

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Epitaxial Growth of Iron and Iron Nitrides on Wurtzite Gallium Nitride (0001)**<sup>1</sup> WENZHI LIN, JEONGIHM PAK, KANGKANG WANG, ABHIJIT CHINCHORE, DAVID INGRAM, ARTHUR R. SMITH, Nanoscale and Quantum Phenomena Institute, Ohio University, Athens, OH 45701 — Magnetic transition metal-containing layers on GaN have potential spintronic applications. We explore the epitaxial growth of iron and iron nitride films on wurtzite (*w*)-GaN(0001). First, we investigate the growth of  $\sim 1:1$  iron nitride on *w*-GaN(0001) using rf N<sub>2</sub>-plasma molecular beam epitaxy (MBE) and monitor growth with *in-situ* reflection high energy electron diffraction (RHEED). We find that FeN grows epitaxially with zinc-blende structure and [111]-orientation on *w*-GaN(0001). To achieve high Fe content, such as Fe<sub>4</sub>N, and Fe<sub>16</sub>N<sub>2</sub>, current efforts are aimed at reducing N content in the source gas. In the case of pure Fe deposition, x-ray diffraction and RHEED suggest the epitaxial relationship to be [110]<sub>Fe</sub> || [0001]<sub>GaN</sub> with Fe in bcc structure. The assignment is based on lattice spacing measurements as well as angular dependence of the RHEED pattern. In this presentation, most recent results for Fe and Fe<sub>*x*</sub>N<sub>*y*</sub> films grown on *w*-GaN(0001) will be presented.

<sup>1</sup>This work has been supported by DOE (grant #DE-FG02-06ER46317).

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Date submitted: 04 Dec 2007

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