Supporting Information

Enhanced continuous desalination performance with

iron-complexed malonate redox couples

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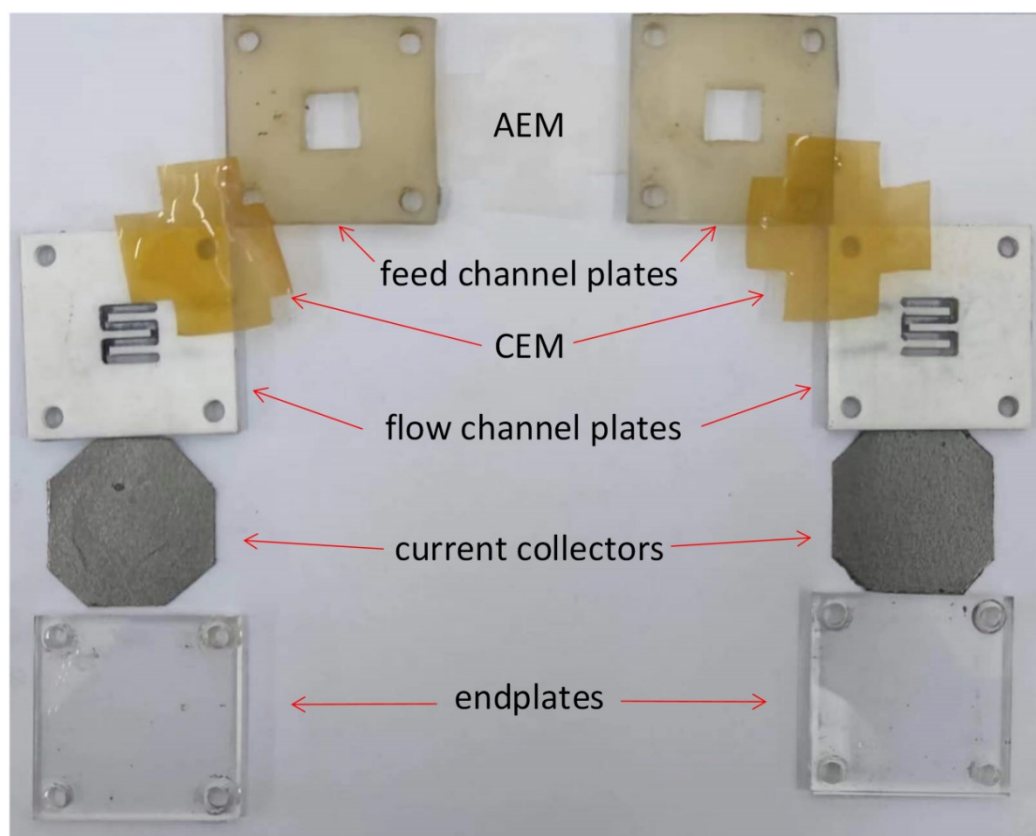
Fig. S1 Exploded view of device configuration for both RFD and $[Fe(Mal)_2]^{-/2-}$-mediated FCDI, which comprises two acrylic endplates, two graphite current collectors, two teflon serpentine flow channel plates, two cation exchange membranes(CEM), two silicone feed channel plates and one anion exchange membrane(AEM).
