PENGARUH KETEBALAN LAPISAN FOTOELEKTRODA TiO_2 TERHADAP SIFAT OPTIK DAN KINERJA DSSC

SKRIPSI

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ABSTRAK

PENGARUH KETEBALAN LAPISAN FOTOELEKTRODA TiO_2 TERHADAP SIFAT OPTIK DAN KINERJA DSSC

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Dye Sensitized Cells (DSSC) merupakan jenis sel surya silikon konvensional yang memanfaatkan proses fotoelektrokimia, untuk mengubah energi cahaya matahari menjadi energi listrik. Sel surya ini termasuk sel surya generasi ketiga dan digunakan karena memiliki biaya yang murah, ramah lingkungan, proses fabrikasi yang mudah dan sederhana, dan juga menghasilkan sel surya yang ringan. Penelitian ini memfokuskan pada pengaruh ketebalan dari fotoelektroda TiO_2 (TTIP) dengan sifat optik *dye* standar N719 pada kinerja DSSC ditentukan oleh nilai absorbansi, nilai *bandgap* dan persentase LHE menggunakan UV-Vis *Spectrophotometer*, sedangkan pengaruh ketebalan terhadap kinerja DSSC ditentukan oleh sifat listrik meliputi J_{sc}, V_{oc}, FF serta efisiensi. Hasil yang diperoleh yaitu ketebalan yang lebih besar memiliki sifat optik dan kinerja DSSC yang lebih baik dilihat dari meningkatnya puncak absorbansi, persentase LHE, J_{sc}, dan efisiensi. Sampel terbaik yang di hasilkan pada penelitian ini adalah sampel dengan ketebalan 3,6 μm dengan nilai efisiensi sebesar $4{,}3 \times 10^{-7}$ %, J_{sc} $3{,}52 \times 10^{-5}$ mA/cm², V_{oc} 0.0656 V, dan FF 0,251 %. Hal ini disebabkan oleh adanya energi foton yang terabsorpsi pada permukaan *TiO_2,* serta proses difusi elektron pada proses transfer elektron berlangsung secara cepat.

Kata kunci : *dye-sensitized solar cell*, TiO_2, TTIP, N719

ABSTRACT

EFFECT OF THICKNESS OF TiO_2 PHOTELECTRODA LAYERS ON OPTICAL FEATURES AND PERFORMANCE OF DSSCs

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Dye Sensitized Cells (DSSC) are a type of conventional silicon solar cell that utilizes photoelectrochemical processes, to convert sunlight energy into electrical energy. These solar cells include third generation solar cells and are used because they have low cost, environmentally friendly, easy and simple fabrication process, and also produce lightweight solar cells. This study focuses on the effect of the thickness of the TiO_2 (TTIP) photoelectrode with the optical properties of standard dye N719 on DSSC performance determined by absorbance value, bandgap value and LHE percentage using a UV-Vis Spectrophotometer, while the effect of thickness on DSSC performance is determined by electrical properties including J_{sc}, V_{oc}, FF and efficiency. The results obtained are that the greater thickness has better optical properties and DSSC performance seen from the increase in absorbance value, LHE percentage, J_{sc}, and efficiency. The best sample produced in this study is the sample with a thickness of 3.6 μm with an efficiency value of $4{,}3 \times 10^{-7}$ %, J_{sc} $3{,}52 \times 10^{-5}$ mA/cm², V_{oc} 0.0656 V, and FF 0,251 %. This is due to the photon energy that is absorbed on the TiO_2 surface, and the elektron diffusion *process in the elektron transfer process takes place quickly.*

Key : dye-sensitized solar cell, TiO_2, TTIP, N719

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