ELECTRONIC SUPPLEMENTARY INFORMATION

Functionalized 1,3-thiazoles by combined halogen dance

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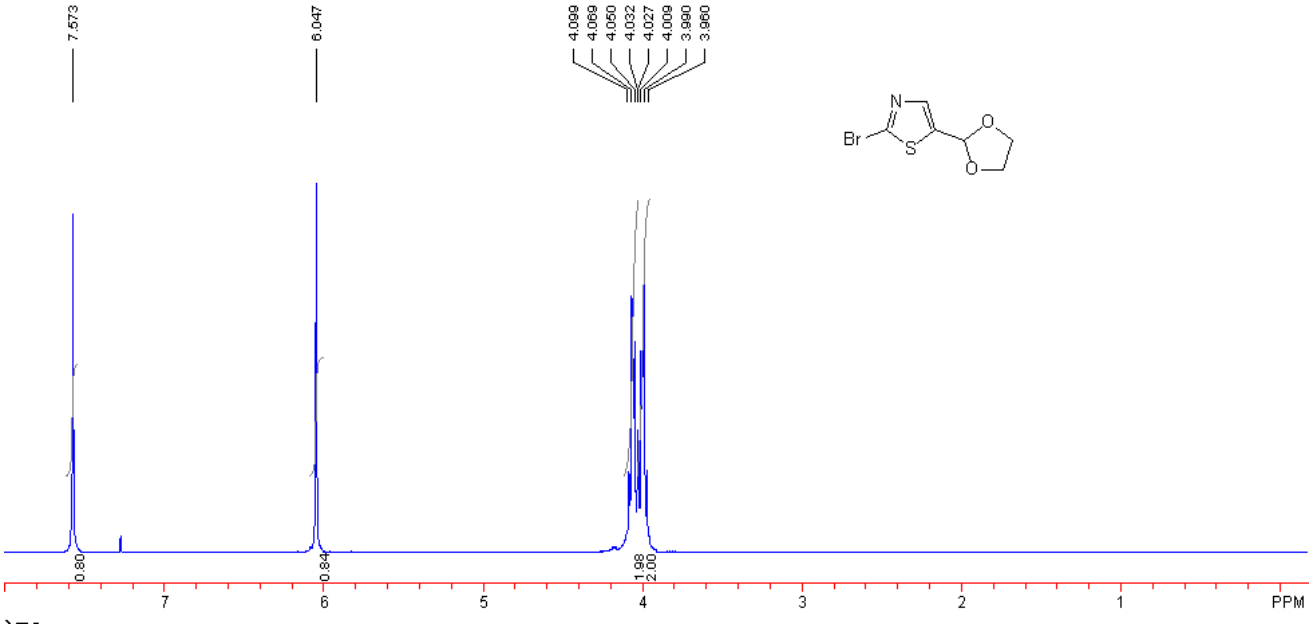
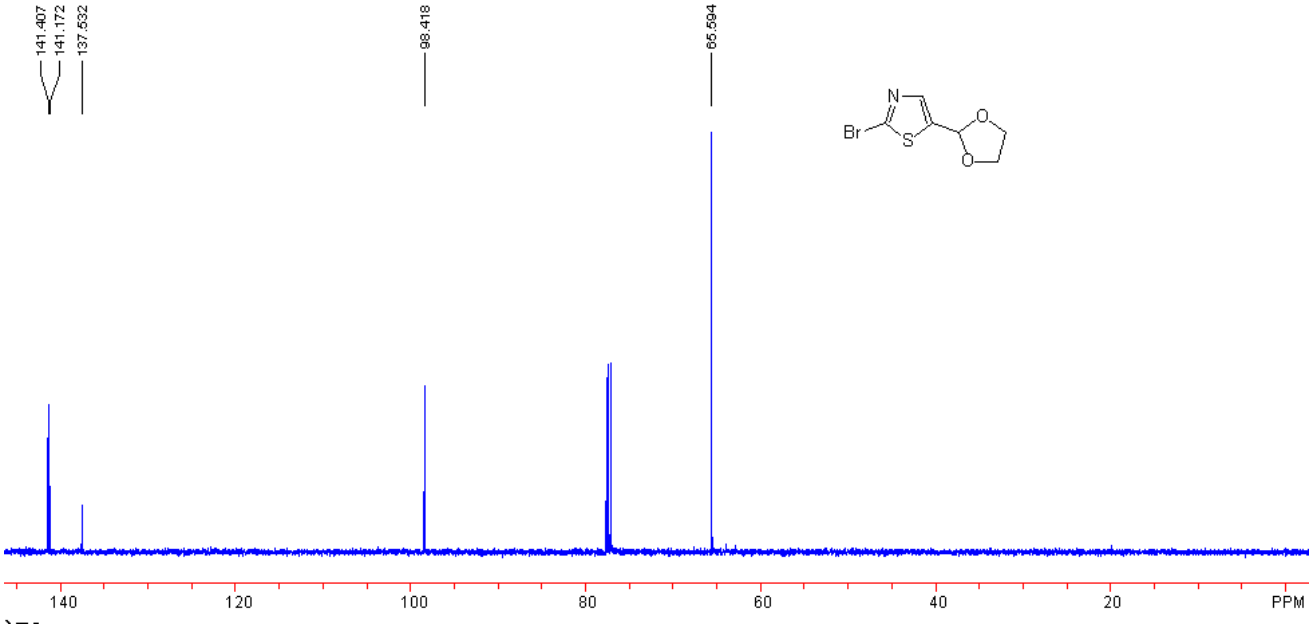
Figure S1. Compound 2

