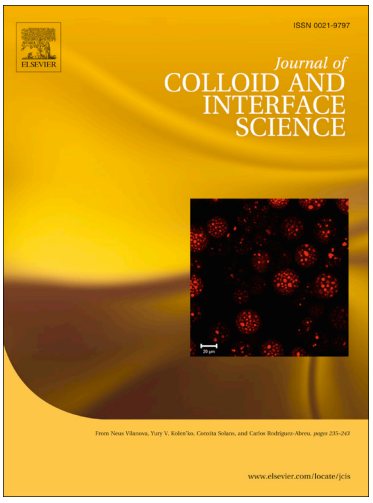

Metal organic frameworks derived cobalt sulfide/reduced graphene oxide composites with fast reaction kinetic and excellent structural stability for sodium storage

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Metal organic frameworks derived cobalt sulfide/reduced graphene oxide composites with fast reaction kinetic and excellent structural stability for sodium storage

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ABSTRACT:

We report a metal-organic framework-derived Co_9S_8 nanoflakes on reduced graphene oxide sheet composites as an advanced sodium-ion battery anode. Using a galvanostatic intermittent titration technique, we reveal that the sodium diffusion coefficient of the composite is higher than that of its counterpart. *Ex-situ* scanning electron microscopy images suggest the excellent mechanical stability of Co_9S_8 nanoflakes on the reduced graphene oxide sheet electrode during cycling, thereby facilitating cyclic stability. The partial surface-induced capacitive effect also contributes to electrochemical performance. With the reduced graphene oxide, the Co_9S_8 nanoflakes on the reduced graphene oxide sheet electrode deliver a high discharge capacity of 551 mA h g^{-1} at 0.1 A g^{-1}, a good rate capability at 10 A g^{-1}, and an excellent cyclic stability up to 500 cycles. rGO/Co_9S_8 shows potential for practical applications in $Na_3V_2(PO_4)_3$‖rGO/Co_9S_8 full cells.

Keywords: Transition metal sulfides; Metal organic frameworks; Sodium ion battery; Long-term stability; Ion diffusion coefficients

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