Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Electronic Supplementary Information

Water-soluble diboronic acid-based fluorescent sensors recognizing D-sorbitol

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UV-vis absorption spectra of sensor 1, 2 and 15c

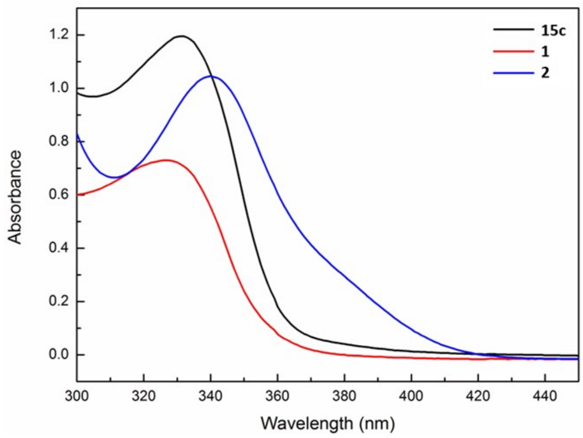


Fig. S1 UV-vis absorption spectra of sensor **1, 2** and **15c** DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature.

Fluorescence properties of sensors

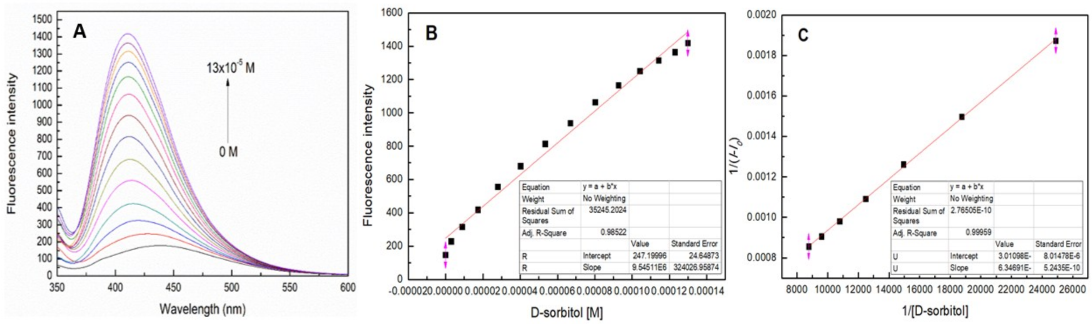


Fig. S2 A) Fluorescence spectra of sensor **1** (1×10^{-5} M) in the presence of different concentrations of D-sorbitol in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature; B) The photograph of sensor **1** linear range. C) Benesi-Hildebrand plot of sensor **1**$1/(I - I_0)$ *versus* 1/[D-sorbitol].

The calculation process of LOD：

I =9545110c +247.19996

R^2=0.98522

S=9545110

$\delta=\sqrt{\frac{\Sigma(F_i - F_0)^2}{N-1}}$ =4.87 (N=5) K=3

LOD =K × δ/S=1.53×10^{-6} M

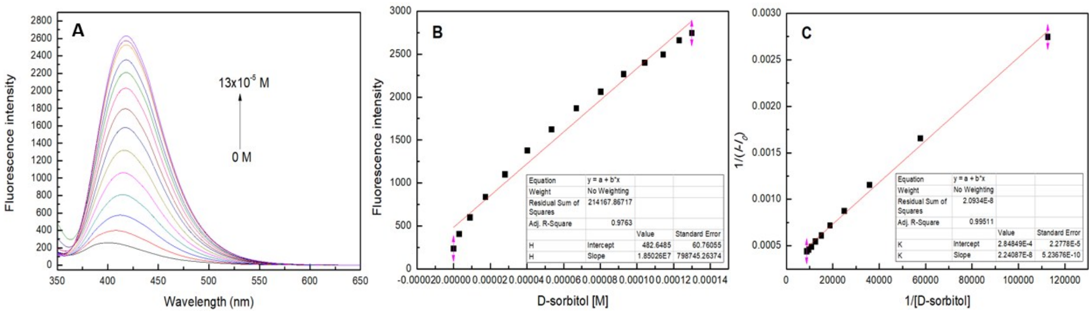


Fig. S3 A) Fluorescence spectra of sensor **15a** (1×10^{-5} M) in the presence of different concentrations of D-sorbitol in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature; B) The photograph of sensor **15a** linear range. C) Benesi-Hildebrand plot of sensor **15a**$1/(I - I_0)$ *versus* 1/[D-sorbitol].

The calculation process of LOD：

I=18502600c+482.6485

R^2=0.9763

S=18502600

$\delta=\sqrt{\frac{\Sigma(F_i - F_0)^2}{N-1}}$ = 5.02 (N=5) K=3

LOD =K × δ/S=8.14×10^{-7} M

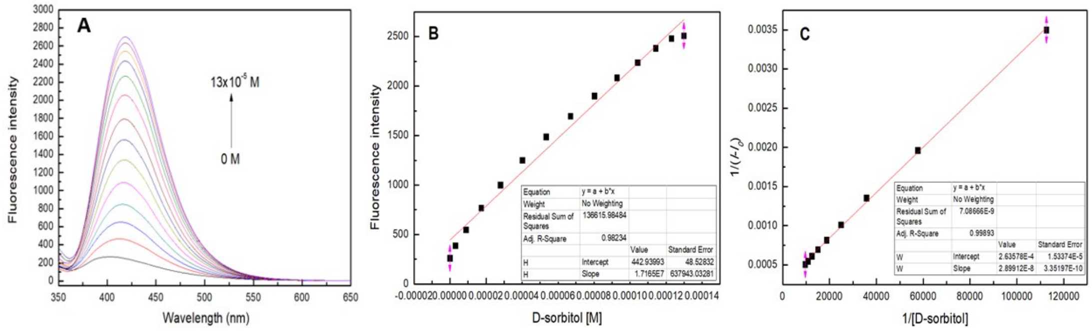


Fig. S4 A) Fluorescence spectra of sensor **15b** (1×10^{-5} M) in the presence of different concentrations of D-sorbitol in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature; B) The photograph of sensor **15b** linear range. C) Benesi-Hildebrand plot of sensor **15b**1/(I - I_0) *versus* 1/[D-sorbitol].

The calculation process of LOD：

I=17165000c+442.93993

R^2=0.98234

S=17165000

$$\delta=\sqrt{\frac{\Sigma(F_i-F_0)^2}{N-1}} = 4.37 \text{ (N=5) K=3}$$

LOD =K × δ/S=7.64×10^{-7} M

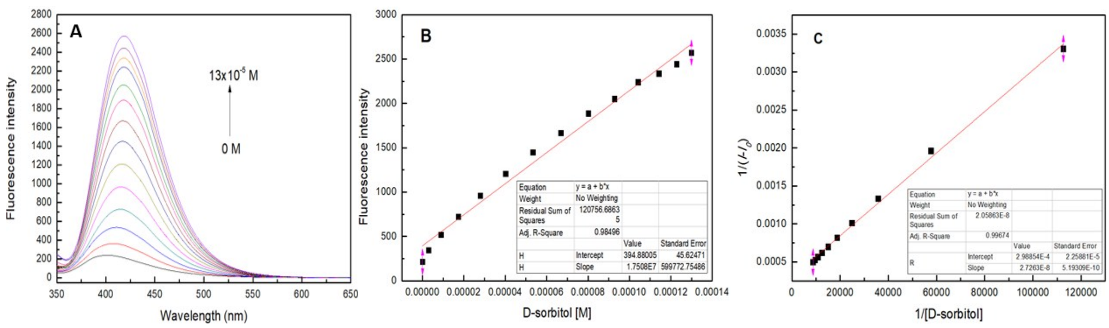


Fig. S5 A) Fluorescence spectra of sensor **15c** (1×10^{-5} M) in the presence of different concentrations of D-sorbitol in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature; B) The photograph of sensor **15c** linear range. C) Benesi-Hildebrand plot of sensor **15c**1/(I - I_0) *versus* 1/[D-sorbitol].

The calculation process of LOD：

I=17508000c+394.88005

R^2=0.98496

S=17508000

$$\delta=\sqrt{\frac{\Sigma(F_i-F_0)^2}{N-1}} = 4.03 \text{ (N=5) K=3}$$

LOD =K × δ/S=6.91×10^{-7} M

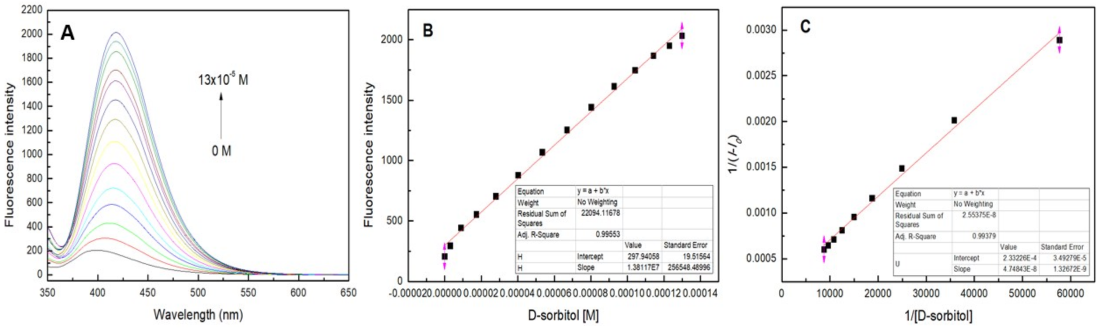


Fig. S6 A) Fluorescence spectra of sensor **15d** (1×10^{-5} M) in the presence of different concentrations of D-sorbitol in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature; B) The photograph of sensor **15d** linear range. C) Benesi-Hildebrand plot of sensor **15d**$1/(I - I_0)$ *versus* 1/[D-sorbitol].

