Electronic Supplementary Information for

A Dual-Stimuli-Responsive Fluorescent Switch Ultrathin Film

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Figure S1. The Zeta potential (mV) of SP@PTBEM micelle.
**Figure S2.** The Zeta Potential (mV) of Rf solution.

**Figure S3.** The Zeta Potential (mV) of Rf-PSS hybrid solution.
**Figure S4.** The Zeta potential (mV) of LDHs nanosheets suspension.

**Figure S5.** (A) The fluorescence photographs and (B) corresponding photoluminescence spectra of MC in various solvents (5×10⁻⁴ mol/L) upon irradiation by UV light for 120s.
Figure S6. UV-Vis absorption spectra of SP@PTBEM and MC@PTBEM, and the insert shows the photograph of change from SP to MC.

Figure S7. UV-Vis absorption spectra of Rf-PSS (pH=7) and Rf-PSS (pH=10), the insert shows the relevant photograph of change between pH=7 and pH=10.
Figure S8. The photographs of Rf with different concentration (2 mg/ml, 0.2 mg/ml, 0.02 mg/ml, 0.002 mg/ml) under (A) the visible light and (B) the UV light.

Figure S9. The photoluminescence spectra of Rf with different concentrations (2 mg/ml, 0.2 mg/ml, 0.02 mg/ml, 0.002 mg/ml).
Figure S10. The XRD pattern of MgAl-LDHs nanoplatelets.

Figure S11. The SEM image of MgAl-LDHs nanoplatelets.
**Figure S12.** Side-view of SEM images for: (A) (SP@PTBEM/LDHs)₄ UTF, (B) (SP@PTBEM/LDHs)₈ UTF, (C) (SP@PTBEM/LDHs)₁₆ UTF on a silicon substrate. (D) The linear correlation between thickness of (SP@PTBEM/LDHs)ₙ UTFs and bilayer number $n$, with a bilayer thickness of 31 nm.

**Figure S13.** Side-view of SEM images for: (A) (Rf-PSS/LDHs)₄ UTF, (B) (Rf-PSS/LDHs)₈ UTF, (C) (Rf-PSS/LDHs)₁₆ UTF on a silicon substrate. (D) The linear correlation between thickness of (Rf-PSS/LDHs)ₙ UTFs and bilayer number $n$, with a bilayer thickness of 25 nm.
Figure S14. X-ray photoemission spectra of the N 1s core level regions of (A) the closed-ringed SP form and (B) open-ringed MC form.

Figure S15. The transformation of molecular structure for riboflavin caused by pH value.\textsuperscript{[1]}