

Low Temperature Synthesis and Characterization of ZnO Nanoparticles and their Ink-Jet Printing Applications

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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. However, applying inkjet printing for the deposition of functional materials, formulation of suitable inks is the need of time because ink-formulation only determines the quality of printed patterns. Owing to our interest, we have successfully synthesized well dispersed uniform ZnO nanoparticles with particles size < 5 nm by solution process. As-synthesized ZnO nanoparticles were investigated in terms of its structural and optical characterization. Moreover, as-synthesized pure ZnO nanoparticles (10 wt %) were further formulated as an ink using mixed solvents of 1-Butanol and ethylene glycol (70:20 wt %), respectively. We have successfully demonstrated jetting and writing of various width size ZnO pattern line on Ag deposited substrate at room temperature using formulated ZnO ink and observed that uniformity and line width can be controlled by varying drop spacing.