Structural, optical and electrical properties of Sn-doped ZnO nanowires by thermal evaporation process

이은원, 김상훈, 김진석, 홍동민, 한윤봉*
전북대학교
(ybhahn@chonbuk.ac.kr*)

Well-crystalline tin (Sn)-doped ZnO nanowires have been successfully synthesized on Si (100) substrates by simple thermal evaporation process by using the mixtures of metallic zinc and tin powders in the presence of oxygen. It is observed from the detailed structural characterizations that the grown nanowires are well-crystalline with the wurtzite hexagonal phase. And the atomic percentages of compositional elements Sn, Zn, and O were measured by EDX analysis as 24.36%, 43.92%, and 31.71%, respectively. The optical properties of the grown Sn-doped ZnO nanowires was observed by using room-temperature PL spectroscopy which exhibited a weak UV emission and a strong and dominated green emission. The electrical properties of as-grown Sn-doped ZnO nanowire was examined by fabricating single nanowire based field effect transistors (FETs). The peak transconductances of the fabricated FETs was ~78.6 nS. The field effect mobilities (μeff) and carrier concentration for the fabricated FETs were measured to be 90.1 cm2/V•s and 6.94 x 1016, respectively.