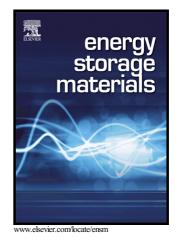
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Robust Graphene Layer Modified Na₂MnP₂O₇ as a Durable High-Rate and High Energy Cathode for Na-ion Batteries

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Keywords: Sodium-ion batteries; Na₂MnP₂O₇; Graphene; Cathodes; Surface modification

Abstract

Na₂MnP₂O₇ has been considered as a promising cathode candidate for advanced sodium-ion batteries due to its high potential, low cost and non-toxicity. However, the low initial Coulombic efficiency, poor high-rate and unsatisfactory cycling ability originated from the intrinsic inferior electronic conductivity and manganese dissolution severely hinder its practical application. Herein, we report an approach based on a feasible high energy vibrating activation process to fabricate a robust graphene layers (GL) modified Na₂MnP₂O₇ material (noted as NMP@GL) for the first time. The as-prepared NMP@GL could exhibit an ultrahigh initial Coulombic efficiency of 90%, and a high energy density over 300 Wh kg⁻¹. In addition, rate performance and cycling

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