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MXene Debris Modified Eggshell Membrane as Separator for High-Performance Lithium-Sulfur Batteries

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Abstract: A functional separator (MXene/ESM) to suppress the lithium polysulfides shuttling via coating MXene debris on one surface of a biodegradable eggshell membrane (ESM) is designed to enhance the electrochemical performance of Li-S batteries. The excellent electronic conductivity of the porous MXene debris, and the good mechanical strength, superior thermal stability as well as large electrolyte infiltration of ESM make MXene/ESM an ideal separator for high-performance Li-S batteries. The strong chemisorption induced from both Ti-S bond formed between Ti atom in MXene and the lithium polysulfides by the Lewis acid-base interaction and affinity of O and N containing functional groups on ESM to the lithium polysulfides greatly prevents the shuttling effect of the polysulfides. Compared with a commercial

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