Analysis of PBTS Instability of Self-Aligned Coplanar InGaZnO Thin Film Transistors

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Positive bias temperature stress (PBTS) stability is critical in achieving stable display operation, especially in OLED applications. Self-aligned coplanar structures have advantages such as lower parasitic capacitance, and better scalability due to an absence of overlap with source/drain metal regions. The PBTS instability of oxide (IGZO) thin film transistors (TFTs) is correlated with the activation energy for electron trapping (denoted as E_τ).

In this study, we obtained E_τ from the PBTS measurements under various temperatures. Fig. 1 shows the PBTS instability characteristics for sample A and sample B. As shown in Table. 1, Eτ of sample A is lower than that of sample B. sample B with better PBTS stability characteristics resulted in higher E_τ. We investigate the interface characteristics of the self-aligned coplanar devices by comparing D_{it} properties obtained via photonic C-V characteristics.

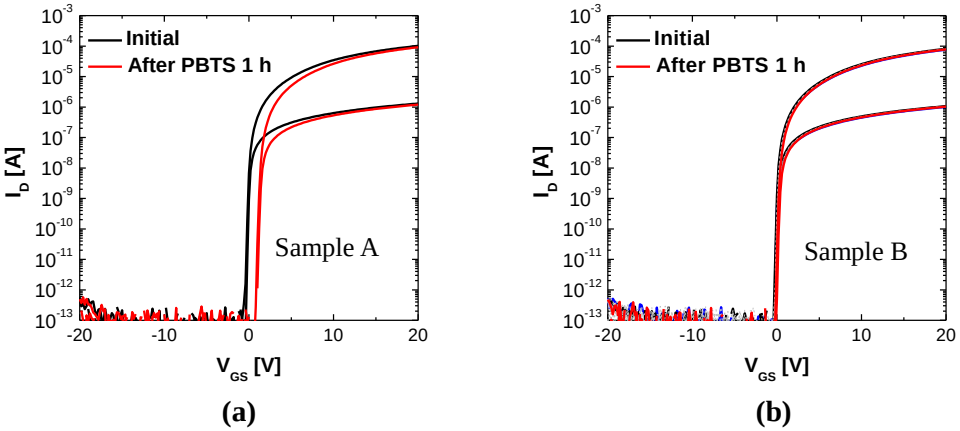

Fig. 1. The PBTS transfer characteristics of the sample A and B.

	sample A	sample B
PBTS ΔV_{th} (V)	1.4	0.28
E_τ (eV)	0.72	2.43

Table. 1. Extracted ΔV_{th} and E_τ parameters for sample A and B.

References

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