

Supplementary File

Design and Synthesis of C-19 Isosteviol Derivatives as Potent and Highly Selective Antiproliferative Agents

Tian Luan^{a#}, Li-Hua Cao^{b#}, Hao Deng^a, Qing-Kun Shen^a, Yu-Shun Tian^{a*} & Zhe-Shan Quan^{a*}

^aKey Laboratory of Natural Resources and Functional Molecules of the Changbai Mountain, Affiliated Ministry of Education, College of Pharmacy, Yanbian University, Yanji, Jilin, 133002, China

^bDepartment of Pharmacology, College of Medicine, Yanbian University, Yanji, Jilin, 133002, China

***Corresponding author: Tel: + 86 433 243-6020; Fax: + 86 433 243-6020.**

E-mail: zsqvan@ybu.edu.cn (Z. S. Quan).

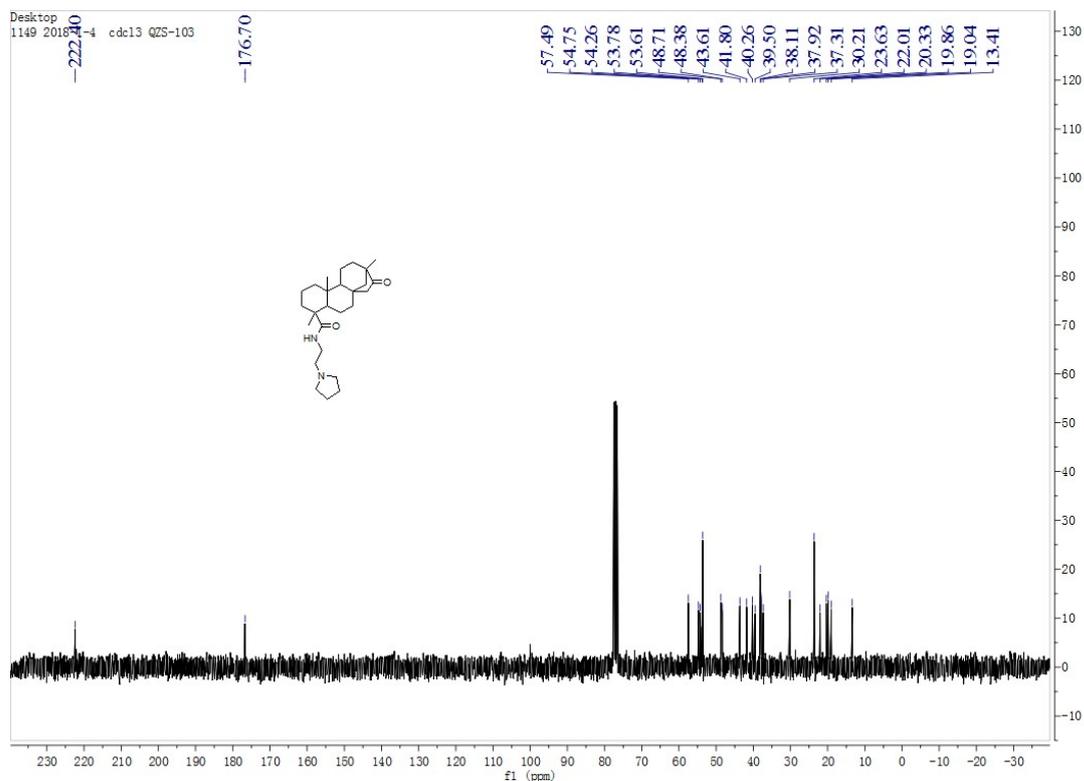
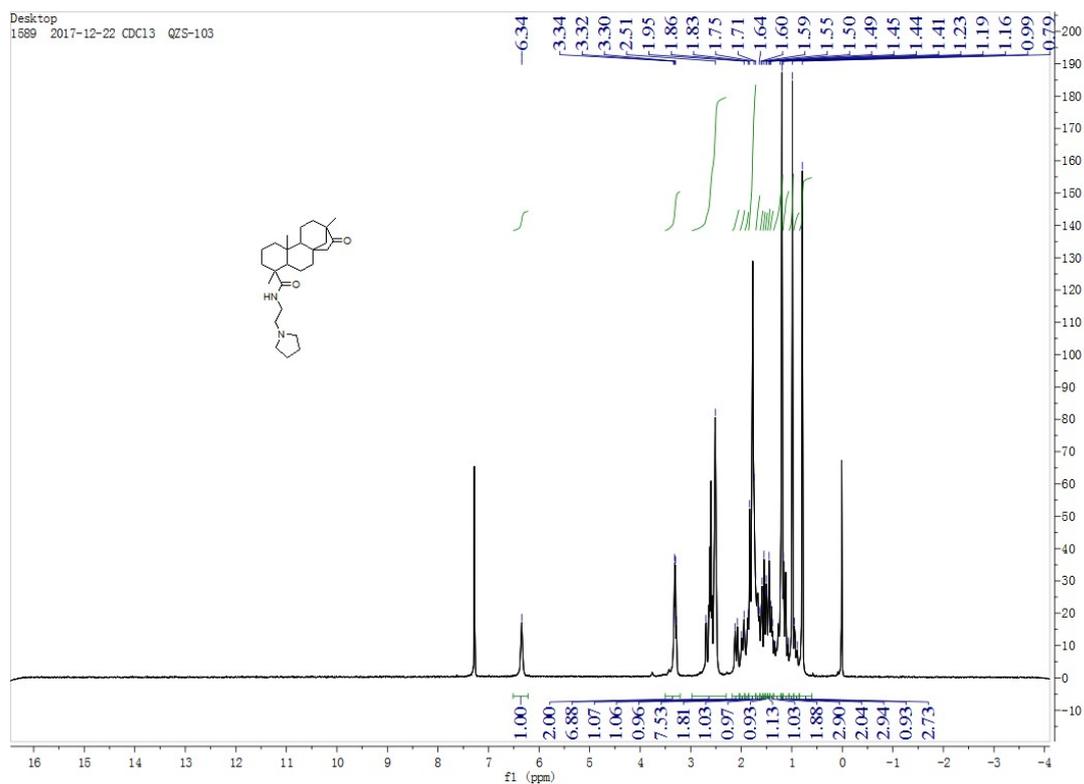
***Corresponding author: E-mail: ystian@ybu.edu.cn (Y. S. Tian).**

[#]These authors contributed equally to this work.

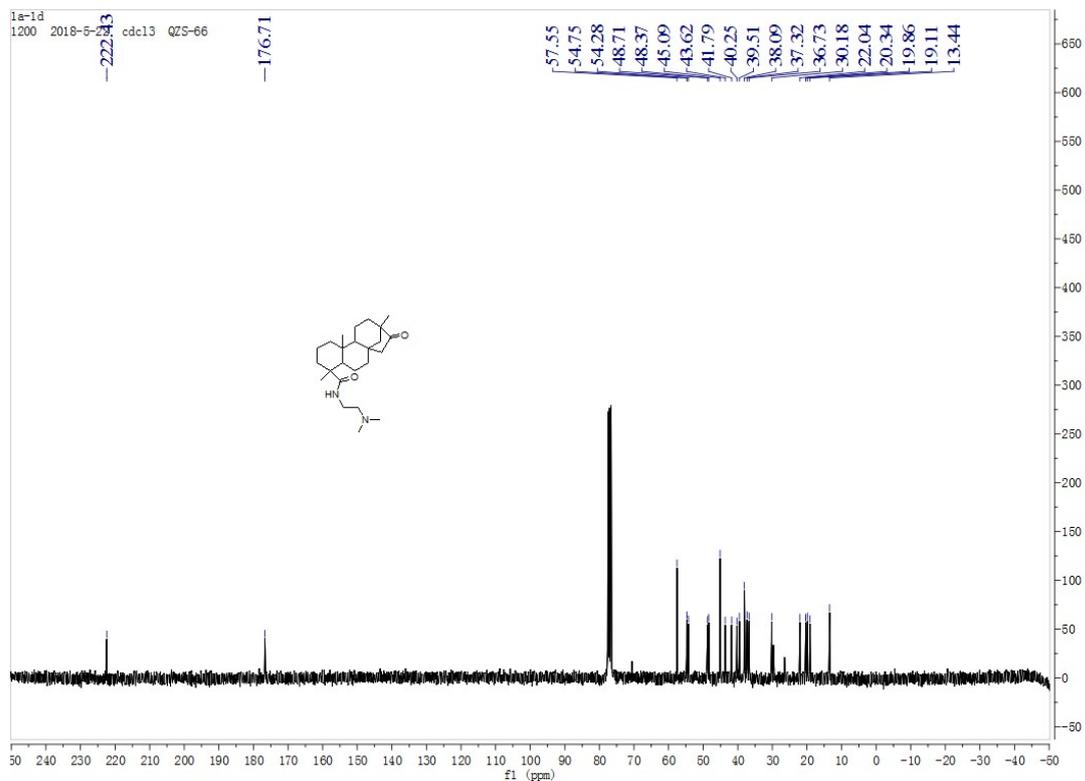
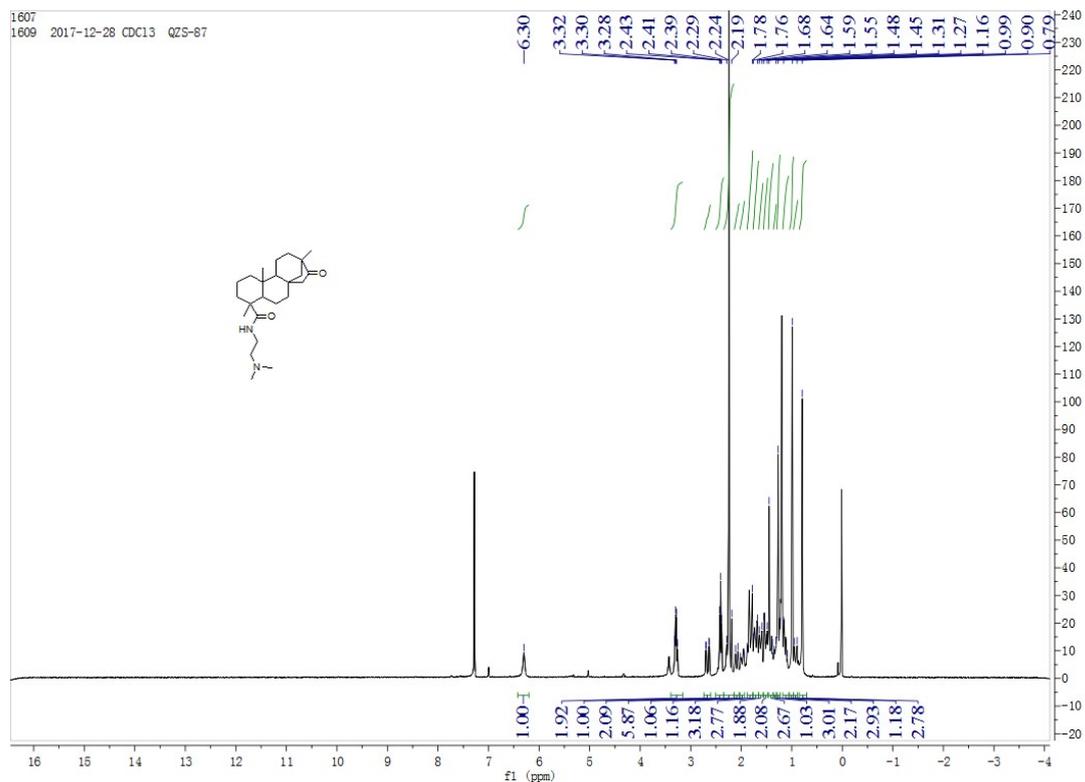
Table of contents:

¹ H NMR and ¹³ C NMR spectra of compound 1a	page 3
¹ H NMR and ¹³ C NMR spectra of compound 1b	page 4
¹ H NMR and ¹³ C NMR spectra of compound 1c	page 5
¹ H NMR and ¹³ C NMR spectra of compound 2a	page 6
¹ H NMR and ¹³ C NMR spectra of compound 2b	page 7
¹ H NMR and ¹³ C NMR spectra of compound 2c	page 8
¹ H NMR and ¹³ C NMR spectra of compound 2d	page 9
¹ H NMR and ¹³ C NMR spectra of compound 2e	page 10
¹ H NMR and ¹³ C NMR spectra of compound 3a	page 11
¹ H NMR and ¹³ C NMR spectra of compound 3b	page 12
¹ H NMR and ¹³ C NMR spectra of compound 3c	page 13
¹ H NMR and ¹³ C NMR spectra of compound 3d	page 14

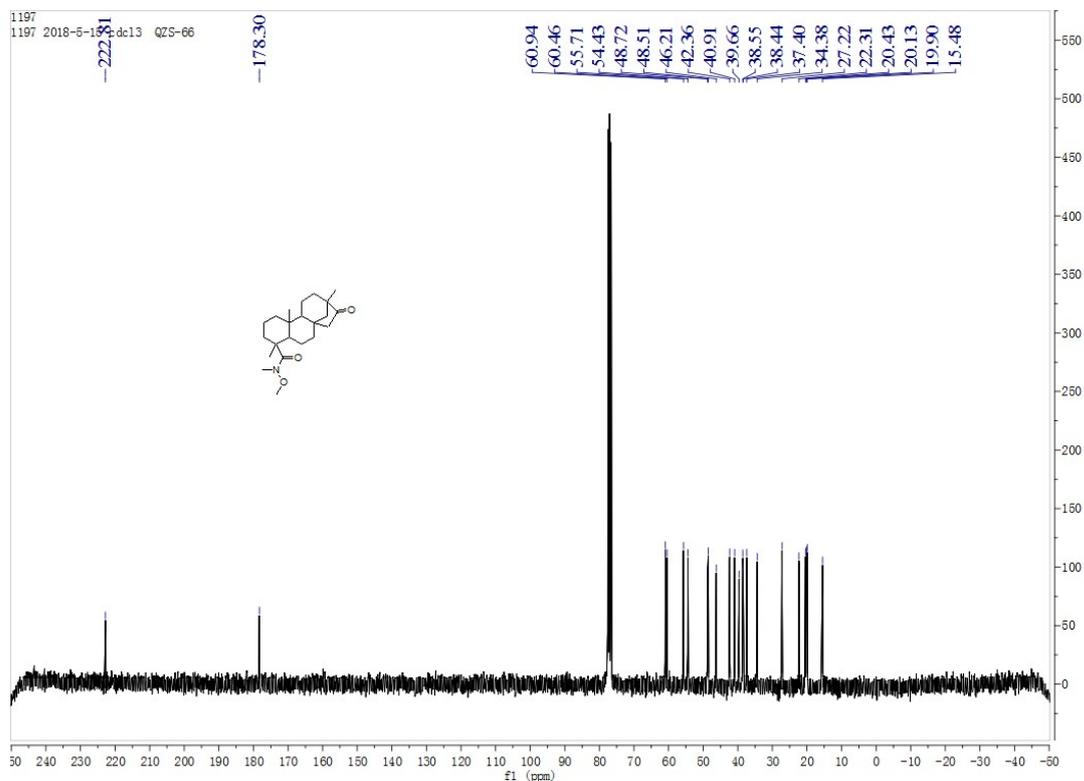
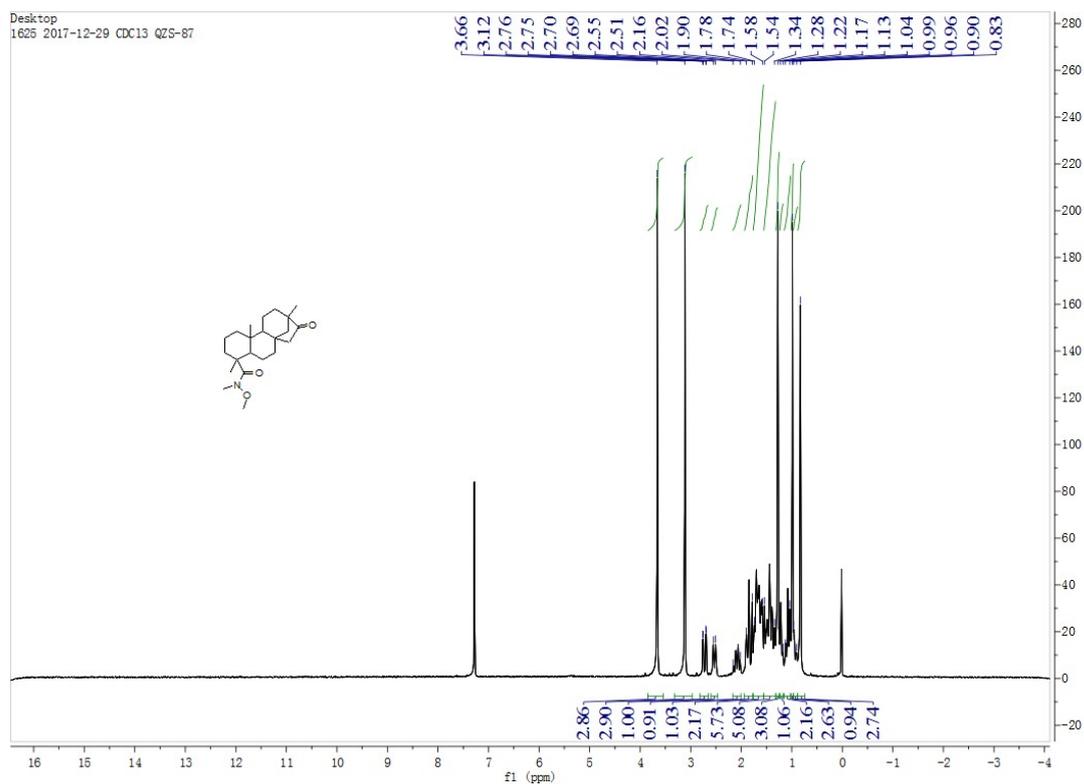
¹ H NMR and ¹³ C NMR spectra of compound 4a	page 15
¹ H NMR and ¹³ C NMR spectra of compound 4b	page 16
¹ H NMR and ¹³ C NMR spectra of compound 4c	page 17
¹ H NMR and ¹³ C NMR spectra of compound 4d	page 18
¹ H NMR and ¹³ C NMR spectra of compound 4e	page 19
¹ H NMR and ¹³ C NMR spectra of compound 4f	page 20
¹ H NMR and ¹³ C NMR spectra of compound 4g	page 21
¹ H NMR and ¹³ C NMR spectra of compound 4h	page 22
¹ H NMR and ¹³ C NMR spectra of compound 4i	page 23
¹ H NMR and ¹³ C NMR spectra of compound 4j	page 24
¹ H NMR and ¹³ C NMR spectra of compound 5a	page 25
¹ H NMR and ¹³ C NMR spectra of compound 5b	page 26
¹ H NMR and ¹³ C NMR spectra of compound 5c	page 27
¹ H NMR and ¹³ C NMR spectra of compound 5d	page 28
¹ H NMR and ¹³ C NMR spectra of compound 5e	page 29
¹ H NMR and ¹³ C NMR spectra of compound 6a	page 30
¹ H NMR and ¹³ C NMR spectra of compound 6b	page 31
¹ H NMR and ¹³ C NMR spectra of compound 6c	page 32
¹ H NMR and ¹³ C NMR spectra of compound 6d	page 33
¹ H NMR and ¹³ C NMR spectra of compound 6e	page 34
HRMS spectra of compound 2d	page 35
HRMS spectra of compound 2e	page 36
HRMS spectra of compound 3b	page 37
HRMS spectra of compound 5b	page 38
HRMS spectra of compound 5c	page 39
HRMS spectra of compound 5d	page 40
HRMS spectra of compound 6c	page 41
HRMS spectra of compound 6d	page 42
¹ H-NMR spectra of intermediate Va	page 43



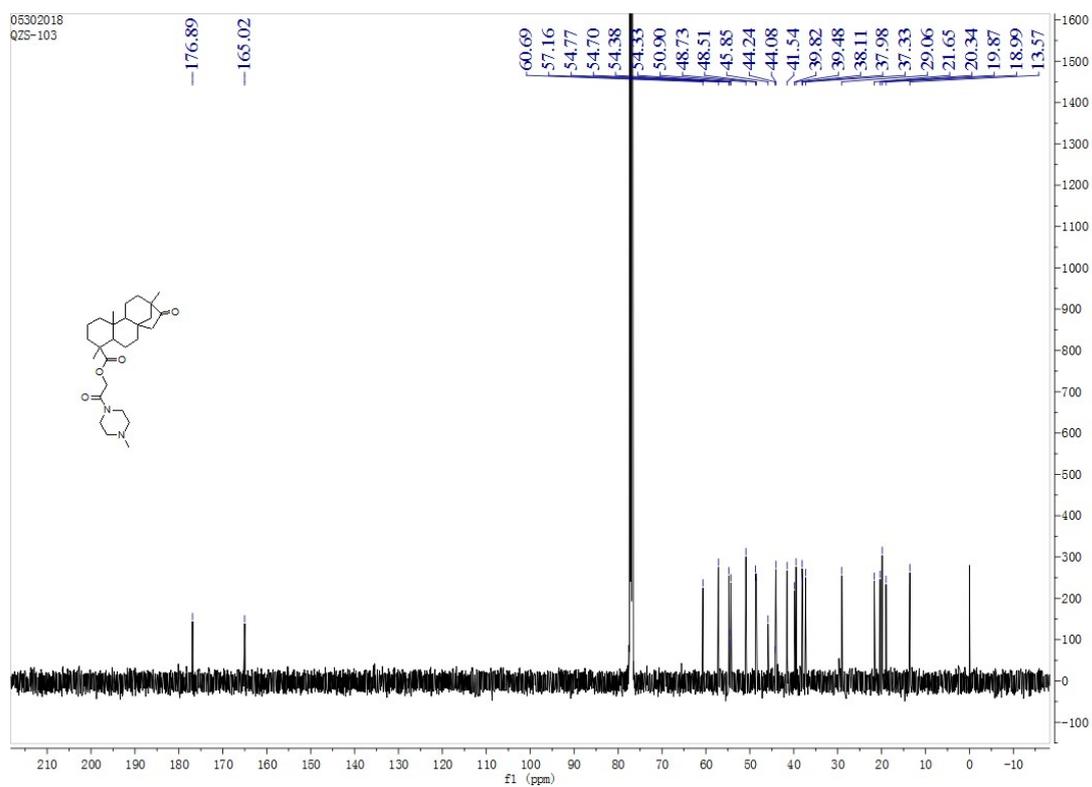
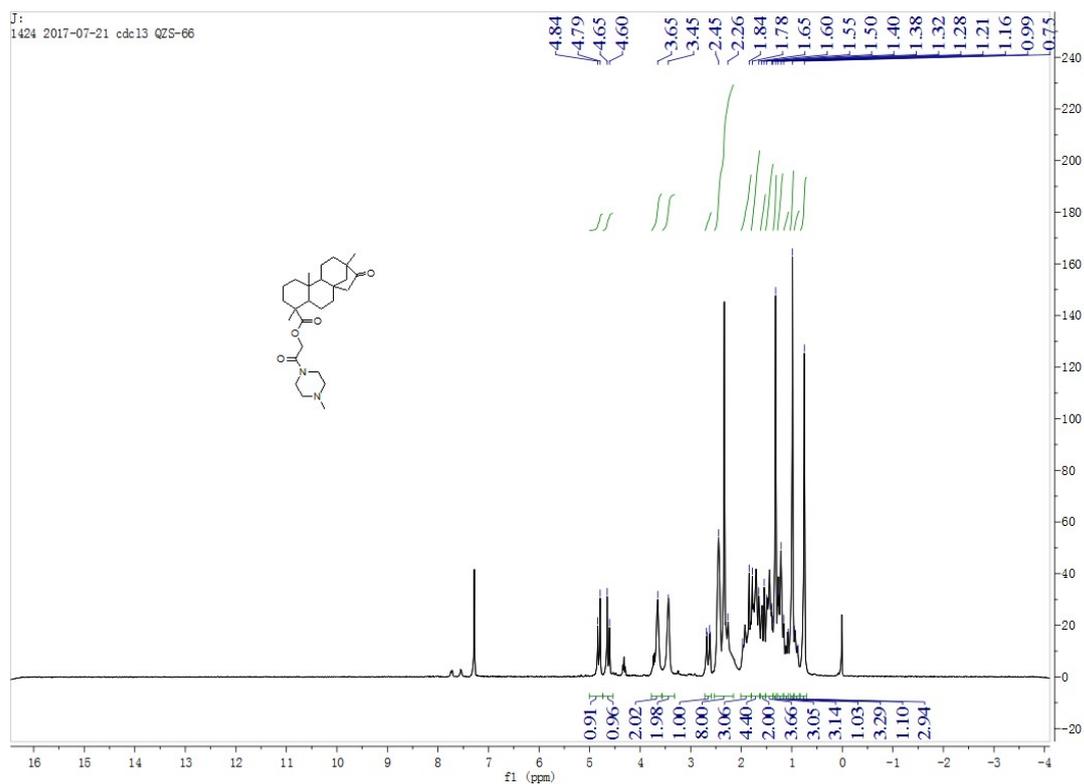
^1H NMR and ^{13}C NMR spectra of compound **1a**



