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Zn- and O-polar surface effects on Raman mode activation in homoepitaxial ZnO thin films

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SOLID STATE COMMUNICATIONS

Volume: 152 Issue: 9 Pages: 794-797

DOI: 10.1016/j.ssc.2012.01.040

Published: MAY 2012

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Abstract

ZnO thin films were grown by metalorganic chemical vapor deposition on (0001) Zn- and O-polar surfaces of ZnO substrate. The surface morphology of these films was investigated by micro-Raman scattering and scanning electron microscopy. In the case of Zinc-polar face and using back scattering configuration, two new Raman bands were observed at 398 and 584.5 cm⁻¹. They have been interpreted as quasi phonons TO (qTO) and LO (qLO) respectively. The origin of these modes was attributed to the particular morphology of ZnO films grown on Zn-polar face, which consists in c-axis nano-platelets, randomly tilted from the substrate. qTO and qLO frequencies have been calculated using the model of Loudon. SEM observation is in agreement with our Raman interpretation. (C) 2012 Elsevier Ltd. All rights reserved.

Keywords

Author Keywords: ZnO; Chemical vapor deposition; Quasi-phonon; Raman

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Publisher

PERGAMON-ELSEVIER SCIENCE LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND

Categories / Classification

Research Areas: Physics

Web of Science Categories: Physics, Condensed Matter

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000302978800012

ISSN: 0038-1098

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