The calculation process of LOD：

I=13811700c+297.94058

R^2=0.99553

S=13811700

$\delta=\sqrt{\dfrac{\Sigma(F_i-F_0)^2}{N-1}}$=5.63 (N=5) K=3

LOD =K × δ/S=1.22×10^{-6} M

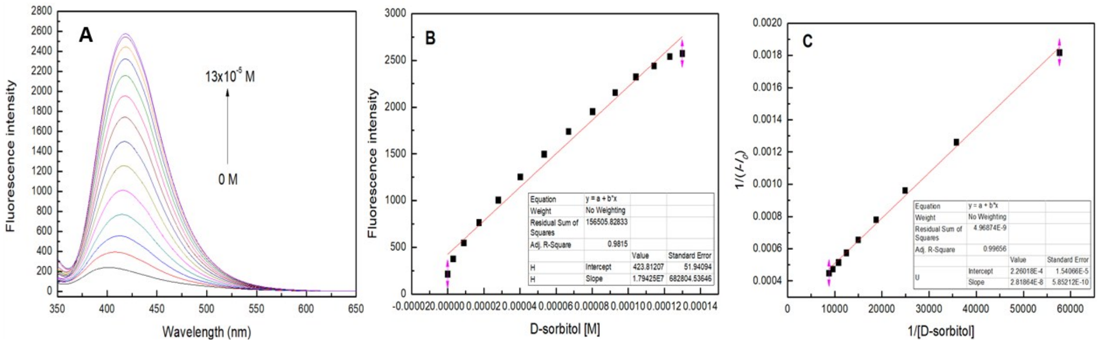


Fig. S7 A) Fluorescence spectra of sensor **15e** (1×10^{-5} M) in the presence of different concentrations of D-sorbitol in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature; B) The photograph of sensor **15e** linear range. C) Benesi-Hildebrand plot of sensor **15e**$1/(I - I_0)$ *versus* 1/[D-sorbitol].

The calculation process of LOD：

I=17942500c+423.81207

R^2=0.9815

S=17942500

$\delta=\sqrt{\dfrac{\Sigma(F_i-F_0)^2}{N-1}}$ = 3.28 (N=5) K=3

LOD =K× δ/S=5.48×10^{-7} M

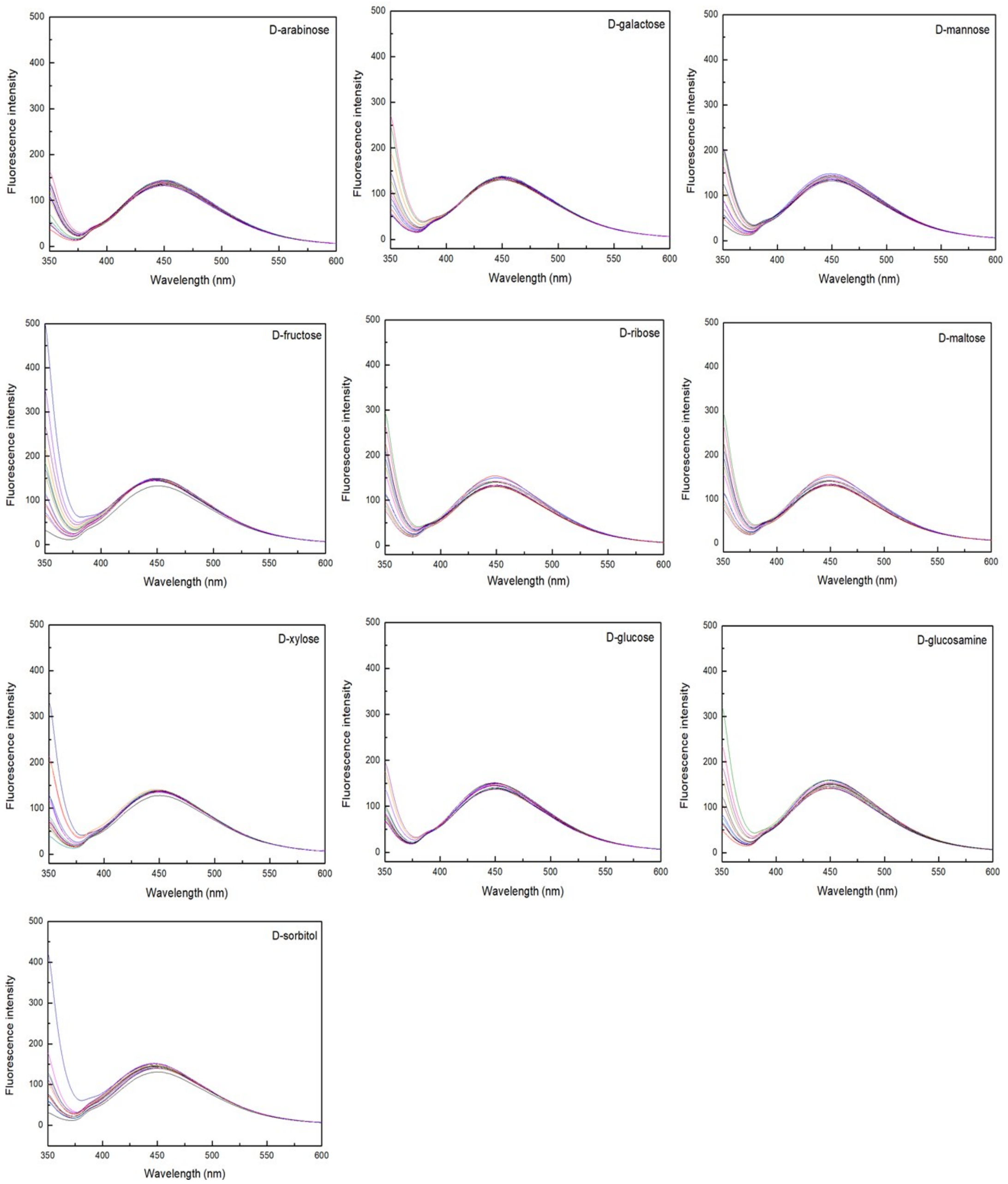
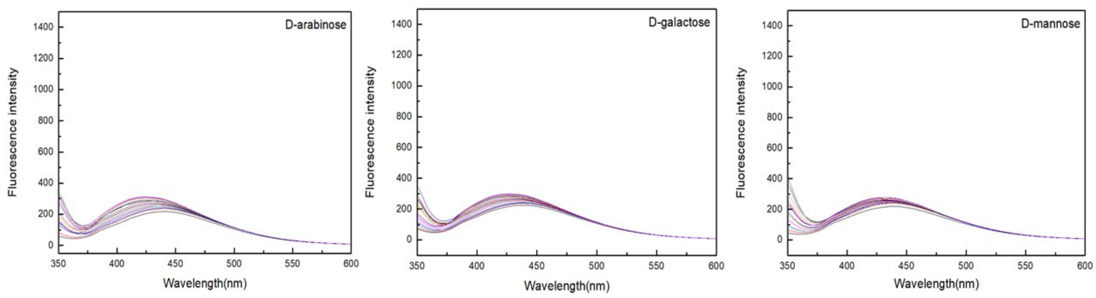


Fig. S8 Fluorescence spectra of sensor **2** (1×10^{-5} M) in the presence of different carbohydrates (from 0 to 13×10^{-5} M) in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature.



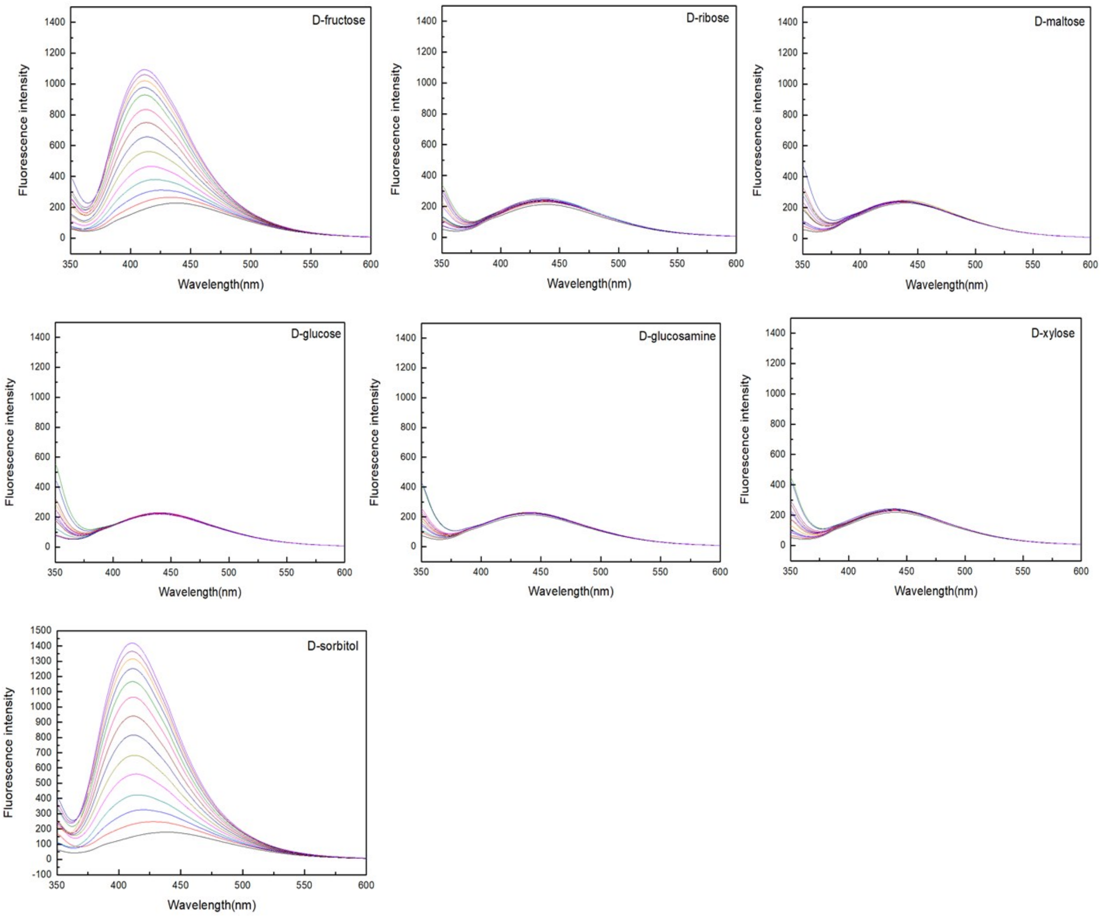
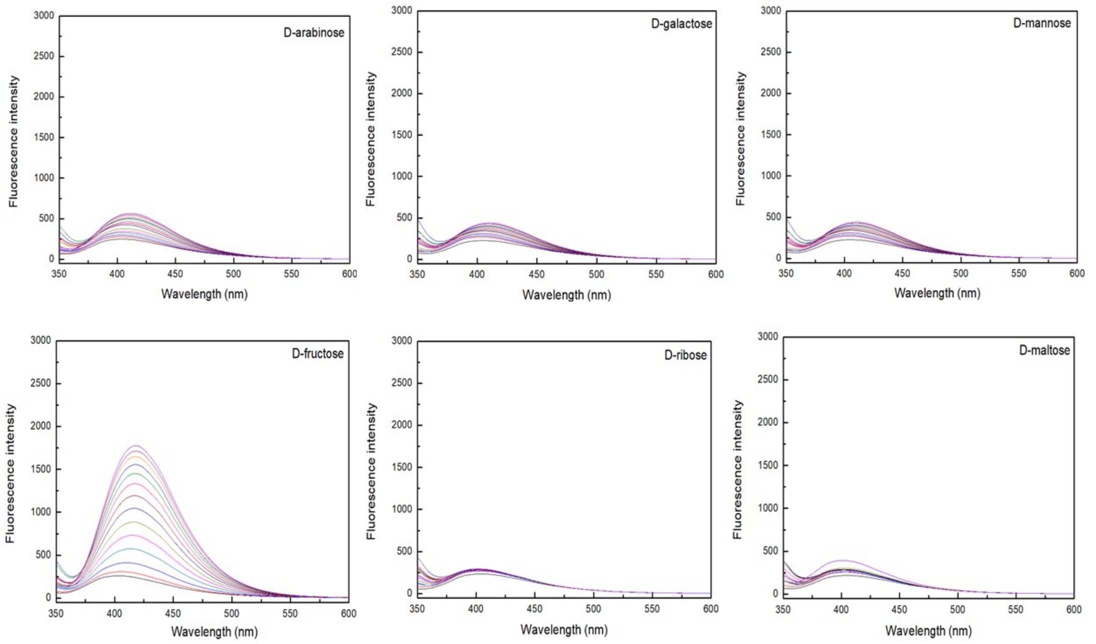


