Supplementary Information

Transistor application of new picene-type molecules, 2,9-DIALKYLATED PHENANTHRO[1,2-*b*:8,7-*b*']DITHIOPHENES

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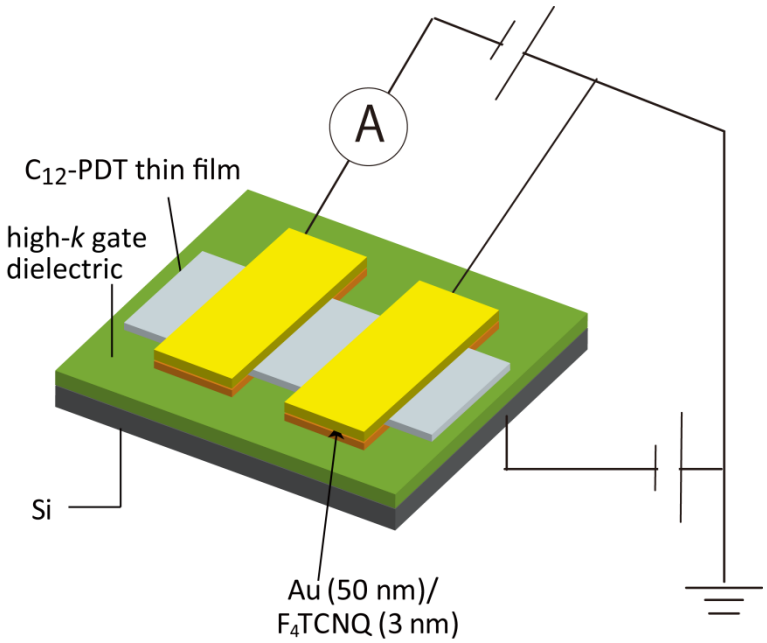

Fig. S1. Device structure of C_{12}-PDT thin-film FET with high-*k* gate dielectric; instead of high-*k* gate dielectric, the thermally oxidized SiO_2 is used for C_{12}-PDT thin-film FET with SiO_2 gate dielectric.

Table S1. FET characteristics of C_{12}-PDT FETs with an SiO_2 gate dielectric: L = 450 μm

Device No.	$<\mu>$ ($cm^2\ V^{-1}\ s^{-1}$)	$<\lvert V_{th}\rvert>$ (V)	$<I_{on/off}>$	$<S>$ (V decade^{-1})
1	1.41	4.7×10^1	1.0×10^7	2.4
2	8.84×10^{-1}	3.8×10^1	9.3×10^5	4.4
3	6.38×10^{-1}	3.1×10^1	1.6×10^6	2.9
4	8.55×10^{-1}	6.9×10^1	1.9×10^7	1.3
5	1.75	6.8×10^1	5.0×10^5	12
6	1.61	6.4×10^1	3.7×10^5	12
7	5.78×10^{-1}	5.5×10^1	4.0×10^5	4.6
8	7.16×10^{-1}	7.2×10^1	1.5×10^5	7.2
9	1.53	5.7×10^1	6.9×10^5	9.6
Av.	1.1(5)	$6(1) \times 10^1$	$4(7) \times 10^6$	6(4)

Table S2. FET characteristics of C_{12}-PDT FETs with high-k gate dielectrics: L = 450 μm.

	$<\mu>$ ($cm^2\ V^{-1}\ s^{-1}$)	$<\lvert V_{th}\rvert>$ (V)	$<I_{on/off}>$	$<S>$ (V decade^{-1})
PZT				
1	6.40×10^{-1}	8.7	1.7×10^5	8.3×10^{-1}
2	7.31×10^{-1}	8.7	9.6×10^2	2.7
3	5.83×10^{-1}	6.9	1.7×10^5	1.0
Av.	$6.5(7) \times 10^{-1}$	8(1)	$1(1) \times 10^5$	2(1)
HfO_2				
1	1.08	1.088×10^1	1.8×10^6	9.720×10^{-1}
2	1.40	1.182×10^1	1.2×10^6	1.154
3	2.19	1.165×10^1	1.6×10^5	1.002
4	2.15	1.218×10^1	2.6×10^5	1.058
Av.	1.7(6)	$1.16(6) \times 10^1$	$8(8) \times 10^5$	1.05(8)
Ta_2O_5				
1	9.1×10^{-1}	1.123×10^1	8.4×10^6	1.32
2	5.8×10^{-1}	1.134×10^1	7.7×10^4	1.54
3	7.3×10^{-1}	1.101×10^1	4.4×10^4	1.59
4	4.2×10^{-1}	1.257×10^1	9.4×10^3	1.19
Av.	$7(2) \times 10^{-1}$	$1.15(7) \times 10^1$	$2(4) \times 10^6$	1.4(2)
ZrO_2				
1	2.06	1.179×10^1	2.9×10^5	1.25
2	9.69×10^{-1}	1.222×10^1	3.5×10^5	1.61
3	2.12	1.185×10^1	6.3×10^4	1.51
4	2.13	1.175×10^1	1.5×10^5	1.26
Av.	1.8(6)	$1.19(2) \times 10^1$	$2(1) \times 10^5$	1.4(2)