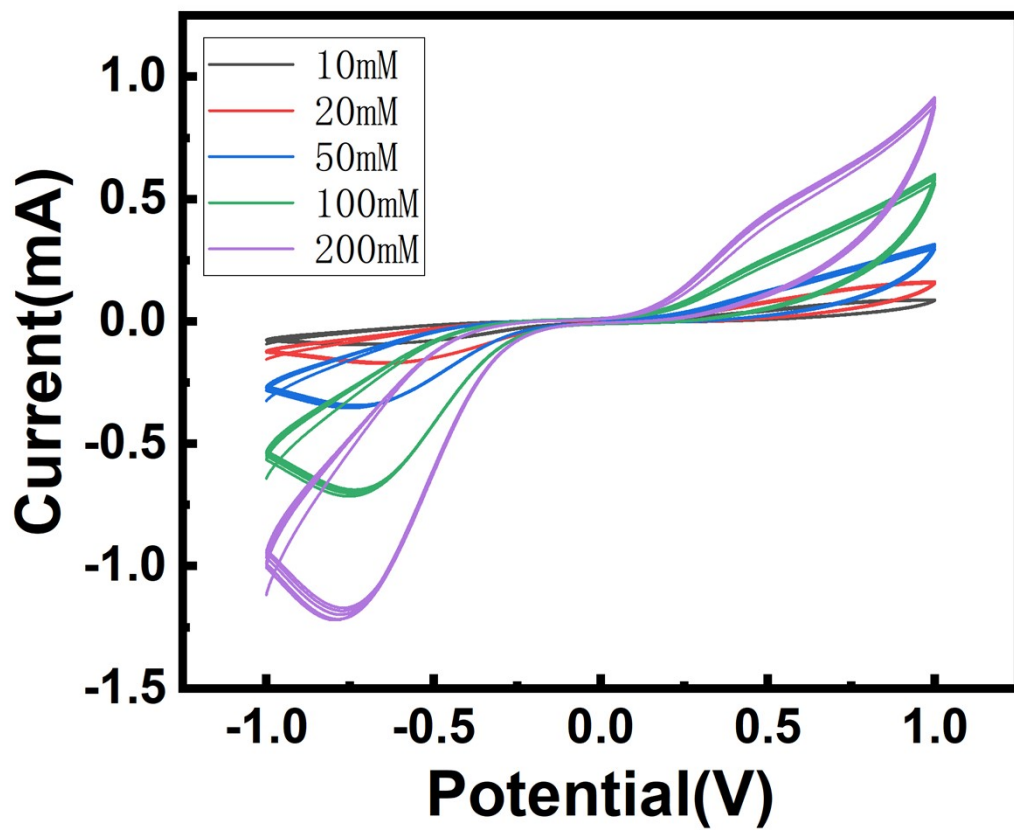
Fig. S2. Cyclic voltammetry of the prepared solution containing 10mM, 20mM, 50mM, 100mM and 200mM $FeCl_2/FeCl_3$ with a fixed amount ratio of 2:2:10:5: 0.1027 between $FeCl_2$, $FeCl_3$, sodium malonate dibasic, malonate and NaCl.
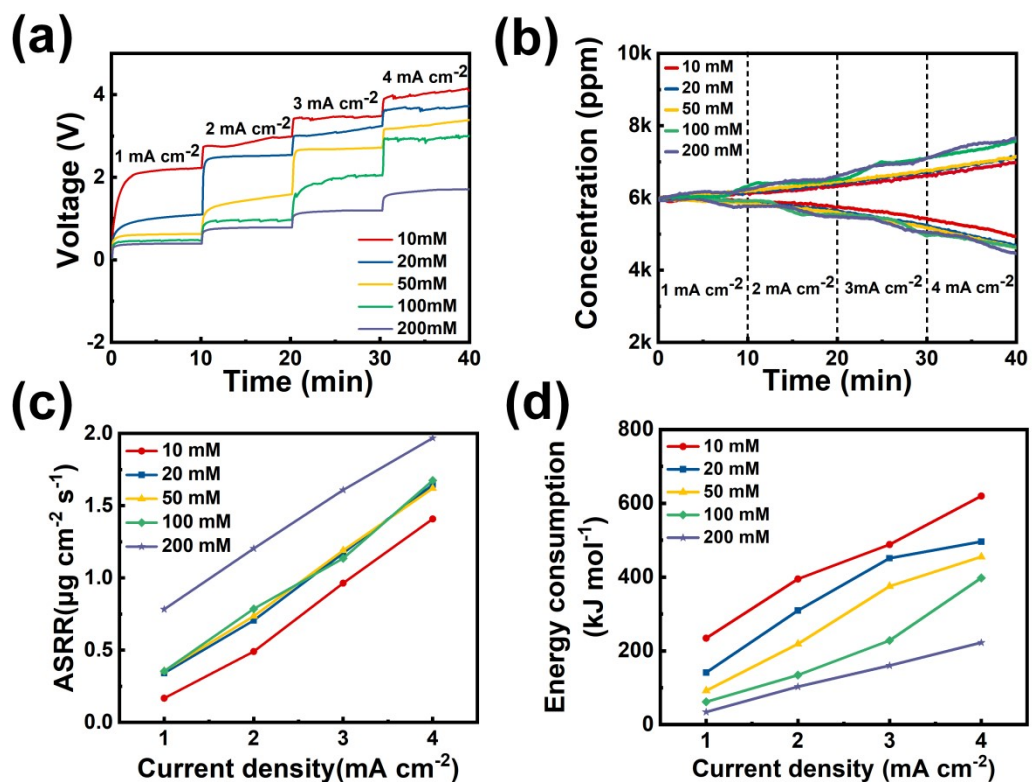
Fig. S3. (a)Voltage profile, (b)concentration variation of concentrated and desalinated stream, and (c)ASRR of RFD process at various electrolyte concentration applying current density gradient, and (d)the corresponding energy consumption.
