Electronic Supplementary Material (ESI) for Analytical Methods.


# Supporting Information

## A novel ratiometric fluorescent probe based on BODIPY derivative for $Cu^{2+}$ detection in aqueous solution

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## Contents

## 1 Measurement of fluorescence quantum yields

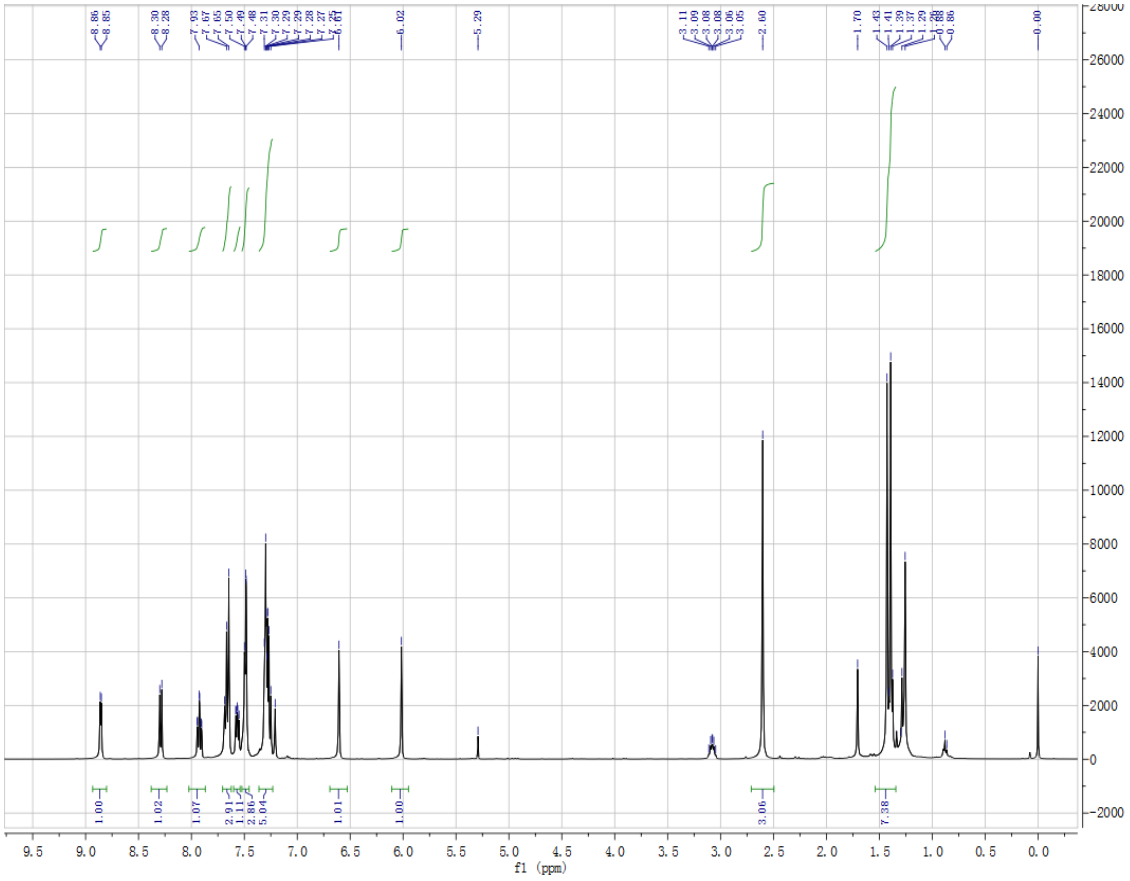
The fluorescence quantum ($\Phi_F$) was calculated using the following equation 1.

$$\Phi_{unk} = \Phi_{std} \frac{\left(I_{unk} / A_{unk}\right)}{\left(I_{std} / A_{std}\right)} \left(\frac{n_{unk}}{n_{std}}\right)^2 \quad \text{eq. 1}$$

