Short Communication

Lithium-magnesium Alloy as an Anode for Lithium-Sulfur Based Batteries

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Lithium-sulphur (Li-S)-based batteries have received much attention due to their overwhelming theoretical energy density (2500 Wh·kg⁻¹). The modification of Li-based anodes is a critical issue relevant to the practical usage of Li-S based batteries, considering the increasing cost of Li metal and the dendritical tendency of anodes. In this study, we demonstrated that a lithium-magnesium (Li-Mg) alloy can also act as the anode of Li-S based batteries and perform comparably to Li. The electrochemical behavior of the Li-Mg alloy could be further improved by the surface nitridation and coating with a layer of molybdenum disulfide. There was no clear dendrite on the surface of the electrode. When the surface was nitrified, the stability of the battery was improved, and when the surface of the Li-Mg anode was coated with molybdenum disulfide by magnetron sputtering, the cycling performance of the electrode was improved, with an increased specific discharge capacity. Thus, this work suggests that the Li-Mg alloy could be a suitable material for replacing lithium as the anode material of Li-S based batteries.

Keywords: Lithium-Magnesium Alloy Electrodes, Surface Modification, Li-S Battery

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