Electronic Supplementary Material (ESI) for Polymer Chemistry

Supporting Information

Thermoresponsive fluorescence polymer brushes device as a platform for selective detection of Cr (VI)

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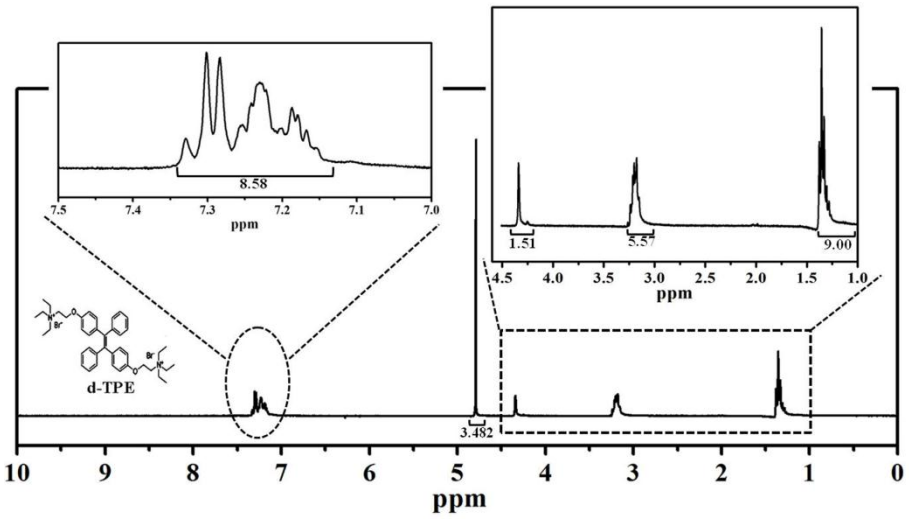

Figure S1. The structure of tetraphenylethene derivate (d-TPE) was confirmed by ^{1}H NMR spectroscopy in D_2O. The proton chemical shift at 7.21 ppm was assigned to the phenyl ring and the shift at 4.34 ppm could be attributed to the chemical shift of $-CH_2-$ in 1-methoxy-4-methylbenzene. The proton chemical shift at 3.196 ppm was attributed to the $-CH_2-$ in methylethanaminium bromide and the shift at 1.36 ppm assigned to the proton in methyl groups. All structures indicate the origin of monomer tetraphenylethene derivate d-TPE.

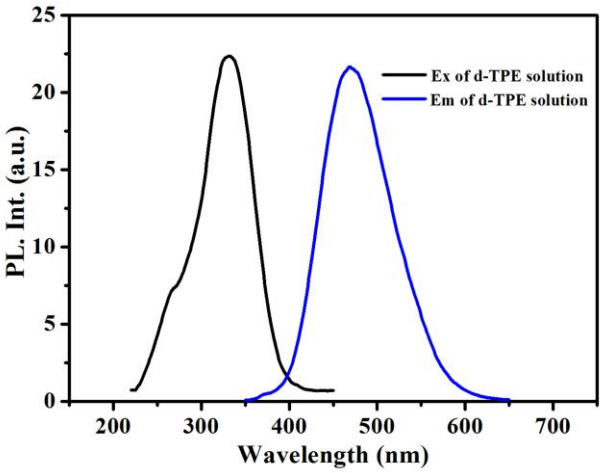

Figure S2. The PL excitation (λ_{ex} = ~ 340 nm) and emission (λ_{em} = ~ 468 nm) spectra of d-TPE molecules in aqueous solution.

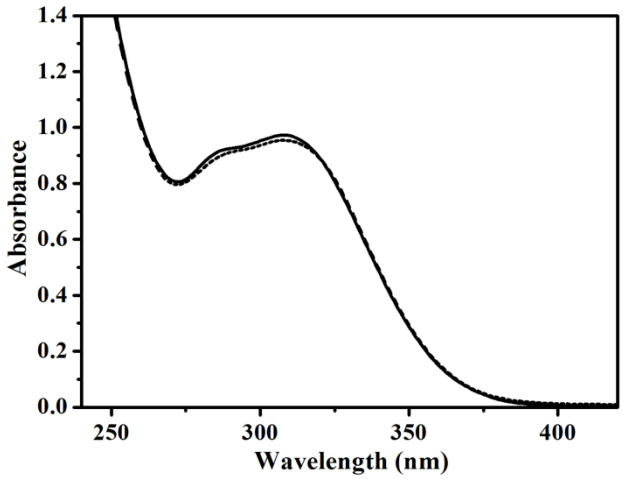

Figure S3. The UV absorption spectra of d-TPE in aqueous solution (1×10^{-3} mol/L, 3 mL) before (solid line) and after (dotted line) interacting with the p(NIPAM-*co*-AAc) brushes film. The absorbance was 0.97270 and 0.95436, respectively. According to the Bouguer–Lambert–Beer law: $A=\lg(1/T)=Kbc$, $A_1/A_2=C_1/C_2$, $C_2=9.8114\times10^{-4}$ mol/L. $C=C_1-C_2=1.886\times10^{-5}$ mol/L, the self-assemble amounts of d-TPE molecular on the brushes film was 1.886×10^{-5} mol/L×0.003 L=5.658×10^{-5} mmol.