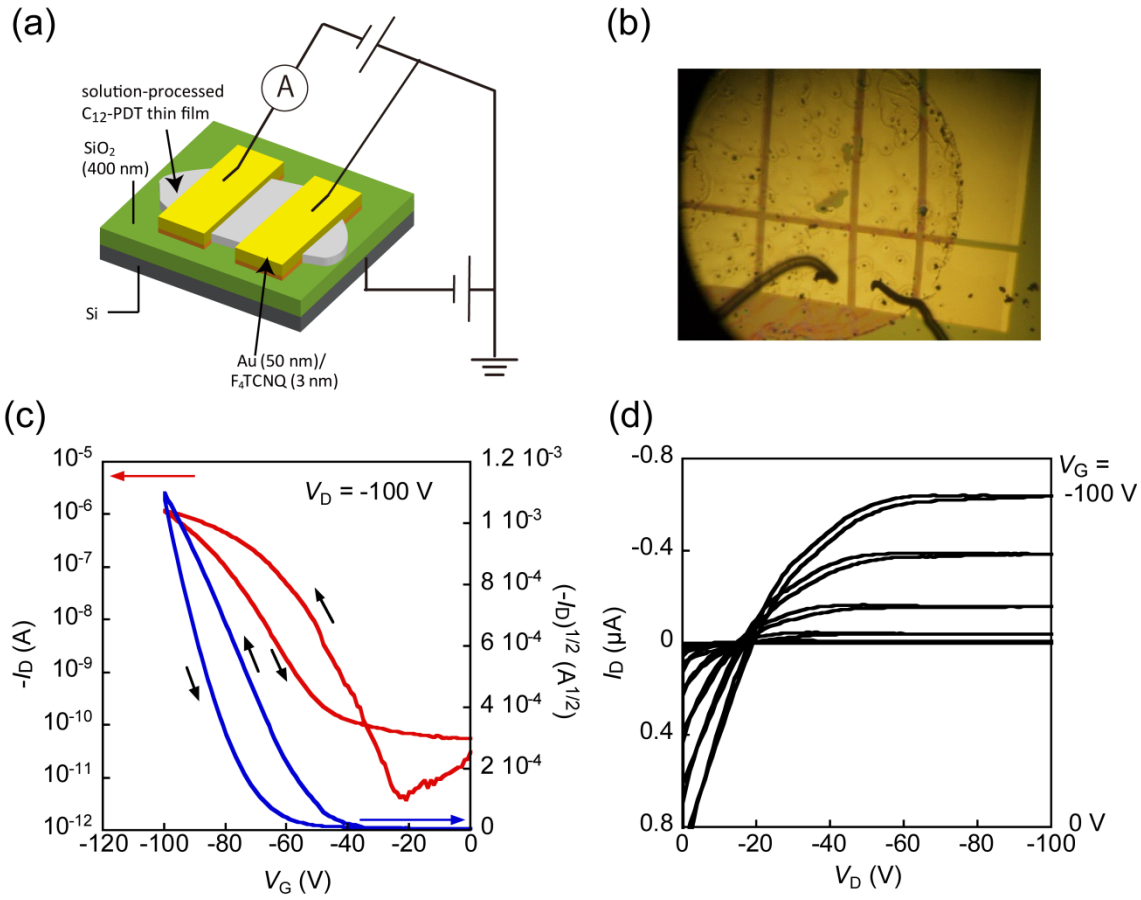

Fig. S2. (a) Device structure and (b) photograph of solution-processed C_{12}-PDT thin-film FET. (c) Transfer and (d) output curves of the FET.