

Anatase-TiO₂ as sustainable buffering filler for Si anodes in Lithium batteries.

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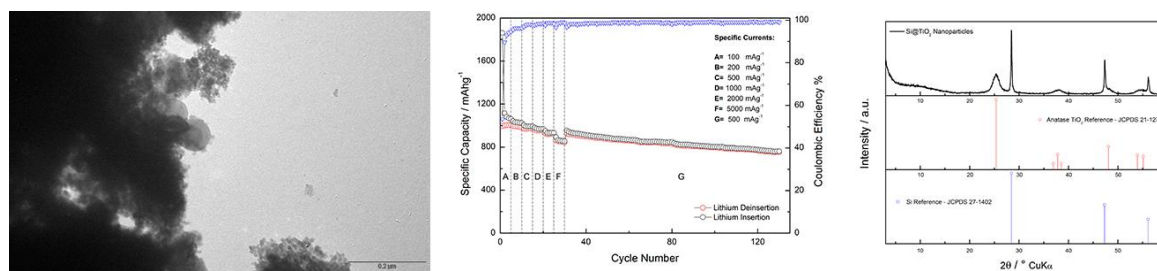
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Designing ad-hoc nanostructures is a common strategy to prepare high energy-density anode materials employing Si nanoparticles in Lithium-ion batteries, but these very nanostructures are often plagued by complex preparation procedures[1].

In this work[2], it is reported the simple and low-cost preparation of environmentally benign and sustainable 5-nm nanocrystalline Anatase-TiO₂ nanoparticles as buffering filler for Si nanoparticles (Si@TiO₂). In addition, electrodes were prepared using a lower impact processing based on Poly(Acrylic)-Acid (PAA) binder and ethanol solvent[3].

The material morphology and structure have been characterized by Electron Microscopy and X-Ray Diffraction. Electrochemical characterization showed very good reversible specific capacities, up to 1000 mAhg⁻¹, while testing the rate capability at several specific currents, ranging from 500 mA g⁻¹ to 2000 mA g⁻¹, showed low cell polarization notwithstanding the increasing cycling rate. Post-cycling electrode analysis revealed a very good electrode integrity after 100 cycles at 500 mA g⁻¹ specific current.



References:

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