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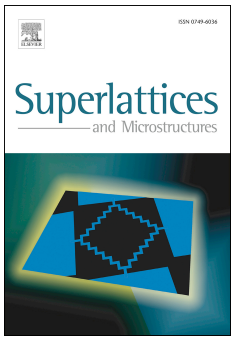

Synthesis and field emission performance for P-doped GaN NWs

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ACCEPTED MANUSCRIPT

[1]Synthesis and field emission performance for P-doped GaN NWs

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Abstract

P-doped GaN NWs in different contents have been synthesized via catalyst assisted chemical vapor deposition (CCVD). The P-doped GaN NWs present a uniform density and the each nanowire possesses a uniform thickness. The structure of the NWs is single crystalline structure of hexagonal wurtzite. Furthermore, the results from field emission (FE) test indicate that the turn-on field of the sample with P content of 2.24 at. % is as low as 2.85 V/μm, which presents significant improvement of the FE properties in contrast to pristine GaN NWs.

Keywords: Field emission; P-doped GaN NWs; Work function

1. Introduction

GaN serve as a direct wide band gap (3.4 eV) semiconductor owing superior electronic properties, such as low electron affinity (2.7-3.3 eV), high melting point (2600 K), and small work function (4.1 eV) [1], which are of great performance for field emission (FE) devices such as cold cathode emitters and flat panel display **Error! Reference source not found.**. GaN NW is 1D nanomaterial with a high aspect ratio and is suitable for being used as cold cathode material.

In order to expand GaN desirable properties in optoelectronic device, numerous discussions about property doped with impurity elements have been proposed, including Si [2],**Error! Reference source not found.**, Mg [5][6], Cu [7], Co [8], Ce

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