Fabrikasi thin film quarternair CuGaSeTe dan CuGa0.5In0.5Te2 dengan evaporasi flash

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Abstrak

Material quarternair CuGaSeTe and CuGa0.5In 0.5Te2 merupakan material dasar yang digunakan dalam fabrikasi solar sel. Material tersebut memiliki koefisien absorpsi yang tinggi sekitar 103 ? 105 cm-1 dan rentang energi gap 1-5 eV. Pada penelitian ini telah dibuat lapisan tipis dengan menggunakan metode evaporasi Flash dari butiran-butiran quarternair material CuGaSeTe and CuGa0.5In 0.5Te2 yang dievaporasi agar menempel di substrat kaca. Setelah lapisan tipis diperoleh kemudian dilakukan karakteristik optik dan listrik lapisan tipis tersebut. Spektroskopi X-Ray Diffraction (XRD) digunakan untuk memperoleh parameter kisi dan struktur kristal lapisan tipis tersebut. Hasil XRD memperlihatkan bahwa struktur lapisan tipis CuGaSeTe and CuGa0.5In 0.5Te2 adalah chalcopyrite. Koefisien absorpsi dan energi gap lapisan tipis dihitung dari pola kurva transmitansi dan reflektansi hasil pengukuran difraktrometer UVVIS. Dengan menggunakan Energy Dispersive Spectroscopy (EDS), komposisi lapisan tipis dapat diketahui, sedangkan dengan menggunakan Hall Effect dapat dihitung resistivitas, mobilitas dan pembawa muatan mayoritas lapisan tipis CuGaSeTe and CuGa0.5In 0.5Te2.

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Quarternair CuGaSeTe and CuGa0.5In 0.5Te2 Thin Films Fabrication Using Flash Evaporation. Quarternair materials CuGaSeTe and CuGa0.5In 0.5Te2 are the basic materials to solar cell fabrication. These materials have high absorption coefficients around 103 ? 105 cm-1 and band gap energy in the range of 1-5 eV. In this research, the films were made by flash evaporation method using quarternair powder materials of CuGaSeTe and CuGa0.5In 0.5Te2 to adhere in a glass substrate. After the films were obtained, the properties of these films will be characterized optically and electrically. The lattice parameter of the films and the crystalline film structure were obtained using X-Ray Diffraction (XRD) spectroscopy. The XRD results show that the quarternair CuGaSeTe and CuGa0.5In 0.5Te2 films have a chalcopyrite structure. The absorption coefficient and the band gap energy of the films were calculated using transmittance and reflectance patterns that measured using UV-VIS Difractometer. The films composition can be detected by using the Energy Dispersive Spectroscopy (EDS), while the films resistivity, mobility and the majority carrier of the films were obtained from Hall Effect experiments.