Supporting Information

A New ESIPT-Based Fluorescent Probe for the Highly Sensitive Detection of Amine Vapors

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Photophysical properties of HBTAc

Table S1 Photophysical properties of the probe.

entry	λ_{ab} (nm)	λ_{em} (nm)	Φ^a
HBTAc	321	460	0.001
HBTAc+ammonia	334	460	0.131[b]

(a) The quantum yield (Φ) of **HBTAc** and **HBTAc**-ammonia system were determined according to the literature.[1] (b) Φ was determined in the present of 10 equiv. of ammonia.

$$\Phi_{Sample} = \frac{\Phi_{QS} \cdot A_{QS} \cdot F_{Sample} \cdot \lambda_{exQS} \cdot \eta^2_{Sample}}{A_{Sample} \cdot F_{QS} \cdot \lambda_{exSample} \cdot \eta^2_{QS}}$$

Where Φ is quantum yield; A is absorbance at the excitation wavelength; F is integrated area under the corrected emission spectra; λ_{ex} is the excitation wavelength; η is the refractive index of the solution; the Sample and QS refer to the sample and the standard, respectively. We chose quinine sulfate in 0.1N H_2SO_4 as standard, which has the quantum yield of 0.546.[2]

Additional spectroscopic data

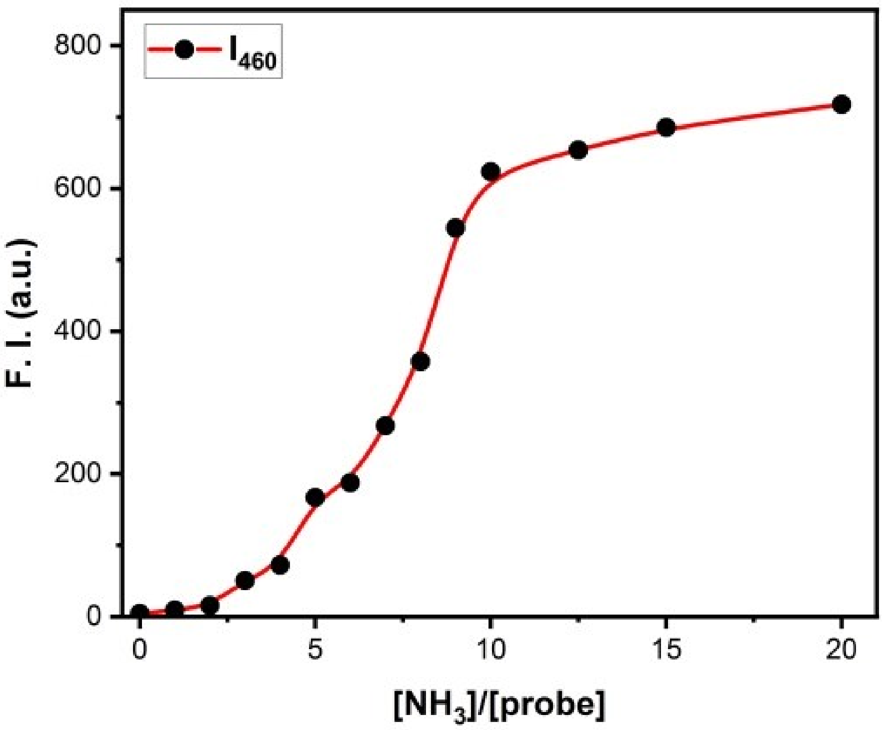


Fig. S1 Fluorescent intensity of **HBTAc** (10.0 μM, in aqueous solution) at 460 nm (I_{460}) as a function of ammonia concentration (0-20 equiv.) (λex = 365 nm).