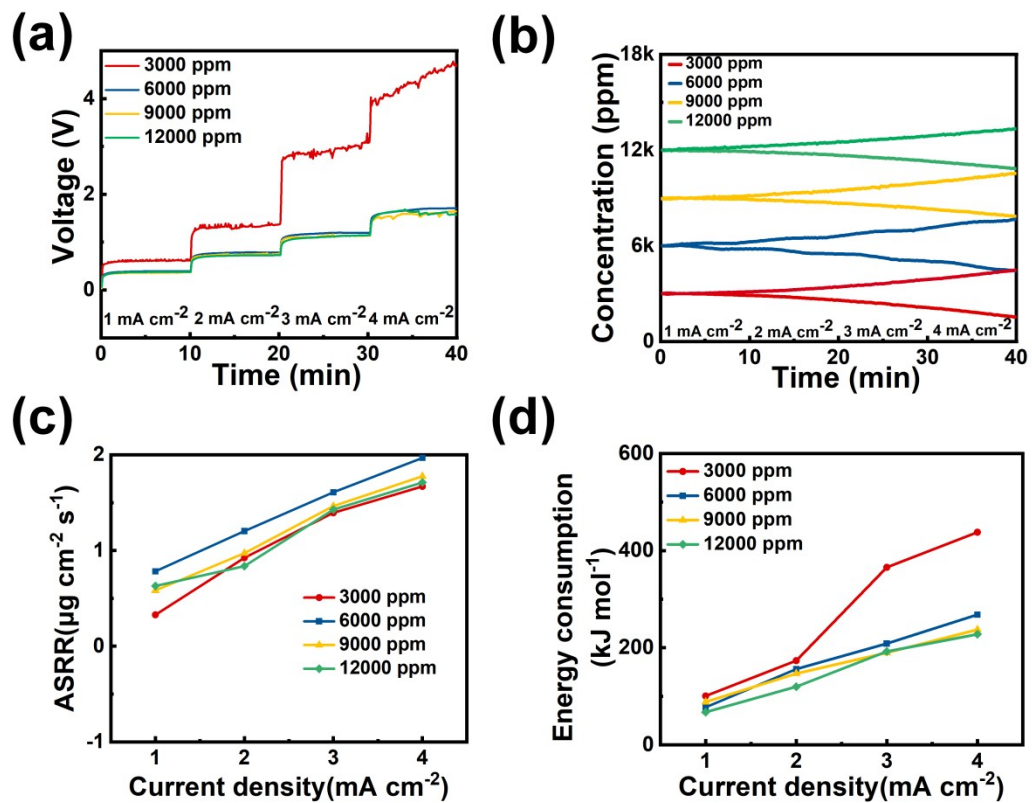
Fig. S4. (a)Voltage profile, (b)concentration variation of concentrated and desalinated stream, and (c)ASRR of RFD process treating salt water with various salinities applying current density gradient, and (d)the corresponding energy consumption.
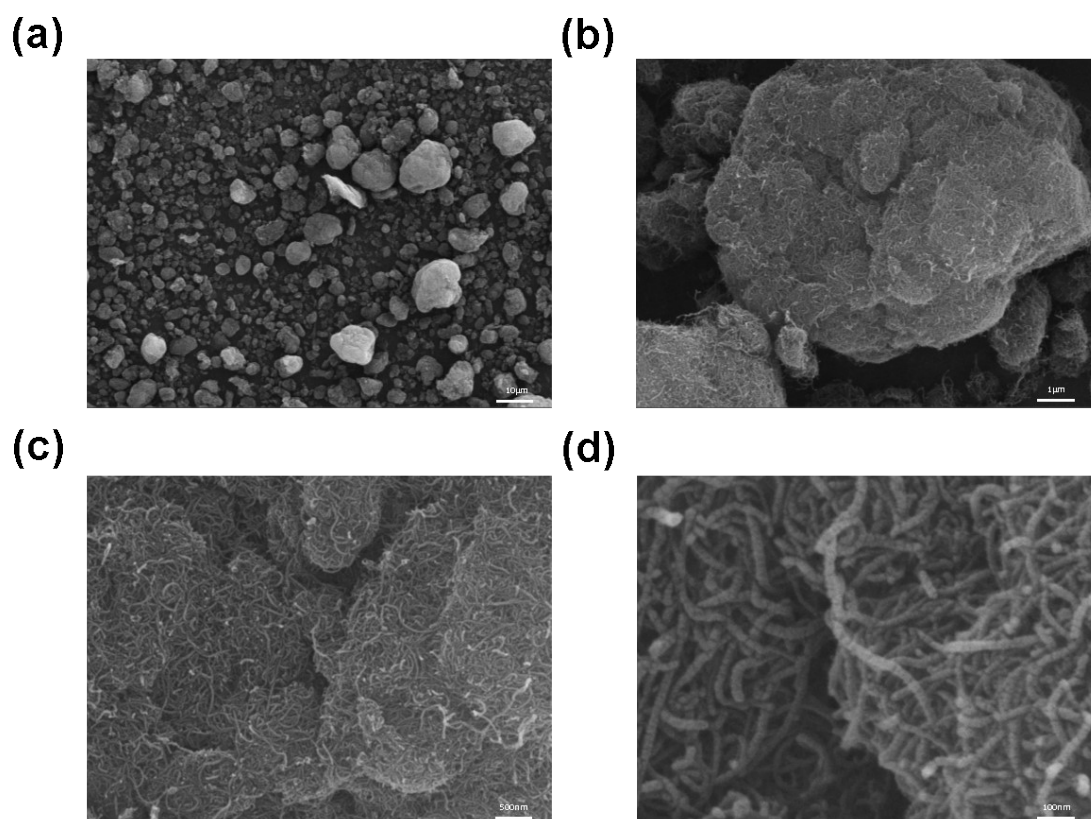
