materials

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Supplementary Materials

Nanocluster-Based Ultralow-Temperature Driven Oxide Gate Dielectrics for High-Performance Organic Electronic Devices

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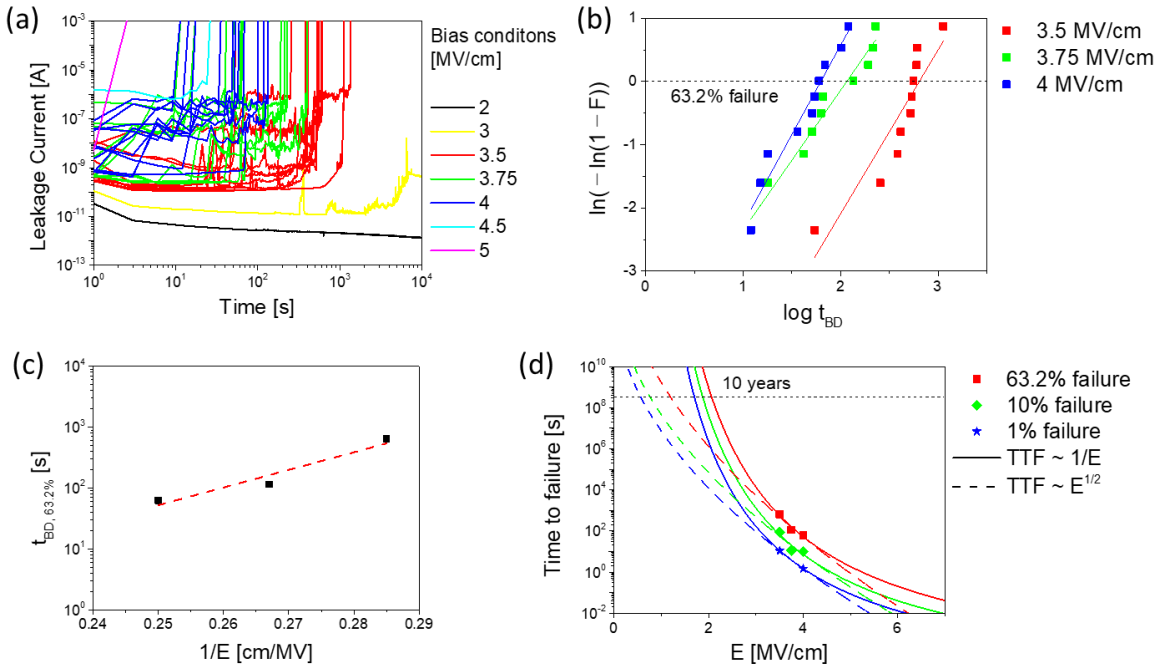

Figure S1. (**a**) Gate leakage current over time during a constant voltage stress for selected bias conditions of 2–5 MV/cm. (**b**)Weibull plot for the bias-dependent TDDB measurements conducted on nanocluster-based Al_2O_3 dielectric films. (**c**) Weibull scaling factor (t_{BD} at 63.2% failure) from bias-dependent TDDB measurements as a function of 1/*E*. (**d**) Lifetime of the nanocluster-based Al_2O_3 gate dielectric at lower gate voltages extrapolated from TDDB experiments. TTF for 63.2, 10, and 1% failure rate is shown. 1/*E* model (solid line) and $E^{1/2}$ model (dotted line) were used to extrapolate the maximum operation voltage.

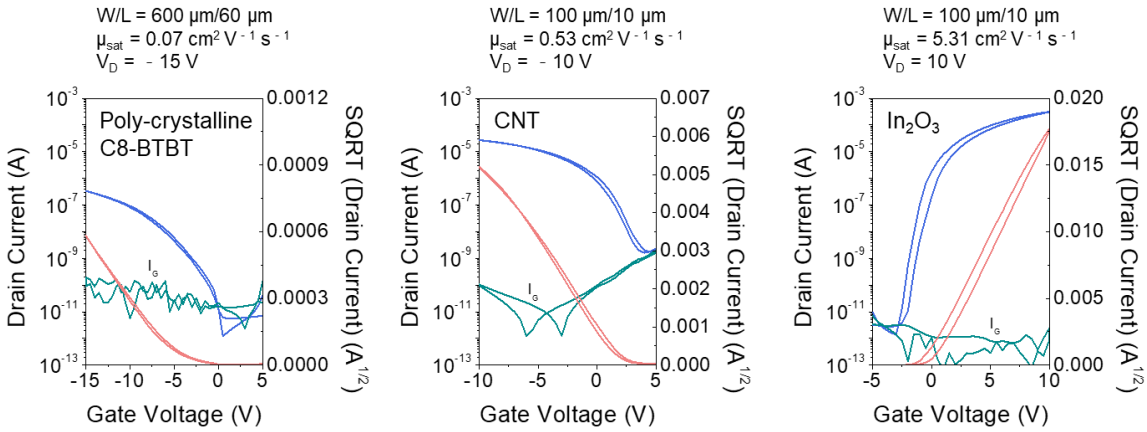

Figure S2. Representative transfer characteristics of poly-crystalline C8-BTBT, CNT, and indium oxide TFTs based on the nanocluster-based Al_2O_3.

Table S1. Summary of the extrapolated maximum operation voltages of the nanocluster-based Al_2O_3 dielectric films comparing the lifetime models for 63.2, 10, and 1 % failure rate for 10 years lifetime.

Model (Failure Rate)	Maximum Operation Electric Field
1/E (63.2%)	2.07 MV/cm
1/E (10%)	1.88 MV/cm
1/E (1%)	1.69 MV/cm
$E^{1/2}$ (63.2%)	1.20 MV/cm
$E^{1/2}$ (10%)	0.75 MV/cm
$E^{1/2}$ (1%)	0.56 MV/cm