

Electronic Supplementary Information for
Fabrication of Pyrenetetrasulfonate/Layered Double Hydroxide
Ultrathin Films and their Application in Fluorescence Chemosensors

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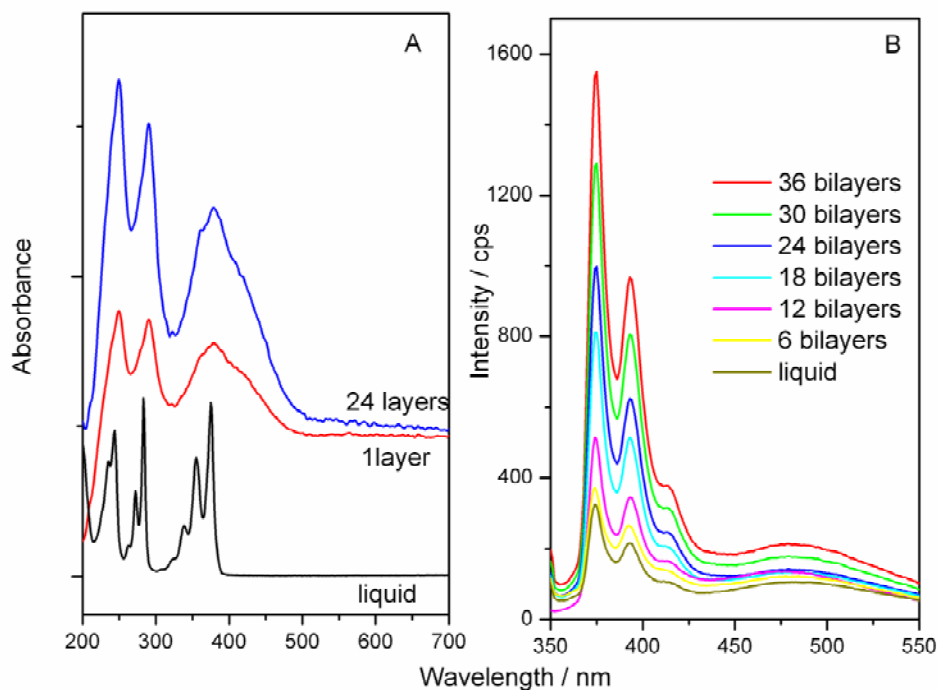


Figure S1. (A) The UV-vis absorption spectra and (B) emission spectra of the pristine PTS in solution and PTS/LDH UTFs.

