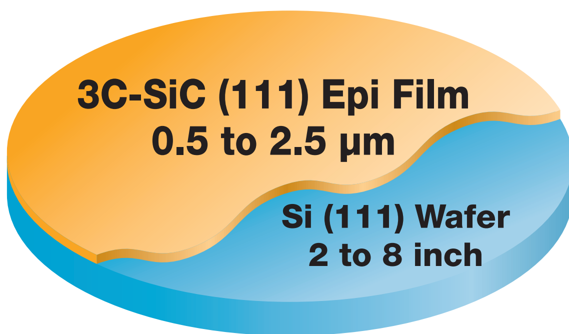
# 3C-SiC/Si Heteroepitaxial substrates for GaN

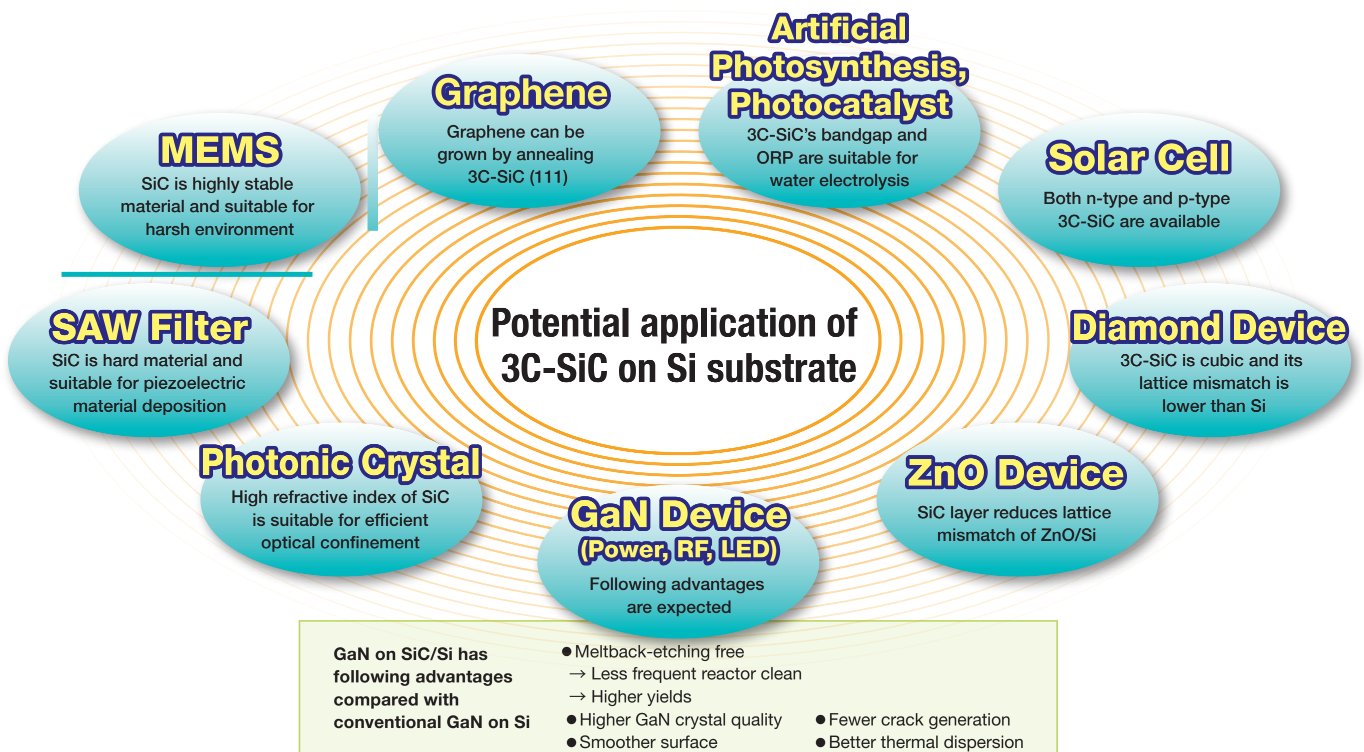
**AWI 3C-SiC (111) /Si heteroepitaxial wafers using AW-original epitaxial technologies are one of the most suitable substrates for GaN devices.**
**The 3C-SiC heteroepitaxial technology can realize large diameter substrates, on which high quality GaN layers can be easily grown using simple buffers.**

