

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Atomic and Electronic Structure of Polar Nitride/Oxide Interfaces: h-GaN(0001) and c-GaN(111) on MgO(111) MARIJA GAJDARDZISKA-JOSIFOVSKA, VLADO LAZAROV¹, JUSTIN ZIMMERMAN², YI RONG, SAU HA CHEUNG, MICHAEL WEINERT, LIAN LI, Department of Physics and Lab for Surface Studies, University of Wisconsin-Milwaukee — Polarity can play an important role in atomic and electronic structures of surfaces and interfaces. In this work we show that MgO(111) surface polarity can be used as a parameter for controlled growth of both the hexagonal and the energetically less favorable cubic phase of GaN by electron-cyclotron resonance (ECR) plasma-assisted molecular beam epitaxy (MBE). The growth of cubic (111) (or hexagonal (0001)) GaN is achieved when N (or Ga) is first deposited on the polar MgO(111)-(1×1) surface. High resolution transmission electron microscopy (HRTEM) and density functional theory (DFT) studies indicate that the cubic GaN(111)/MgO(111) interface structure is determined by Mg-O-N-Ga stacking, with each N atom bonded to O at top site. This specific atomic arrangement at the interface allows cubic stacking to more effectively screen the substrate and film electric dipole moment than the hexagonal stacking.

¹currently at Brookhaven National Lab

²REU student from Seattle University

Marija Gajdardziska-Josifovska
Department of Physics and Lab for Surface Studies,
University of Wisconsin-Milwaukee

Date submitted: 03 Dec 2004

Electronic form version 1.4