HOMOGENEITY OF THICKNESS, ELECTRICAL CONDUCTIVITY AND BAND GAP THIN FILM a-Si:H p-TYPE AND p-Delta TYPE WICH DEPOSITED BY PECVD SYSTEM

Name : Enny Kusumawati  
Student Identity Number : 1109201729  
Supervisor : Prof. Ir. Eddy Yahya, M.Sc, Ph.D.

ABSTRACT

Has been successfully deposited a thin layer of a-Si: H p-type and p-delta type with PECVD system with a temperature of 270°C and the growth pressure of layer 530 mTorr. Gas rate of SiH₄ = 20 sccm, H₂ = 70 sccm, B₂H₆ = 2 sccm. Structure p-delta layer with a time of growing p-i-p respectively 10, 30, and 10 minutes produced an average thickness of 198.7 nm for p-delta, and the average p-type 89.7 nm with a time of 30 minutes. Sample of p-type and p-delta is put in open space so the color of the sample surface is not homogeneous. The lack of homogeneity samples tested by the thickness and then observed the changes in band gap and conductivity. Then viewed the difference between the conductivity and the band gap between the p-layer with the p-delta. The result, lack of homogeneity color samples is not influence on the thickness. Thickness of p-layer tends to a homogeneous, ie, 98.8 nm, while the p-delta layer varies between 165.1 to 219.7 nm. Band gap measurements using UV-Vis spectrometer data with Touch Plot method tends to produce a homogeneous value with the highest value of 1.60 eV for p-type and 1.74 eV for p-delta type. Electrical conductivity measurements are also likely homogeneous with the highest conductivity of the dark and light respectively when 0.71 S/cm and 1.01 S/cm for p-regular structures and 0.39 S/cm and 0.35 S/cm for the structure of the p -delta. Layer of p-delta potential to serve as the next layer of p-i-n solar cell structure because having a wide band gap and low conductivity so as to reduce the occurrence of fotoexitation and be able to increase the number of charge carriers in the face layer.

Keywords: p structure, p-delta structure, PECVD, layer thickness, band gap and conductivity.