Supporting Information

Mn^{2+}-Assisted High-Capacity Retention in Iron-Chromium Flow Batteries via Hydrogen Evolution Inhibition and Cr^{3+}/Cr^{2+} Activation

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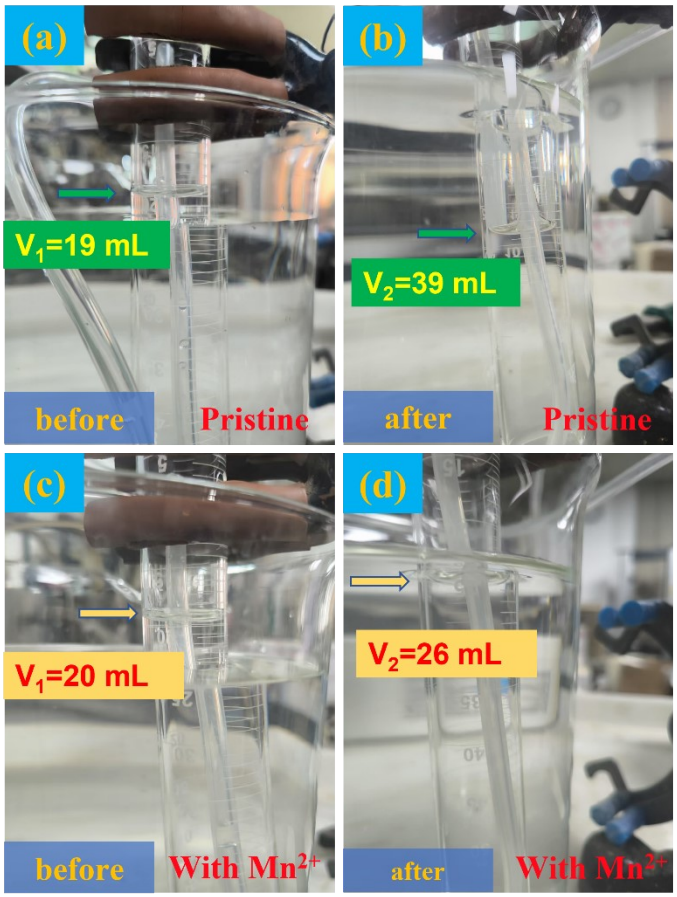

Fig. S1. The amount of hydrogen produced by the manganese-containing system and the blank control group was measured at 40 mA cm^{-2}: (a) uncycled and (b) cycled for 20 cycles at 40 mA cm^{-2}, and the pristine electrolyte with 0.002 M Mn^{2+}: (c) uncycled and (d) cycled for 20 cycles at 40 mA cm^{-2}.

The generated hydrogen was collected via water displacement, with the initial water level maintained at 20 mL to ensure experimental consistency. The results showed that after 20 charge-discharge cycles, the hydrogen production was significantly reduced (from 20 mL to 6 mL) after the addition of Mn^{2+}, confirming the inhibitory effect of manganese ions on HER.

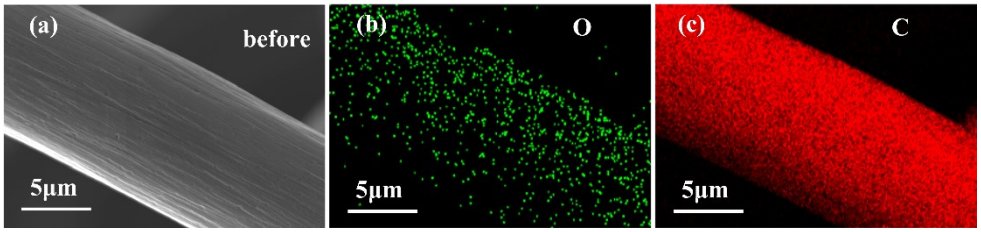

Fig. S2. SEM and EDS of graphite felt before charge (a) SEM; (b) O; (c) C.

The pristine graphite felt exhibited a characteristic fibrous morphology, with individual fibers measuring approximately 10 μm in diameter. The elemental distribution appeared homogeneous throughout the material, while the fiber surfaces displayed pronounced groove-like textures.

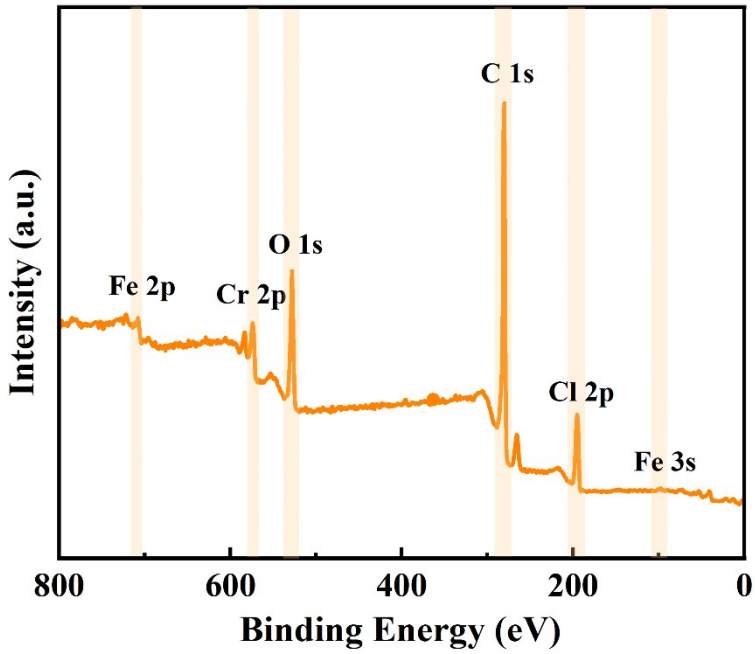

Fig. S3. XPS Spectra of Electrode after Cycling in Electrolyte Containing Mn^{2+}