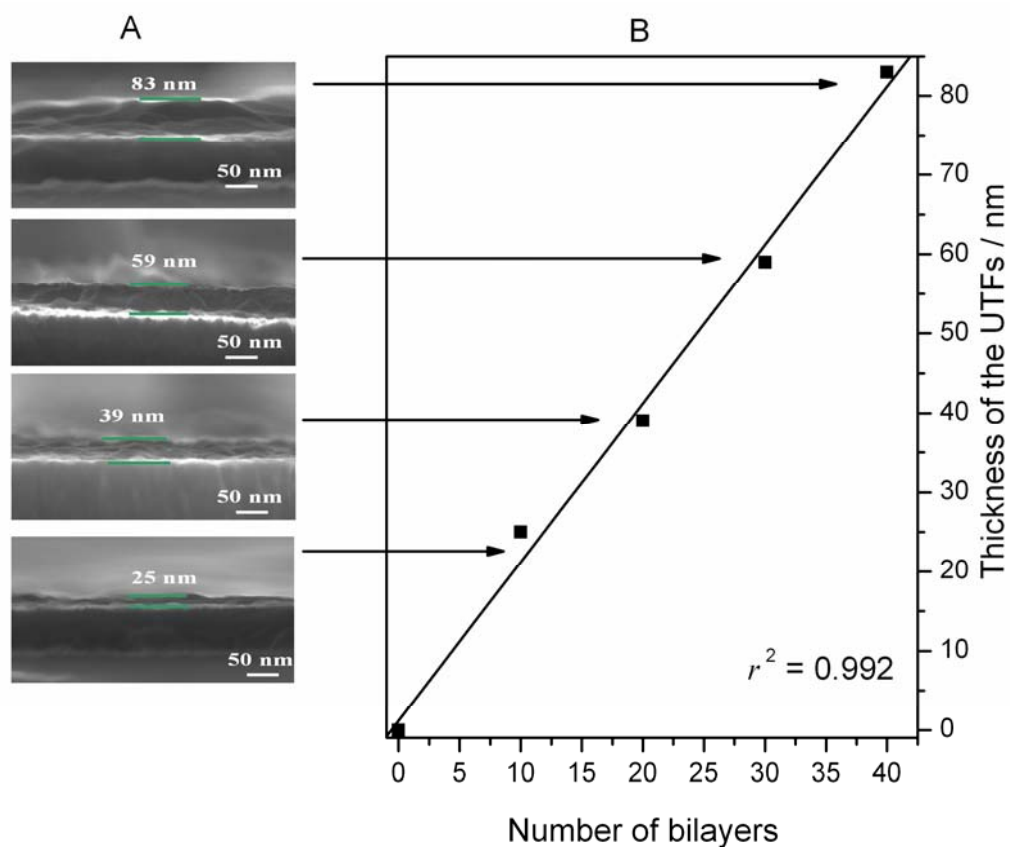


Figure S2. (A) Side-view of SEM images for the (PTS/LDH)_n UTFs with $n=10$, 20, 30 and 40 respectively; (B) thickness of these UTFs vs. n .

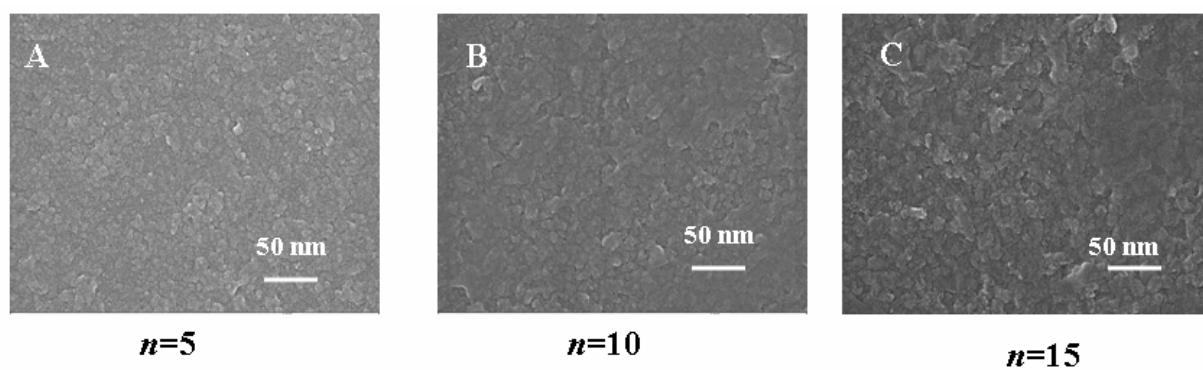


Figure S3. Top-view of SEM images of the (PTS/LDH)_n UTFs for (A) $n=5$, (B) $n=10$ and (C) $n=15$.

