Hydrogen Fuel Cell: Titania Nanotubes as Photoanode

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Hydrogen plays an important in producing energy because it is an ultimate clean energy. At present, hydrogen mainly produced from fossil fuels together with formation of CO2 which is release into atmosphere. Photocatalyst process, is the alternative method to produce hydrogen gas without CO2 emission. In this process, titania nanotube is used as photoanode to carry out photocatalyst reaction. The purpose of using titania nanotubes as photoanode are because the conventional TiO2 nanoparticulate films are limited in its photocatalytic applications due to the small surface area. The first method used to produced titania nanotubes is synthesizing titania by anodization process. Second, the anodized titania was then undergo characterization process by using Scanning Electron Microscopy (SEM) to make sure the structure of the nanotubes is formed. The crystallization of the nanotubes is by annealing process and the characterization of annealed titania is by using SEM and X-ray Diffraction (XRD) Spectrometer. The investigation of the hydrogen gas produced is proved by photocurrent measurement. The results of using titania nanotubes as photoanodes is according to the times taken for the anodizing process. As the length of nanotubes will affect the production of hydrogen gas, the longer nanotubes will help to increase the surface area for the recombination of photo-generated electron and holes, thus produce more hydrogen. . As the conclusion, the more the hydrogen produced, the higher the reading of the photocurrent measurement. Hydrogen is the future fuel to save our environment.