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Supporting Information

Role of oxygen in dramatically enhancing the electrical properties of solution-processed Zn-Sn-O thin-film transistors

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Keywords: Indium-free; solution-process; metal oxide thin-film transistors; new Sn precursor; oxygen annealing

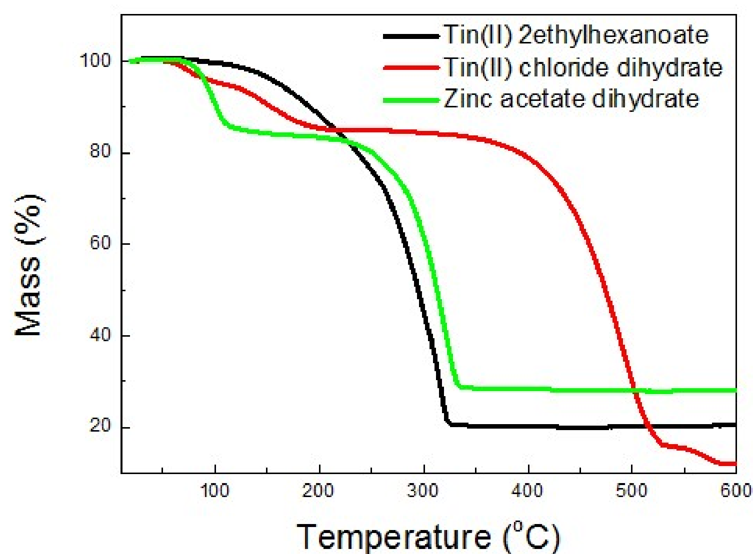

Fig. S1 Thermogravimetric analysis (TGA) measurement obtained with the tin (II) 2-ethylhexanoate, tin (II) chloride and zinc acetate dehydrate as precursors.

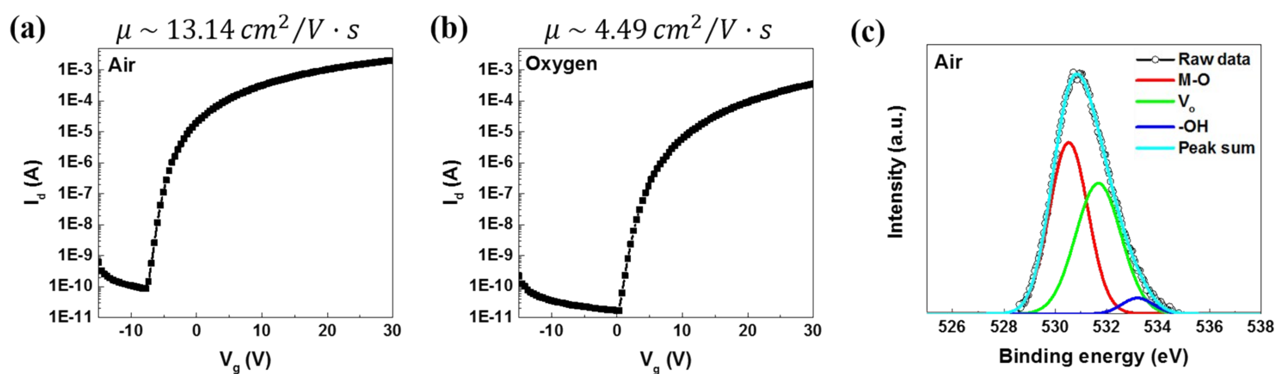

Fig. S2 Transfer characteristics of the Zn-Sn-O TFTs using tin (II) chloride with (a) air annealing and (b) oxygen annealing at 500℃ for 2 h, and (c) deconvoluted O 1s XPS peaks of a Zn-Sn-O TFT using tin (II) chloride annealed in an air environment.