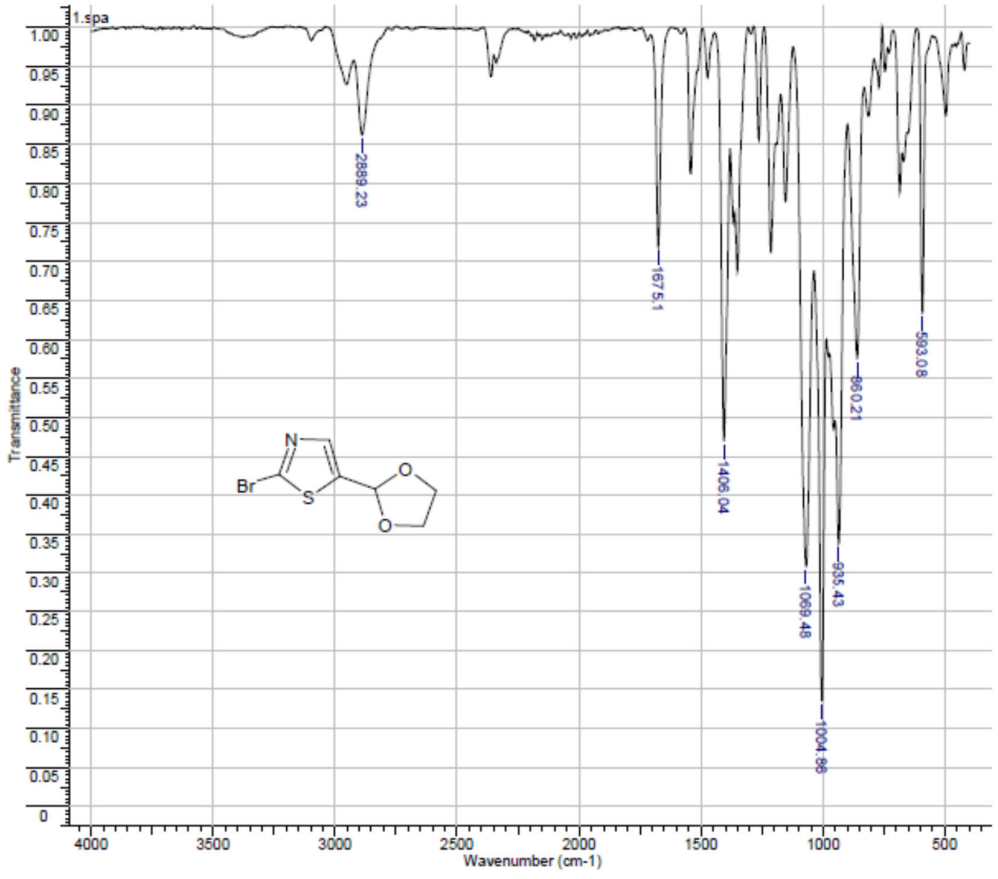
(A) ^{1}H-NMR spectrum ($CDCl_3$)



