

TT-P062

Au Catalyst Free and Effect of Ga-doped ZnO Seed Layer on Structural Properties of ZnO Nanowire Arrays

In-Hyung Yer, Ji-Hyoung Roh, Ju-Hong Shin, Jae-Ho Park,
Seul-Ki Jo, On-Jeon Park, Byung-Moo Moon*

Department of Electrical Engineering, Korea University, Seoul, Korea

In this study, we report the vertically aligned ZnO nanowires by using different type of Ga-doped ZnO (GZO) thin films as seed layers to investigate how the underlying GZO film micro structure affects the distribution of ZnO nanowires. Arrays of highly ordered ZnO nanowires have been synthesized on GZO thin film seed layer prepared on p-Si substrates (7-13 Ωcm) with utilize of a pulsed laser deposition (PLD). With the vapor-liquid-solid (VLS) growth process, the ZnO nanowire synthesis carries out no metal catalyst and is cost-effective; furthermore, The GZO seed layer facilitates the uniform growth of well-aligned ZnO nanowires. The influence of the growth temperature and various thickness of GZO seed layer have been analyzed. Crystallinity of grown seed layer was studied by X-Ray diffraction (XRD); diameter and morphology of ZnO nanowires on seed layer were investigated by field emission scanning electron microscopy (FE-SEM). Our results suggest that the GZO seed layer with high c-axis orientation, good crystallinity, and less lattice mismatch is key parameters to optimize the growth of well-aligned ZnO nanowire arrays.

Keywords: Nanowire, Seed layer, Ga-doped ZnO, Pulsed laser deposition