An efficient multidoped $Cu_{0.39}Zn_{0.14}Co_{2.47}O_4$-ZnO electrode attached on reduced graphene oxide and copper foam as superior lithium-ion battery anodes

Ji-Liang Niu, Hai-Jun Peng, Cheng-Hui Zeng, Xiao-Ming Lin, Palanivel Sathishkumar, Yue-Peng Cai, An-Wu Xu

PII: S1385-8947(17)32170-8
DOI: https://doi.org/10.1016/j.cej.2017.12.049
Reference: CEJ 18210

To appear in: *Chemical Engineering Journal*

Received Date: 4 September 2017
Revised Date: 22 November 2017
Accepted Date: 11 December 2017

Please cite this article as: J-L. Niu, H-J. Peng, C-H. Zeng, X-M. Lin, P. Sathishkumar, Y-P. Cai, A-W. Xu, An efficient multidoped $Cu_{0.39}Zn_{0.14}Co_{2.47}O_4$-ZnO electrode attached on reduced graphene oxide and copper foam as superior lithium-ion battery anodes, *Chemical Engineering Journal* (2017), doi: https://doi.org/10.1016/j.cej.2017.12.049

An efficient multidoped $Cu_{0.39}Zn_{0.14}Co_{2.47}O_4$-ZnO electrode attached on reduced graphene oxide and copper foam as superior lithium-ion battery anodes

Ji-Liang Niu[a, 1], Hai-Jun Peng[a,1], Cheng-Hui Zeng,[c] Xiao-Ming Lin[a,b,d*], Palanivel Sathishkumar[a], Yue-Peng Cai[a,*] An-Wu Xu[b,*]

[a] *Key Laboratory of Theoretical Chemistry of Environment, Ministry of Education; School of Chemistry and Environment, South China Normal University, Guangzhou 510006, P. R. China*

[b] *Division of Nanomaterials and Chemistry, Hefei National Laboratory for Physical Sciences at Microscale, University of Science and Technology of China, Hefei, 230026, China.*

[c]*College of Chemistry and Chemical Engineering, Key Laboratory of Functional Smal l Organic Molecule, Ministry of Education and Jiangxi's Key Laboratory of Green Ch emistry, Jiangxi Normal University, Nanchang, 330022, P. R. China*

[d] *State Key Laboratory of Structural Chemistry, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, Fujian, 350002, P. R. China*

[1] These authors contributed equally to this work.

Abstract

Metal-organic frameworks (MOFs) are very promising self-sacrificing templates to develop the large-scale fabrication of new functional materials for energy conversion and storage. In this study, novel multidoped porous mixed metal oxides $Cu_{0.39}Zn_{0.14}Co_{2.47}O_4$-ZnO nanoparticles were successfully fabricated through one-step pyrolysis of a polymetallic zeolitic imidazolate framework attached on reduced graphene oxide (RGO) and copper foam. The obtained $Cu_{0.39}Zn_{0.14}Co_{2.47}O_4$-ZnO/RGO/Cu composites can be directly used as binder-free anode material for lithium-ion battery for the first time, exhibiting a high reversible capacity of 1762 mAh g^{-1} at a current density of 0.1 A g^{-1} after 500 cycles with outstanding cycling stability. Such an impressive performance should benefit from the