Nanostructured surfaces

Structure, optical and electrical properties CdTe prepared by vapor-phase condensation

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Cadmium telluride (CdTe) is a promising photovoltaic material for low-cost thin-film solar cells. CdTe is a II-VI compound semiconductor with an ideal (1.45eV) bandgap for direct light-to-electricity conversion and has several advantages over other semiconductor compounds II-VI [1]. These include a wide band gap, the ability to show both types of conductivity (n-, p-), their low concentration of charge carriers under normal conditions ($2{,}0 \cdot 10^{-16}$ cm^{-3} at 300 K), low coefficient of light absorption in the infrared region of the spectrum, high resistance to chemicals and humidity, relatively high mobility of charge carriers and not very stringent conditions of synthesis [2].

The CdTe films were deposited on silicon and glass substrates using the vapor-phase condensation method. The growth temperature T_S was 200 ºC, temperature evaporation of the sample pre-synthesized compounds CdTe change within T_v = (500 - 600)°C. The thickness of the thin films asked deposition time τ= (60-420) sec. The morphological and structural properties of the CdTe thin films were investigated by Scanning Electon Microscope (Vega 3 Tescan) and Atomic Force Microscope (CSM Instruments).

Optical properties of CdTe films gives information about other physical properties, band gap energy and band structure. Observed that with a reduction deposition time (films thickness), absorption window of the samples CdTe thin films expanded. The chemical composition of the obtained films was investigated by SEM using the method Energy-dispersive X-ray spectroscopy (EDX). The measurement of the electrical parameters of condensates was realized at the room temperature in the constant magnetic and electric fields on the developed automated installation.

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