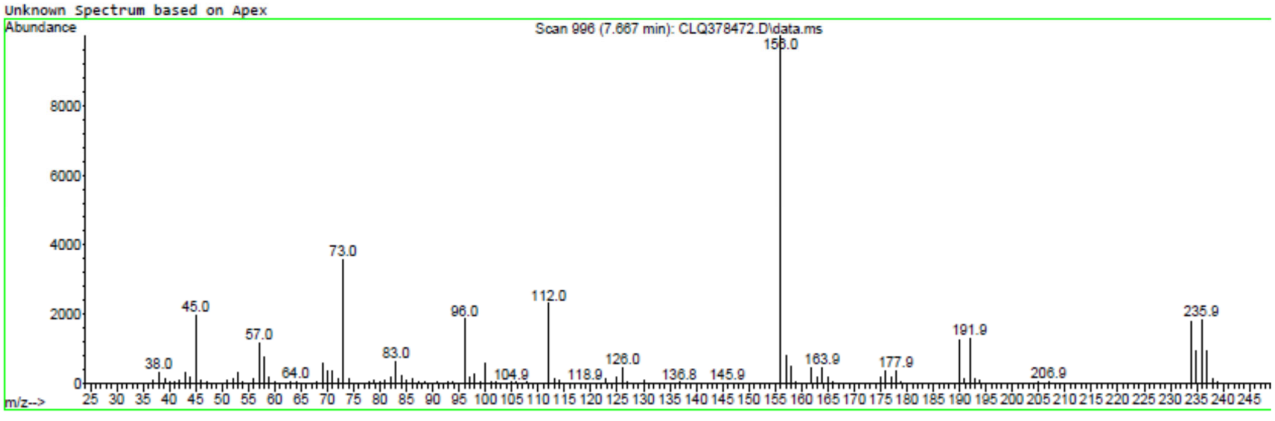
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) ATR-IR spectrum



