INTRODUCTION

Properties:
-direct band gap
-high mobility (2000-3000 cm^2/Vs
-controlled band gap (less than 1.4 eV)

GaN_xAs_{1-x}

Application:
Laser$_s$, fast switching system, detector,

Growth Condition

- P_g = 50 torr
- N_2 = 300 sccm
- H_2=300 sccm
- T_g = 560 – 590^{o}C
- DMHy/TDMAAs = 0.6 – 1
- TDMAAs/TMGa = 4.5

EQUATION FOR N CONCENTRATION

Bragg's law:

$$2d_{hkl}\sin\theta = \lambda$$

$$d_{hkl} = \frac{1}{\sqrt{\frac{h^2}{a^2}+\frac{k^2}{b^2}+\frac{l^2}{c^2}}}$$

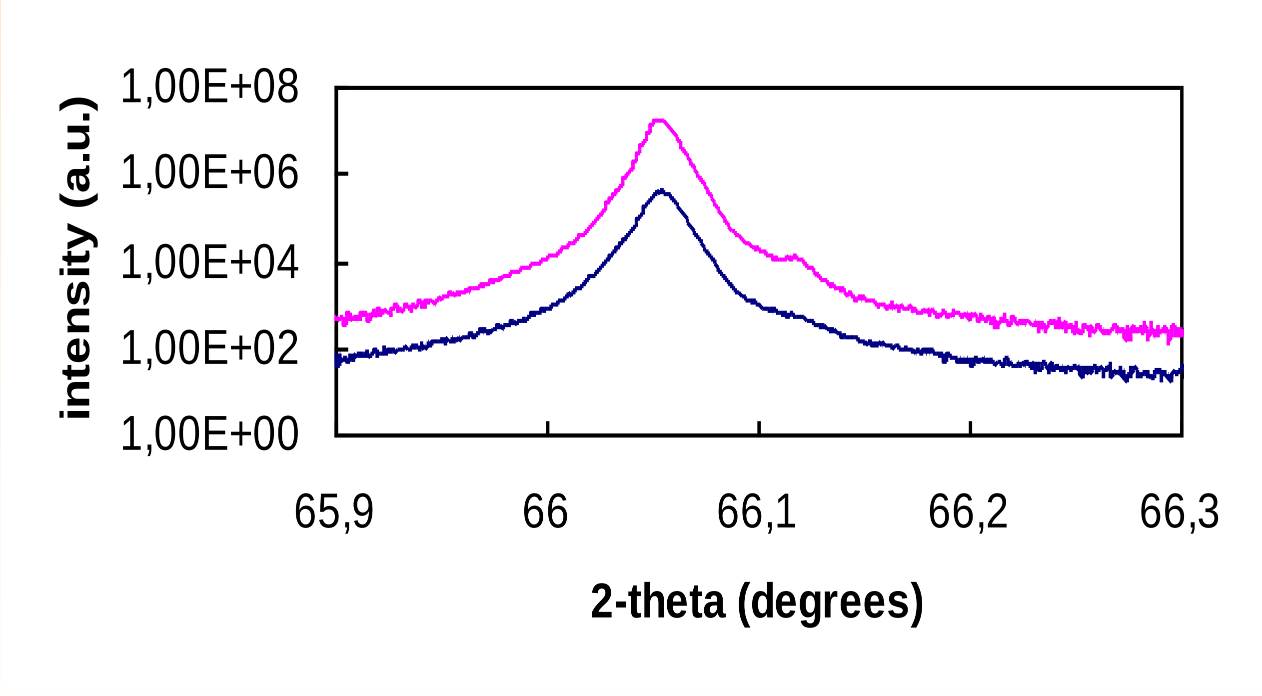
Lattice constant:

$$a_0 = a_{ll}\left(1 - \frac{c_{11}}{c_{11}-2c_{12}}\frac{a_{ll}-a_{\perp}}{a_{ll}}\right)$$

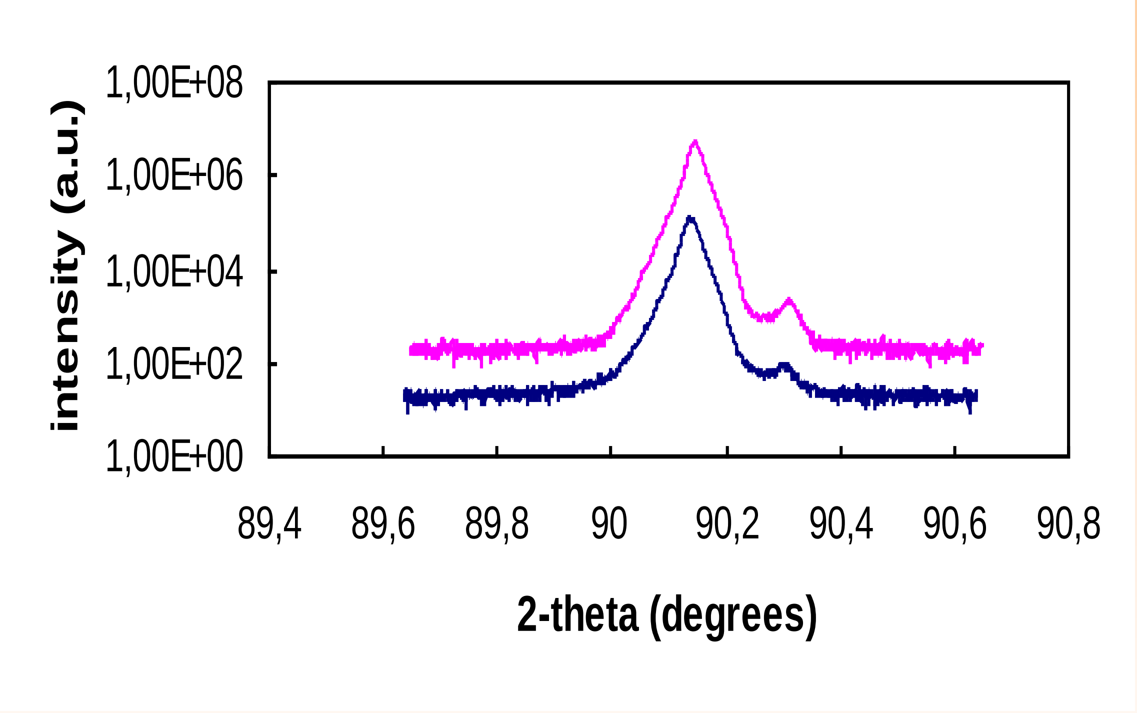
Vegard's law:

