Supporting information

A tryptophan responsive fluorescent and wettable dual-signal switch

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1. NMR Spectra and ESI-MS spectrum of C4DA

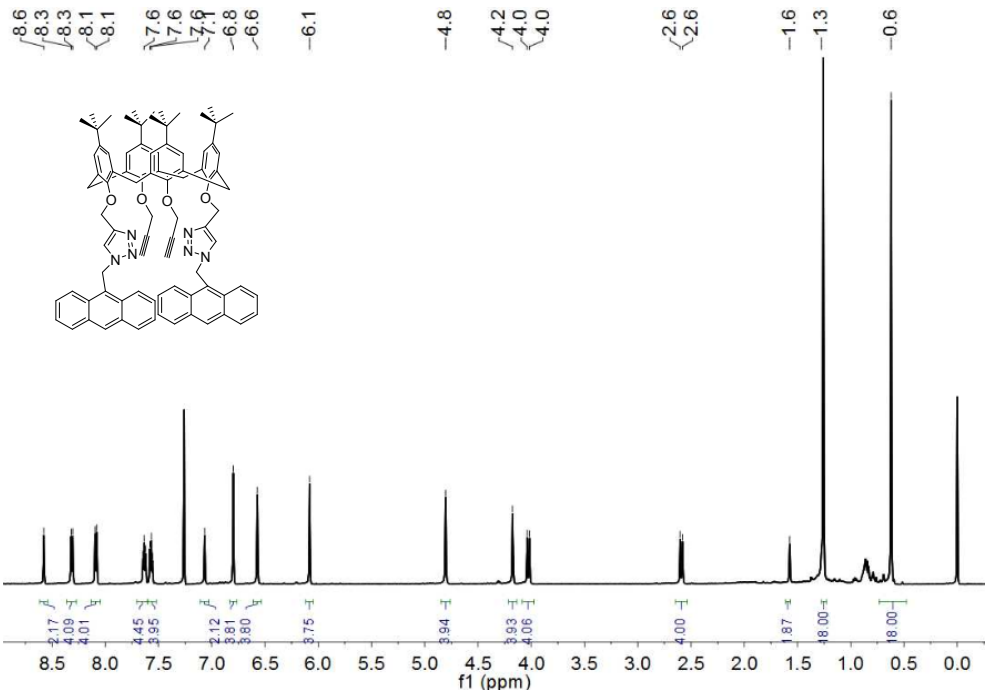

Figure S1. ^{1}H NMR of C4DA ($CDCl_3$, 400 MHz, 298 K).

