

# Surface Modifications and Growth of Titanium Dioxide for Photo-Electrochemical Water Splitting 336 pages Springer, 2016 9783319342290 2016 John Alexander

Surface Modifications and Growth of Titanium Dioxide for Photo-Electrochemical Water Splitting. Springer International Publishing. John Callum Alexander (auth.)  
Photochemical splitting of water into H<sub>2</sub> and O<sub>2</sub> using solar energy is a process of great economic and environmental interest. Since the discovery of the first water splitting system based on TiO<sub>2</sub> and Pt in 1972 by Fujishima and Honda, over 130 inorganic materials have been discovered as catalysts for this reaction. This review discusses the known inorganic catalysts with a focus on structure-activity relationships. This study investigates photo-anodes based on titanium dioxide (TiO<sub>2</sub>) that can be used to produce hydrogen by the photo-electrochemical decomposition of water. TiO<sub>2</sub> is a wide band gap semiconductor that absorbs only the UV region of the solar spectrum. Sensitization of TiO<sub>2</sub> to visible light by the addition of gold nanoparticles (AuNPs) was studied. AuNPs sustain localized surface plasmon resonance (LSPR) that results in the absorption of light at the resonant energy. The evidence for water splitting by Au-TiO<sub>2</sub> systems is discussed critically. Fabrication of arrays of AuNPs was done by; annealing  
Keyword- Titanium dioxide, photoelectrochemical cells, photoelectrodes. I. INTRODUCTION.  
In the present investigation, photo-electrodes of titanium dioxide supported on aluminum, glass and graphite were prepared. It was established that any of these materials has an effect that would alter the crystal structure of titanium dioxide, and consequently the photonic exhibition; however, the surface characteristics of graphite do not allow adequate adhesion of the TiO<sub>2</sub> film, which is a limiting factor for the occurrence of the photo-electrochemical process.  
[15] J. Nowotny, T. Bak, M. Nowotny, L. Sheppard, Titanium dioxide for solar-hydrogen I. Functional properties, International Journal of Hydrogen Energy, 32, 2609-2629. The titanium dioxide nanofibers (TiO<sub>2</sub> NFs) are synthesized using electrospinning, and are surface-modified by the deposition of gold nanoparticles (Au NPs) using a simple photoreduction method. The structure and morphology of the materials were characterized by field emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS). The surface plasmon resonance (SPR) of the Au NPs was investigated by ultraviolet-visible (UV-Vis) diffuse reflectance spectroscopy.  
Surface-Modified Titanium Dioxide Nanofibers with Gold Nanoparticles for Enhanced Photoelectrochemical Water Splitting. Catalysts. 2020; 10(2):261. <https://doi.org/10.3390/catal10020261>. Book Editions for Surface Modifications And Growth Of Titanium Dioxide For Photo Electrochemical Water Splitting. 1 results. All matches. Books. Study. Textbooks. Surface Modifications and Growth of Titanium Dioxide for Photo-Electrochemical Water Splitting.