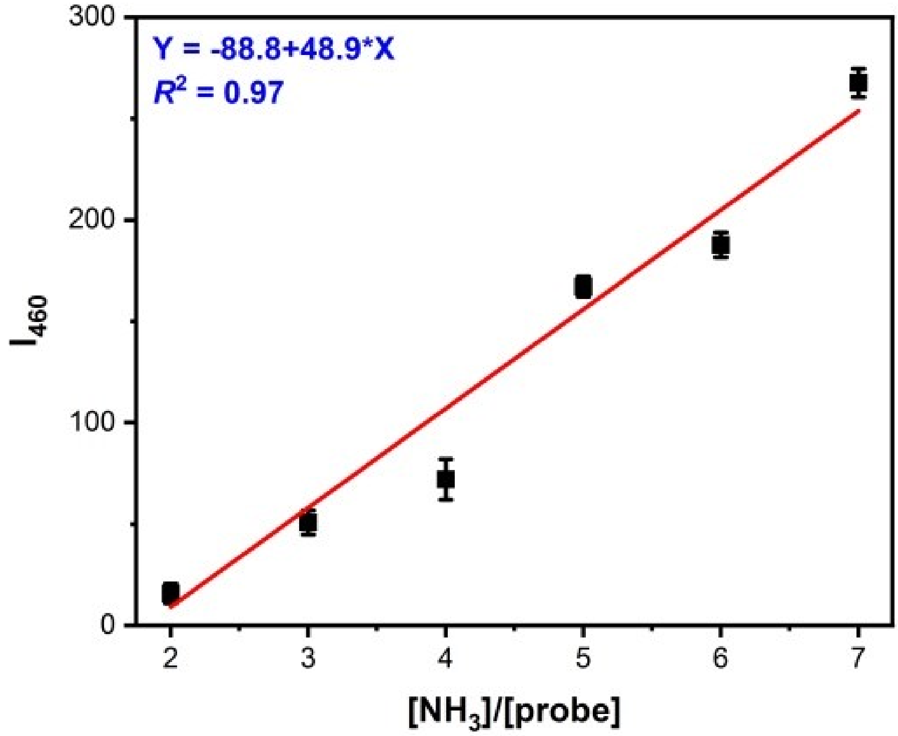


Fig. S2 Fluorescent intensity of **HBTAc** (10.0 μM, in aqueous solution) at 460 nm (I_{460}) as a function of ammonia concentration (2.0-7.0 equiv.) (λex = 365 nm).

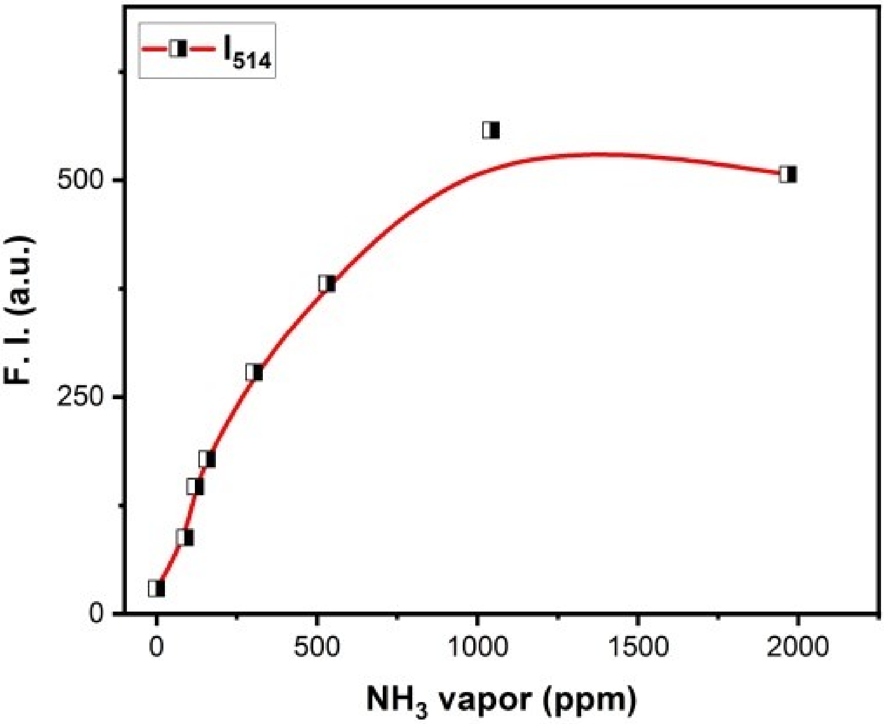


Fig. S3. Fluorescent intensity of **HBTAc**-loaded filter paper at 514 nm (I_{514}) after exposure to ammonia vapor (0, 89, 122, 157, 304, 531, 1042, 1968 ppm) for 5 min. (λex = 365 nm).

