

SnC anode based composite solid state electrolyte of sodium ion battery

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Sn has been regarded as one of the most promising materials for application to anodes, given its high electrical conductivity, low potential plateau versus Na/Na⁺, and high theoretical specific capacity of 847 mAh g⁻¹. By repeating the sodiation and desodiation cycle of Sn, it causes volume expansion and contraction, which causing internal cracks and deteriorating cycle characteristics, thereby reducing the battery cycles. To improve the cycle, nanometer-sized Sn with a soft material, which would mitigate the stress and prevent the electrical isolation that results from the pulverization. As the crucial component of solid state batteries, solid state electrolytes should possess high ionic conductivity, excellent thermal and electrochemical stability, as well as good interfacial compatibility with cathode and anode materials. Among Solid-state electrolytes, Na₃Si₂Zr₂(PO₄)₃ (NASICON)-based ceramic solid electrolyte have some improved features such as elevated ionic conductivity, non-flammable, and a high lithium ion transference number. The composite solid electrolyte consists of (Na₃Si₂Zr₂(PO₄)₃) ceramic powder, PVdF and carbonated additive.