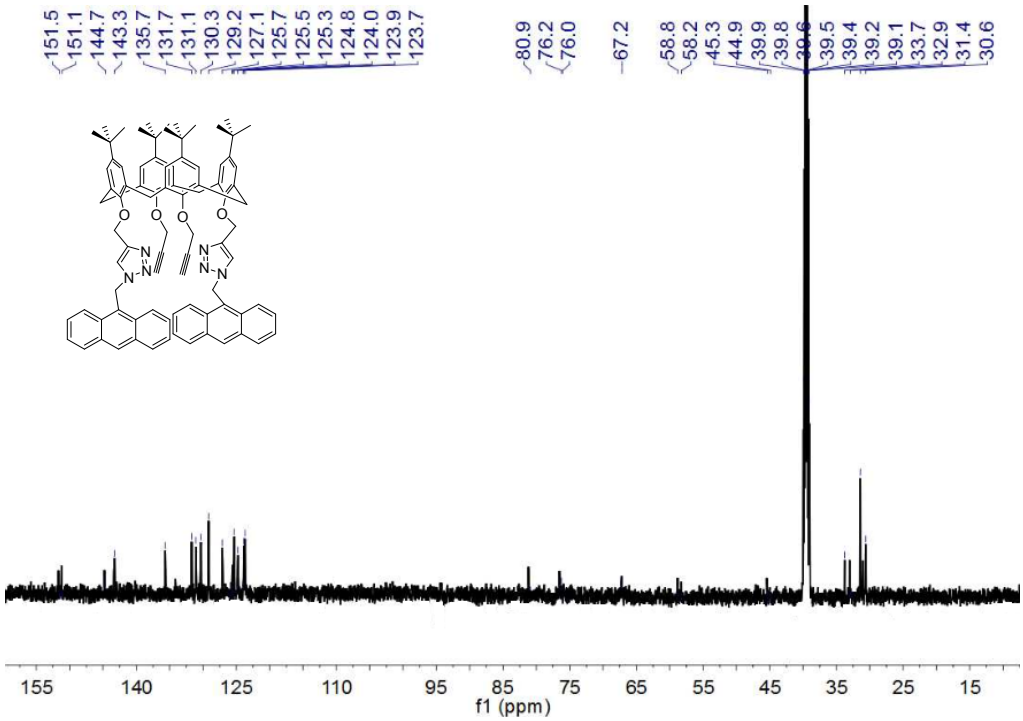

Figure S2. ^{13}C NMR of C4DA (DMSO-d_6, 400 MHz, 298 K).

2. Continuous variation plot of the C4DA-Trp system

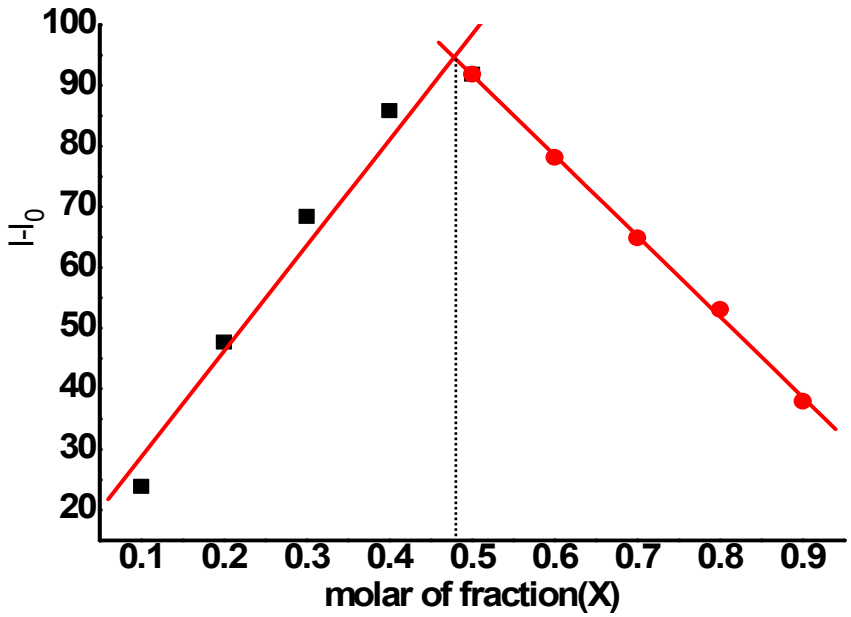

Figure S3. Continuous variation plot of the C4DA-Trp system ([C4DA] + [Trp] = 2.0×10^{-3} mol·L^{-1}). Job plot has a peak with a molar fraction of 0.5 and indicates the conjugating ratio of C4DA and Trp was 1:1.

