Supporting Information

A Novel pH–Responsive POSS–Based Nanoporous Luminescent Material Derived from Brominated Distyrylpyrdine and Octavinylsilsesquioxane

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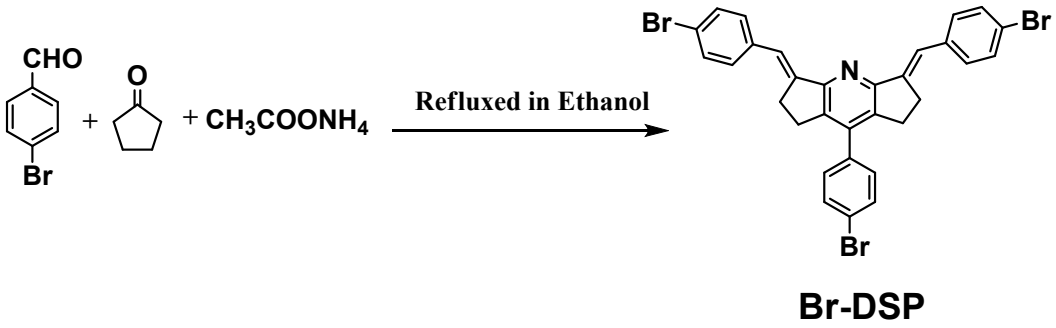
Synthesis and characterization of Br–DSP

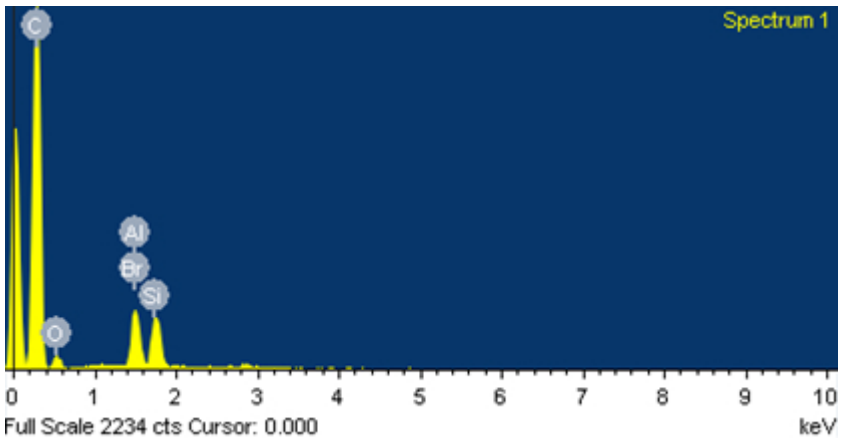
As shown in Scheme 1, Br–DSP was synthesized through one–step reaction according to our previous report.[1] A mixture of 4–bromobenzaldehyde (0.1 mol), cyclopentanone (0.05 mol) and ammonium acetate (38.5 g, 0.5 mol) in ethanol (250 mL) with 1 mL of 30 % hydrogen peroxide was boiled during 1 h and left to stand overnight at 20 °C. The precipitate was refluxed in 50 mL acetone, and then filtered to get product, which is dried in vacuum at 80 °C for 24 h.



Scheme 1S. Synthesis of Br–DSP.

Reference

(1) X. Jiang, J. Yin, Y. Murakami and M. Kaji, *J. Photopolym. Sci. Technol.,* 2009, **22**, 351.



Element	Weight%	Atomic%
C	82.80	89.50
O	8.73	7.09
Al	2.80	1.35
Si	3.83	1.77
Br	1.84	0.30
Totals	100.00	

Element	Weight%	Atomic%
C	85.19	90.72
O	8.98	7.19
Si	3.94	1.79
Br	1.89	0.30
Totals	100.00	

Figure 1S. Energy dispersive spectroscopy (EDS) of HPP.

