

Investigation of NaTiOPO₄ as anode for sodium-ion batteries: a SEI - free material?

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Abstract

Tavorite NaTiOPO₄ (NaTP) is here explored as a possible Solid Electrolyte Interphase (SEI) - free anode material for Na-ion batteries (NIBs). The operation voltage is found around 1.4 V vs. Na⁺/Na with a very low polarization (around 0.02 V) and an efficiency of ~95% after 100 cycles. Operando X-ray diffraction measurements have unveiled that insertion and deinsertion of Na ions occurs via a symmetric mechanism involving biphasic and solid solution reactions. The evolution of the SEI formation at different voltage values upon electrochemical cycling has been analyzed by means of X-ray Photoelectron Spectroscopy (XPS) and the results show that, although not inexistent, a very thin and stable SEI layer is formed that positively contributes to the excellent cycling stability of the material.