ADDENDUM

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Free-Standing Membranes to Study the Optical Properties of Anodic TiO$_2$ Nanotube Layers

Chem. Asian J., 2016, 11

DOI: 10.1002/asia.201501336

Abstract: In the present work we investigate various optical properties (such as light absorption and reflectance) of anodic TiO$_2$ nanotube layers directly transferred as self-standing membranes onto quartz substrates. This allows investigation in a transmission geometry which provides significantly more reliable data than measurements on the metallic Ti substrate. Light transmission and reflectance measurements were carried out for layers of thickness varying from 1.8 to 50 μm, and the layers were investigated in their amorphous and crystalline forms. A series of wavelength-dependent light attenuation coefficients are extrapolated and found to match the photocurrent versus irradiation wavelength behavior. A feature specific to anodic nanotubes is that their intrinsic carbon contamination content causes a proportional sub-bandgap response. Overall, the extracted data provide a valuable basis and understanding for the design of photo-electrochemical devices based on TiO$_2$ nanotubes.

Already published see: 10.1002/asia.201501336