

INFRARED AND RAMAN SPECTROSCOPY STUDIES ON PULSED PECVD a-Si:H FILMS

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ABSTRACT

This work presents a study on the structural properties of hydrogenated amorphous silicon (a-Si:H) prepared by pulsed plasma enhanced chemical vapour deposition (PECVD) technique using Raman and infrared spectroscopy. The bonded hydrogen content and hydrogen bonding configurations in the a-Si:H films were investigated from the Fourier transform infrared (FTIR) spectra of the films. The Raman spectra of the films have been used to obtain evidence of nanocrystallinity in the films. The dependence of silane flow-rates and discharge power on these properties was investigated. Increase in the discharge power resulted in films with lower hydrogen content and increase the dihydride bond concentration.

Nanocrystallinity was observed in films prepared at low discharge power at all silane flow-rates but increase in discharge power resulted in films with purely amorphous structure.

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