Supplementary Information (SI) for Analytical Methods.
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**Supplementary data**

# A coumarin-based ratiometric fluorescent sensor for the detection of hydrazine in environmental and biological samples

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## Materials and instrumentation

Fluorescein (95%), $CH_3OH$, NaOH, $CHCl_3$, $H_2SO_4$, piperidine, triethylamine, hydrazine were purchased from Sinopharm Chemical Reagent Co., Ltd; diethyl malonate, 15-crown - 5, acetyl chloride, 4-bromobutyryl chloride were purchased from Shanghai Macklin Biochemical Co., Ltd. Hydrazine and other ions stock solutions (2.0 mM) were prepared in ultrapure water, while stock solution of the probe (1.0 mM) was prepared in DMSO. All aqueous solution were prepared in ultrapure water with Milli-Q water purification system (18.2 MΩ cm).

The NCM-460 cell line was purchased from Cellverse Co., Ltd. (Shanghai, China). UV-Vis and fluorescence spectra were recorded on a Varian Cary 50 spectrophotometer (Agilent Technologies, USA) and a F-7000 spectro-fluoro-photometer (Hitachi High-Technologies, Japan), respectively. Spectra of $^1H$ NMR and $^{13}C$ NMR were measured on a BRUKER AVIII 400 nuclear magnetic resonance spectrometer (*Bruker* Corporation, Switzerland). MS spectra were obtained by a HR-MS Triple TOF 4600 spectrometer (SCIEX Inc., USA). Living cells were imaged by an Olympus IX 51 inverted fluorescence microscopy (Olympus Corporation, Japan) equipped with integrated color filters, using green light excitation.

