Electrical and Structural Properties of ZnO Thin Films Prepared by Plasma Enhanced Atomic Layer Deposition (PEALD)

김진환, 김상훈, 김정현, 한윤봉*
전북대학교
(ybhahn@chonbuk.ac.kr*)

High-quality thin films of Zinc oxide (ZnO) were successfully grown on Si(111) substrates at low-temperature of 220 °C via plasma enhanced atomic layer deposition (PEALD) process by using high-purity diethyl zinc and oxygen as source materials for zinc and oxygen, respectively. The cross-sectional high-resolution FESEM images revealed that the films are grown in uniform thickness over the whole substrate surface. The crystal orientations of the as-grown films are along the [0001] direction which was confirmed by the X-ray diffraction patterns. The room-temperature PL spectrum showed a strong UV emission with a suppressed green emission exhibiting that the as-deposited thin films have good optical properties. To check the electrical properties of the as-grown high-quality ZnO films, hall measurements are performed at room-temperature. The as-grown high-quality ZnO films by PEALD in our experiments may have possible application for the fabrication of efficient ZnO-based TFTs and LEDs in near future.