Electronic Supplementary Information

Systematic Study on Effects of Precursors and Solvents for Optimization of Solution-Processed Oxide Semiconductor Thin-Film Transistors

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Fig. S1

The output characteristics of the (a) sample A, (b) sample B, (c) sample C, (d) sample D, (e) sample E, (f) sample F, and (g) sample G.
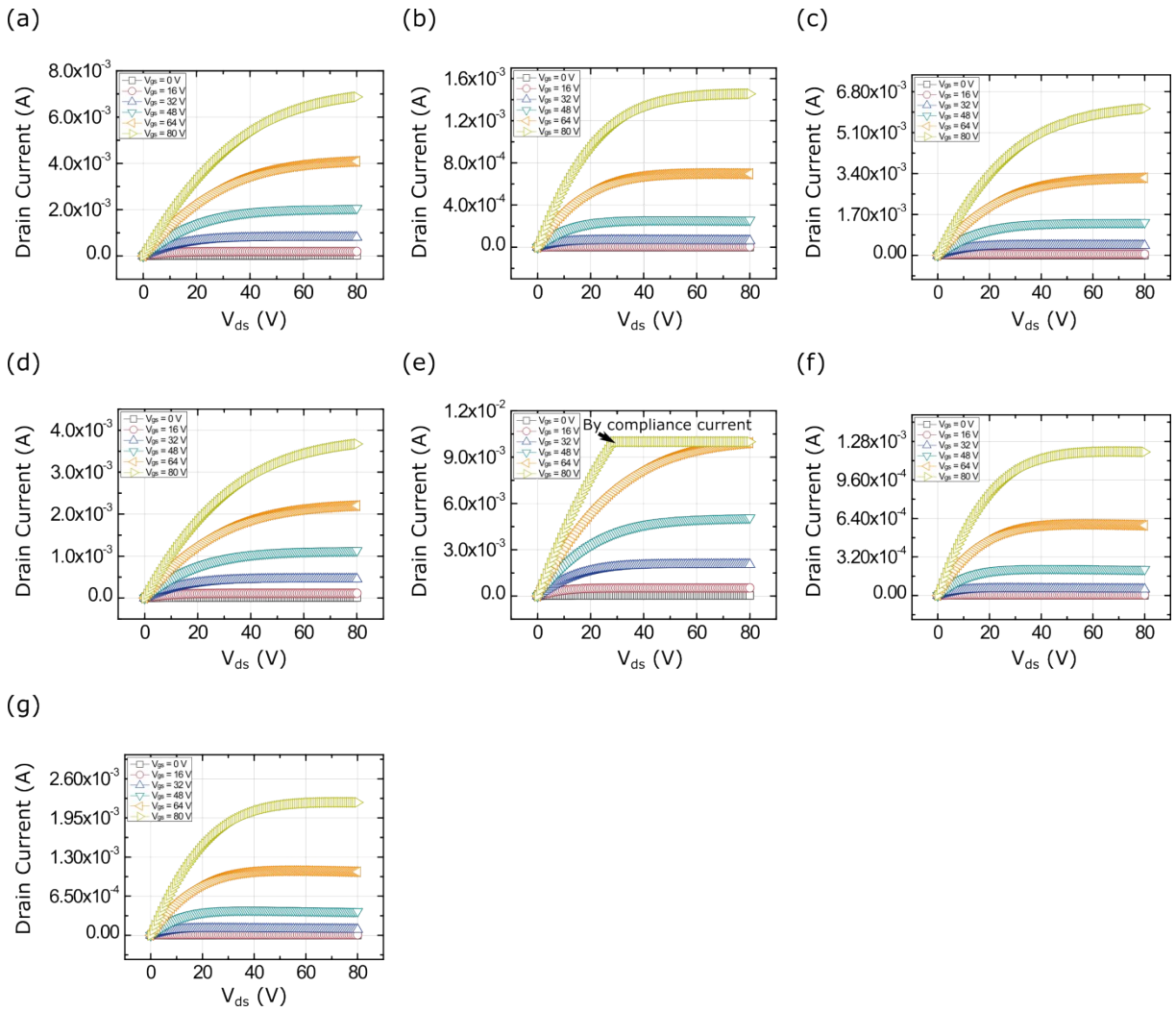
Fig. S2