Fig. S9 Fluorescence spectra of sensor **1** (1×10^{-5} M) in the presence of different carbohydrates (from 0 to 13×10^{-5} M) in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature.



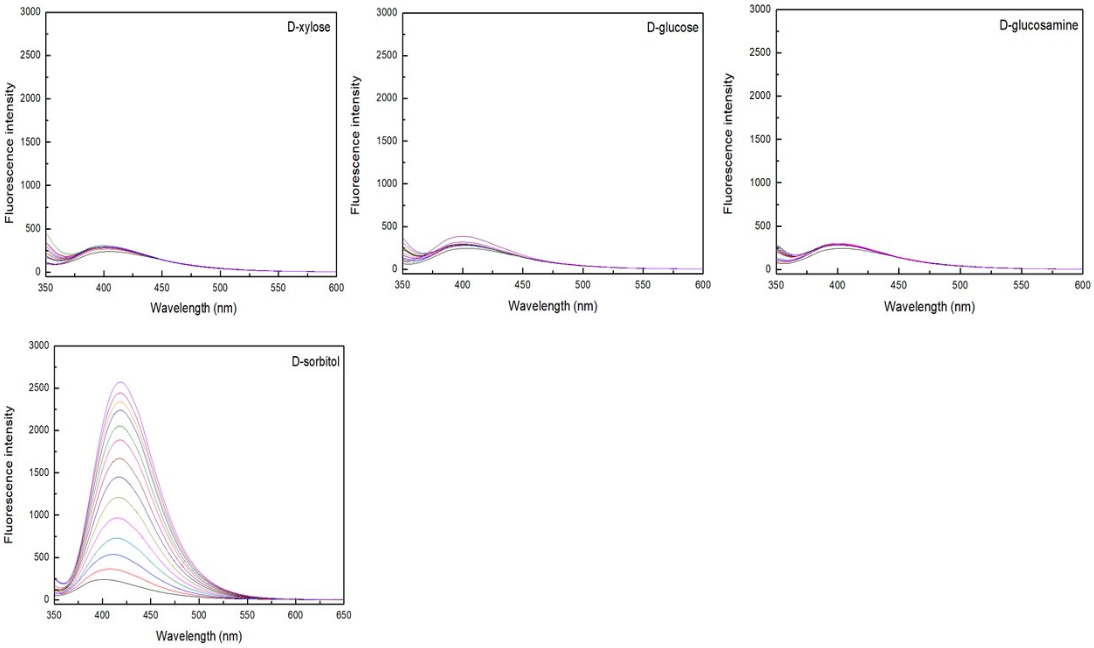


Fig. S10 Fluorescence spectra of sensor **15c** (1×10^{-5} M) in the presence of different carbohydrates (from 0 to 13×10^{-5} M) in DMSO/PBS (pH 9, 0.1M) solution (1:99, v/v), at room temperature.

