Molecular Beam Epitaxy Growth and Characerization of ZnO-based layers and Heterostructures

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Cuvillier Verlag Aug 2008, 2008. Taschenbuch. Book Condition: Neu. 211x144x12 mm. Neuware - In semiconductor research a reliable epitaxial growth technique for growing high quality thin films and heterostructures is necessary. In the case of ZnO one of the main difficulties is the absence of suitable substrate material for ZnO epitaxial growth. Although special oxide material (for example ScAlMgO4) and ZnO bulk crystal can serve as lattice matched substrates, the quality of the substrates themselves, the size of the available wafer, and the expense do not encourage to use these lattice matched substrates for ZnO epitaxial growth. In the current research, a widely used low cost commercial substrate sapphire was employed to develop a reliable epitaxial growth technique and growth process for ZnO. The versatile epitaxial growth technique, molecular beam epitaxy (MBE) equipped with a rf-plasma source was developed for growth and various characterizations methods were conducted to obtain a fundamental understanding in both the epitaxial processes and material properties of ZnO thin films and heterostructures. Employing a thin HT MgO buffer layer prior to ZnO growth is the key to overcome the very large mismatches between c-Al2O3 substrate. Wetting the surface of Al2O3 substrate with a few MgO monolayers,...

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