

Ink-Jet Printed Metal Oxide Based Field Effect Transistors

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Metal oxide (i.e., p-type ZnO & CuO) nanoparticles (NPs) were synthesized by a simple solution process. As-synthesized nanoparticles were investigated in detail in terms of structural and optical characterization, and further formulated as inks using mixed solvents of water, ethanol, isopropanol and diethylene glycol. Inkjetting behavior of the as-formulated inks samples were examined with printing lines on Si/SiO₂ substrates as a function of metal oxide NPs concentration at room-temperature printing condition. It was observed that the metal oxide concentration and the number of over-printing are important factors for optimizing the uniformity and thickness of printed lines with smooth edge definition. In this report, we present the first results of inkjet printed p-ZnO and CuO field effect transistors (FET) on Si/SiO₂ (gate material) substrate. Moreover, various annealing effect on printed line patterns has also been discussed.