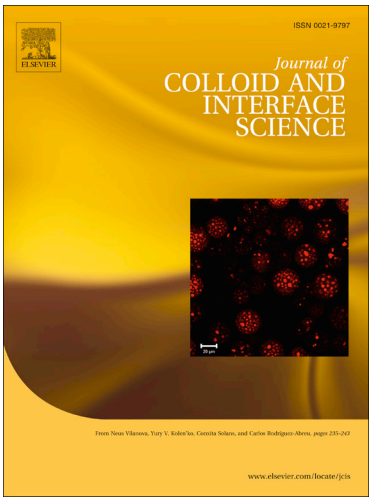

Regular Article

Tin sulphide nanoflowers anchored on three-dimensional porous graphene networks as high-performance anode for sodium-ion batteries

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Tin sulphide nanoflowers anchored on three-dimensional porous graphene networks as high-performance anode for sodium-ion batteries

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Abstract

The SnS_2 nanoflowers anchored on three dimensional porous graphene were easily constructed with nickel foam (NF) as supported backbone through the dip-coating method followed by one-step controllable hydrothermal growth and mild reduction. The interconnected SnS_2 nanoflowers with cross-linking nanosheets and rich pores assembled to form one layer of continuous network structure, which tightly adhered on the surface of graphene. The porous graphene supported by NF built a conductively integral highway that is preferable for the charge transfer kinetics, while the hierarchical pores from the SnS_2 nanoflowers and NF are particularly beneficial for mitigating the volume expansion and promoting electrolyte penetration. The as-constructed Ni foam/reduced graphene oxide/SnS_2 (NF/RGO/SnS_2) composite exhibited dramatically enhanced reversible capacity, remarkable rate capability, and long-term cycling stabilities without the use of any binders and conductive additives. Especially, NF/RGO/SnS_2 composite remained the specific capacity as high as 561.9 mA h g^{-1} at the current densities of 1000 mA g^{-1} after continuous tests for 160 cycles,