(a) Schematic of device strucutre of sample A-G. The optical microscope images of (b) sample A, (c) sample B, (d) sample C, (e) sample D, (f) sample E, (g) sample F, and (h) sample G.
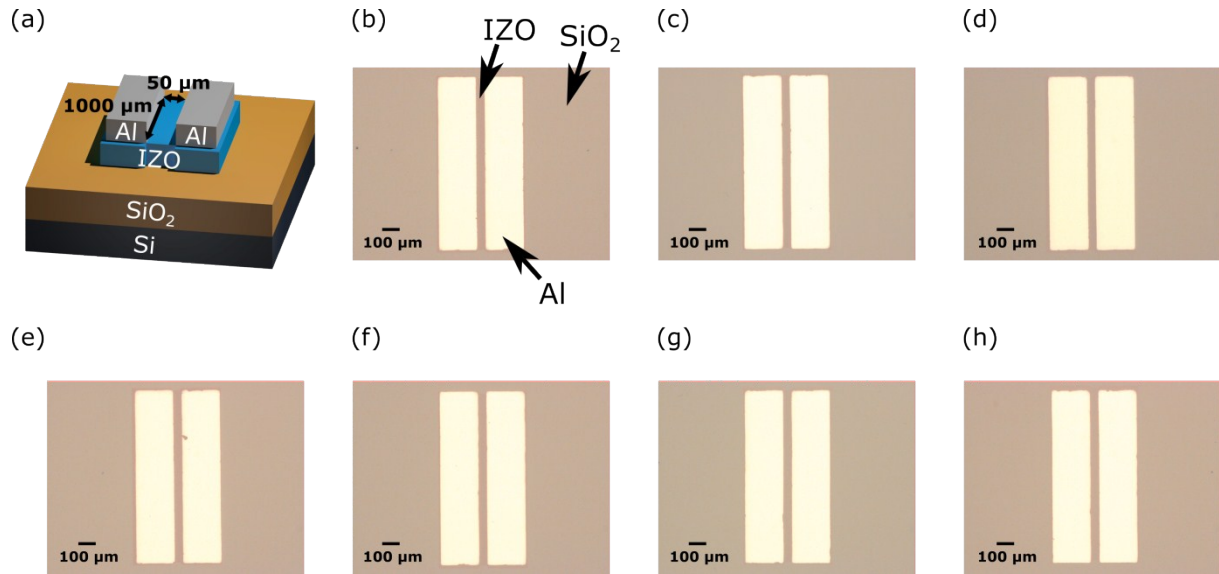
Fig. S3