Copies of NMR (^{1}H and ^{13}C) and HRMS spectra

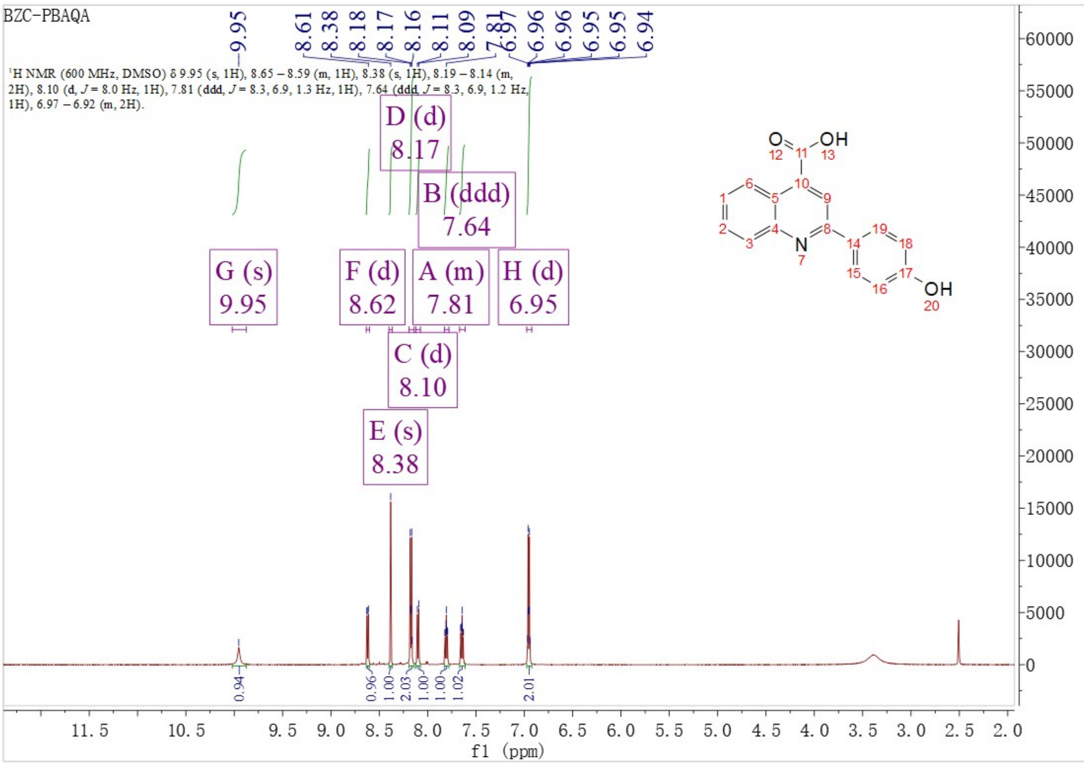


Fig. S11 ^{1}H NMR spectrum of **2**

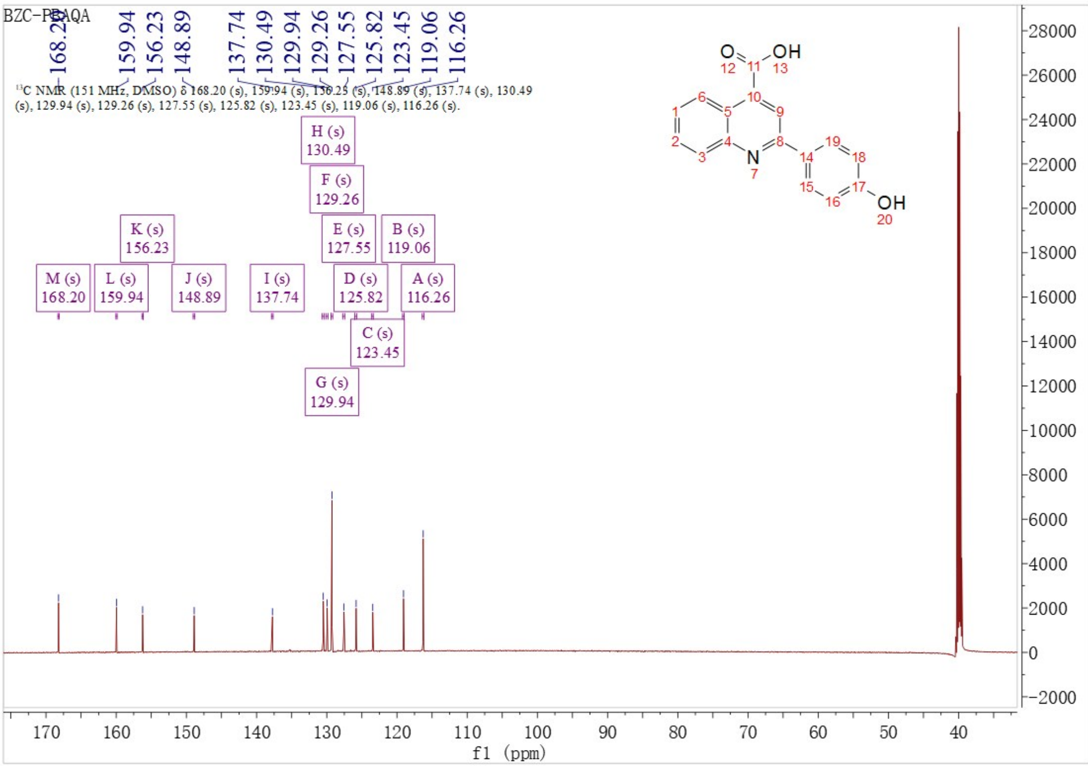


Fig. S12 ^{13}C NMR spectrum of **2**

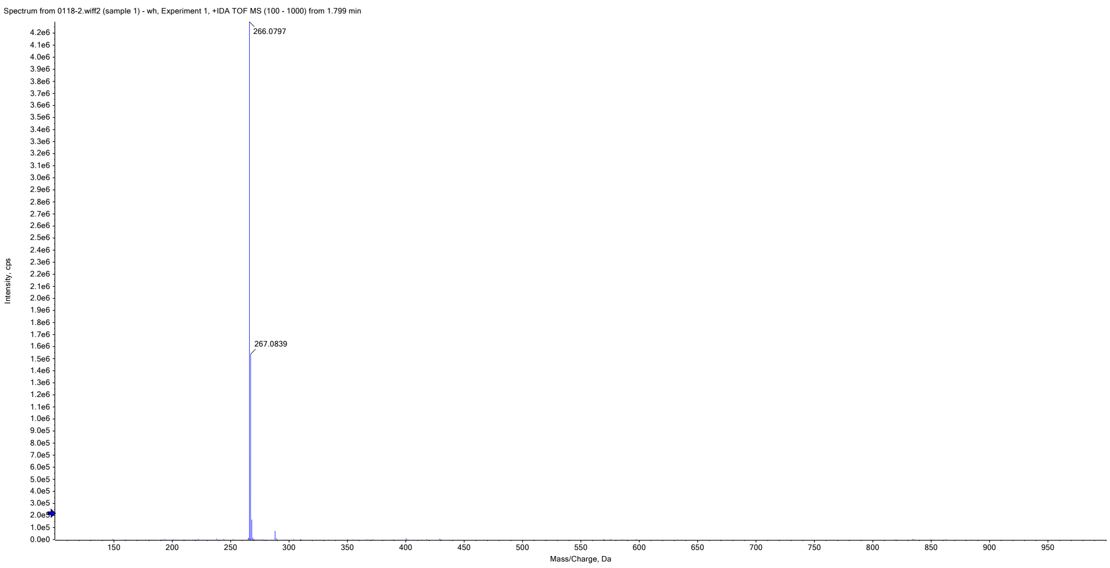


Fig. S13 HRMS spectrum of compound **2**

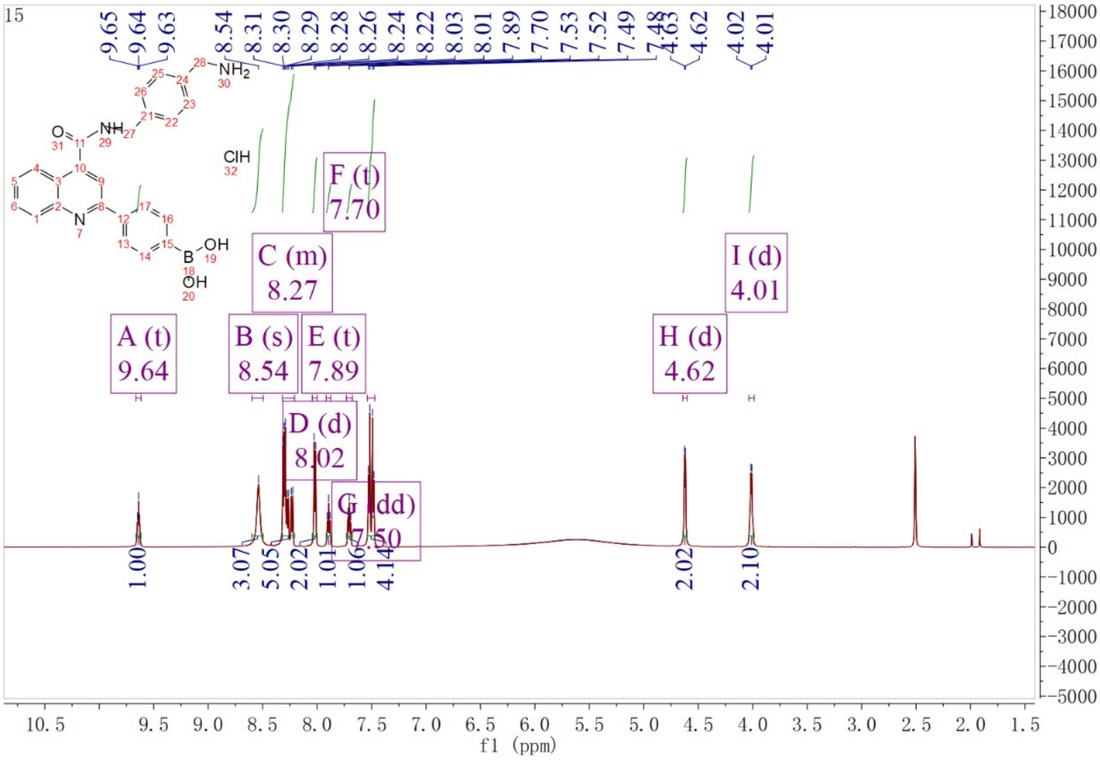


Fig. S14 ^{1}H NMR spectrum of **3**