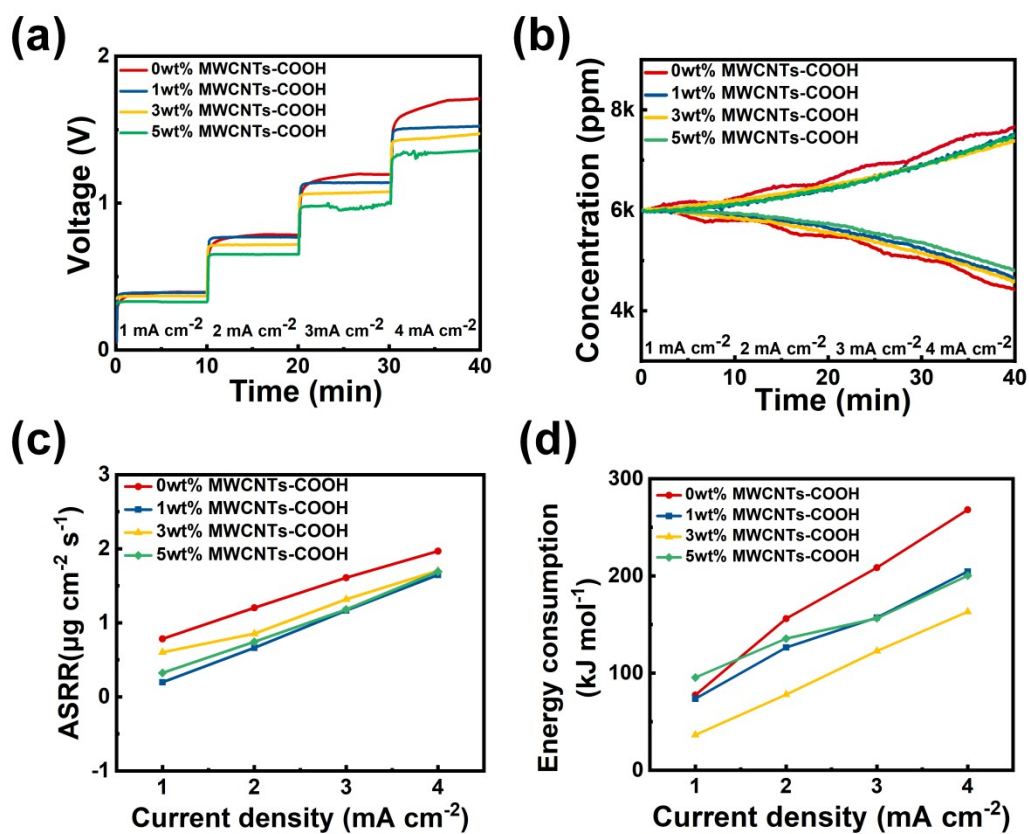Fig. S5. SEM image of original MWCNTs-COOH at magnifications of (a)1000x, (b)10000x, (c)20000x and (d)100000x.

Fig. S6. (a)Voltage profile, (b)concentration variation of concentrated and desalinated stream, and(c)ASRR of FCDI process with different MWCNTs-COOH concent applying current density gradient, and (d)the corresponding energy consumption.