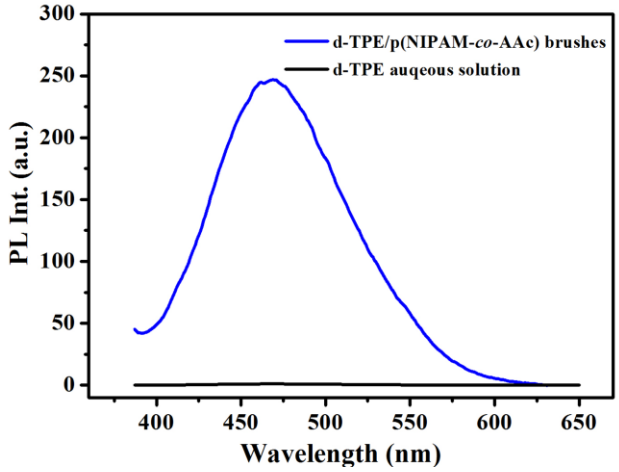

Figure S4. The PL spectra (λex = 340 nm) of d-TPE/p(NIPAM-*co*-AAc) brushes (blue line) and d-TPE molecules in aqueous solution (1×10^{-3} mol/L) (black line).

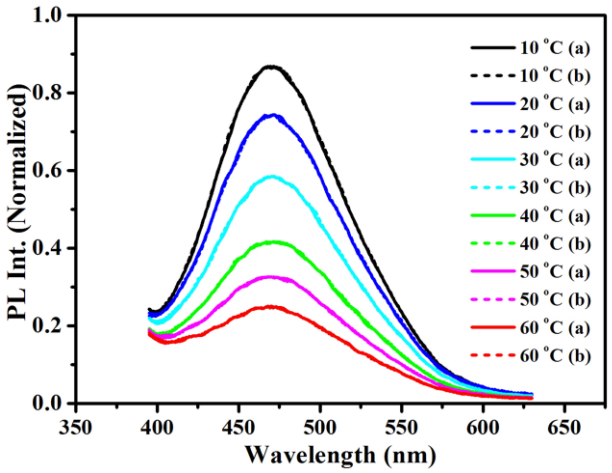

Figure S5. Normalized PL spectra of the d-TPE/p(NIPAM-*co*-AAc) brushes with the temperature increasing from 10 to 60 ^{o}C, and subsequently decreasing from 60 to 10 ^{o}C.

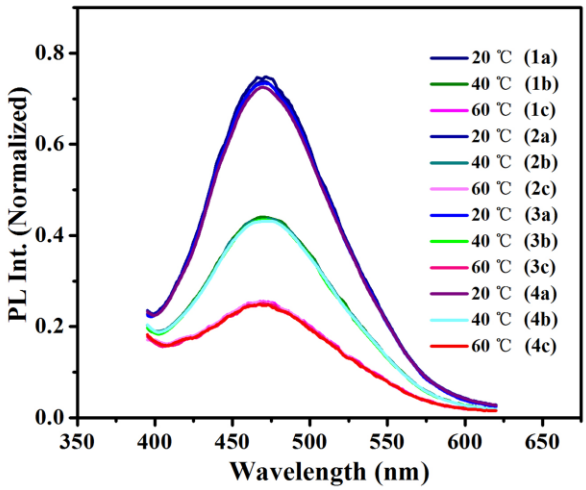

Figure S6. Normalized PL emission spectra of d-TPE/p(NIPAM-*co*-AAc) brushes at different temperatures (20, 40, and 60 ^{o}C) for four cycles. The PL intensity was obtained at ~ 468 nm with the excitation at 340 nm.

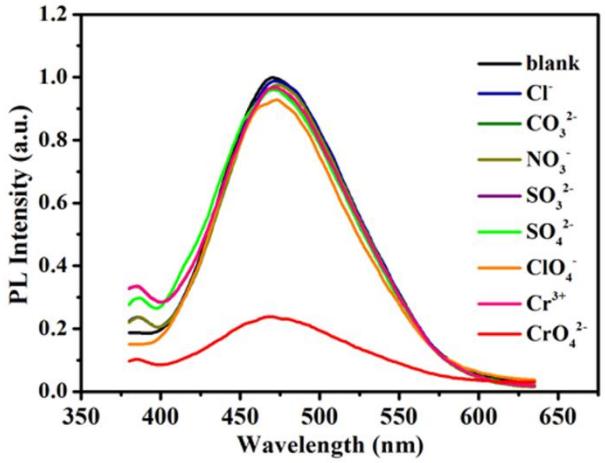

Figure S7. Normalized PL emission spectra of d-TPE/p(NIPAM-*co*-AAc) brushes in the presence of different ions (Cl^-, CO_3^{2-}, NO_3^-, SO_3^{2-}, SO_4^{2-}, ClO_4^-, Cr^{3+} and CrO_4^{2-}) in aqueous solution at the same concentration of 50 ppm.