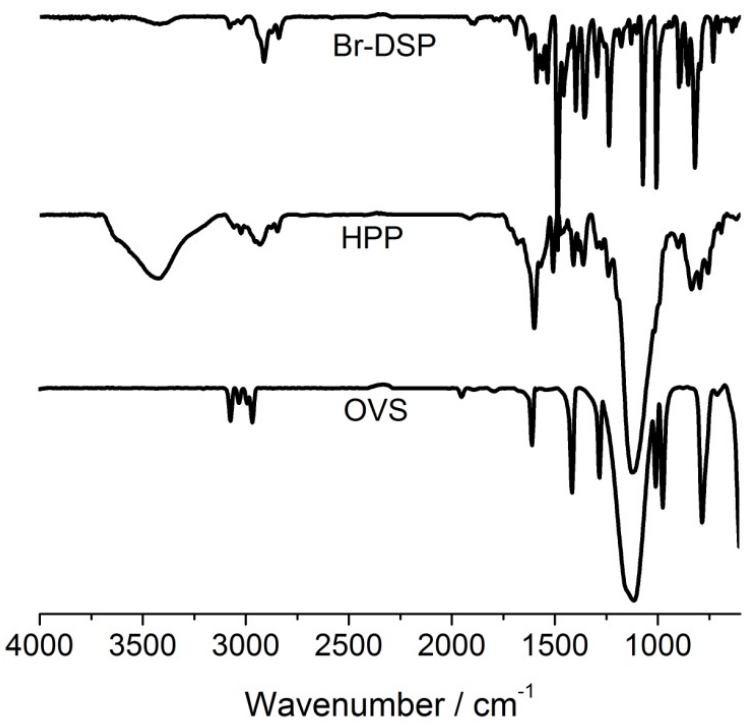


Figure 2S. FTIR spectra of OVS, Br–DSP and HPP.

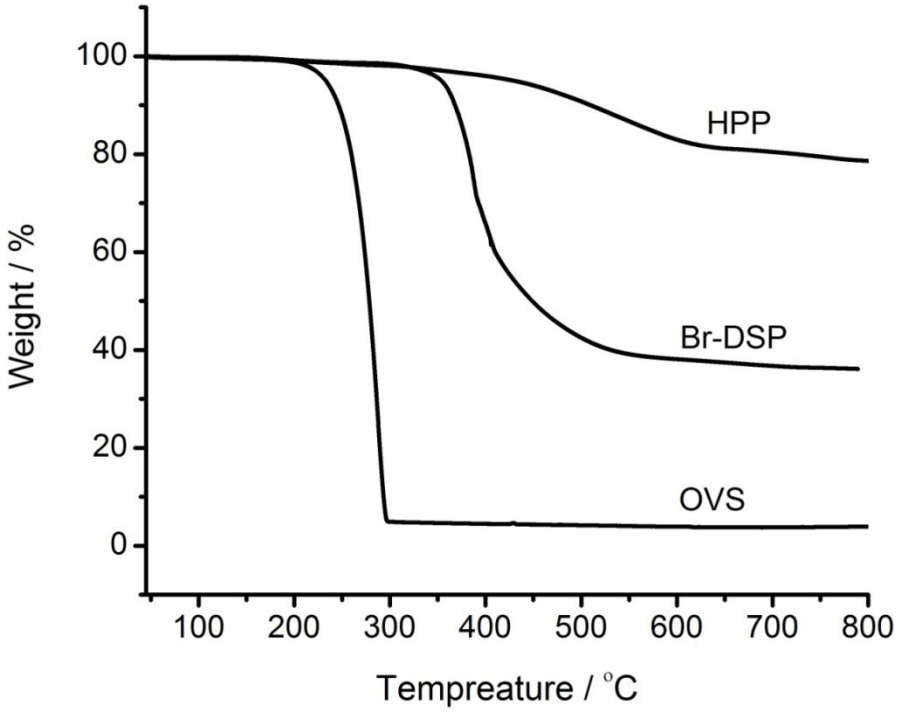


Figure 3S. TGA curves of OVS, Br–DSP and HPP.

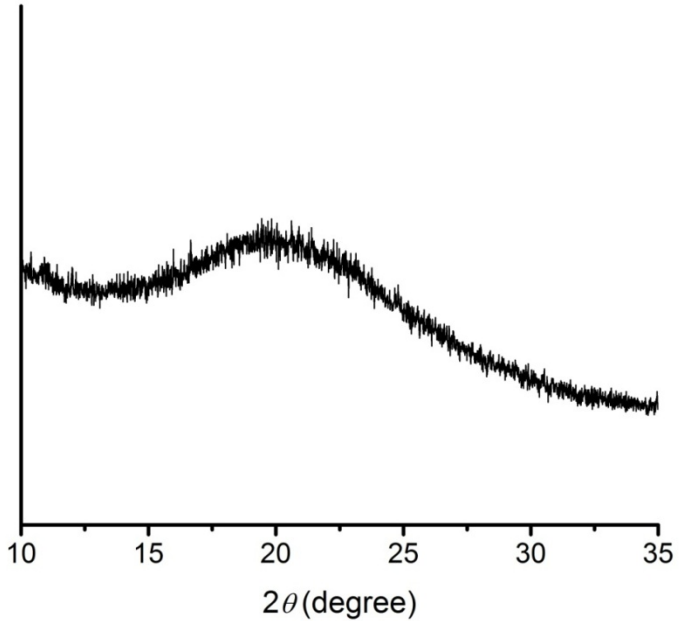


Figure 4S. PXRD pattern of HPP.