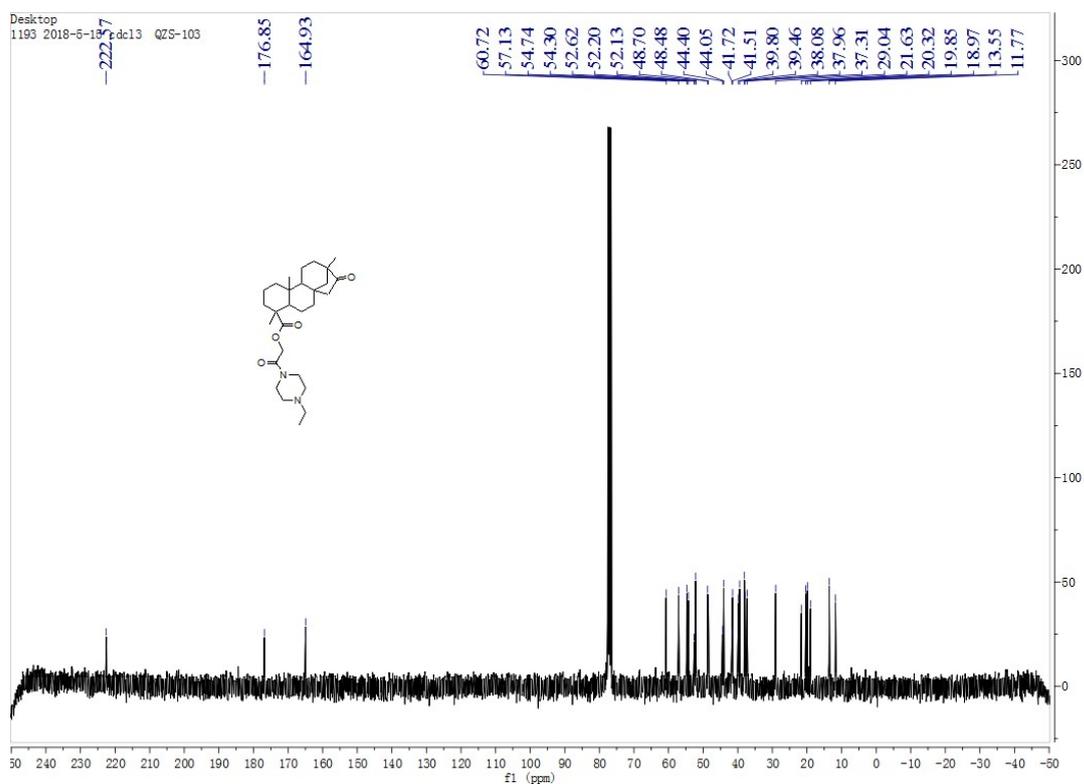
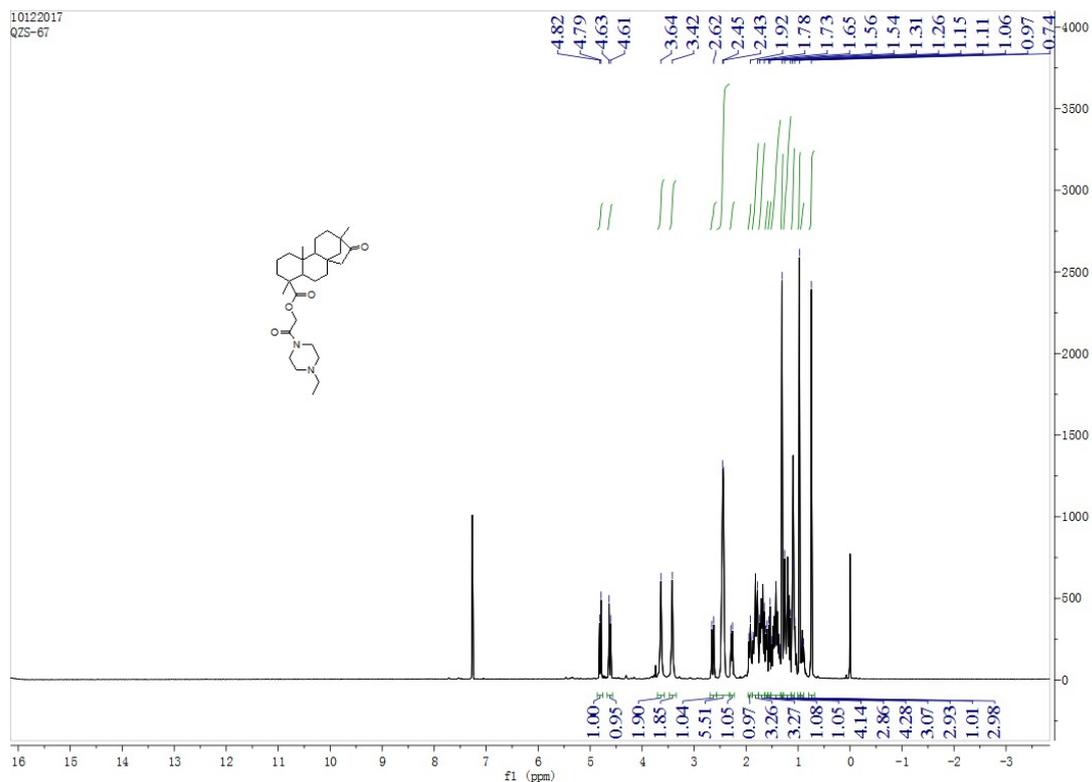
^1H NMR and ^{13}C NMR spectra of compound 2a



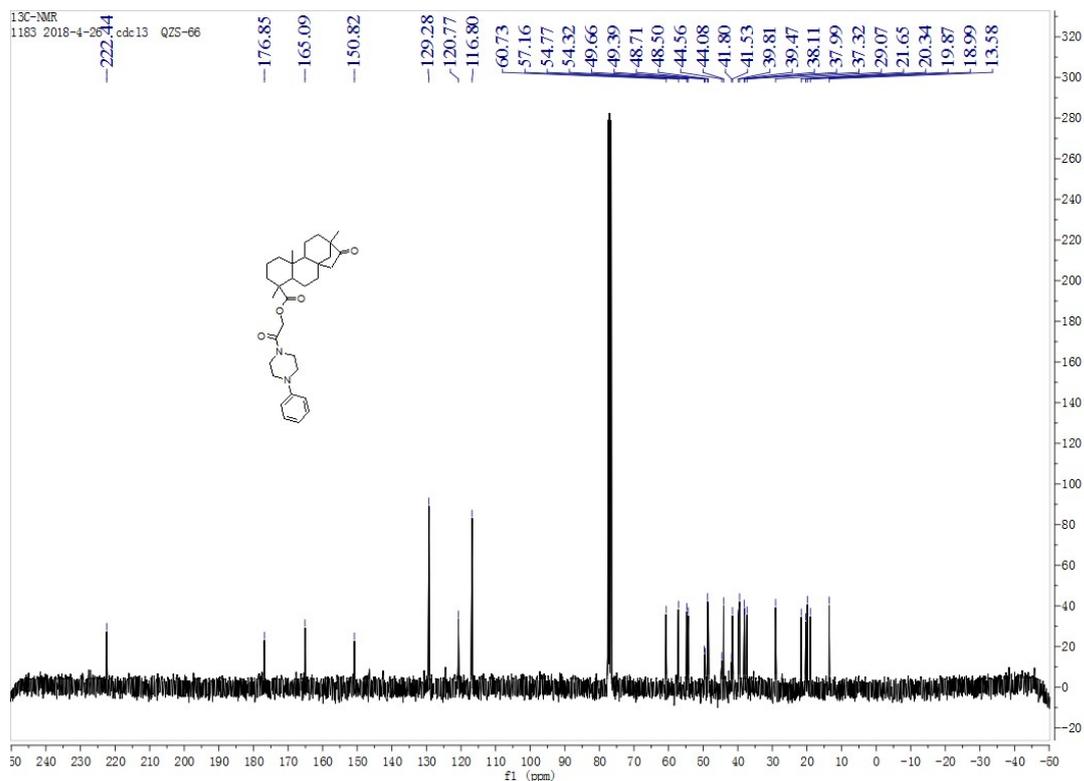
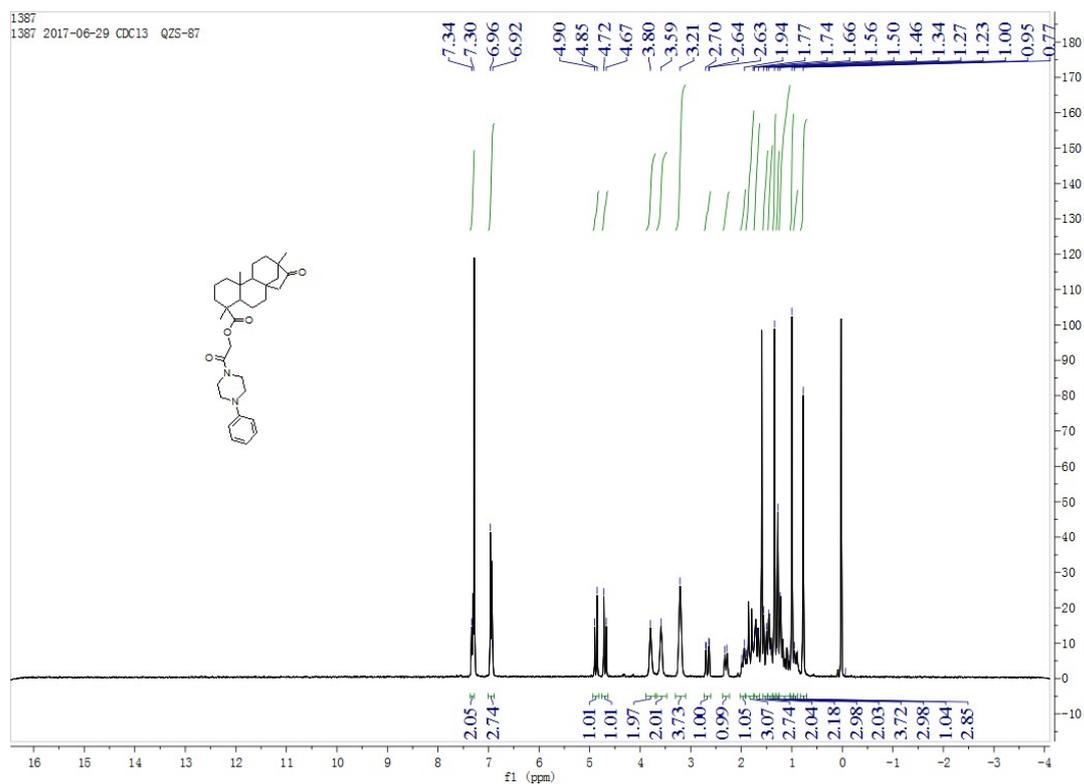
^1H NMR and ^{13}C NMR spectra of compound **1c**



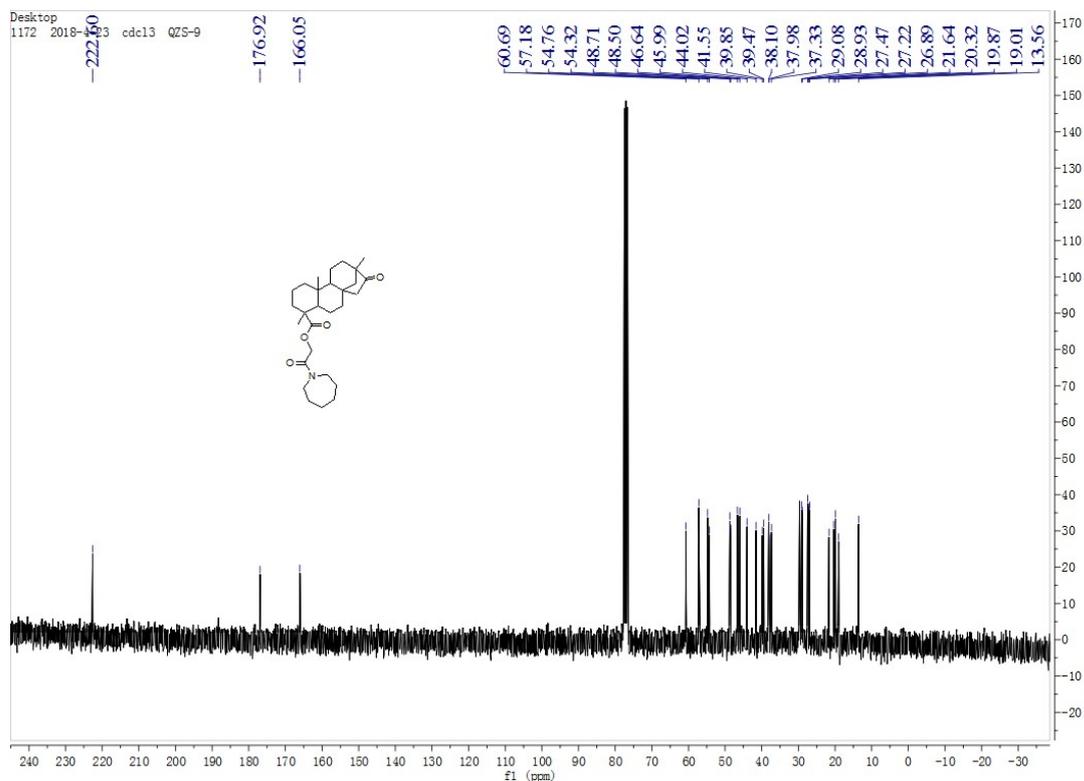
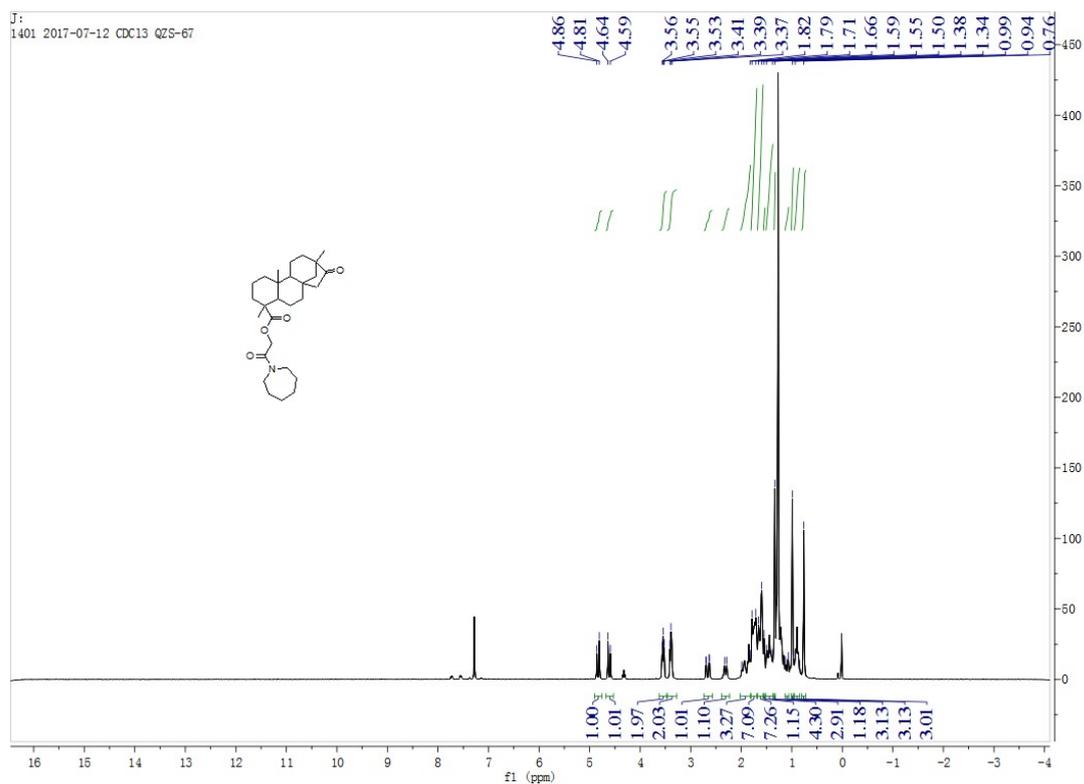
^1H NMR and ^{13}C NMR spectra of compound 2a



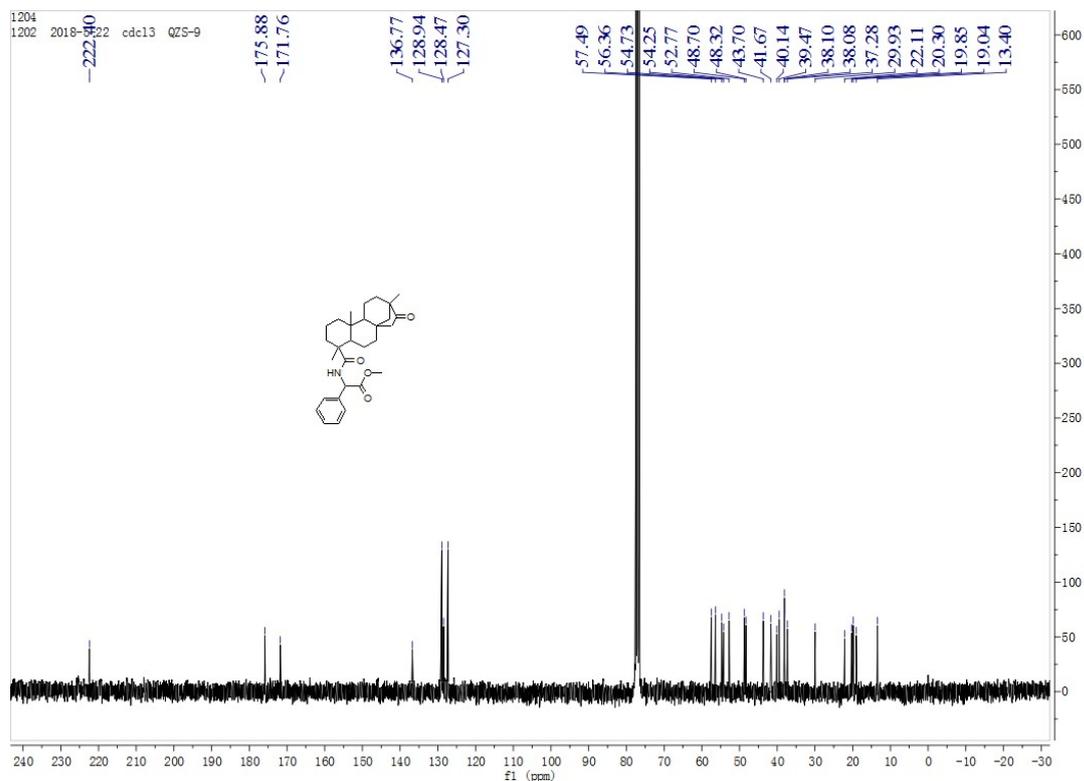
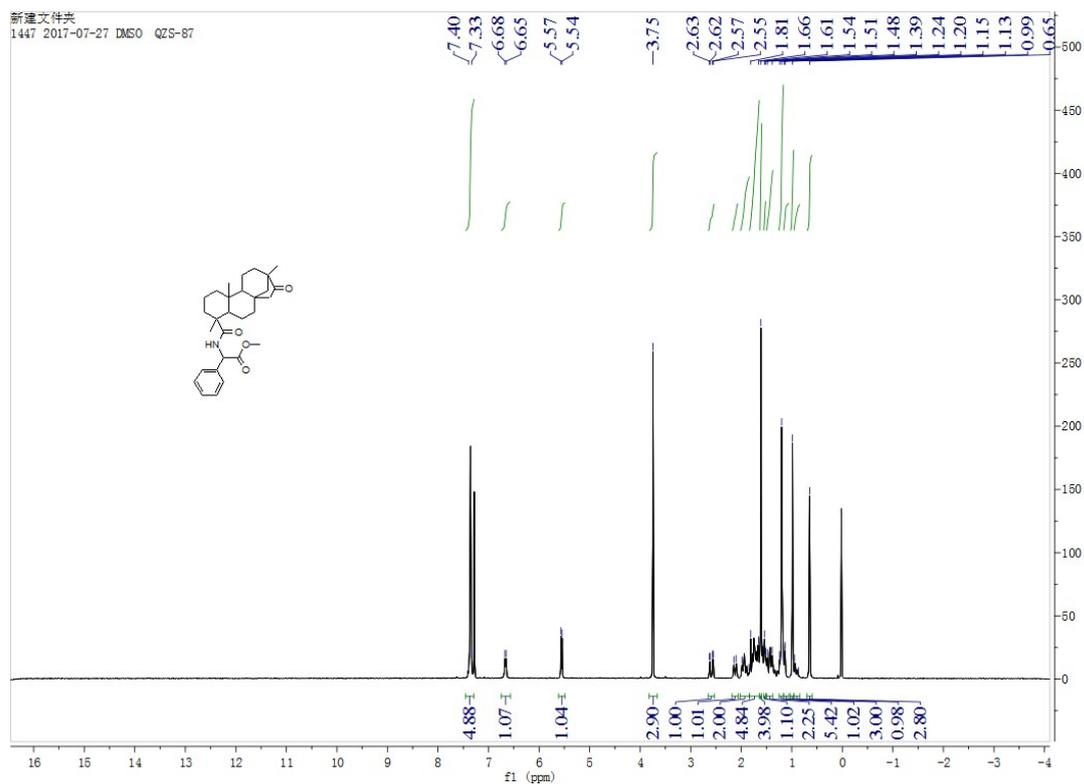
^1H NMR and ^{13}C NMR spectra of compound **2b**



