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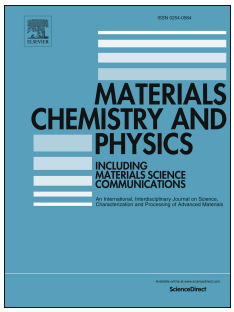

Mesoporous CoO/reduced graphene oxide as bi-functional catalyst for Li-O_2 battery with improved performances

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Mesoporous CoO/reduced graphene oxide as bi-functional catalyst for Li-O_2 battery with improved performances

Zhonghai Song [a], Xue Qin[a] *, Ning Cao [a], Xuejiao Gao [a], Qiu Liang [a], Yanfang Huo [b]

[a] Department of Chemistry, School of Science, Tianjin University, and Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Tianjin 300072, China

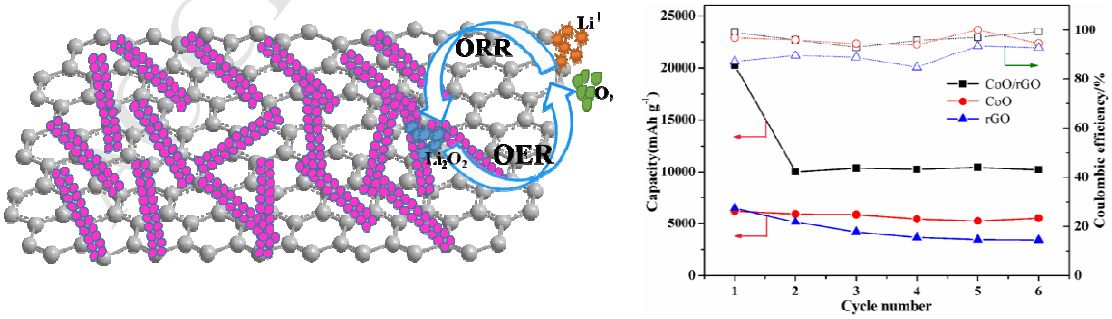
[b] Tianjin Key Laboratory of Biosensing and Molecular Recognition, College of Chemistry, Nankai University, Tianjin 300071, China

Corresponding Author Tel.: +86 022 27403670 E-mail address: qinxue@tju.edu.cn

Abstract

Wheat-like mesoporous CoO nanorods grown on the reduced graphene oxide (CoO/rGO) is synthesized by a simple hydrothermal method. Owing to synergistic effect between CoO and rGO, the CoO/rGO hybrid exhibits a good initial capacity of 20254 mAh g^{-1} along with a high coulombic efficiency (98.9%) at 200 mA g^{-1}. In addition, the batteries show an excellent rate capability (13952 mAh g^{-1} at 800 mA g^{-1}) and enhanced cycling stability (69 cycles with the capacity limited to 1000 mAh g^{-1} at 200 mA g^{-1}). The electrochemical performance is intimately related to the unique architecture (i.e., hierarchical mesoporous structure), facilitating the reversible formation and decomposition of insoluble Li_2O_2. The results of electrochemical tests confirm that the CoO/rGO hybrid is a promising candidate for the Li-O_2 batteries.

Graphical abstract



Highlights

Wheat-like mesoporous CoO nanorods are prepared and investigated in Li-O_2 batteries.

High initial capacity (20254 mAh g^{-1}) and cycle stability (69 cycles) are shown.