

Characterization of CdTe/CaF₂ thin film

by

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ABSTRACT

A continuous and highly biaxially textured CdTe film was grown on an amorphous substrate using biaxial CaF₂ nanorods as a buffer layer. The CaF₂ nanorod buffer layer was grown by oblique angle deposition and possesses a {111}<121> biaxial texture. The CdTe film was subsequently deposited by metal organic chemical vapor deposition. The interface between the CdTe film and CaF₂ nanorods and the morphology of the CdTe film were studied by transmission electron microscopy (TEM) and scanning electron microscopy (SEM). The TEM images show that small CdTe grains formed from the nanorod surfaces and merged into large columnar grains in the later stages of growth. Both the TEM and x-ray pole figure analysis clearly reveal that the crystalline orientation of the continuous CdTe film followed the biaxial texture of the CaF₂ nanorods. A high density of twin faults was observed in the CdTe film. Furthermore, the near surface texture of the CdTe thin film was investigated by reflection high-energy electron diffraction (RHEED) and RHEED surface pole figure analysis. Twinning was also observed from the RHEED surface pole figure analysis.