

염료감응 태양전지 응용을 위한 non-TiO₂ 나노구조 전극

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Nanostructured non-TiO₂ electrodes for DSSC application

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Abstract : TiO₂-based dye sensitized solar cell (DSSC) has shown an elevated energy conversion efficiency as high as 11%, which can be considered a result of elaboration of every component of DSSC including the best formulated semiconducting electrode, consisting of simple 15-20nm nanoparticles. Such a result, however, is also suggesting that some alternative electrodes other than simple particulate one are now required to make a breakthrough to get higher efficiency than 11%. In this aspect, we have tried to introduce nanostructures to metal oxide electrodes, ZnO and SnO₂ and monitored the consequences in view of photovoltaic performances. We report here remarkable increases of the solar energy conversion efficiency when nanostructured electrodes were applied to DSSC. Nanorod and nanoball electrodes will be presented in this paper, in which the fabrication and PV characterization are discussed in details. For instance, nanoball ZnO electrodes showed a greatly increased efficiency 5.8% under the illumination condition of 100mW/cm². Preparation of ZnO electrodes and their PV properties including I-V behavior, ICPE and impedance response will be discussed along with their nanostructures. Also, influences of introduction of mesopores into the SnO₂ electrodes on the PV properties will be briefly presented in view of enhanced diffusion of electrolytes within the semiconducting electrode matrices.

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