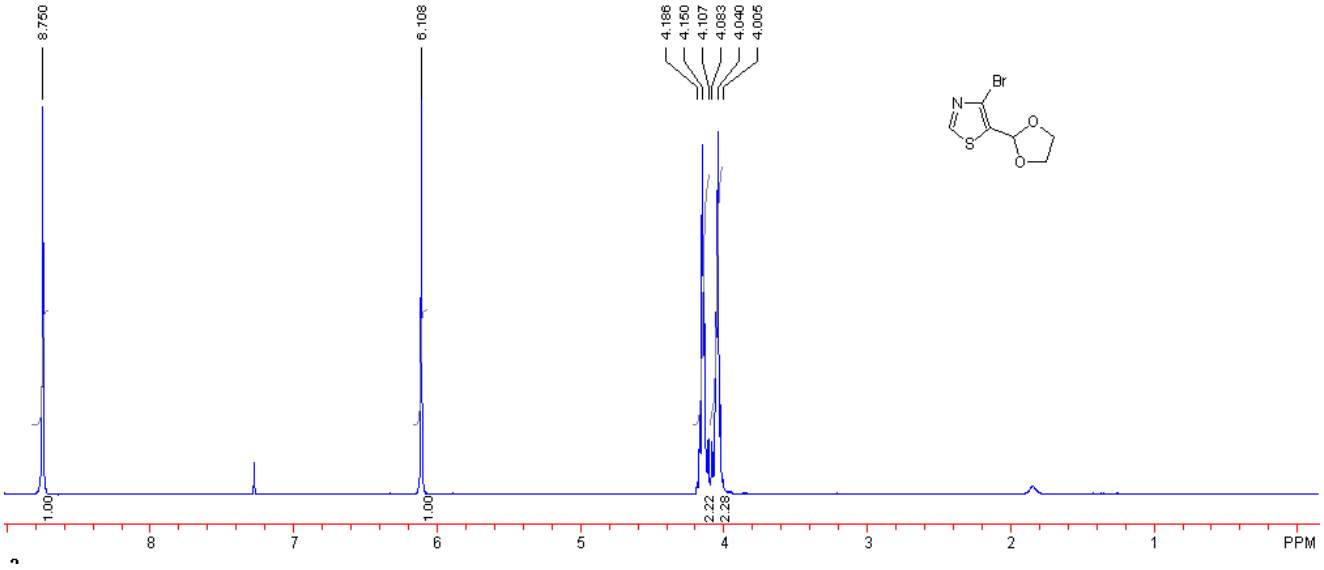
(D) GC/MS spectrum of compound **2**



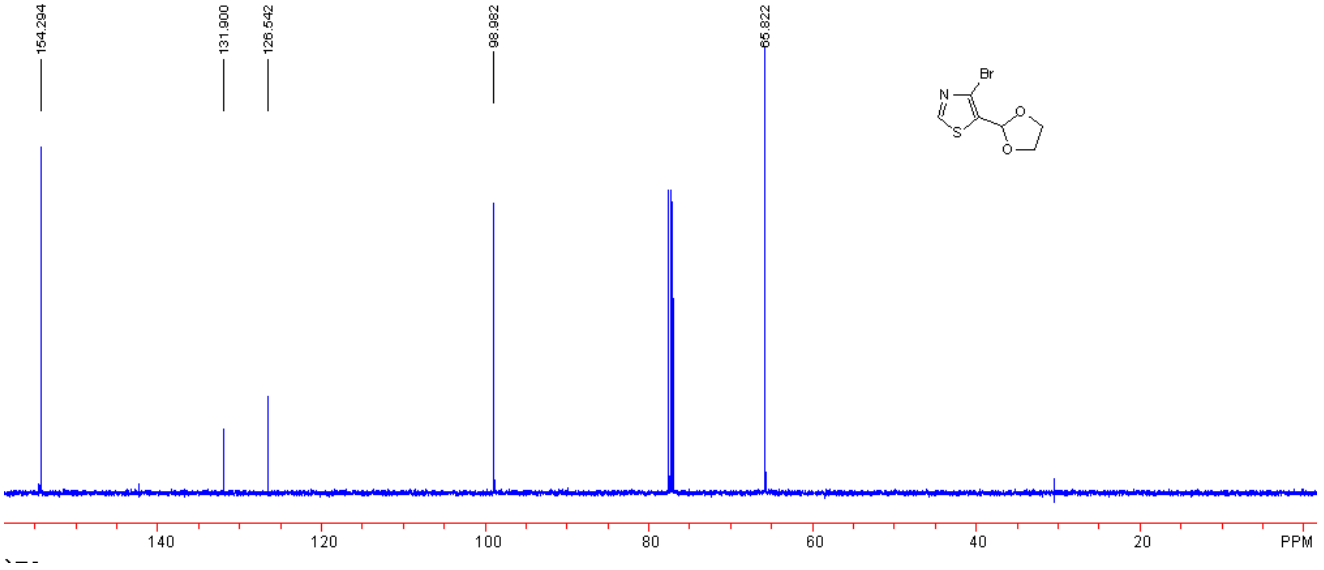
RT = 7.668 min

Figure S2. Compound 3

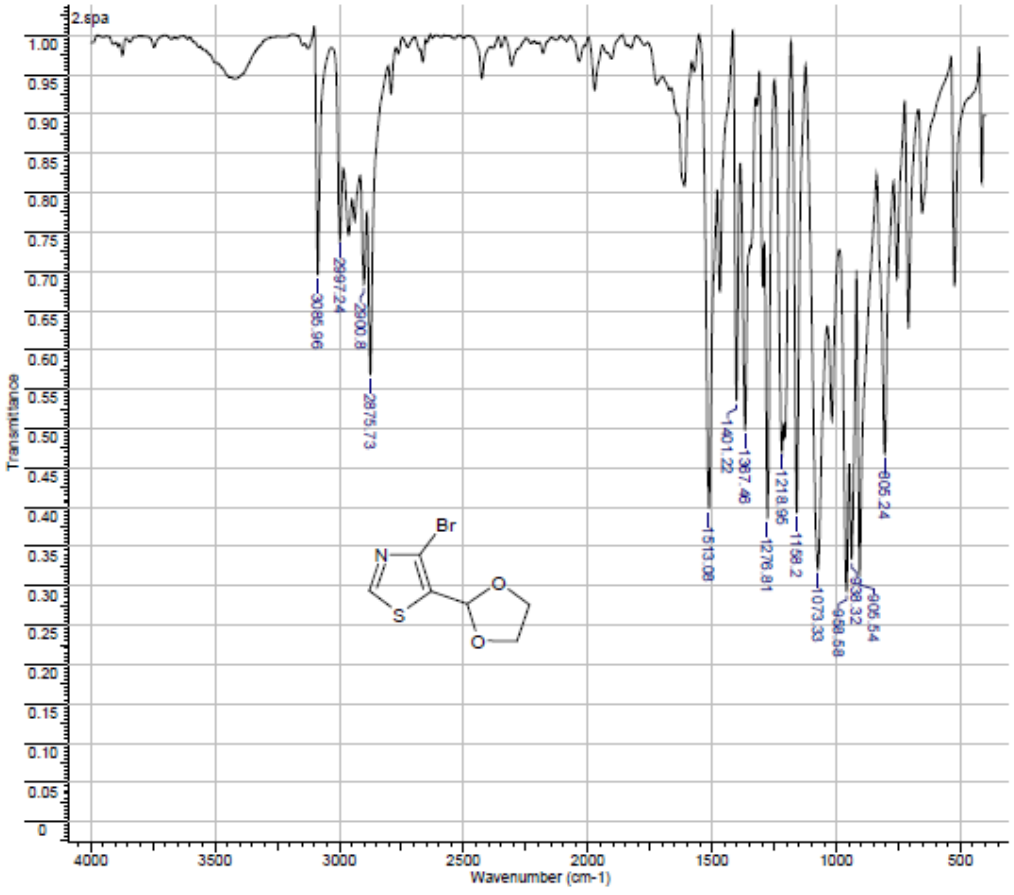
(A) ^{1}H-NMR spectrum ($CDCl_3$)



