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Yeast-derived active carbon as sustainable high-performance electrodes for Lithium–oxygen batteries

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Abstract

Here, we report a high performance biomass-derived cathode material. Compared to traditional carbon materials, biomass-derived carbon, prepared through the pyrolysis of yeast followed by activation with KOH, shows a great improvement in both catalytic activity and stability. A lithium–oxygen battery that uses the yeast-derived carbon as its cathode presents a discharge capacity of 22100 mAh g⁻¹ at 570 mA g⁻¹, and sustains more than 500 cycles at a fixed capacity of 1360 mAh g⁻¹. Moreover, the rate capability reaches as high as 3390 mA g⁻¹, a value which is nearly an order of magnitude higher than that of conventional lithium–oxygen batteries. This work will provide a new direction for choosing cathode material for energy conversion and storage.

Key words: Lithium–air batteries, Yeast, Carbon materials, Biomass, Biomaterials

1. Introduction

With the development of science and technology, human's energy consumption is growing rapidly, which is projected to be 42 TW by 2050 [1]. Batteries with larger capacity are in great need to satisfy mankind's rising desire. Non-aqueous

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