

# Investigations on the influence of Sm<sup>3+</sup> ion on the nano TiO<sub>2</sub> matrix as the anode material for lithium ion batteries

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## ABSTRACT

The influence of the Samarium ions (Sm<sup>3+</sup>) on the electrochemical properties TiO<sub>2</sub> nanoparticles has been analyzed by incorporating Sm ions in two different combinations using the sol-gel method. The bare and doped samples have been characterized using XRD, SEM, TEM and EDX, for its structural, morphological and compositional analysis of the sample. The Galvanostatic cycling, Cyclic voltammetry and Impedance analyzer has been employed to point out the electrochemical properties of the assembled batteries. The electrochemical properties of the sol-gel derived bare TiO<sub>2</sub> are comparable with the literature. The Sm<sub>0.1</sub>Ti<sub>0.9</sub>O<sub>2</sub> exhibits better capacity and lower capacity fading over multiple cycles. The higher Sm concentration exhibits more capacity fading after the initial cycles. The study reveals that the lower concentration doping of Sm stabilizes the TiO<sub>2</sub> nanoparticles which makes it as a better candidate for its application potential towards lithium ion batteries.

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