**Figures**

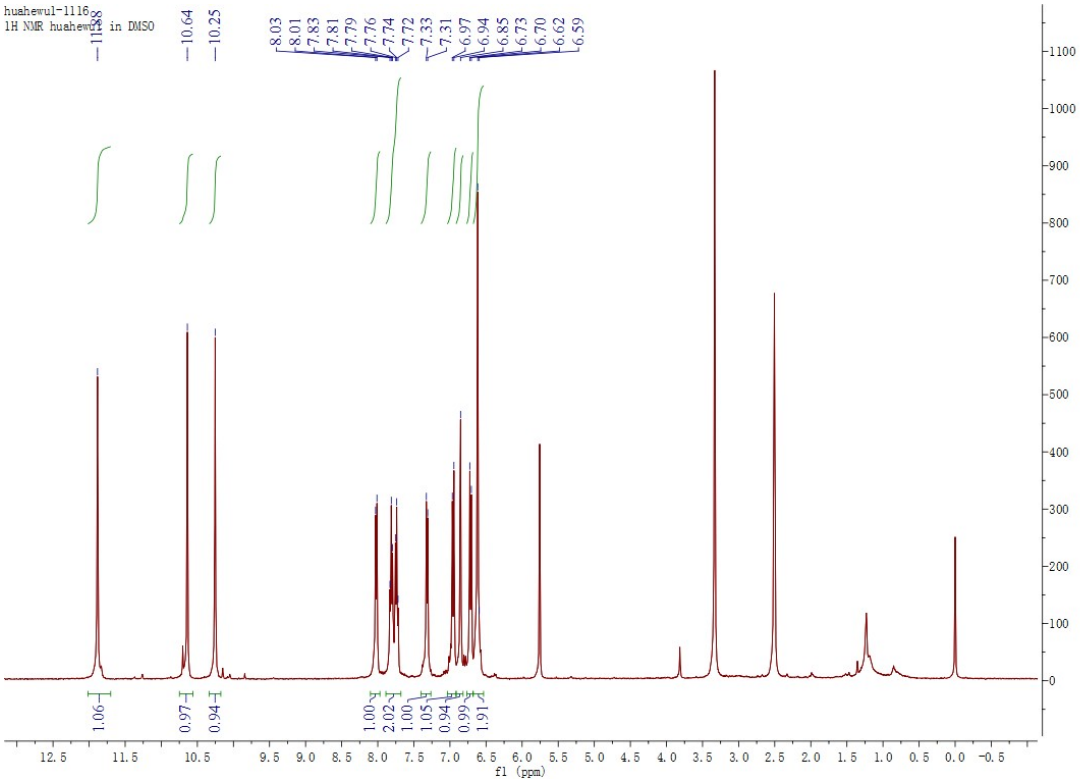


Figure S1 $^{1}$H NMR (400 MHz, DMSO-*d6*) of compound **1**.

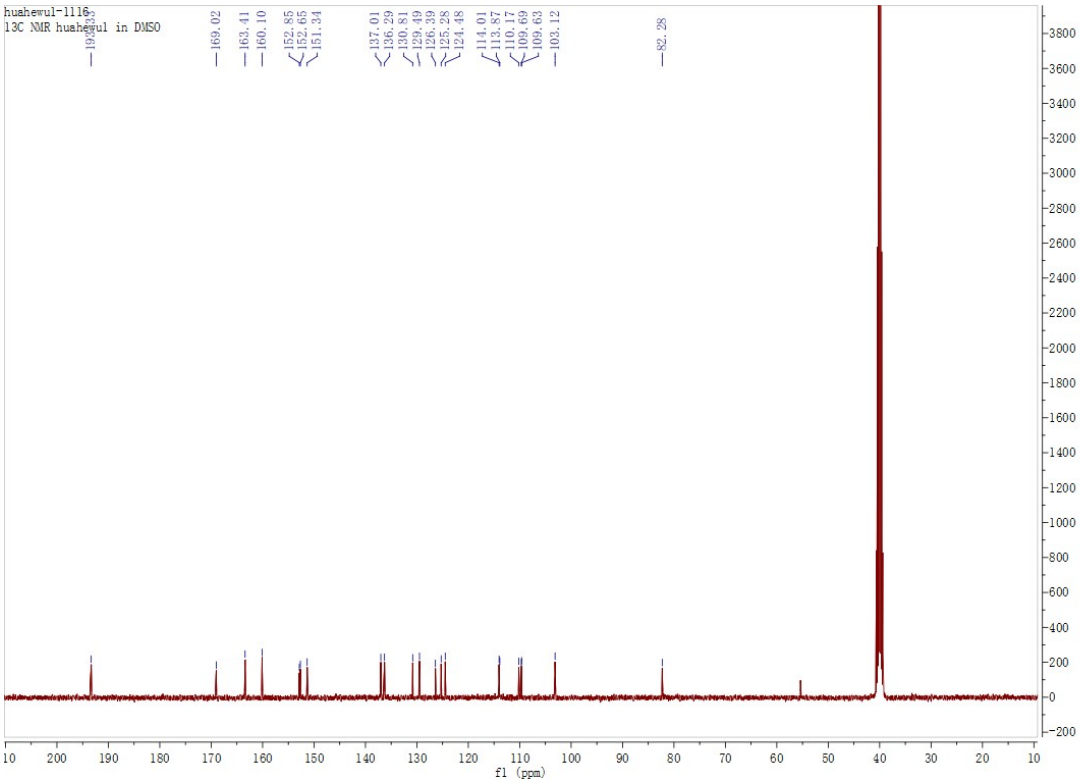


Figure S2 $^{13}$C NMR (101 MHz, DMSO-*d6*) of compound **1**.

