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EFFECTS OF ANNEALING ON THE ELECTRO-OPTICAL PROPERTIES OF a- Si:H THIN FILMS DEPOSITED BY D.C. AND PULSED PECVD

Lim Seck Chai, Goh Boon Tong and Saadah Abdul Rahman
Physics Department,
University of Malaya,
50603 Kuala Lumpur
E-mail: gohboontong@um.edu.my / saadah@um.edu.my

ABSTRACT

Hydrogenated amorphous silicon thin films studied in this work were prepared by d.c. and pulsed PECVD technique at a fixed silane flow-rates of 10 sccm and 40 sccm. The deposition temperature, pressure and power were fixed at 200^{O}C, 0.45 mbar and 1.4 W respectively. The pulsed PECVD system was developed from a modification of the existing d.c. PECVD system with a modulation frequency of 10 kHz. The ON-time and OFF-time was set at 30 seconds. In this work, the effects of annealing on the electro-optical properties of films prepared by both techniques at these flow-rates were investigated. These films were analyzed using optical absorption spectroscopy technique. The results showed that annealing had significant effects on electro-optical properties of these films at annealing temperatures above 300^{O}C mainly due the evolution of hydrogen. The silane flow-rate and the deposition technique also influenced the effects of annealing on the electro-optical properties of these films.

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