

Fabrication of ZnO/TiO₂ nanoheterostructure And its application to photoelectrochemical cell

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There are many researches about TiO₂ and ZnO as a photoelectrode because of their good optical and electrical properties. Both TiO₂ and ZnO could be fabricated to one-dimensional nanowire structure by hydrothermal method at low temperature. Applying this method, three-dimensional hierarchical TiO₂/ZnO nanoheterostructure could be fabricated. This structure provides large surface area which can absorb the light efficiently. Moreover, this nanoheterostructure can array the energy band as type 2 cascade structure, which makes electron-hole pair separate efficiently. All these advantages of TiO₂/ZnO nanoheterostructure affect the photoelectrochemical characteristics. Because both TiO₂ and ZnO has large band gap energy, the visible light could not be absorbed efficiently. To solve this problem, some researches using quantum dots (CdS, CdSe) which has small band gap energy compared to TiO₂ and ZnO could be expected.