Supporting Information

Based-Sorbitol Electrolyte Additive for Reversible Zn Electrochemistry

Qiong Sun, Haihui Du, Tianjiang Sun, Diantao Li, Min Cheng, Jing Liang*, Haixia Li* and Zhanliang Tao

Key Laboratory of Advanced Energy Materials Chemistry (Ministry of Education), Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Renewable Energy Conversion and Storage Center (RECAST), College of Chemistry, Nankai University, Tianjin, 300071, China

Figure S1. The average coordination numbers of Zn-H$_2$O, Zn-SO$_4^{2-}$ and Zn–SOR collected from MD simulations in ZSO-SOR-2~5 M electrolytes.
Figure S2. Comparison of the performance of Zn/Ti asymmetric cells with different concentrations of SOR additives.

Figure S3. EIS spectra of the ZSO-SOR-x M electrolyte.
**Figure S4.** Comparison of cycling performance of Zn/Zn cells with different SOR additives concentration at 1mA·cm$^{-2}$ and 1 mAh·cm$^{-2}$

**Figure S5.** CV curve of Zn/Zn symmetric cell with 1 M SOR aqueous solution at a scan rate of 10 mV·s$^{-1}$

**Figure S6.** The corresponding sorbitol and water adsorption type simulation diagram at the zinc anode interface.
Figure S7. FTIR spectra and Corresponding structure of PNDA

Figure S8. Long-term cycling performance of the (a) Zn//MnO$_2$ full cells, (b) Zn//NaV$_3$O$_8$ at a current density of 1 A g$^{-1}$. (c) Typical charge/discharge profiles.
Table S1 Comparison of CE and cycling performance of recently reported works for RAZIBs in the literatures. All the electrochemical performances were tested at 25 °C.

<table>
<thead>
<tr>
<th>Based electrode</th>
<th>Addictive</th>
<th>CE (%)</th>
<th>Cycling life (h)</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 M ZnSO₄</td>
<td>1 M sorbitol</td>
<td>99.6</td>
<td>500</td>
<td>This work</td>
</tr>
<tr>
<td>1 M ZnSO₄</td>
<td>10~500mM glucose</td>
<td>97.2</td>
<td>200</td>
<td>[1]</td>
</tr>
<tr>
<td>3.0 M Zn(CF₃SO₃)₂</td>
<td>(2-hydroxypropyl)-β-cyclo dextrin</td>
<td>99</td>
<td>400</td>
<td>[2]</td>
</tr>
<tr>
<td>1 M ZnSO₄</td>
<td>betaine</td>
<td>99.905</td>
<td>950</td>
<td>[3]</td>
</tr>
<tr>
<td>2 M ZnSO₄</td>
<td>1.0% gum arabic</td>
<td>99.1</td>
<td>500</td>
<td>[4]</td>
</tr>
<tr>
<td>2 M ZnSO₄</td>
<td>4-hydroxybenzoic acid sodium salt</td>
<td>98.6</td>
<td>500</td>
<td>[5]</td>
</tr>
</tbody>
</table>

Reference:


