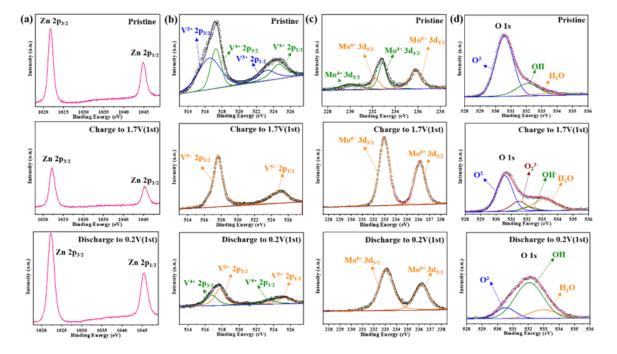
## **Supplementary Information**

## Integrating molybdenum into zinc vanadate enable $Zn_3V_2MoO_8$ as a high-capacity Zn-supplied cathode for Zn-metal free aqueous batteries

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**Figure S1.** XPS spectra of (a) Zn 2p, (b) V 2p, (c) Mo 3d, and (d) O 1s regions of Zn<sub>3</sub>V<sub>2</sub>MoO<sub>8</sub> cathodes at pristine, full-charge and full-discharge states.

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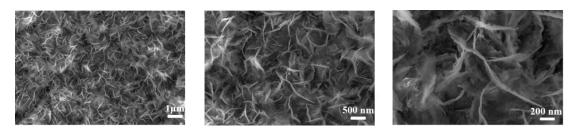


Figure S2. SEM images of  $Zn_3V_2MoO_8$  cathode at the 2nd full discharge at different magnifications.

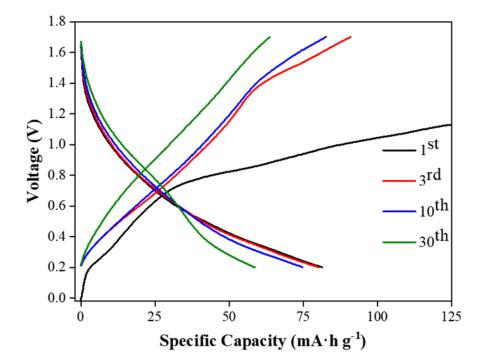


Figure S3. Representative galvanostatic charge-discharge curves of  $Zn_3V_2MoO_8||brass\ battery\ at\ 100\ mA\ g^{\text{-}1}.$ 

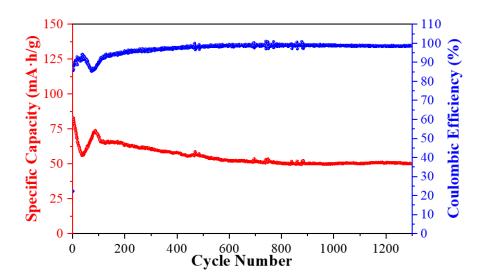


Figure S4. Cyclic performance of  $Zn_3V_2MoO_8||$ brass battery for the initial 1300 cycles at 100 mA g<sup>-1</sup>.