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Supporting Information

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Graphene Scroll-Coated α-MnO_2 Nanowires as High-Performance Cathode Materials for Aqueous Zn-Ion Battery

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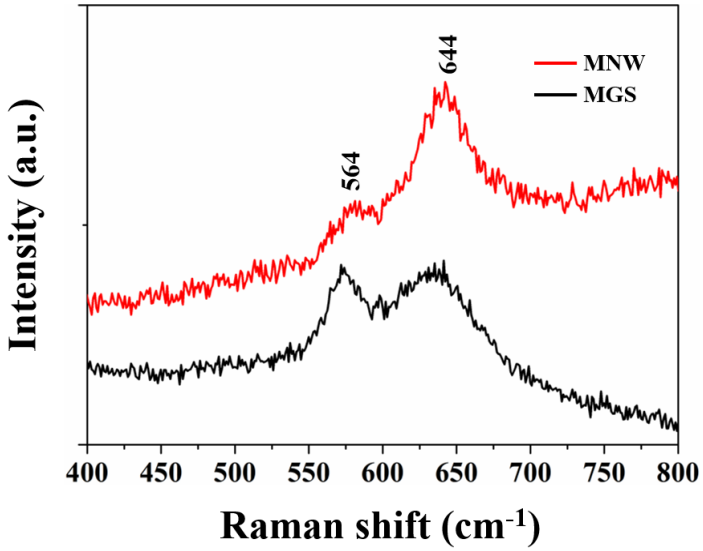

Figure S1. The Raman spectra of MNW and MGS, showing no obvious shift between the MNW and MGS.

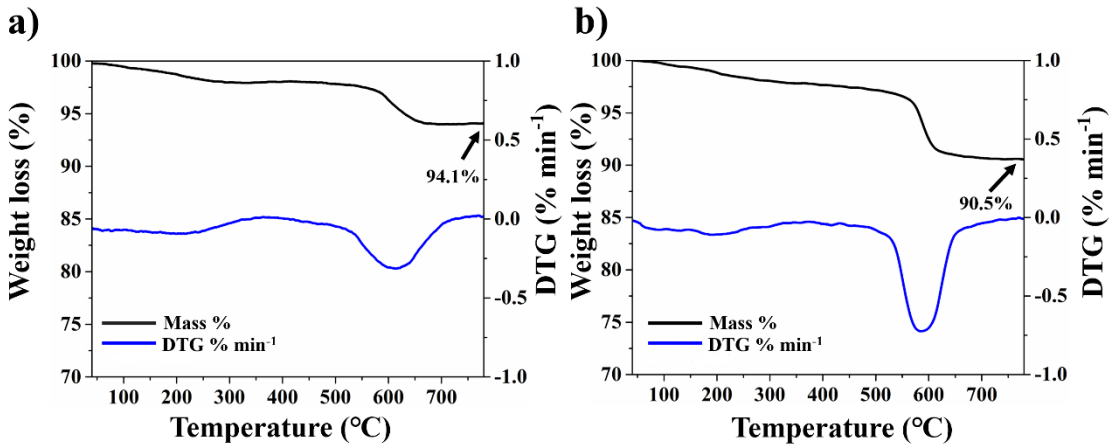

Figure S2. a) The TG and DTG curves of MnO_2. b) The TG and DTG curves of MGS-3.6%. The total carbon content in MGS-3.6 is 3.6%.

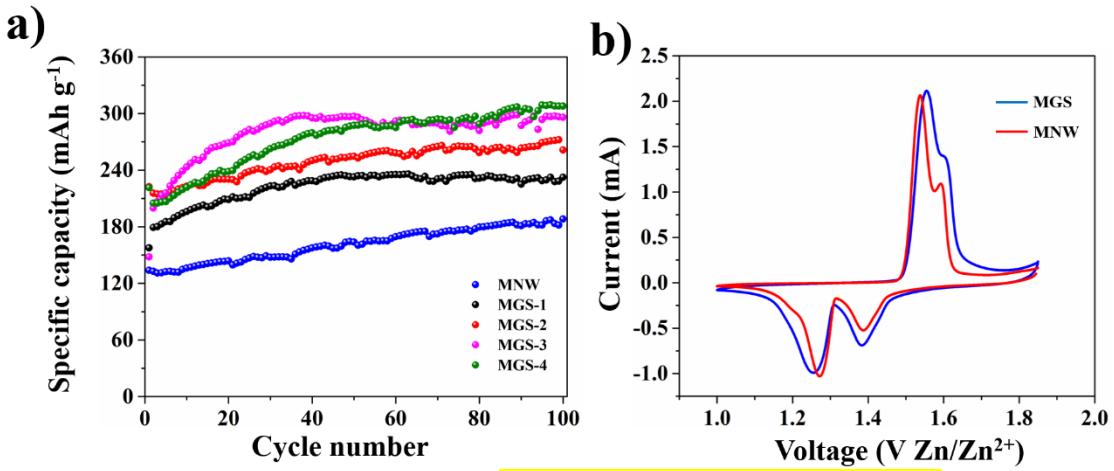

Figure S3. a) The cycling performance of MGS-0.9%, 1.8%, 2.7% and 3.6% and MNW at the current density of 0.3 A g^{-1}. b) CV curves of MNW and MGS at a scan rate of 0.1 mV s^{-1}.