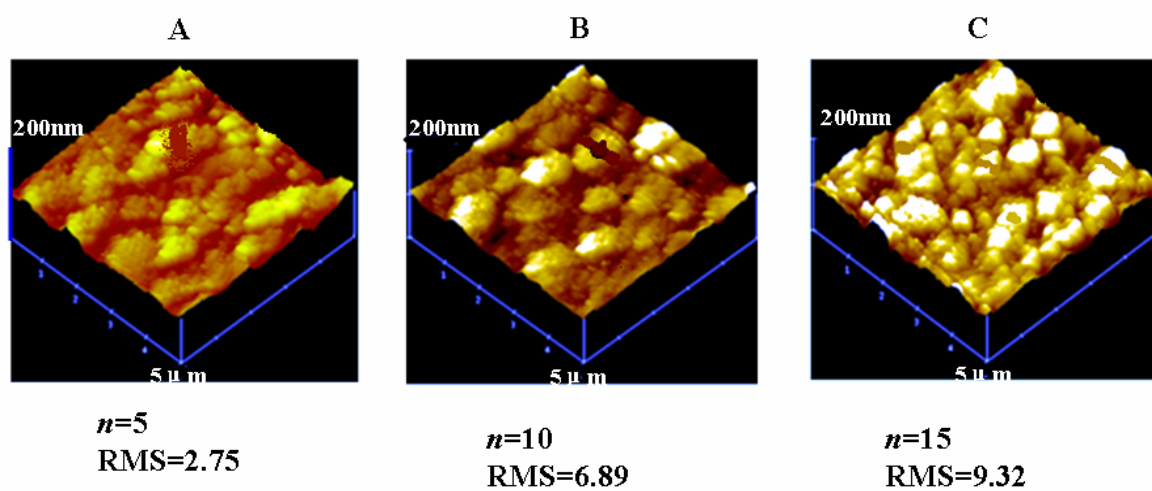


Figure S4. AFM images of the (PTS/LDH)_n UTFs for (A) *n* = 5, (B) *n* = 10 and (C) *n* = 15.

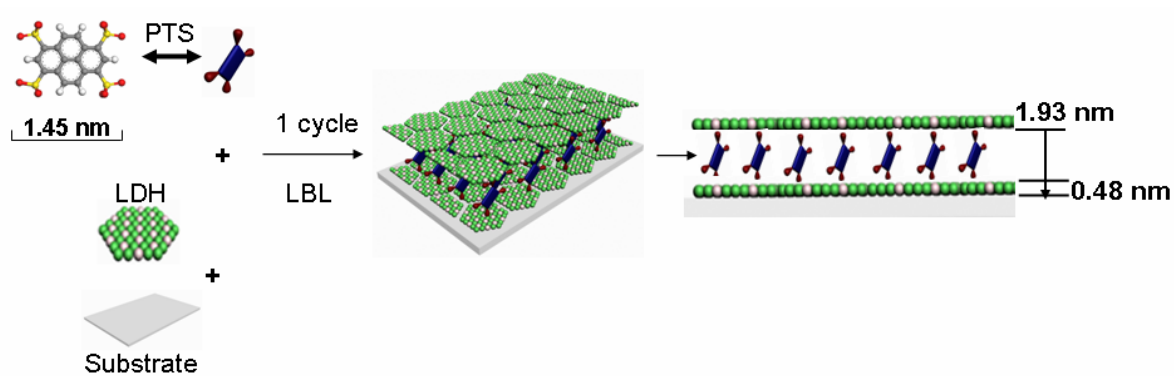


Figure S5. Schematic representation for an ideal assembly and structure of PTS/LDH UTF (Zn green, Al pink, H white, S yellow, O red, C grey).

