

Supporting Information

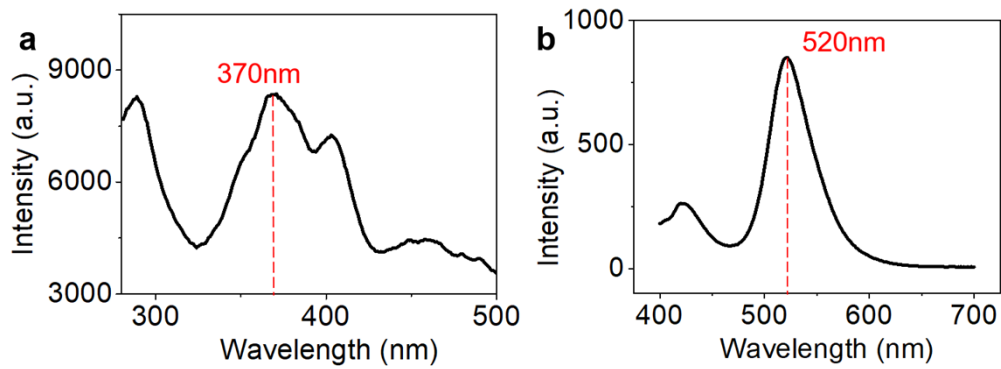
Metastable Molecular Array Guided by the Synergy of Confinement and Charge Repulsion for Piezochromic Sensor

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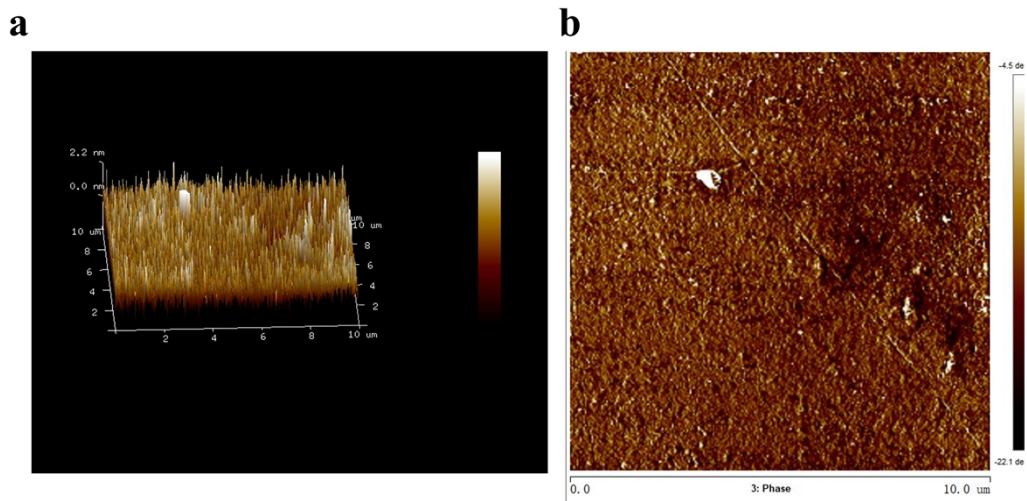
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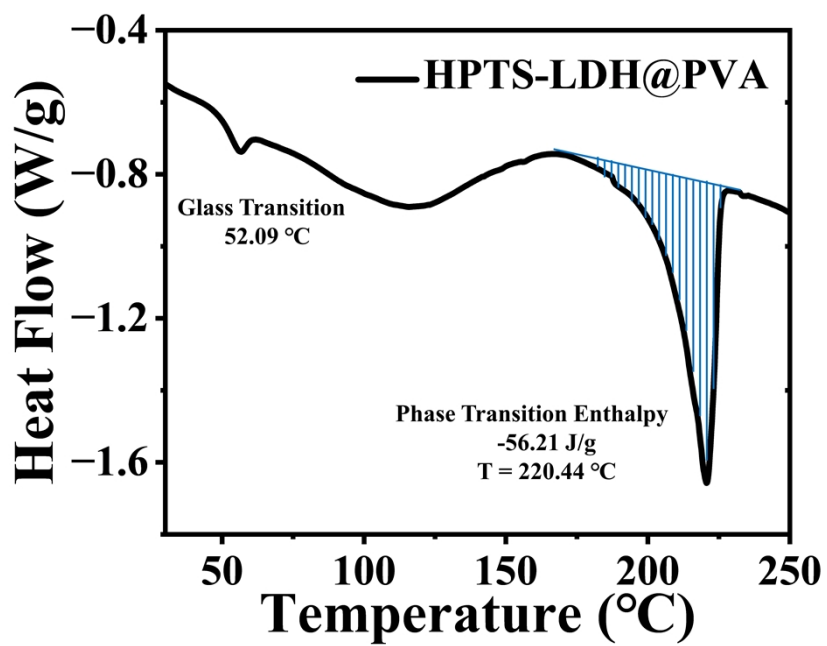
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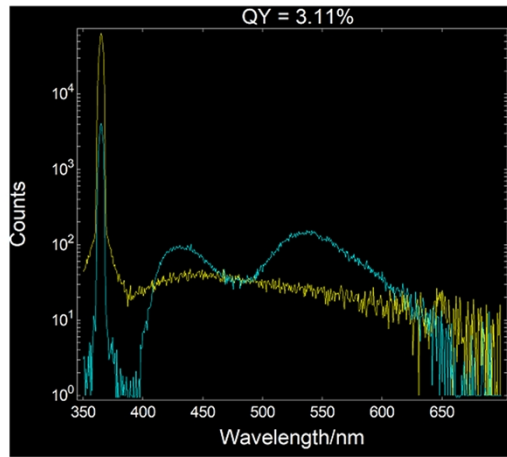
Supplementary Figure 1. The fluorescent (a) excitation and (b) emission spectrum of HPTS-LDH@PVA film.



