TAIYO NIPPON SANSO
The Gas Professionals

Research and Development-Production

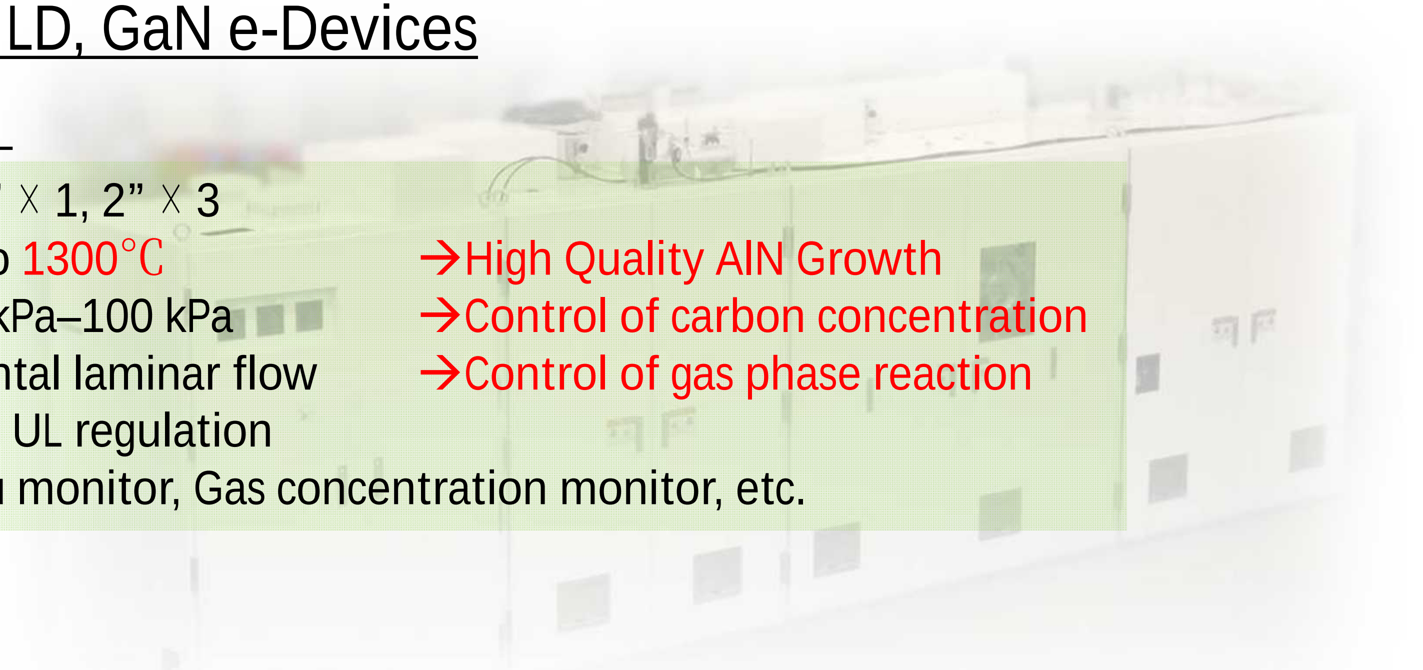
World - Class Nitride MOCVD
Faster, Better for you

New Type MOCVD System “SR4000 HT”

