ФІЗИКА І ТЕХНОЛОГІЯ ТОНКИХ ПЛІВОК ТА НАНОСИСТЕМ

XIII МІЖНАРОДНА КОНФЕРЕНЦІЯ

МКФТТПН-XIII

МАТЕРІАЛИ
MATERIALS

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СЕКЦІЯ 1 (усні доповіді)
ТЕХНОЛОГІЯ ТОНКИХ ПЛІВОК (МЕТЕЛИ, НАПІВПРОВІДНИКИ, ДІЕЛЕКТРИКИ, ПРОВІДНІ ПОЛІМЕРИ) І МЕТОДИ ЇХ ДОСЛІДЖЕННЯ

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SESSION 1 (oral)
THIN FILMS TECHNOLOGY (METALS, SEMICONDUCTORS, DIELECTRICS, CONDUCTIVE POLYMERS) AND THEIR RESEARCH METHODS

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Effect of thermal annealing on the electrical parameters of ohmic contacts to n-n^+-n^{++}-InP

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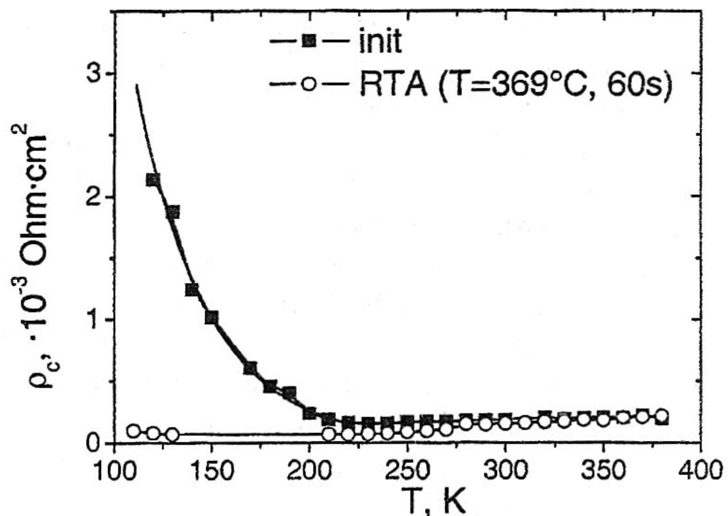
It is known that InP practically is not exceeded by GaAs in bandgap and charge carrier mobility, while outperforming it in drift velocity and thermal conductivity. This makes InP promising for development of highly efficient short mm-wave Gunn diodes.

To take advantage of the merits of this material, it is necessary to develop reliable thermally stable ohmic and barrier contacts to InP. One of the ways for solution of this problem is application of multilayer contact structures with refractory metals and their compounds as diffusion barriers [1, 2].

We studied I–V corves and temperature dependence of contact resistivity ρ_c in the 100–380 K range for Au(500Å)–Ge(500Å)–TiB_2(1000Å)–Au(2000Å) ohmic contacts to InP, both before and after rapid thermal annealing (RTA) at a temperature of 369 °C for 60 s. The thickness of n-n^+ epitaxial layers was $d = 2$ µm; the dopant concentration in them was $N_D = 9\times10^{15}$ cm^{-3}.

For initial (before RTA) layer, ρ_c decreased as temperature grew from 120 K up to 220 K. This may be owing to the thermionic mechanism of current transport. In the 220–380 K temperature range, ρ_c did not vary considerably. This may indicate the field mechanism of current transport. For a sample subjected to RTA (369 °C, 60 s), ρ_c remained practically unchanged over the whole temperature range.



1. W.C. Huang Effect of Au overlayer on PtSi ohmic contacts with n-InP // Applied Surface Science 245. – 2005. – P.141-148.
2. O.A. Ageev, A.E. Belyaev, N.S. Boltovets, R.V. Konakova, V.V. Milenin, V.A. Pilipenko Interstitial Phases in Technology of Semiconductor Devices and VLSI (in Russian). – 2008. – P. 104-108.