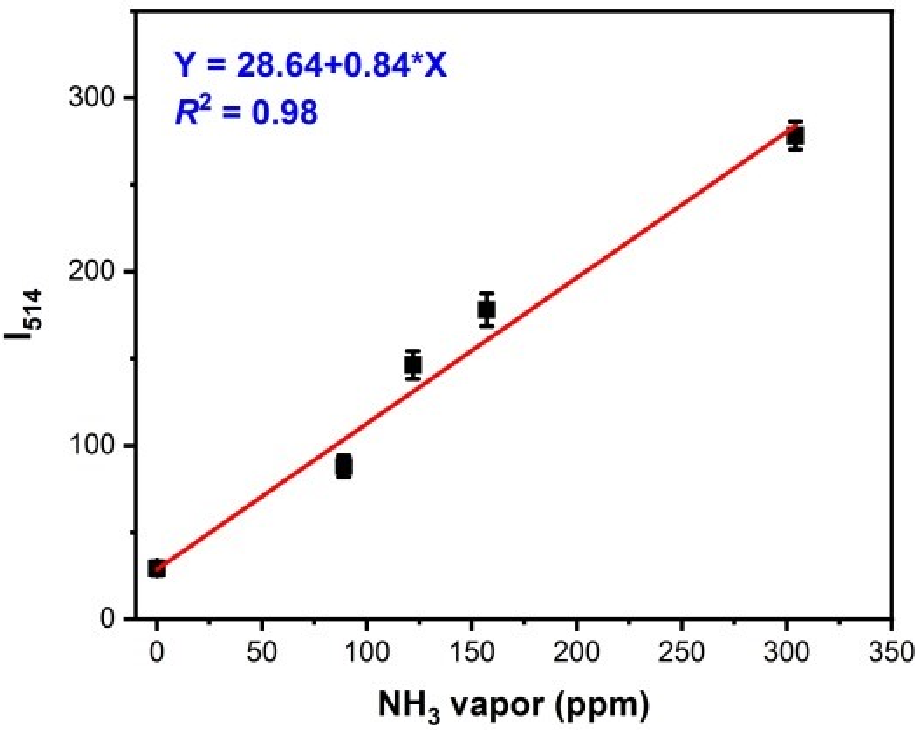


Fig. S4 The changes of the fluorescent intensity of **HBTAc** at 514 nm (I_{514}) as a function of ammonia vapor concentration (0-300 ppm) under the same condition as the ammonia vapor titration.

The detection limit (DL) of ammonia vapor using **HBTAc** was determined from the following equation: [3]

$$DL = 3*\sigma/K$$

Where σ is the standard deviation of the blank solution; K is the slope of the calibration curve.

