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PII: S1226-086X(18)30003-0
DOI: https://doi.org/doi:10.1016/j.jiec.2018.01.002
Reference: JIEC 3821

To appear in:

Received date: 23-8-2017
Revised date: 27-12-2017
Accepted date: 3-1-2018

Please cite this article as: P. Yang, X. Song, C. Jia, H.-S. Chen, Metal-organic framework-derived hierarchical ZnO/NiO composites: morphology, microstructure and electrochemical performance, *Journal of Industrial and Engineering Chemistry* (2018), https://doi.org/10.1016/j.jiec.2018.01.002

Metal-organic framework-derived hierarchical ZnO/NiO composites: morphology, microstructure and electrochemical performance

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Abstract:

Hierarchical ZnO/NiO microstructures with different morphologies were synthesized employing bimetallic Zn/Ni MOFs as the precursor. The MOFs with rambutan- and seaweed-like morphologies were produced using terephthalic acid and polyvinylpyrrolidone. The molar ratio of Zn/Ni plays an important role for the microstructure and capacitance performance of samples. In particular, hierarchical ZnO/NiO hollow microspheres and seaweed microflowers were obtained when the molar ratio of Zn/Ni was 1:2 and 1:1, respectively. The seaweed microflowers exhibited larger specific capacitance and higher rate capability. The composition and unique microstructure result in improved ionic and electronic conductivity and rich electroactive sites for the electrochemical reactions.

Keywords: ZnO, NiO, Metal-organic framework, Morphology, Electrochemical