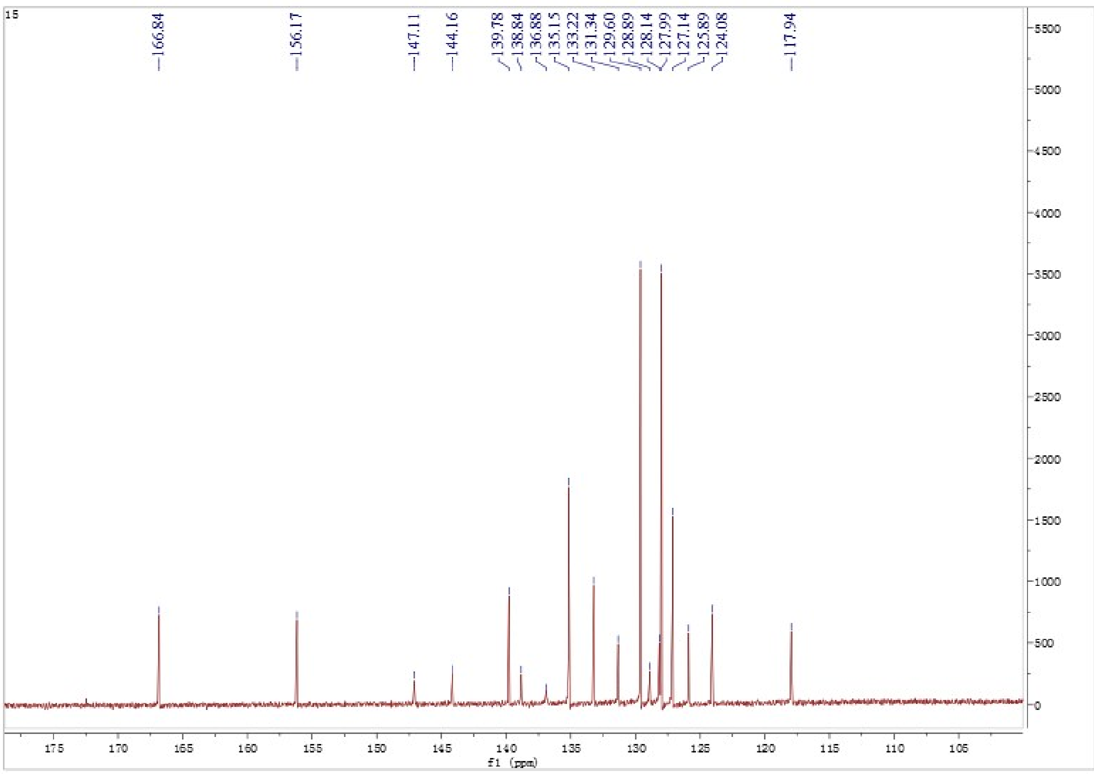


Fig. S15 ^{13}C NMR spectrum of **3**

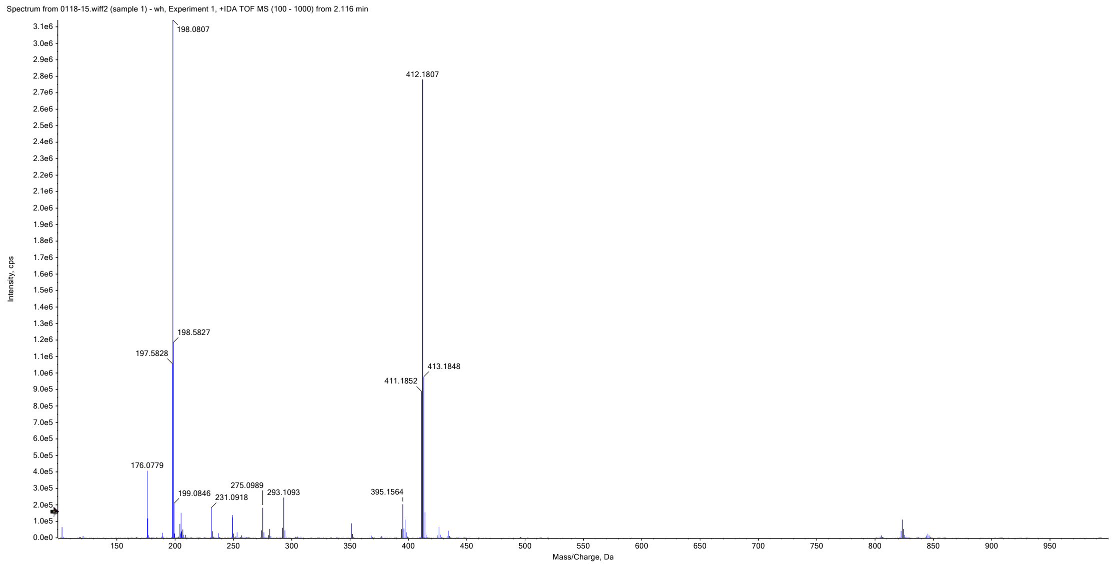


Fig. S16 HRMS spectrum of compound **3**

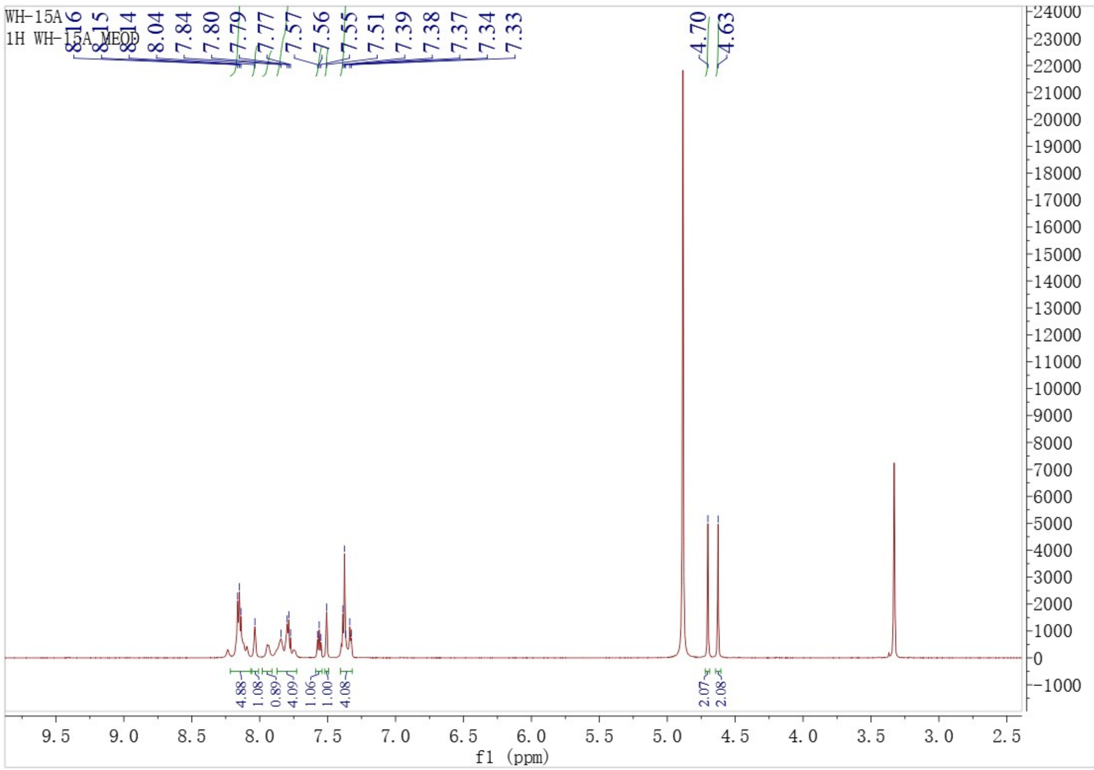


Fig. S17 ^{1}H NMR spectrum of **15a**

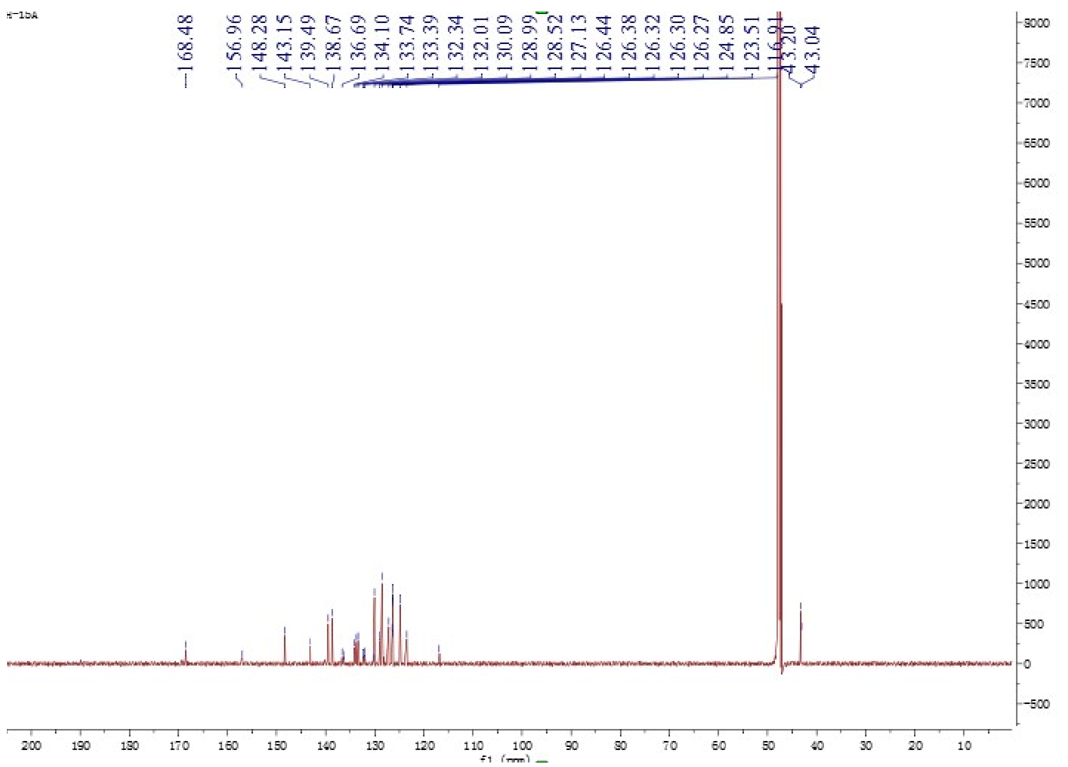


Fig. S18 ^{13}C NMR spectrum of **15a**

