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**CdS-MoS2 core-shell nanospheres: a new electrode for lithium ion batteries**

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**Abstract**

Simple and single step ionic liquid assisted solvothermal method is proposed for synthesis of CdS@MoS2 core–shell nanospheres. The formation of core–shell structure can be attributed to 1-triethylene glycol monomethyl ether-3-methylimidazolium methanesulfonate ionic liquid added during the synthesis. Several physicochemical techniques were exercised to validate the desired state of the obtained material. Generally, implementation of CdS as anode for lithium ion batteries is truncated by its low theoretical capacity. Herein, we introduce CdS@MoS2 core–shell nanospheres to account this issue. MoS2, a layered material with high capacity and good stability, is selected as an appropriate material to form a p-n junction by encapsulation of CdS nanospheres. For the first time, CdS@MoS2 is probed as an anode for lithium ion batteries. At very high current rate of 0.2 C, the electrode delivered a high discharge capacity of 734 mA h g−1 after 100 cycles. The excellent electrochemical properties of CdS@MoS2 core–shell nanospheres including high specific capacity and high stability are ascribed to the encapsulation of CdS nanospheres with amorphous MoS2.

**Keywords:**

Nanospoheres, lithium ion batteries, methylimidazolium, methanesulfonate, ionic liquid

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