

## Supporting Information

# Mechanistic Investigation of Redox Processes in Zn-MnO<sub>2</sub> Batteries in Mild Aqueous Electrolytes

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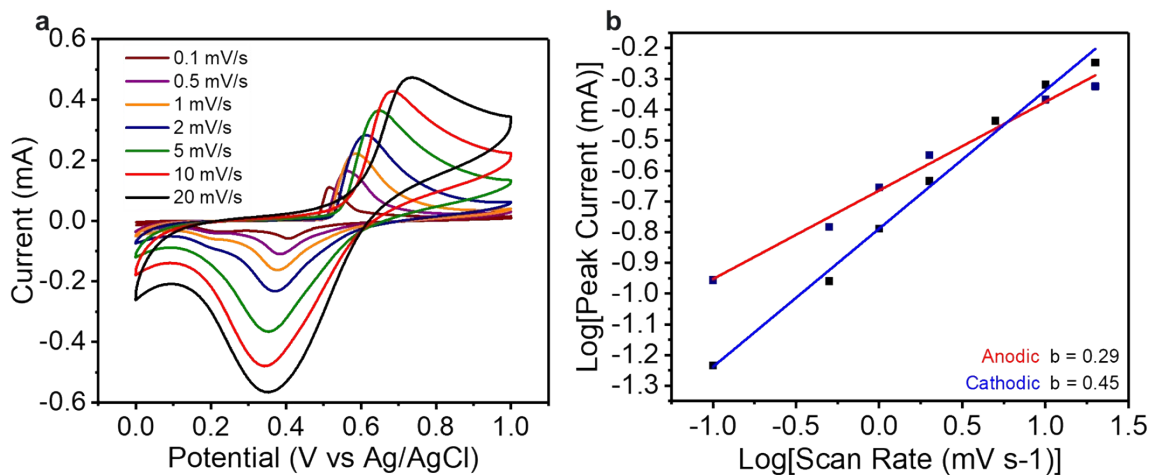
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**KEYWORDS:** Zinc-ion batteries, EMD cathode, EQCM, Proton insertion, energy storage mechanism

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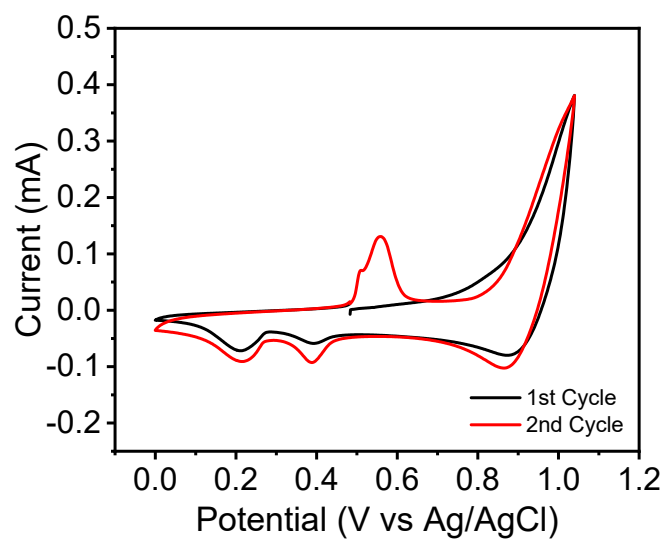
[matthew.fayette@pnnl.gov](mailto:matthew.fayette@pnnl.gov)



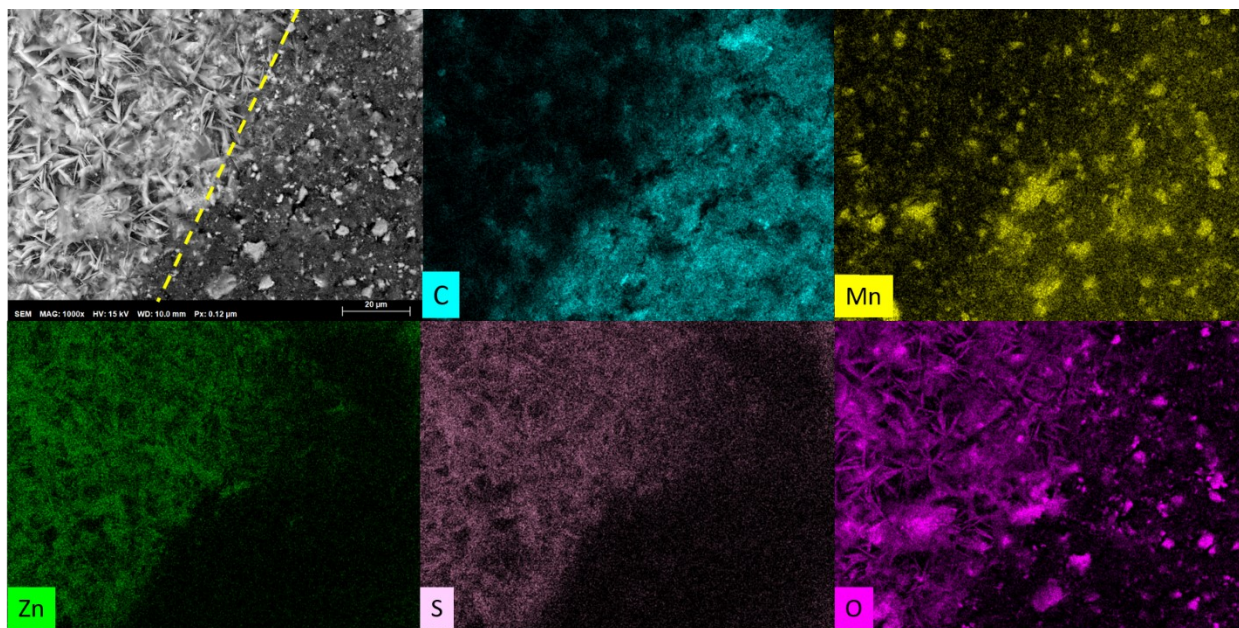
**Figure S1:** (a) CV curves of EMD cathode at different scan rates in 1M ZnSO<sub>4</sub> + 0.1M MnSO<sub>4</sub>. (b) Log current vs Log scan rate plots for each redox process on EMD cathode.

**Table S1.** ICP of EMD (pristine sample and pristine soaked sample) in 1 M ZnSO<sub>4</sub> electrolyte. The “dilute times” resemble how many times the sample was diluted for the ICP, i.e. if an original sample was 1 ml, a “dilute times” (with DI water) of 100 would signify a total of 100 ml final solution.

EMD Sample	Dilute times	Conc. of the elements (mol/L)		Conc. of the elements (ppm)	
		Zn	Mn	Zn	Mn
Pristine	500	9.34E-5	8.87E-3	0.006	0.975
Pristine after soaked	500	4.15E-4	<b>6.21E-3</b>	0.027	<b>0.682</b>



**Figure S2:** CV curves of EMD cathode in 1M ZnSO<sub>4</sub> + 0.1M MnSO<sub>4</sub> when oxidation of CV was first performed.



**Figure S3.** SEM and EDX images of EMD electrode in 1M ZnSO<sub>4</sub> + 0.1M MnSO<sub>4</sub> discharged at C/3.