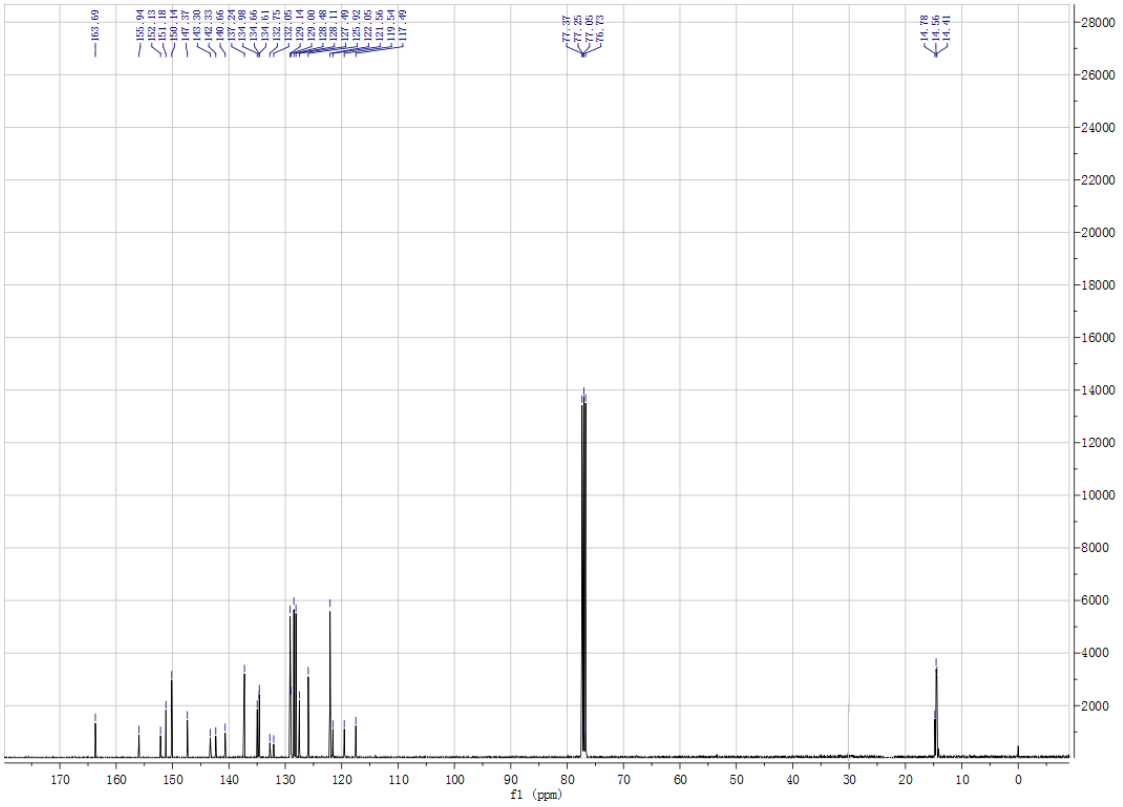
Where $\Phi_{unk}$ and $\Phi_{std}$ are the quantum yield of the sample and standard, $I_{unk}$ and $I_{std}$ are the integrated emission intensity of the corrected spectra of the sample and standard, $A_{unk}$ and $A_{std}$ are the absorbance of the sample and standard at the excitation wavelength (lower than 0.05), and n is the refractive index of the solvent used for the two solutions. The standard reference compound used for the determination of $\Phi_F$ was Rhodamine 6 G in EtOH ($\Phi_{std}$ = 0.95).

