Supporting information

Suppression mechanism of the photodegradation of J-aggregate thin films of cyanine dyes by coating with polysilanes

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Synthesis of OS-H-Cl



To a solution of 5-chloro-2-mercaptomethyl-benzothiazol (4.31 g, 20 mmol) in *o*-dichlorobenzene (20 mL), propane sultone (4.8 g, 40 mmol) was added and the solution was refluxed for 24 h. After filtration, the filtrate was washed with chloroform and 3-(2-mercaptomethyl-benzothiazol-3-yl)-propane-1-sulfonic acid anion (1) was obtained. Yield was 60%.

To a solution of 5-chloro-2-methylbenzoxazol (3.3 g, 20 mmol) in *o*-dichlorobenzene (20 mL), propane sultone (4.8 g, 40 mmol) was added and the solution was refluxed for 24 h. After filtration, the filtrate was washed with chloroform and

3-(2-methyl-benzoxazol-3-yl)-propane-1-sulfonic acid anion (2) was obtained. Yield was 69%.

1 (3.4 g, 10 mmol) and 2 (2.9 g, 10 mmol) were dissolved in pyridine (20 g) and the solution was refluxed for 2 h. After filtration, the filtrate was washed with acetone. The filtrate was purified by recrystallization and OS-H-Cl (**3**) was obtained Yield was 46%. ¹H NMR (DMSO-*d*6) d 8.87 (t,2H), d 8.48(t, 1H), d 8.05(d,3H), d7.98(t, 3H), d 7.75(d, 2H), d 7.42(m, 3H), d 6.78(s,1H), d2.57 (m,5H), d2.11(m,5H).



Figure SI-1. Cyclic voltammogram of $J_{A-Et-Cl}$ (a), PMPS thin films (b), and $J_{A-Et-Cl}$ / PMPS composite film (c).