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Photoelectrochemical Ultraviolet Photodetector by Anodic Titanium Dioxide Nanotube Layers

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Abstract

A prototype ultraviolet (UV) photodetector based on photoelectrochemical (PEC) cell from material synthesis up to assembly, was demonstrated in this work. Self-organized titanium dioxide (TiO₂) nanotube layers (1 and 5 μm thicknesses) prepared by electrochemical anodization were applied as the sensing layer in the photodetector. A printed circuit board (PCB) platform with physical size of 2 cm × 2 cm was designed to mount the sensing layer. The photodetector system comprised of a sandwich structure can be described as glass/ITO/electrolyte/TiO₂ nanotube layer/Ti/PCB platform. For this system, a low applied voltage of 0.5 – 1 V was required to drive the photodetector. TiO₂ nanotube layers have shown positive photoresponse in

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