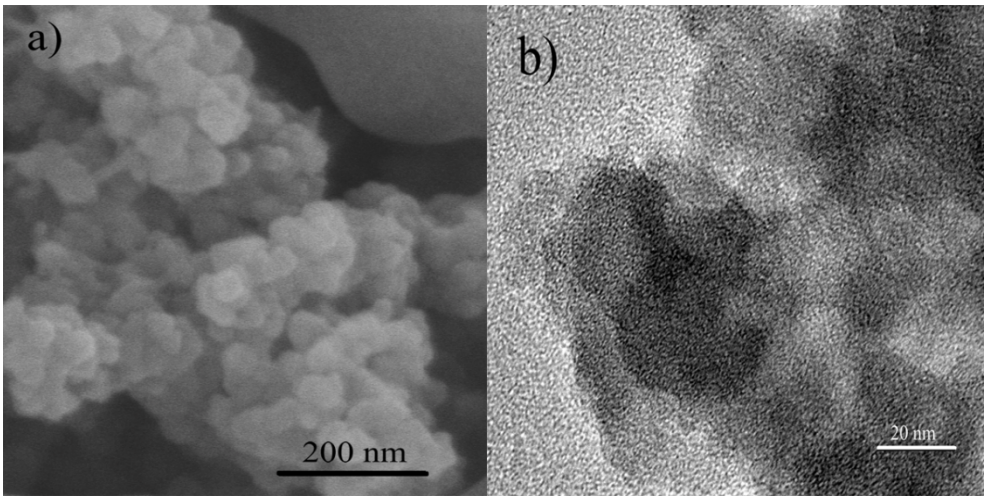


Figure 5S. a) FE–SEM image of HPP and b) HR–TEM image of HPP.

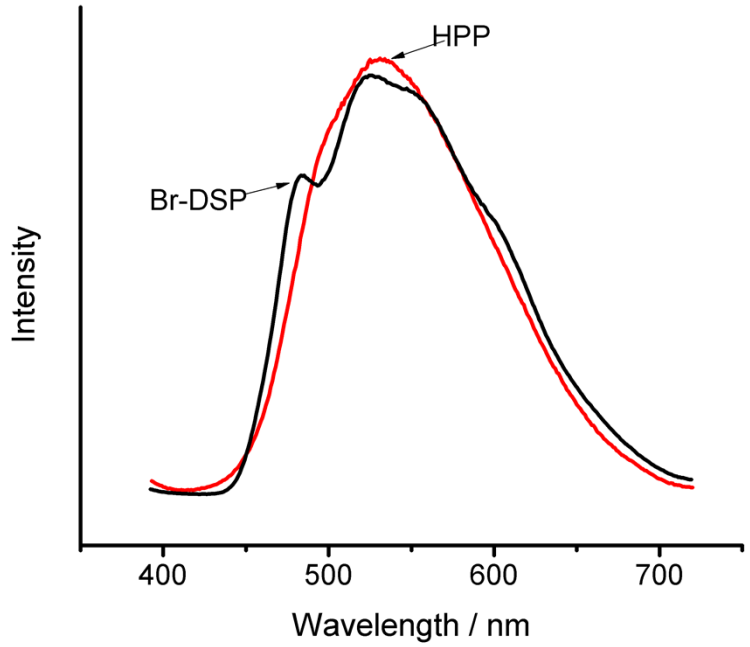


Figure 6S. Fluorescence spectra of HPP and Br–DSP in the solid state (excited at 370 nm).