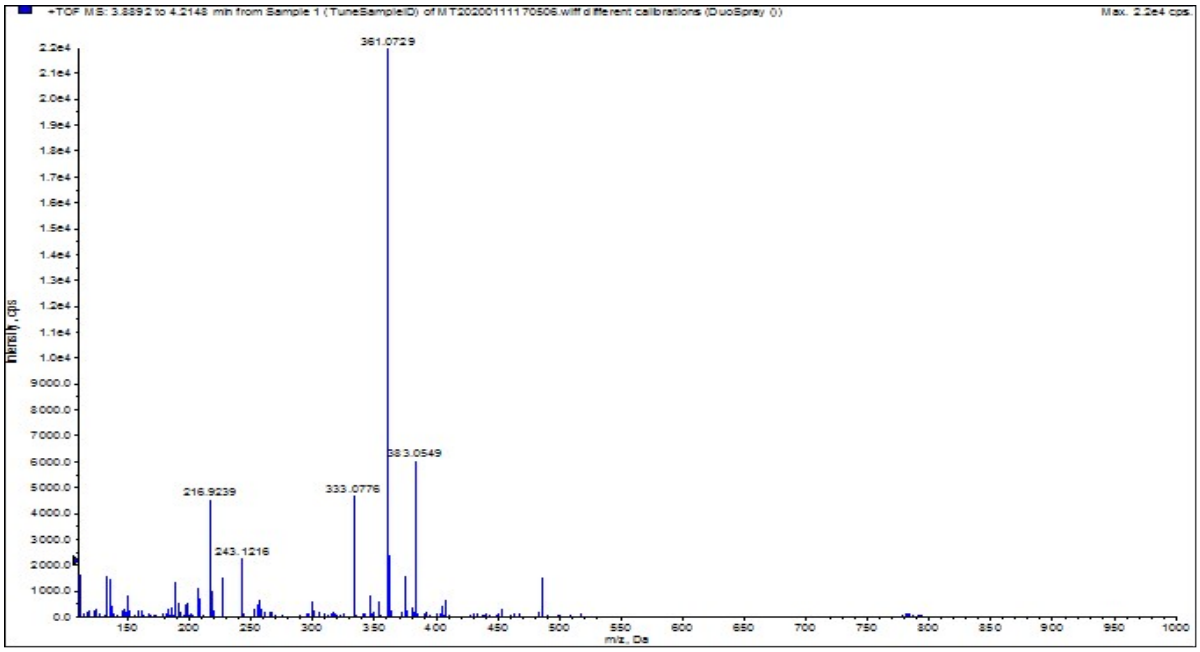


Figure S3 ESI-HR-MS spectrum of compound **1**.

