# Supporting information

# MnO/C Cubo-polyhedrons Derived from α-$MnO_2$@ZIF-8 as Anode Materials for high-performance lithium-ion batteries

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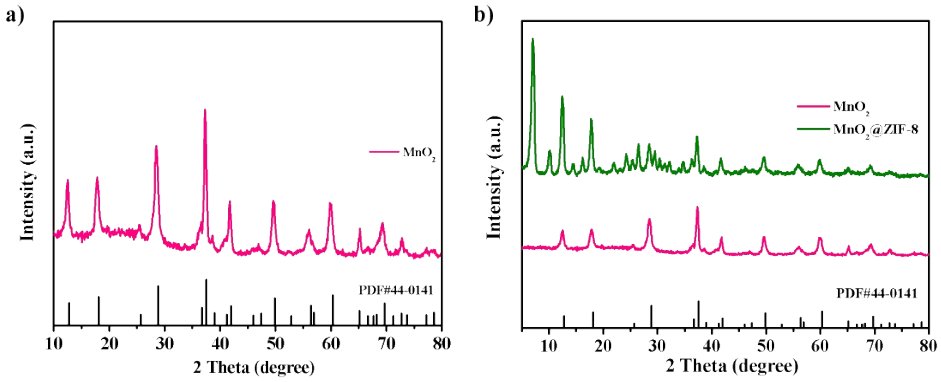


Figure S1. XRD pattern of (a) α-$MnO_2$ and (b) α-$MnO_2$@ZIF-8 precursors.

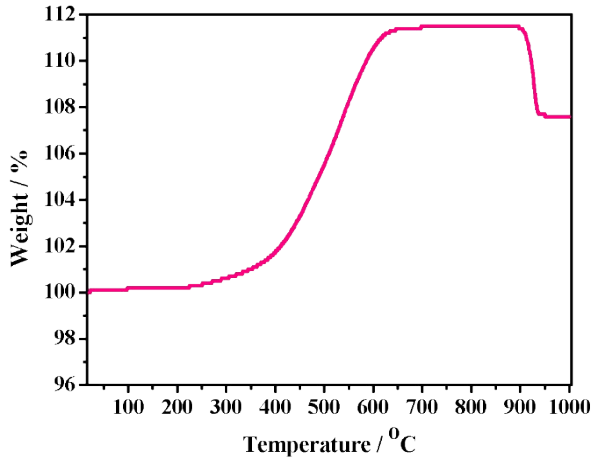


Figure S2. TGA curve of MnO/C-900 cubo-polyhedrons.

Figure S2 presents the TGA curve of MnO/C-900 cubo-polyhedrons. A major weight increase in the range from 250 to 600 °C, which can be attributed to the oxidation of C into $CO/CO_2$ and MnO into $Mn_2O_3$[1, 2]. Let the amount of substance of MnO in the MnO/C cubo-polyhedrons to be X mol, so the generated $Mn_2O_3$ to be X/2 mol. If the carbon is completely converted into $CO_2$ after oxidation, one has the relation, 157.8∗X/2 = 107.6%. Therefore x = 1.36 mol, the weight percentage of MnO and C in the MnO/C cubo-polyhedrons were estimated to be about 96.48% and 3.52%, respectively.

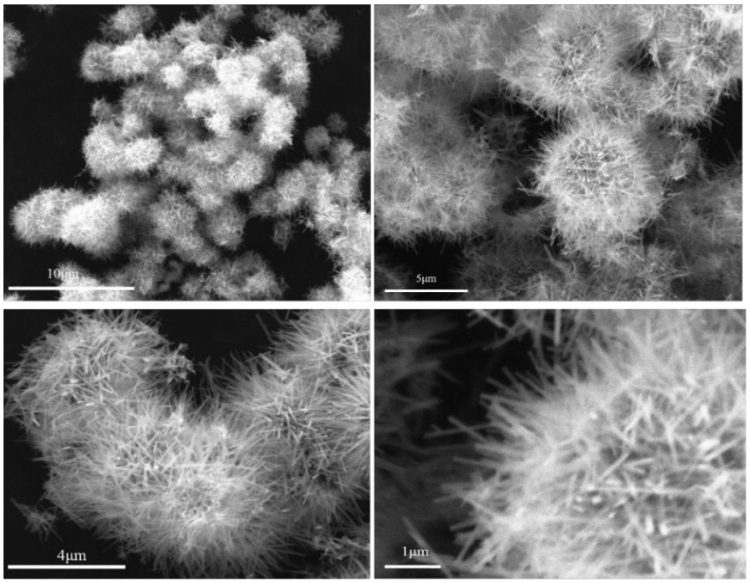


Figure S3. SEM images of α-$MnO_2$.

