SnO_2 nanowire grown carbon paper as a functional interlayer

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Lithium-sulfur battery has been attracting attention as one of the most promising next-generation rechargeable energy storage devices due to its high energy density, low price and environmental friendliness of sulfur. However, in order to commercialize lithium-sulfur battery, there are still some challenges such as low sulfur utilization, insufficient battery cycle life, and poor rate capability. In this study, SnO_2 nanowire grown carbon paper (SnO_2@CP) was synthesized via a facile CVD technique and then used as a functional interlayer for lithium-sulfur battery. As an interlayer between the cathode and separator, SnO_2@CP showed excellent polysulfide trap efficiency. The lithium-sulfur battery with a SnO_2@CP interlayer retains 918mAh/g at the 50th discharge at 0.2C, while the battery with a CP interlayer or without functional layer retains only 778mAh/g and 596mAh/g respectively. The increased cycling performance could be ascribed to the fact that web-shaped SnO_2 nanowires can efficiently trap the polysulfide dissolution, and the porous carbon paper can provide enhanced conductivity in the electrode.