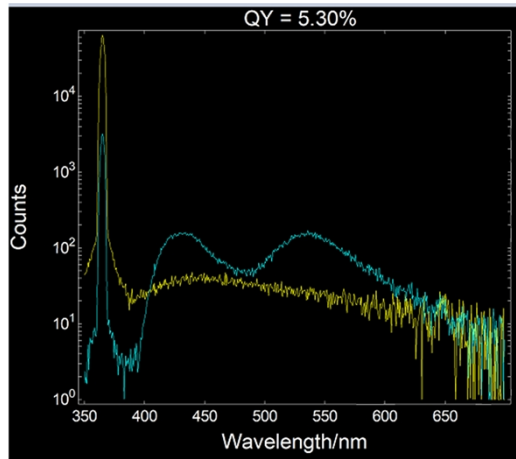
Supplementary Figure 2. (a) The 3D and (b) 1D of tapping-mode AFM topographical images of the HPTS-LDH@PVA film.



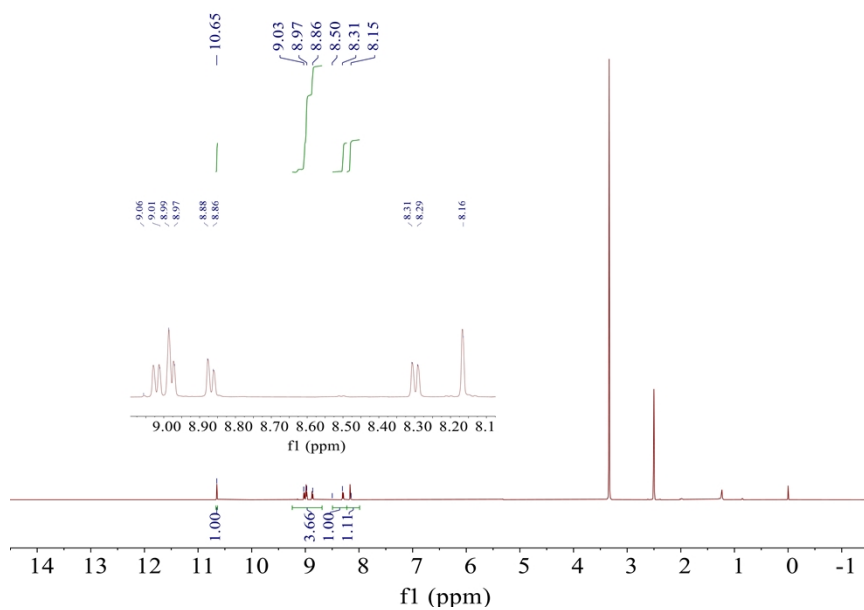
Supplementary Figure 3. Heat flow-temperature relationship of HPTS-LDH@PVA.



