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Supporting Information

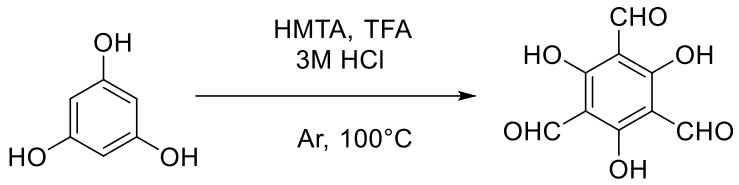
# Adsorption of rhodamine B by organic porous materials rich in nitrogen, oxygen, and sulfur heterogeneities

Xiao-Cheng Du, Ji-Hua Zhu, Xi-Cun Wang* and Zheng-Jun Quan*

International Scientific and Technological Cooperation Base of Water Retention Chemical Functional Materials, College of Chemistry and Chemical Engineering, Northwest Normal University, Lanzhou, Gansu 730070, P. R. China.

## Contents

## 1. Synthesis of 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde (TP)




**Scheme S1.** Synthetic route approach to TP

Under an argon atmosphere, 45 mL trifluoroacetic acid was added to dry phloroglucinol (3.007 g, 24.5 mmol) and urotropine (7.549 g, 54 mmol), and the mixture was heated at 100 ° C for 2.5 h. Then cooled to room temperature, 75 mL of 3M HCl solution added and the mixture was heated at 100 ℃ for 1h. then the mixture was cooled to room temperature, filtered through diatomite and extracted with 150mL dichloromethane, then it was dried by anhydrous magnesium sulfate and filtered. The organic layer concentrated under reduced pressure to provide 2,4,6-Triformylphloroglucinol (0.8g, 15.5%) a yellow-white solid. $^{1}$H NMR (600 MHz, $CDCl_3$) δ 14.10 (s, 1H), 10.14(s, 1H). $^{13}$C NMR (151 MHz, $cdcl_3$) δ 192.01, 173.43, 102.92.

