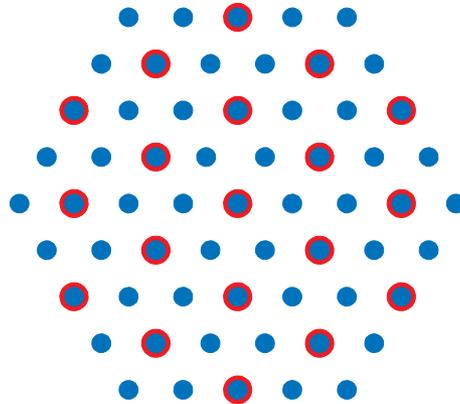


# Coincident-Site Lattice Matching of InGaN on Spinel Substrates

## (0001) $\text{In}_{0.31}\text{Ga}_{0.69}\text{N}$ on (111) $\text{MgAl}_2\text{O}_4$ spinel:

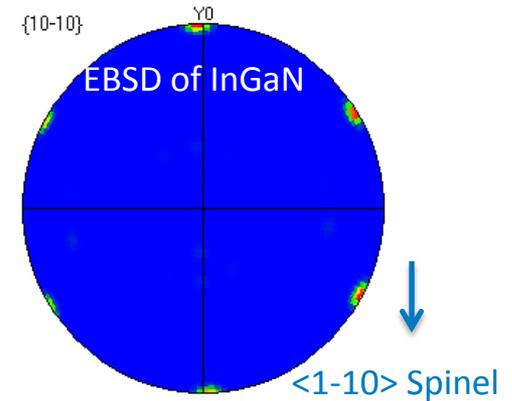
- 30° rotation results in coincident-site lattice match condition
- Results in lower strain films

$\langle 10\text{-}10 \rangle$  InGaN  
 $\langle 1\text{-}10 \rangle$  Spinel



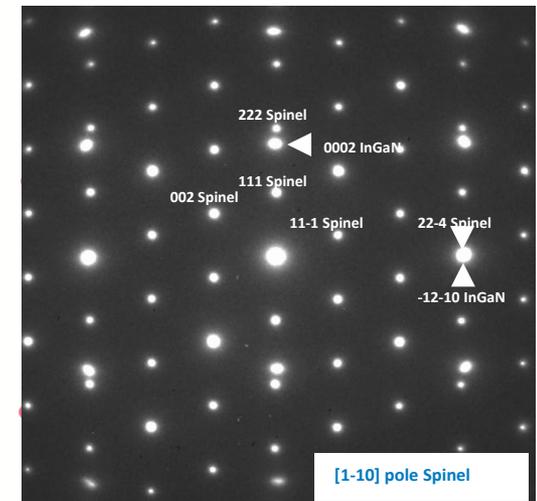
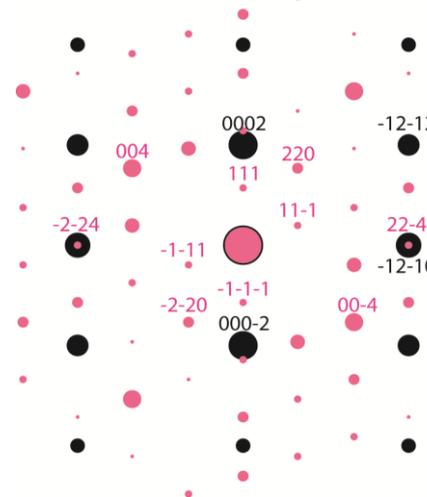
● {111} Spinel plane

● {0001}  $\text{In}_{0.31}\text{Ga}_{0.69}\text{N}$  plane



## $\text{In}_{0.31}\text{Ga}_{0.69}\text{N}$ films grown on spinel by MBE

- Nitride films show coincident-site lattice match rotation by electron backscatter diffraction (EBSD)
- Film rotation confirmed by transmission electron diffraction



# Future Development

- **In<sub>0.31</sub>Ga<sub>0.69</sub>N on spinel material studies needed**
  - Confirm coincident-site growth by MOCVD
  - Measure structural properties (assess strain, dislocation density, phase separation, if applicable)
- **Coincident-site lattice matched LED device development**
  - Development of quantum wells (GaNAlN Barriers?)
  - Study optoelectronic properties
- **Ideal collaborator would have resources to do both material and device development of this technology**