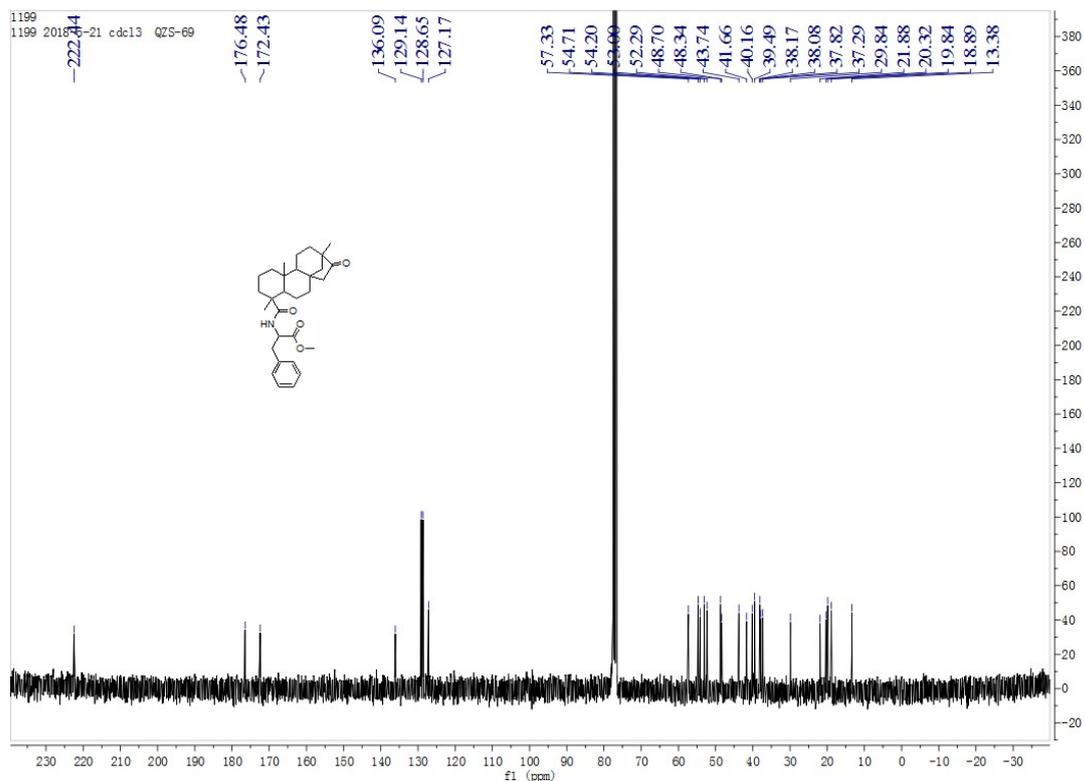
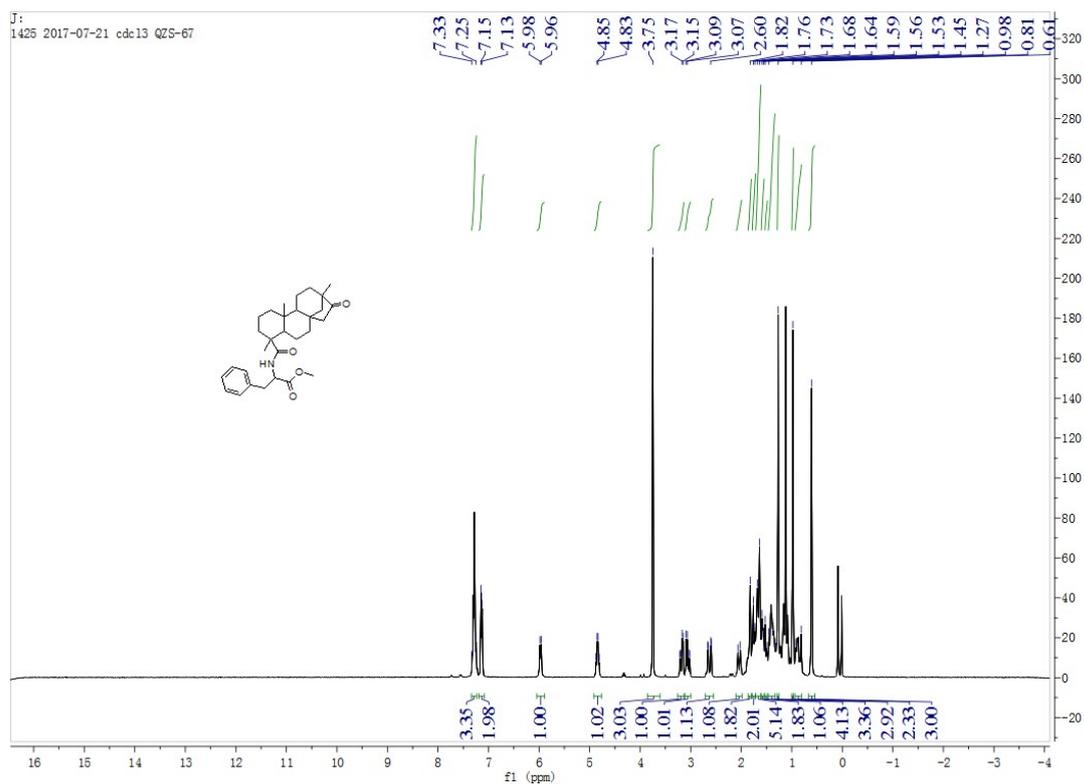
^1H NMR and ^{13}C NMR spectra of compound 2c



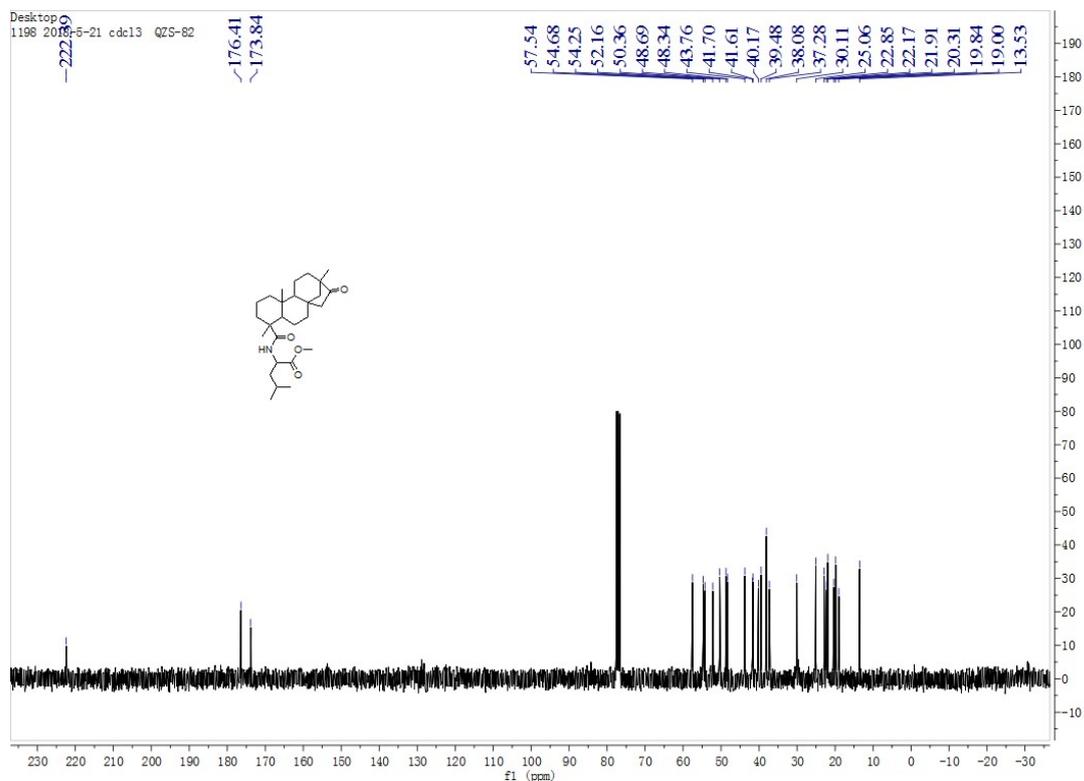
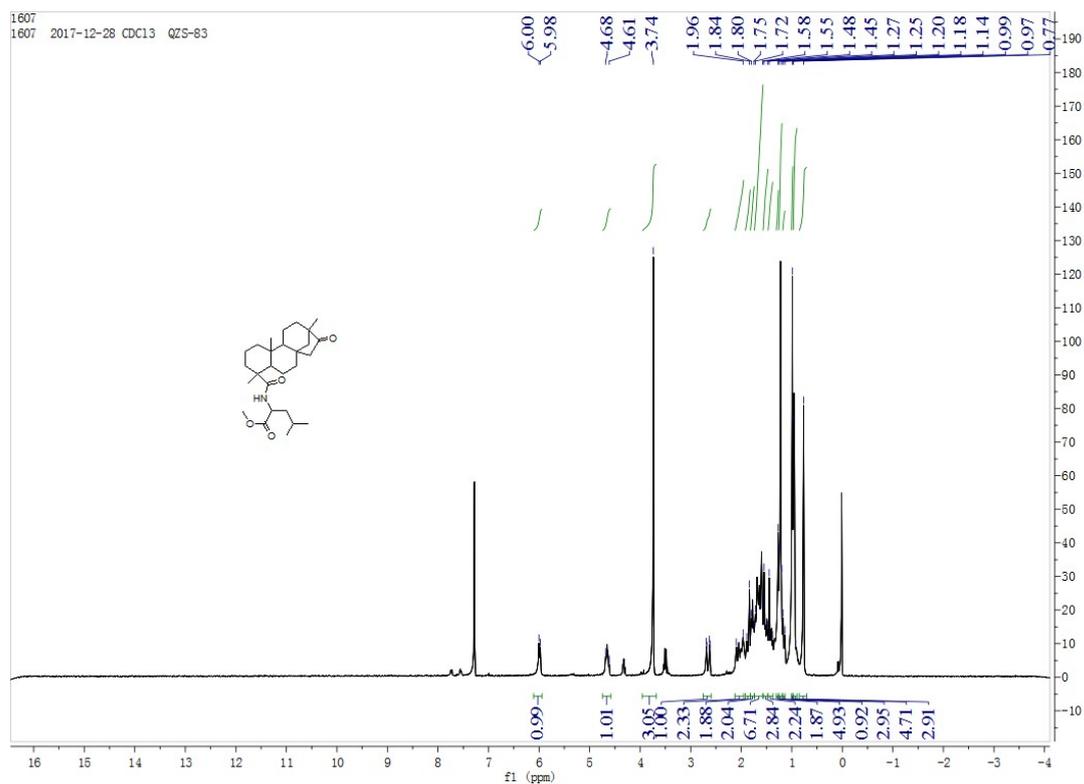
^1H NMR and ^{13}C NMR spectra of compound **2e**



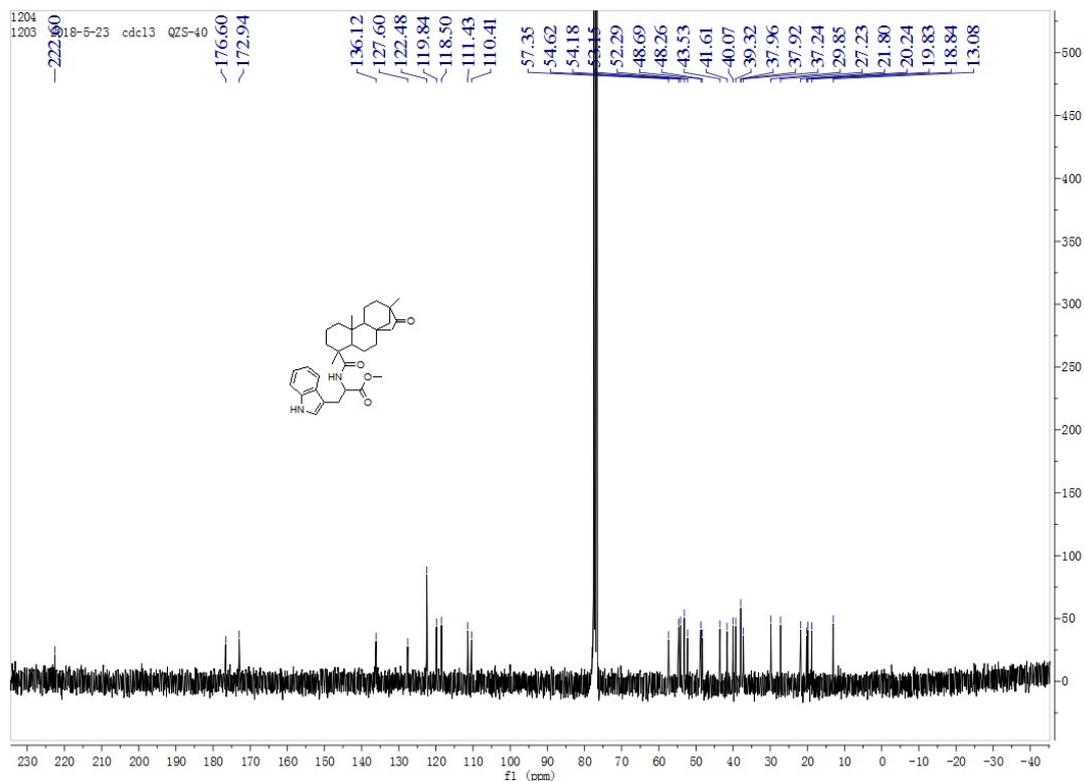
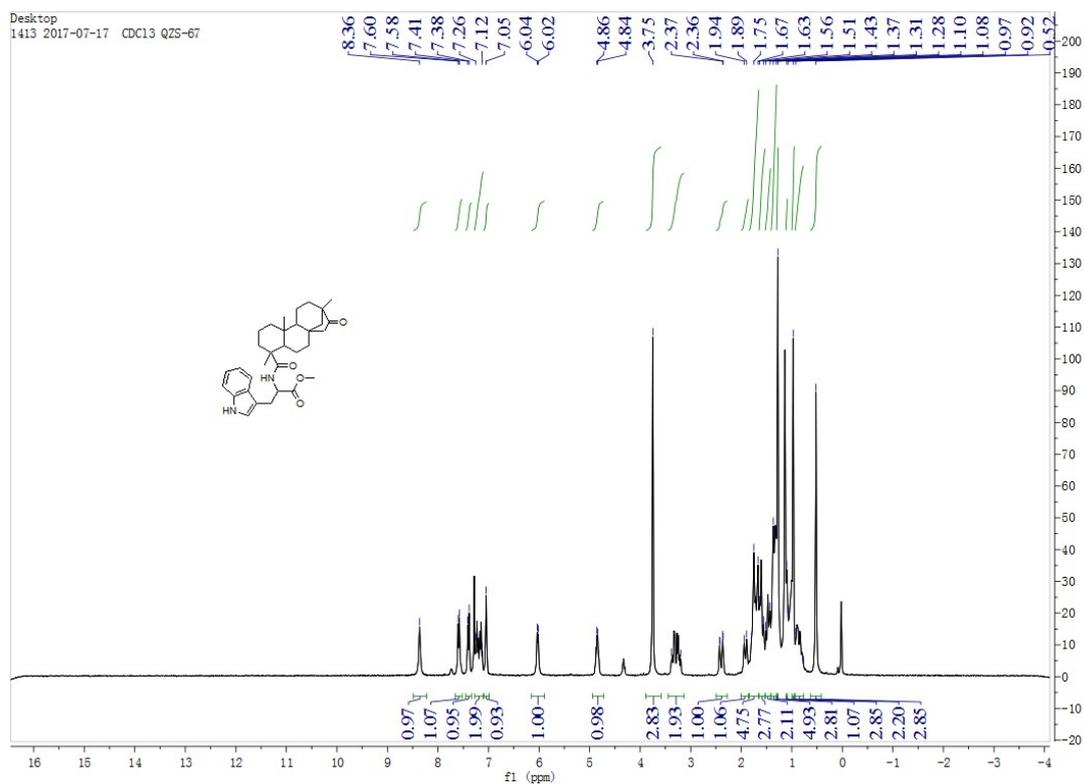
^1H NMR and ^{13}C NMR spectra of compound **3a**



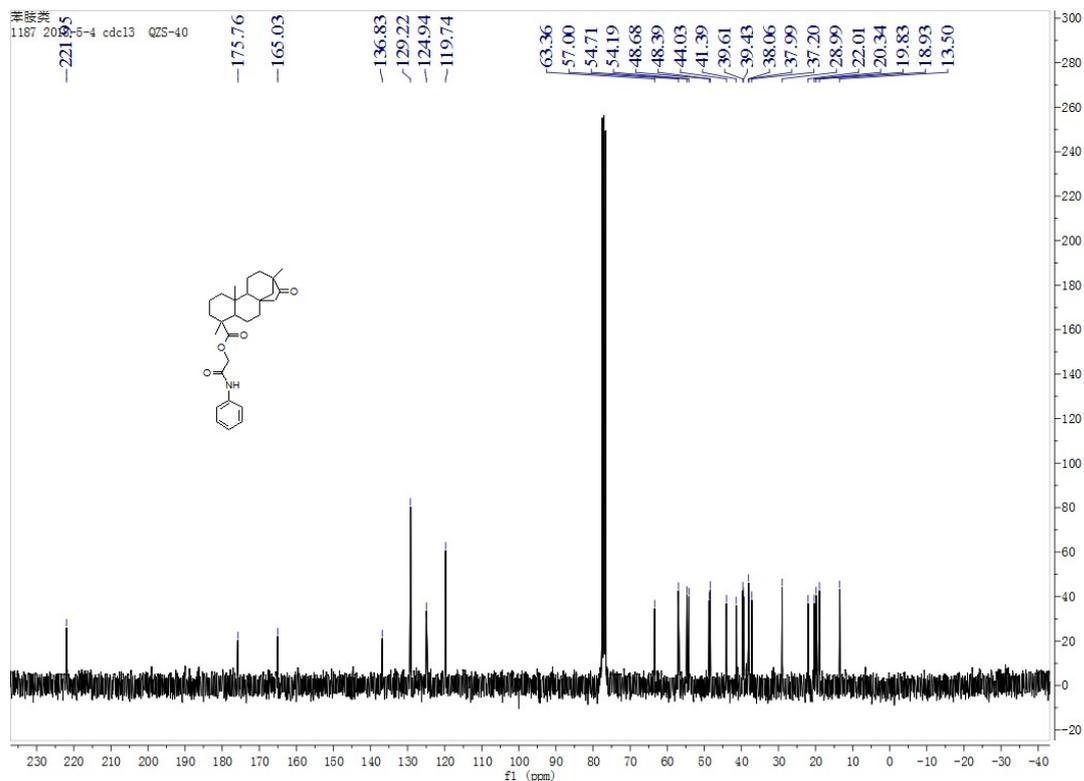
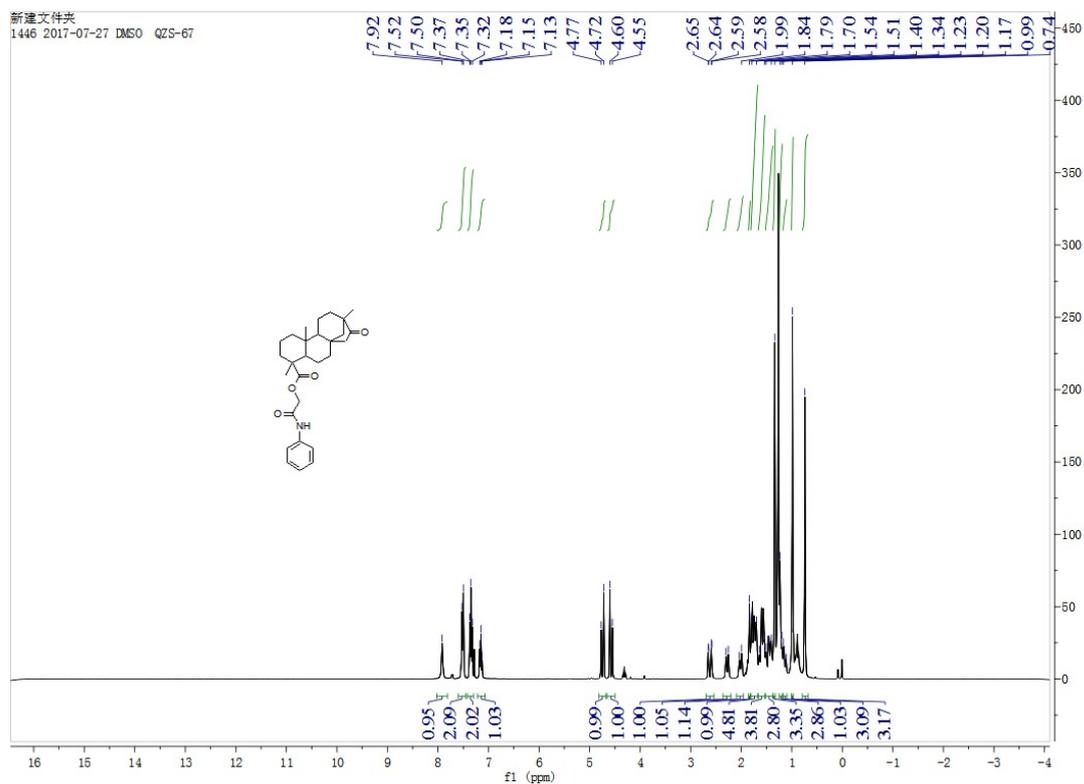
^1H NMR and ^{13}C NMR spectra of compound **3b**



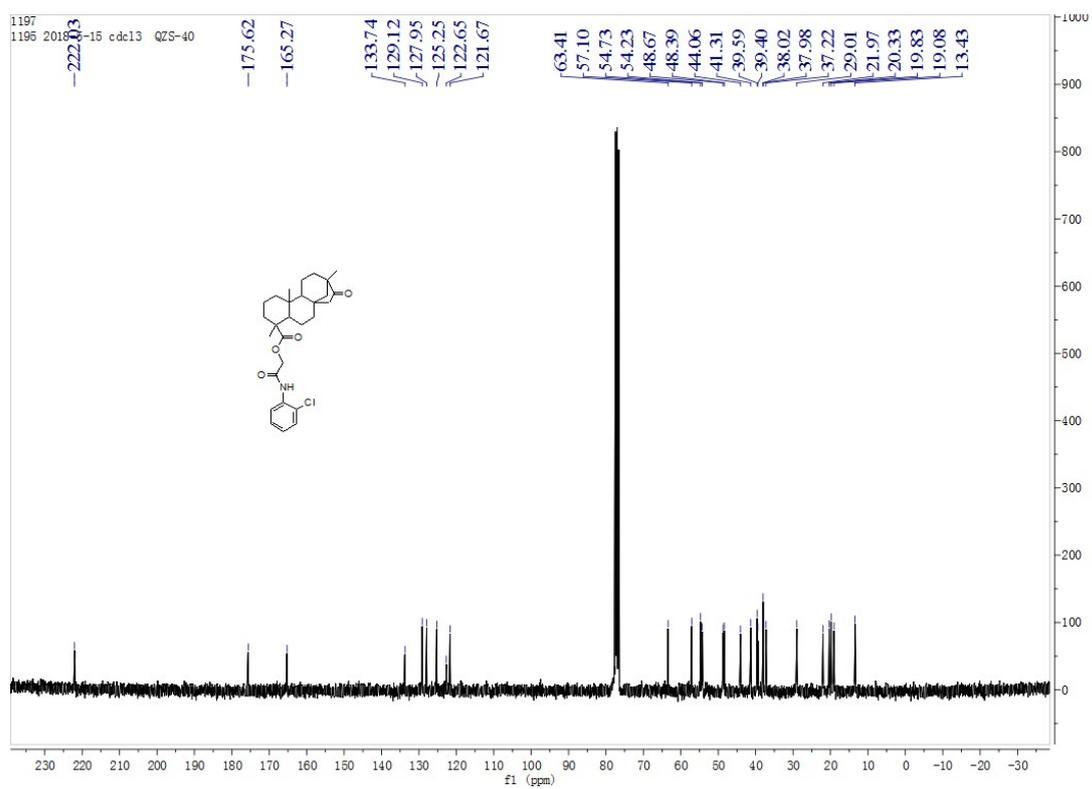
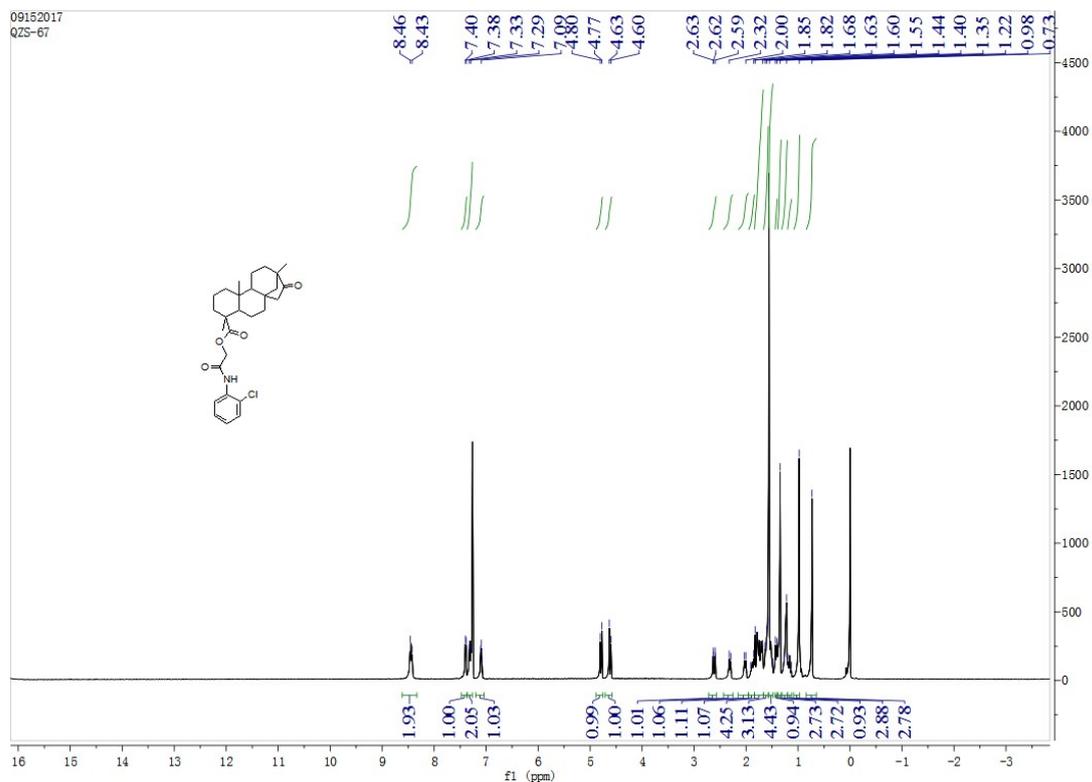
^1H NMR and ^{13}C NMR spectra of compound **3c**