Since 2015

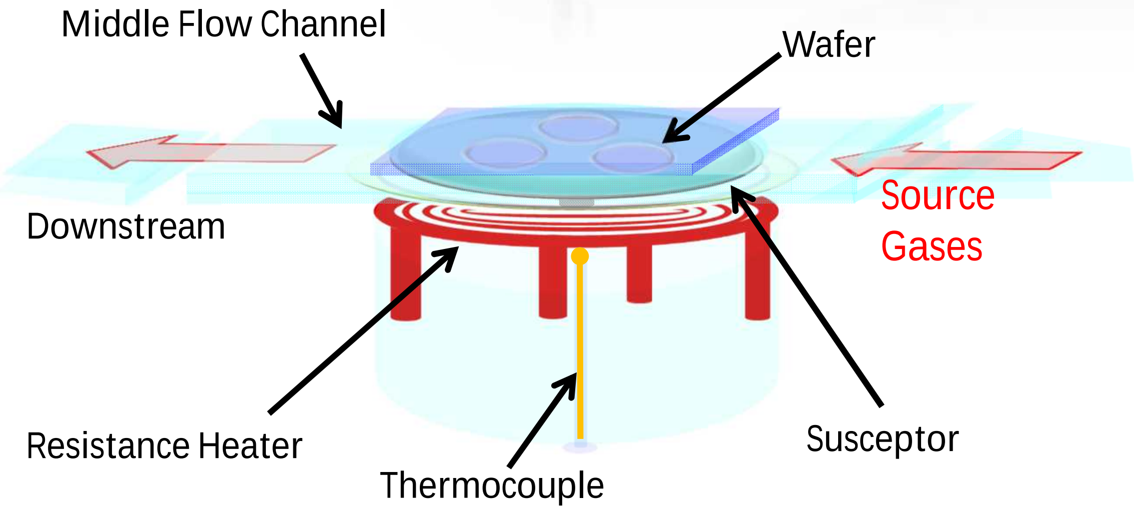
SR4000 HT Configuration

Target : UVLED, LD, GaN e-Devices



Specification :

1. Wafer Size : 4” X 1, 2” X 3
2. Heating : up to 1300℃ →High Quality AlN Growth
3. Growth at 10 kPa–100 kPa →Control of carbon concentration
4. 3-layer horizontal laminar flow →Control of gas phase reaction
5. Correspond to UL regulation
6. Option: In-Situ monitor, Gas concentration monitor, etc.



High Quality & High Growth Rate AlN & AlGaN Performance

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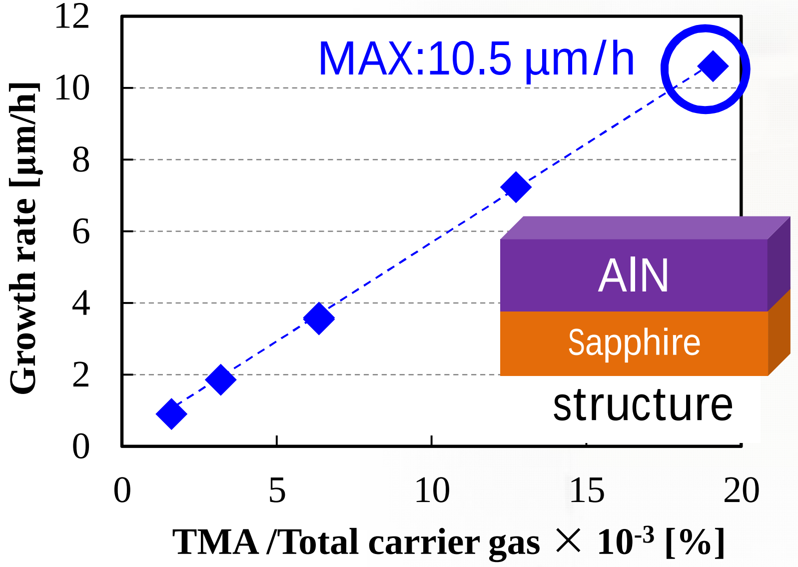
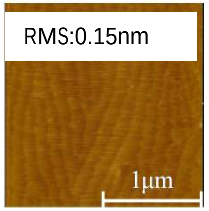
High Temp (1300 ºC) Growth of AlN