3. NMR spectra of the interaction

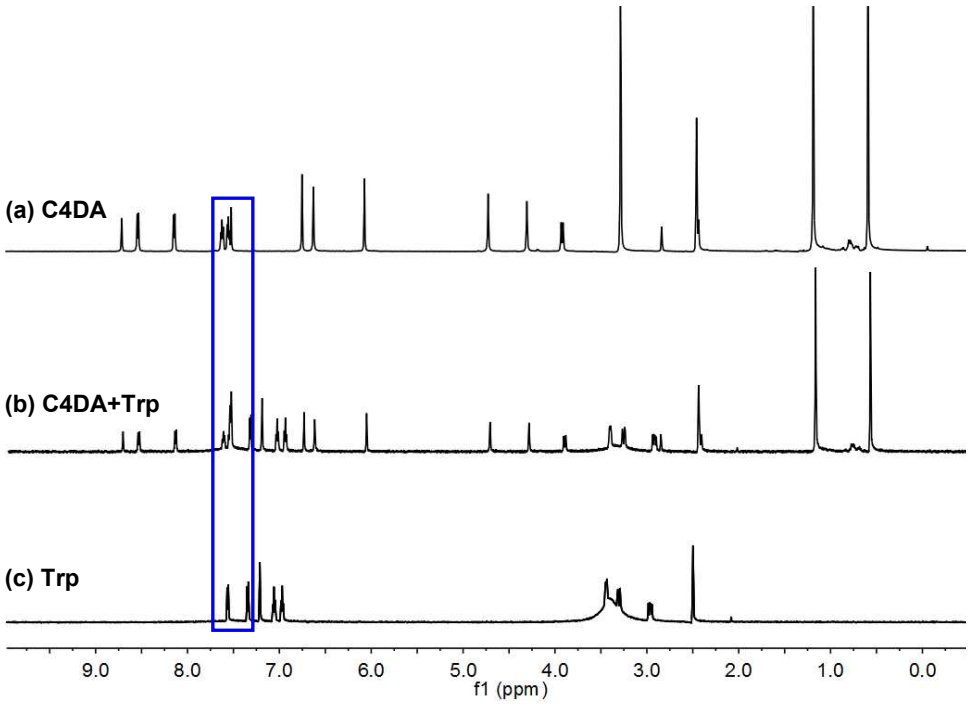

Figure S4. ^{1}H NMR spectra (d_6-DMSO, 600 MHz, 298 K) of (a) C4DA (6 mM), (b) C4DA and Trp (6 mM each), (c) Trp (6 mM). Insertion: Part of ^{1}H NMR spectra (d_6-DMSO, 600 MHz, 298 K) of (a) C4DA (6 mM), (b) C4DA and Trp (6 mM each), (c) Trp (6 mM). The result indicates the interact between C4DA and Trp.

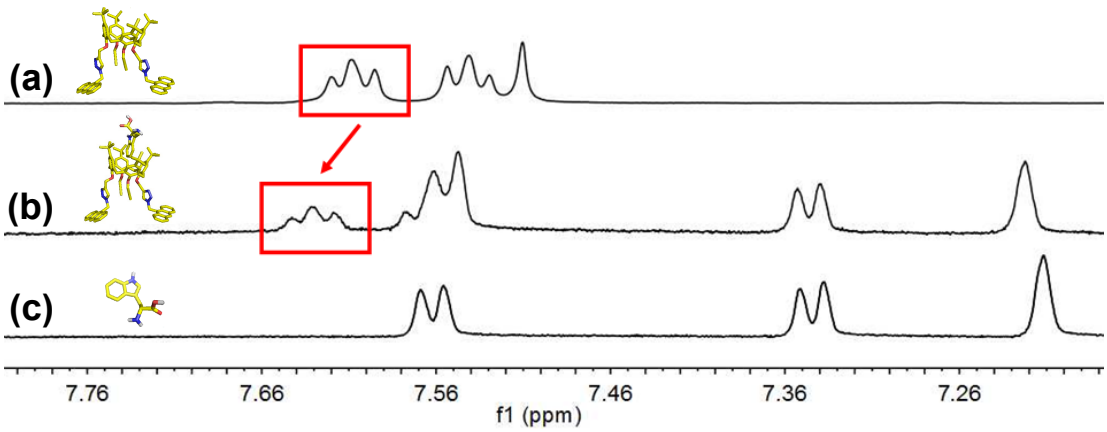

Figure S5. Part of ^{1}H NMR spectra (d_6-DMSO, 600 MHz, 298 K) of (a) C4DA (6 mM), (b) C4DA and Trp (6 mM each), (c) Trp (6 mM). The result indicates the interact between C4DA and Trp.