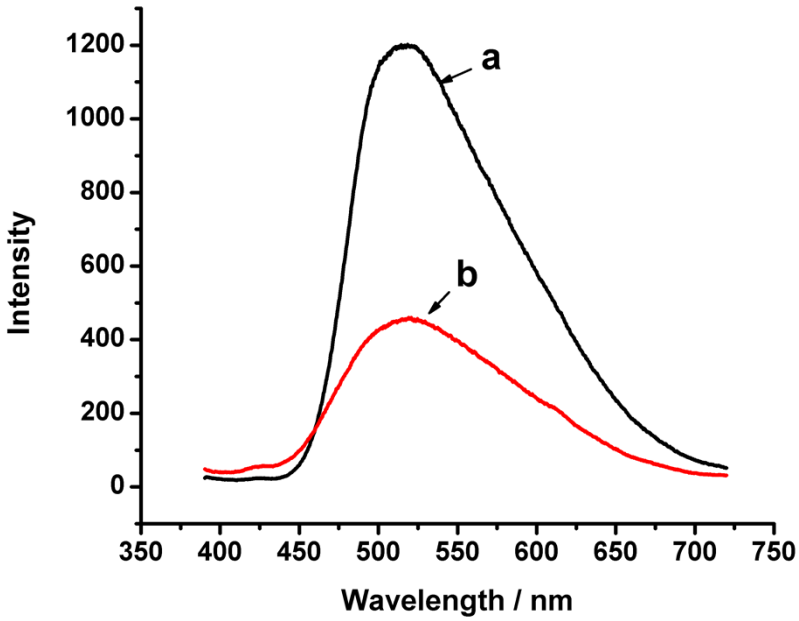


Figure 7S. Fluorescence spectra for the suspensions of HPP in buffer solutions with the pH = 7.00, **a** curve was before irradiated under ultraviolet light; **b** curve was after irradiated under continuous ultraviolet light for 2 h.

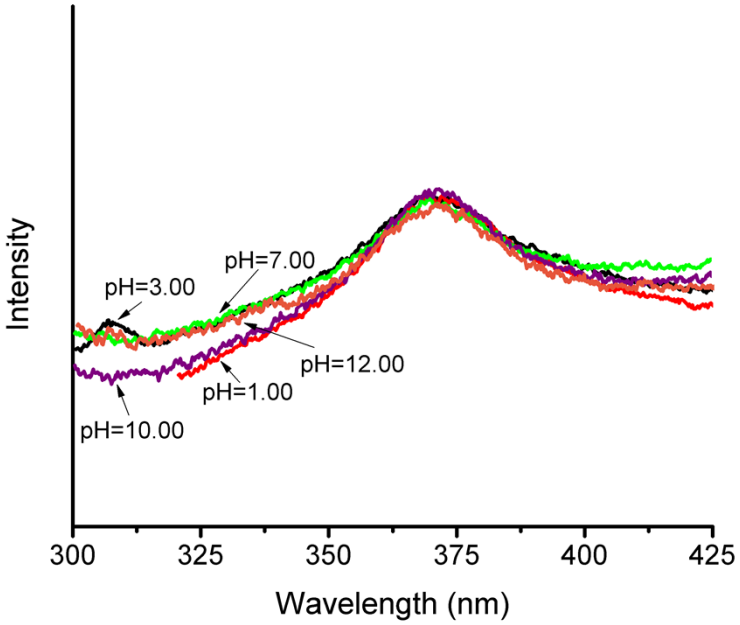


Figure 8S. Fluorescence excitation spectra of suspensions of HPP in buffer solutions with different pH values.

Table 1S. The λ_{em} at different pH values of suspensions of HPP.

pH	λ_{em} /nm	pH	λ_{em} /nm
1.00	618	4.50	561
1.50	614	5.00	530
2.00	608	5.50	525
2.50	600	6.00	525
3.00	593	6.50	524
3.50	587	7.00	524
4.00	575	12.00	524