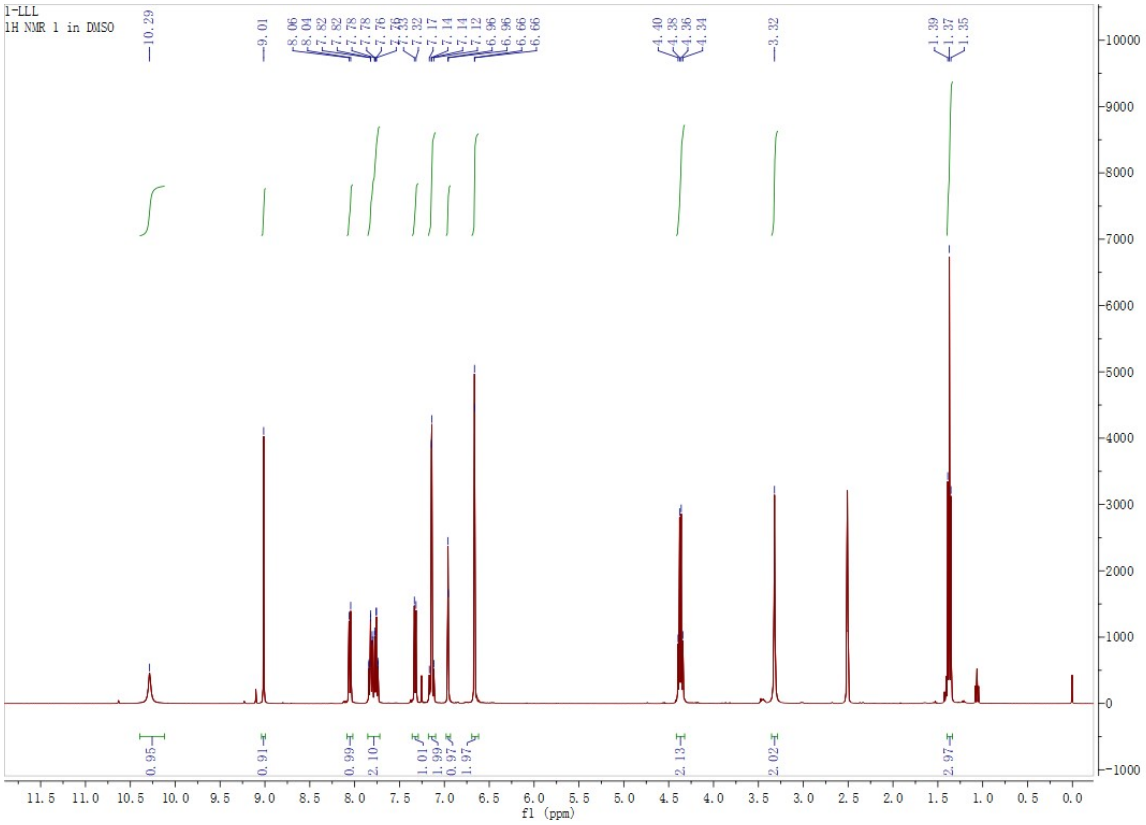


Figure S4 $^{1}$H NMR (400 MHz, DMSO-*d6*) of compound **2**.

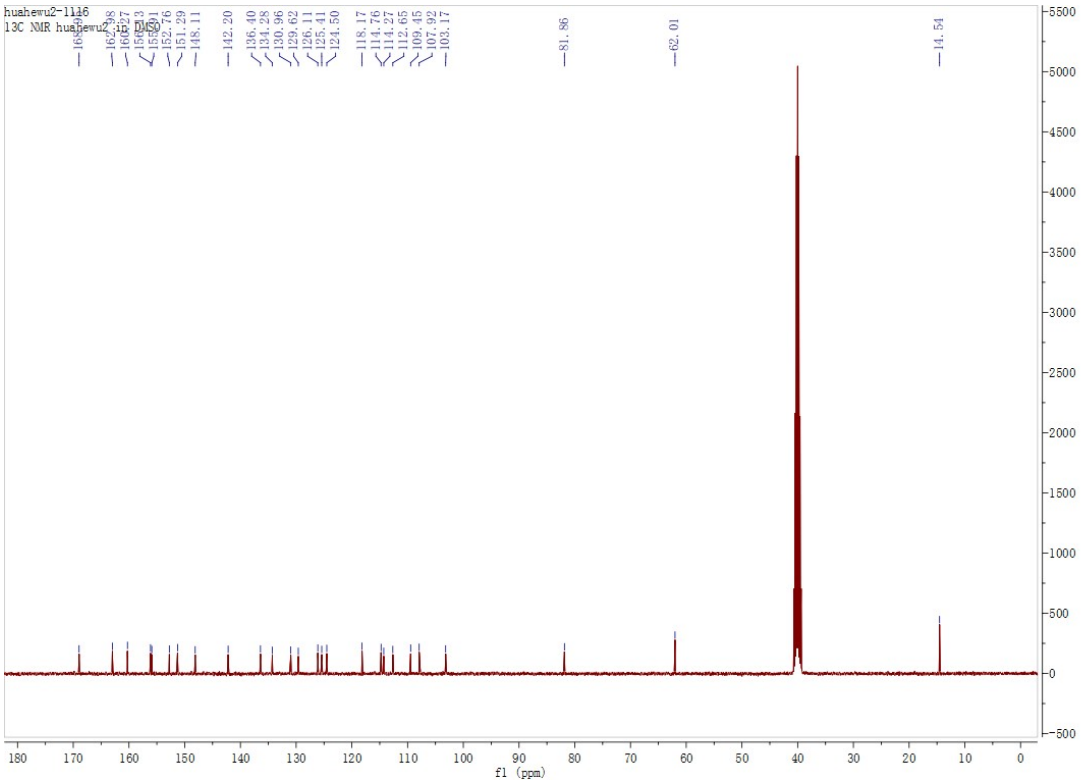


Figure S5 $^{13}$C NMR (101 MHz, DMSO-*d6*) of compound **2**.