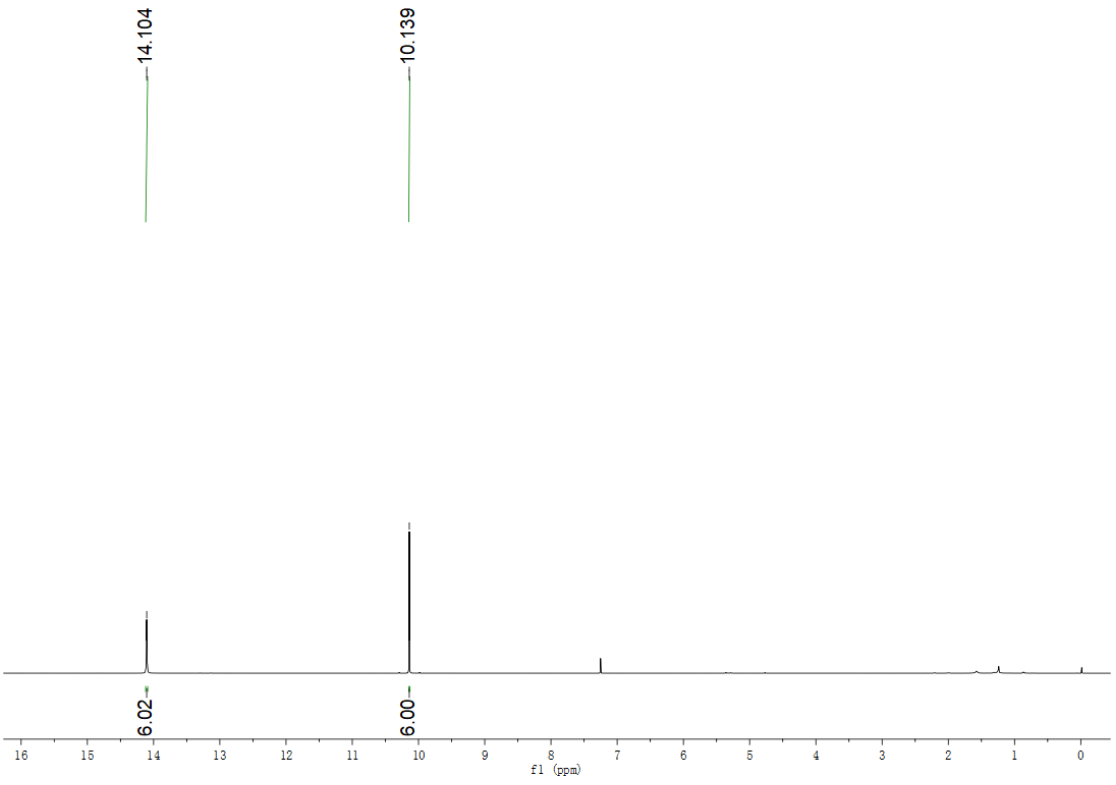


**Figure S1.** [1]H NMR spectrum of as-prepared 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde

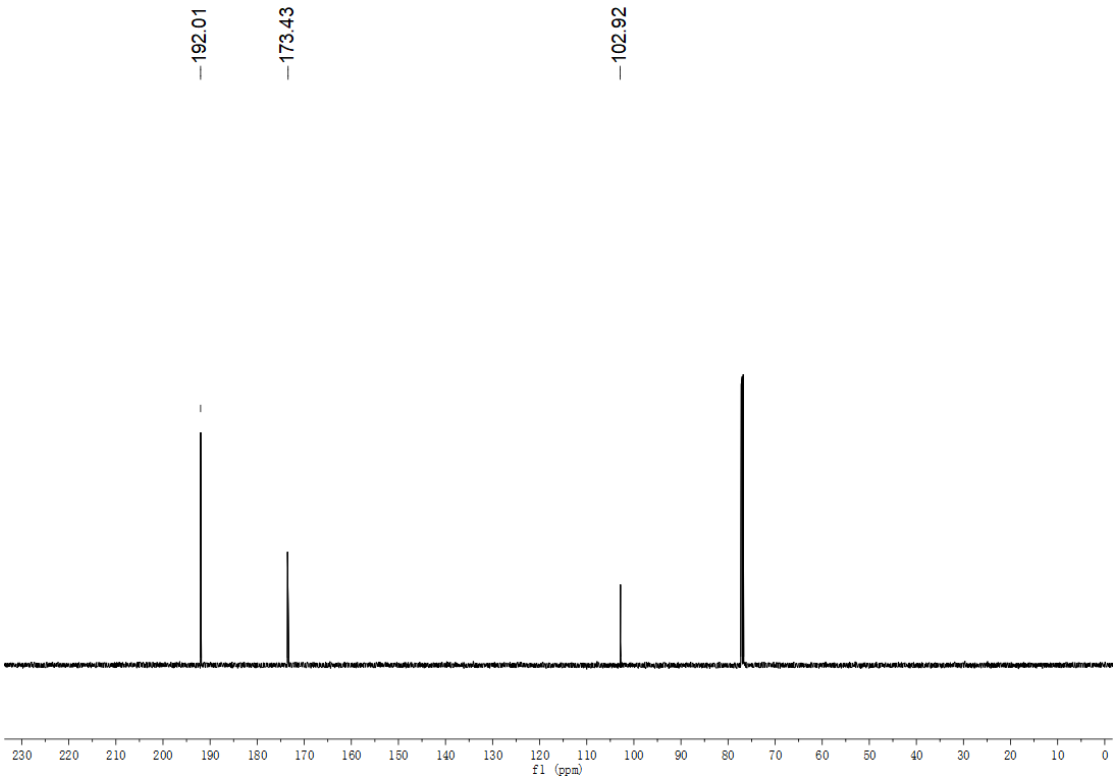
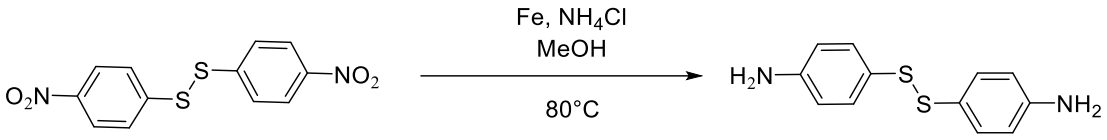