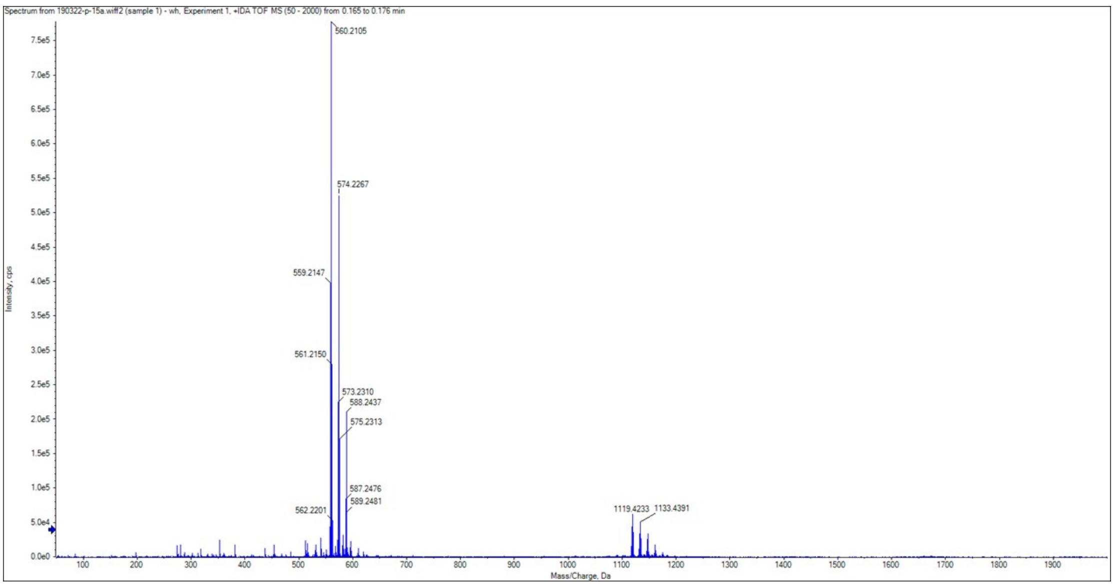


Fig. S19 HRMS spectrum of compound **15a**

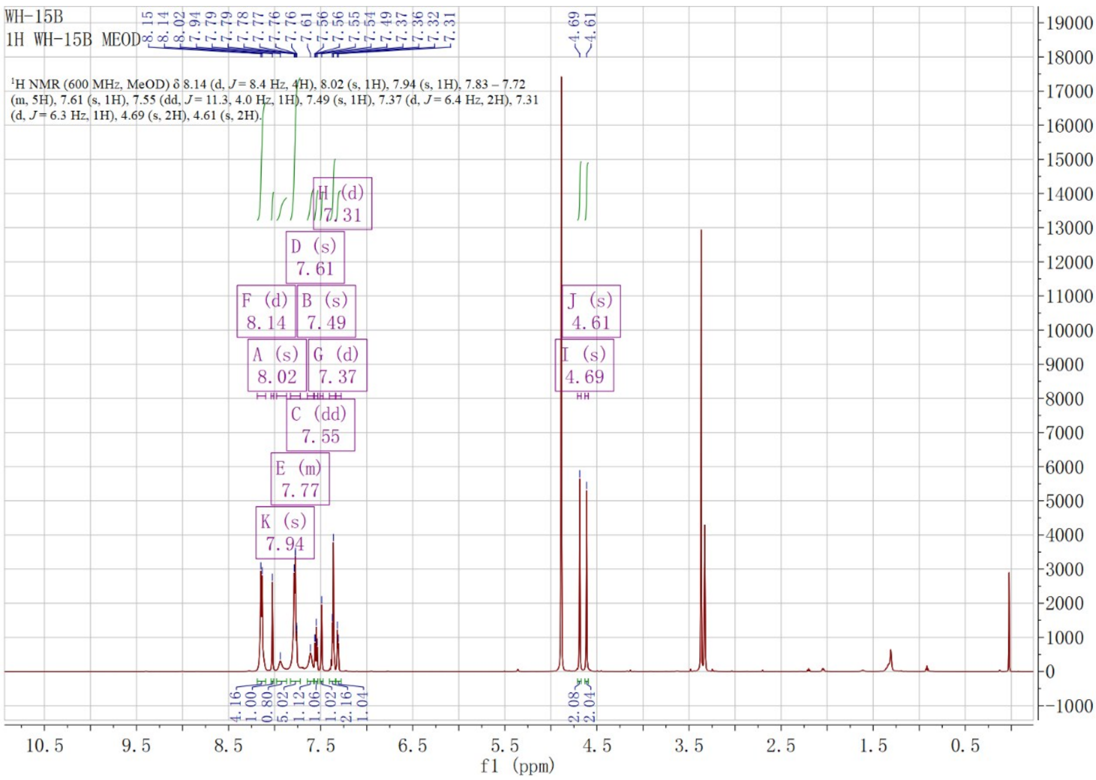


Fig. S20 [1]H NMR spectrum of **15b**

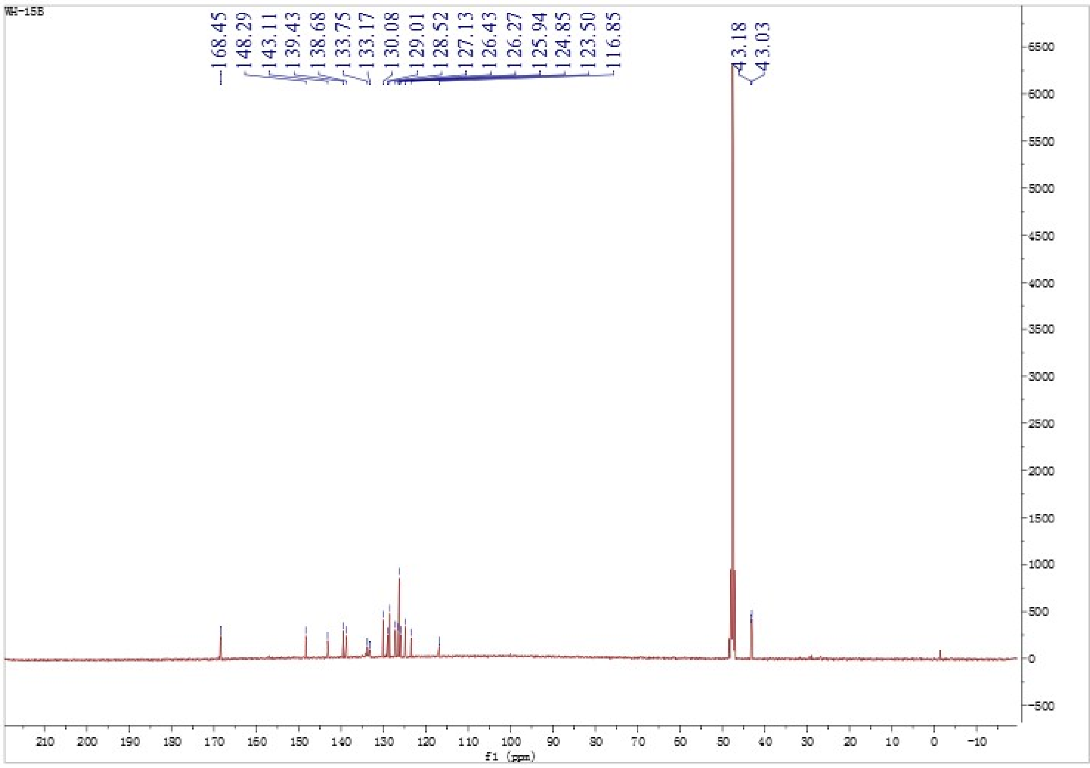


Fig. S21 [13]C NMR spectrum of **15b**

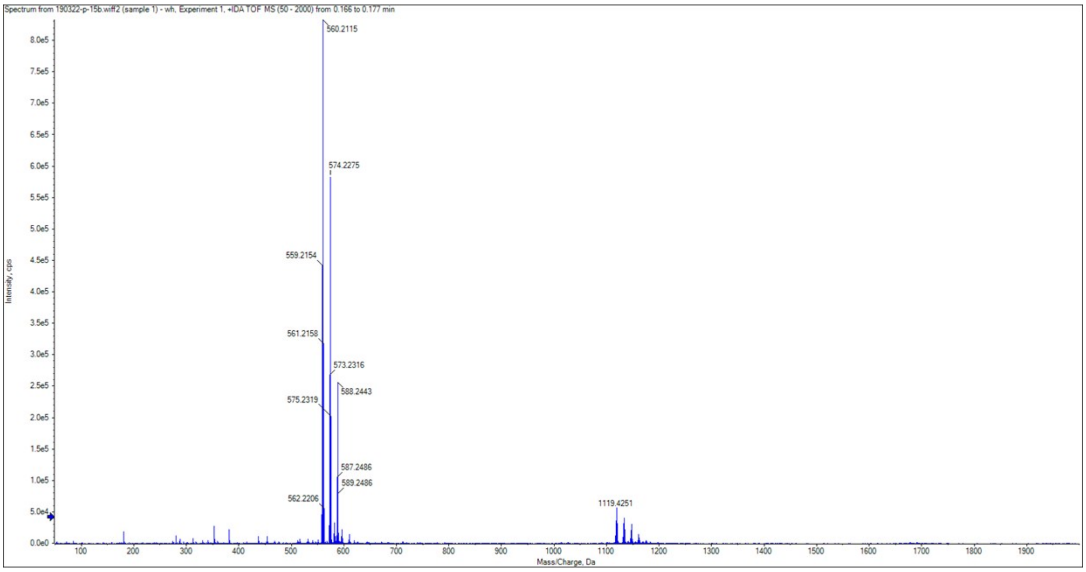


Fig. S22 HRMS spectrum of compound **15b**

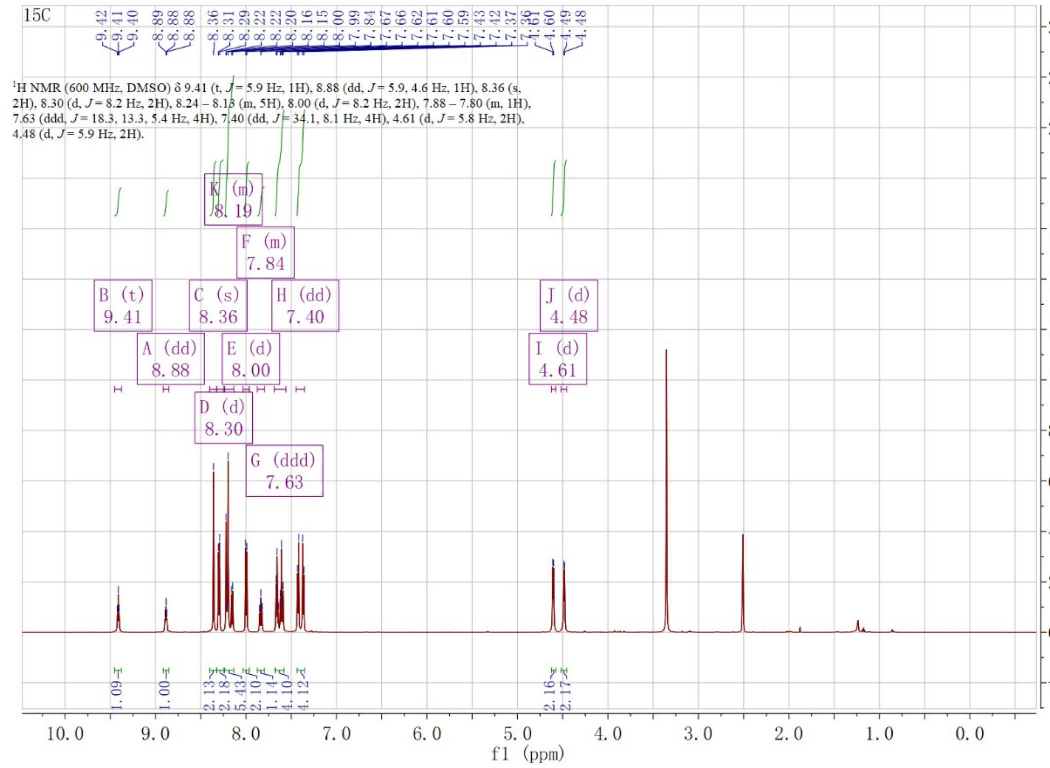