## 2. $^1$H NMR，$^{13}$C NMR and HRMS copies of probe 1 and Compound 2

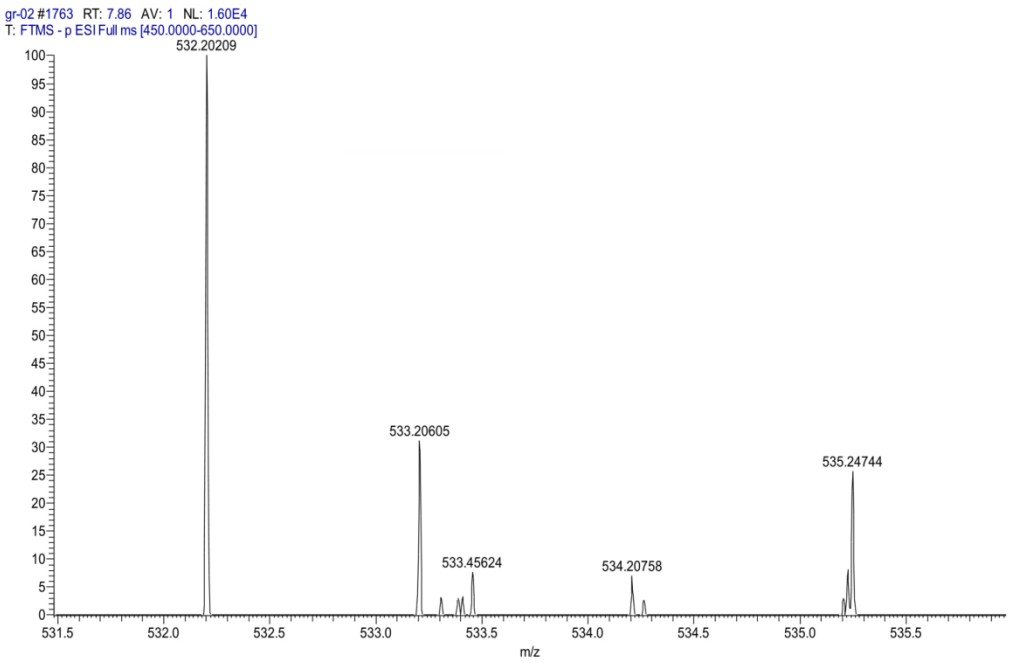
### $^1$H NMR of probe 1



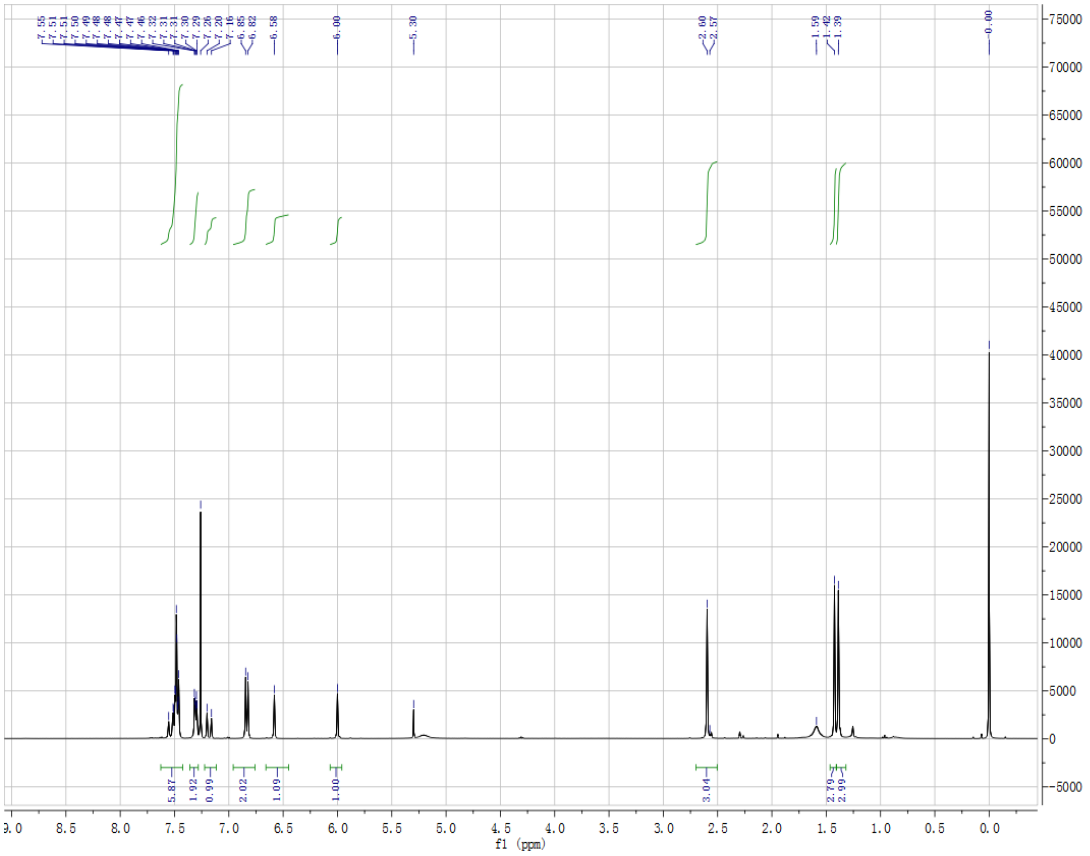

### $^{13}$C NMR of probe 1



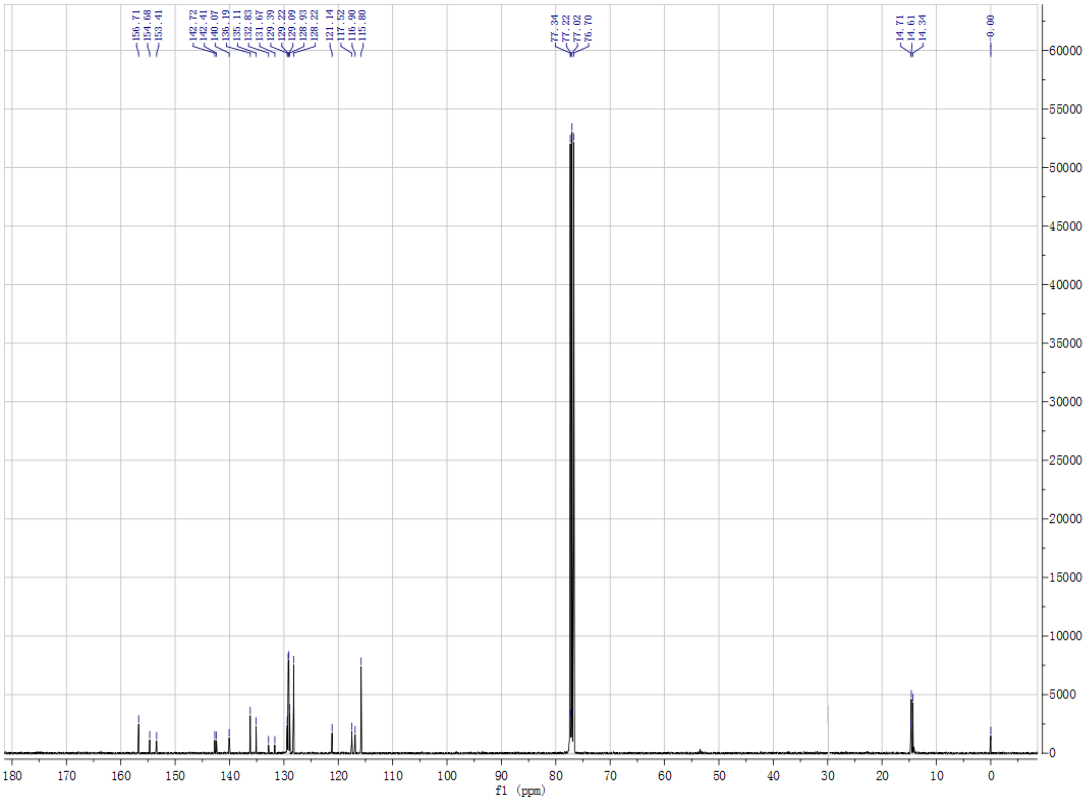

## HRMS of probe 1



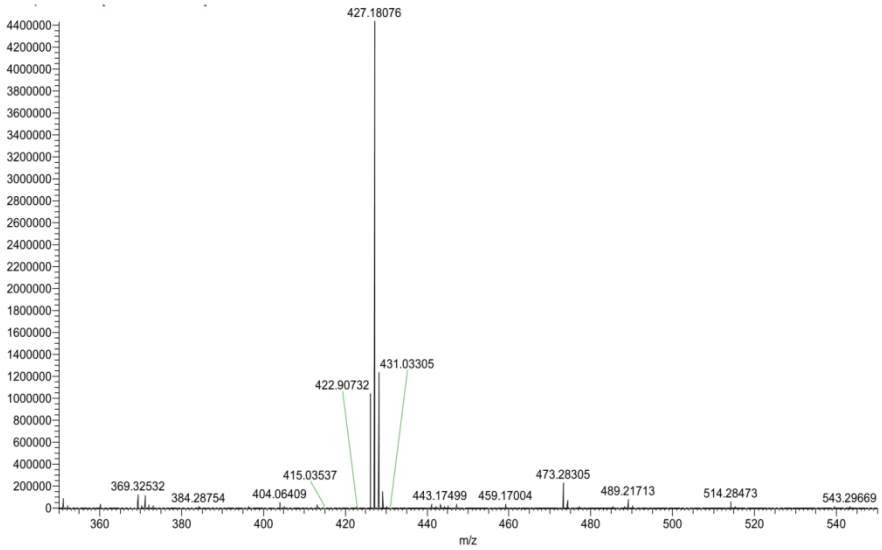