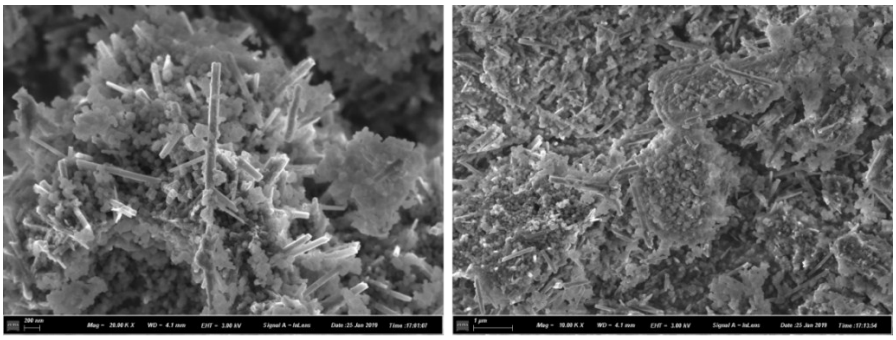

Figure S4. FESEM images of α-$MnO_2$@ZIF-8 precursors.

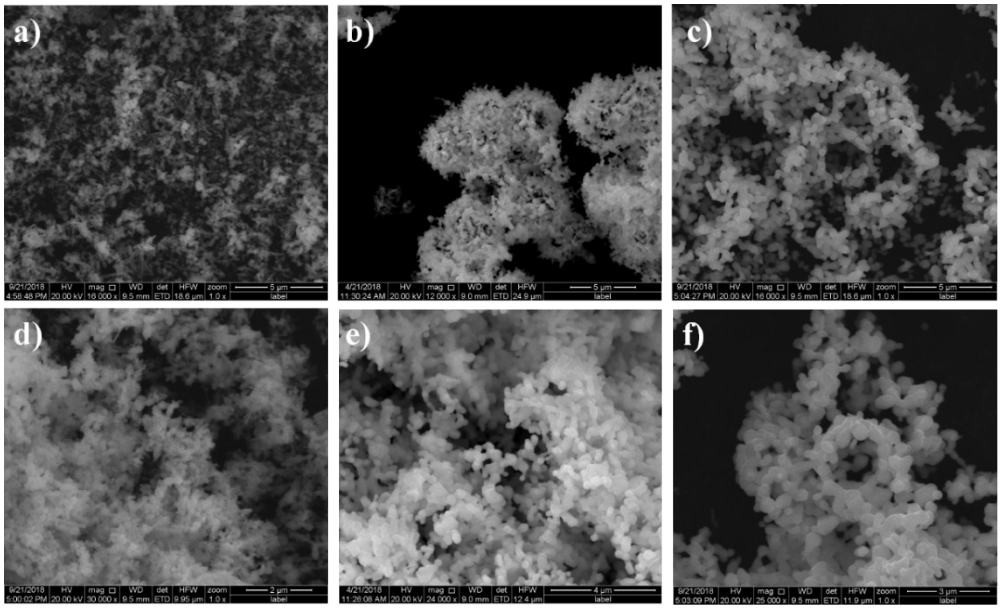


Figure S5. SEM images of (a,d) ZnO@MnO-600, (b,e) ZnO@MnO-700 and (c,f) ZnO@MnO-800 composites.

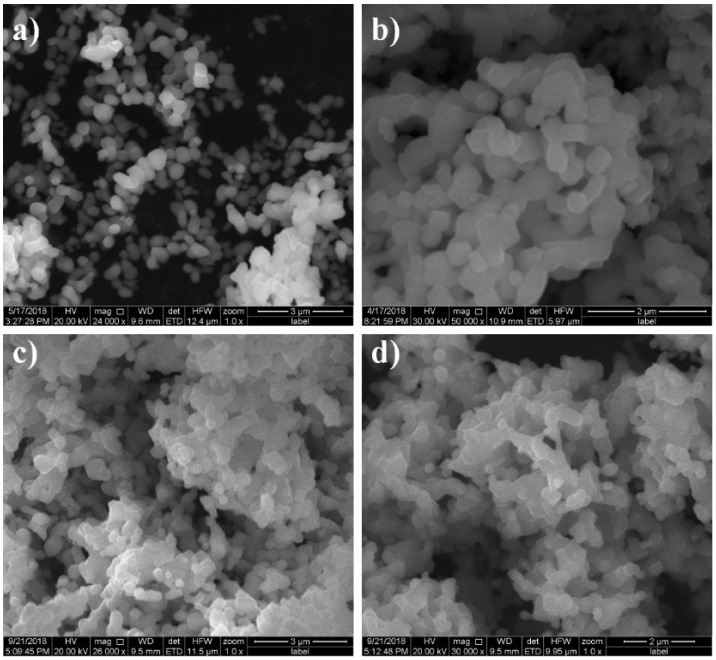

Figure S6. SEM images of (a-b) MnO/C-900 and (c-d) MnO/C-1000 cubo-polyhedrons.

