

Non-destructive Characterization of Heterointerfaces by Depth-Resolved Cathodoluminescence and its Application to InGaP/GaAs interface

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Abstract

A cathodoluminescence interface spectroscopy (CLIS) technique is proposed and applied to InGaP/GaAs multi-layer heterostructures as a contactless and non-destructive characterization method of buried multi-layer heterointerfaces. Plots of CL intensity vs. acceleration voltage are defined as CLIS spectra. A theoretical analysis of CLIS spectra was performed using the Everhart-Hoff electron energy loss curve. Experimentally, reference CLIS spectra were taken first on a well-characterized commercial high quality InGaP/GaAs wafer grown by MOVPE. Then, the technique was applied to various InGaP/GaAs heterostructures and quantum wells grown on GaAs by GSMBE using TBP as the P source. Data on MOVPE grown HBT wafers are also presented and discussed.