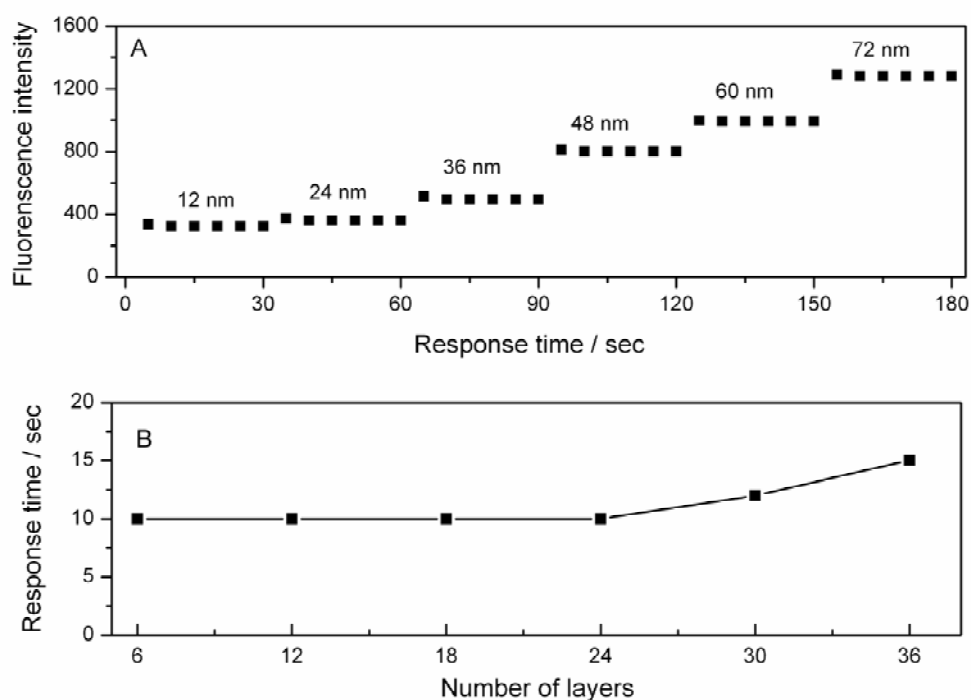


Figure S6. (A) Response time of the chemosensor for Cu^{2+} ($0.2 \mu\text{M}$) with different film thickness. The interval time of each measurement is 5 s. The excitation wavelength is 340 nm and monitor wavelength is 375 nm. (B) Correlation between the response time and n .

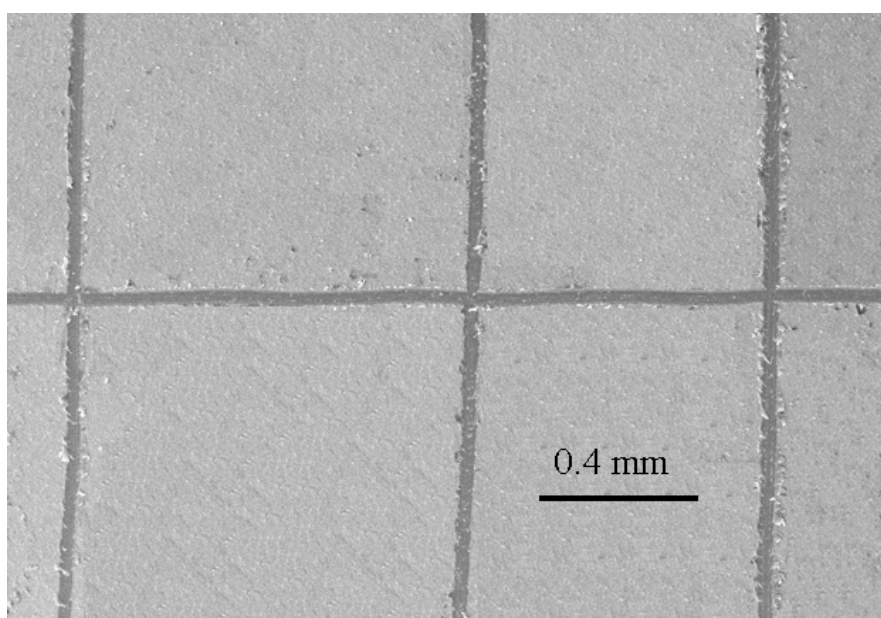


Figure S7. SEM image of the $(\text{PTS/LDH})_{24}$ UTF tested for adhesion to the substrate.

Table S1: Fluorescence Decay Data of PTS in Solution and the (PTS/LDH)_n UTFs.

n	x	τ_i (ns)	A_i (%)	$\langle\tau\rangle$ (ns)	Chi ²
6	2	128.6	46.6	113.5	1.55
		100.3	53.4		
12	2	108.6	40.4	116.3	1.14
		121.5	59.6		
18	2	106.9	56.4	120.4	1.25
		137.9	43.6		
24	2	130.5	43.9	128.6	1.36
		127.1	56.1		
30	2	124.3	41.9	120.1	1.54
		117.1	58.1		
PTS solution /10 ⁻⁵ mol/L	1	80.2	100	80.2	1.32
(PTS/LDH) ₂₄ -Cu ²⁺	2	130.5	52.3	127.3	1.52
		123.8	47.7		

n is the number of bilayer; x is the series of exponential fit; τ_i is the fluorescence lifetime; A_i is the preexponential factor related with the statistical weights of each exponential; $\langle\tau\rangle$ is the intensity average lifetime. The goodness of fit is indicated by the value of Chi².