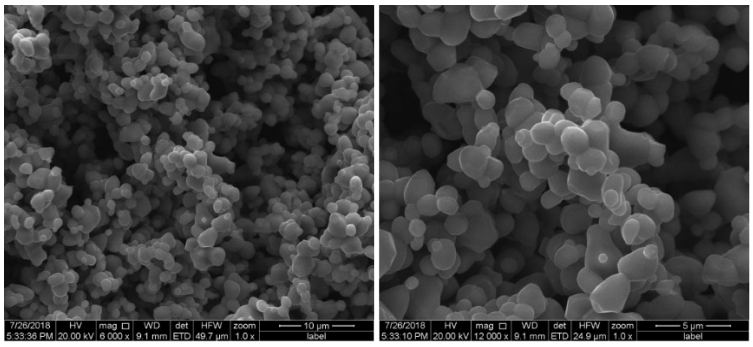

Figure S7. SEM images of pure MnO particles.

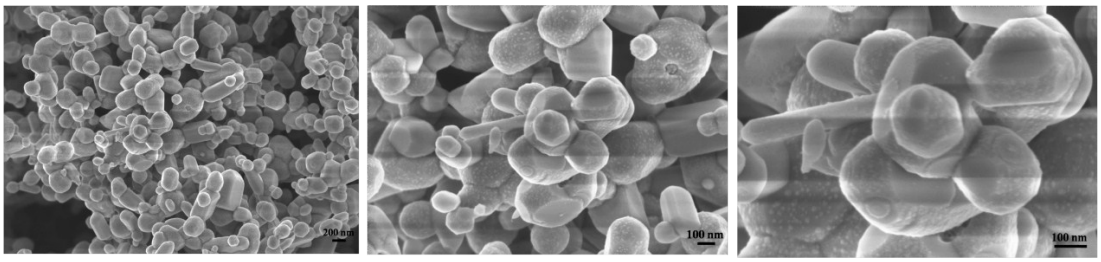

Figure S8. FESEM images of ZnO@MnO-700 composites.

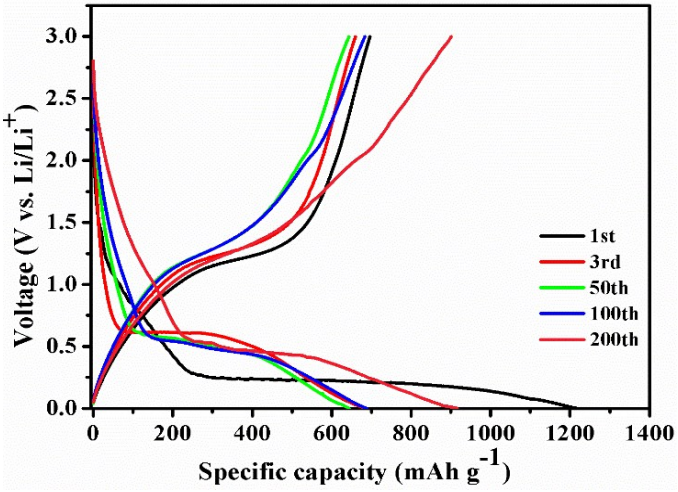


Figure S9. Discharge/charge profiles at a current density of 100 mA $g^{-1}$ for 1st, 3rd, 50th, 100th, and 200th cycles of MnO/C-900 cubo-polyhedrons.

Table S1. The comparison of the capacity of present work with reported MnO material.

| Samples | Initial capacity (mAh $g^{-1}$) | Restored capacity (mAh $g^{-1}$) | Cycle number | Current (mA $g^{-1}$) | Ref. |
|---|---|---|---|---|---|
| C/MnO/SiOC | 1173 | 770 | 200 | 100 | [3] |
| MnO/Ni/CNF | 737 | 534.5 | 100 | 200 | [4] |
| MnO@$Al_2O_3$ | 1390 | 855 | 100 | 100 | [5] |
| $MnO_2$@C@MnO | 1171.3 | 919.2 | 100 | 200 | [6] |
| Porous MnO/C-N | 1045.8 | 756.5 | 400 | 300 | [7] |
| GNS@MnO@N-C | 1024 | 754.3 | 350 | 100 | [8] |
| MnO@C hybrid | 909 | 900 | 400 | 300 | [9] |
| Porous MnO@C core-shell nanowires | 1115.8 | 448.1 | 100 | 200 | [10] |
| MnO/C cubo-polyhedrons | 1217.5<br>897 | 916<br>1334 | 200<br>500 | 100<br>200 | This work |

**References**


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