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| Title | Ambient redox synthesis of vanadium-doped manganese dioxide nanoparticles and their enhanced zinc storage properties | | |
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| Abstract |  |
| In this work, we demonstrate the first use of a V-doped MnO2 nanoparticle electrode for zinc-ion battery (ZIB) applications. The V-doped MnO2 was prepared via a simple redox reaction and the X-ray diffraction studies confirmed the formation of pure MnO2, accompanied by an anisotropic expansion of MnO2 lattice, suggesting the incorporation of V-ions into the MnO2 framework. V doping of MnO2 not only increased the specific surface area but also improved the electronic conductivity. When Zn-storage properties were tested, the V-doped MnO2 electrode registered a higher discharge capacity of 266 mAh g−1 compared to 213 mAh g−1 for the pure MnO2 electrode. On prolonged cycling, the doped electrode retained 31% higher capacity than that of the bare MnO2 electrode and thereby demonstrated superior cycling performance. This study may pave the way towards understanding the enhancement of the energy storage properties via doping in electrodes of aqueous ZIB applications and also furthers the efforts for the practical realization of a potential eco-friendly battery system. | |