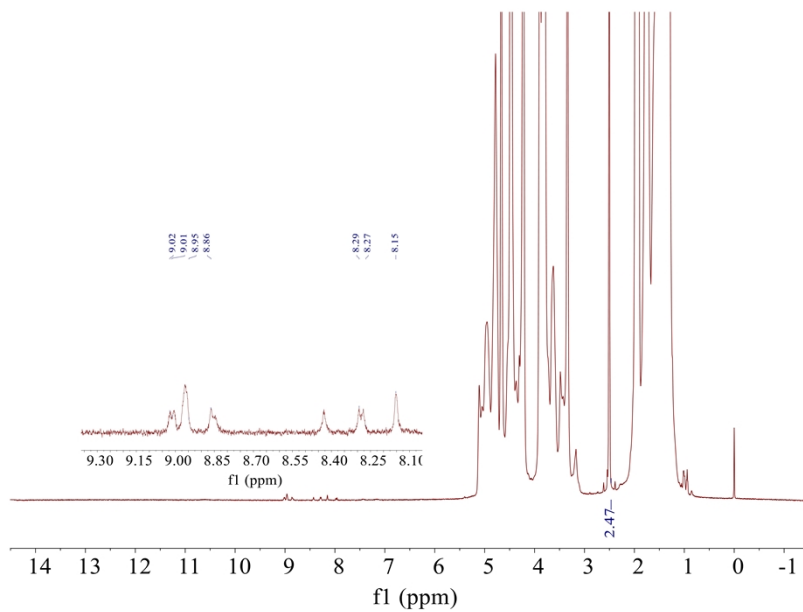
Supplementary Figure 4. Quantum efficiency of HPTS-LDH@PVA film before pressure.



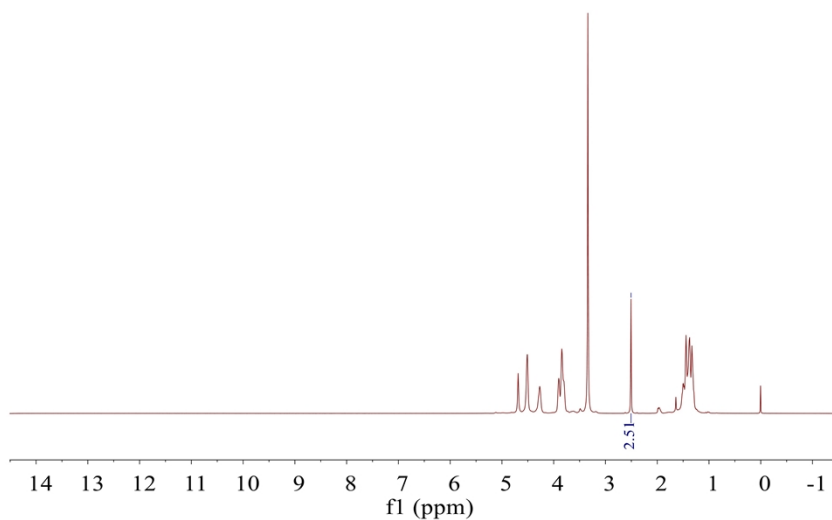
Supplementary Figure 5. Quantum efficiency of HPTS-LDH@PVA film after pressure.