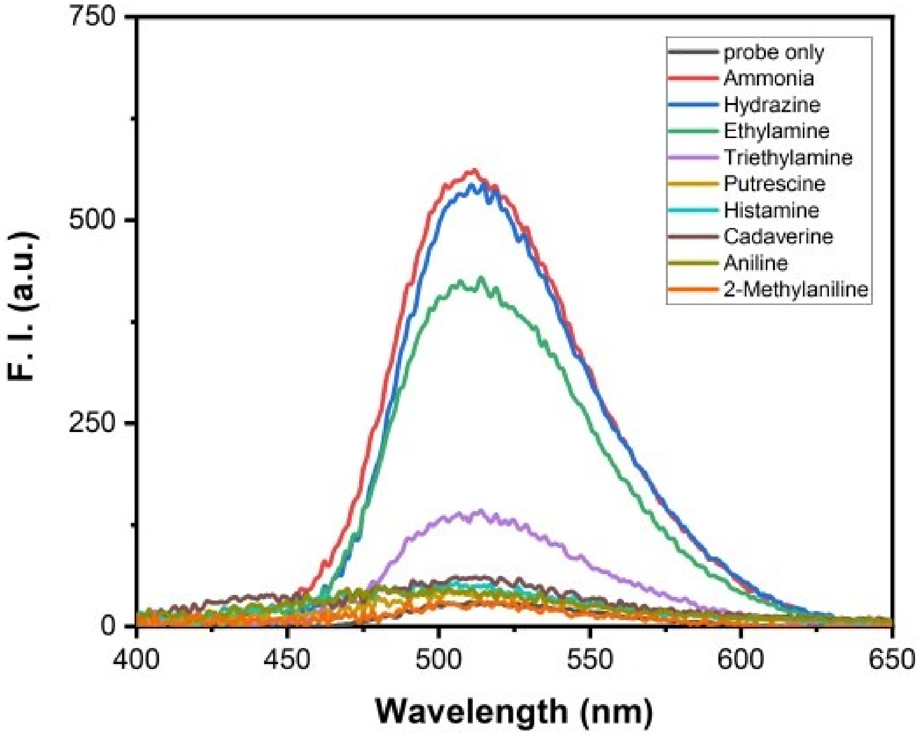


Fig. S5 Fluorescence spectra of the probe **HBTAc**-loaded filter paper before and after exposure with various amine vapors generated from their corresponding aqueous solutions (including ammonia, hydrazine, ethylamine, triethylamine, putrescine, histamine, cadaverine, aniline, and 2-methylaniline) (λex = 365 nm).

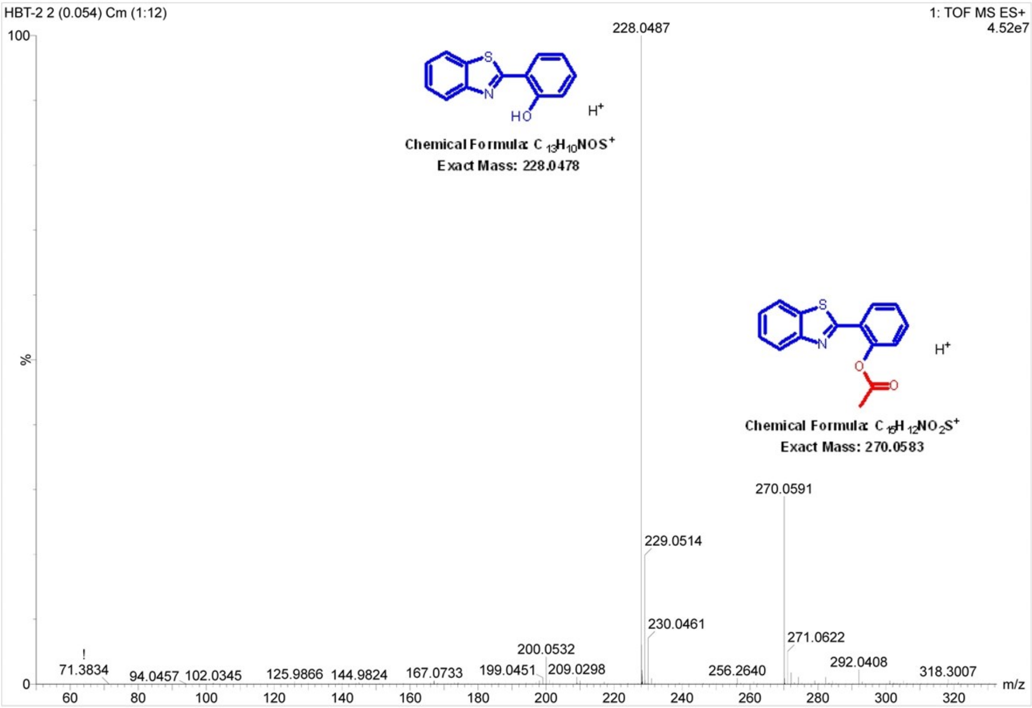


Fig. S6 The HR-MS (TOF-ESI) experiment of the **HBTAc**-N_2H_4 system (the **HBTAc** in the present of 0.3 equiv. of N_2H_4).

