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Mussel-inspired dopamine-mediated graphene hybrid with silver nanoparticles for high performance electrochemical energy storage electrodes

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Abstract

To facilitate the immobilization of the silver nanoparticles with high crystallinity and stability, the mussel-inspired dopamine is functionalized on the surface of the graphene. Considering the unique adhesive property of a catechol group in the dopamine toward metallic ions, a large amount of silver nanoparticles can be coated on the surface of the dopamine-functionalized graphene. To use the high surface area of graphene, large-sized graphene sheets are prepared using the microwave heat treatment of graphite powder followed by chemical oxidation and exfoliation. In addition, the large-area graphene sheets are selectively collected by a pH-assisted fractionation technique and are confirmed by the green-light filtered optical microscopic images. The dopamine-mediated graphene hybrid with silver nanoparticles shows superior

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