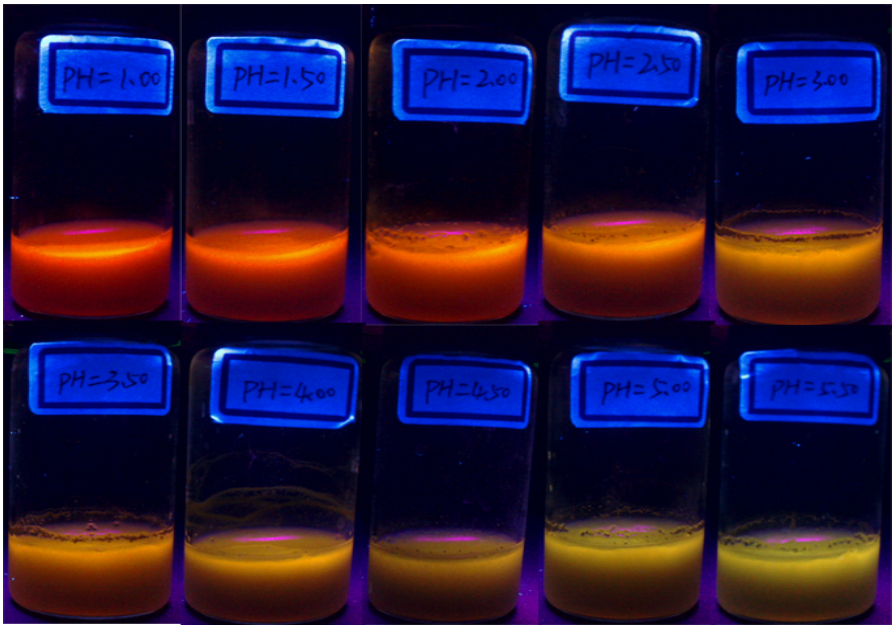


Figure 9S. Photos of suspensions of HPP in buffer solutions with the pH values in the range from 1.00 to 5.50 under UV light (365 nm) illumination.

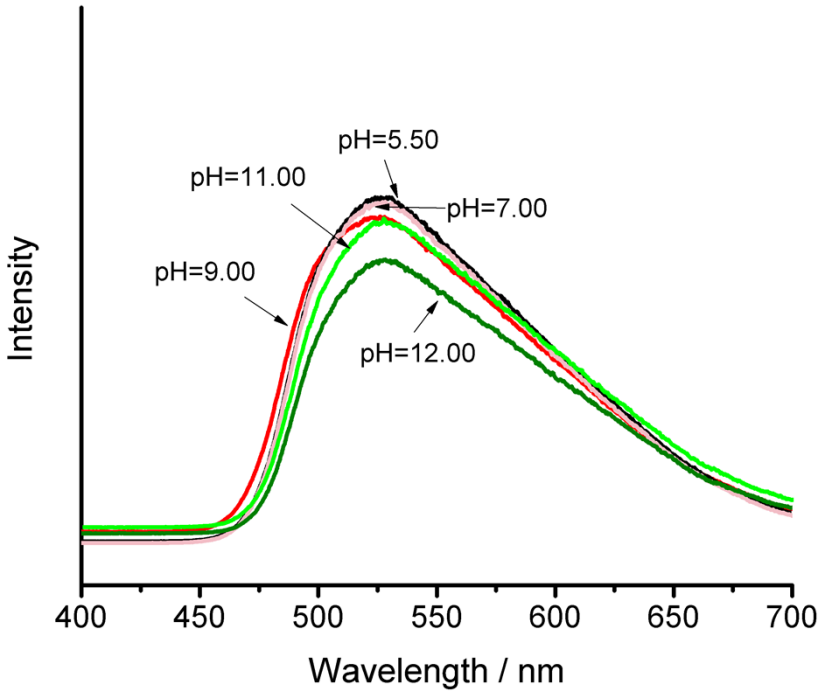


Figure 10S. Fluorescence spectra of suspensions of HPP in buffer solutions with the pH values in the range from 5.50 to 12.00 (excited at 370 nm).

