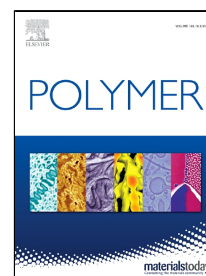


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Porous carbon prepared from polyacrylonitrile for lithium-sulfur battery cathodes using phase inversion technique

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Keywords: porous carbon, polyacrylonitrile, cathode, phase inversion, lithium-sulfur batteries.

Abstract

In this paper, a time and resource efficient way of preparing porous carbon cathode for lithium-sulfur batteries with superior cycle stability has been demonstrated. In this simple work, we used commercially available polymer as carbon source and non-solvent mixture as porogen or pore former. The cathode has been fabricated by using polyacrylonitrile as base polymer *via* phase inversion route. By this technique, a highly porous substrate material is generated by dipping a semi-gelled film of polyacrylonitrile in non-solvent mixture. After oxidative crosslinking followed by pyrolysis under inert atmosphere results a highly porous nitrogen doped carbon material, which was further hybridized with sulfur *via* melt diffusion of elemental sulfur. This cathode material shows although relatively low specific capacity (Cycle 1: ca. 1050 mAh/g_{sulfur}, cycle 500: ca. 400 mAh/g_{sulfur}), but excellent cycle stability over 500 charging-discharging cycles is displayed.

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