Abstract

Structural Cork in Ferroelectric Solid-State Devices by Scanning Kelvin Probe †

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Energy is a pillar in the socio-economic organization of modern society. In the last decade, we have had the development and implementation of new and various ways of generating energy, aiming for the production of clean energy with a subsequent reduction in fossil fuel dependency. Consequently, a wide range of products with electrical autonomy, from nanotechnology, wearables, cellphones, and laptops to vehicles, have been developed at a quick pace. In this scenario, energy storage and batteries are of paramount importance. The development of these areas is extremely relevant. The search for new and innovative materials makes the batteries more efficient, clean, and cheaper.

Cork is mostly used for making wine bottle stoppers. Nonetheless, it is used in vast and diverse areas such as construction, fashion industries, vehicles, and the aerospace industry. The objective of this project is to study cork [1] as a valuable and promising material for usage in structural batteries based on solid ferroelectric electrolytes [2,3].

The technique utilized for the study of the cork and structural batteries is the scanning Kelvin probe (SKP), a non-invasive technique that allows the electrochemical study of the surface of the cork by itself or combined with other materials [4,5]. Here we use the SKP technique in the research of various materials and cells that may prove to be innovative for obtaining better structural batteries (Figure 1) [2].

Figure 1. Surface topography by capacitive surface tracking (CST) and SKP of the surface of a Cu tape/cork junction: (a) CST and (b) SKP.

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