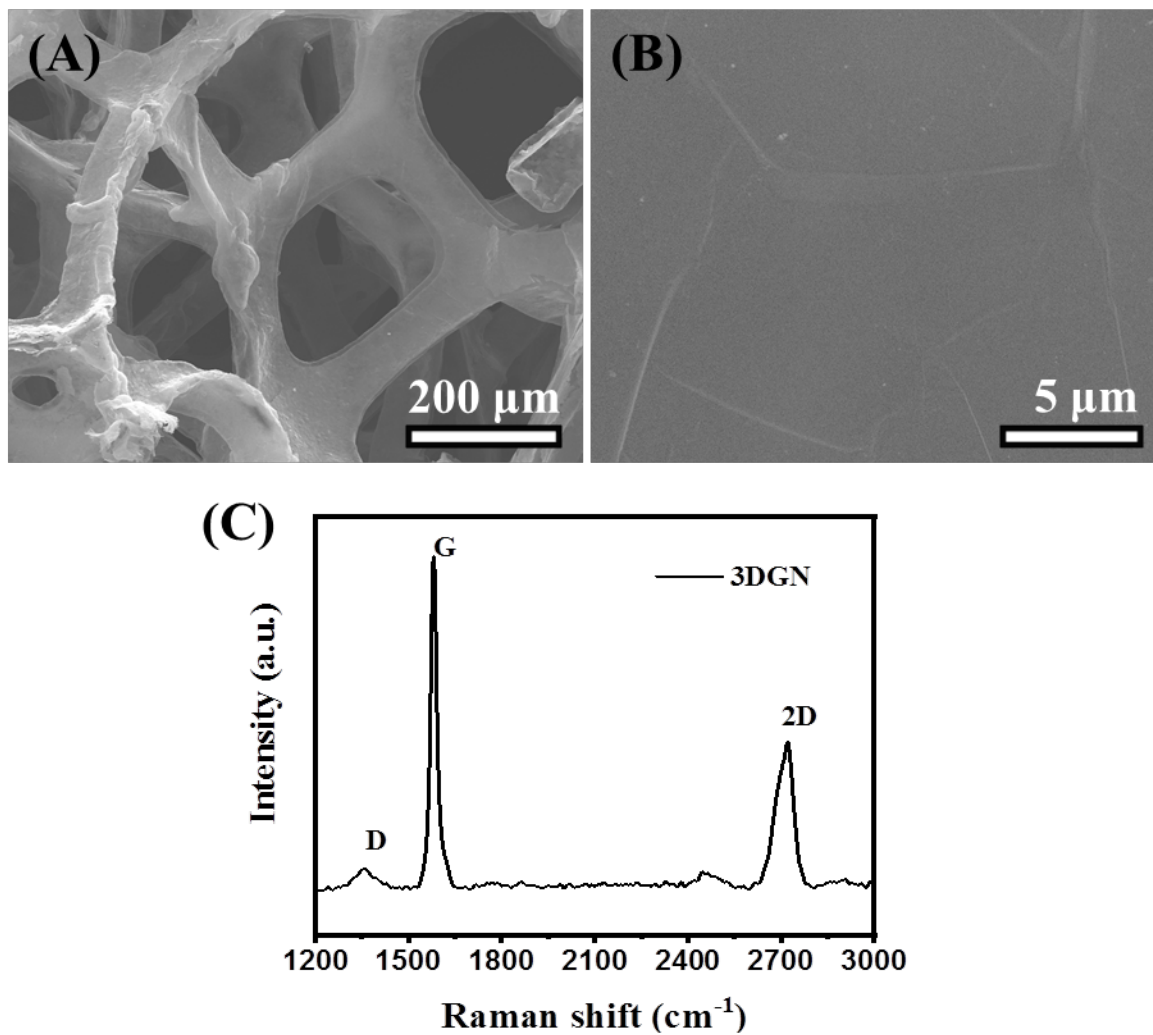
**FIGURE S4** | SEM images of (A) CoFe-CNTF, (B) CoNi-CNTF and (C) Co-CNTF.



**FIGURE S5** | The pore size distributions of Co-CNTF, CoNi-CNTF and CoFe-CNTF

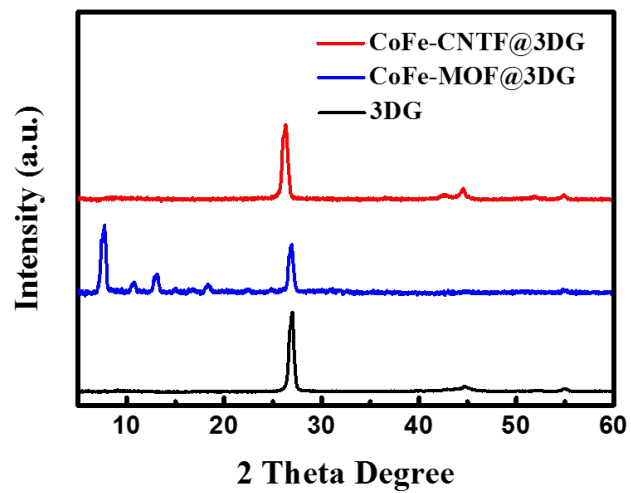


**FIGURE S6** | (A) Linear sweep voltammetry (LSV) curves and (B) corresponding Tafel plots of CoFe-CNTF and IrO<sub>2</sub> in 1.0 M KOH at a scan rate of 5 mV s<sup>-1</sup>. (C) Nyquist plots of CoFe-CNTF and IrO<sub>2</sub>. (D) Galvanostatic measurement of OER of CoFe-CNTF at a constant current density of 10 mA cm<sup>-2</sup>.



**FIGURE S7** | (A, B) SEM images and (C) Raman spectrum of 3DG.





**FIGURE S8** | XRD patterns of CoFe-CNTF@3DG, CoFe-MOF@3DG and 3DG.

**Table S1.** The comparison of CDI performance of our work with various recently reported carbon-based materials.

<b>Electrode Materials</b>	<b>Cell Potential (V)</b>	<b>Initial Salt Concentration (mg L<sup>-1</sup>)</b>	<b>Removal Capacity (mg g<sup>-1</sup>)</b>	<b>Reference</b>
TiO <sub>2</sub> /GO	0.8	300	9.1	<i>Desalination</i> , 2015, 361, 53-64.
Graphene Laminate	1.2	400	15.3	<i>Desalination</i> , 2015, 357, 178-188.
Sulfonated Graphene-CNF	1.2	400	9.54	<i>Adv. Mater. Inter.</i> , 2015, 2, 1500372.
Nitrogen-doped graphene Sponge	1.2	500	14.8	<i>ACS Sustain. Chem. Eng.</i> , 2017, 5, 325-333.
PVA/Active Carbon	1.2	565	14.4	<i>Environ. Sci. Technol.</i> , 2018, 52, 5859-5867.
MIL-88-derived PC/rGO	1.2	500	30.3	<i>ACS Omega</i> , 2018, 3, 8506-8513.
CNFH	1.4	500	43.3	<i>Adv. Mater. Technol.</i> , 2018, 1800135.
Bimetallic MOF derived PC	1.4	750	45.62	<i>J. Mater. Chem. A</i> , 2017, 5, 6113-6121.
Co-Fe-CNT/PC	1.2	500	37.0	<b>This work</b>
	1.4	500	47.0	