XRC-FWHM

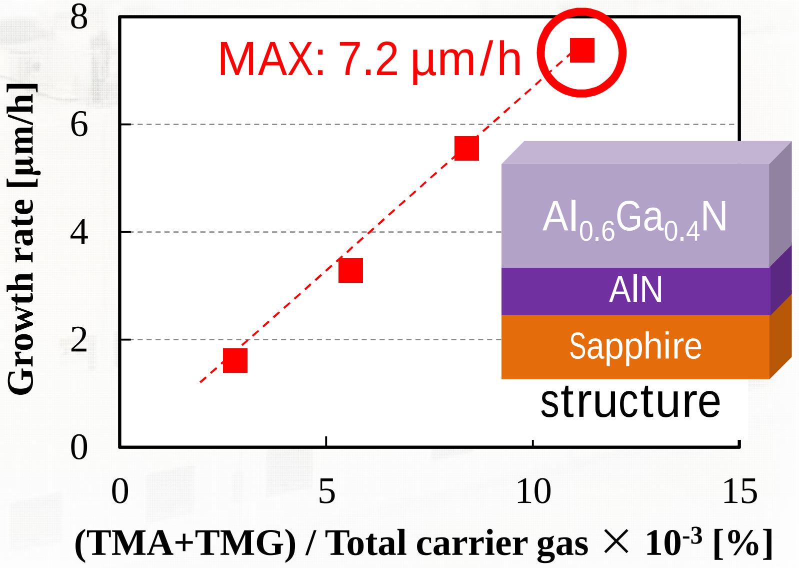
AlN(0002) : 220 arcsec

AlN(10-12) : 450 arcsec



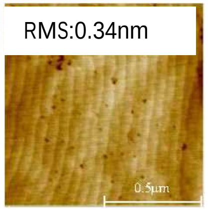
AFM image

$Al_{0.6}Ga_{0.4}N$



n-$Al_{0.6}Ga_{0.4}N$ resistibility

< $2.2\mathrm{x}10^{-2}$ Ω ▪cm@ 7.2 µm/h

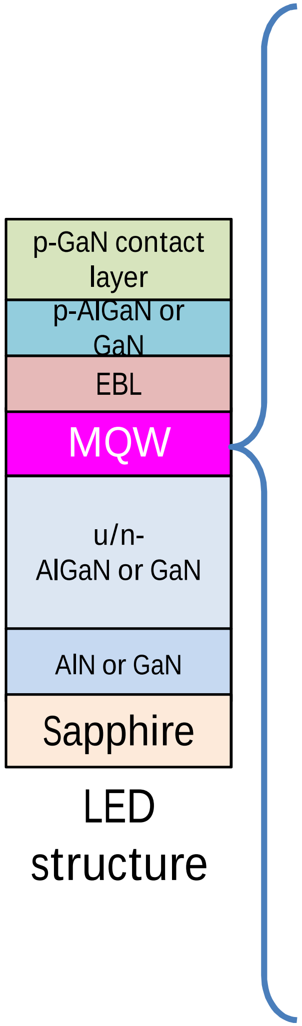


AFM image

Can grow high quality AlN
at a high temperature of 1300 ºC

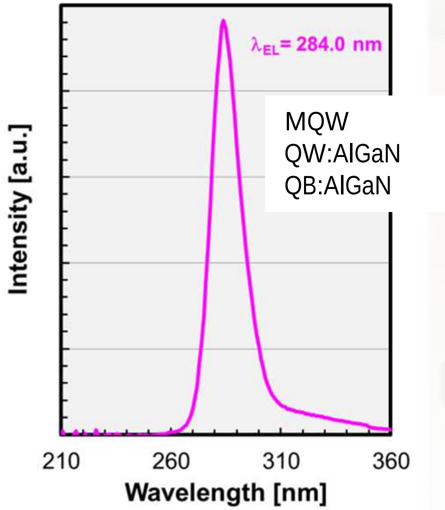
Can grow high quality AlGaN with high Al content at a high growth rate by controlling gas phase reaction

LED Development of Wide Wavelength Area from UV LED to Green LED



LED structure

UV LED
EL Spectrum

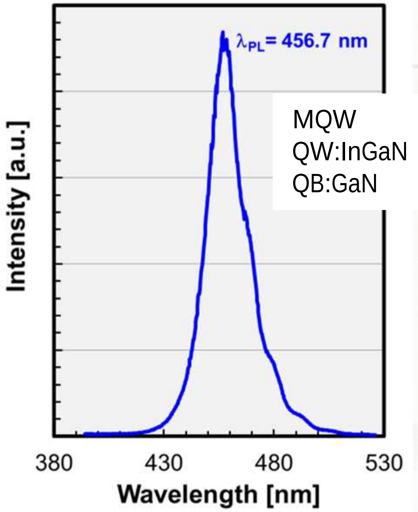


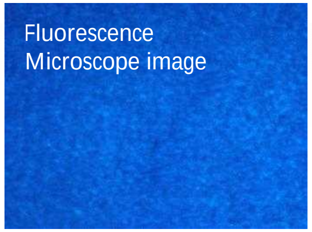
*collaboration with ITRI (Industrial Technology Research Institute of Taiwan)

