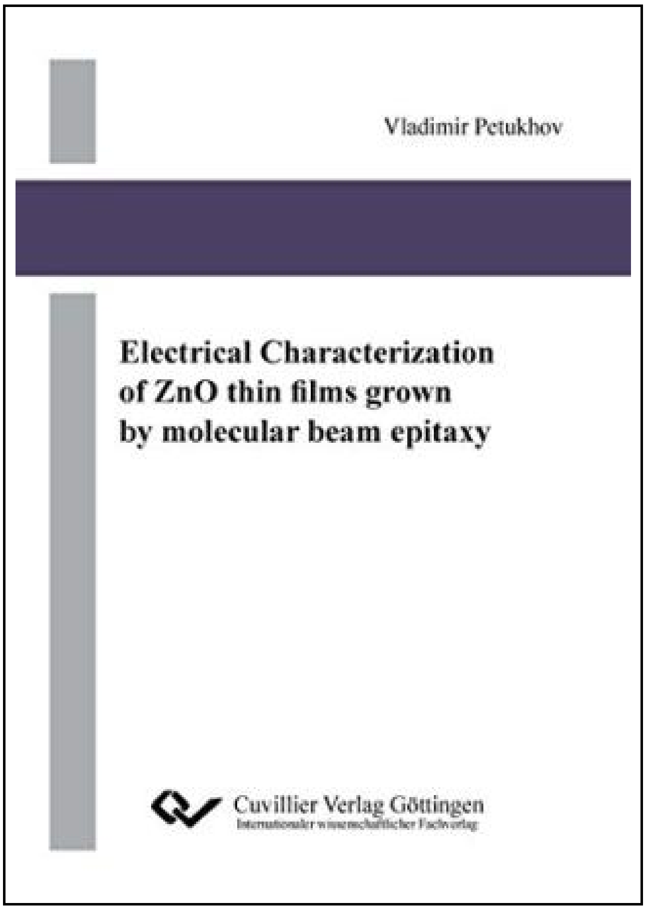
Electrical Characterization of ZnO thin films grown by molecular beam epitaxy



Filesize: 2.37 MB

Reviews

This ebook is very gripping and fascinating. Sure, it is engage in, nevertheless an amazing and interesting literature. It is extremely difficult to leave it before concluding, once you begin to read the book.

(Ms. Ora Buckridge)

ELECTRICAL CHARACTERIZATION OF ZNO THIN FILMS GROWN BY MOLECULAR BEAM EPITAXY

Cuvillier Verlag Apr 2012, 2012. Taschenbuch. Book Condition: Neu. 211x149x4 mm. Neuware - For the electronic and optoelectronic device realization a precise control of the electrical properties in the utilized material is a very important issue. Doping profiles in realized p-njunctions influence the functionality of the devices. The morphological and crystal properties of a device material directly influence the electrical ones. Dislocations present in a region of p-n-junctions can short circuit them leading to malfunctions. Too rough surfaces during epitaxial growth could lead to inhomogeneities in a single or multiple quantum wells and superlattices.The main goal of the present work was to provide the basis for a reliable p-type doping of ZnO grown by molecular beam epitaxy. Firstly, the well established heteroepitaxial growth on c-sapphire substrates has been employed. Based on the theoretical and experimental works, suggesting nitrogen to be the impurity that builds the most shallow acceptor level in ZnO comparing to other group-V elements, it has been implied as a dopant. To generate reactive nitrogen atoms an rf-plasma source has been utilized in the MBE process. The resulting samples have been characterized by such methods as AFM, XRD, TEM, PL spectroscopy, temperature domain Hall measurements (TDHM) and ECV-profiling. First results of TDHM have shown that even in undoped samples the temperature dependencies of the electron mobility and carrier concentration have regions which are difficult to interpret. It is necessary to fit them with theoretical curves in order to extract the correct values. This task has proven to be very difficult. The complicated character of the dependencies has been explained in terms of the multilayer conduction model dividing a layer in thin interfacial region with mobility and carrier concentration µ1 and n1 respectivly and bulk region with a higher mobility µ2 and lower carrier concentration n2. The electrical transport...

See Also