

Project Title	Ohmic contacts to GaAs
Name of the Principal Investigator	Dr. Choempel ANTARASENA
Name of the Co-Investigator	Assoc. Prof. Dr. Banyong TOPRASERTPONG
Month-Year	May 1987

### Abstract

The ohmic contacts Ni/AuGe/GaAs (n) and AuZn/GaAs (p) have been fabricated and the suitable processing techniques have been developed since the properties of ohmic contact depend considerably on the choice of metallic layers, their thickness, the metal deposition condition, the surface preparation and heat treatment procedure. By Transmission Line Method (TLM), we can measure the ohmic contact resistivity and we obtained the linear I-V characteristics with the resistivity of  $3 \times 10^{-4} \Omega\text{-cm}^2$ . We also discuss deeply the thermal behavior of various components and show that gold is main metal which acts as a selective getter of gallium around GaAs surface, germanium and zinc are used as n-type and p-type dopants respectively and nickel can control gold-semiconductor interaction. From this point of view, we then propose the model of  $n^{++}$  layer formation. In such a case the depletion region in the semiconductor become so thin that, even in a high barrier, Field Emission (FE) dominates and the contact is ohmic. Finally, we mentioned some compound semiconductor devices using these ohmic contacts such as heterojunction bipolar transistors, semiconductor lasers and solar cells.