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Magnetron-Sputtering MoS_2 on Carbon Paper and its Application as Interlayer for High-Performance Lithium Sulfur Batteries

Jie Li[a], Yongjia Jiang[a], Furong Qin[a], Jing Fang[a], Kai Zhang*[,a], and Yanqing Lai[a]

a School of Metallurgy and Environment, Central South University, Changsha 410083, China

No.932, Lushan Road, Changsha city, Hunan Province, 410083 China

** Corresponding author(E-mail): chinamcsu@163.com (Kai Zhang)*

Abstract

Marked by high energy density and low material cost, lithium sulfur batteries are considered to be one of the most promising energy storage devices. However, the poor electrochemical performance impedes their practical application. In this work, MoS_2 is decorated on carbon nanotubes paper (CNTP) through magnetron sputtering technique to fabricate interlayers for high-performance lithium sulfur batteries. Due to the catalysis of MoS_2 on the conversion of sulfur species, lithium sulfur batteries present enhanced electrochemical performance. The initial discharge capacity reaches 1233 mA h g^{-1} and maintains 850 mA h g^{-1} after 100 cycles at 0.5 C even the sulfur loading is about 3.4 mg cm^{-2}. In addition, the coulombic efficiency is over 96% among all 100 cycles.

Keywords: Lithium-Sulfur Batteries; MoS_2; Interlayer; Magnetron sputtering; Sulfur loading

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