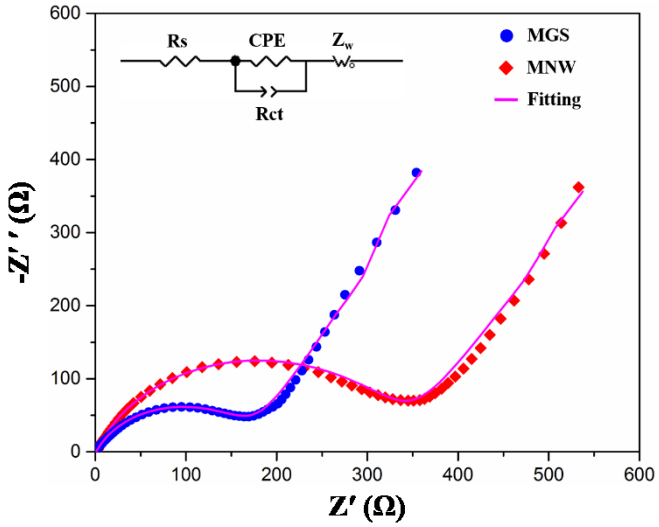

Figure S4. The Nyquist plots of MGS and MNW in the frequency range from 0.01 Hz to 100000 Hz.

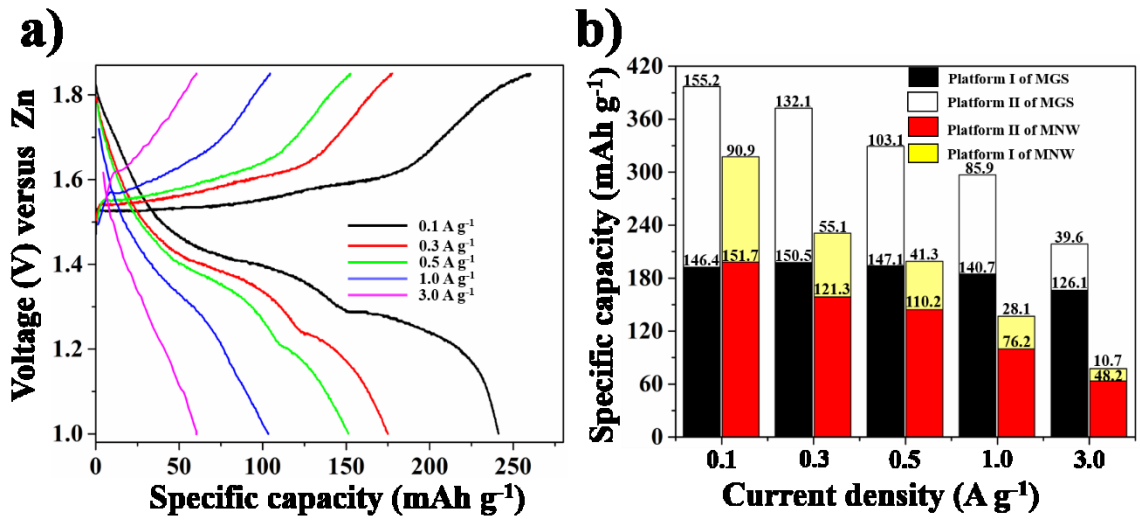

Figure S5. Charge and discharge curves of MNW at current densities from 0.1 A g^{-1} to 3 A g^{-1}. b) The capacities of DP I within the voltage range of 1.30-1.85 V and the capacities of DP II within the voltage range of 1.00 - 1.30 V.

Table S1 Comparison of the capacity of our Zn/MGS battery with those of some aqueous Zn-ion batteries reported before.

