

# 鈮/鍺/鉬(鉻)/銅歐姆接觸 應用在磷化銦鎵/砷化鎵異質接面雙載子電晶體

研究生:謝東霖

指導教授:張翼博士

國立交通大學材料科學與工程學研究所

## 摘要

本篇論文探討在磷化銦鎵/砷化鎵異質接面雙載子電晶體上使用鈮/鍺/鉬/銅及鈮/鍺/鉻/銅作為歐姆接觸金屬的可行性,其中金屬鉬與鉻是作為歐姆接觸中銅的擴散阻絕層。

在鈮/鍺/鉬/銅與鈮/鍺/鉻/銅歐姆接觸的材料分析中,兩種結構在 350°C 的溫度下皆是穩定的。熱穩定測試中,在 300°C, 20 小時退火後,以鉬作為擴散阻絕層的歐姆接觸仍然穩定,以鉻作為擴散阻絕層的歐姆接觸電阻則有上升的趨向。材料分析也和此結果相符。

在元件的製造上,鉬作為擴散阻絕層的歐姆接觸將運用在磷化銦鎵/砷化鎵異質接面雙載子電晶體上,經過 250°C 二十四小時的退火處理,並和使用金為歐姆接觸的元件電性比較,兩者元件的電性幾乎沒有改變

# Study of Pd/Ge/Mo(Cr)/Cu ohmic contact in InGaP/GaAs HBTs

**Student: Tung-Ling Hsieh**

**Advisor: Dr. Edward Y. Chang**

**Department of Materials Science and Engineering**

**National Chiao Tung University**

## Abstract

In this paper, the feasibilities of using the Pd/Ge/Mo/Cu and Pd/Ge/Cr/Cu layers as the ohmic contacts on InGaP/GaAs HBTs were studied. Refractory metal Mo, and Cr were used as the diffusion barrier and applied to the ohmic contact applications.

For the material analysis of the Pd/Ge/Mo/Cu and Pd/Ge/Cr/Cu ohmic contacts, both structures were thermally stable up to 350°C. For the electrical characteristic measurement, the contact resistance of the contact with Mo as the diffusion barrier was stable up to 300°C, 20 hours annealing, while the contact resistance of the contact with Cr as the diffusion barrier increased after the 300°C, 20 hours annealing. The results are in consistent with the materials analysis.

For HBT device fabrication, Mo and Cr were chosen as the diffusion barrier for copper ohmic contact. A gallium arsenate (GaAs) Heterojunction Bipolar Transistor (HBT) with copper-metallized ohmic contact was successfully developed. Sputtered Mo was used as the diffusion barrier. Comparing the HBT devices with Cu metallization ohmic contact with devices made with traditional Au ohmic contact, both devices show little change in device performance after annealing at 250°C for 24 hours.

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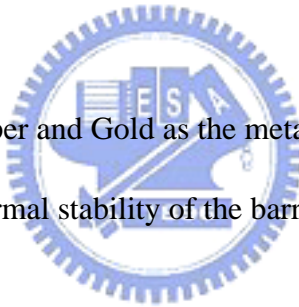
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