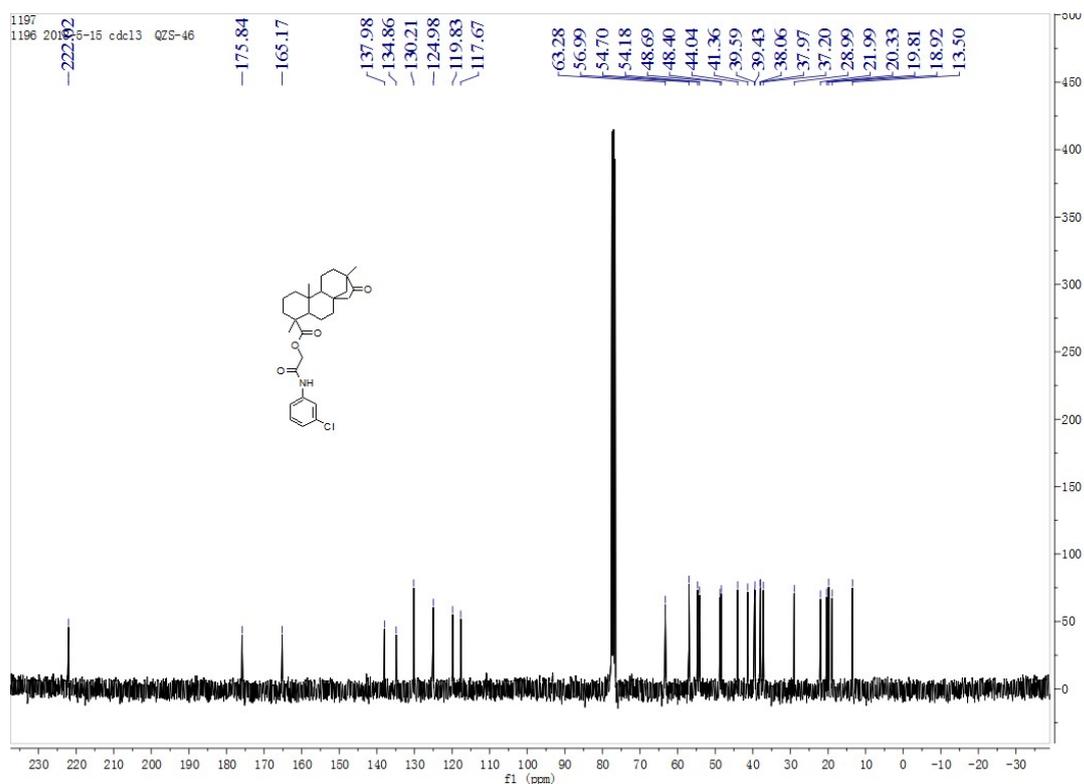
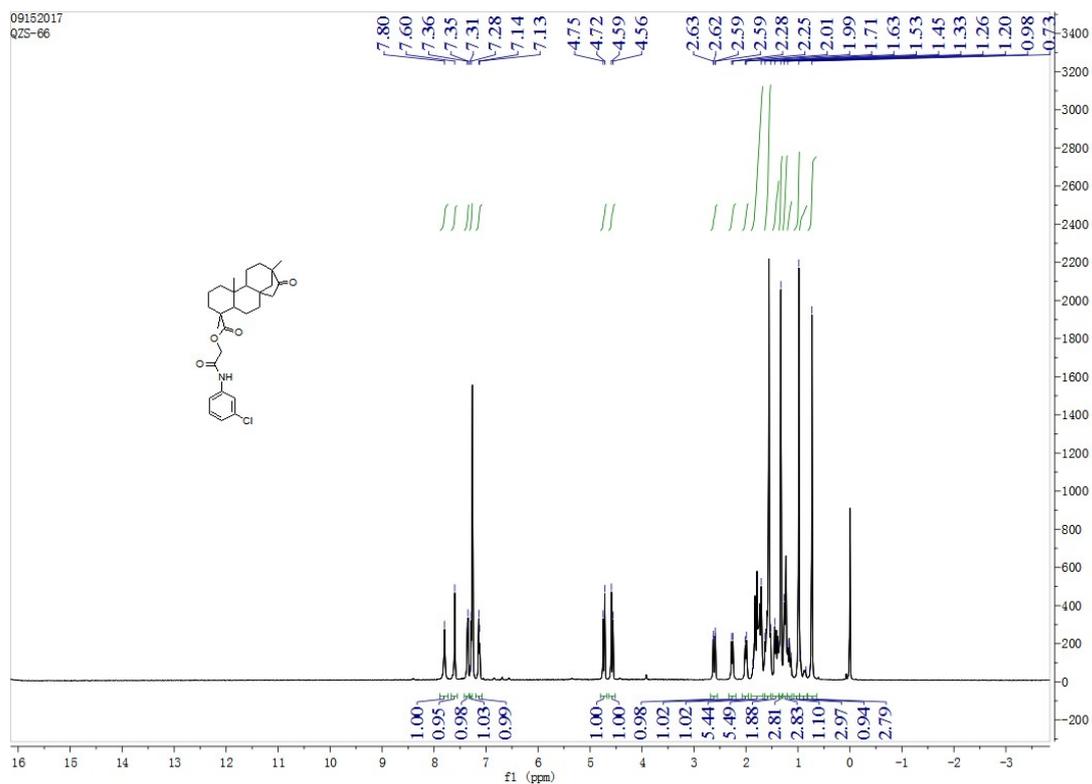
^1H NMR and ^{13}C NMR spectra of compound 3d



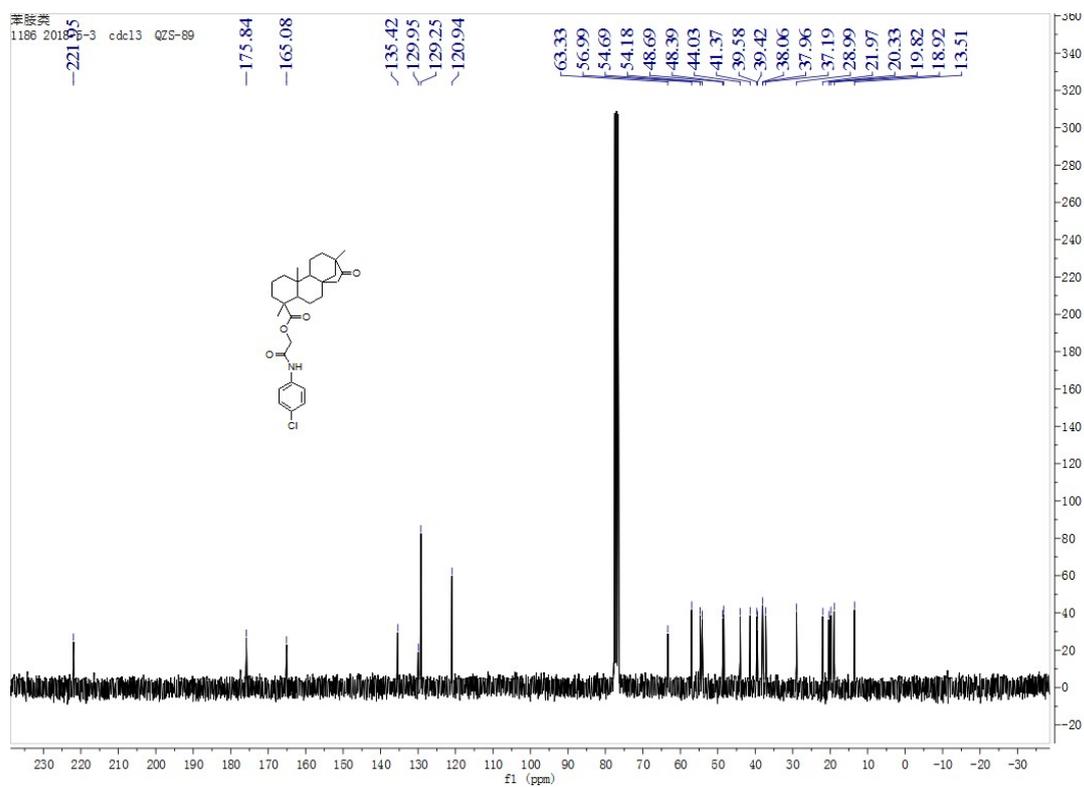
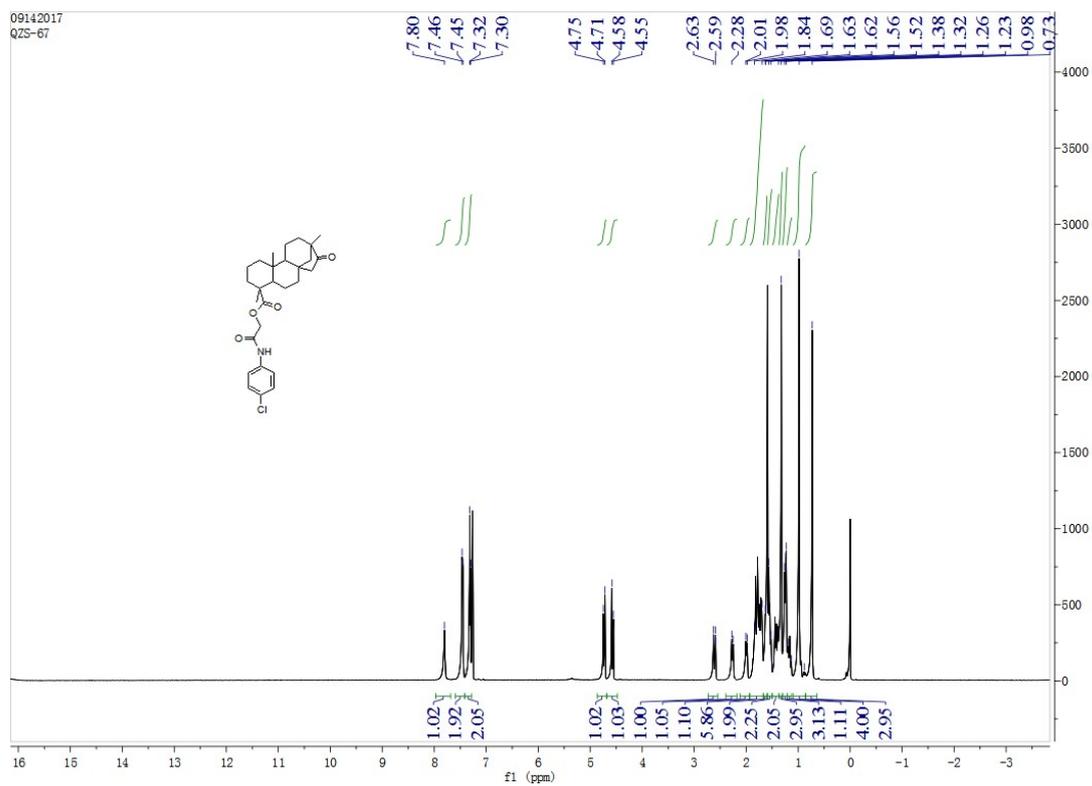
^1H NMR and ^{13}C NMR spectra of compound 4a



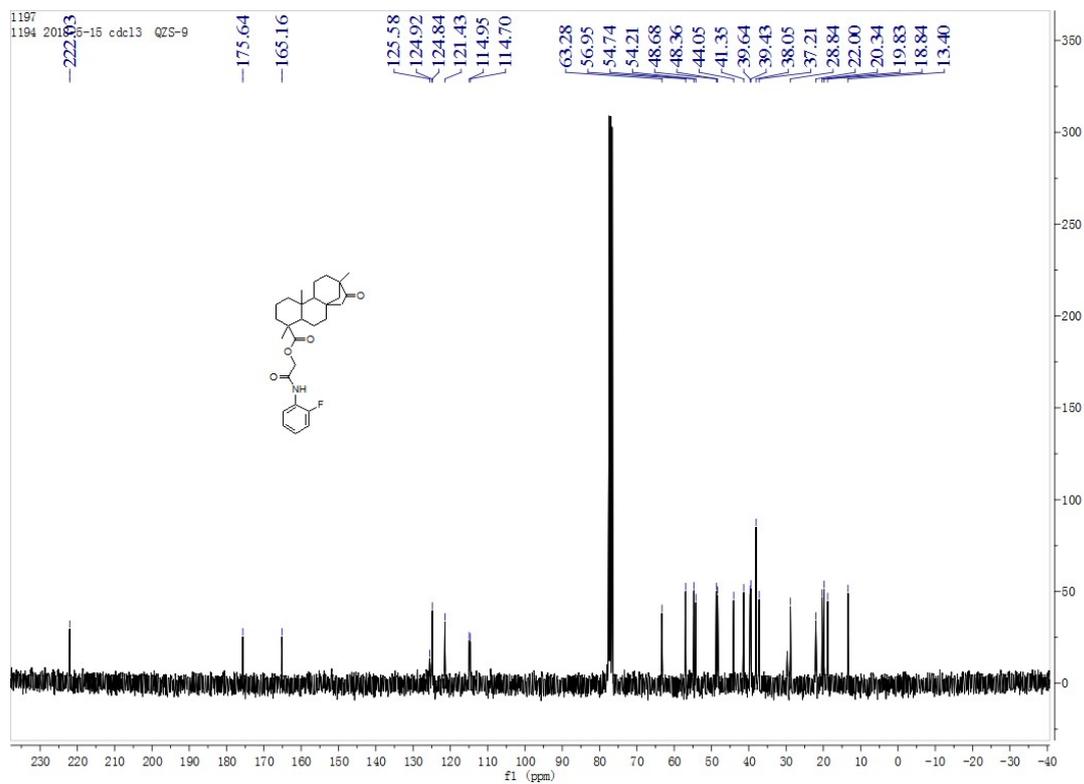
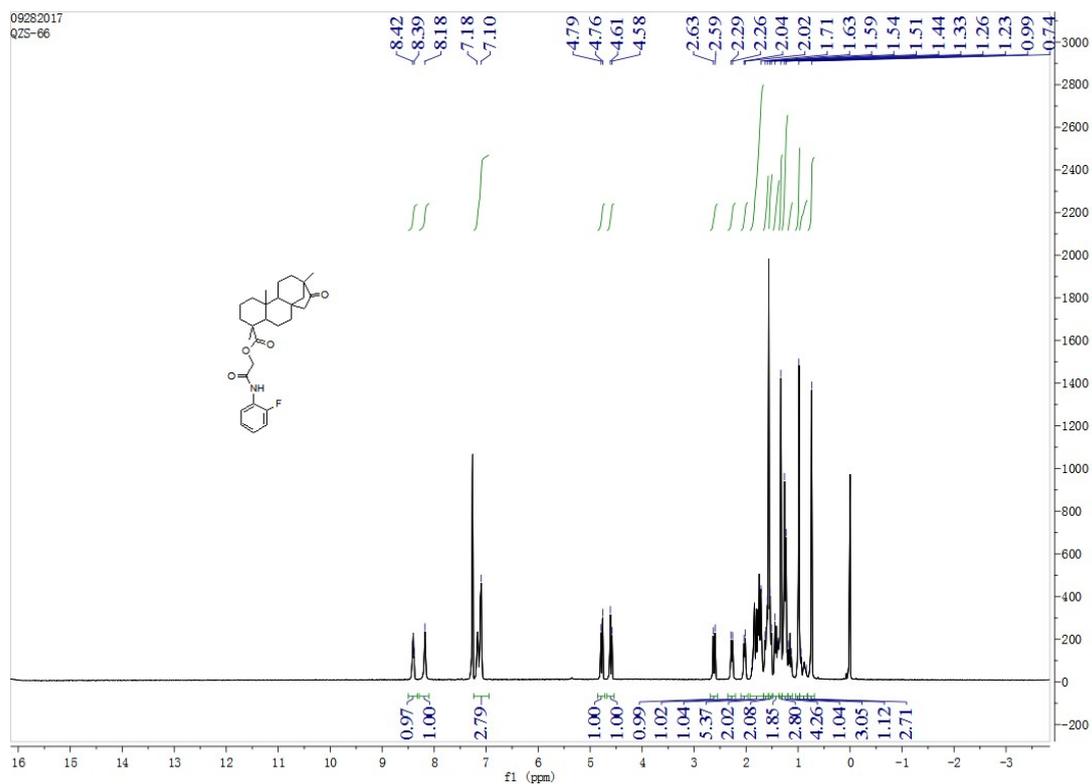
¹H NMR and ¹³C NMR spectra of compound **4b**



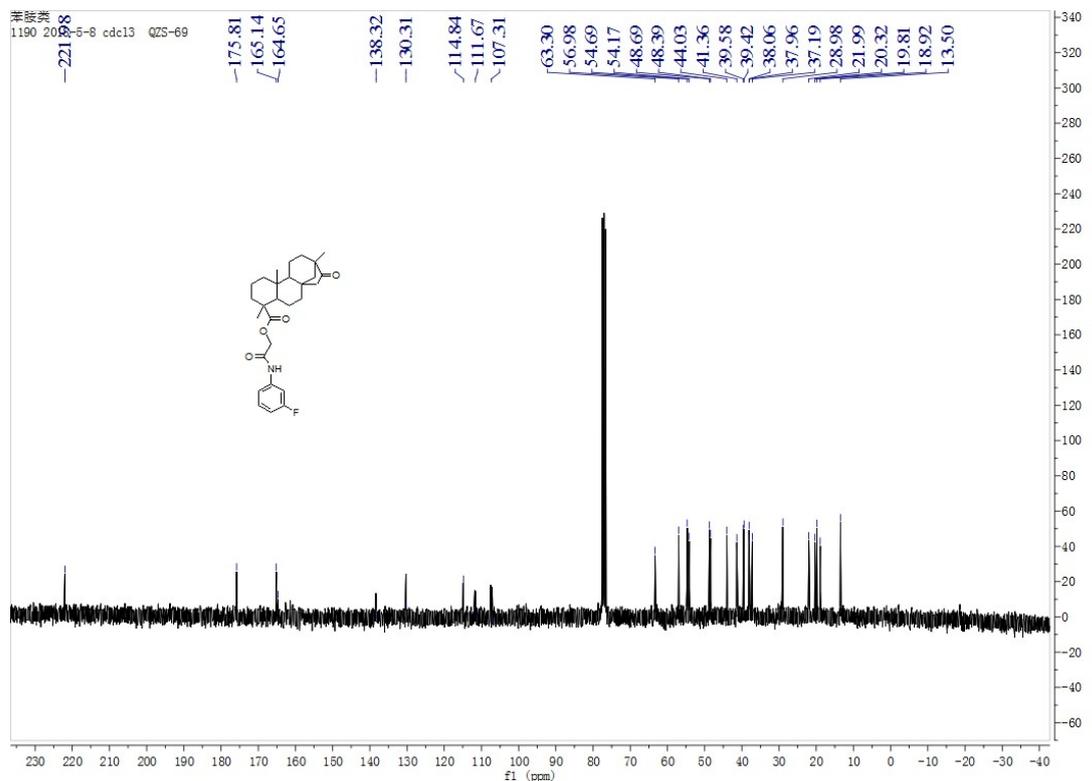
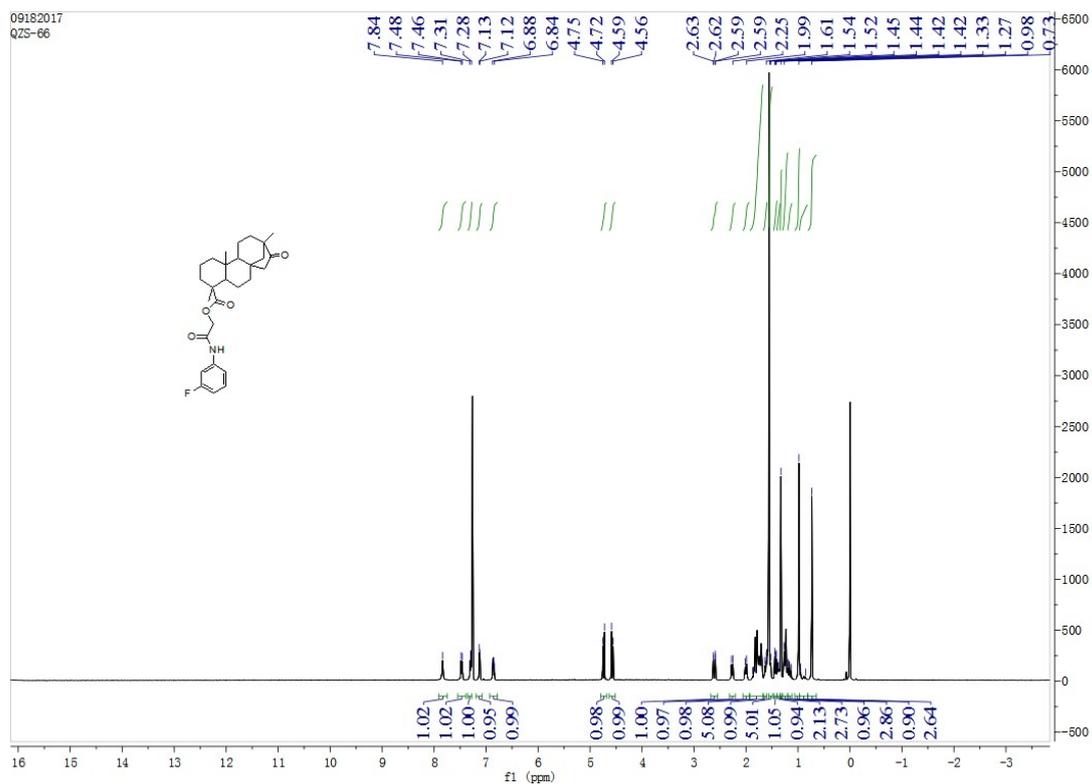
^1H NMR and ^{13}C NMR spectra of compound **4c**



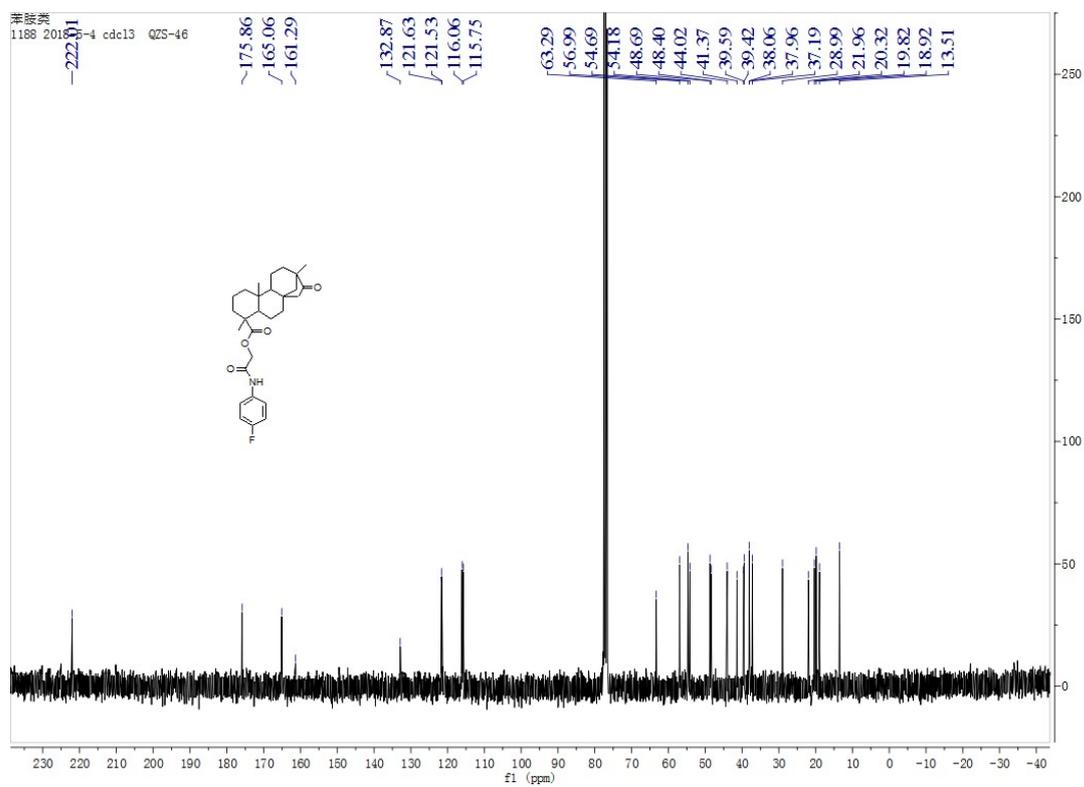
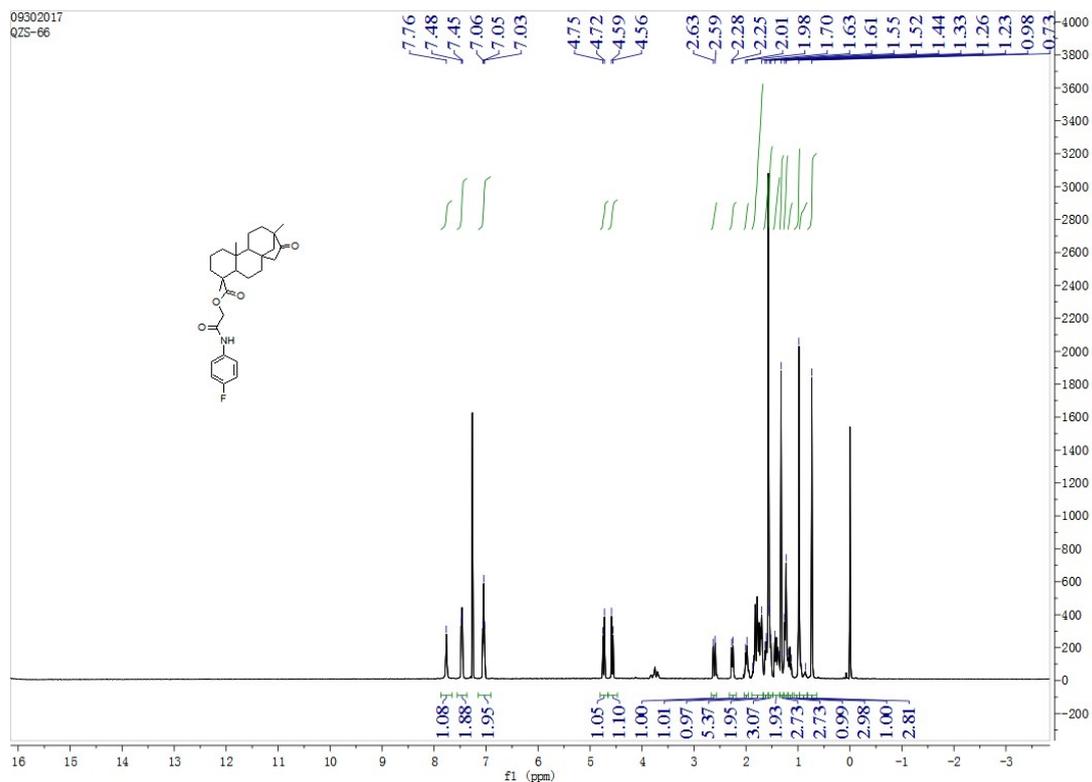
^1H NMR and ^{13}C NMR spectra of compound **4d**



