High Performance Amorphous ZnMgO/Carbon Nanotubes Composite Thin-Film Transistors with Tunable Threshold Voltage

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RECEIVED DATE ( )

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Supplementary Information

SI 1. Method of Preparing a-ZMO/SWNTs Composite Thin Film.

SI 2. Characterization of the Single Wall Carbon Nanotubes.

SI 1. Method of Preparing a-ZMO/SWNTs Composite Thin Film

$Mg(NO_3)_2$ and $ZnAc{\cdot}2H_2O$ (99%) were dissolved in a mixture solution of ethanolamine and ethanolamine/2-methoxyethanol with volume ratio of 0.92:100. To prepare a-ZMO based thin films, the desired amount of Mg precursor was used while the total concentration of metal ions is maintained at 0.03 M. After 2 h vigorous stirring, the stable transparent solutions were formed. Finally, the uniform dispersed SWNTs solution was added into these solutions with the default weight concentrations. The metal oxide/SWNTs thin films were formed by spin-coating

method at the speed of 3000 rpm for 60 s on 100 nm SiO_2 coated p^+-Si substrates. Subsequently, the spin-coated films were prebaked on the hotplate at 150 °C for 10 min to remove the organic solvent. The desired thickness of the a-ZMO/SWNTs was achieved through multiple coating processes. Finally, the as-prepared thin films were annealed on the hot plate at 350 °C for 40 min under ambient condition.

SI 2. Characterization of the Single Wall Carbon Nanotubes

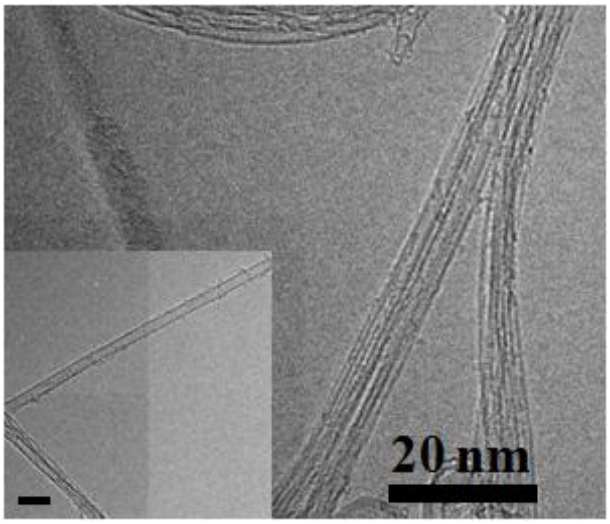

Figure S1. The transmission electron microscope (TEM) images of the SWNTs used in this work. The inset is the high-resolution TEM image, the scale bar is 5 nm, identifying their single-walled nanostructures.