

ELECTRODEPOSITION OF CdTe SEMICONDUCTOR THIN FILMS ON SINGLE CRYSTAL n-SILICON (100) SUBSTRATES.

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The direct growth of compound semiconductors on elemental semiconductor substrates (i.e. Si) can lead to many promising applications such as the monolithic integration of optical and electronic functions in microelectronic devices.

In this way, CdTe/Si heterojunctions are currently employed in various optoelectronic devices such as:

- X-ray imaging sensors
- γ -ray detection
- solar cells
- infrared focal plane arrays for thermal imaging applications

In the last years, growth of CdTe onto silicon substrates by an electrochemical way was suggested (1-3). However, not very satisfactory results were obtained as the electrodeposited film characterization revealed that they do not form a coherent layer or do not show a preferential crystallographic orientation.

In this work, deposition conditions (surface preparation, bath temperature, HF addition to the electrolytic bath, deposition potential), were studied in order to improve the morphology, structure and quality of the CdTe thin films onto n-Si (100). Annealing conditions were also explored in order to improve the crystallinity of the deposits.

A two step electrodeposition route has also been explored. For this purpose a tellurium film was first electrodeposited onto the silicon substrate and then a cadmium layer was electrodeposited. Afterwards, a heat treatment was applied to these two layers.

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