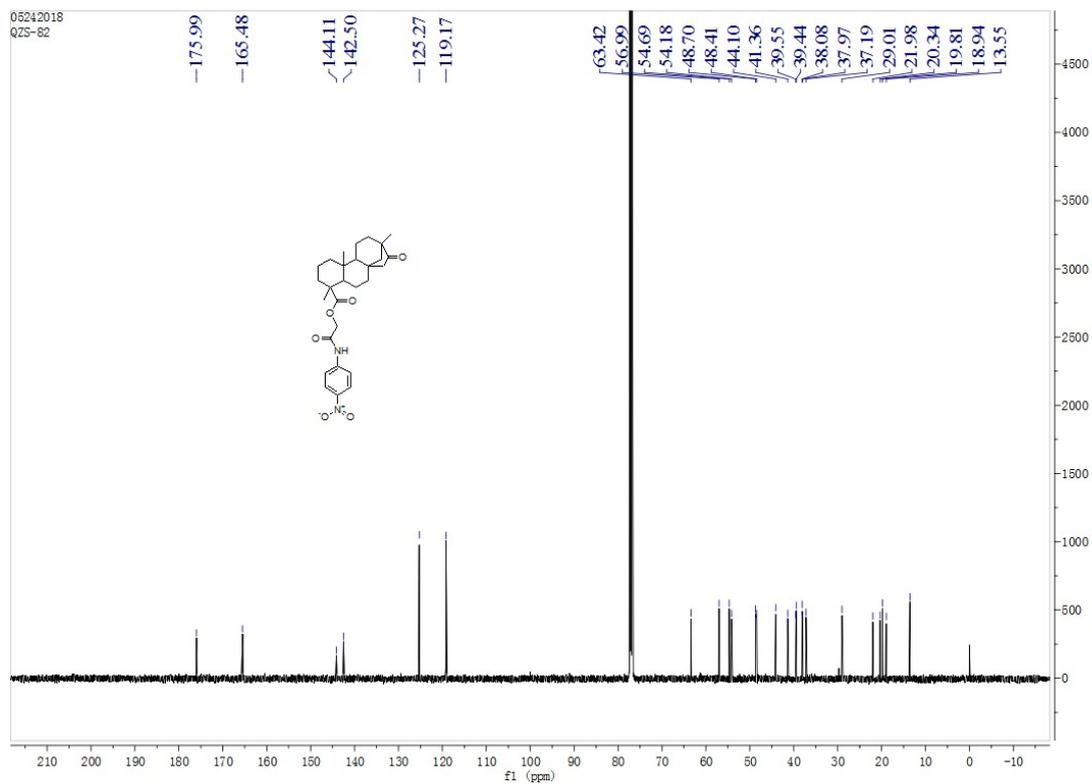
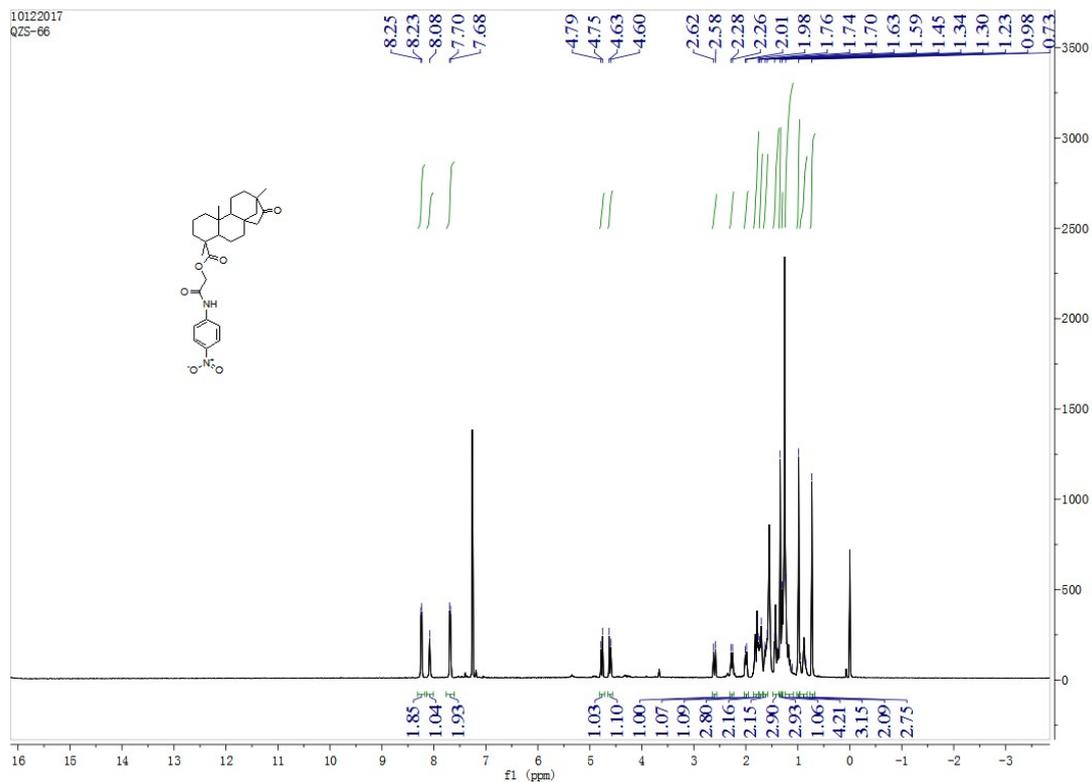
^1H NMR and ^{13}C NMR spectra of compound **4e**



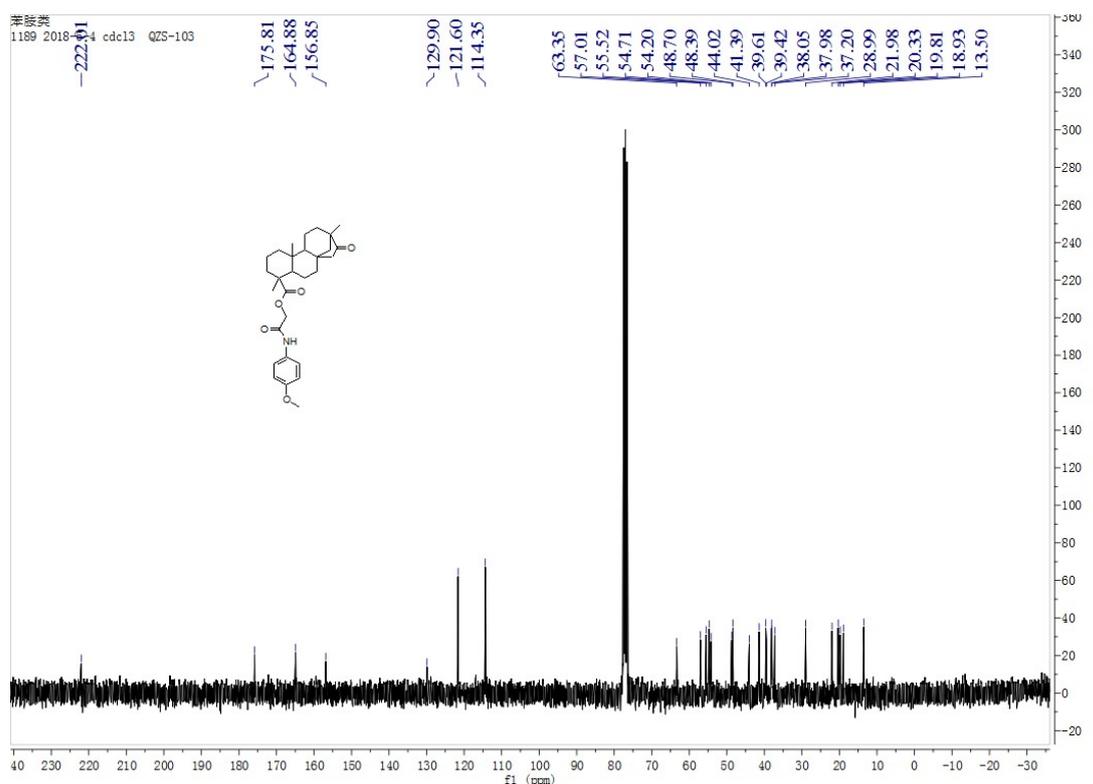
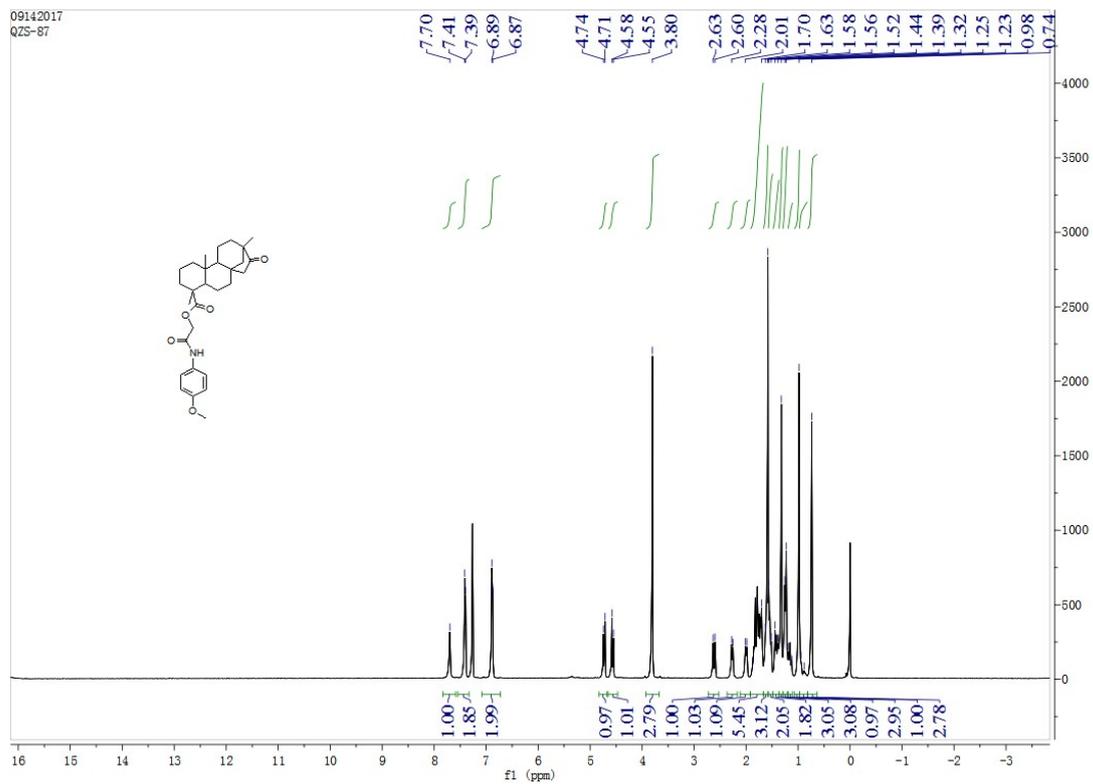
^1H NMR and ^{13}C NMR spectra of compound **4f**



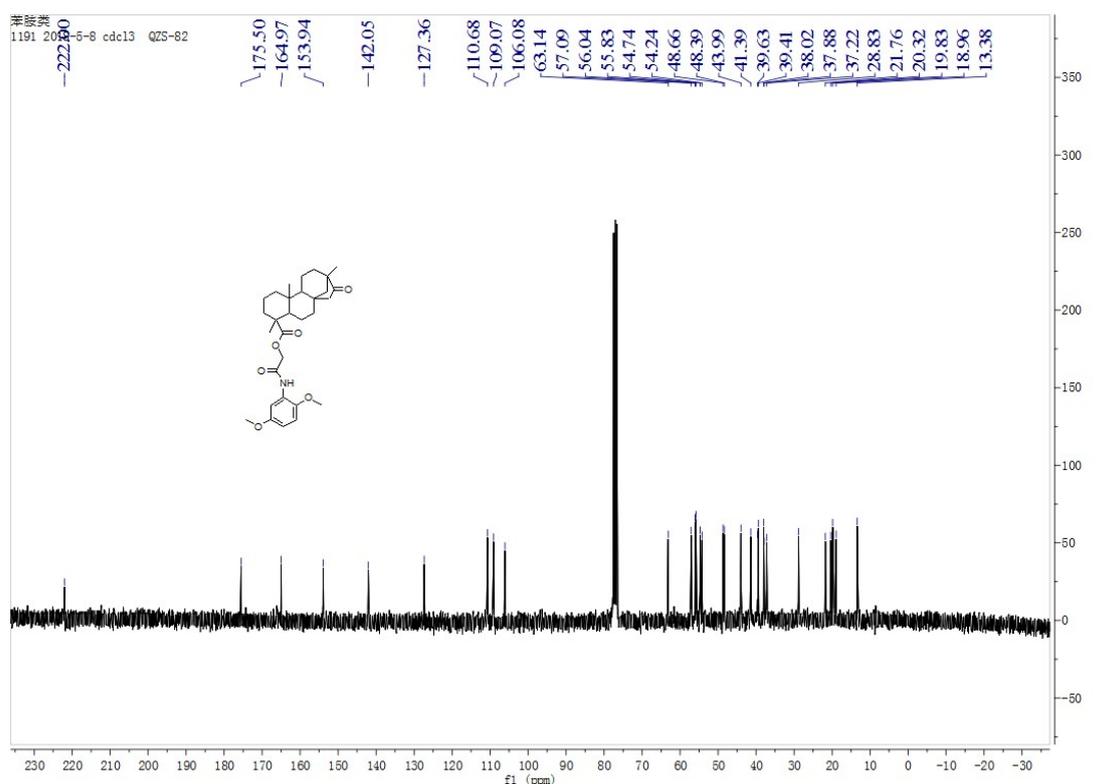
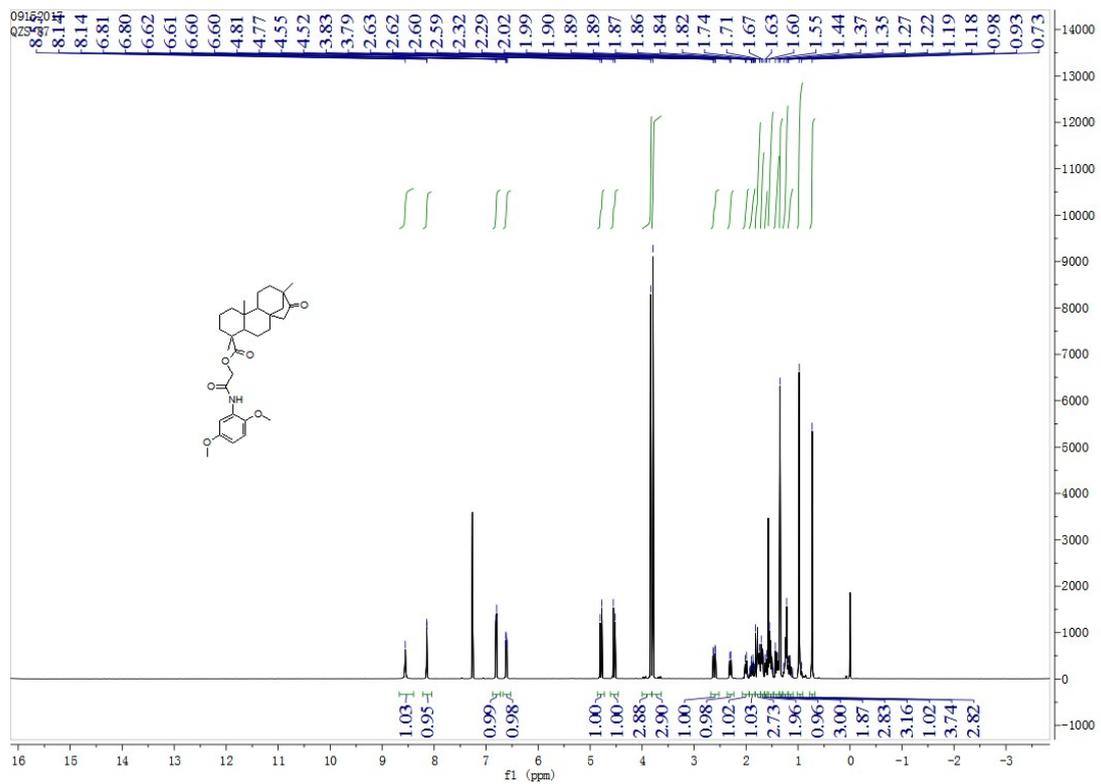
^1H NMR and ^{13}C NMR spectra of compound **4g**



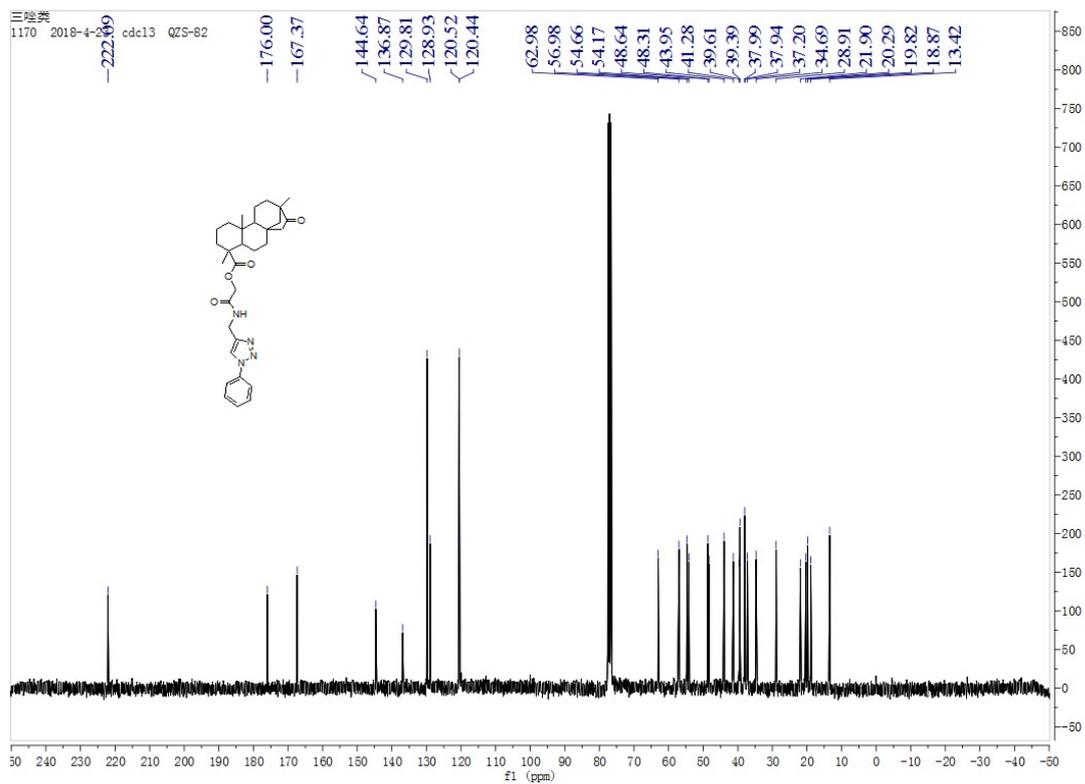
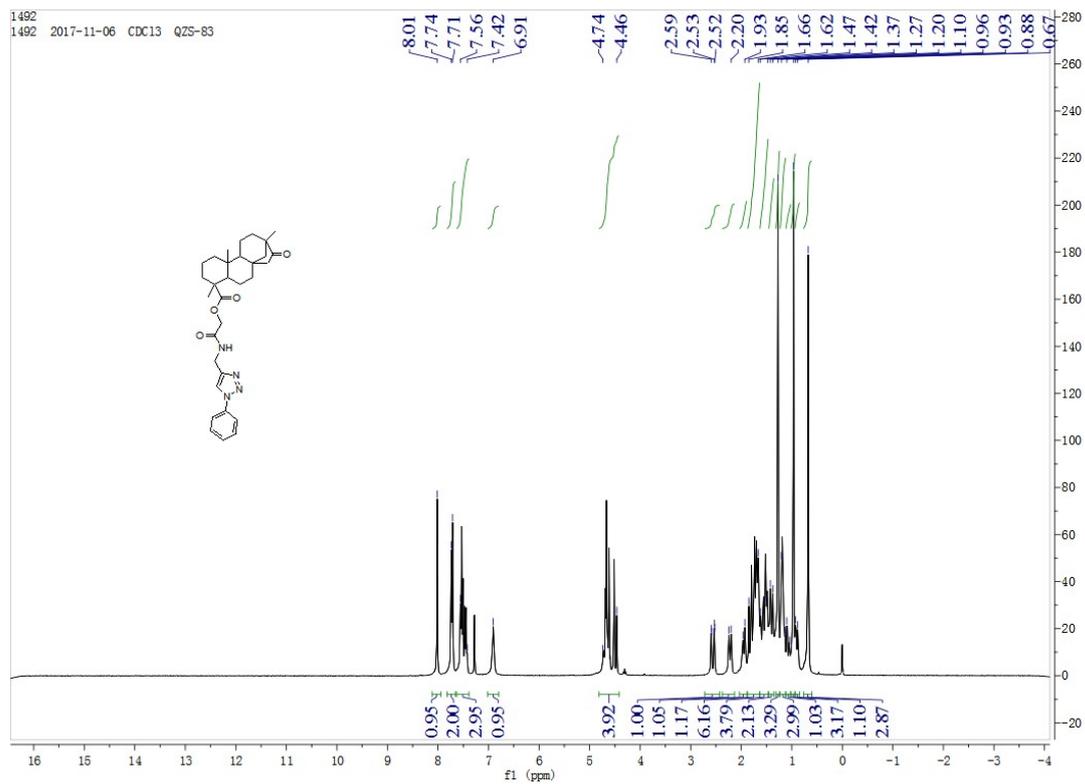
¹H NMR and ¹³C NMR spectra of compound 4h



