

Supporting Information

Thiophene-*S,S*-dioxidized diarylethenes for light-starting irreversible thermosensors that can detect a rise in heat at low temperature

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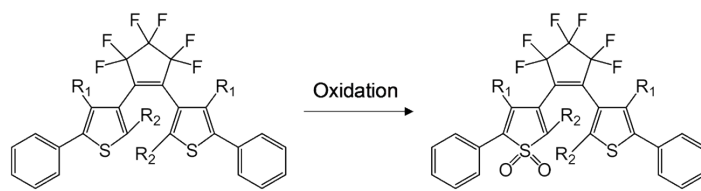
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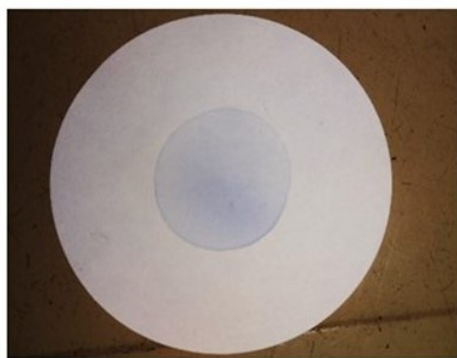
Table S1. Molar absorption coefficients of the open-ring isomer and the closed-ring isomer for diarylethenes and thiophene-*S,S*-dioxidized diarylethenes reported previously.



- 7:** $R_1 = H, R_2 = CH_3$
8: $R_1 = H, R_2 = C_2H_5$
9: $R_1 = H, R_2 = CH_2CH(CH_3)_2$
10: $R_1 = H, R_2 = CH(CH_3)_2$
11: $R_1 = H, R_2 = cyclo-C_6H_{11}$
12: $R_1 = H, R_2 = CH(CH_3)C_2H_5$
13: $R_1 = H, R_2 = CH(CH_3)C_3H_7$
14: $R_1 = H, R_2 = CH(C_3H_7)_2$
15: $R_1 = H, R_2 = C_3H_7$
16: $R_1 = H, R_2 = OCH_3$
17: $R_1 = H, R_2 = OC_2H_5$
18: $R_1 = H, R_2 = OCH_2CH(CH_3)_2$
19: $R_1 = H, R_2 = OCH_2C(CH_3)_3$
20: $R_1 = H, R_2 = OCH(CH_3)_2$
21: $R_1 = H, R_2 = O-cyclo-C_6H_{11}$
22: $R_1 = H, R_2 = OC(CH_3)_3$
23: $R_1 = H, R_2 = CH_2OCH_3$
24: $R_1 = CH_3, R_2 = CH(CH_3)_2$
25: $R_1 = CH_3, R_2 = CH(C_3H_7)_2$

- 26:** $R_1 = H, R_2 = CH_3$
27: $R_1 = H, R_2 = C_2H_5$
28: $R_1 = H, R_2 = CH_2CH(CH_3)_2$
29: $R_1 = H, R_2 = CH(CH_3)_2$
30: $R_1 = H, R_2 = cyclo-C_6H_{11}$
31: $R_1 = H, R_2 = CH(CH_3)C_2H_5$
32: $R_1 = H, R_2 = CH(CH_3)C_3H_7$
33: $R_1 = CH_3, R_2 = CH(CH_3)_2$

Scheme S1. Molecular structure of diarylethenes and thiophene-*S,S*-dioxidized diarylethenes reported previously.^{S1,S2}



Just after irradiation with UV light



after 20 min at $-10\text{ }^{\circ}\text{C}$

Fig. S1. Thermal bleaching behavior of **1b** in a filter paper at $-10\text{ }^{\circ}\text{C}$.

Table S1. Molar absorption coefficients of the open-ring isomer and the closed-ring isomer for diarylethenes and thiophene-*S,S*-dioxidized diarylethenes reported previously.^{S1, S2}

Compound	open-ring isomer	closed-ring isomer
	$\epsilon_0/\text{M}^{-1} \text{ cm}^{-1}$	$\epsilon_c/\text{M}^{-1} \text{ cm}^{-1}$
7	35600	15600
8	40000	17000
9	37200	14700
10	34900	14800
11	34700	13600
12	36200	14000
13	40600	14900
14	37600	12600
15	34100	14500
16	33000	15000
17	33000	13000
18	38700	13500
19	36800	14500
20	32000	13000
21	34000	13000
22	33000	10000
23	40000	16300
24	27100	9300
25	32000	8850
26	25000	19000
27	29200	20600
28	31500	19600
29	24100	17300
30	26000	17000
31	29700	16800
32	26200	16400
33	19400	15100

Reference

- S1. H. Shoji, D. Kitagawa and S. Kobatake, *New J. Chem.*, 2014, **38**, 933.
- S2. D. Kitagawa and S. Kobatake, *Chem. Rec.*, 2016, **16**, 2005.