Fabrication of ZnO nanowire/TiO_2 nanowire heterostructure and its application to photoelectrochemical cell

송홍선, 용기중†
POSTECH
(kyong@postech.ac.kr†)

There are many researches about TiO_2 and ZnO as a photoelectrode because of their good optical and electrical properties. Both TiO_2 and ZnO could be fabricated to one-dimensional nanowire structure by hydrothermal method at low temperature. Applying this method, three-dimensional hierarchical TiO_2 nanowire/ZnO nanowire heterostructure could be fabricated. This structure provides large surface area which can absorb the ligt efficiently. Moreover, this heterostructure can array the energy band as type 2 cascade structure, which makes electron-hole pair separate efficiently. All these advantages of TiO_2 nanowire/ZnO nanowire heterostructure affect the photoelectrochemical characteristics. Because both TiO_2 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 TiO_2 and ZnO could be expected