Fig. S23 ^{1}H NMR spectrum of **15c**

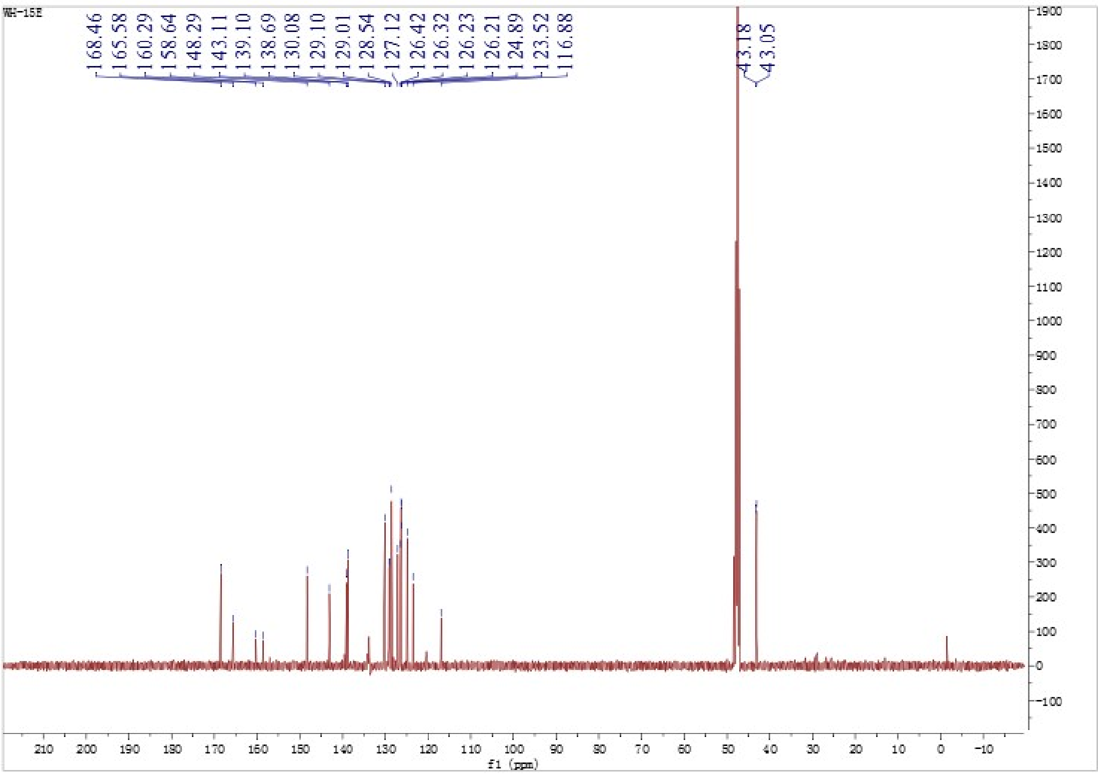


Fig. S24 ^{13}C NMR spectrum of **15c**

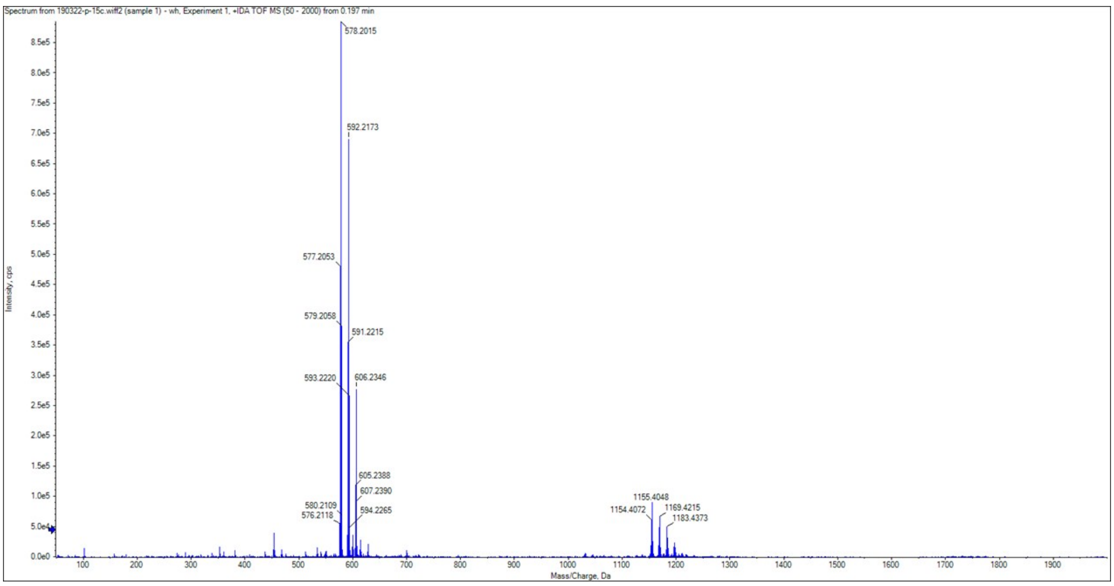


Fig. S25 HRMS spectrum of compound **15c**

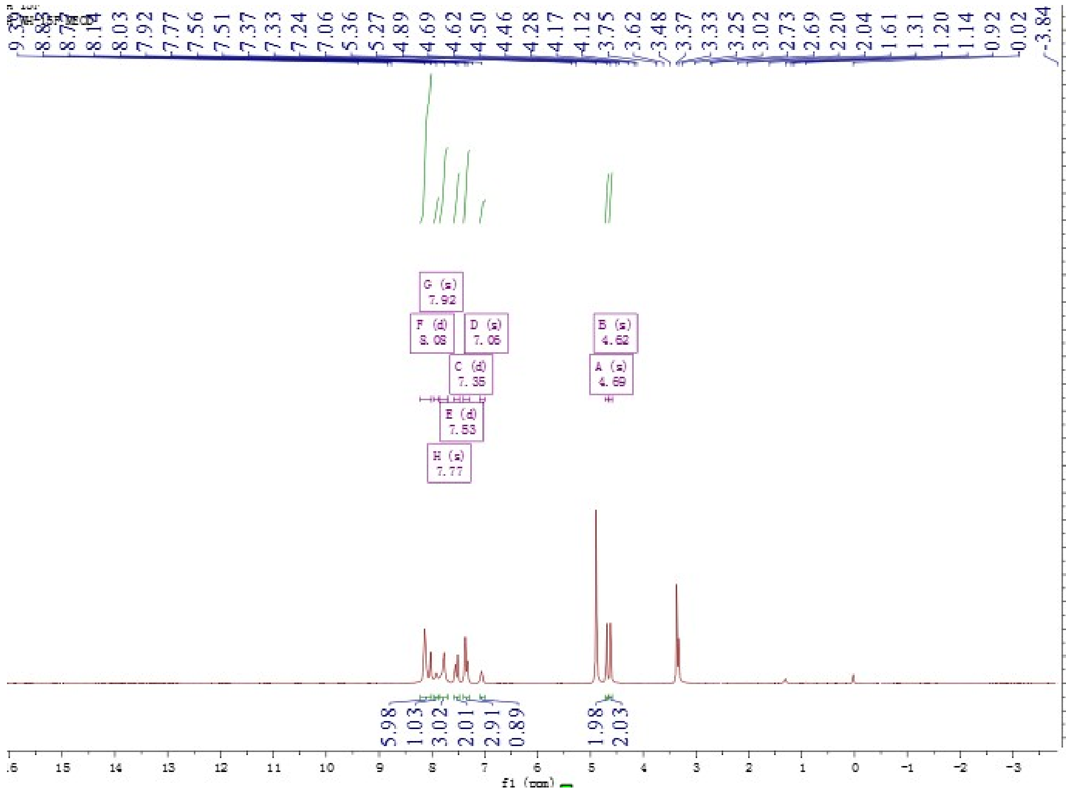


Fig. S26 ^{1}H NMR spectrum of **15d**

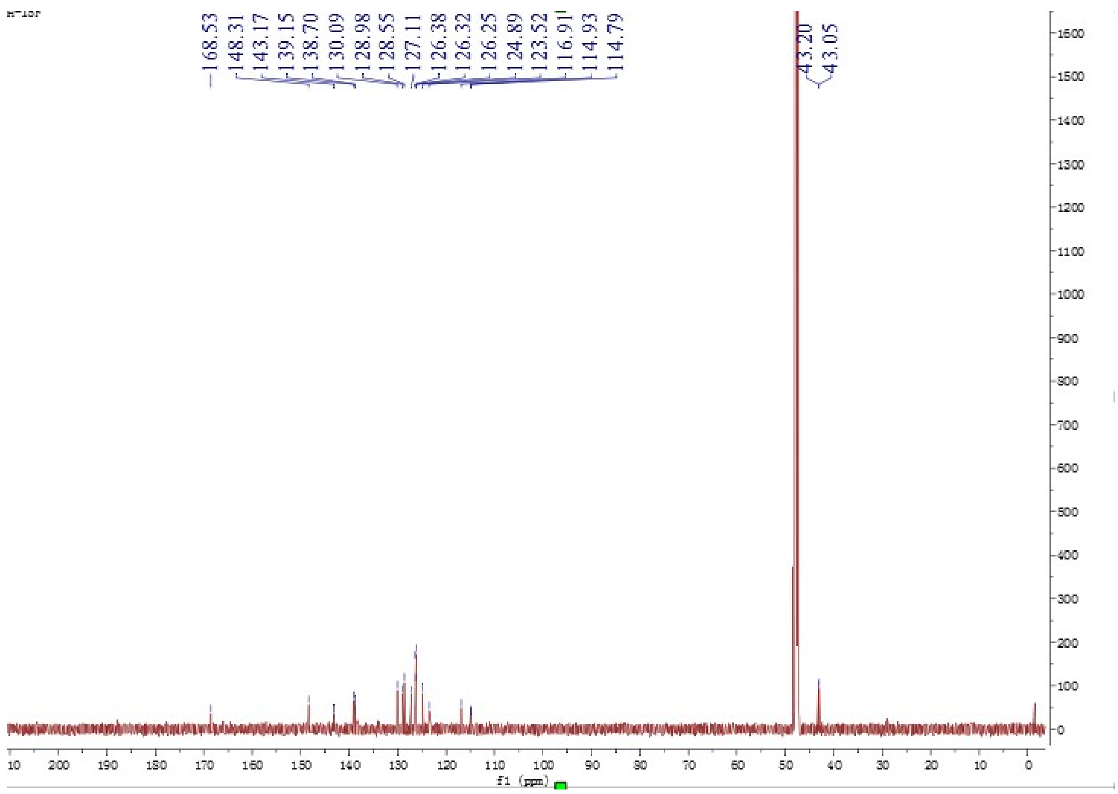