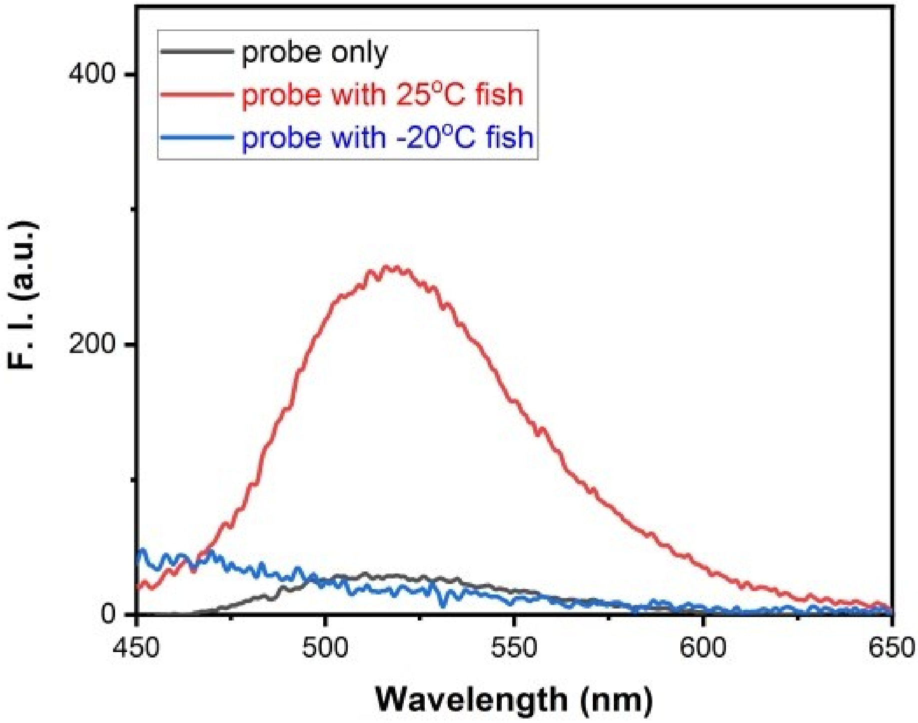
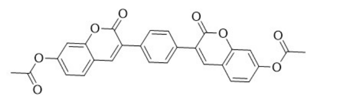
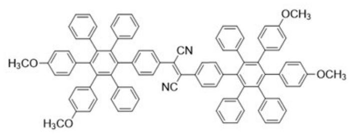
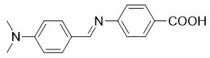
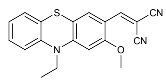
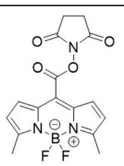
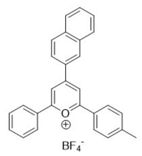
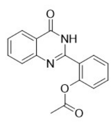
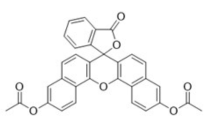
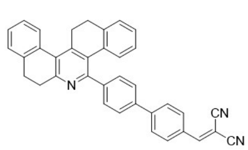
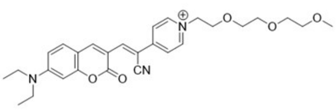
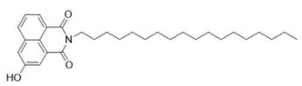
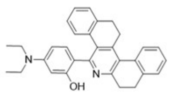
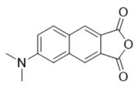
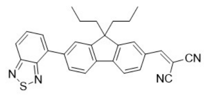
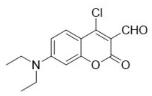
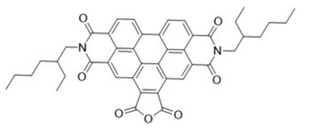
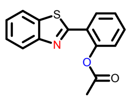


Fig. S7 Fluorescent spectra of **HBTAc**-loaded filter paper after exposure to different pomfret samples (pomfret stored for one day at -20 °C and 25 °C, respectively) (λex = 365 nm).

