

**X-Ray Diffraction Measurements of Lattice Parameter of
Heteroepitaxial $\text{Ga}_{1-x}\text{Al}_x\text{As}$ Thin Layers Grown
on a GaAs Substrate**

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An x-ray diffraction analysis was performed in order to make high precision measurements of lattice parameters of heteroepitaxial $\text{Ga}_{1-x}\text{Al}_x\text{As}$ thin layers grown on a GaAs (100) substrates. The layers were grown by liquid phase epitaxy. The incident x-ray beam penetrated through the thin film, and therefore, reflections arose from both the GaAs substrate and the layer. These reflections are overlapped, making the analysis difficult. The x-ray diffraction profiles were deconvoluted to remove the layer α_1/α_2 doublets from the substrate peaks. Lattice parameters of $\text{Ga}_{1-x}\text{Al}_x\text{As}$ were then obtained related to the strain and non-uniform distribution of aluminium in the matrix. In addition, aluminium concentration in the thin films were determined by using Auger Electron Spectroscopy (AES). A precision determination of the aluminium concentration in heteroepitaxial $\text{Ga}_{1-x}\text{Al}_x\text{As}$ is important for various electro-optical devices performance such as semiconductor lasers and photovoltaic cells.