Nanostructured surfaces

Effect of lamination on the microstructural properties of $Li_{1,3}Al_{0,3}Ti_{1,7}(PO_4)_3$ thick films

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Nowadays lithium-ion batteries are widely used for storage power generation and UPS systems due to its high energy performance [1]. However, using Li-conducting organic liquid or polymer electrolyte prevents the manufacture of completely safe devices. Replacement of the organic electrolyte by an inorganic solid will not only significantly improve the safety of lithium-ion battery, but extend its life by reducing the degradation processes. The procurement of supported electrolyte thick films can be the key to the development of novel architectures needed to the preparation of a all solid state battery. This supported electrolytes will open the possibility to large area electrolytes and the design of competitive planar Li-ASSB. The preparation of supported thick films onto refractory substrates is not a so usual way of preparing solid electrolytes for Li-Batteries.

In this work, the influence of different thermal sintering treatments on Li-NASICON thick films of composition $Li_{1.3}Al_{0.3}Ti_{1.7}(PO_4)_3$ has been investigated. The isostatic lamination step performed before the thermal sintering of thick films has demonstrated to improve film density and grain size, increasing as a result "bulk" and grain boundary Li-conductivity.

The use of an isostatic lamination step before sintering treatments enhanced density and grain size in thick films. The preparation method used can be scaled to produce large area electrolytes for new Li all-solid state batteries architectures.

1. *Tarascon J.- M., Armand M.* Issues and challenges facing rechargeable lithium batteries // Nature.-2001.-**414**. P.359-367.