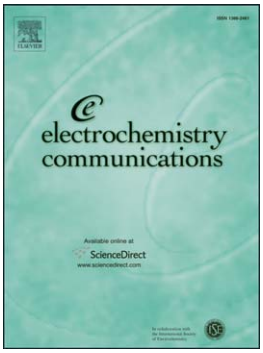

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Amorphous Silicon Nanotubes via Galvanic Displacement Deposition

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Abstract

Amorphous silicon nanotubes were grown in a single step into a polycarbonate membrane by a galvanic displacement reaction conducted in aqueous solution. In order to optimize the process, a specifically designed galvanic cell was used. SEM images, after polycarbonate dissolution, showed interconnected nanotube bundles with an average length of 18 μm and wall thickness of 38 nm.

The deposited silicon was revealed by EDS analysis, whilst X-ray diffraction and Raman spectroscopy showed that nanotubes have an amorphous structure. Silicon nanotubes were also characterized by photo-electrochemical measurements that showed n-type conductivity and optical gap of ~1.6 eV.

Keywords: Silicon nanotubes; Galvanic displacement deposition; Template synthesis; Li-ion batteries; Solar cells; Amorphous silicon.

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