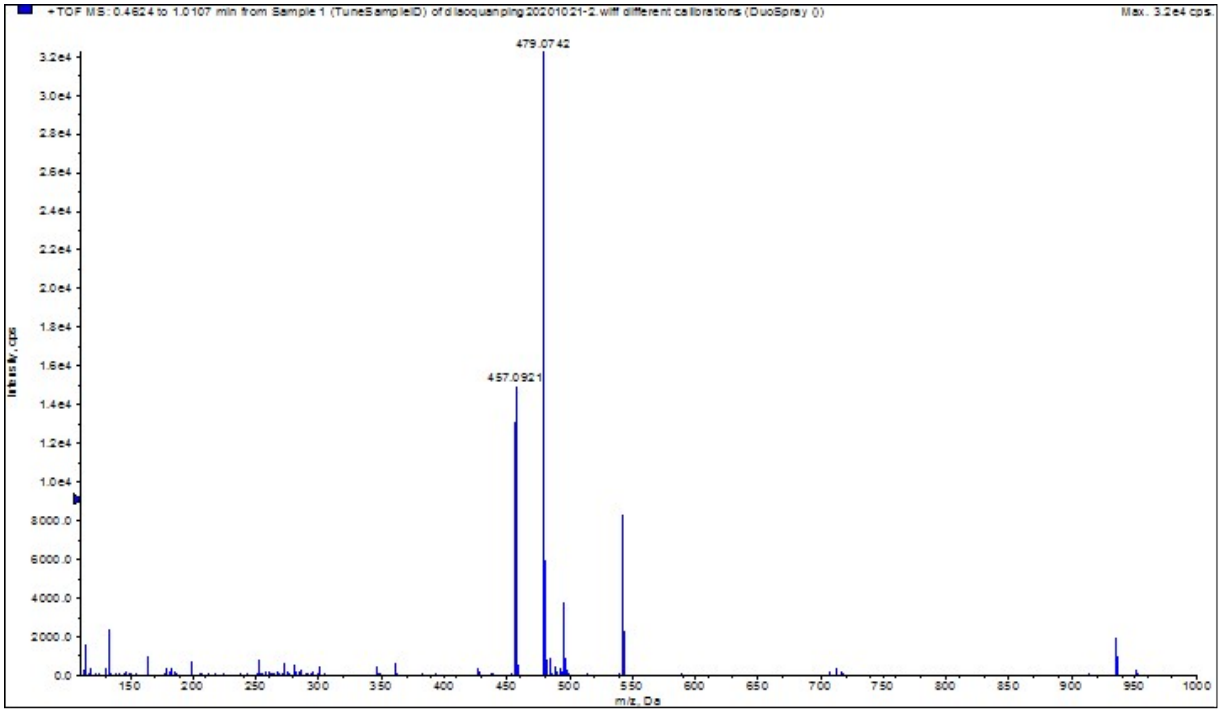


Figure S6 ESI-HR-MS spectrum of compound **2**.

