Measuring Impurity Depth Profile in Semiconductor Materials

ION TECHNOLOGY CENTER

Impurity Evaluation using SIMS

SIMS : Secondary Ion Mass Spectrometry

<Features>

SIMS is an analysis technique to detect trace-level impurities with high sensitivity. This technique performs depth profiling of impurities in the ppm to ppb range. When a sample surface is irradiated with primary ions, the sputtering on solid surface releases secondary particles. These particles contain the secondary ions and by conducting mass spectrometry, impurities within the solid can be identified and quantified. Since sputtering progresses from the surface to inner part, depth profile can also be obtained.

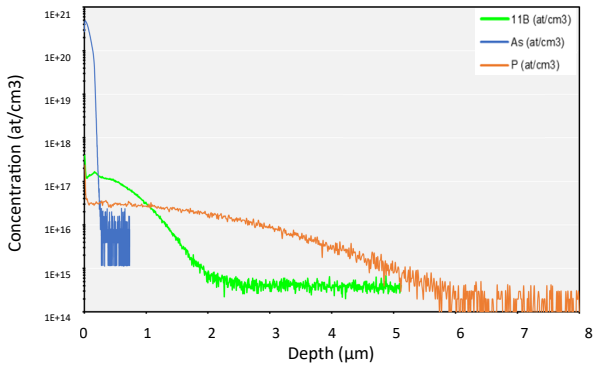
Moreover, SIMS can provide profile evaluation after ion implantation or measurement of trace-level impurities in semiconductor layers.

<Typical Limit of Detection>

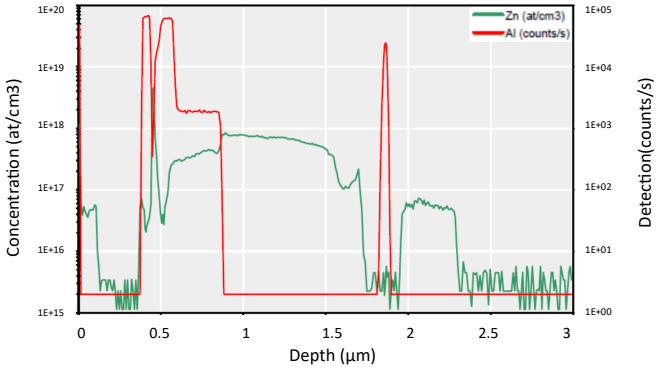
Element	Si or SiC-based	GaAs-based	GaN-based
H	～1E17	～1E17	1～5E17
C	1E16	1E16	1～5E16
O	3～5E16	1E16	1～5E16
Si	-	2～3E15	1～5E15
P	1E15	-	-
S	-	-	0.5～1E15
B	1E14	-	1～5E14
Mg	-	-	1～5E14(O2/SIMS)
Zn	-	1～2E15(CsM＋)	

＊ Limit of detection may vary depending on the structure of the measuring sample or the measurement conditions.

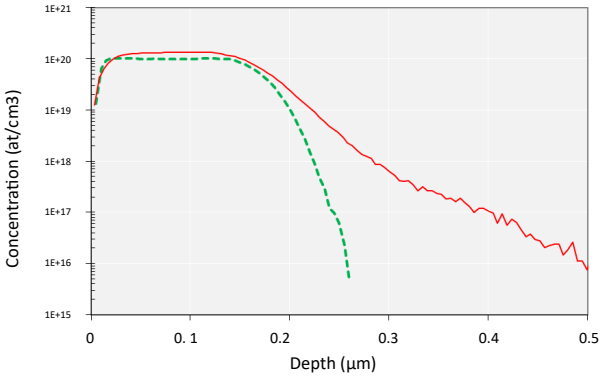
● Evaluation of B, As, P implantation profile in Si substrate



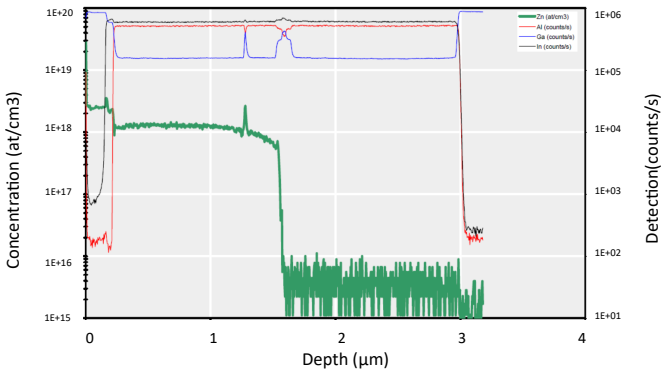
● Impurity evaluation of AlGaAs layered film on GaAs substrate



● Evaluation of Ca box implantation profile in SiC substrate (SRIM, SIMS)



● Impurity evaluation of AlGaInP layered film on GaAs substrate



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