At 193.15 K, 228.15 K, 263.15 K, and 298.15 K, the transfer characteristics of (a) sample A, (b) sample B, (c) sample C, (d) sample D, (e) sample E, (f) sample F, and (g) sample G.
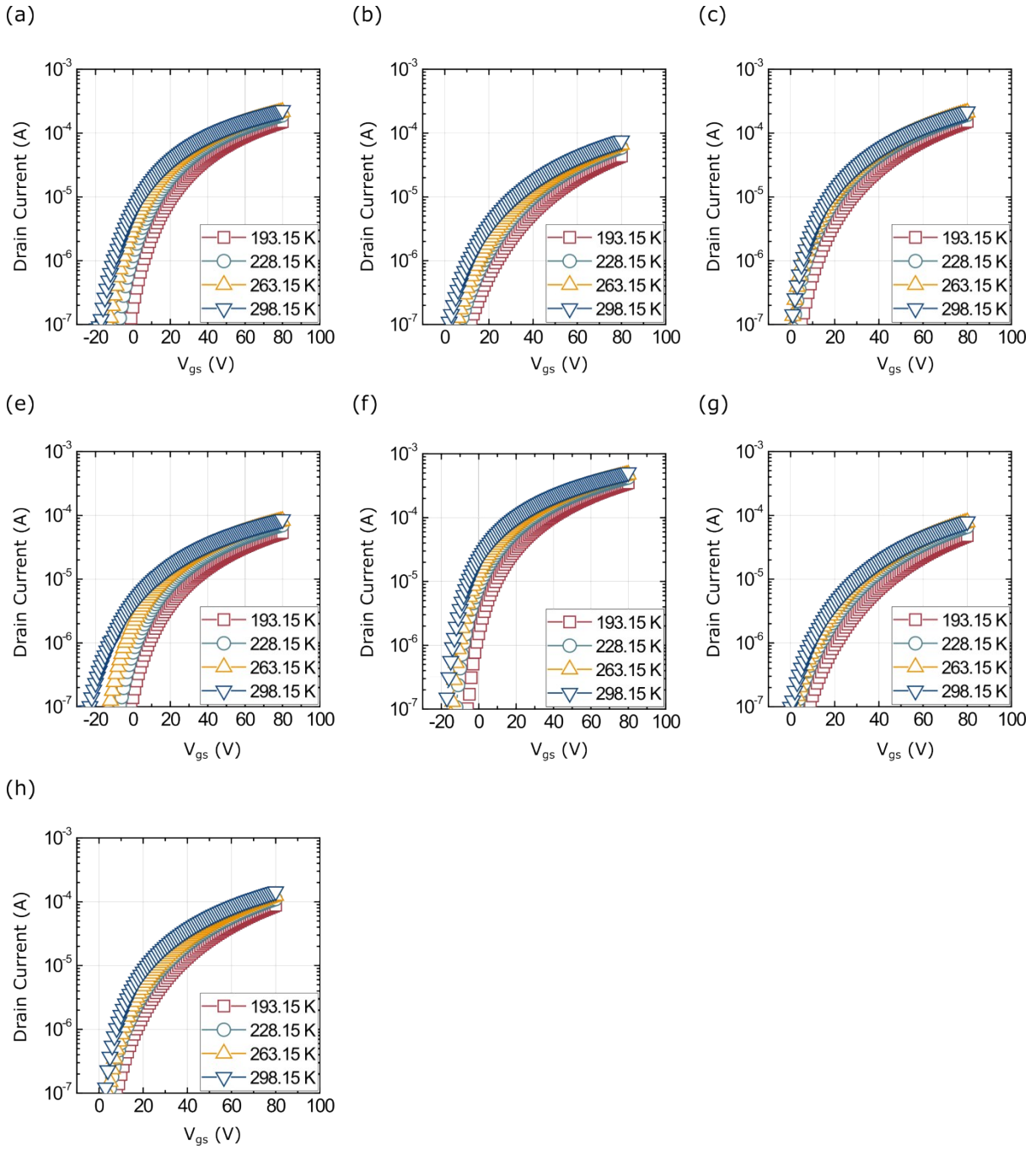
Fig. S4