**Figure S2.** [13]C NMR spectrum of as-prepared 2,4,6-trihydroxybenzene-1,3,5-tricarbaldehyde

## 2. Synthesis of 4,4'-disulfanediyldianiline (DAPS)




**Scheme S2.** Synthetic route approach to 4,4'-disulfanediyldianiline

4,4'-Dinitrodiphenyl disulfide (8mmol, 2.467g) and iron powder (80mmol,4.480g) was added 10mL methanol. After stirring for 5 min, slowly added ammonium chloride to the mixture and heated at 80℃ for 6 h. After the reaction was cooled to room temperature，the aqueous layer was extracted with ethyl acetate twice. The organic layers were combined and washed with water and dried over $Na_2SO_4$. After removal of solvent by evaporation, 4,4'-diaminodiphenyl disulfide (1.8g, 90.6%)

was obtained a yellow solid. $^{1}$H NMR (600 MHz, $CDCl_3$) δ 7.25 (d, *J* = 9.0 Hz, 1H), 6.56 (d, *J* = 8.4 Hz, 1H), 3.73 (s, 1H). $^{13}$C NMR (151 MHz, $cdcl_3$) δ 147.16, 133.93, 125.57, 115.39.

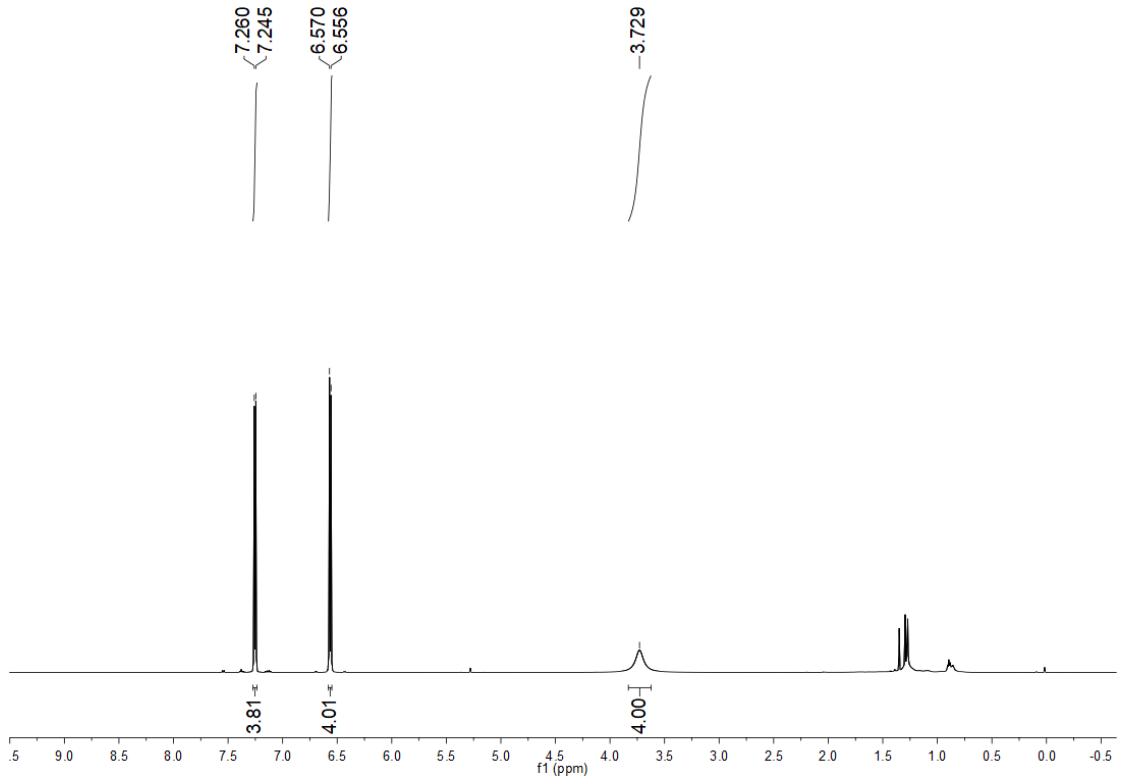



**Figure S3.** $^{1}$H NMR spectrum of as-prepared 4,4'-disulfanediyldianiline

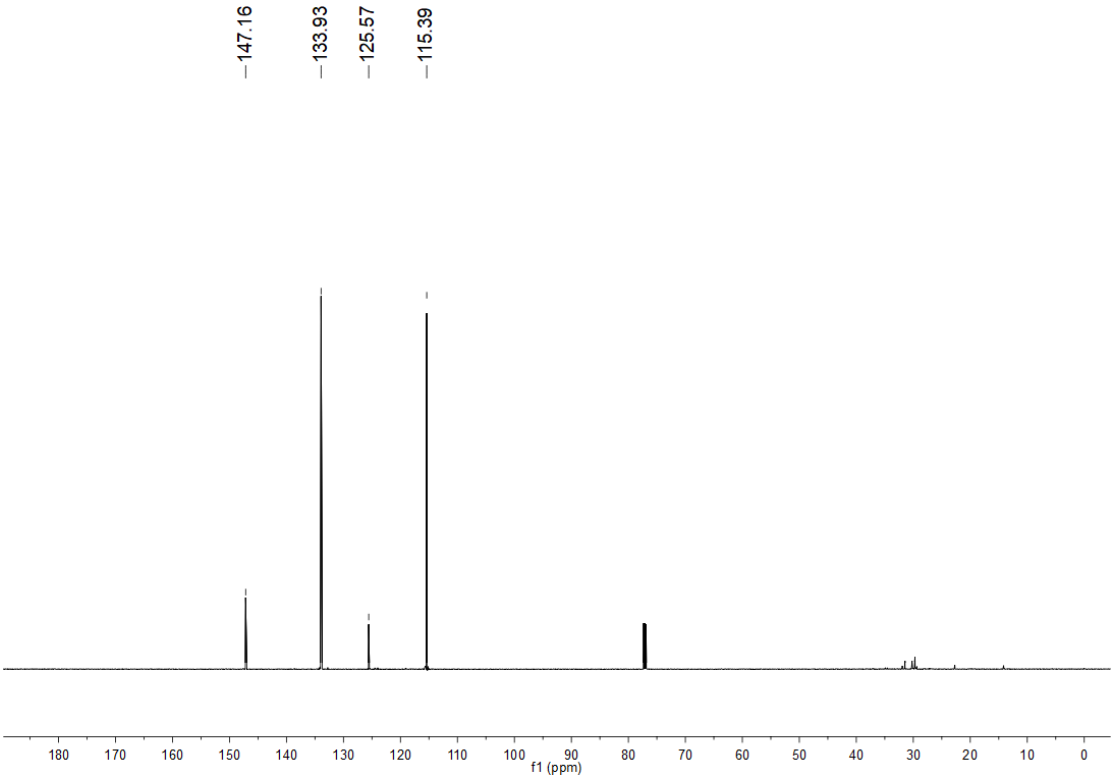