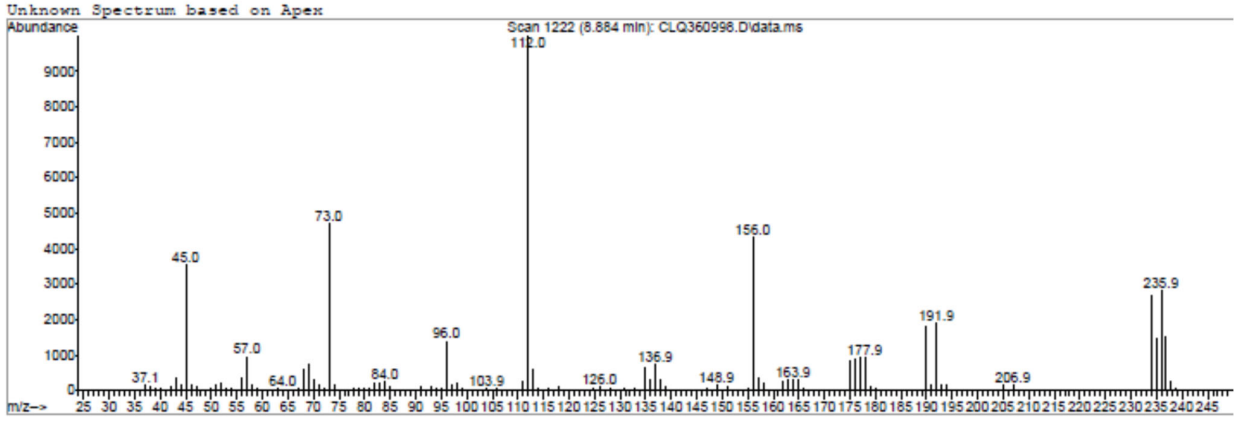
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