From the theoretical formula with physical parameters obtained by physical-based analytical TFT model, the free charge carrier concentration (n_b), the trapped charge concetration (n_t), and the total charge carrier concentration (n_T) of (a) sample A, (b) sample B, (c) sample C, (d) sample D, (e) sample E, (f) sample F, and (g) sample G.
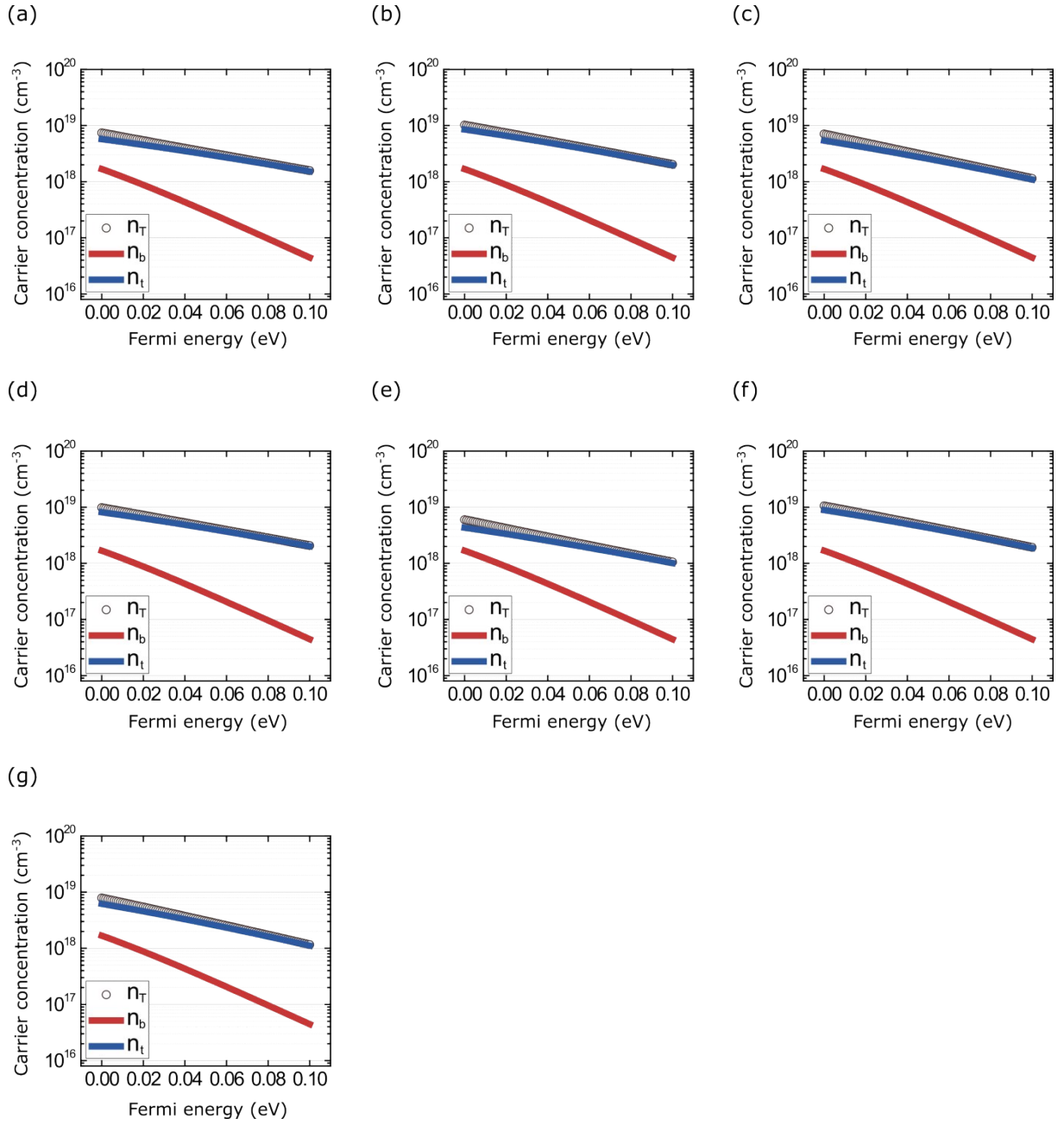
Fig. S5

The simple calculation with ions and atoms volume of decomposed impurities in metal chloride, metal nitrate, and metal acetate.

R = ~181 pm

Chloride ion (Cl⁻) in metal chloride

Volume = $2.5 * 10^{-2}$ nm³

R = ~25 pm

Nitrogen ion (N⁺) in metal nitrate

Volume = $6.5 * 10^{-5}$ nm³

R = ~70 pm

Carbon atom (C) in metal acetate

Volume = $1.4 * 10^{-3}$ nm³

The volume of chloride impurities in metal chloride (1 chloride ion) : $2.5 * 10^{-2}$ nm³

The volume of nitrate impurities in metal nitrate (1 nitrogen ion) : $6.5 * 10^{-5}$ nm³

The volume of acetate impurities in metal acetate (2 carbon atoms) $2.8 * 10^{-3}$ nm³

Table S1

The composition ratio of In and Zn obtained XPS analysis.

	In / Zn ratio
Sample A	1.52
Sample B	1.55
Sample C	1.55
Sample D	1.56
Sample E	1.53
Sample F	1.51
Sample G	1.54

Table S2

The ratio of O-H bond area to M-O bond area and O_{vac} bond area to M-O bond area.

	$Area_{O\text{-}H} / Area_{M\text{-}O}$	$Area_{O\text{-}VAC} / Area_{M\text{-}O}$
Sample A	0.41	0.42
Sample B	0.46	0.48
Sample C	0.40	0.42
Sample D	0.43	0.45
Sample E	0.31	0.41
Sample F	0.49	0.57
Sample G	0.46	0.71