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REVIEW OF A MONOGRAPHS

Interactions Between Phases and Degradation Mechanisms in Metal-InP and Metal-GaAs Structures

by E.F. Venger, R.V. Konakova, G.S. Korotchenkov, V.V. Milenin, E.V. Russu and I.V. Prokopenko
(PC KTNK Publishers, Kiev, 1999, 234 p.)

In their monograph the authors have systematized and generalized the results of numerous theoretical, as well as experimental, investigations of interactions between phases at the metal–InP (GaAs) interfaces and degradation mechanisms in indium phosphide and gallium arsenide Schottky barrier device structures. For barrier contacts with a transition layer the aging mechanisms and role of mass transport in them are discussed. The physico-chemical peculiarities of the metal–InP (GaAs) interface formation, as well as feasibility of prediction of interactions between phases, are considered.

Particular emphasis is placed by the authors on (i) the analysis of predominant factors in the interactions between phases in metal–III-V compound contacts with one- and two-component metallizations and (ii) the effect of order←→disorder-type structural phase transitions on the properties of interfaces in such contacts.

In the reviewer's opinion, the most interesting chapters are those based on the authors' investigations aimed at revealing the nature of physico-chemical processes at the metal–InP (GaAs) interfaces and the effect of these processes on the electrophysical characteristics of the Schottky barrier diode structures.

Of considerable utility for the researchers who deal with metal–semiconductor heterostructures are the chapters of the monograph where the authors discuss formation of macroinclusions in the GaAs matrix and their evolution under different external actions (heating, stresses, electric fields), as well as potentialities to exert control over the interface properties using radiation-technology procedures.

The authors have managed to find a unified standpoint for a detailed consideration of various processes at the metal–InP (GaAs) interfaces and their role in both current flow mechanisms and degradation in the corresponding device structures. It is my firm belief that the reviewed monograph will attract attention of numerous researchers - experts in materials science and solid state physics, as well as those engaged in designing various Schottky barrier devices. The book may be of use also for students and postgraduates specializing in the above areas.

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