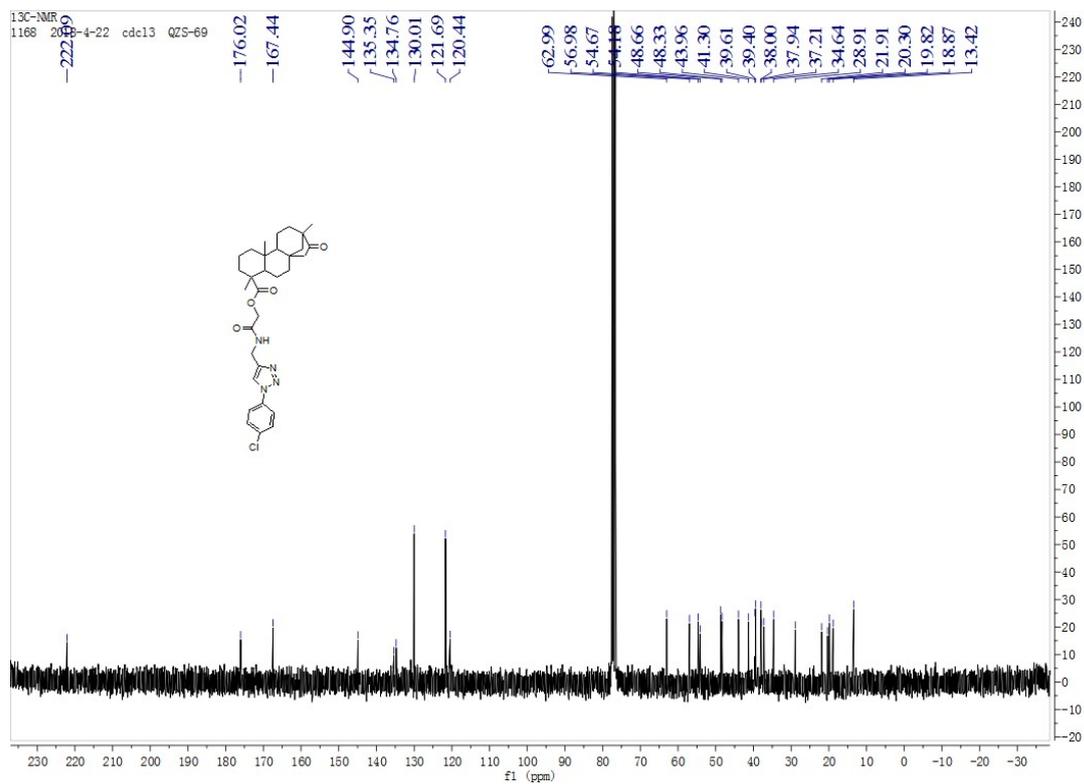
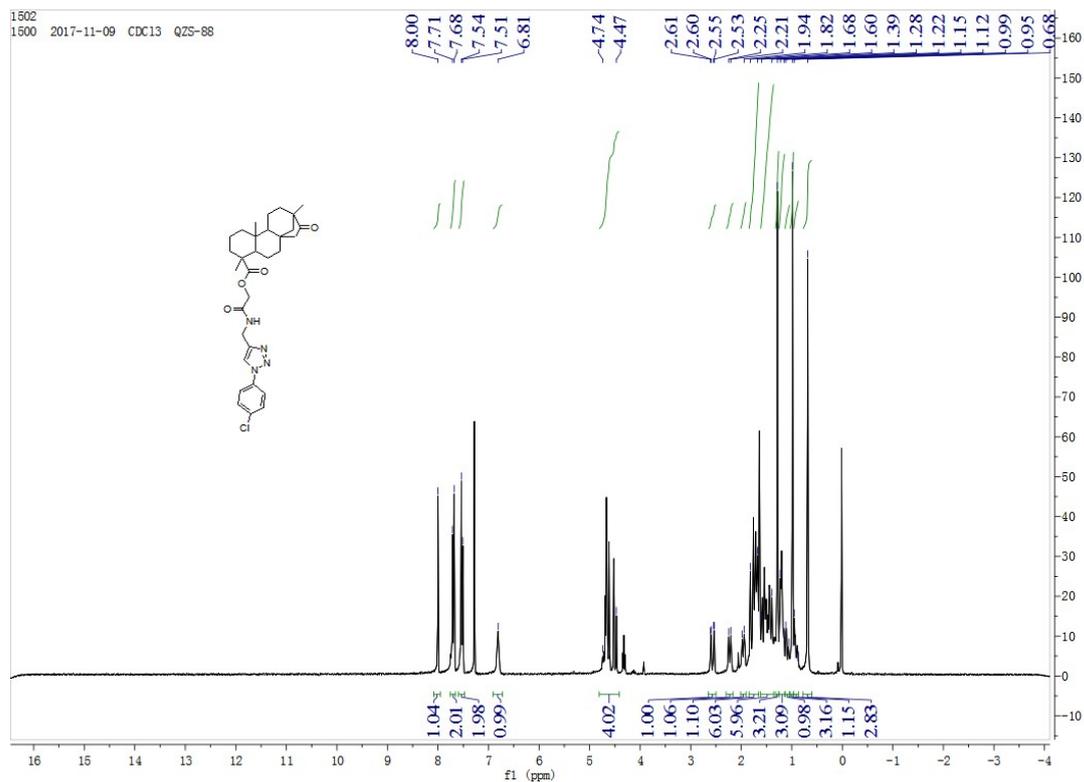
¹H NMR and ¹³C NMR spectra of compound 4i



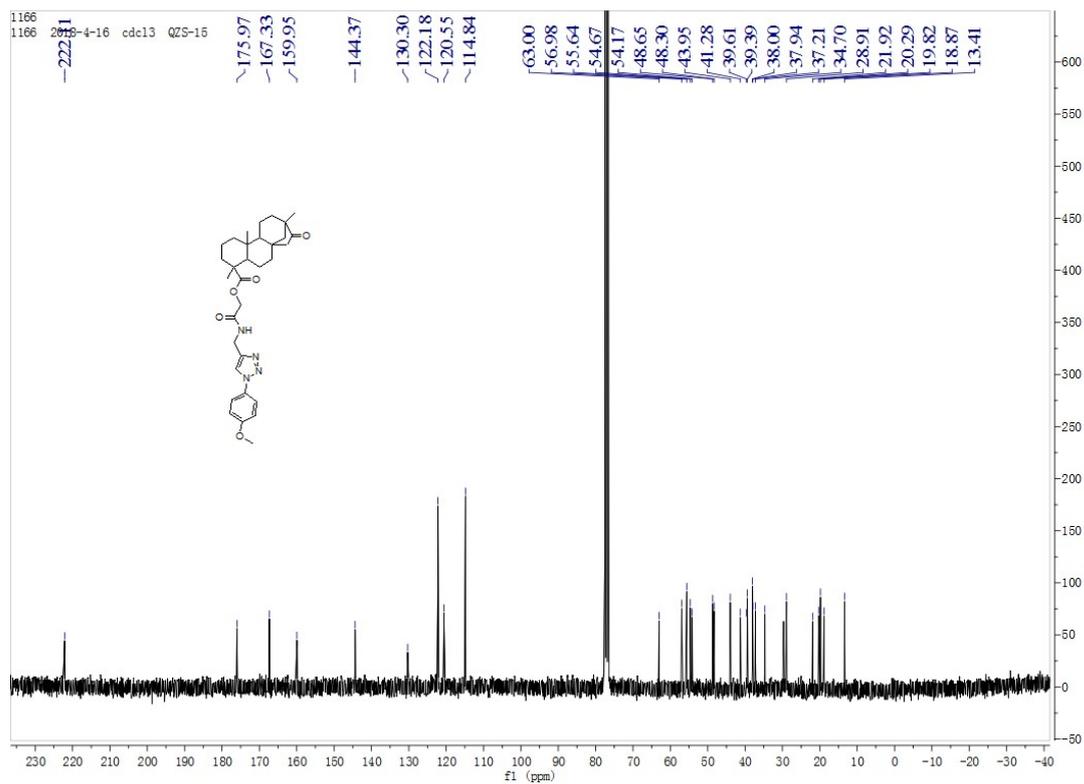
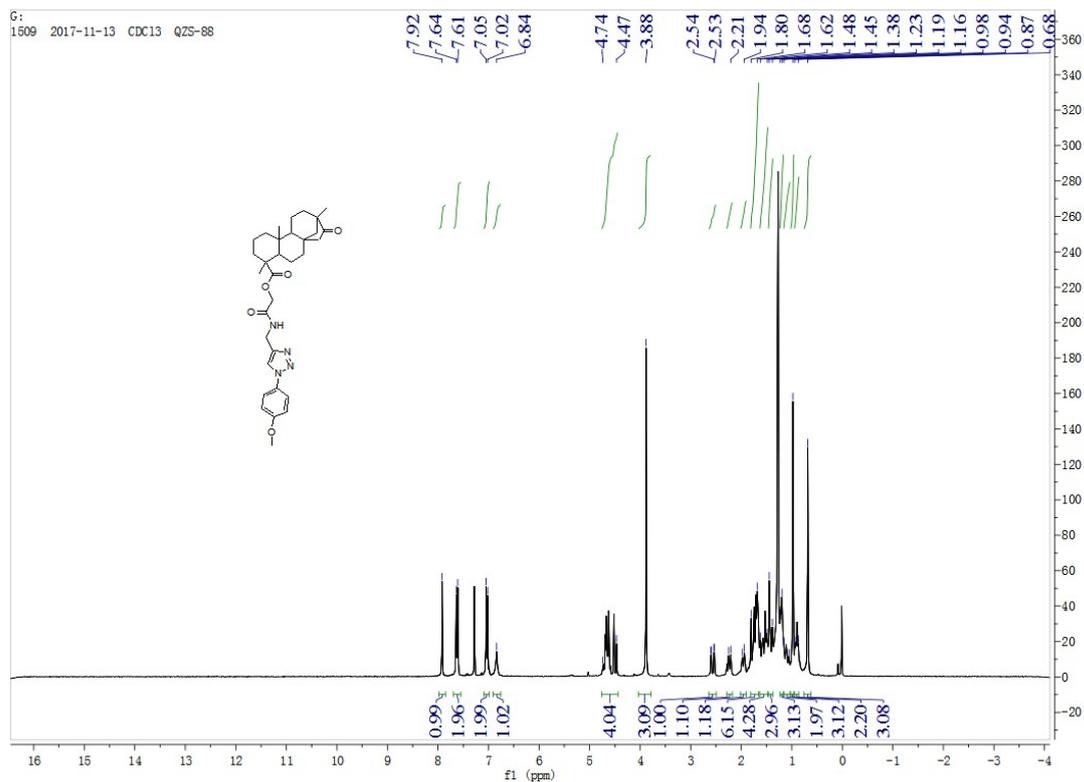
¹H NMR and ¹³C NMR spectra of compound 4j



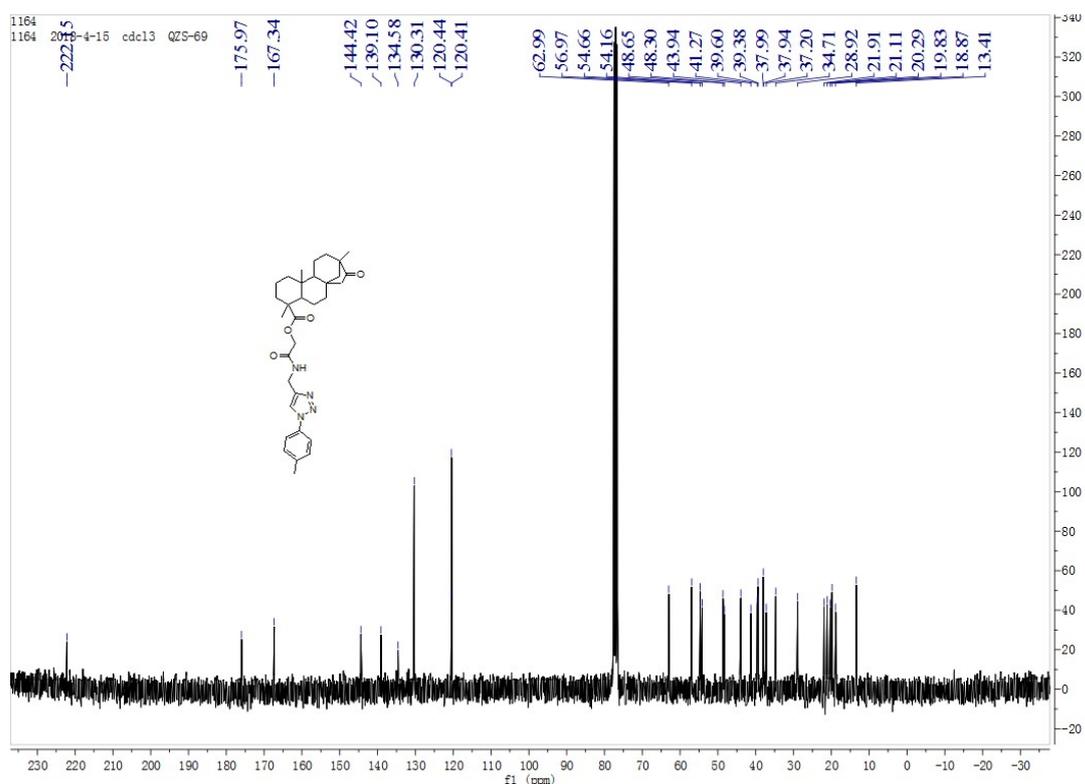
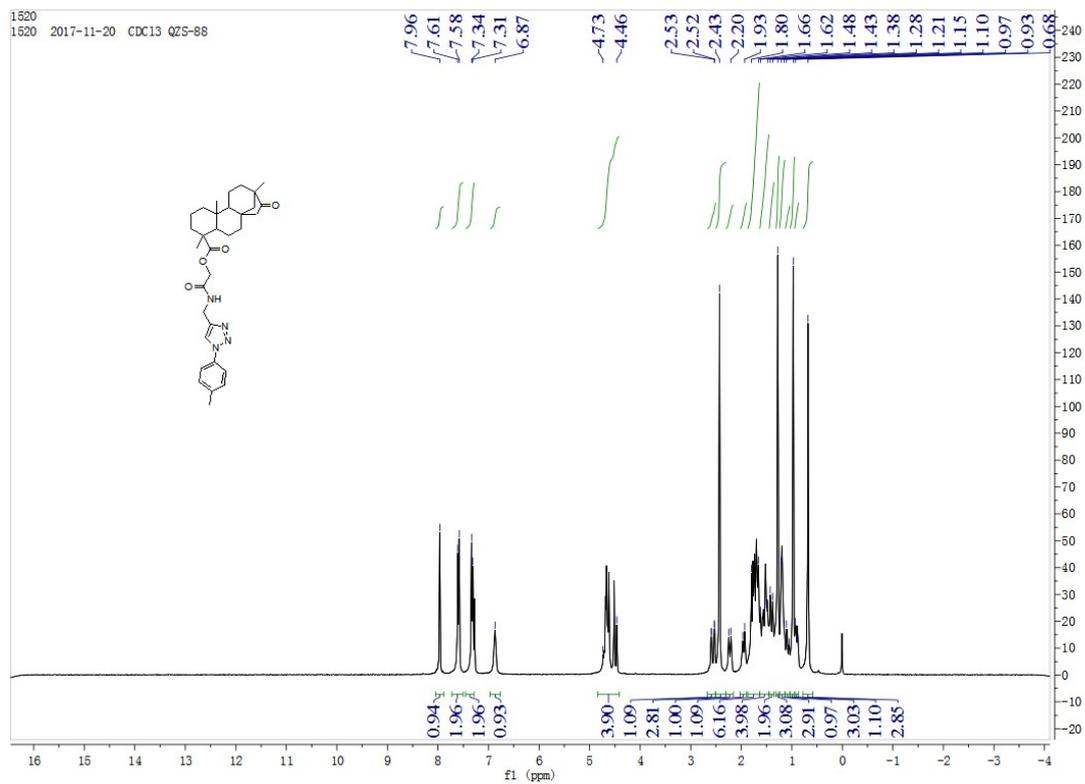
¹H NMR and ¹³C NMR spectra of compound 5a



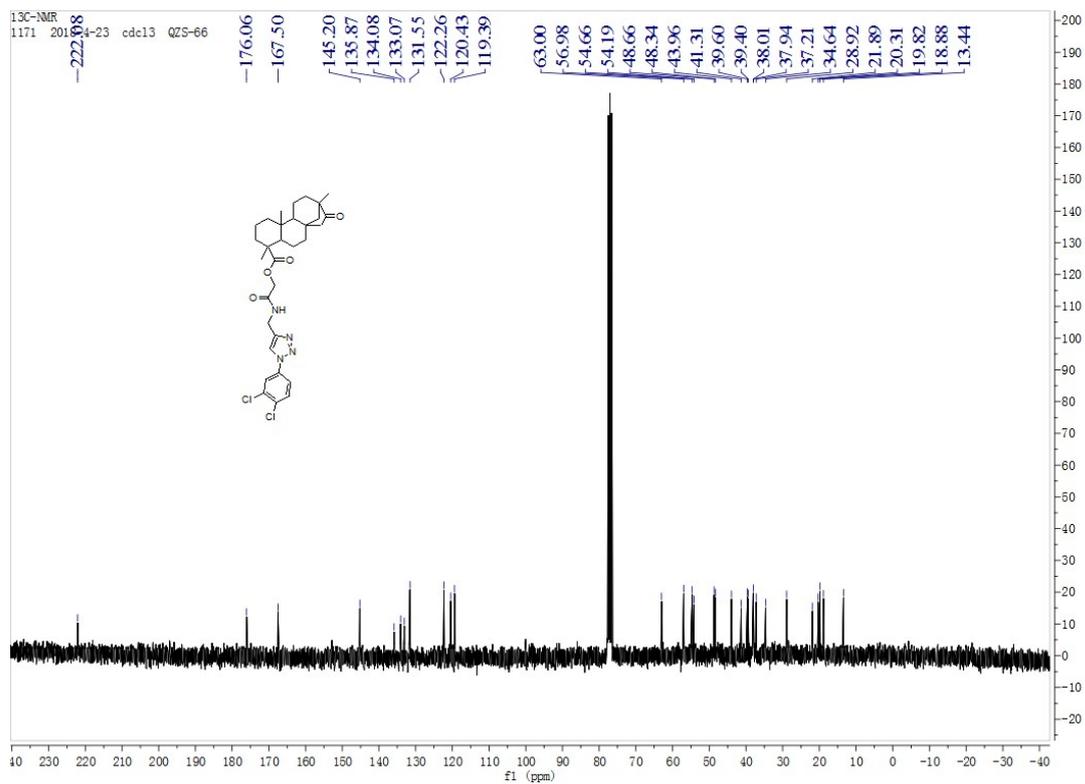
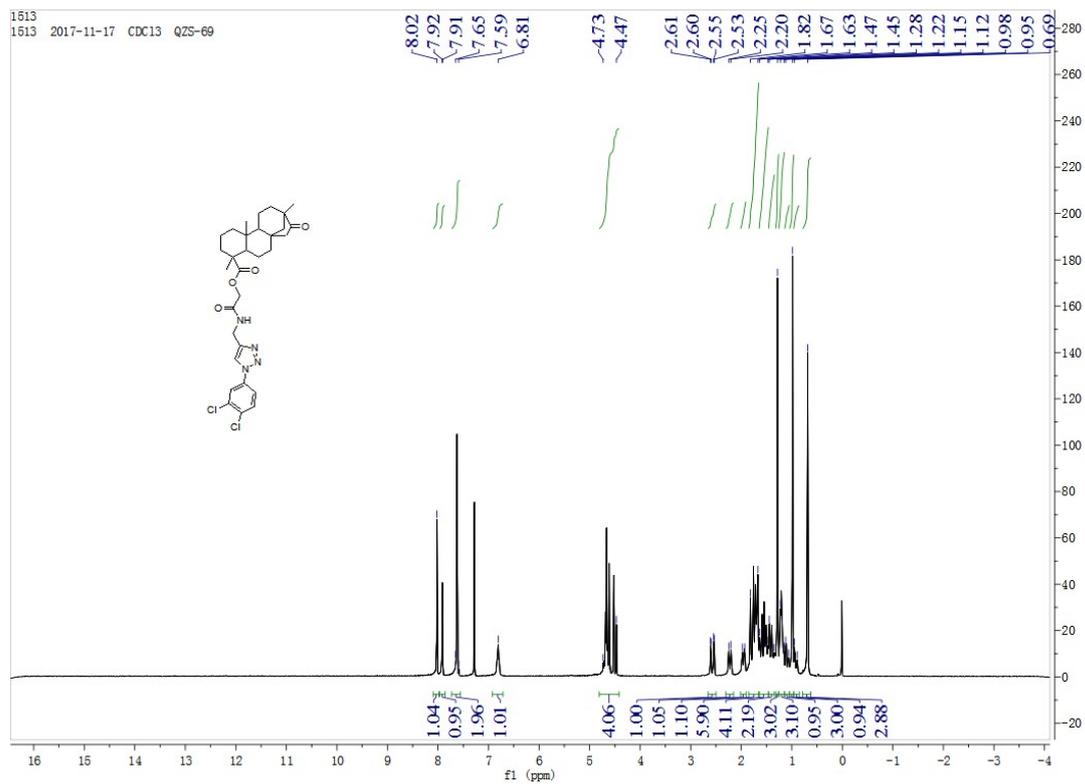
¹H NMR and ¹³C NMR spectra of compound **5b**



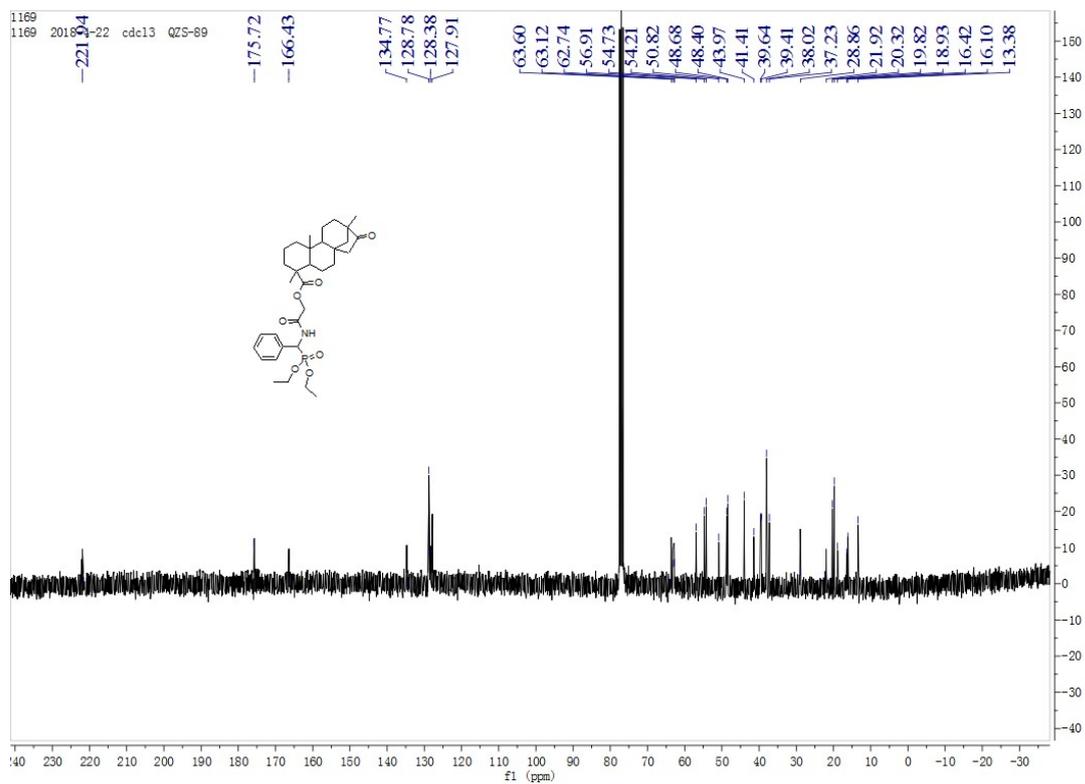
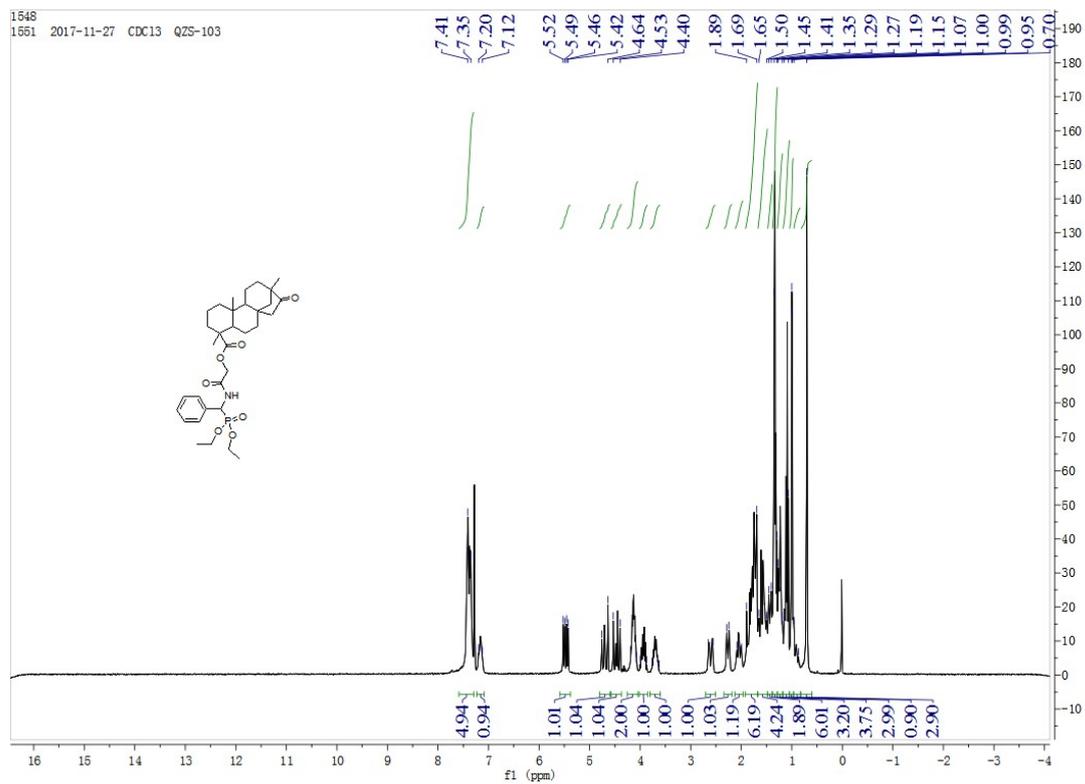
^1H NMR and ^{13}C NMR spectra of compound 5c



