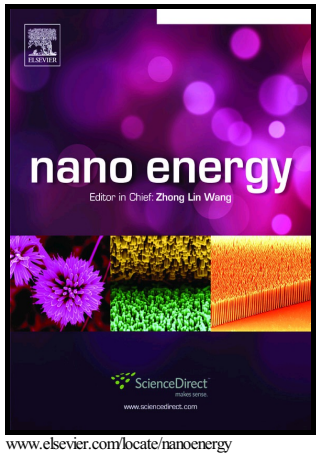

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POM-Based Metal-Organic Framework/Reduced Graphene Oxide Nanocomposites with Hybrid Behavior of Battery-Supercapacitor for Superior Lithium Storage

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Abstract

The energy storage field has witnessed a dramatic expansion in research at materials that might combine the high energy density of batteries and short charging times of supercapacitors. However, the materials mainly focus on transition metal oxides or sulfides, new material has rarely been reported yet. Herein, we report a novel nanocomposites based on polyoxometalates-based metal–organic frameworks (POMOFs)/reduced graphene oxide (RGO) for lithium-ion batteries. It demonstrates the advantages of polyoxometalates (POMs), metal–organic frameworks (MOFs) and RGO, thus shows the hybrid behavior of battery and supercapacitor. A reversible capacity of 1075 mAh g^{-1} was maintained after 100 cycles, and the capacity retentions are nearly 100 % both at 2000 and 3000 mA g^{-1} for over 400 cycles. These performances are almost the best compared to the reported pristine MOFs and POMs based materials to date. The design and synthesis of POMOFs/RGO nanocomposites might guide the development of new generation electrode materials for lithium-ion batteries.

Keywords: POM-Based MOF; RGO Nanocomposites; Hybrid Behavior of Battery-Supercapacitor; Lithium Storage; Ultra-Stable

1. Introduction

Electrochemical energy storage (EES) devices play an increasingly critical role for the

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