

Synthesis of High crystalline ZnO Quantum Dots by Solution Process for Ink-jet Printing Application

이길목, Mohammad Vaseem, 김나영¹, 한윤봉*
전북대학교; ¹전북대학교 화학공학부
(ybhahn@chonbuk.ac.kr*)

Recently, inkjet-printing technique to fabricate semiconductor devices is considered as a most promising technology by which device fabrication can be possible via direct and simple steps without wasting processing materials. From material points of view with wide area application, the development of n-type ZnO is one of the key technologies for p-n junction based devices as diodes, transistors, and light emitting diodes. We have successfully synthesized uniform ZnO QDs with particles size less than 10 nm by solution process. As-synthesized ZnO QDs were investigated with details in terms of its structural and optical characterization. Moreover, the as-synthesized pure ZnO QDs (20 wt %) were further formulated as an ink using mixed solvents of ethanol, DI-water and ethylene glycol in 50:20:30 vol %, respectively. Further, using the as-formulated ZnO ink we have successfully demonstrated jetting and writing of various width size ZnO pattern line on Si, SiO₂, glass substrate at room temperature printing condition. Moreover, we have observed that using various drops spacing we can control the uniformity and line width.