Distribution of Impurities in semi-conductor device by NanoSIMS

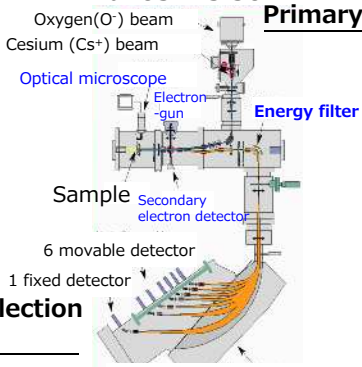
NanoSIMS is specialized technique for imaging with high lateral resolution of ～50-200nm with high sensitivity. Furthermore, depth profiling can also be conducted using primary beam with higher current density enough to sputter up to an interested depth of sample.

NanoSIMS 50L

<Instrument>

(AMETEK HP)

<Configuration>

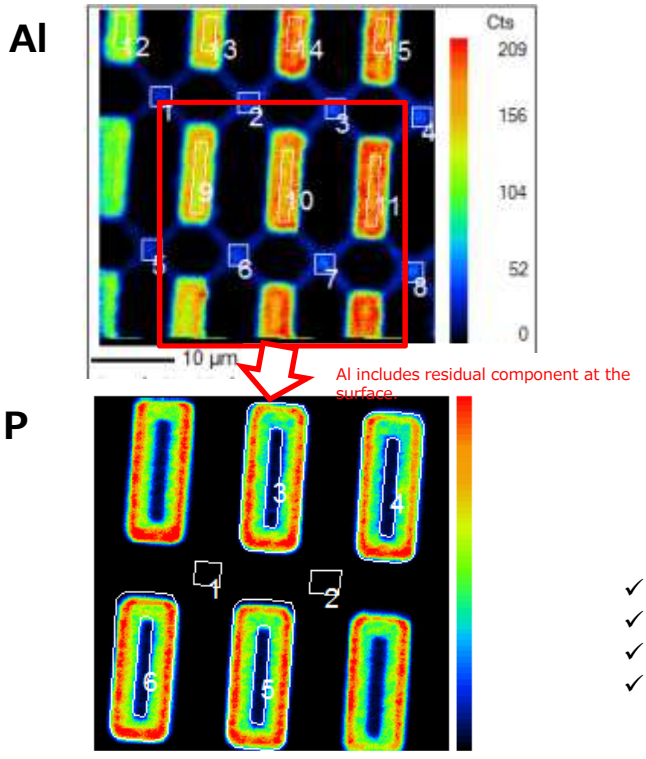


<Specification>

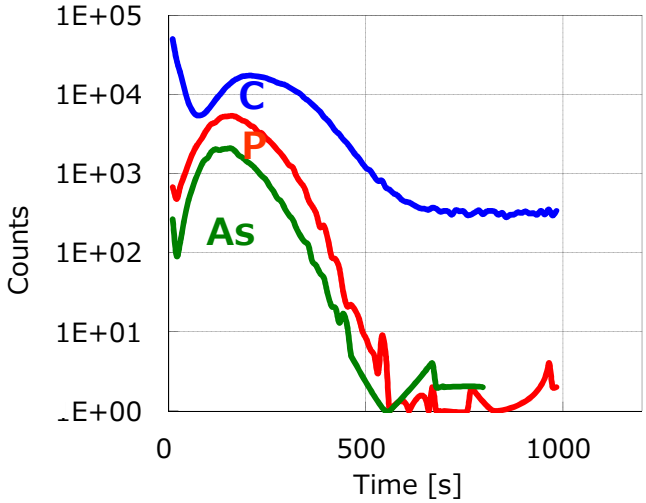
Primary ion species	Cs^+, O^-
Beam size	O^-, Cs^+: < 50 nm
Detection limit	ppb ～ ppm
Type of mass analyzer	Magnetic sector type
Number of detected elements	7
Analytical depth	10 – 500 nm

- ◆ **High lateral resolution of 50 nm**
- ◆ **High sensitivity**
- ◆ **High mass resolution**

Imaging of Al and P of SiC-MOSFET



Depth profiles of implanted elements in Si substrate



<Measurement condition>

- ✓ Cs^+ beam, 16 keV
- ✓ Beam size : >1 μmφ
- ✓ Raster area : 10 μm□
- ✓ Detected area : 1 μm□

Detection limit or Background revel (atoms/cm³)

C	1.5×10^{18}
P	1.5×10^{16}
As	4.0×10^{16}

Thanks to AMETEK , CAMECA

Measured at Atmosphere and Ocean Research Institute, The University of Tokyo