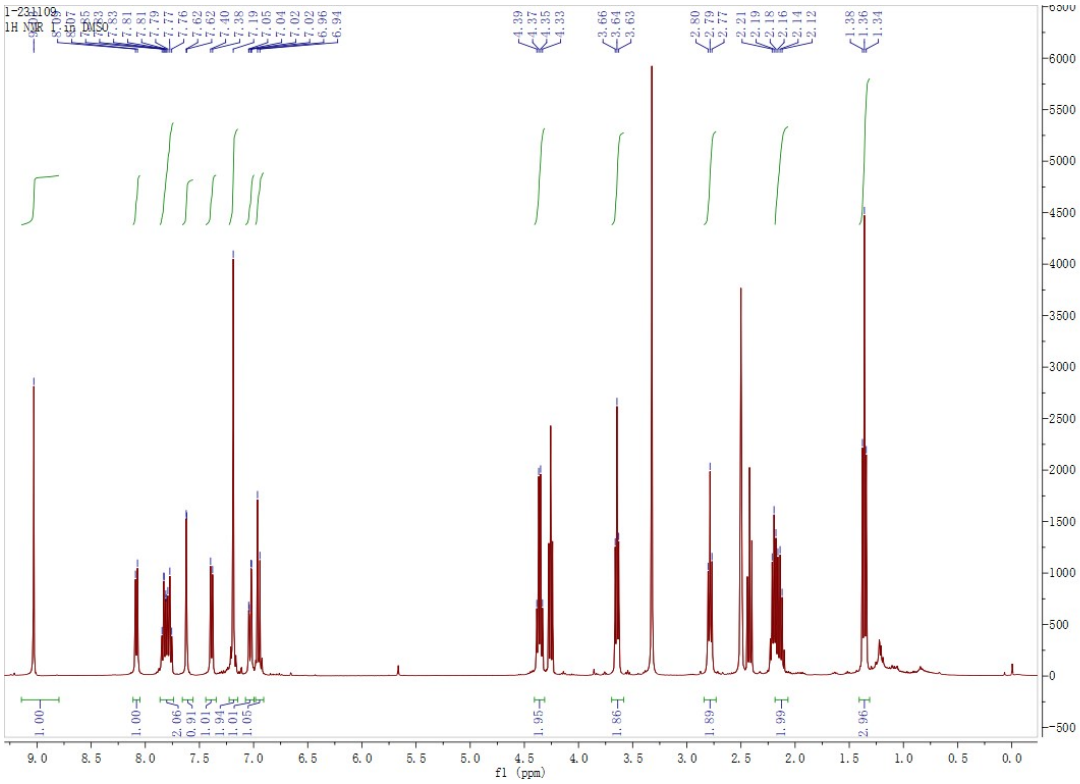

Figure S7 $^{1}$H NMR (400 MHz, DMSO-*d6*) of COFB.