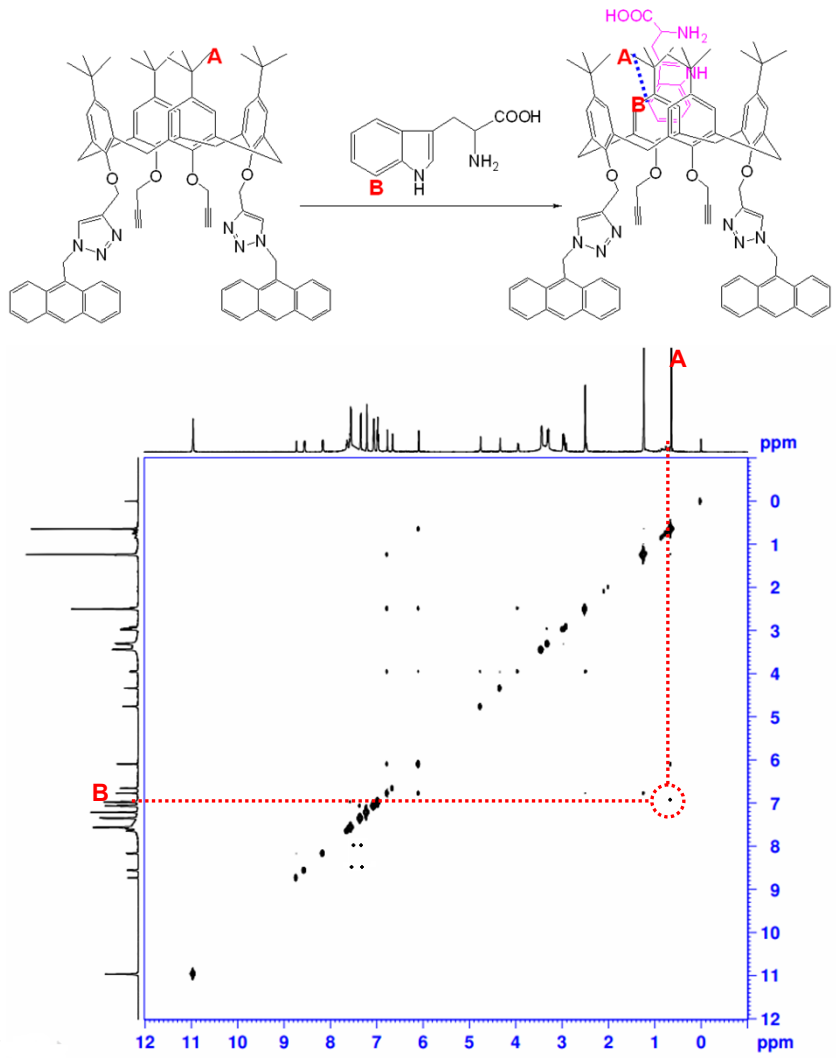

Figure S6. NOESY of the mixture of C4DA and Trp (6 mM each, DMSO, 600 MHz, 298 K), which displayed NOEs between indole ring and anthracene unit.

