

Table IV. Carrier concentration and mobility for n-GaN, n-AlGaN used in metallization study.

Property \ Sample	n-GaN	n-AlGaN	n-GaN
Carrier Concentration(cm^{-3})	4.4×10^{18}	2.18×10^{18}	1.8×10^{17}
Mobility ($\text{cm}^2/\text{V-s}$)	148	167	97
Resistivity ($\Omega\text{-cm}$)	0.00845	0.09593	0.35215

Table V. The specific contact resistivity of Ti/Al/Ni/Au contact on n-GaN under different annealing temperatures in N₂ ambient for 30 sec.

	$\rho_c (\Omega \cdot \text{cm}^2)$	$R_c (\Omega \cdot \text{mm})$	$L_T (\mu\text{m})$	$\rho_s (\Omega/\square)$
500°C *	—	—	—	—
600°C *	—	—	—	—
700°C	7.16×10^{-5}	0.54	9.74	75.50
800°C	4.00×10^{-5}	0.49	9.34	45.85
900°C	3.46×10^{-6}	0.16	1.70	119.72

*Non-linear I-V characteristics

Table VI. The specific contact resistivity of Ti/Al/Ni/Au contact on n-AlGaIn under different annealing temperatures in N₂ ambient for 30 sec.

	$\rho_c(\Omega\cdot\text{cm}^2)$	$R_c(\Omega\cdot\text{mm})$	$L_T(\mu\text{m})$	$\rho_s(\Omega/\square)$
700°C	2.09×10^{-6}	0.23	1.95	151.98
800°C	5.94×10^{-5}	0.69	6.95	122.97
900°C	4.32×10^{-5}	0.61	5.32	149.60

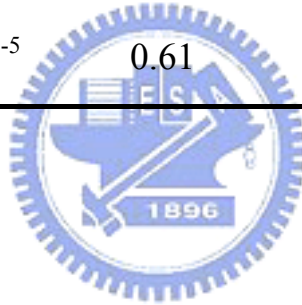


Table VII. The specific contact resistivity of Ti/Al/Pt/Au contact on n-AlGaIn at 950°C in N₂ atmosphere after different annealing times.

	$\rho_c (\Omega \cdot \text{cm}^2)$	$R_c (\Omega \cdot \text{mm})$	$L_T (\mu\text{m})$	$\rho_s (\Omega/\square)$
As-deposited	1.43×10^{-4}	1.36	8.2	212.67
35 sec	5.81×10^{-5}	0.57	4.93	239.04
60 sec	7.50×10^{-6}	0.25	2.25	148.14
120 sec	6.80×10^{-5}	0.81	6.20	176.89

Table VIII. The specific contact resistivity of Ohmic contacts after various annealing conditions.

Sample	Metal (Å)	Carrier Concentration(cm^{-3})	Condition (N_2)	ρ_c ($\Omega \cdot \text{cm}^2$)
n-GaN	Ti/Au/Ni/Au (250/2000/600/500)	4.40×10^{18}	900°C , 30 sec	3.46×10^{-6}
n-AlGaN	Ti/Au/Ni/Au (250/2000/600/500)	2.18×10^{18}	700°C , 30 sec	2.09×10^{-6}
n-AlGaN	Ti/Au/Pt/Au (400/800/1400/1500)	2.18×10^{18}	950°C , 60 sec	7.50×10^{-6}

Table IX. The diode characteristics of WN_x/GaN and TiWN_x/GaN after various annealing temperatures.

	TiWN_x		WN_x	
	n	$\phi_b(\text{eV})$	n	$\phi_b(\text{eV})$
As-deposited	1.17	0.71	1.15	0.67
650°C	1.14	0.76	1.10	0.83
750°C	1.19	0.65	1.10	0.80
850°C	1.54	0.62	1.09	0.80