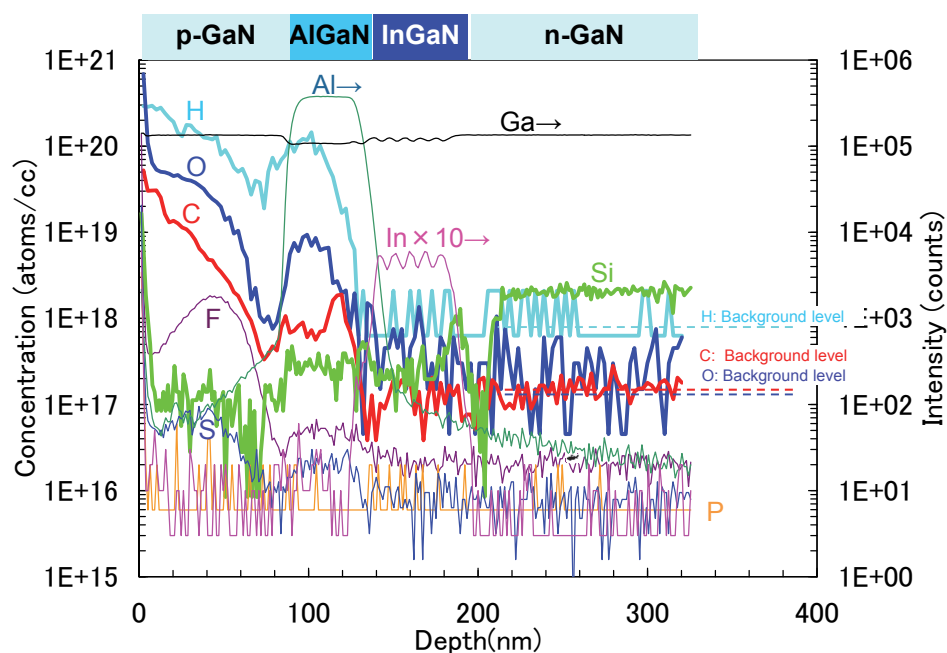


High sensitivity depth profiling of H, C and O in III-V compound semi-conductor by specialized TOF-SIMS

Detection limits have enormously improved by customizing new TOF-SIMS instrument and developing analytical condition. The detection limit of H, C and O has reached to 10^{17} atoms/cm³ level.

The depth profiles of light element in GaN-LED epitaxial layer by TOF-SIMS



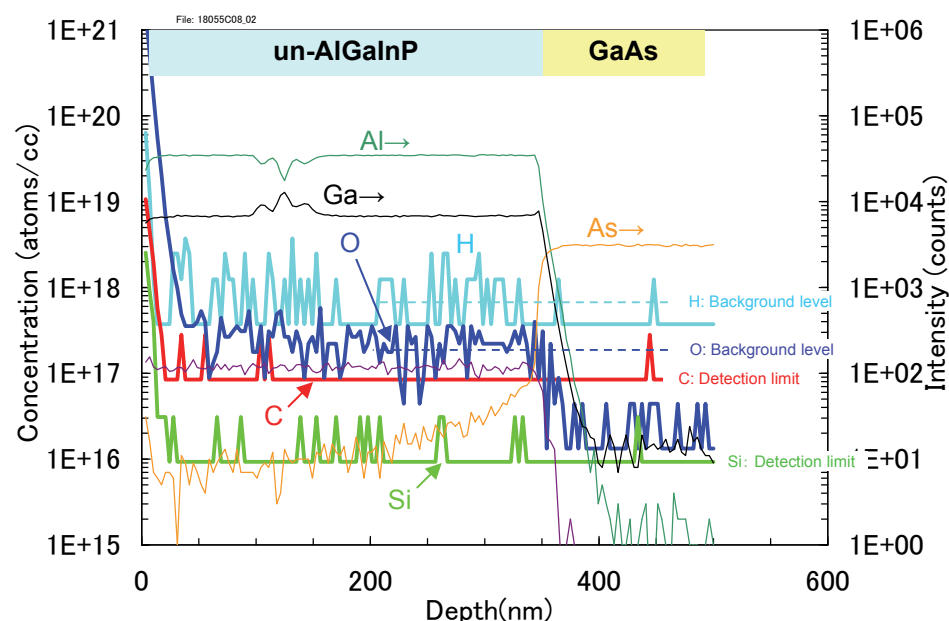
Background level in GaN
(atoms/cm³)

H: 8×10^{17}
C: 2×10^{17}
O: 2×10^{17}

Accurate depth profiles of impurities in p-GaN and AlGaIn were acquired by reducing the background level originated from residual component in the analytical chamber.

Si (n-type dopant), F, P and S can be detected with the detection limit of $10^{15} \sim 10^{16}$ atoms/cm³ level.

The depth profiles of H, C, O and Si in AlGaInP epitaxial layers by TOF-SIMS



Background level in AlGaInP
(atoms/cm³)

H: 8×10^{17}
C: 1×10^{17}
O: 3×10^{17}

Excellent background level has been achieved although reducing the background level of H and O in III-V compound materials including Al is recognized to be difficult in general.

Si (n-type dopant) can be detected with the detection limit of 1×10^{16} atoms/cm³.

By customizing TOF-SIMS instruments and developing analytical condition, high sensitivity depth profiling of light element can be achieved. The technique could be applied to LED and LD chip.