4. DFT Computational Studies

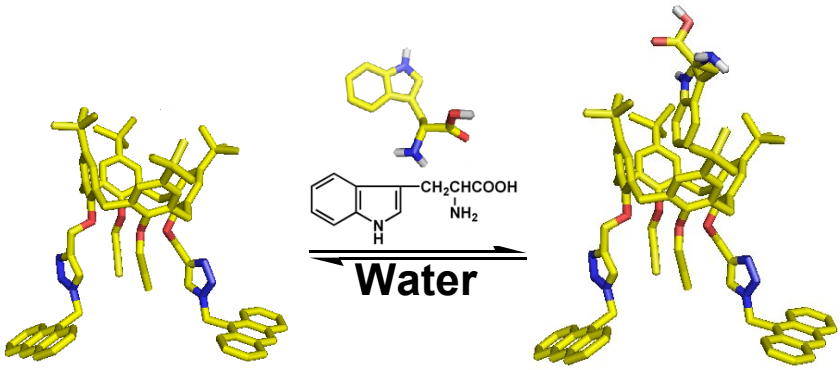

Figure S7. A view of the optimized structure of the host-guest complex, which shows that the indole ring of Trp inserted into the upper rim of the cavity and the carboxyl exposed outside the cavity of the calixarene. Note: Partial hydrogen atoms of the host and guest are omitted for clarity. The host C4DA was yellow, the guest Trp was also yellow, oxygen atoms were red, nitrogen atoms were blue and hydrogen atoms were white.

5. Wettability selectively recognition of Trp and some control experiments on C4DA SAMs

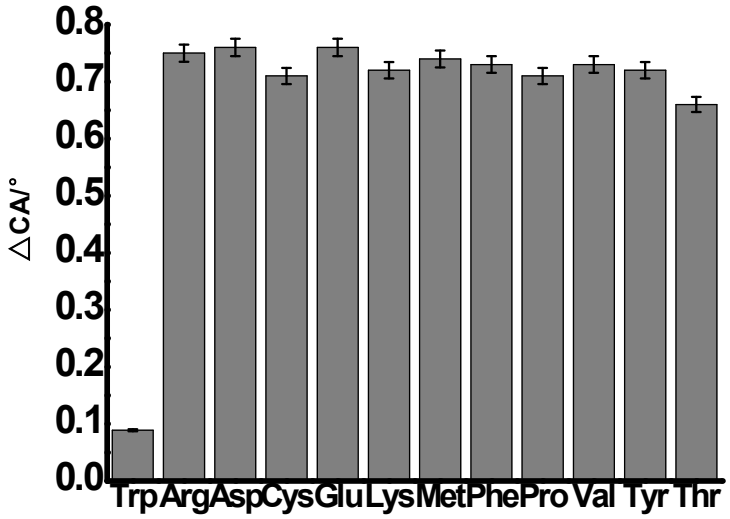

Figure S8. Contact angle variation [$\Delta CA = (CA_{control} - CA)/ CA_{control}$] histogram for the C4DA SAMs in the presence of four guests, which indicates the selectively wettability responsive of C4DA toward Trp.

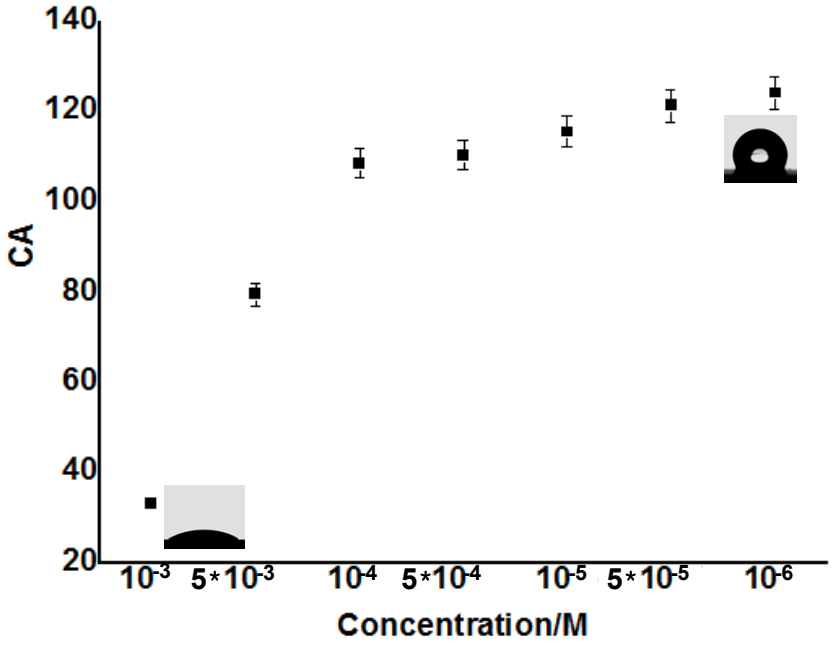

Figure S9. CAs with various concentrations of Trp (0.05 ± 0.01 mL, 1.0×10^{-3} – 1.0×10^{-6} M). It clearly shows that the detection limit for Trp is 1.0×10^{-6} mol/L.

