

Energy conversion efficiency of Dye-Sensitized Solar Cells using TiO_2 nanotubes

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Dye-Sensitized Solar Cells, which were introduced to compensate for the weaknesses of silicon solar cells, are five times cheaper than silicon solar cells and have a much simpler manufacturing process. However, DSSCs can have electrolyte leakage; also, their volatilization is high and their energy efficiency is lower than that of silicon solar cells. To determine the energy efficiency of TiO_2 -containing DSSCs, TiO_2 was used as the TiO_2 electrode layer and TiO_2 nanotubes were used as the light scattering layer. In this research, the electrodes were made with the TiO_2 nanotubes which had the large specific surface area and could adsorb much dye. So it was expected to increase the efficiency of DSSCs. The photocatalysts were improved by increasing active sites and J_{sc} (short-circuit currents) was increased by absorbing a lot of dye. And this was applied to the electrodes of DSSCs. In order to find the energy efficiency of DSSCs, the TiO_2 was used as the TiO_2 electrode layer and the TiO_2 nanotubes were used as the light scattering layer.