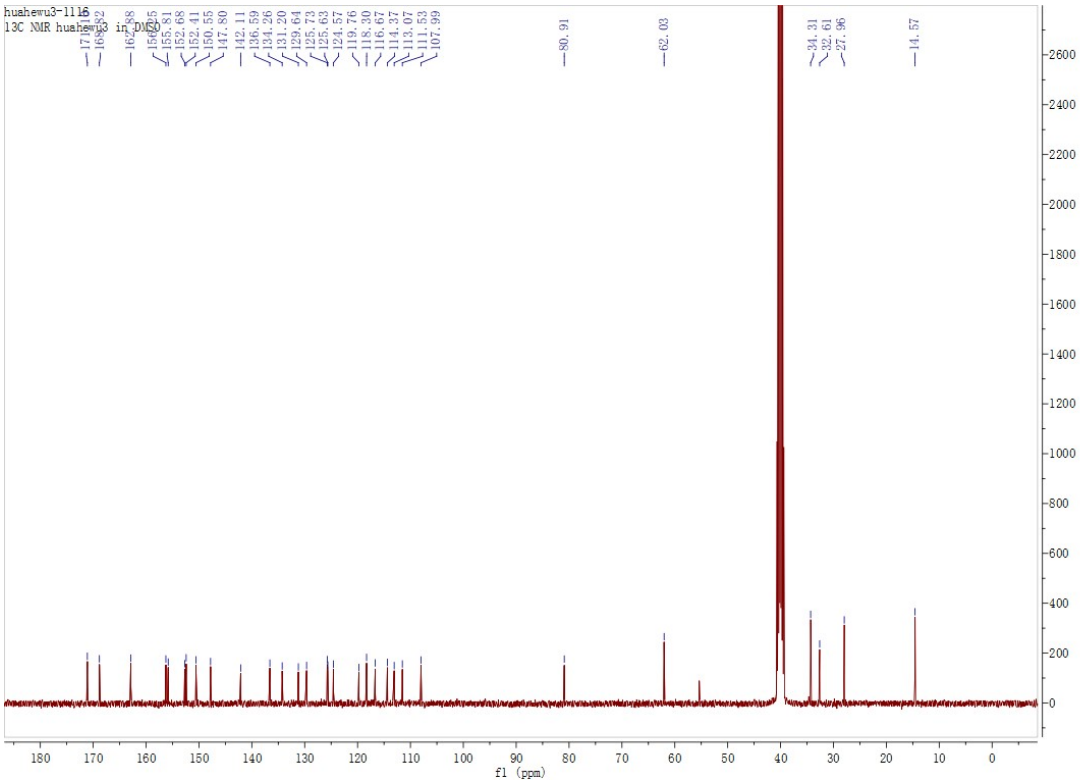

Figure S8 $^{13}$C NMR (101 MHz, DMSO-*d6*) of COFB.