## $^{1}$H NMR of compound 2




## $^{13}$C NMR of compound 2



## HRMS of compound 2




## 3 The absorption and fluorescence spectra of Compound 2 and 1-$Cu^{2+}$

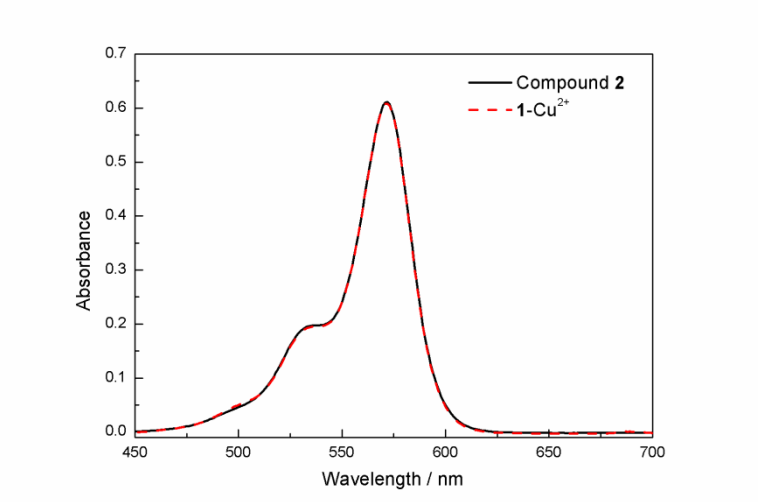



**Fig.S1** Absorption spectra of compound **2** and