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Application Note

Semiconductors

Cathodoluminescence

CL28

Defect evaluation of GaN epitaxial wafer by CL

The threading dislocation occurs easily in GaN crystal grown on sapphire substrates. It is said that this is caused by the large lattice mismatch of sapphire and GaN. The scanning electron microscope (SEM) image of GaN crystal is shown in Fig.1 and the average CL spectrum is shown in Fig.2

Fig.1 : SEM image

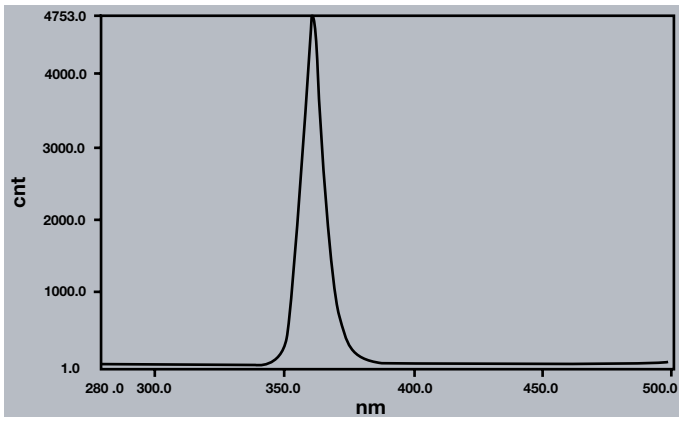

Fig.2 : CL spectrum of GaN

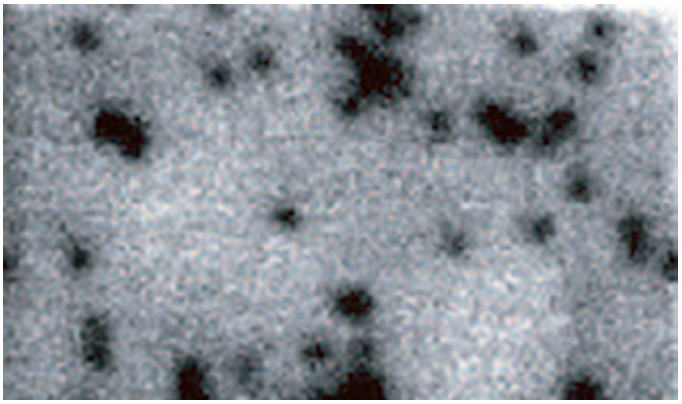

Fig.3 : CL intensity image at a magnification of 45,000

The crystal may seem to be uniform in the SEM image, but the dark spot such as the threading dislocation can be observed when measuring the CL intensity image at the wavelength (362nm) which corresponds to the band edge emission. (Refer to Fig.3). The defect density such as the threading dislocation can be evaluated from the intensity image obtained by CL measurement.

JOBIN YVON Technology

info.sci@horiba.com
www.horiba.com/scientific

HORIBA Scientific

USA: +1 732 494 8660
UK: +44 (0)20 8204 8142
Spain: +34 91 490 23 34
Korea: +81 (0) 753138123
Other Countries: +33 (0)1 64 54 13 00
France: +33 (0)1 64 54 13 00
Italy: +39 0 2 5760 3050
China: +86 (0)10 8567 9966
Taiwan: +81 (0) 753138123
Germany: +49 (0)89 4623 17-0
Japan: +81 (0) 753138123
Brazil : +55 11 5545 1540