Fig. S27 ^{13}C NMR spectrum of **15d**

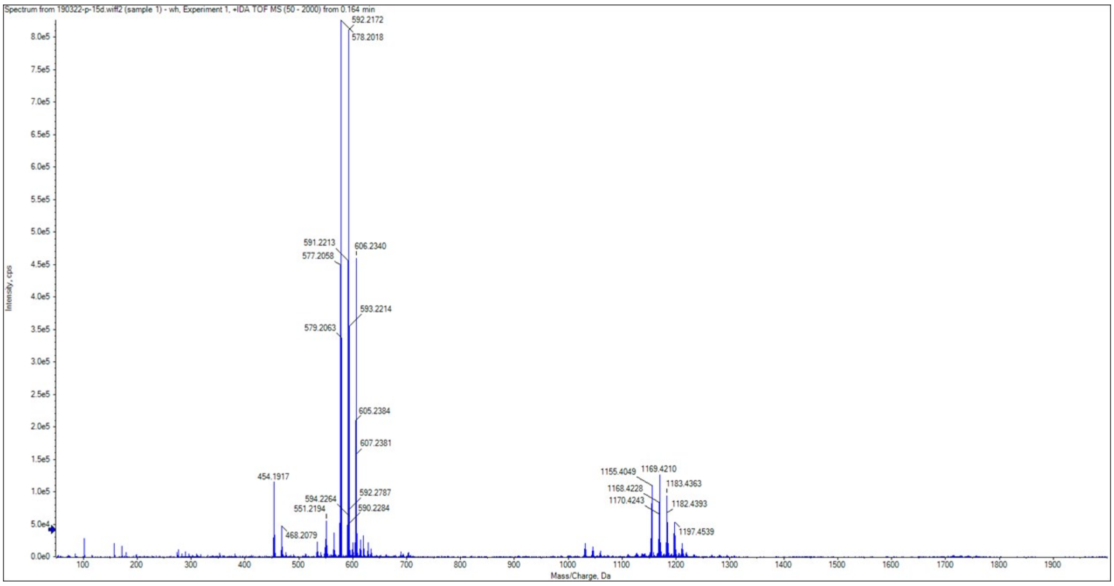


Fig. S28 HRMS spectrum of compound **15d**

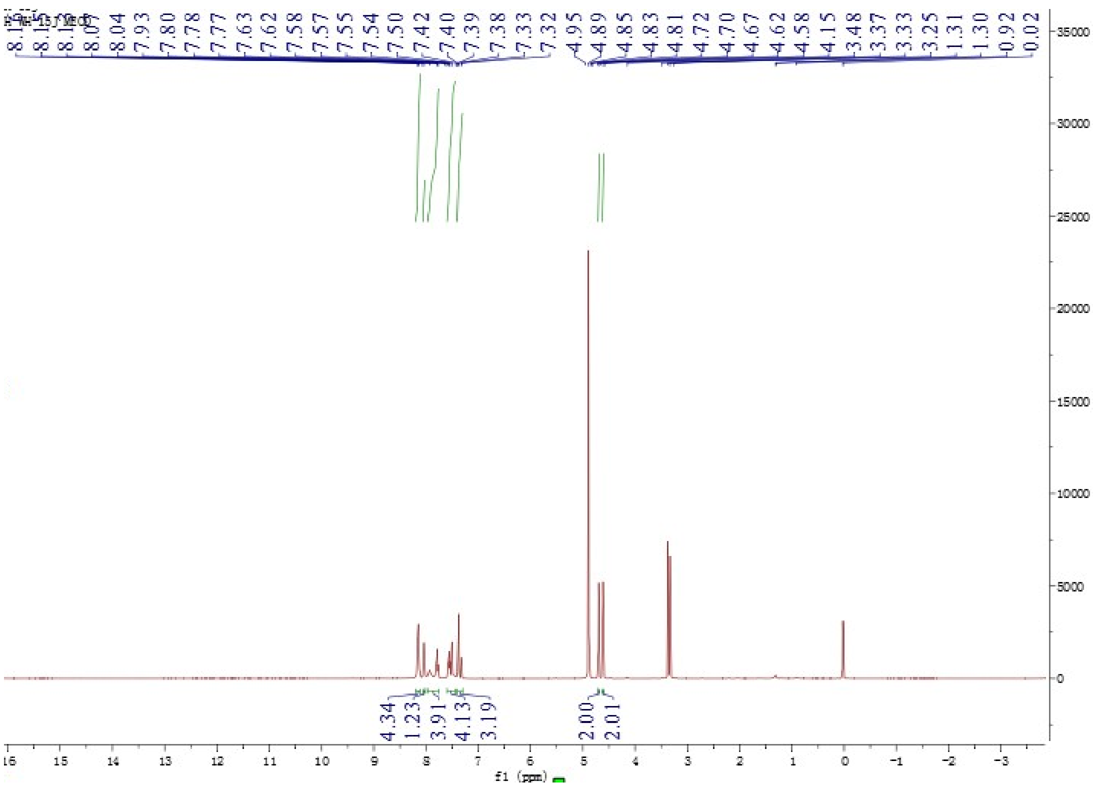


Fig. S29 ^{1}H NMR spectrum of **15e**

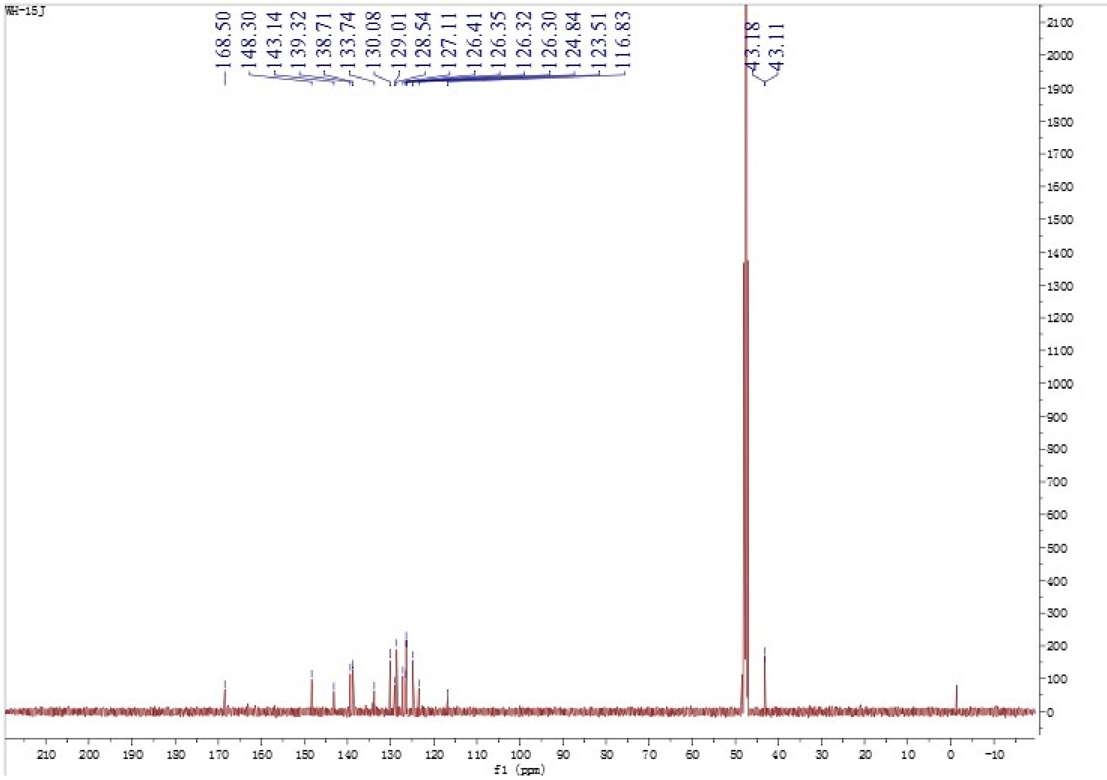


Fig. S30 ^{13}C NMR spectrum of **15e**

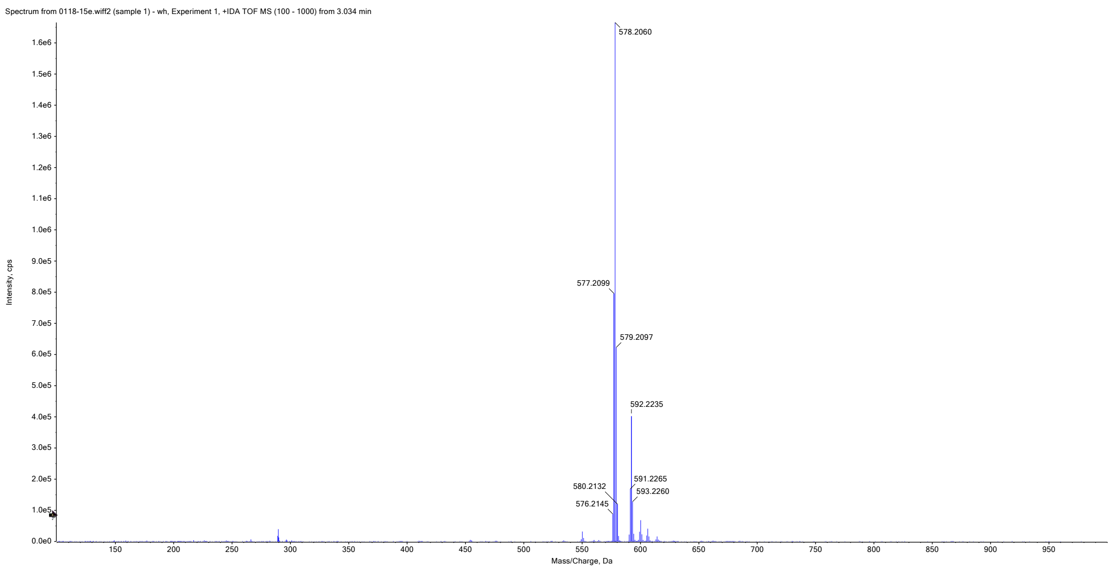


Fig. S31 HRMS spectrum of compound **15e**