Analysis of GaN LEDs

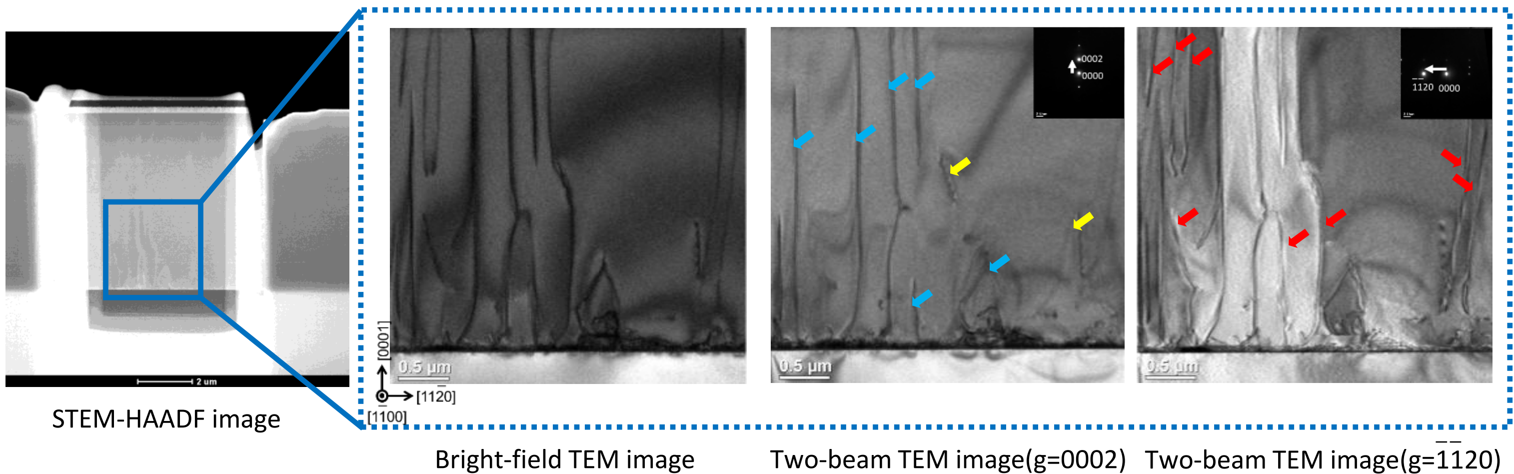
Microstructural Characterization of GaN LEDs by TEM

GaN LEDs are fabricated on substrates such as sapphire, but lattice mismatch causes dislocations to form. Using TEM, the types and densities of these dislocations were evaluated. Moreover, the MQW structure at the center of the bright region was analyzed using TEM and EDX.

Dislocation Analysis in GaN

The dislocation type is determined based on the intensity observed in TEM images under the two-beam diffraction condition.
The dislocation density is calculated using Ham’s method.
(The table on the right shows the results.)

Dislocation type	Dislocation density (1/cm²)
Edge Dislocation (red)	6.8E+8
Screw Dislocation (yellow)	4.9E+7
Mixed Dislocation (blue)	6.6E+8
Total	1.4E+9



STEM-HAADF image

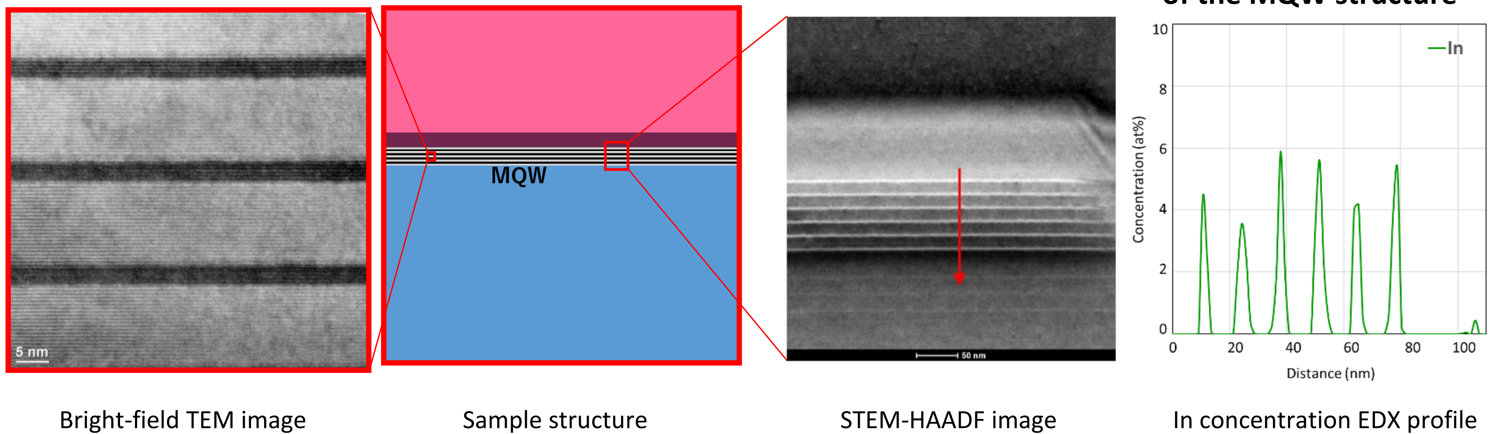
Bright-field TEM image

Two-beam TEM image(g=0002)

Two-beam TEM image(g=$\bar{1}\bar{1}20$)

Lattice-image observation of the MQW structure

In concentration profile of the MQW structure



Bright-field TEM image

Sample structure

STEM-HAADF image

In concentration EDX profile

Connecting technology, information, and people to give shape to "willingness"

Contact us:
https://iontc.co.jp/contact