

Fabrication of meso-spherical TiO₂ film with different calcination temperatures for Dye-sensitized Solar Cells

이정화, 김명실, 나현정, 김지만*

성균관대학교

(jimankim@skku.edu*)

Dye-sensitized solar cells have attracted much attention with their low production costs of electricity and relatively high energy-conversion efficiencies. Recently, nanocrystalline TiO₂ powders have been used as a working electrode for DSSC due to a higher efficiency, lower cost. In order to maximize the cell efficiency of DSSC, the TiO₂ material should have a high surface area where the dye can be sufficiently adsorbed. In this study, mesoporous spherical anatase TiO₂ with high surface area were successfully prepared via in situ hydrolysis of titanium glycolate precursor spheres. The particlediameters of the prepared TiO₂ spheres ranged from 3.3 to 11.4nm through annealing for different calcinations temperatures from 100°C to 700°C. An overall solar conversionefficiency of 6.3% was achieved using the mesoporous TiO₂ spheres electrode which was annealed for 200°C and higher than the other electrodes. These different TiO₂ photoanodes were also treated with a dilute solution of TiCl₄ at room temperature. Significant improvement in the photocurrent was observed for all of the mesoporous TiO₂ electrodes.