Battery	Specific power (W kg^{-1})	Specific energy (Wh kg^{-1})	References
MGS	135	406.6	
(This work)	405	381.5	
	675	338.2	
	1350	305.9	
	4050	223.7	
	9450	109.2	
Todorokite	154	143.0	[18]
	308	123.5	
	924	97.5	
	3080	91.0	
$Zn_{0.25}V_2O_5$	38	228.8	[7]
	228	224.2	
	456	199.1	
	912	191.5	
	1824	186.2	
	280	180.9	
	3420	171.0	
	4560	148.2	
β-MnO_2	240	309.6	[14b]
	598	255.0	
	1201	225.6	
	2402	181.2	
	5987	138.0	
VS_2	80	152	[8]
	160	116	
	400	109.44	
	800	97.2	
	1600	92.08	
α-MnO_2	133	370.5	[11]
	400	338.0	
	800	269.1	
	2000	209.3	
	4000	146.9	

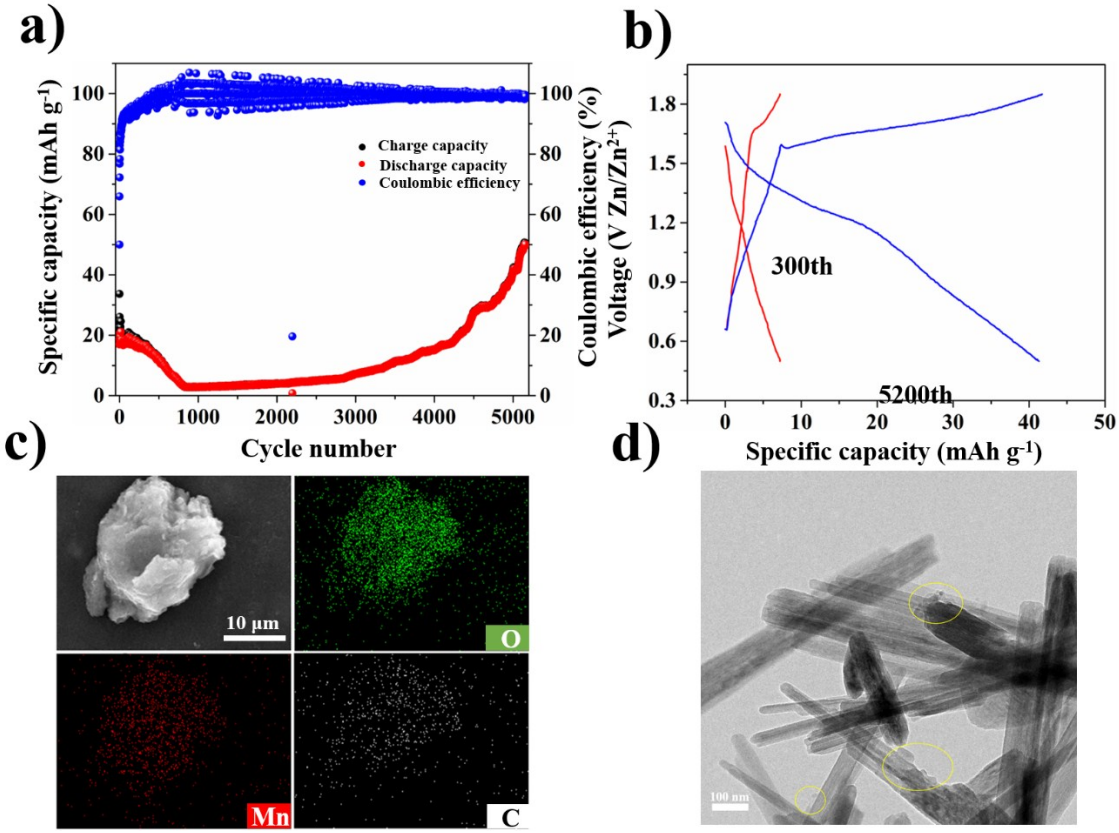

Figure S6. a) The cycling performance of Zn/rGO battery. b) The charge and discharge curves of Zn/rGO battery of 300th cycle and 5000th cycle. c) The EDS result of rGO after 5000 cycles.d) TEM image of the MGS after 50 cycles under 1 A g^{-1}.