## ▶ A schematic cross section of AWI 3C-SiC/Si heteroepitaxial wafers for GaN




## ▶ Specification of 3C-SiC/Si wafers

| | |
|---|---|
| Diameter | 2" to 8" diameter |
| Epi film | 0.5 to 2.5 um-thick SiC (111) layer |
| Crystal | XRC-FWHM (SiC (111), $\omega$-scan) < 1,600 arcsec @ 1 µm, < 900 arcsec @ 2.5 µm |
| Applications | GaN-power, GaN-RF and so on. |




**GaN on SiC/Si has following advantages compared with conventional GaN on Si**

- Meltback-etching free
  → Less frequent reactor clean
  → Higher yields
- Higher GaN crystal quality
- Smoother surface
- Fewer crack generation
- Better thermal dispersion

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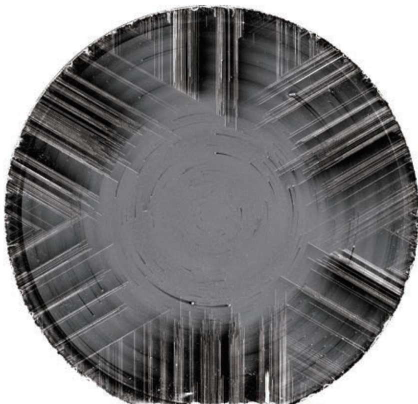
## An example of AW original GaN HEMT on 6″ 3C-SiC/Si substrates

### ▶ Comparison of 6″ thick GaN on Si and 6″ thick GaN on SiC/Si

Laser scattering images (Nitride thickness: 8 μm)
No crack available at thick GaN film deposition

**GaN on Si**

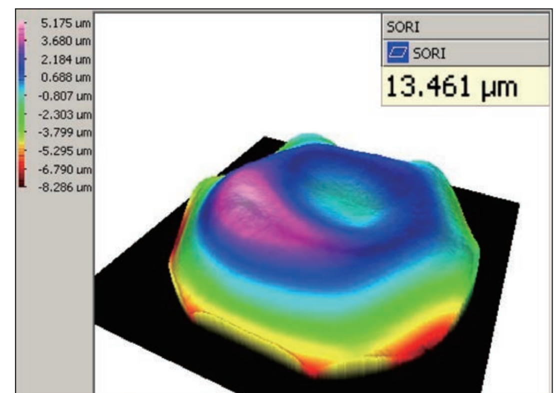


**GaN on SiC/Si**

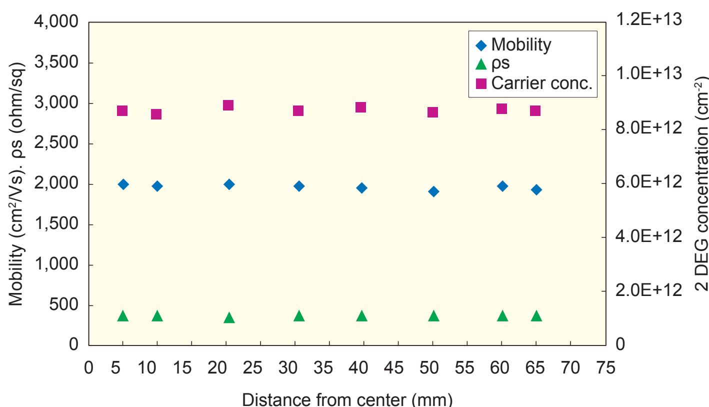
### ▶ SORI control of 6″ thick GaN on SiC/Si

Sori evaluation result (Nitride thickness: 8 μm)
Sori control avalable at GaN film deposition

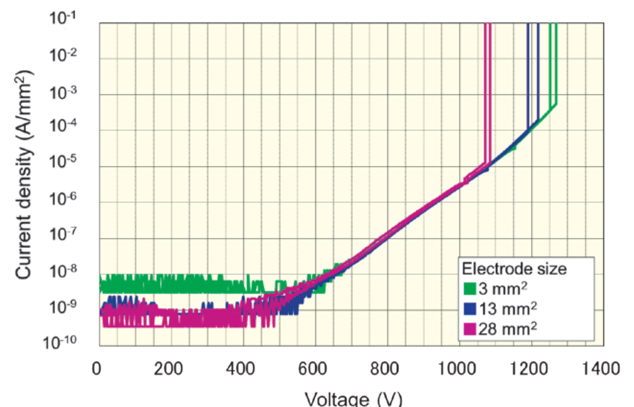
**GaN on SiC/Si**




### ▶ Electron mobility, Sheet resistance, Carrier conc. of AW original GaN HEMT on 6″ 3C-SiC/Si substrates




### ▶ Vertical I-V characteristic of AW original GaN HEMT on 6″ 3C-SiC/Si substrates

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