IQE : 65%

30kPa Growth

Blue LED
PL Spectrum

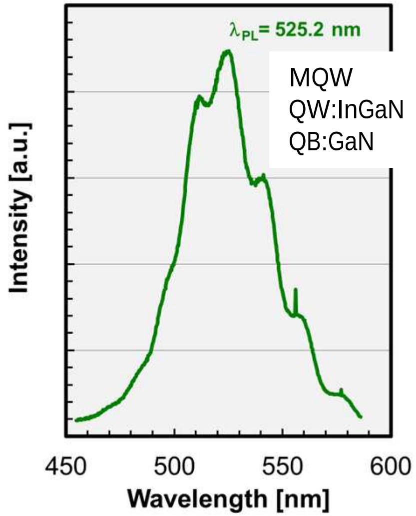


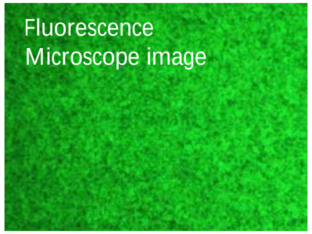


IQE : 68%

Atmospheric (100kPa) growth

Green LED
PL Spectrum





IQE : 37%

Atmospheric (100kPa) growth

<u>Wide range wavelength R&D is possible!!</u>

<u>(from UV LED to Green LED)</u>

High Growth Rate & Low Carbon Concentration in GaN

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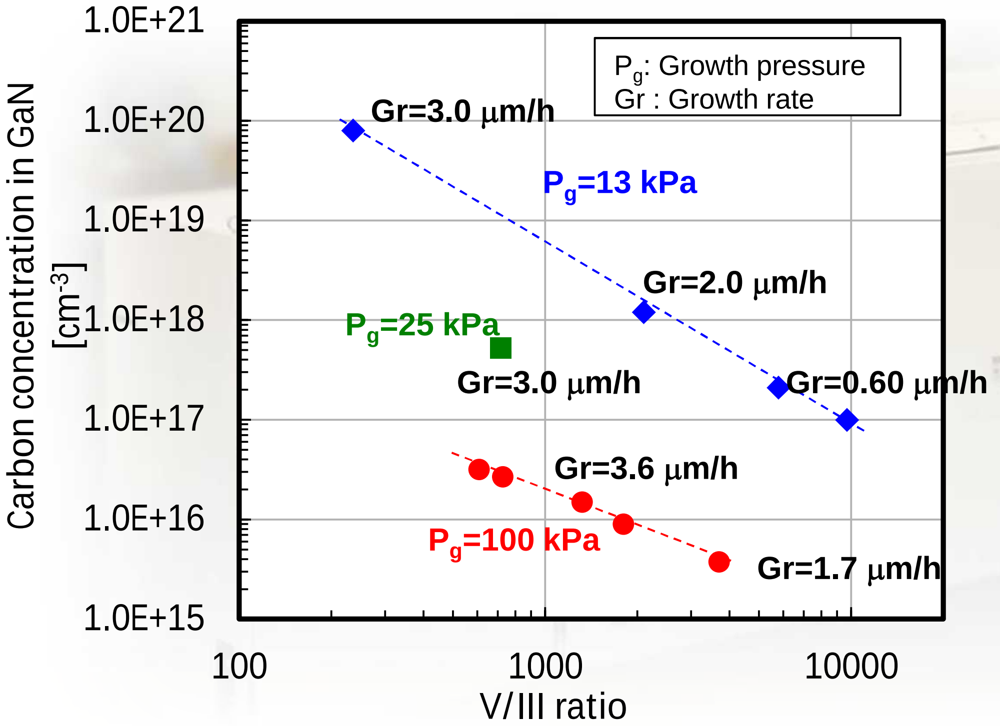

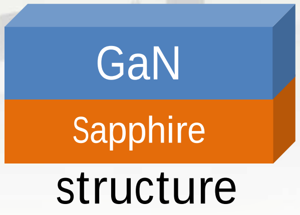

Effective growth parameter of Carbon concentration control within GaN :

V/III Ratio

When growing under high V/III ratio, need to decrease MO supply (GR down)

Growth Pressure

Decreasing of Carbon concentration is possible by keeping stable growth rate

Can control roughly from 10^{15}cm^{-3} to 10^{20}cm^{-3} !!