Synthesis, Characterization and Ink-formulation Based on CuO Nanoparticles for Inkjet Printing Application

Mohammad Vaseem, 이길목[1], 최한석[1], 한윤봉[1,*]
전북대학교 공과대학; [1]반도체화학공학부
(ybhahn@jbnu.ac.kr*)

Inkjet printing generally avoids the need for conventional photolithography and vacuum deposition methods. In inkjet printing technology, only the requirement is to formulate ink using nanoparticles, which must be well suited for inkjet printer heads (nozzles). Accordingly, based on various ink-formulations, until now polymer based photovoltaic, light emitting device, thin film transistors and organic semiconductor based thin film transistors, have been extensively studied. However, ink formulation and inkjet printed p-type semiconductor have been seldom reported. In this regards, we have successfully synthesized well dispersed uniform CuO nanoparticles with average particles size in the range of ~5-8 nm by simple solution process. As-synthesized CuO nanoparticles were investigated with details in terms of its structural and optical characterization. Moreover, as-synthesized CuO nanoparticles were further formulated as an ink using mixed solvents of water, ethanol, isopropanol and diethylene glycol in 50:20:5:5 wt %, respectively. In this paper, we present the first results of inkjet printed CuO field effect transistors (FET) on Si/SiO2 (gate material) substrate.