Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.
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Supplementary Information

A new design concept for preparing nickel-foam-supported metal oxide microspheres with superior electrochemical properties

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Fig. S1 (a) shows the XRD patterns of the as-prepared nickel-foam-supported NiO microspheres configuration. The sample shows a mixed XRD pattern of Ni and NiO. Fig. S1 (b-d) shows the SEM images of the sample. It can be observed that a thin layer of NiO microspheres is uniformly deposited on the nickel foam substrate.

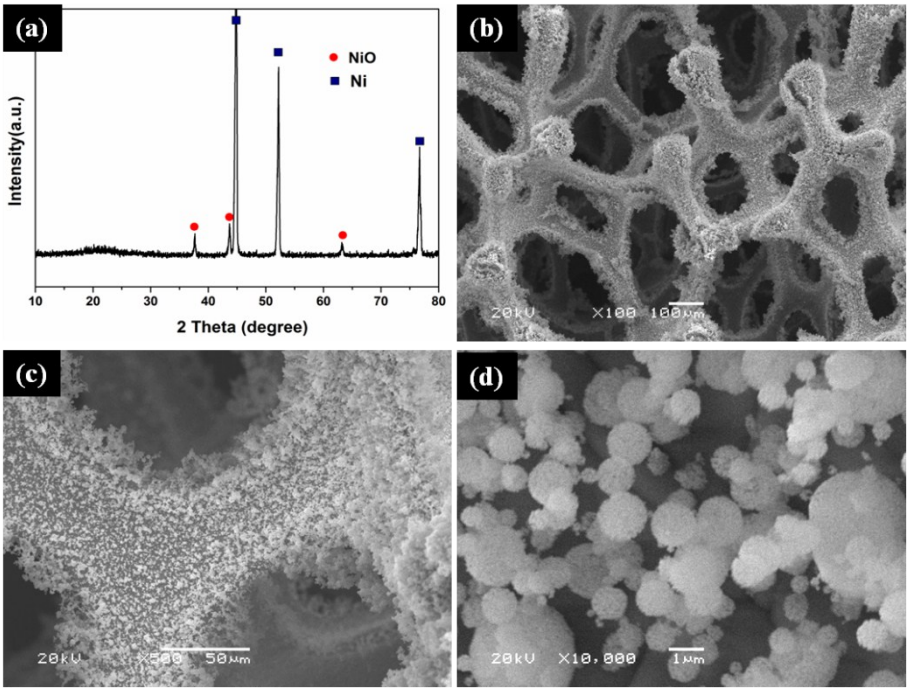

Fig. S1 (a) XRD patterns and (b-d) SEM images of the nickel-foam-supported NiO microspheres.

Fig. S2 (a) shows CV curves of the first three cycles of the nickel-foam-supported NiO anode between 0.01 and 3.0 V. The first cathodic scan has a main cathodic peak centered at about 0.48 V, corresponding to the reduction of NiO to Ni and the formation of SEI layer. In the subsequent cycles, the reduction process show one major peak centered at 1.18 V. Meanwhile, in the anodic scan process, only one peak is recorded at about 2.22 V and is related to the oxidation of Ni.

The charge-discharge curves at 200 mA g^{-1} during the first three cycles are shown in Fig. S2 (b). The NiO electrode delivers a initial discharge and charge capacity of 941 mAh g^{-1} and 694 mAh g^{-1}, with an initial coulombic efficiency of 73.7%. Fig. S2 (c) displays the discharge–charge capacity versus cycle number for the NiO electrode. As can be seen, the NiO electrode exhibits a good capacity retention during the first 100 cycles. Thereafter, the capacity decreases rapidly, which might be due to the drastic volume change induced structure destruction and decomposition of the electrolyte.

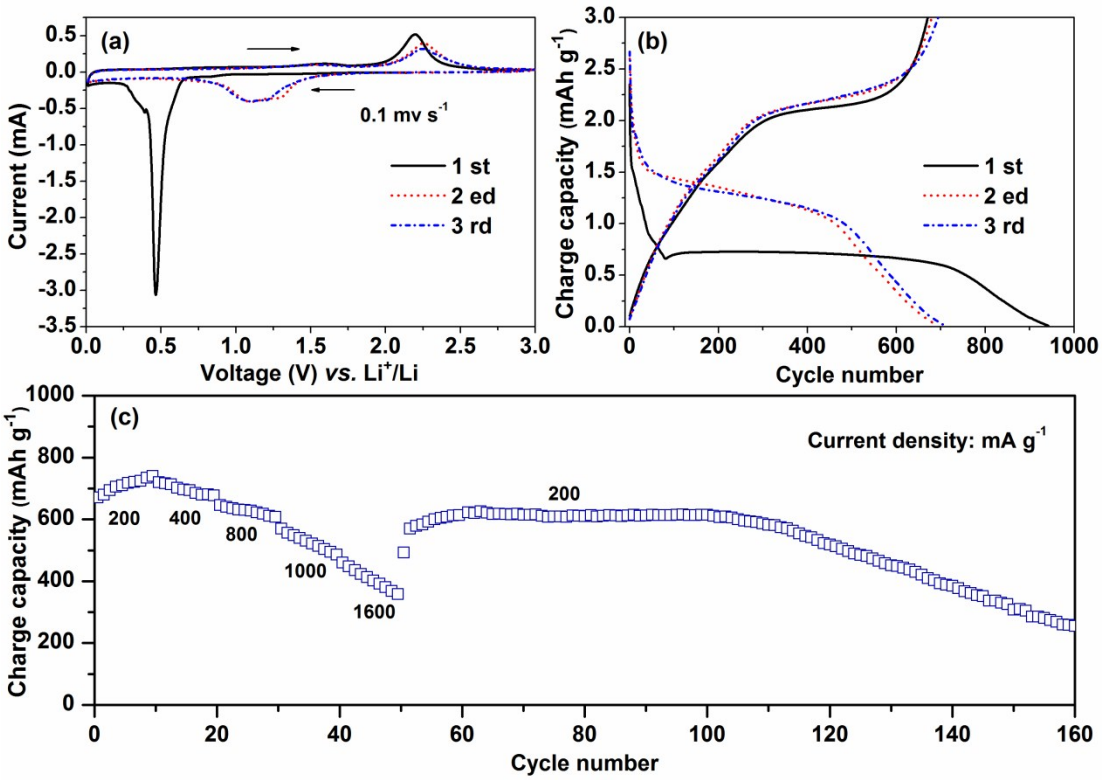

Fig. S2 Electrochemical performance of the nickel-foam-supported NiO anode:

(a) CV curves; (b) the first three charge-discharge curves; (c) rate and cycle performance.