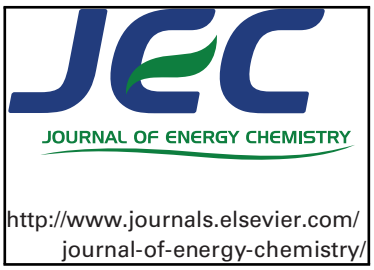

Recent progress on confinement of polysulfides through physical and chemical methods

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Review

Recent progress on confinement of polysulfides through physical and chemical methods

Sheng-Yi Li[a, b], Wen-Peng Wang[a, b], Hui Duan[a, b], Yu-Guo Guo[a, b]*

[a] *CAS Key Laboratory of Molecular Nanostructure and Nanotechnology, CAS Research Education Center for Excellence in Molecular Sciences, Chinese Academy of Sciences (CAS), Beijing 100190, China.*

[b] *University of Chinese Academy of Sciences, Beijing 100049, China*

Abstract

With high theoretical energy density and the natural abundance of S, lithium−sulfur (Li-S) batteries are considered to be the promising next generation high-energy rechargeable energy storage devices. However, issues including electronical insulation of S, the lithium polysulfides (LiPSs) dissolution and the short cycle lifespan have prevented Li-S batteries from being practical applied. Feasible settlements of confining LiPSs to reduce the loss of active substances and improve the cycle stability include wrapping sulfur with compact layers, designing matrix with porous or hollow structures, adding adsorbents owning strong interaction with sulfur and inserting polysulfide barriers between cathodes and separators. This review categorizes them into physical and chemical confinements according to the influencing mechanism. With further discussion of their merits and flaws, synergy of the physical and chemical confinement is believed to be the feasible avenue that can guide Li-S batteries to the practical application.