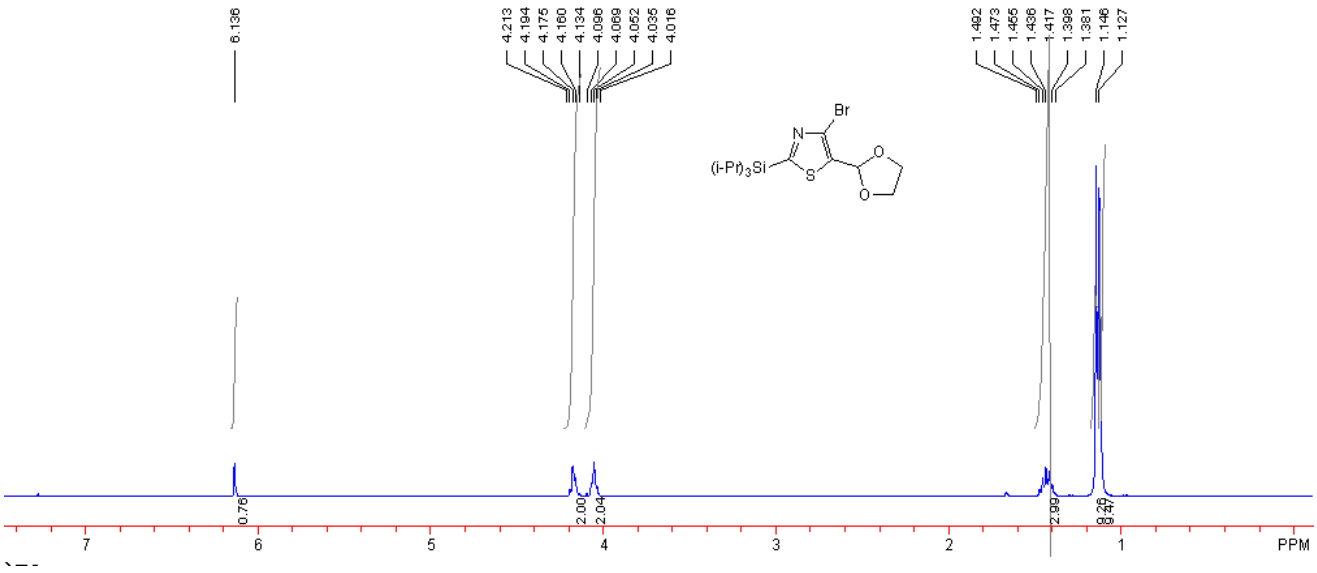
(D) GC/MS spectrum of compound **3**



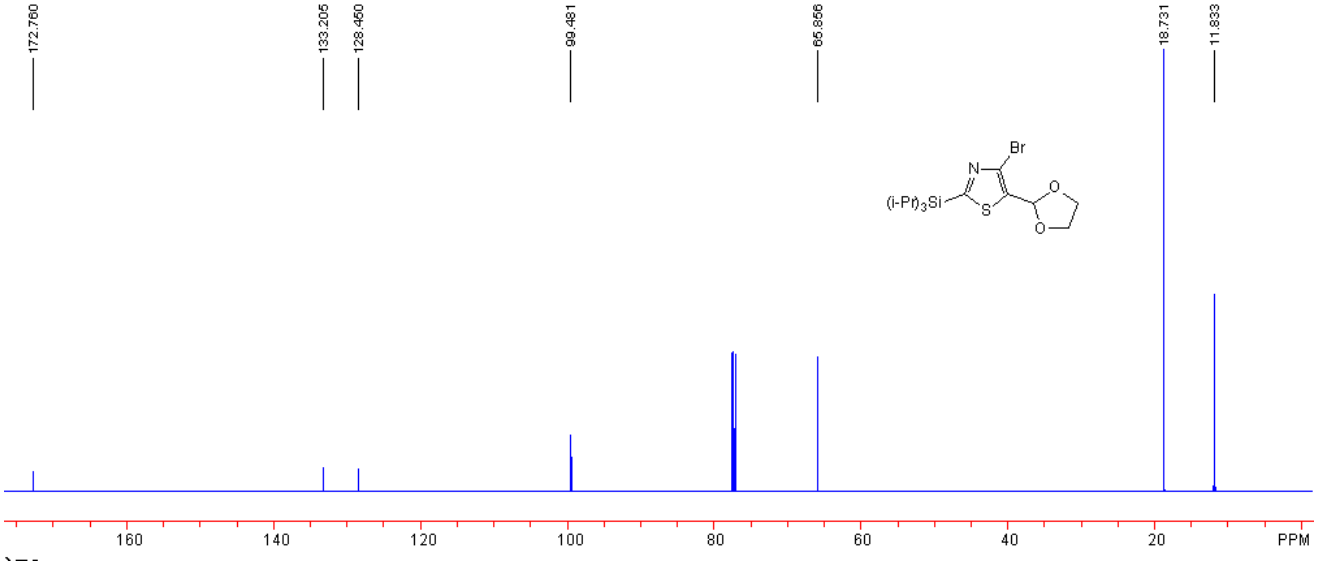
RT = 8.886 min

Figure S3. Compound 4

