

# 奈米半導體之製作與特性研究

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## ABSTRACT

本篇論文主要是研究以有機金屬化學氣相磊晶(MOCVD)系統成長氮化鎵(GaN)奈米線於單晶矽基板上，我們所採用之成長機制以氣-液-固(VLS)生長法為主，一般而言，大多數以氣-液-固(VLS)生長法成長奈米線皆有使用催化物，如成長砷化鎵奈米線時有人用金作為催化物，而成長氮化鎵奈米線時以鐵為催化物，而有些以回填法成長氮化鎵奈米線時也有使用鈮作為催化物，而我們成長氮化鎵奈米線時並無使用其它之金屬而是將鎵通入腔體使其沈積於基板上再通入氮氣以成長氮化鎵奈米線。我們成長氮化鎵奈米線是先利用液滴磊晶法(Droplet Epitaxy)之方式先於矽基板上均勻灑上鎵顆粒，就是先單獨於700 通入三甲基鎵(TMGa)(16sccm)原料於腔體中通入時間為6秒，這樣可以先於矽基板上產生直徑約150 nm密度為 $1.35 \times 10^9 \text{ cm}^{-2}$ 的鎵顆粒，而灑上鎵顆粒後再於800 通入氮氣使其分解出氮原子與鎵顆粒產生反應以成長出氮化鎵奈米線，而產生出來之氮化鎵奈米線其直徑約為25 nm。

Keywords : 有機金屬化學氣相磊晶；氮化鎵奈米線；氣-液-固(VLS)生長法；液滴磊晶法

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