the isolated product **1**-$Cu^{2+}$ in the buffer solution (0.02 M HEPES, 50% DMSO, pH = 7.2).

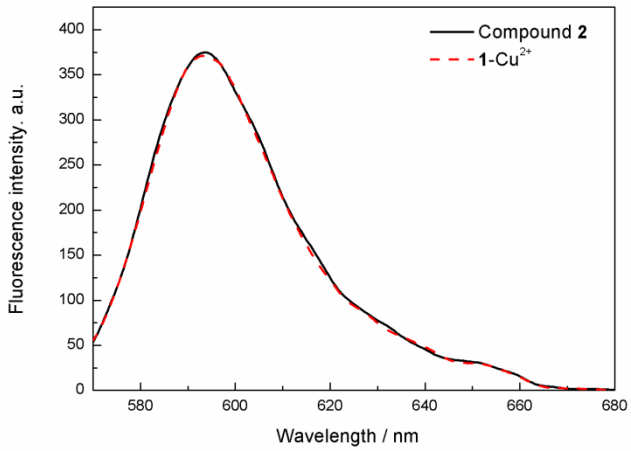



**Fig.S2** Fluorescence spectra of compound **2** and the isolated product **1**-$Cu^{2+}$ in the buffer solution (0.02 M HEPES, 50% DMSO, pH = 7.2).