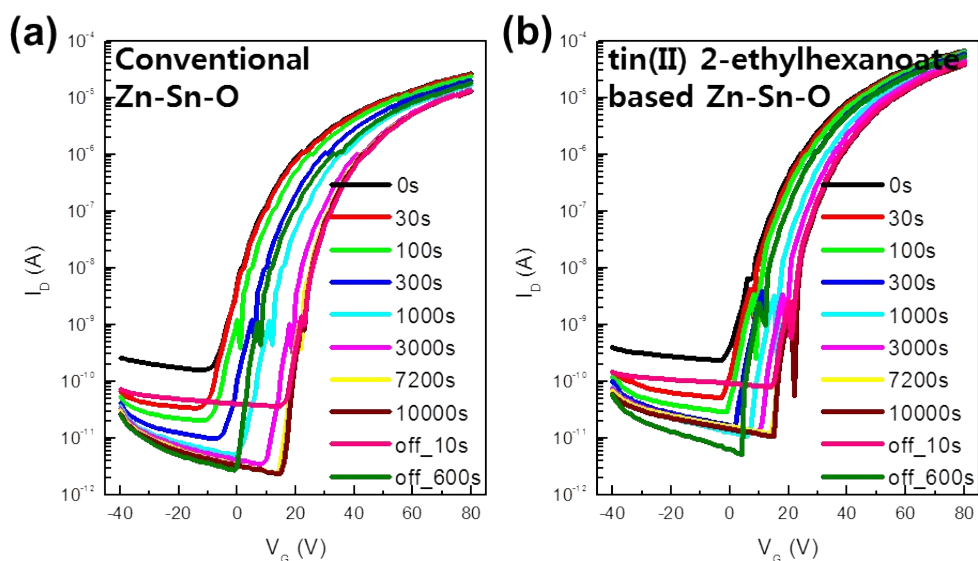

Fig. S3 Time-dependent transfer characteristics of (a) tin (II) chloride based Zn-Sn-O device and (b) tin(II) 2-ethylhexanoate based Zn-Sn-O device under a gate bias stress of Vg = +20 V at 60°C (Vd = 10 V).

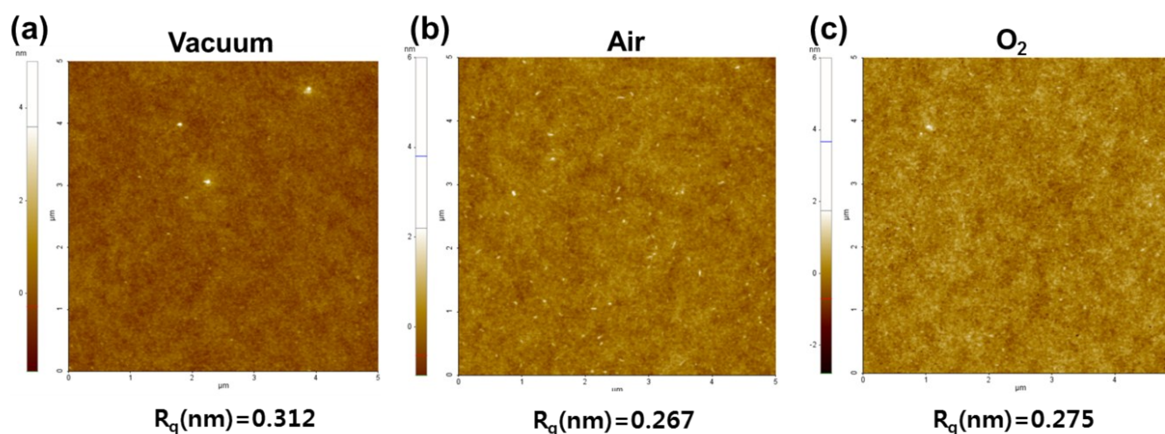

Fig. S4 Atomic force microscopy (AFM) images of tin(II) 2-ethylhexanoate based Zn-Sn-O films annealed at 500 °C in vacuum (a), air (b), and oxygen (c). Rq means the root mean square roughness value.

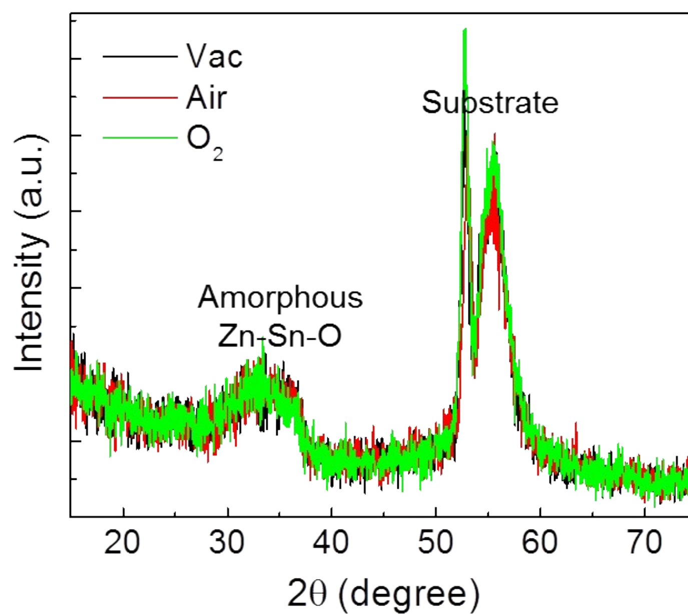

Fig. S5 High resolution X-ray diffraction (XRD) patterns of tin(II) 2-ethylhexanoate based Zn-Sn-O films annealed at 500 °C in vacuum, air, and oxygen. The incident angle is 1° and the peaks around 55 ° are substrate artifact.