

### Bifunctional separator blocking the polysulfide anions in Li-S batteries

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High order lithium polysulfide dissolves in electrolyte and it moves from cathode to anode in lithium-sulfur(Li-S) batteries. This shuttle effect causes the loss of active sulfur and it makes the electrochemical performances of cell decreased. It is most critical issue to enhance the Li-S battery performance. Here, we present a simple strategy to block the shuttle effect using metal-organic framework(MOF) and Nafion coated battery separator. -SO<sub>3</sub> group in MOF and Nafion push the negatively charged polysulfide, but positively charged lithium ion can be permitted to pass. This functionalized -SO<sub>3</sub> group also help to improve the ionic conductivity. This NOF-Nafion coated separator for Li-S batteries shows a low capacity decay(0.079% per cycle within 250 cycles)