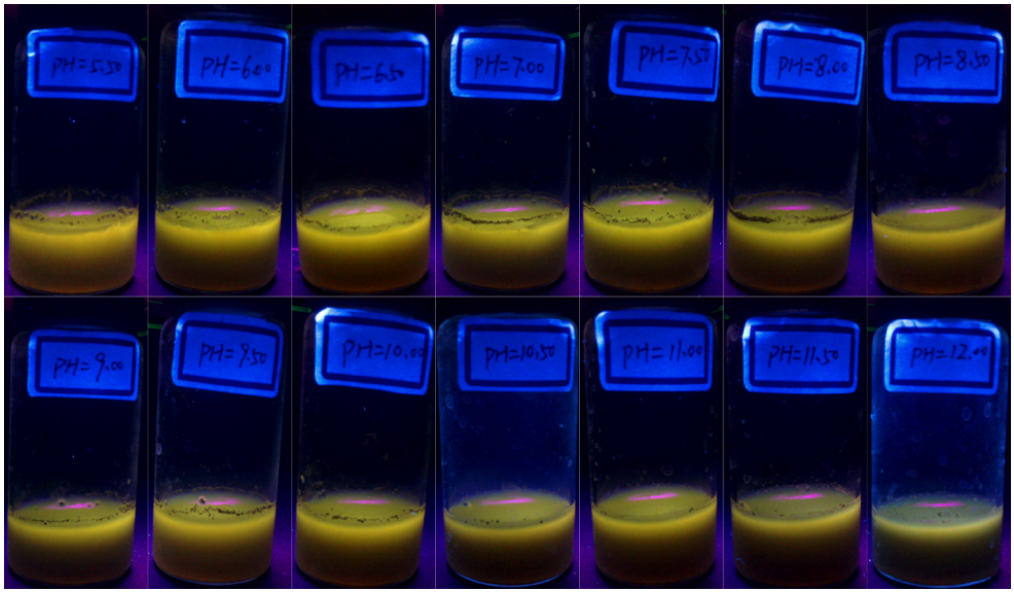


Figure 11S. Photos of suspensions of HPP in buffer solutions with the pH values in the range from 5.50 to 12.00 under UV light (365 nm) illumination.

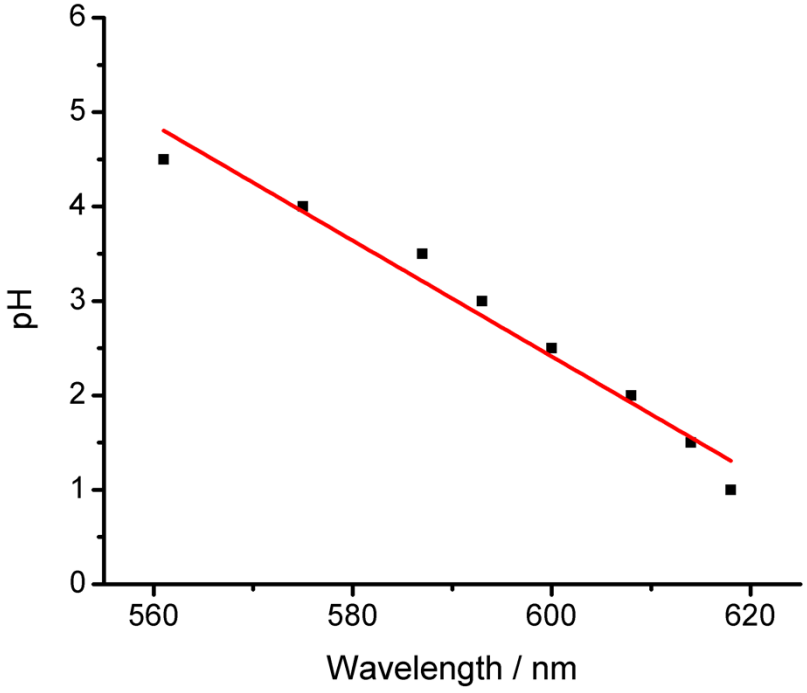


Figure 12S. Plots of the fluorescence maximum emission wavelength of HPP versus pH values with a formula of pH = –0.061 λ_{em}+ 39 (pH = 1.00–4.50).

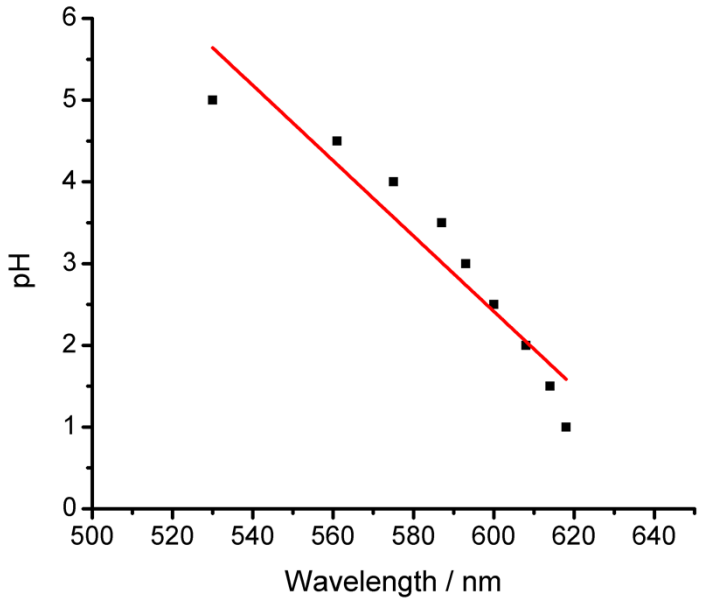


Figure 13S. Plots of the fluorescence maximum emission wavelength of HPP versus pH values with a formula of pH = –0.046 λ_{em}+ 30 (pH = 1.00–5.00).