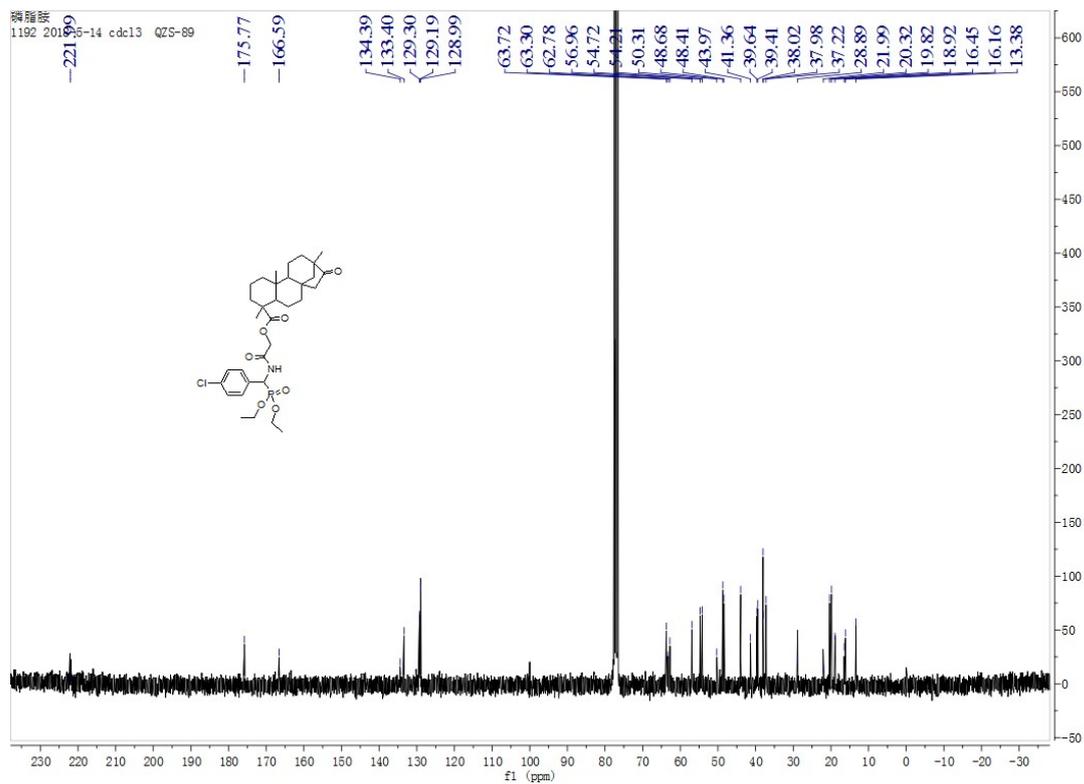
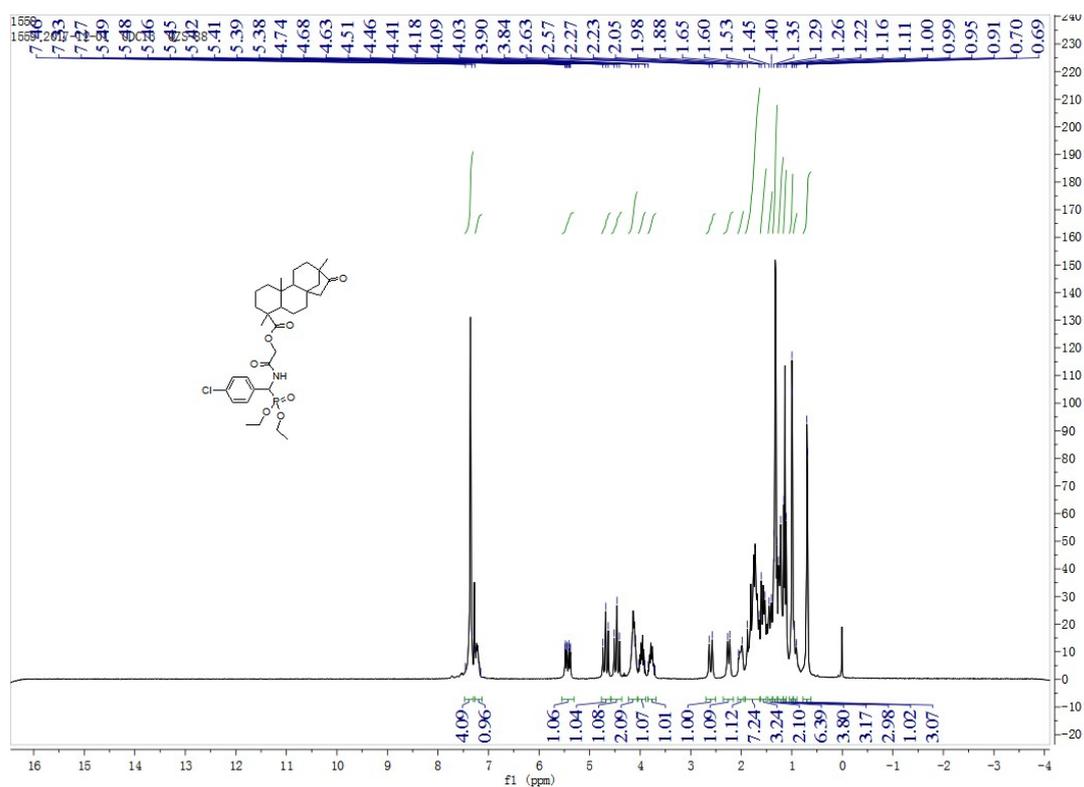
¹H NMR and ¹³C NMR spectra of compound 5d



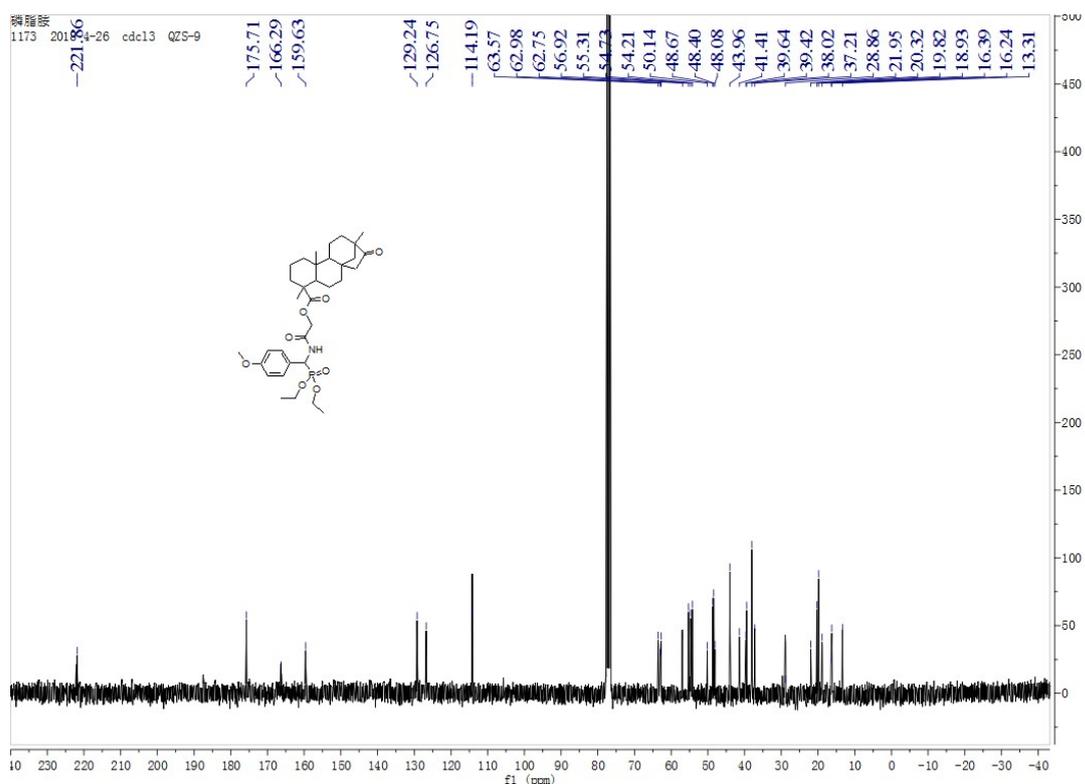
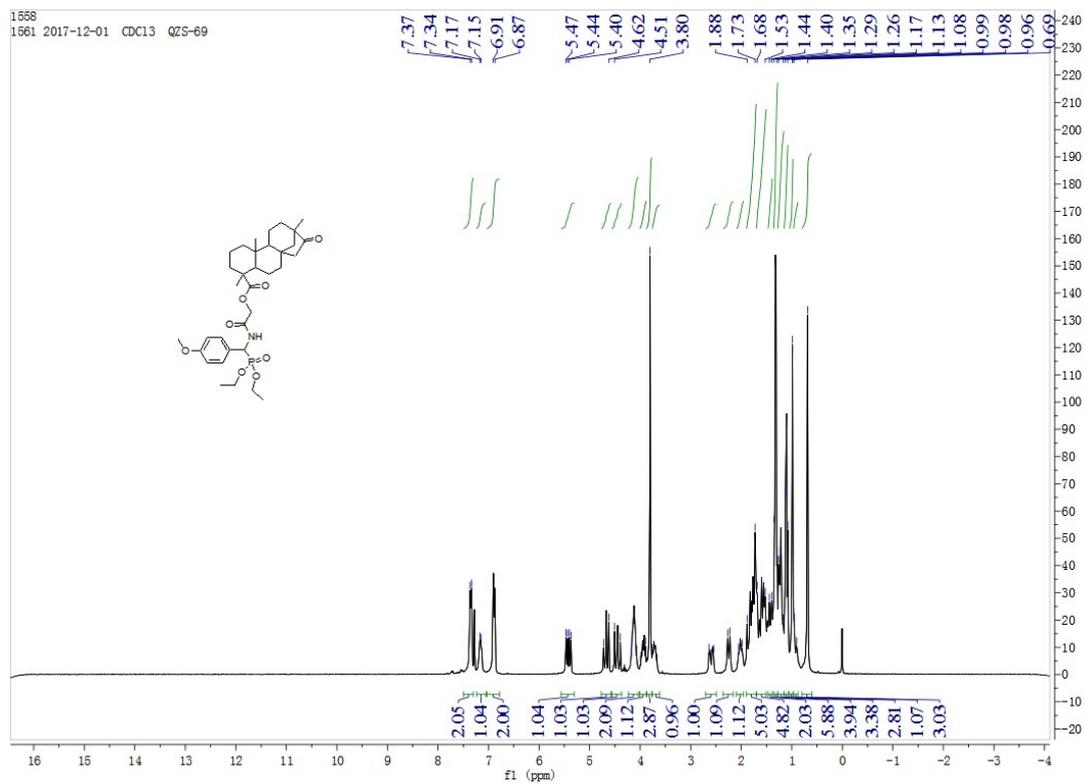
¹H NMR and ¹³C NMR spectra of compound 5e



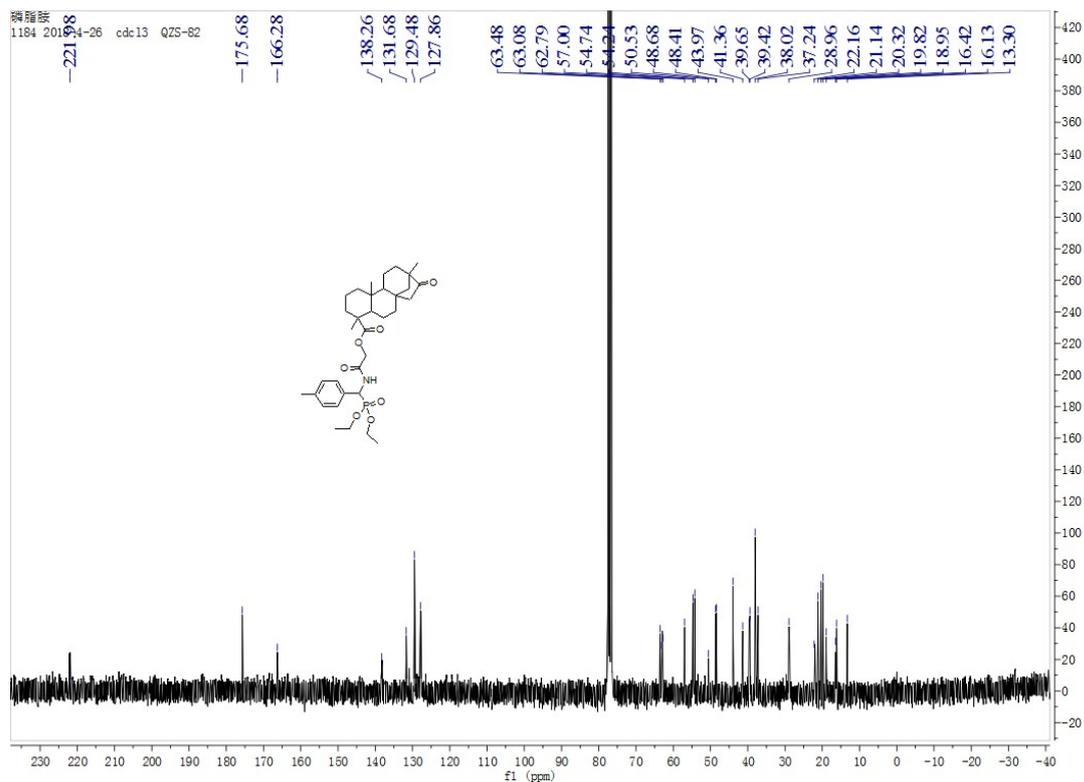
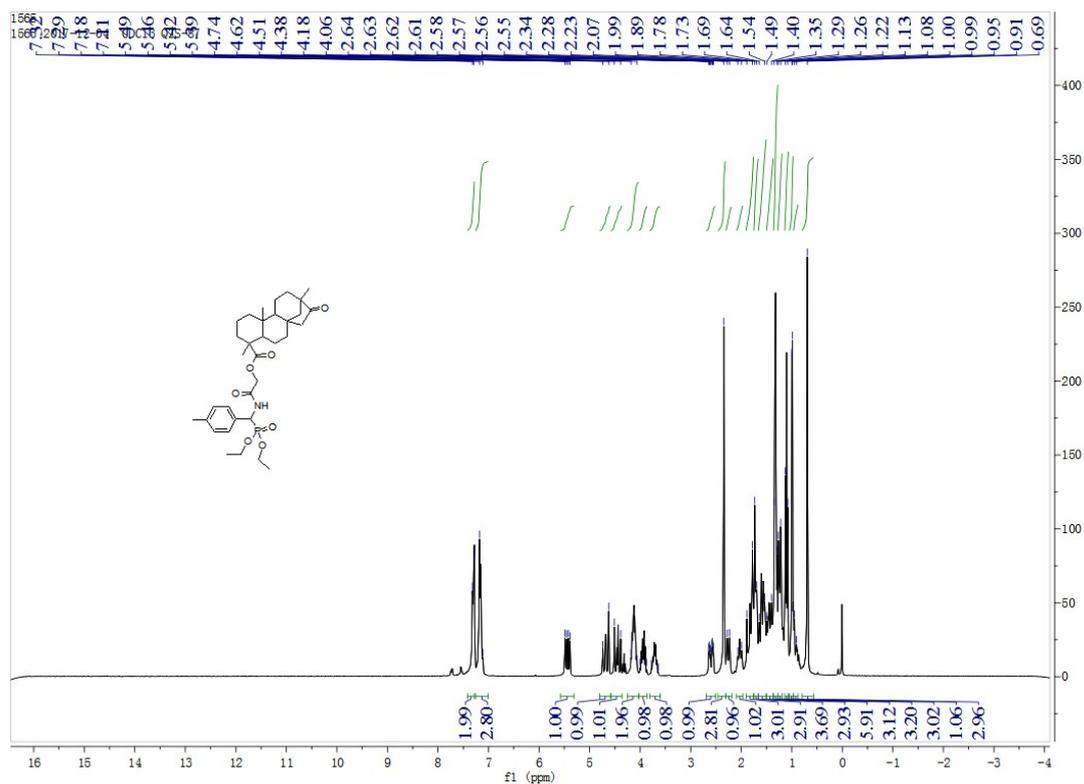
¹H NMR and ¹³C NMR spectra of compound 6a



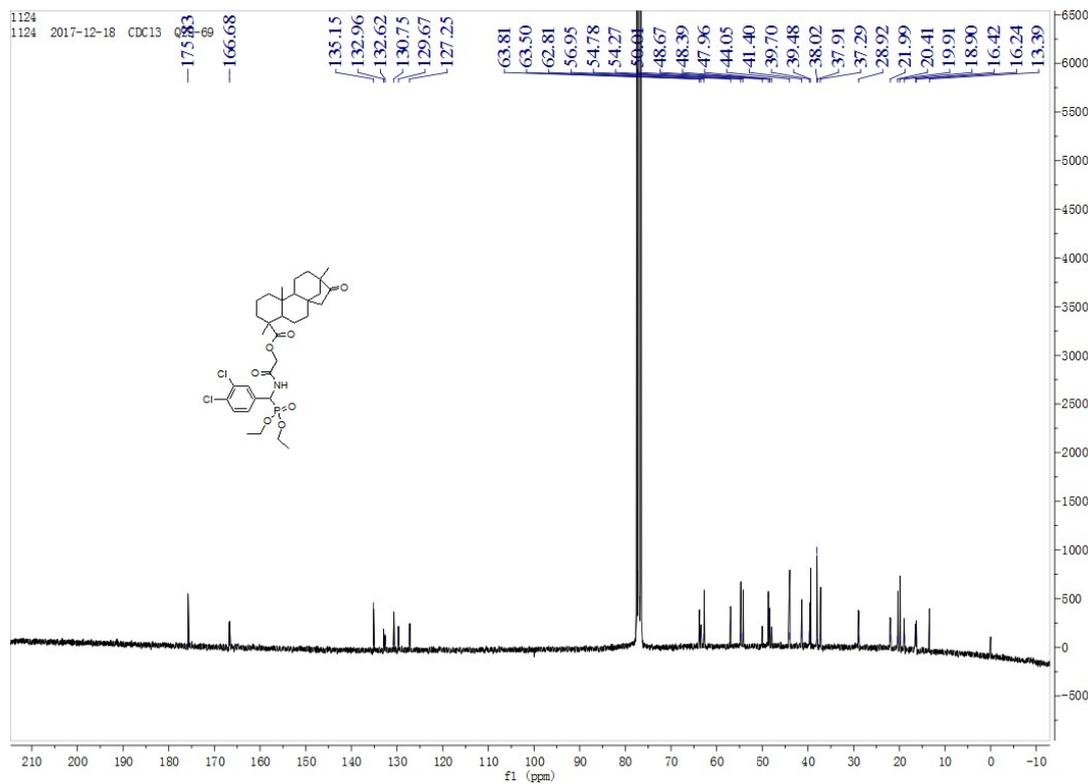
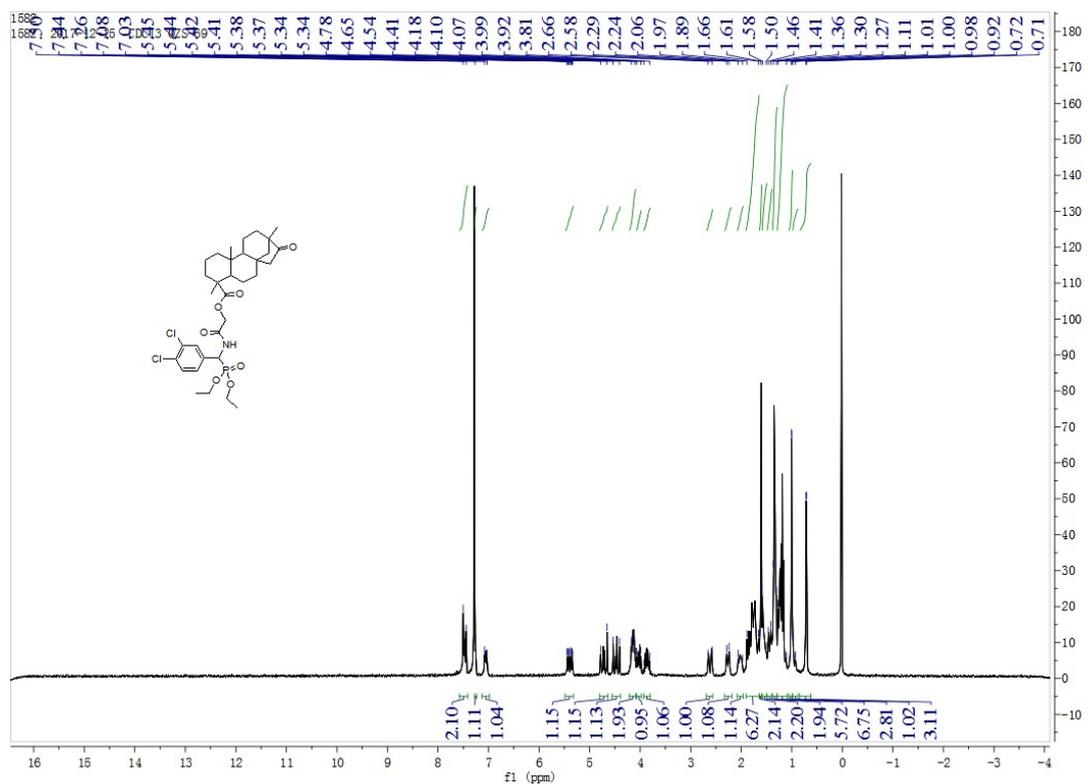
$^1\text{H NMR}$ and $^{13}\text{C NMR}$ spectra of compound 6b