## 4 $^{1}$H NMR of 1-$Cu^{2+}$ and Compound 2

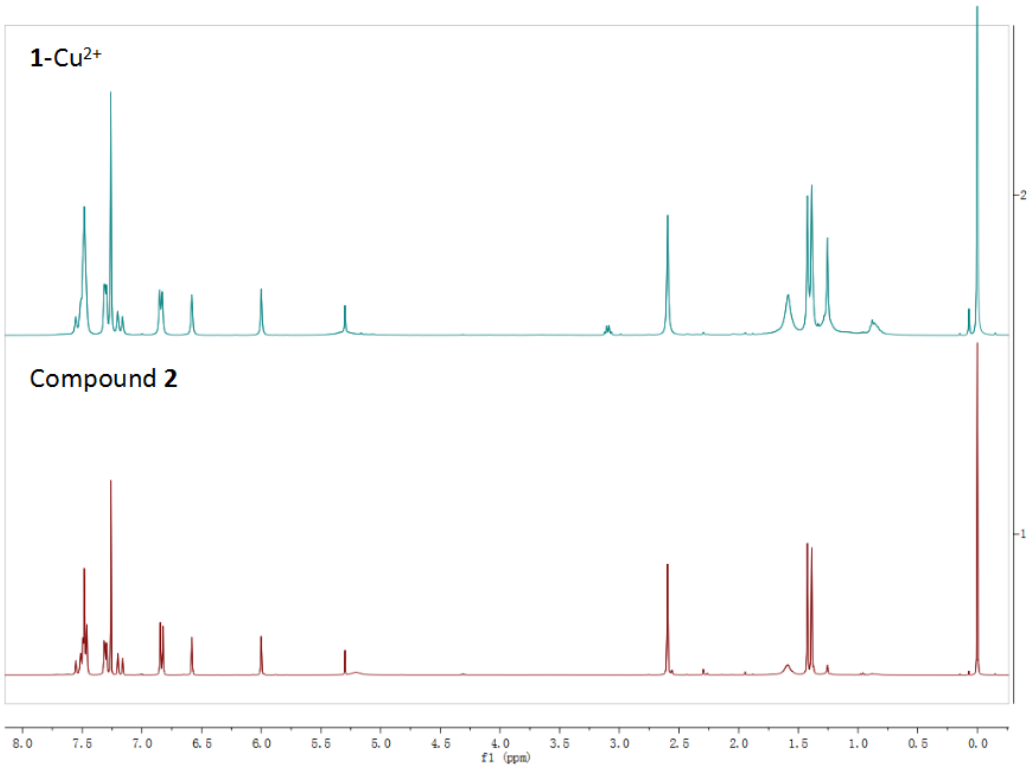



Fig.S3 $^{1}$H NMR of **1**-$Cu^{2+}$ and Compound **2**

## 5. The MS spectra of 1 – CN adduct

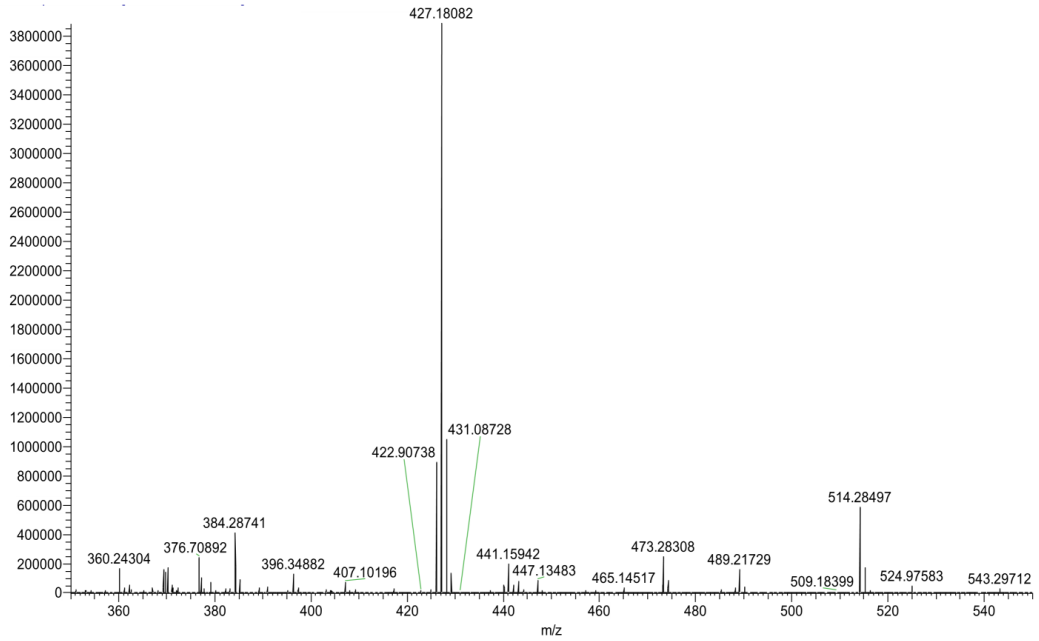



Fig.S4 The MS spectra of 1 – CN adduct