

2nd RD-50 Workshop 19-21/5/2003

THE INNOVATION OF GaAs technology FOR DETECTORS

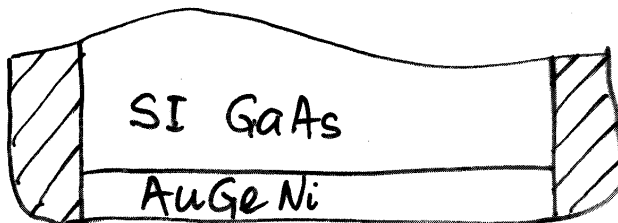
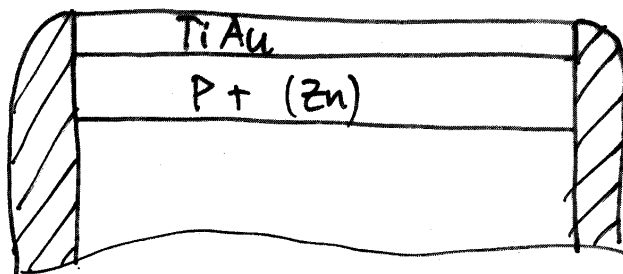
¹⁾B. SOPKO, ²⁾S. POSPÍŠIL, ¹⁾D. CHREN, ¹⁾Z. KOHOUT
¹⁾T. HORAŽDŮVSKÝ, ³⁾V. JURKA, ³⁾E. HULCIUS

¹⁾ CTU in Prague, MEE, Institute of Physics

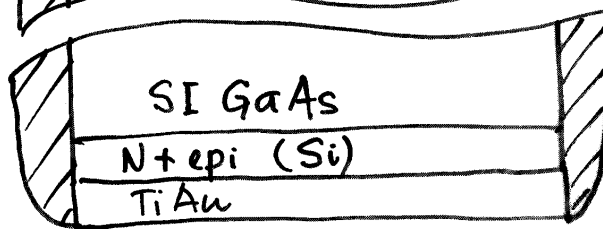
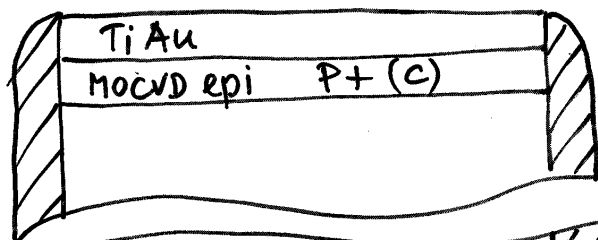
²⁾ CTU in Prague, Institute of technical and
experimental physics

³⁾ CAS - Institute of Physics

1.



2.



CONCLUSION

- FINISH THE TESTING OF SAMPLES
- STABILIZATION OF TECHNOLOGY AND MAKE MORE THAN 100 SAMPLES
- RESOLVE DESIGN RULES AND MASKS FOR PLANAR TECHNOLOGY

TECHNOLOGY FOR GaAs DETECTORS

MAIN TECHNOLOGY STEPS:

1. DIFFUSION OF Zn (SOLID TO SOLID)
($\text{SiO}_2 + \text{ZnO}$ layer, CVD deposition on GaAs substrate)
DIFFUSION : $< 800^\circ\text{C}$ IN FG
REMOVING $\text{SiO}_2 + \text{ZnO}$
2. DEPOSITION OF MOCVD epi LAYER (DOT C AND Si)
(METAL ORGANIC CVD)

STANDARD METALIZATION

Ti Au

Au Ge Ni

ANNEALING : 400°C IN FG

AFTER CUTTING OF WAFER (5×5) mm

THE SIDES OF SAMPLES WAS PREPARED OF PROTECTION LAYER
(PROTECTION TECHNOLOGY SIMILAR FOR HV DIODES)

CONTEMPORARY EXPERIMENTAL STRUCTURE OF GaAs DETECTORS

SI GaAs substrate, $\approx 500 \mu\text{m}$

1. $\text{P}^+ (\text{Zn})$ $(2-4) \mu\text{m}$
METALIZATION OF P^+ SIDE : TiAu $(10\text{nm} + 200\text{nm})$
METALIZATION OF BACK SIDE : AuGeNi
 $(200 + 100 + 100 \text{ nm})$
2. MOCVD epi layer $\text{P}^+ (\text{C}) \approx 0.5 \mu\text{m}$
MOCVD epi layer $\text{N}^+ (\text{Si})$ - back side
METALIZATION: TiAu $(10\text{nm} + 200\text{nm})$

RESULTS:

WE FINISHED PRODUCTION MORE THAN
20 SAMPLES OF DETECTORS

IV - CHARACTER: 7n dif samples $30V/8nA/mm^2$
epi samples $30V/4nA/mm^2$