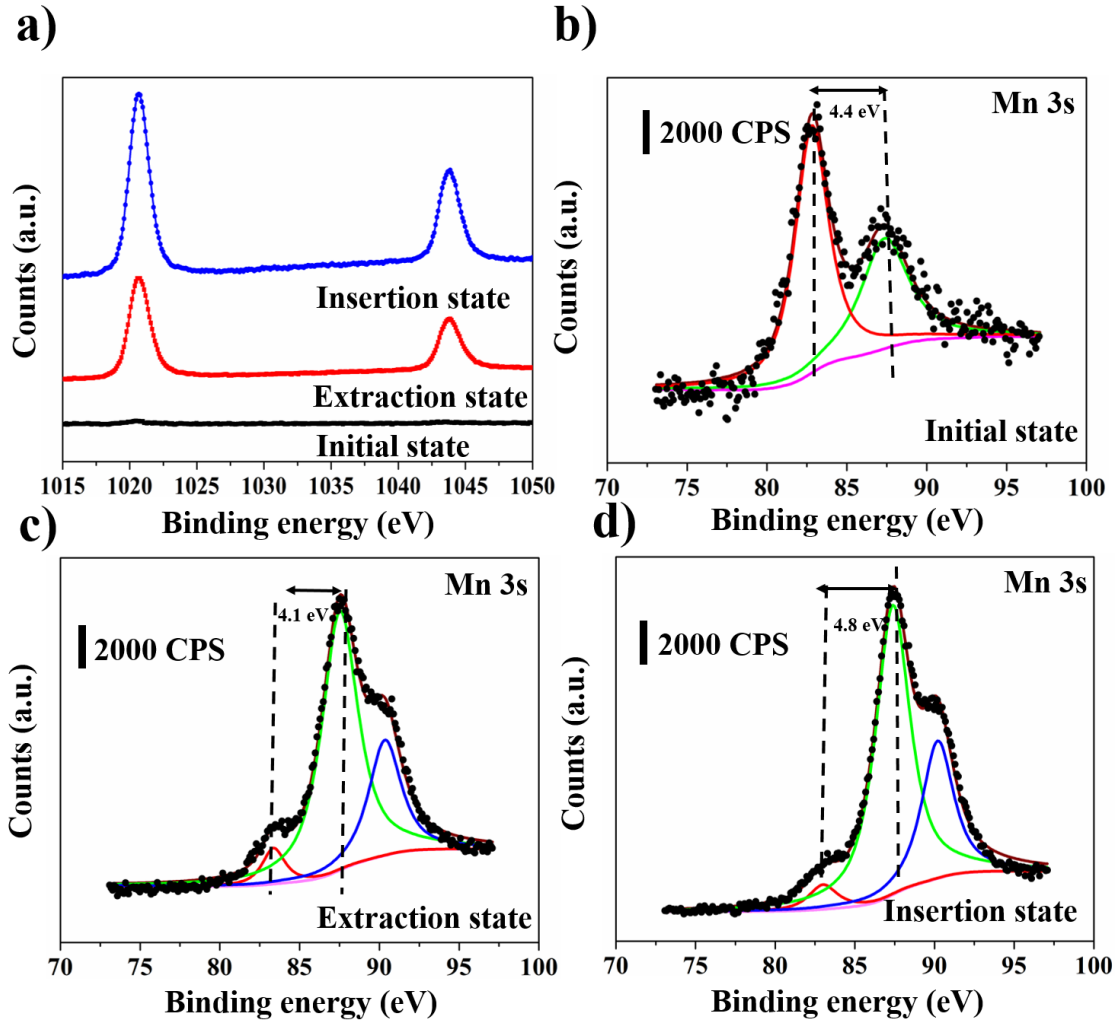

Figure S7. a) The Zn 2p core level of MGS electrodes spectra in initial, extraction and insertion states, Mn 3s core level of MGS electrodes in insertion b), extraction c), initial d) states.

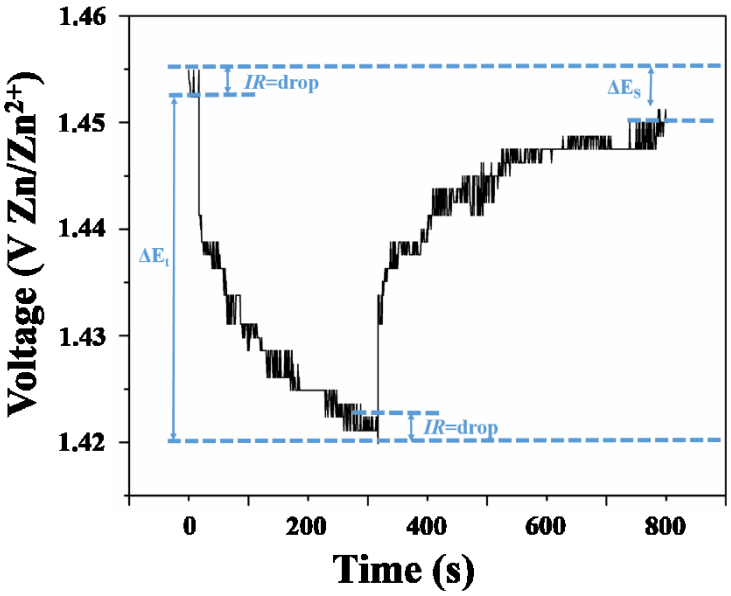

Figure S8. GITT potential response curve with time. The experiment was carried out at constant current pulse of 20 mA g^{-1} for 10 minutes followed by a relaxation period of 30 minutes. ΔEs is the voltage difference during the open circuit period, and ΔEt is the total change of cell voltage during a constant current pulse excluding the IR drop.