

전처리된 사파이어 기판에 성장한 GaN의 열처리 효과
(Annealing effects of GaN epilayer grown on pretreated sapphire substrate)

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1. Introduction

Sapphire substrates have been widely adopted to grow the high quality GaN epilayer despite of the large differences of lattice constant and thermal expansion coefficient between them. So, GaN or AlN buffer layer on the sapphire was indispensably introduced before the GaN epilayer growth. Moreover, pretreatment process prior to the buffer growth has known to play the critical role in improving the GaN overgrown layer. Nitridation is a general and simple pretreatment at high temperature in N_2 or NH_3 ambience.

Annealing process was employed to decrease lattice strain through thermal treatment. And the electrical properties such as Hall mobility and carrier concentration were improved by this increase of crystallinity. These results showed that the improvement of GaN epilayer can be achieved by combination of N^+ -ion-implantation pretreatment of sapphire substrate and proper annealing process.

2. Experimental

Aannealing effects of the GaN epilayer on the N^+ -ion-implanted sapphire substrate grown by MOCVD were studied. The properties of the annealed GaN epilayer on the N^+ -ion-implanted sapphire substrate was characterized by Hall measurement, DCXRD, PL and Raman spectra. The Hall mobility of the annealed GaN epilayer on the N^+ -ion-implanted sapphire substrate was improved at all annealing temperature range.

3. Summary

Aannealing process was employed to decrease lattice strain through thermal treatment. And the electrical properties such as Hall mobility and carrier concentration were improved by this increase of crystallinity. These results showed that the improvement of GaN epilayer can be achieved by combination of N^+ -ion-implantation pretreatment of sapphire substrate and proper annealing process.