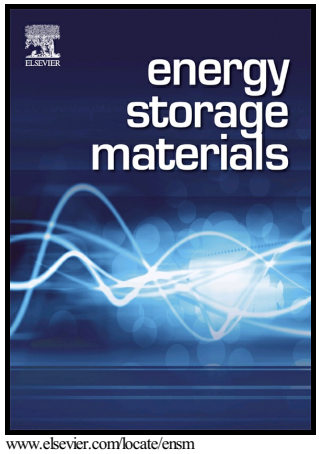

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Few Layer Nitrogen-doped Graphene with Highly Reversible Potassium Storage

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Abstract

Few-layer nitrogen-doped graphene (FLNG) have been successfully prepared by a simple bottom-up synthesis of technique using Dicyandiamide and Coal tar pitch as raw materials. The as-synthesized FLNG with the thickness of about 2-10 nm, high surface area (479.21 m^2g^{-1}) and high nitrogen content (14.68 at%) exhibits excellent K-ion storage performances. The FLNG delivers competitive reversible capacity (320 $mAh \cdot g^{-1}$ at 50 $mA \cdot g^{-1}$ after 60 cycles), superior rate capability as well as long-term cycling life at large current density (150 $mAh \cdot g^{-1}$ at 500 $mA \cdot g^{-1}$ after 500 cycles). The multiple synergistic effects of nitrogen doping, high specific surface area, interconnected mesopores with large pore volume not only facilitate the ions transportation throughout the electrode matrix, but also provide substantial active sites for K-ion storage. Furthermore, Electrochemical Impedance Spectroscopy (EIS) of the FLNG electrode during the initial K-ion intercalation process were measured to thoroughly understand the electrochemical

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