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| Title | Carbon-coated manganese dioxide nanoparticles and their enhanced electrochemical properties for zinc-ion battery applications. | | |
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| Published Journal Name | Journal of Energy Chemistry | | |
| Type of Publication | Journal | | |
| Volume | 26 | Issue | 4 |
| Publisher | Elsevier | | |
| Publication Date | Apr 21, 2017 | | |
| ISSN | 20954956 | | |
| DOI | https://doi.org/10.1016/j.jechem.2017.04.002 | | |
| URL | https://www.sciencedirect.com/science/article/abs/pii/S2095495616303552 | | |
| Other Related Info. | Page 815-819 | | |
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| Abstract |  |
| In this study, we report the cost-effective and simple synthesis of carbon-coated α-MnO2 [nanoparticles](https://www.sciencedirect.com/topics/chemical-engineering/nanoparticles) (α-MnO2@C) for use as cathodes of aqueous zinc-ion batteries (ZIBs) for the first time. α-MnO2@C was prepared via a gel formation, using [maleic acid](https://www.sciencedirect.com/topics/engineering/maleic-acid) (C4H4O4) as the [carbon source](https://www.sciencedirect.com/topics/engineering/carbon-source), followed by annealing at low temperature of 270 °C. A uniform carbon network among the α-MnO2 nanoparticles was observed by [transmission electron microscopy](https://www.sciencedirect.com/topics/engineering/transmission-electron-microscopy). When tested in a zinc cell, the α-MnO2@C exhibited a high initial discharge capacity of 272 mAh/g under 66 mA/g current density compared to 213 mAh/g, at the same current density, displayed by the pristine sample. Further, α-MnO2@C demonstrated superior cycleability compared to the pristine samples. This study may pave the way for the utilizing carbon-coated MnO2 electrodes for aqueous ZIB applications and thereby contribute to realizing high performance eco-friendly batteries. | |