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N/S co-doped three-dimensional graphene hydrogel for high performance supercapacitor

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Abstract

Doping and high specific area are essential to the performance of supercapacitor electrode materials. However, the conventional single doping in two dimensional electrode materials is still unable to get high supercapacitive performance. Here we report a facile hydrothermal process using ammonia as a source of nitrogen (N) and thiourea as a sulfur (S) source to prepare N/S co-doped three dimensional (3D) graphene hydrogel (N/S-3DGH) for supercapacitor electrode application. The as-prepared N/S-3DGH is uniform and stable. The N/S co-doped 3DGH electrode material exhibits a high specific capacity of 1063 Cg^{-1} at a current density of 1 Ag^{-1}. Even at a density of 20 Ag^{-1}, it can still hold an excellent charge and discharge cycling stability, and with 76% of initial capacity