Gradient valence distributed vanadium oxygen hydrate hybrid induce high-performance aqueous zinc-ion batteries

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Figure S1 TG and DSC for G-VOH.



Figure S2 Fitting result of Raman spectrum for G-VOH.



Figure S3 (a) and (b) Typical nanowire morphology of G-VOH; (c-f) the EDS mapping for G-VOH.



Figure S4 Cycle performance for G-VOH tested at 0.1 A g^{-1} .



Figure S5 dQ/dV for G-VOH tested at 0.1 A g^{-1} for the second cycle.



Figure S6 Galvanostatic discharge–charge curves of G-VOH, tested at currents ranging from 0.3 to 3 A g^{-1} .



Figure S7 (a) TEM for G-VOH discharged to 0.4 V; (b) TEM for G-VOH recharged to 1.6 V; (c) HRTEM for G-VOH discharged to 0.4 V; (d) HRTEM for G-VOH recharged to 1.6 V.



Figure S8 High–resolution XPS V2p spectra of fully discharged after etching for 20 nm.

	fresh	50 th	1000 th
Rsol (Ω)	1.16	1.14	1.96
Rct+Rs (Ω)	152.2	39.46	25.38
$D zn^{2+} (cm^2 s^{-1})$	2.56*e-18	3.30*e-17	5.18*e-16

Table S1 Fitting results for EIS analyze