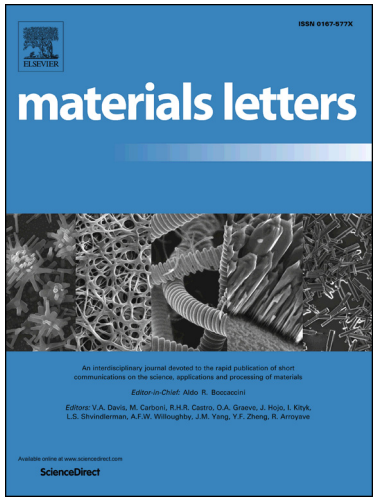


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# Nano potassium phosphotungstate spheres/sulfur composites as cathode for Li-S Batteries

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**Abstract:**

Herein, a new strategy of using polyoxometalates($K_3PW_{12}O_{40}$) to stabilize sulfur was introduced for the first time for Li-S batteries. The as prepared $K_3PW_{12}O_{40}$ spheres/S electrode shows a initial discharge capacity of 1281.0 mAh $g^{-1}$ with a good cycling stability at a rate of 0.1 C. In particular, the $K_3PW_{12}O_{40}$/S electrode exhibits an initial specific capacity of 810.0 mAh $g^{-1}$ at a high current rate of 2 C, and remains 560.4 mAh $g^{-1}$ after 250 cycles. The excellent performances are attributed to the significant roles that $K_3PW_{12}O_{40}$ host played during the charge/discharge process.

**Keywords:**

Lithium sulfur batteries; Potassium phosphotungstate spheres; Nanocomposites; Energy storage and conversion

## 1. Introduction

Lithium-sulfur batteries have been considered as the most likely alternatives to Li ion batteries, owing to the high energy density of 2600 Wh $kg^{-1}$[1, 2]. However, several inherent problems still limited the commercial application of Li-S battery, such as high dissolution of polysulfides, the reaction between lithium anode and the dissolved polysulfides, and low electric/ionic conductivity of sulfur[3-5]. To