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| Other Related Info. | Page 1 – 12 | | |
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| Abstract |  |
| Zinc-ion batteries (ZIBs) are very promising energy storage devices owing to their safety, environmental friendliness, and low-costs. Nevertheless, their development has been mostly focused on aqueous-based systems. We fabricated a quasi-solid-state ZIB based on α-MnO2 nanohusk morphology synthesized using a one-step hydrothermal method and gel electrolyte. The fabricated quasi-solid-state ZIB exhibited a high initial discharge capacity of 321 mA h g−1 at a current density of 33 mA g−1 and considerable cyclability. We systematically investigated its electrochemical properties utilizing various characterization methods such as cyclic voltammetry and galvanostatic intermittent titration technique. In addition, in-situ synchrotron X-ray diffraction and X-ray absorption spectroscopy were used to elucidate the phase transformation of the cathode in the quasi-solid-state ZIB upon electrochemical cycling. This study may provide further insight into electrochemical behaviour of the quasi-solid-state ZIB based on the α-MnO2 nanohusk morphology and gel electrolyte as a promising energy storage device. | |