**Figure S4.** $^{13}$C NMR spectrum of as-prepared 4,4'-disulfanediyldianiline

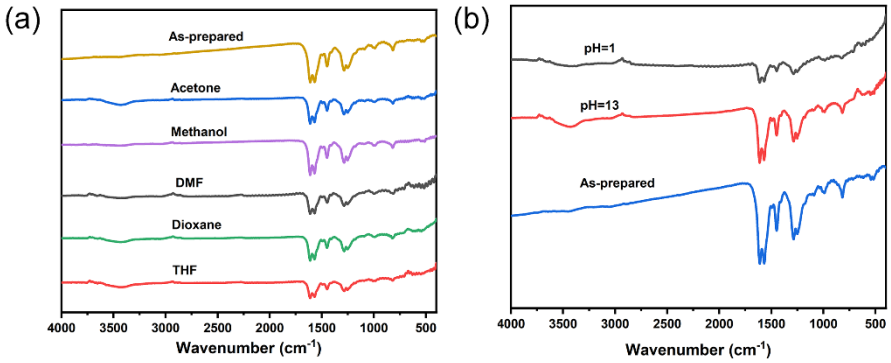



**Figure S5.** FT-IR spectra of DAPS-TP-POP at different solvents（a）and different pH (b)

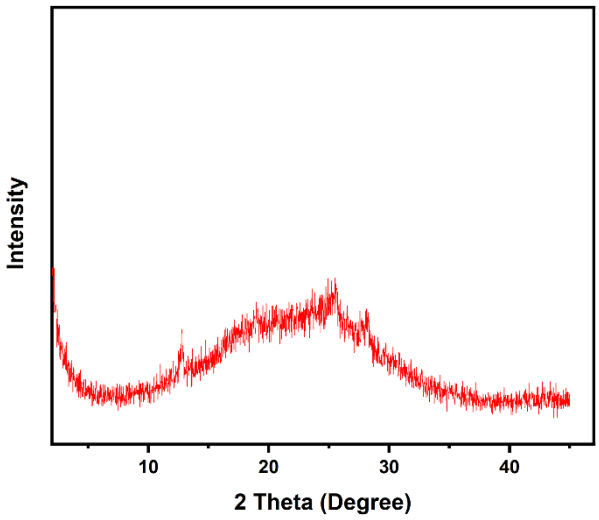



**Figure S6.** Powdered XRD pattern of DAPS-TP-POP

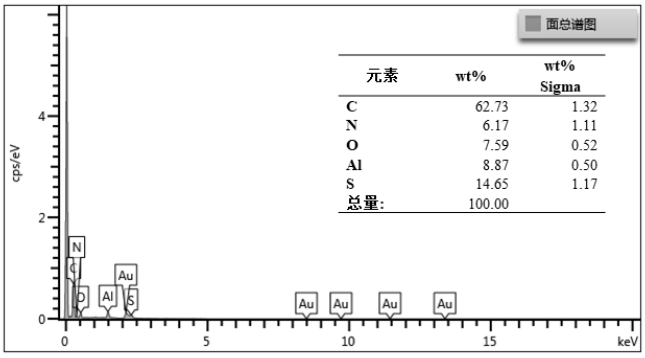



**Figure S7**. EDX spectra of DAPS-TP-POP

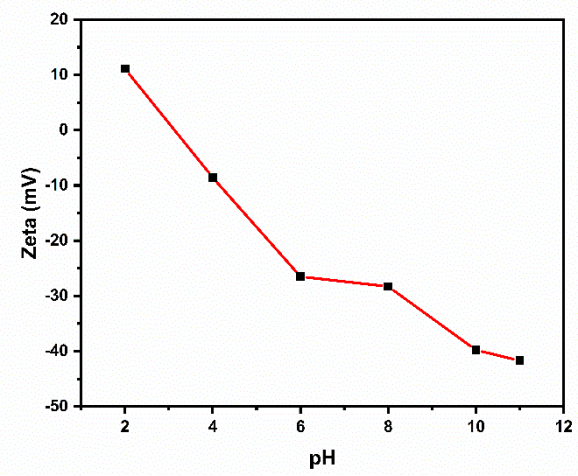