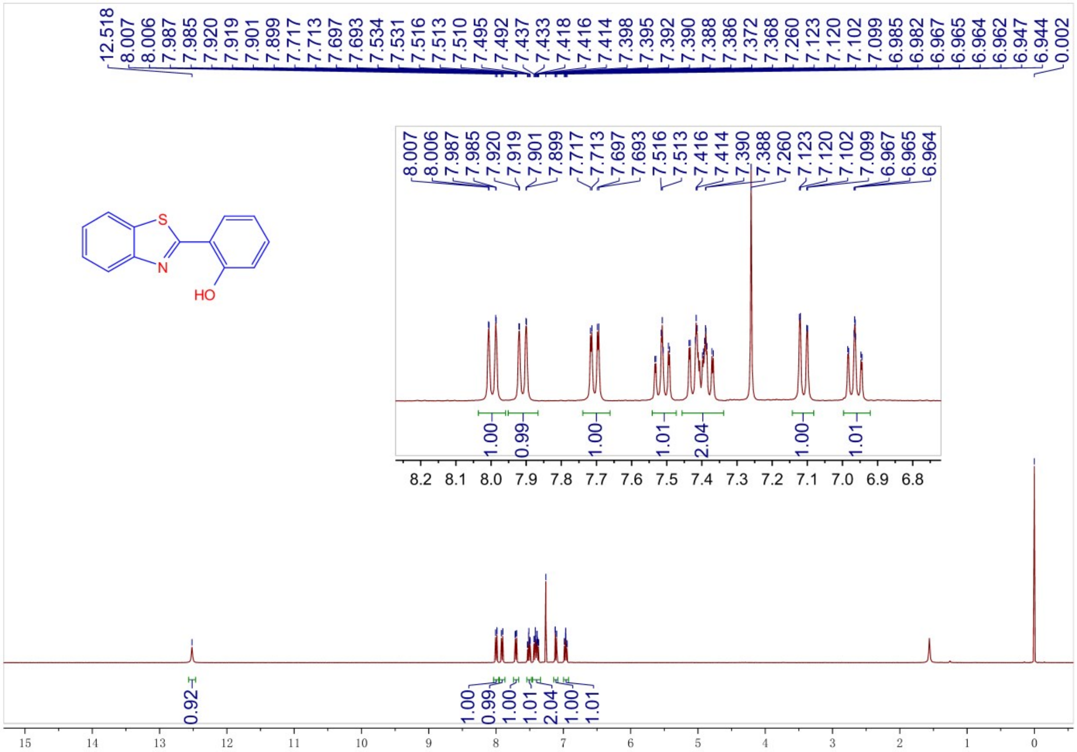
Table S2 Summary of some reported amine fluorescent probes.

Structures	$\lambda_{ex}/\lambda_{em}$ (nm)	LOD	Solution	Gaseous	References
	356/445	6.85 ppm	+	+	*Anal. Methods*, 2020, **12**, 1744-1751
	372/450	1.01 ng/cm^2	+	+	*ACS Appl. Mater. Interfaces*, 2018, **10**, 12112-12123
	360/469	2.61 Pa	-	+	*Talanta*, 2018, **178**, 522-529
	363/530	-	+	+	*Dyes Pigm.*, 2020, **178**, 108366-108373.
	470/622	10 ng	+	+	*J. Am. Chem. Soc.*, 2020, **142**, 9231-9239
	390/573	421 nM	+	+	*ACS Appl. Bio Mater.,* 2020, **3**, 772-778
	333/492	-	+	+	*ACS Sens.*, 2016, **1**, 179-184
	580/656	47 nM	+	+	*ACS Sustainable Chem. Eng.,* 2020, **8**, 4457-4463
	375/594	3.67 nM	+	+	*Dyes Pigm.,* 2020, **178**, 108346-108360
	560/640	-	+	+	*Anal. Chem.*, 2019, **91**, 7360-7365
	375/409	2.23 µM	+	-	*ACS Appl. Polym. Mater.*, 2019, **1**, 1485-1495

