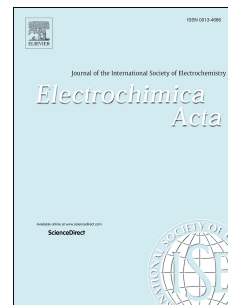


# Accepted Manuscript

CNTs@NC@CuCo<sub>2</sub>S<sub>4</sub> nanocomposites: An advanced electrode for high performance lithium-ion batteries and supercapacitors

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**CNTs@NC@CuCo<sub>2</sub>S<sub>4</sub> nanocomposites: An advanced electrode for high performance lithium-ion batteries and supercapacitors**

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**Abstract:** The design and fabrication of the materials to improve their performance are crucial for energy storage of lithium-ion batteries and supercapacitors. Herein, the CuCo<sub>2</sub>S<sub>4</sub> nanocrystallites grown on N-doped amorphous carbon coated CNTs are synthesized via a facile solvothermal method (CNTs@NC@CuCo<sub>2</sub>S<sub>4</sub>). The N-doped amorphous carbon layer with functional groups can effectively strengthen the adhesion between CNTs matrix and CuCo<sub>2</sub>S<sub>4</sub> nanocrystallites. The combination of nanocrystallites and the CNTs not only shortens the diffusion path of the electrolyte, but also enhances the electrical conductivity of the electrode. As a result, the CNTs@NC@CuCo<sub>2</sub>S<sub>4</sub> displays excellent electrochemical performance both in lithium-ion batteries and supercapacitors. The reversible capacity can be retained at 783 mAh g<sup>-1</sup> after 100 cycles at the current density of 100 mA g<sup>-1</sup>. And the discharge capacity of 507 mAh g<sup>-1</sup> is still maintained after 60 cycles even at high rate of 5000 mA g<sup>-1</sup>. As the electrode for supercapacitors, the CNTs@NC@CuCo<sub>2</sub>S<sub>4</sub> delivers good capacitive performance with high capability (1604 F g<sup>-1</sup> at 1 A g<sup>-1</sup>), good rate capability, and enhanced cycling stability, with 93.6% capacitance retention after 2000 cycles at the current density of 2 A g<sup>-1</sup>.

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