Controlling the Performance of P-type Cu2O/SnO Bilayer Thin-Film Transistors by Adjusting the Thickness of the Copper Oxide Layer

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Abstract

The effect of copper oxide layer thickness on the performance of Cu2O/SnO bilayer thin-film transistors was investigated. By using sputtered Cu2O films produced at an oxygen partial pressure, O-pp, of 10% as the upper layer and 3% O-pp SnO films as the lower layer we built a matrix of bottom-gate Cu2O/SnO bilayer thin-film transistors of different thickness. We found that the thickness of the Cu2O layer is of major importance in oxidation of the SnO layer underneath. The thicker the Cu2O layer, the more the underlying SnO layer is oxidized, and, hence, the more transistor mobility is enhanced at a specific temperature. Both device performance and the annealing temperature required could be adjusted by controlling the thickness of each layer of Cu2O/SnO bilayer thin-film transistors.

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