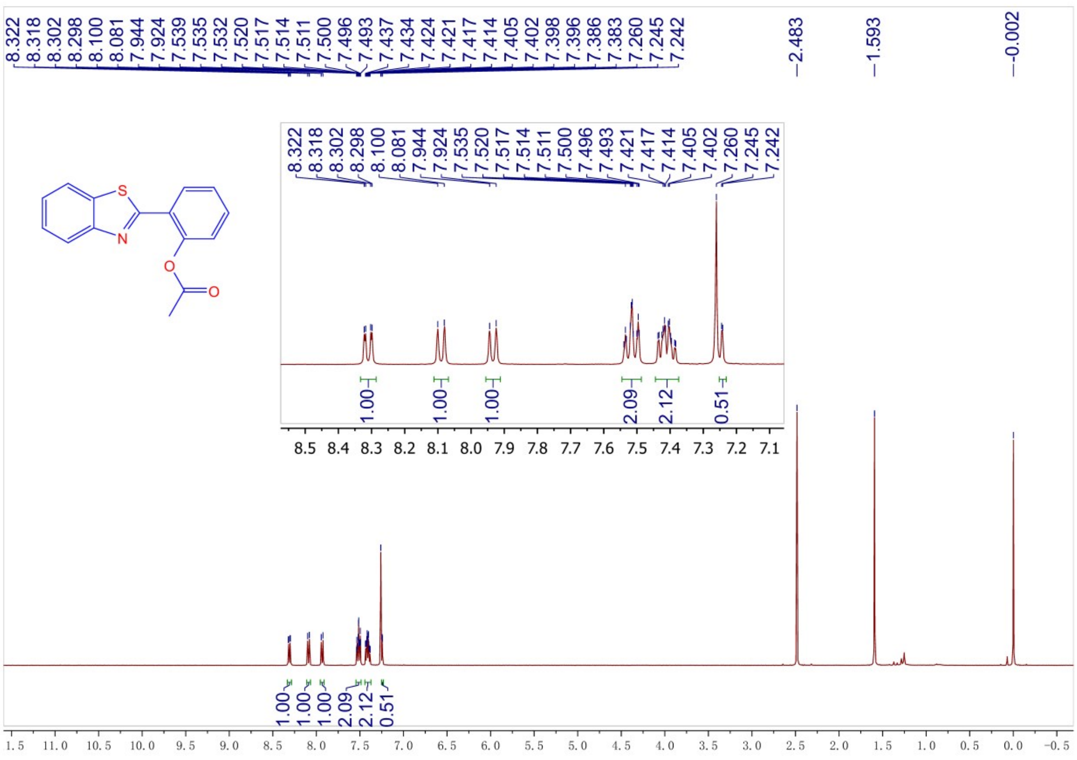
	330/516	12.6 nM	+	-	*J. Org. Chem.*, 2019, **84**, 11513-11523
	380/448	17 nM	+	-	*Analyst*, 2016, **141**, 827-831
	372/490	610 ppb	+	+	*J. Mater. Chem. C*, 2020, **8**, 13723-13732
	380/475	209 nM	+	+	*Dyes Pigm.,* 2021, **186**, 108963-108970
	440/580	180 nM	+	+	*ACS Appl. Mater. Interfaces.,* 2019, **11**, 47207-47217
	365/460 365/514	12.7 ppm	+	+	This work

The characterization data of HBTAc

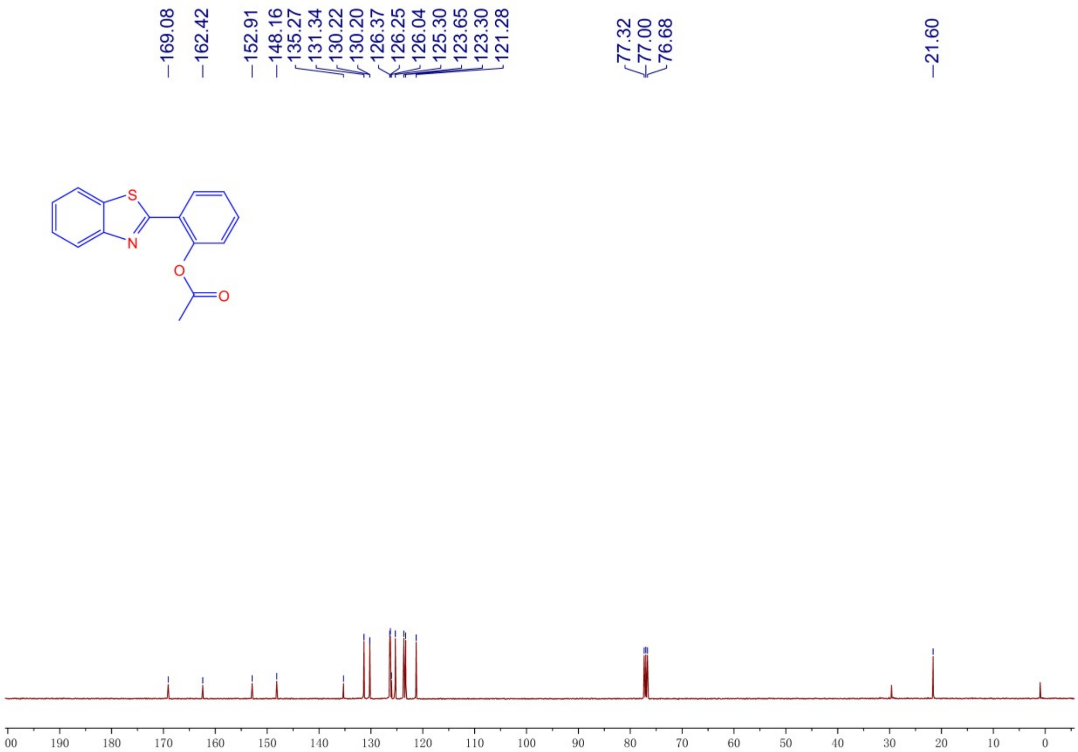
[1]H NMR of **2-(benzo[d]thiazol-2-yl)phenol (HBT)**



