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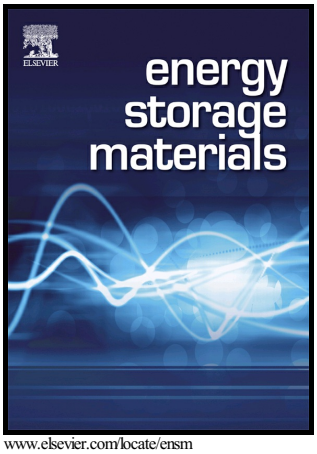

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Metal-organic framework nanosheets-guided uniform lithium deposition for metallic lithium batteries

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Abstract:

Metallic lithium (Li) has attracted much attention as anode for high-energy-density batteries because of its ultrahigh specific capacity (3860 mAh g^{-1}) and the lowest electrochemical potential. Uncontrolled Li dendrite growth gives rise to serious safety hazards with poor cycle life and low coulombic efficiency. Metal-organic framework (MOF) nanosheets modified electrodes are designed to inhabit Li dendrite growth with improved electrochemical performance. Due to high surface area and plentiful polar surface functional groups, MOF nanosheets possess enhanced electrolyte uptake capabilities and improved adhesive interactions with Li-ions, which facilitates well-distributed homogeneous Li ionic flux. A remarkable coulombic efficiency of 98% for over 180 cycles at a current density of 2.0 mA cm^{-2} and a cycle capacity of 1.0 mAh cm^{-2} is achieved. This study may pave a way for obtaining high-performance metallic Li batteries with a wide variety of MOFs-based materials.

Keywords:

metal-organic framework, lithium, batteries, polar surface functional groups, dendrite

1. Introduction

High-energy-density storage has become an ever-growing demand on account of rapid growth in

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