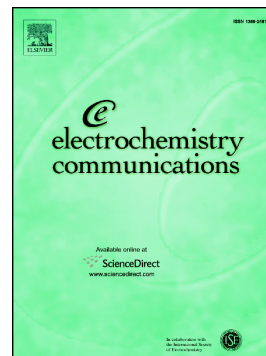


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Comparison of Photoelectrochemical Performance of Anodic Single- and Double-Walled TiO₂ Nanotube Layers

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ABSTRACT

In this work, the photoelectrochemical response of single-walled (SW) and double-walled (DW) TiO₂ nanotube (TNT) layers is presented. TNT layers were grown on Ti substrates by anodization in two different ethylene glycol-based electrolytes to obtain ~5 and ~15 μm thick TNT layers. The inner shell of the TNT was quantitatively removed *via* a mild pre-annealing followed by a selective chemical etching treatment in piranha solution. All TNT layers were investigated for their photoelectrochemical response in the ultraviolet and near visible spectral range. Significantly enhanced photocurrent densities were revealed for the SW-TNT layers. This is ascribed to improved charge carrier separation along the tube walls due to the lack of the C- and F-rich inner shell removed by etching.

Keywords: titanium dioxide, nanotubes, single-walled, double-walled, photoelectrochemistry

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