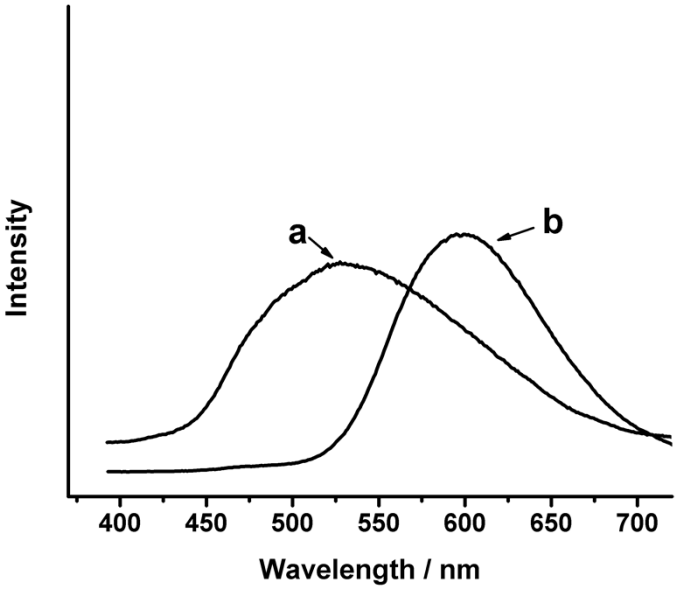


Figure 14S. Fluorescence spectra of suspensions of HPP in buffer solutions. **a** curve was the buffer solution of pH = 1 was replaced by the buffer solution of pH = 12; **b** curve was the buffer solution of pH = 12 was replaced by the buffer solution of pH = 1 again.

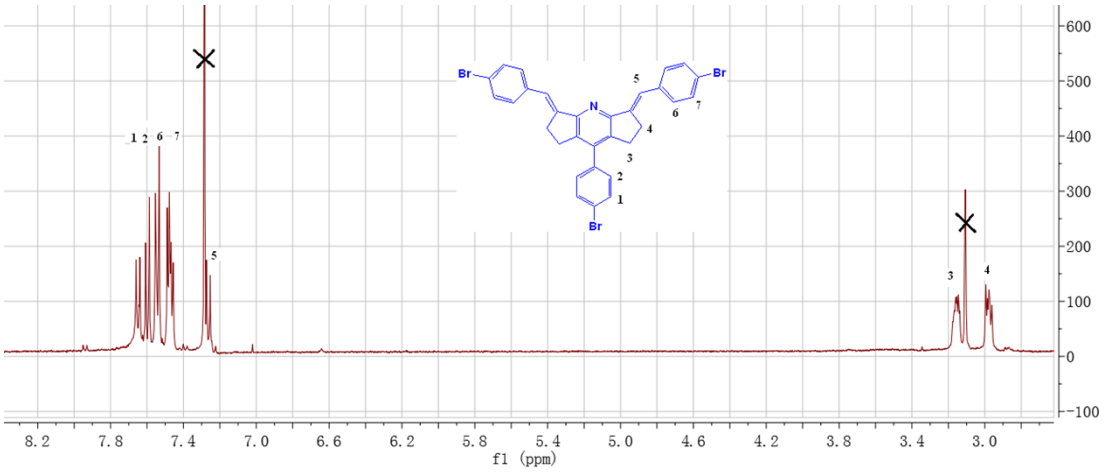


Figure 15S. ^{1}H NMR of Br–DSP in $CDCl_3$.

