

Charge storage mechanism of Mn²⁺ or Cu²⁺ doped Na_{2+2x}Fe_{2-x}(SO₄)₃ as cathode material for Sodium ion batteries

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Na_{2+2x}Fe_{2-x}(SO₄)₃ is considered as promising cathode material for sodium ion batteries since it provides high operating potential (3.7 V) and reasonable capacity (100 mAh g⁻¹) [1]. Due to its low electrical conductivity, synthesis strategies were developed to wrap the sulfate-salt particles into conductive layers, *e.g.* graphene oxide, to increase the electrochemical performance [2] – [4]. Even though, fundamental properties, *e.g.* diffusion coefficient, structural evolution during charge/discharge processes or diffusion pathways of the Na-ion in the structure were evaluated, less is known on possible pseudocapacitive behavior of the material [2], [5] – [8].

In that regard, we investigated the charge storage mechanism, surface-controlled or diffusion-controlled, of (un)doped Na_{2+2x}Fe_{2-x}(SO₄)₃ compounds, by means of cyclic voltammetry and galvanostatic charge/discharge procedures. We determined fundamental parameters to identify the charge storage mechanism and discuss the influence of the dopant which was chosen to be Mn²⁺ or Cu²⁺.

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