PT-P019

Conductivity Change of PEDOT:PSS Film according to the Surface Structuring

Jung-Hoon Yu[1], Sang-Hoon Nam[2], Jin-Su Lee[1], Ki-Hwan Hwang[1], Hyeon-Jin Seo[1], Dong-Woo Ju[2], So-Hyoun Jeon[1], Sang-Ho Yun[3,*], Jin-Hyo Boo[1,*]

[1]Department of Chemistry, Sungkyunkwan University, 440-746 Suwon, Korea,
[2]Institute of Basic Science, Sungkyunkwan University, 440-746 Suwon, Korea,
[3]Surface Chemistry, Royal Institute of Technology, 10044 Stockholm, Sweden

We present results from an experimental study of conductivity change of poly (3,4-ethylenedioxy-thiophene) poly(styrenesulfonate) (PEDOT:PSS) film according to the surface structuring. We demonstrate that the patterned structure was enhanced with approximately five times conductivity in comparison with non structure of PEDOT:PSS film. In order to patterning, we have fabricated polystyrene (PS) colloidal monolayer as a template with sphere diameter of 780nm and 1.8um. Structure has honeycomb shape and it provide shorter path way to flowing of electron. Pattern size was controlled by PS diameter and varied by Transformer Coupled Plasma (TCP) etching system. Conductivity was converted from sheet resistance which measured by 4-point prove. Film thickness was derived using Field Emission Scanning Electron Microscopy (FE-SEM) images.

Keywords: nanosphere, colloidal lithography, surface morphology, patterning, conductivity

PT-P020

Optical Properties and Structural Characteristics of Gallium Nitride Thin Films Prepared by Radio Frequency Magnetron Sputtering

Yeon Ki Cho, Joo Han Kim

Department of Advanced Materials Engineering, Chungbuk National University

In this study, the optical properties and structural characteristics of gallium nitride (GaN) thin films prepared by radio frequency (RF) magnetron sputtering were investigated. Auger electron and X-ray photoelectron spectra showed that the deposited films consisted mainly of gallium and nitrogen. The presence of oxygen was also observed. The optical bandgap of the GaN films was measured to be approximately 3.31 eV. The value of the refractive index of the GaN films was found to be 2.36 at a wavelength of 633 nm. X-ray diffraction data revealed that the crystalline phase of the deposited GaN films changed from wurtzite to zinc-blende phase upon decreasing the sputtering gas pressure. Along with the phase change, a strong dependence of the microstructure of the GaN films on the sputtering gas pressure was also observed. The microstructure of the GaN films changed from a voided columnar structure having a rough surface to an extremely condensed structure with a very smooth surface morphology as the sputtering gas pressure was reduced. The relationship between the phase and microstructure changes in the GaN films will be discussed.

Keywords: Optical properties, Crystalline structure, Gallium nitride, Sputtering