

APPLICATION NOTE

SIMS Detection Limits of Selected Elements in GaN Under Normal Depth Profiling Conditions

DISCUSSION

SIMS is a powerful analytical technique which allows detection of all elements from H to U with excellent sensitivity. The table provides a list of typical detection limits for impurities in GaN matrices. These detection levels are for normal depth profiling conditions of blanket wafers. Detection levels for device samples depends on the size of the available analysis area.

O ₂ ⁺ Primary Ion Beam Positive Ions		Cs ⁺ Primary Ion Beam Negative Ions		Cs ⁺ Primary Ion Beam Positive Ions (MCs ⁺)	
Element	DL (atoms/cm ³)	Element	DL (atoms/cm ³)	Element	DL (atoms/cm ³)
Be	1E+14	H*	8E+16 - 2E+17	Mg	2E+16
Li	1E+14	C*	5E+15 - 2E+16	Ar	1E+17
B	1E+15	O*	1E+16 - 3E+16	Zn	2E+15
Na	5E+14	F	2E+15	-	-
Mg	1E+14	Si	5E+14	-	-
Al	1E+16	P	1E+16	-	-
Si	3E+15	S	2E+14		
K	5E+14	Cl	2E+15	-	-
Ca	1E+14	Cu	1E+17	-	-
Ti	5E+14	Ge	2E+15	-	-
Cr	2E+13	As	5E+15	-	-
Mn	1E+14	Se	1E+14	-	-
Fe	1E+15	Br	5E+14	-	-
Ni	2E+15	Sn	5E+15	-	-
Co	1E+15	Sb	2E+15	-	-
Cu	1E+16	Sn	5E+15	-	-
Zn	1E+17	Te	1E+14	-	-
Mo	1E+15	W	7E+16	-	-
Ag	1E+15	Au	5E+14	-	-
In	1E+15			-	-
W	1E+16			-	-

* Varies with vacuum conditions