

## One-step electrochemical synthesis of MoS<sub>2</sub>/graphene composite for supercapacitor application

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### ABSTRACT

In this study, an MoS<sub>2</sub>/graphene composite is fabricated from bulk MoS<sub>2</sub> and graphite rod via a facile electrochemical exfoliation method. The as-prepared samples are characterized by X-ray diffraction, field emission scanning electron microscopy, Fourier transform infrared spectroscopy and ultraviolet-visible spectroscopy techniques to confirm the formation of the MoS<sub>2</sub>/graphene composite. The electrochemical behavior of the MoS<sub>2</sub>/graphene composite is evaluated through cyclic voltammetry, galvanostatic charge/discharge and electrochemical impedance spectroscopy. It exhibits high specific capacitance of 227 F g<sup>-1</sup> as compared with the exfoliated graphene (85 F g<sup>-1</sup>) and exfoliated MoS<sub>2</sub> (70 F g<sup>-1</sup>) at a current density of 0.1 A g<sup>-1</sup>. This can be attributed to the synergistic effect between graphene and MoS<sub>2</sub>. Moreover, it displays high electrochemical stability and low electrical resistance.

### KEYWORDS

Electrochemical exfoliation; Supercapacitors; Graphene; Exfoliated MoS<sub>2</sub>; 2D materials

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