SnSe anode materials for low temperature lithium-ion batteries

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Low-temperature operation of lithium-ion batteries remains a challenge due to the reduced mobility of Li ions and enhanced resistance [1]. Recently, some materials have demonstrated promising results, and among them, we are studying tin selenide (SnSe) anode materials prepared via the electrospinning method.

Tin selenide (SnSe) shows promise as an anode material for energy storage due to its high theoretical capacity and low potential plateau, which can result in higher energy densities and improved cycle stability compared to traditional graphite anodes. SnSe is also environmentally friendly, thermally stable, and relatively inexpensive, making it a practical choice for large-scale energy storage applications [2].

The prepared material was used as an anode material for lithium-ion batteries operating at low temperatures up to -20 °C. SnSe electrode demonstrated an initial discharge capacity of 870 mAh g^{-1} at a current density of 100 mA g^{-1}. Moreover, at a temperature of -20 °C, the electrode exhibited a discharge capacity of 445 mAh g^{-1} at a current density of 100 mA g^{-1}. The outstanding electrochemical performance of SnSe anodes in low-temperature conditions could be linked to the improved conductivity with the addition of carbon and reduced volume changes during charge-discharge processes.

References

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