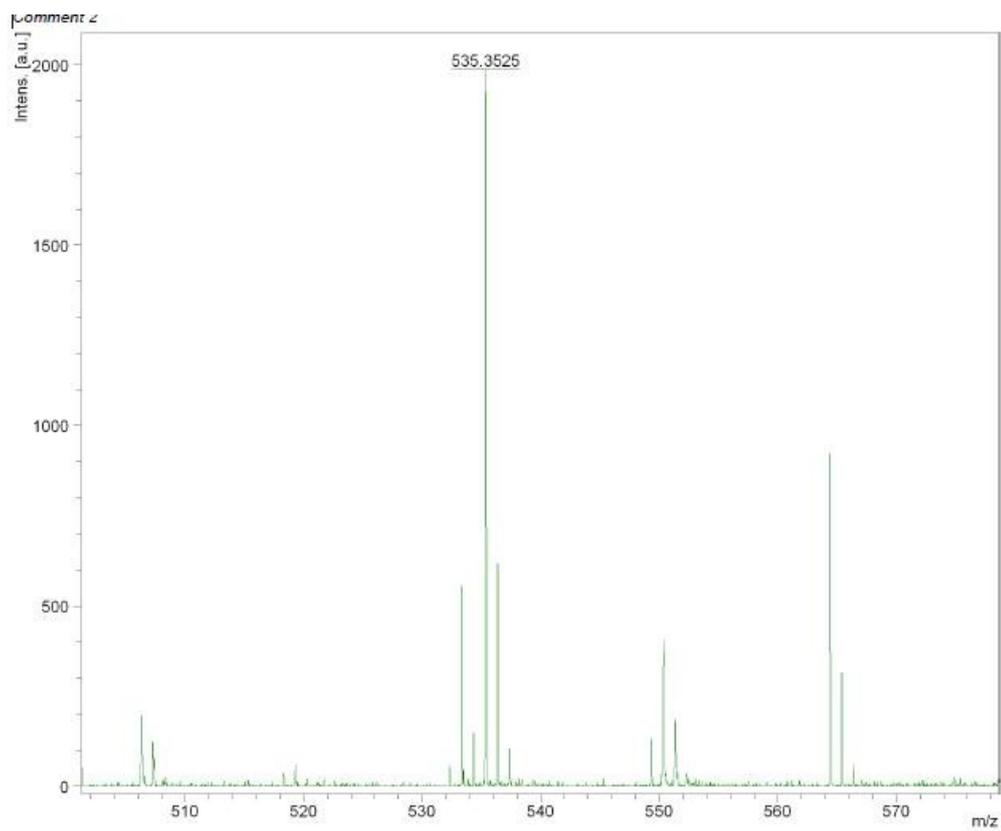
$^1\text{H NMR}$ and $^{13}\text{C NMR}$ spectra of compound 6c



¹H NMR and ¹³C NMR spectra of compound 6d



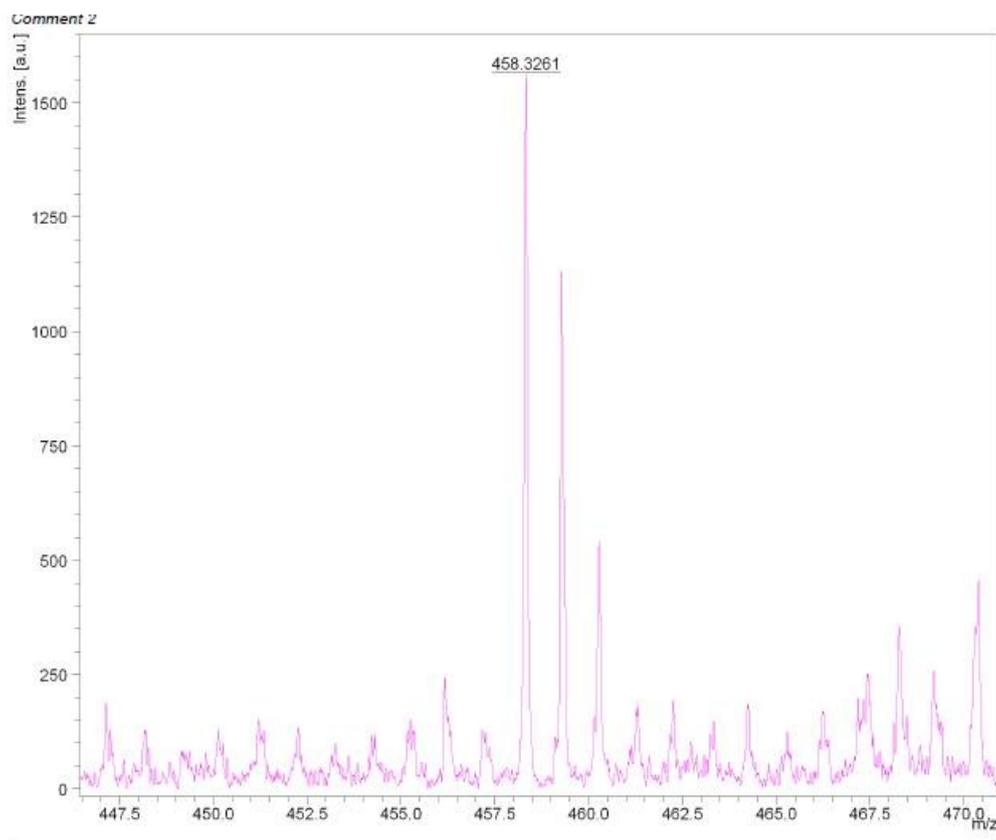
¹H NMR and ¹³C NMR spectra of compound 6e



Acquisition Parameter

Date of acquisition: 2018-06-23T13:00:40.158+08:00
Acquisition method name: D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode: Reflector

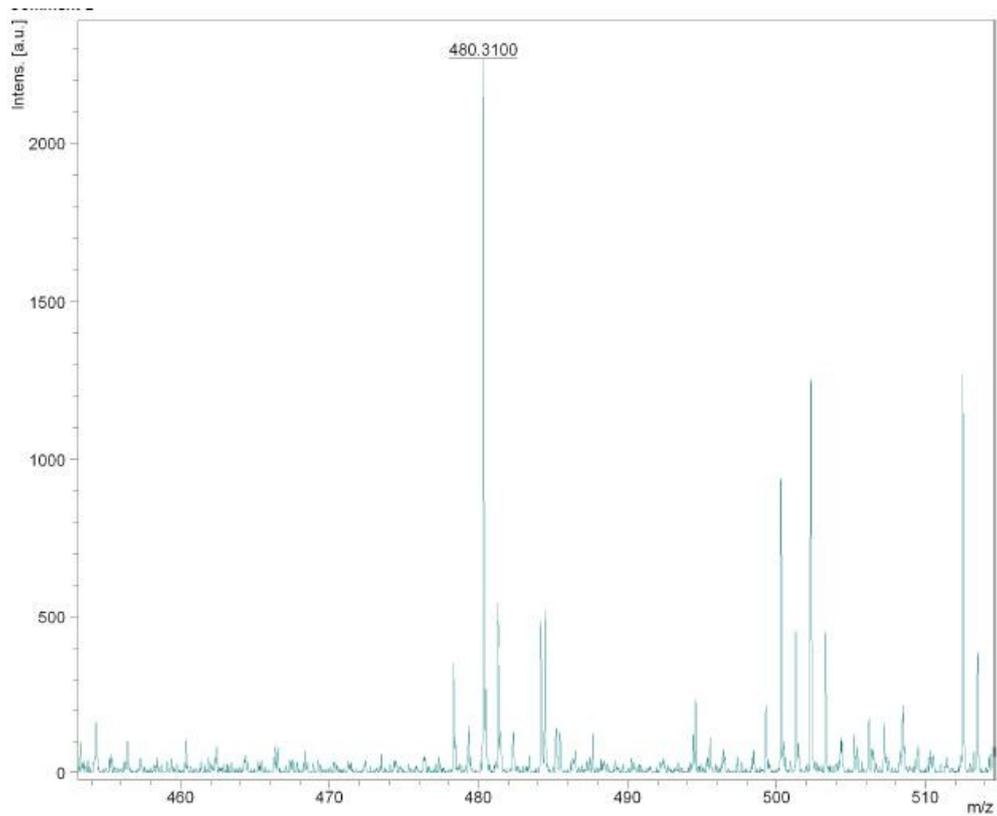
HRMS spectra of compound 2d



Acquisition Parameter

Date of acquisition	2018-06-23T13:01:50.814+08:00
Acquisition method name	D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	Reflector

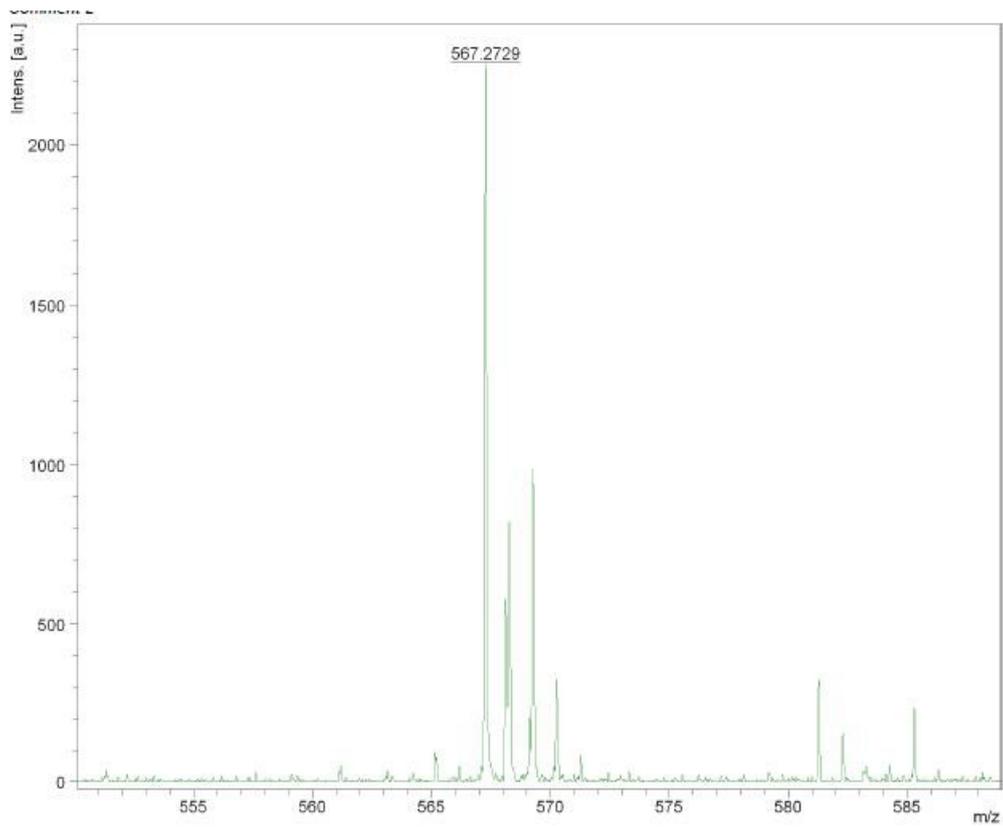
HRMS spectra of compound 2e



Acquisition Parameter

Date of acquisition	2018-06-23T12:15:14.908+08:00
Acquisition method name	D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	Reflector

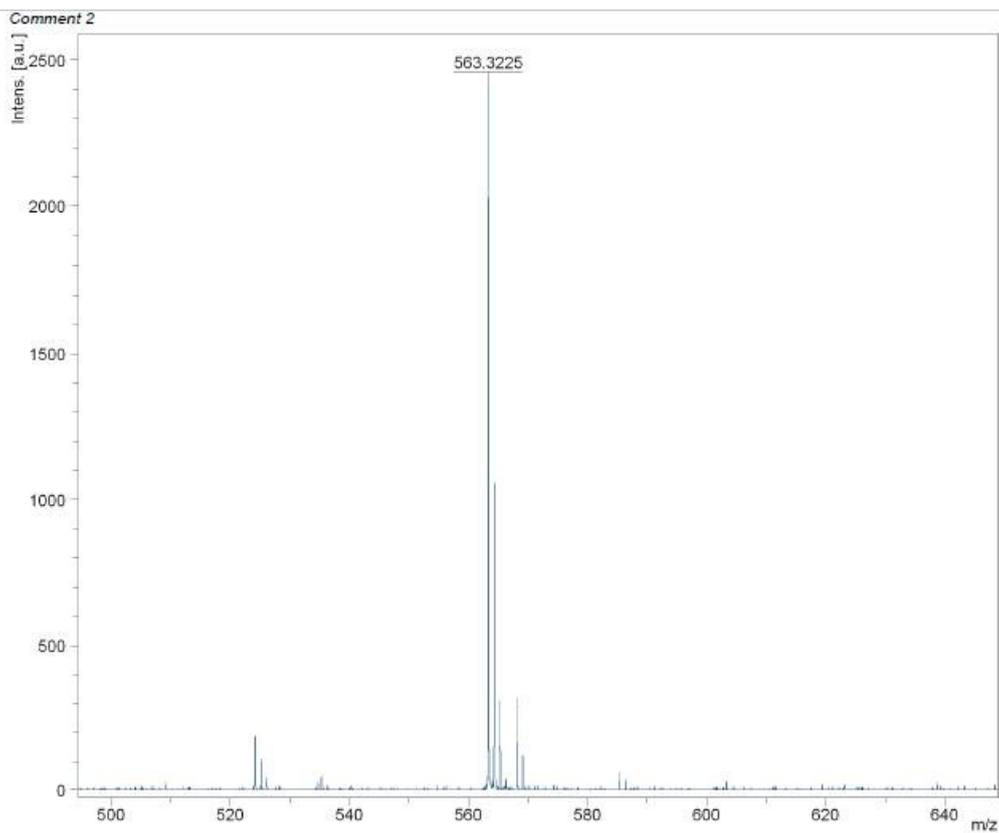
HRMS spectra of compound 3b



Acquisition Parameter

Date of acquisition	2018-06-20T20:10:16.411+08:00
Acquisition method name	D:\Methods\FlexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	Reflector

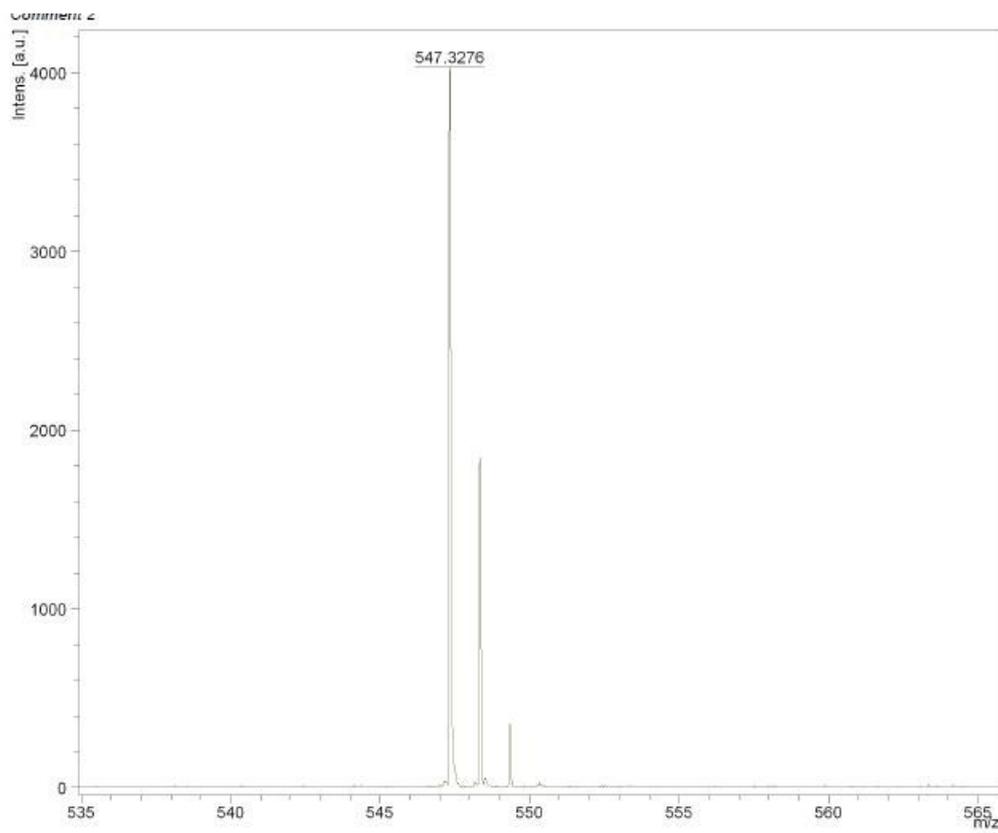
HRMS spectra of compound 5b



Acquisition Parameter

Date of acquisition	2018-08-20T20:10:40.427+08:00
Acquisition method name	D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	FullScan

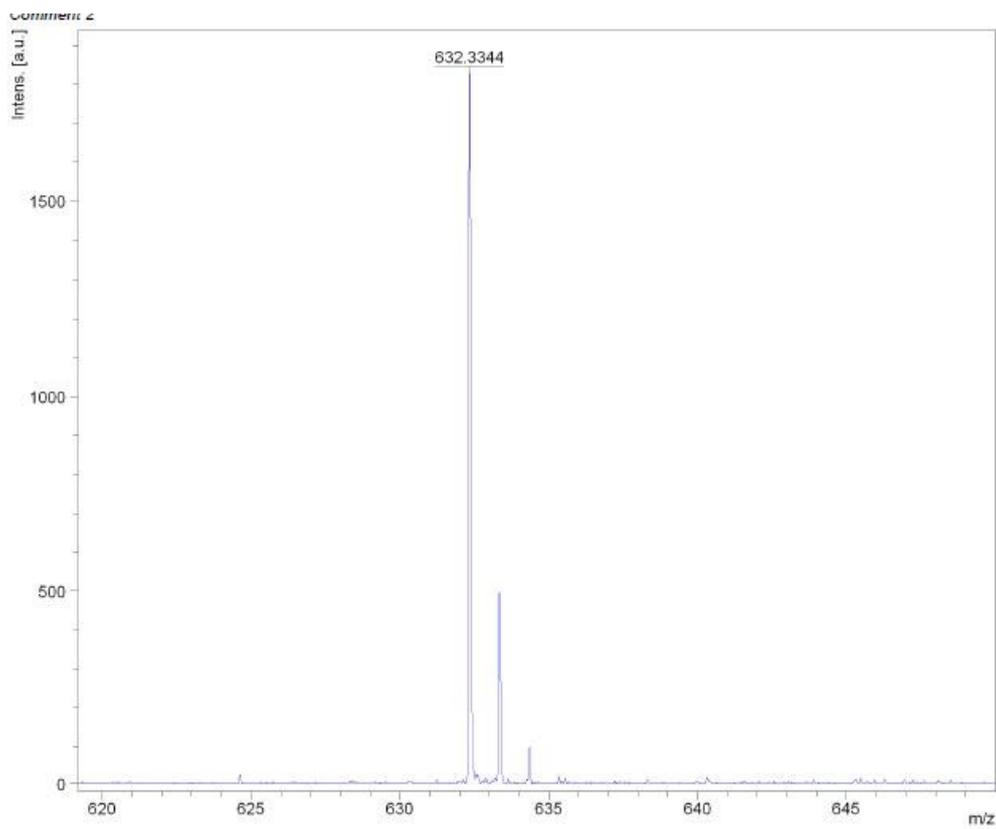
HRMS spectra of compound **5c**



Acquisition Parameter

Date of acquisition	2018-06-20T20:10:50.974+08:00
Acquisition method name	D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	Reflector

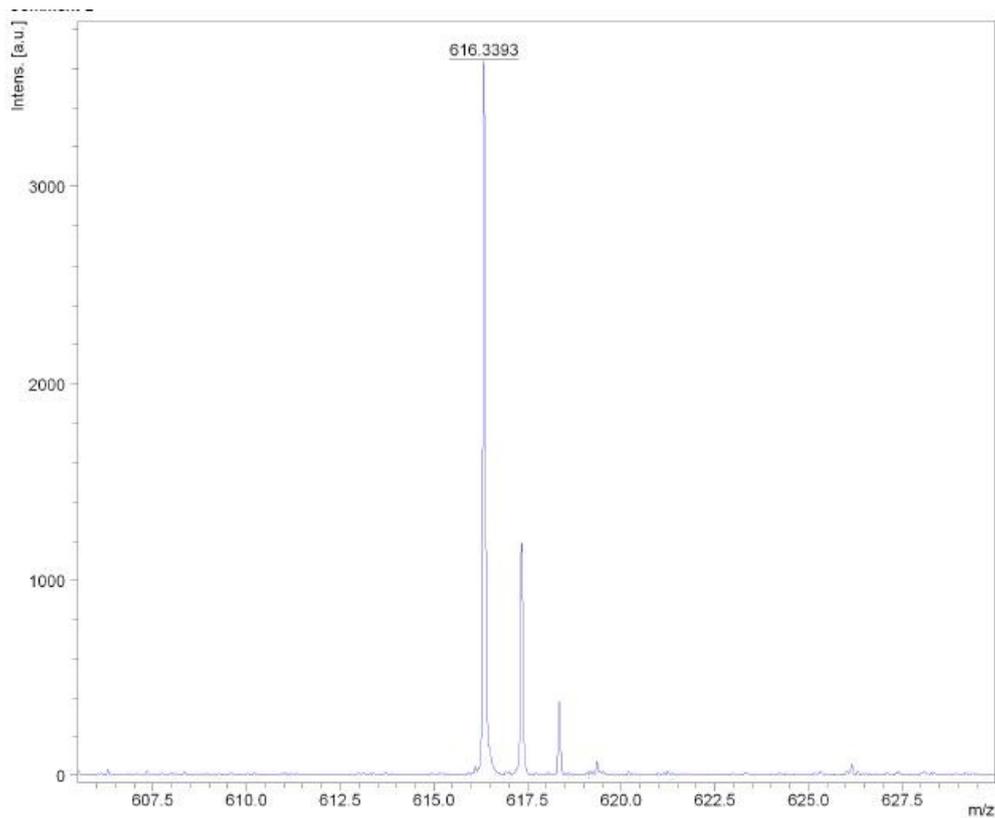
HRMS spectra of compound **5d**



Acquisition Parameter

Date of acquisition	2018-06-23T13:03:24.424+08:00
Acquisition method name	D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	Reflector

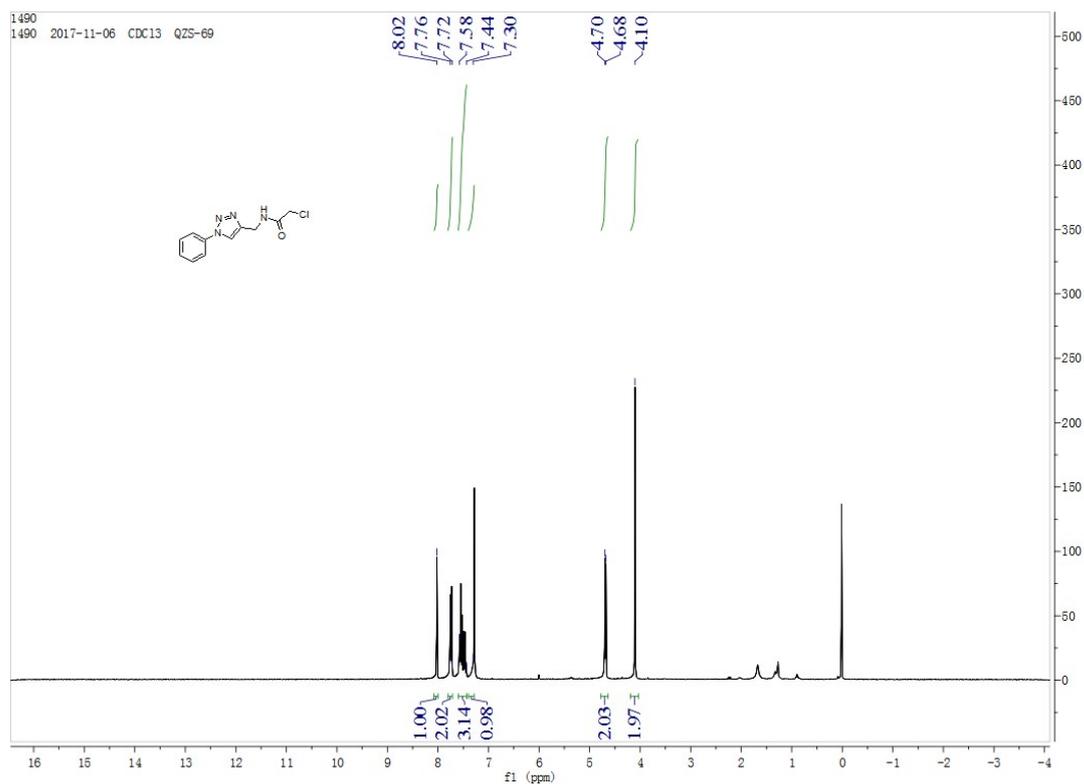
HRMS spectra of compound 6c



Acquisition Parameter

Date of acquisition	2018-06-20T20:12:12.911+08:00
Acquisition method name	D:\Methods\flexControlMethods\gc-RP_100-1500_Da.par
Acquisition operation mode	Reflector

HRMS spectra of compound 6d



¹H-NMR spectra of intermediate **Va**

¹H-NMR (CDCl₃, 300MHz, ppm): δ 8.02 (s, 1H, triazole-H), 7.76-7.72 (m, 2H, Ar-H), 7.58-7.44 (m, 3H, Ar-H), 7.30 (brs, 1H, -NH-CO-), 4.69 (d, *J*= 6 Hz, 2H, -CH₂-NH-), 4.10 (s, 2H, -CH₂-Cl).