$$x = \frac{a_0 - a_{GaN}}{a_{GaN} - a_{GaAs}}$$

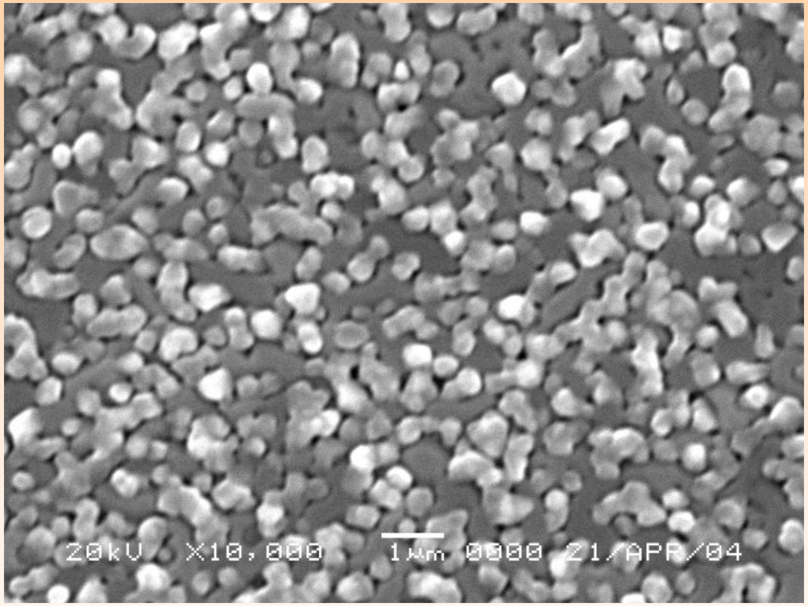
XRD (004) Curve of GaN_xAs_{1-x}

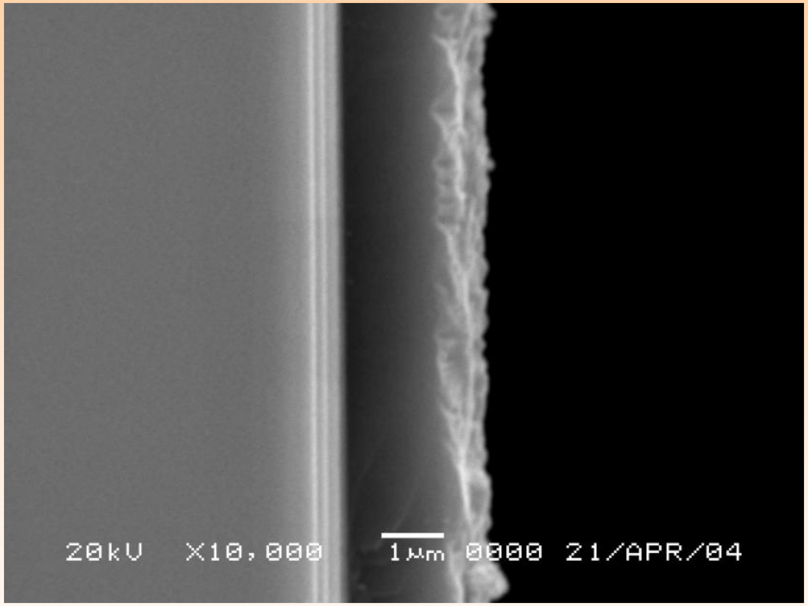


XRD (115) Curve of GaN_xAs_{1-x}



Surface Morphology of GaN_xAs_{1-x} Thin Films





conclusion

- The crystalline structure of GaN_xAs_{1-x} films grown on GaAs (001) substrates by MOCVD were studied by HR-XRD measurements.
- The N concentration of GaN_xAs_{1-x} films had been calculated using Vegard's law, and it is in the range of 5 – 6%
- The surface morphology of GaN_xAs_{1-x} films had been studied by SEM method and it shows a good homogeneity and the growth rate of films were 0.8 – 1.6 um/h

Thank you