Structural and Electrical Properties of CdTe Thin Films with the Application of $CdCl_2$ Treatment

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Abstract

This work presents a study on structural and electrical properties of electron-beam evaporated CdTe thin films with the application of post-$CdCl_2$ treatment. The films having thickness 550 nm were grown on glass and ITO substrates followed by $CdCl_2$ treatment and annealing at different temperature and then subjected to X-ray diffractometer and source-meter to investigate the structural and electrical properties, respectively. The films are found to be polycrystalline in nature having cubic phase at low annealing temperature (≤320 °C) and mixture of cubic and hexagonal phases at higher temperature (470 °C). The improvement in crystallinity is also observed with $CdCl_2$ heat-treatment and maximum grain-growth achieved for films annealed at 320 °C. The electrical analysis reveals that the current have linear behavior with voltage and electrical resistivity is increased with post-$CdCl_2$ treatment. The investigated results indicate that the post-$CdCl_2$ treated films annealed at 320 °C may be well-suitable for thin film solar cells as an absorber layer.

Keywords: CdTe thin films, e-beam evaporation, Structural properties, Electrical properties.

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