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**CuS@Cu freestanding electrode via electrochemical corrosion for high performance Li-ion****batteries**

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**Abstract**

3D porous CuS@Cu composite is prepared via a facile H<sub>2</sub>O<sub>2</sub> aided electrochemical corrosion method, which shows prominent electrochemical performance as freestanding electrode for Li-ion batteries. It delivers no capacity fading at a specific current of 0.5 A g<sup>-1</sup>, showing discharge/charge of 845/834 mAh g<sup>-1</sup> after 500 cycles. After 50 cycles at various specific current from 0.1 to 1.5 A g<sup>-1</sup>, the CuS@Cu electrode can still exhibit no capacity fading over 300 cycles at 2 A g<sup>-1</sup>, delivering discharge capacity of 414 mAh g<sup>-1</sup>.

**Keywords:** Composite Materials; Electrochemical corrosion; Energy storage and conversion; Lithium ion battery;

**1. Introduction**

Li-ion batteries have not any been widely applied in various portable electronic devices, but also been accepted as the potential power sources for electronic vehicles and energy storage power station. In order to meet with the ever-increasing demand of energy storage need, considerable efforts have been devoted to the development of advanced electrode materials for Li-ion batteries [1-5].

Among the available anode materials, transition metal sulfides have received great attention because they possess higher capacity than commercial graphite (372 mAh g<sup>-1</sup>) and higher conductivity than

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