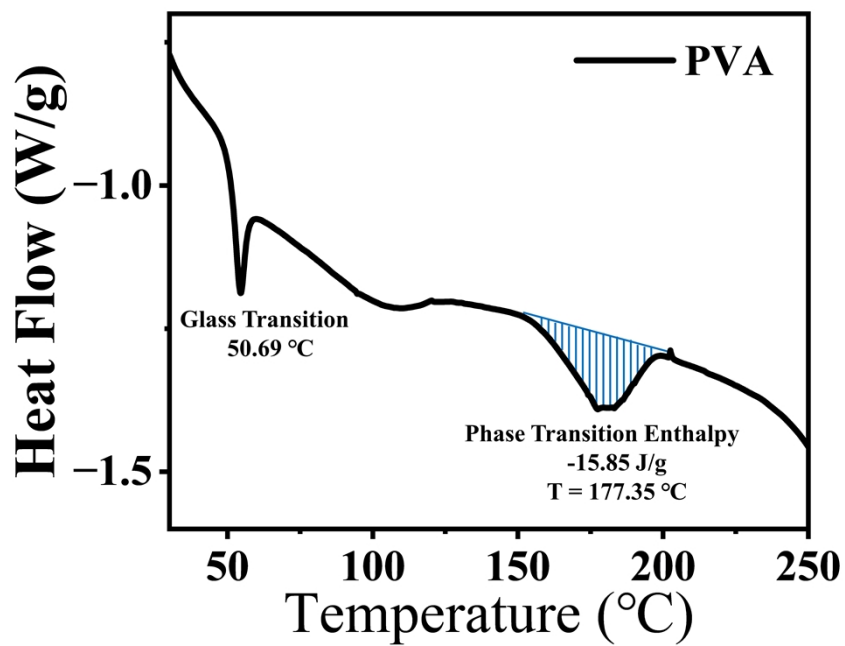
Supplementary Figure 6. ^1H NMR spectrum. The spectrum of HPTS molecule was collected in $\text{DMSO-}d_6$ under ambient conditions.



Supplementary Figure 7. ¹H NMR spectrum of HPTS-LDH@PVA film in DMSO-*d*₆.



Supplementary Figure 8. ^1H NMR spectrum of PVA film in $\text{DMSO-}d_6$.



Supplementary Figure 9. Heat flow-temperature relationship of PVA.

Supplementary Table 1. The ICP-MS results of NO₃-LDH, the calculated ratio of Mg/Al and corresponding chemical formula.

LDH	Mg (ppm)	Al (ppm)	Mg/Al	[Mg _a Al _b (OH) _x](A ⁿ⁻) _y ·zH ₂ O	
				<i>a</i>	<i>b</i>
NO ₃ -LDH	3.88	1.39	3.18	0.76	0.24

Supplementary Table 2. Elemental analysis results of HPTS-LDH and the calculated weight fraction of HPTS in HPTS-LDH.

Batches	S (wt.%)	HPTS (wt.%)	average of HPTS (wt.%)
HPTS-LDH-1	5.21	24.7	
HPTS-LDH-2	5.15	24.4	24.6
HPTS-LDH-3	5.23	24.8	

Supplementary Table 3. The fluorescence decay curve of the original, compressed and recovered HPTS-LDH@PVA.

Sample	τ_1 (ns)	A ₁ (%)	τ_2 (ns)	A ₂ (%)	χ^2	τ_{ave} (ns)
original	1.938	54.31	7.198	45.69	1.246	4.29
compressed	1.922	44.82	7.517	55.18	1.262	4.99
recovered	1.936	52.14	7.402	47.86	1.114	4.48

Supplementary Table 4. The fluorescence decay curve of the original, compressed and recovered HPTS@PVA.

Sample	τ_1 (ns)	A ₁ (%)	τ_2 (ns)	A ₂ (%)	χ^2	τ_{ave} (ns)
original	0.67	59.12	4.32	40.88	0.952	2.12
compressed	0.61	51.80	4.17	48.2	1.012	2.31
recovered	0.64	58.24	4.26	41.8	0.936	2.14