

Size-tunable dual functional mesoporous TiO₂ beads for high performance dye-sensitized solar cells

노동균, 서진아, 안성훈, 지원석, 전하림, 허성연, 김종학*
연세대학교
(jonghak@yonsei.ac.kr*)

We successfully synthesized the mesoporous TiO₂ beads, having controllable diameter in the range from 120 to 750 nm, by solvothermal reaction with TTIP precursor and PVC-POEM graft copolymer at low temperature (at 100 °C). The prepared mesoporous TiO₂ beads have the dual functions of high surface area because of the mesoporous structure and high light scattering effect because of the large size structure. The fabricated TiO₂ film of photoelectrode is single titania layer composed of mesoporous submicrometer-sized beads. Single layer reduce the fabrication process and interfacial resistance between the double layer (nanoparticle layer and scattering layer). As well as, the mesoporous TiO₂ beads film showed a synergistic improvement on the charge collection efficiency resulting from the well interconnected mesopores and the strong scattering efficiency of the submicrometer-sized beads, their effect improve the photoconversion efficiency.