**Figure S8.** Plot of ζ-potential changes with pH.

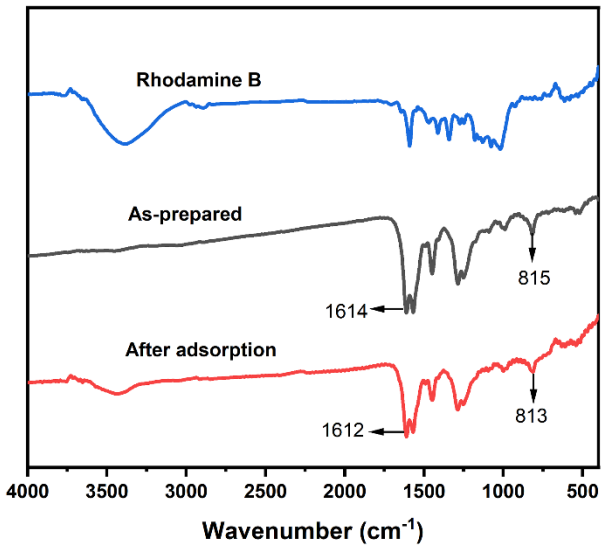



**Figure S9.** FT-IR spectra of rhodamine B, DAPS-TP-POP and DAPS-TP-POP materials after dye adsorption

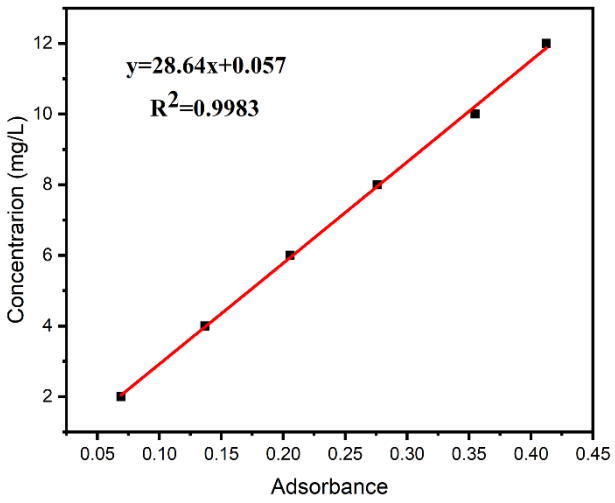



**Figure S10.** The standard curve and fitting equation of Rhodamine B

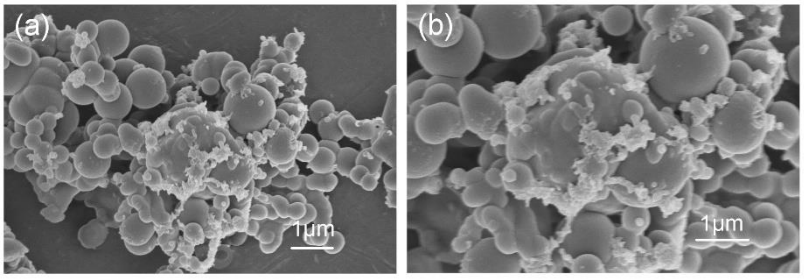



**Figure S11.** SEM picture of DAPS-TP-POP loaded with Rhodamine B

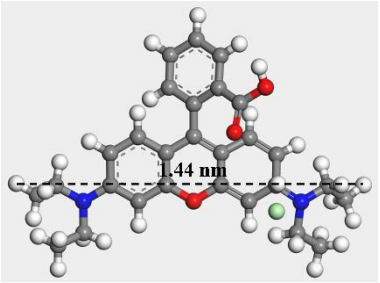



**Figure S12.** Molecular model of rhodamine B