

A Review of Strain Relaxation Observed in Wafer-Bonded Heterostructures"

P.D. Moran

Dept of Materials Science and Engineering/ Physics Dept
Michigan Technological University
Houghton, MI 49931

K.D. Hobart

Naval Research Laboratories
Washington, D.C. 20375

E. Rehder

Materials Science Program
University of Wisconsin - Madison 53711

D.M. Hansen and T.F. Kuech

Chemical Engineering Department
University of Wisconsin - Madison
Madison, WI 53711

There has been a large amount of research over the last several years in the area of how growth on a wafer-bonded heterostructure, or compliant substrate, impacts the relaxation of mismatched semiconductor films. Experimental investigations by different groups have come to different conclusions about the degree to which and the mechanism by which film relaxation is impacted. This talk first reviews the existing data for substrate compliance in the framework of the type of bonded interface, the geometry of the bonded structure, and the degree of mismatch between the film and the wafer-bonded substrate. The different mechanisms that have been proposed to account for the observed relaxation are then articulated. The degree to which the experimental data from a given type of bonded substrate supports one mechanism over another is discussed in terms of the substrate geometry, degree of mismatch, and the bonded interface. Conclusions are then drawn as to the circumstances under which each mechanism is likely to be operative and the nature of the experiments that remain to be done.