# Alkaline Ni-Zn Microbattery Based on 3D Hierarchical Porous Ni Microcathode with High-Rate Performance

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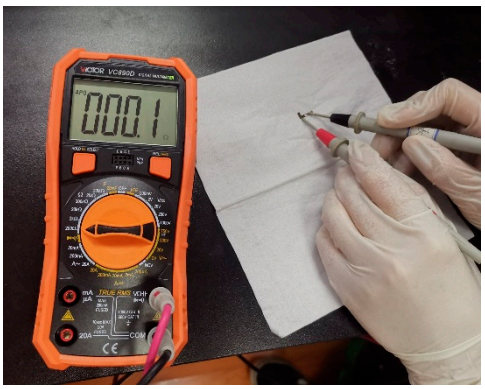


**Figure S1.** Photograph of direct conductivity test of reconstructed 3D hierarchical porous nickel microelectrode.

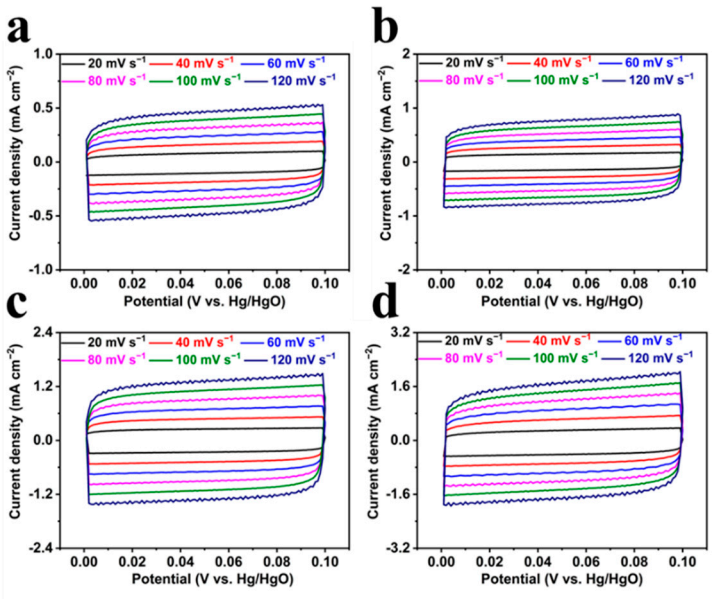


**Figure S2.** CV curves of (a) 30 s, (b) 60 s, (c) 120 s, and (d) 180 s microelectrodes with the potential ranging from 0 to 0.1 V versus Hg/HgO at various scan rates.

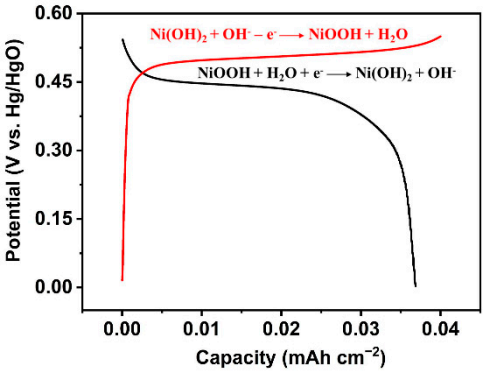


**Figure S3.** The first charge/discharge curve of Ni 30 s microelectrode at a current density of 5 mA $cm^{-2}$.

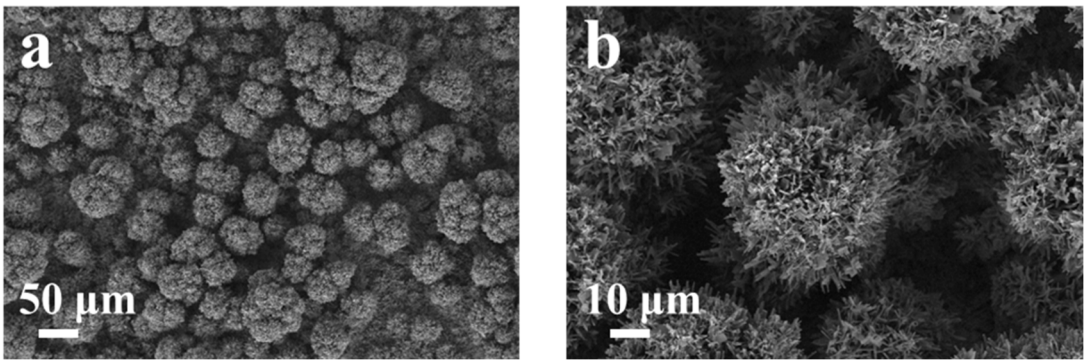


**Figure S4.** SEM images of electrodeposited Zn.

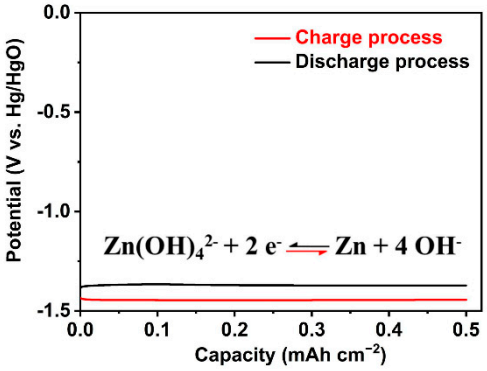


**Figure S5.** The first charge/discharge curve of Zn microelectrode at a current density of 5 mA $cm^{-2}$.

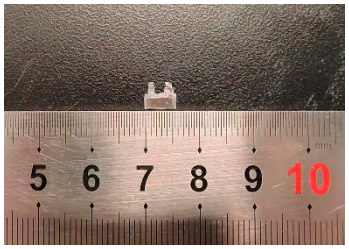


**Figure S6.** Photograph of the assembled Ni-Zn microbattery.

(Notice: The gel electrolyte should be prepared in a thin and almost solid state, otherwise the assembled MB is easy to be short or the packed area needs to be extended.)

**Table S1.** Comparison of electrochemical performance with recently reported MBs and other state-of-the-art micro energy-storage systems (the rate performance here refers to the current range and the related capacity retention (%)).

| Cathode // Anode materials | Device type | Capacity (mAh $cm^{-2}$) | Rate performance | Cycling stability (%) | Ref. |
|---|---|---|---|---|---|
| Reconstructed porous Ni // Zn | Alkaline MB | 0.268 | 2 to 40 mA $cm^{-2}$ 76.8 % | 71.2 in 2000 cycles | This work |
| Ni-Co LDH@CC // Zn | | 0.108 | 0.5 to 1 mA $cm^{-2}$ | 91 in 1000 cycles | 1 |
| $Co(OH)_2$@NiCo LDH // Zn | | 0.108 | 1 to 10 mA $cm^{-2}$ 39.8 % | 71 in 800 cycles | 2 |
| Ni@$Ni(OH)_2$ // Zn | | 0.152 | 1 to 30 mA $cm^{-2}$ 59.8 % | 74.6 in 1800 cycles | 3 |
| Ni-$Ni(OH)_2$/$Zn(OH)_2$ // Zn | | 0.149 | 1 to 200 mA $cm^{-2}$, 85.9 % | 91.2 in 3500 cycles | 4 |
| Ag // Zn | | 0.167 | 0.4 to 4 μA $cm^{-2}$ 46.3 % | 84.2 in 100 cycles | 5 |

**References**


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