

광전기화학적 시스템에 의한 수소발생

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The Hydrogen generation based on photo-electrochemical system by TiO₂ nanotube

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Abstract : Hydrogen generation system in water using solar energy offers a clean, portable source. Titania (TiO₂) is well-known as a semiconductor with photocatalytic activities, so it can be employed in many areas such as environmental purification, gas sensors, photovoltaics, immobilization of biomolecules and generation of hydrogen gas. Titania nanotube can be adopted as a electrode to generate hydrogen in water split system. Ti - Nanotubes have been fabricated by many different methods such as hydrothermal treatment, template-assistant deposition, and electrospinning. Anodic oxidation is also verified to be an effective method in fabrication of nanotube arrays of titania. Anodization of Ti in acidified fluoride solution results in an ordered nanotubular titanium oxide surface. In this study, titanium oxide nanotube arrays were fabricated at 20V in mixed solutions of H₃PO₄, HF and NaNO₃. These nanotube annealed at 500°C in air atmosphere. This nanotubular TiO₂/Ti electrode can be perfectly acted as a photo-anode for photo-electrochemical splitting of water. Various characterization techniques (SEM, XRD, Photoelectrochemistry) are used to study the surface morphology, phase and photo-current density.

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