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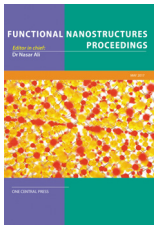

Influence of phase transformation anatase/rutile and morphology on the photoelectrochemical properties of 3D flower-like TiO_2 nanostructures

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ABSTRACT

Among many methods widely employed for hydrogen production, water photoelectrolysis upon solar irradiation is considered as the most attractive from the point of view of ecological safety. The efficiency of photoelectrochemical cell PEC is strongly dependent on the processes in the photoactive electrode. One of the ways to the improvement of the performance of the photoelectrochemical devices is modification the morphology and microstructure of titania and forming of functionalized TiO_2 structures [1-3]. The aim of present work is to study the role of conditions of TiO_2 nanoflowers preparation for phase transformation anatase/rutile and morphology of photoanode in PEC. Flower_like nanostructures of TiO_2 were obtained via a combination of two methods: chemical oxidation by means of H_2O_2 and thermal oxidation. The nanostructures were examined using scanning electron microscopy (SEM), X-ray diffraction (XRD) and Raman spectroscopy. Anatase-to-rutile phase transition in 3D flower_like nanostructures was investigated. The role of the annealing atmosphere, sample thickness, grain shape and size of nanoflowers are discussed.

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