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Effects of annealing conditions on the structural and electrical properties of a-oriented ZnO thin films C.W. CHANG, Q.Y. CHEN, National Sun Yat-Sen University, Taiwan, P.V. WADEKAR, University of Liverpool, UK, H.C. HUANG, C.F. CHANG, H.H. KO, W.C. HSEIH, National Sun Yat-Sen University, Taiwan, C.H. LIAO, ROC Military Academy, Taiwan, H.W. SEO, University of Arkansas, Little Rock, Arkansas, USA, W.K. CHU, University of Houston, Houston, Texas, USA, H.H. LIAO, Enli Technology Inc., Taiwan — We studied the structural and optical properties of non-polar a-plane ZnO films grown on r-plane Al₂O₃ substrates by RF-sputtering with different annealing conditions and oxygen partial pressure. Epitaxial relationships between the ZnO films and Al₂O₃ substrates were determined by φ -scan to be ZnO[0001]//Al₂O₃[-1011], ZnO[1-100]//Al₂O₃[1-210]. Photoluminescence spectra showed that band gap depended on annealing times, which is sensitive to intrinsic emission and surface defects in the a-plane ZnO. Hall Effect were measured on all samples by a PPMS system to find the relations amount annealing times, carrier concentrations and mobilities.

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