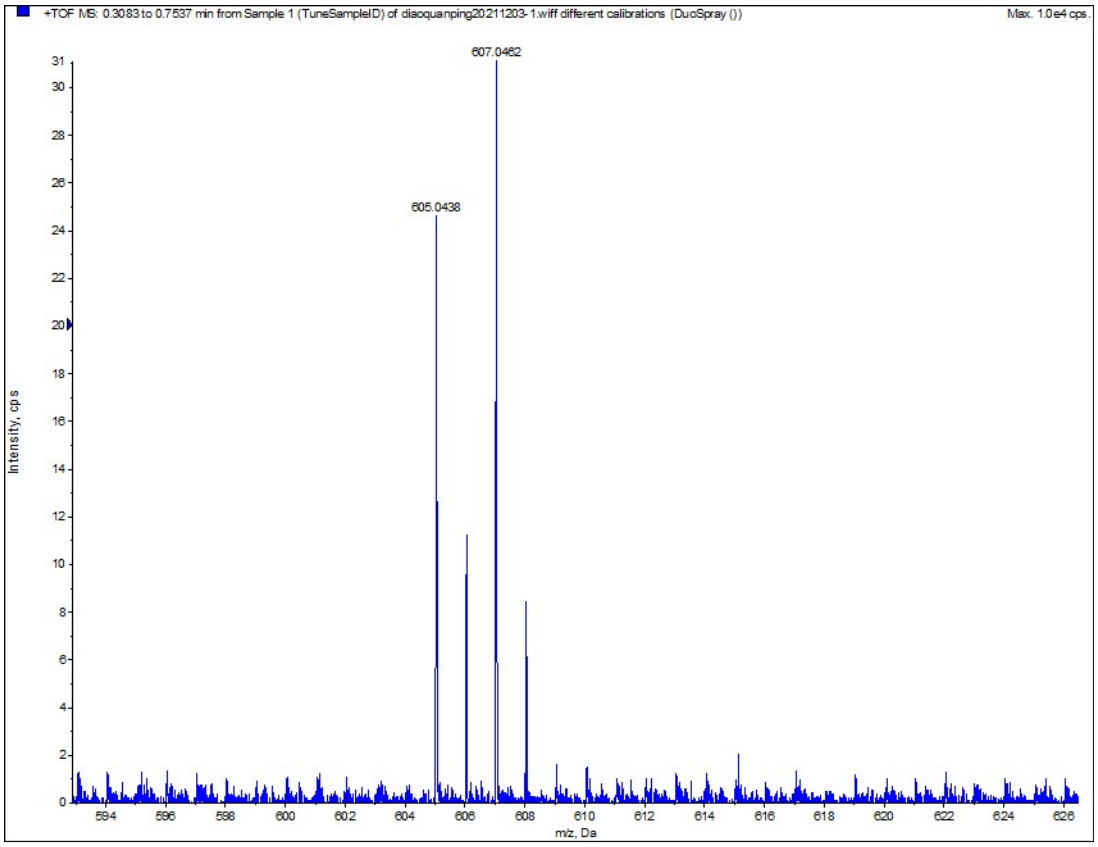


Figure S9 ESI-HR-MS spectrum of COFB.

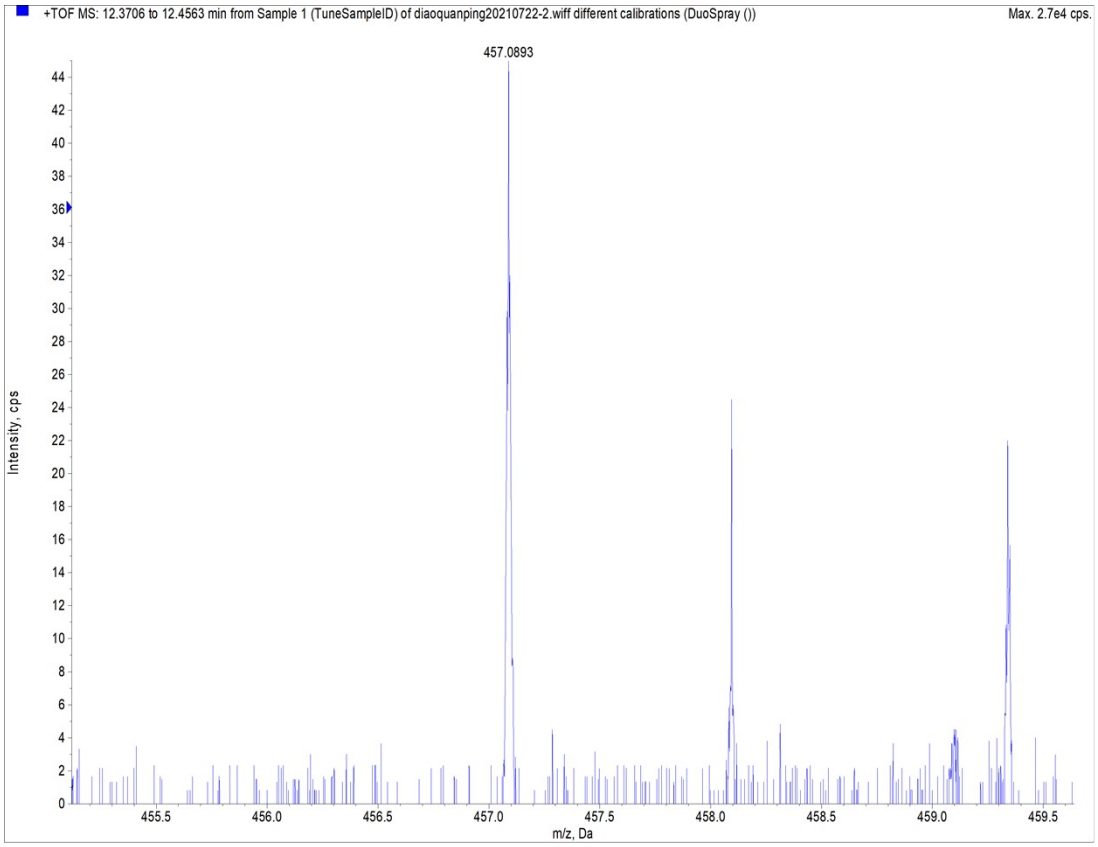

Figure S10 ESI-HR-MS spectrum of COFB after adding $N_2H_4$.