

Prussian blue and graphene oxide composite as a cathode material for a sodium-ion capacitor with superior performance

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Among the various energy storage materials, Prussian blue (PB) has been studied as a candidate because of its open framework structure, nontoxicity, and low cost. Through this structure and interstitial sites, the reversible insertion and desertion of sodium ion can happen more easily. To enhance the cyclic stability, PB and graphene oxide composites (PBG0) is synthesized by a simple method. The PBGO electrode shows a high specific capacity, 166 mAh/g at a current density of 20 mA/g. Even, at a current density of 500 mA/g, this electrode not only represents 106 mAh/g of capacity but also has no noticeable capacity decrease. A sodium ion capacitor is fabricated by combination with activated carbon as a negative electrode. This capacitor shows 95.5 capacity retentions after 5000 cycles and delivers an energy density of 47.7 Wh/kg and a power density of 3000 W/kg. From this result, it is demonstrated that the PBGO is a promising candidate material for sodium-ion capacitors.