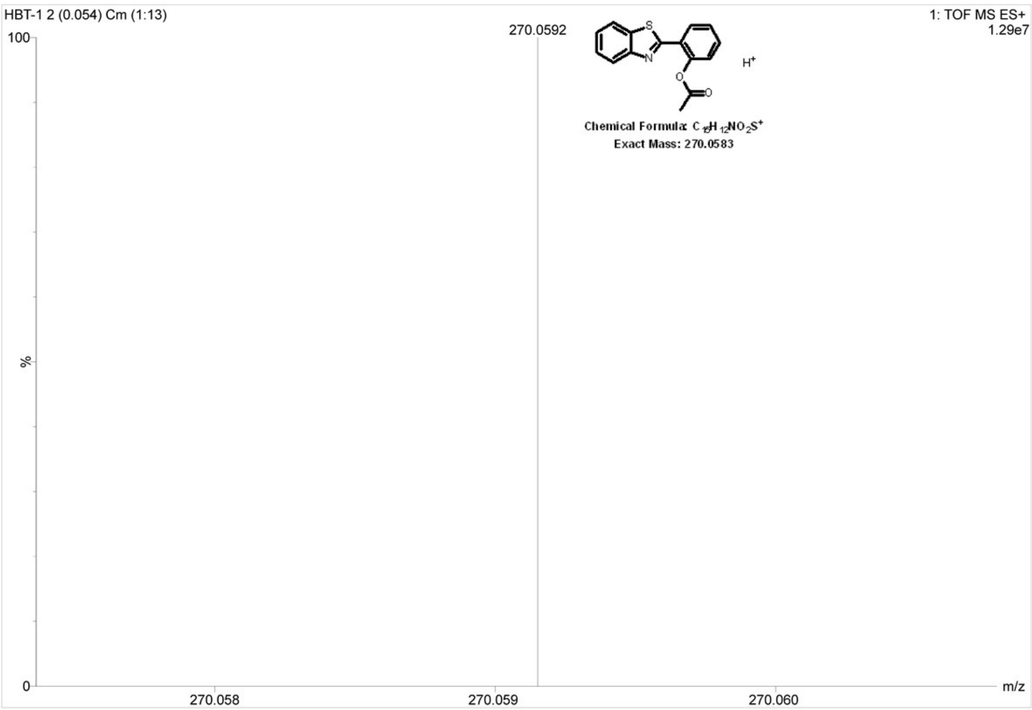
[1]H NMR of **2-(benzo[d]thiazol-2-yl)phenyl acetate (HBTAc)**



^{13}C NMR of **2-(benzo[d]thiazol-2-yl)phenyl acetate (HBTAc)**



HR-MS of **2-(benzo[d]thiazol-2-yl)phenyl acetate (HBTAc)**



References

1 R. A. Velapoldi, and H. H. Tønnesen, *J. Fluoresc*., 2004, **14**, 465-472.

2 (*a*) D. F. Eaton, *Pure Appl. Chem*., 1988, **60**, 1107-1114; (*b*) D. Magde, R. Wong, and P. G. Seybold, *Photochem. Photobiol*., 2002, **75**, 327-334.

3 (*a*) J. T. Yeh, P. Venkatesan and S. P. Wu, *New J. Chem*., 2014, **38**, 6198-6204. (*b*) A. Roy, D. Kand, T. Saha and P. Talukdar, *Chem. Commun*., 2014, **50**, 5510-5513.