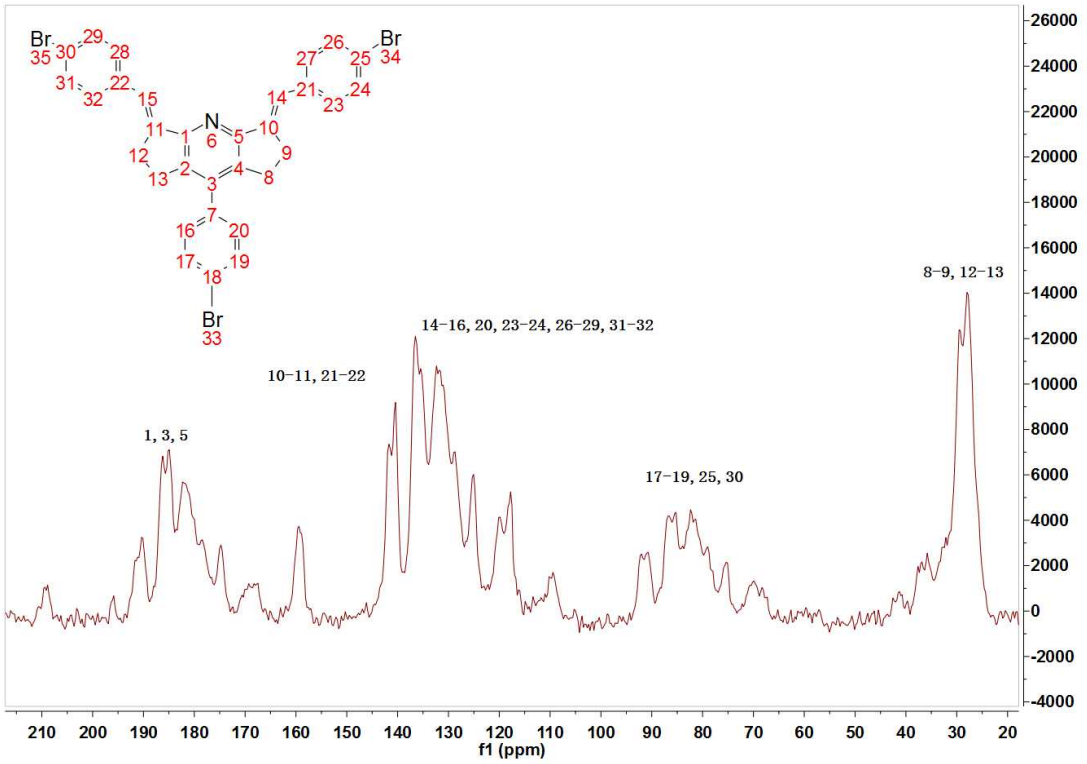


Figure 16S. Solid–state ^{13}C CP/MAS NMR spectrum of Br–DSP.

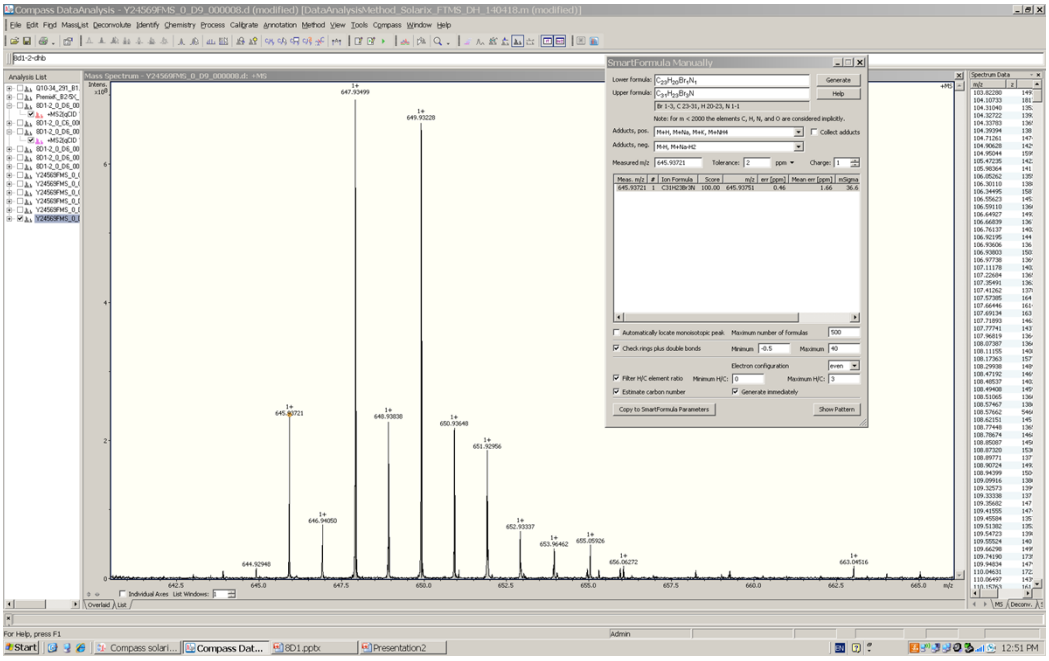


Figure 17S. Mass spectrum of Br–DSP.