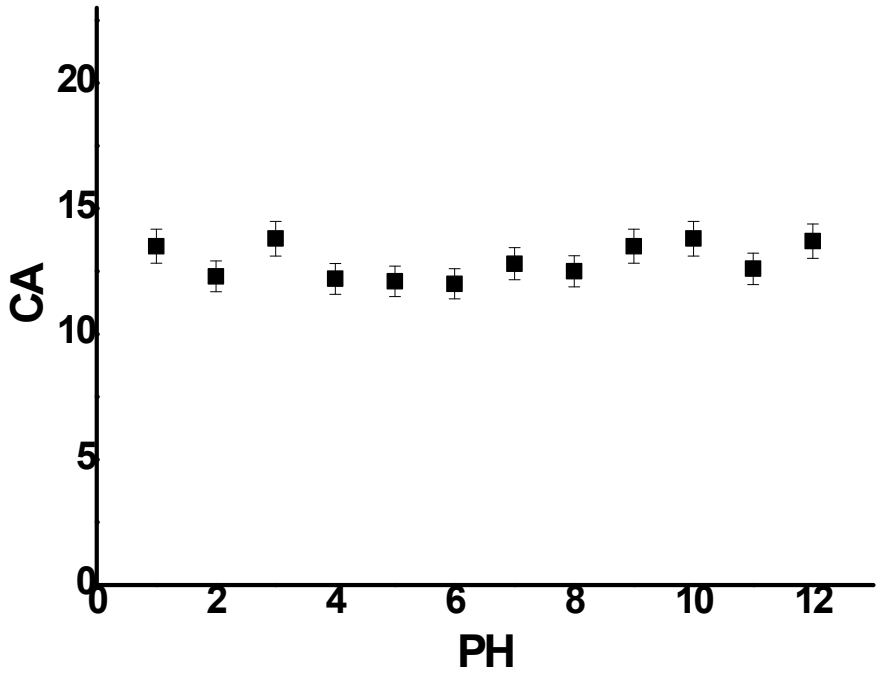

Figure S10. Effect of pH on the recognition of Trp on C4DA-SAMs. The results show that the C4DA-SAMs were acid and alkali resistant.

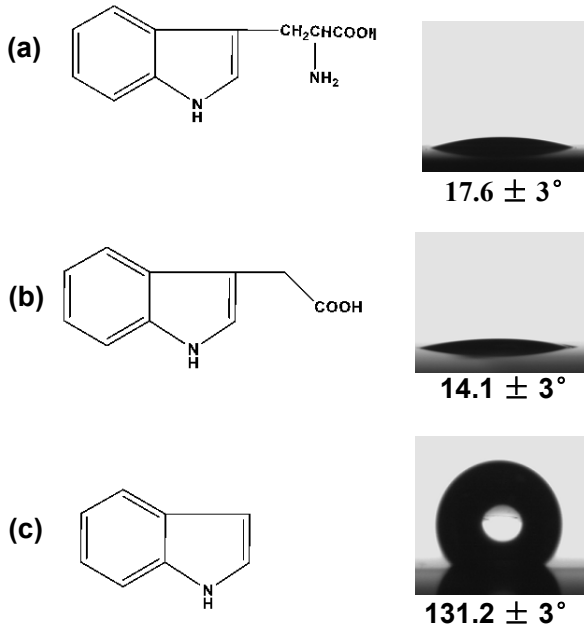

Figure S11. Contact angle of C4DA SAMs in the presence of indole and its derivatives. This result suggests that the hydrophilic unit of Trp is important for the wettability switch.