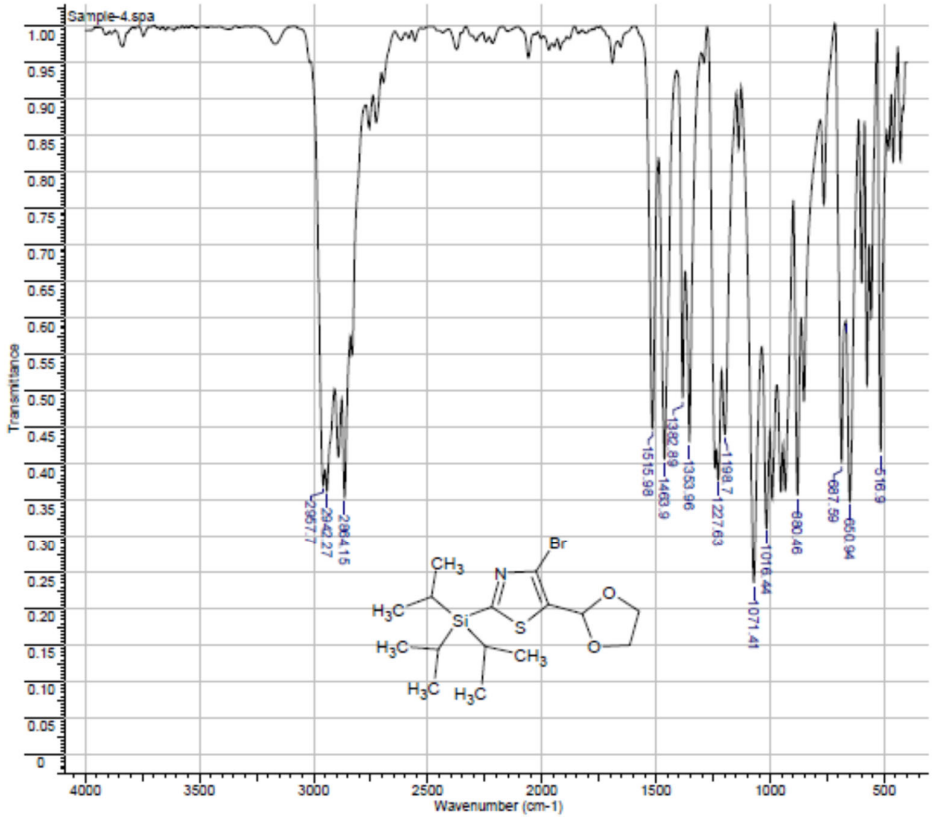
(A) ^{1}H-NMR spectrum ($CDCl_3$)



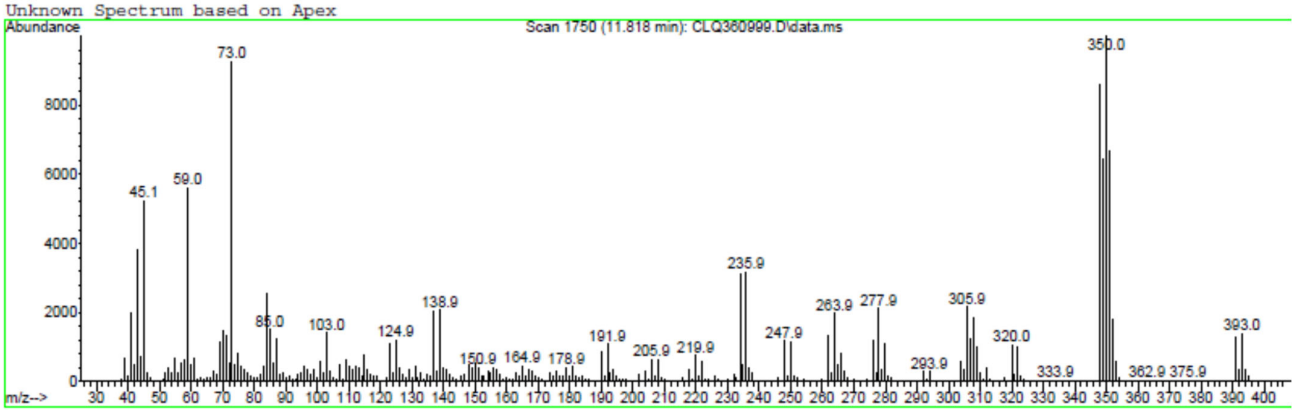
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



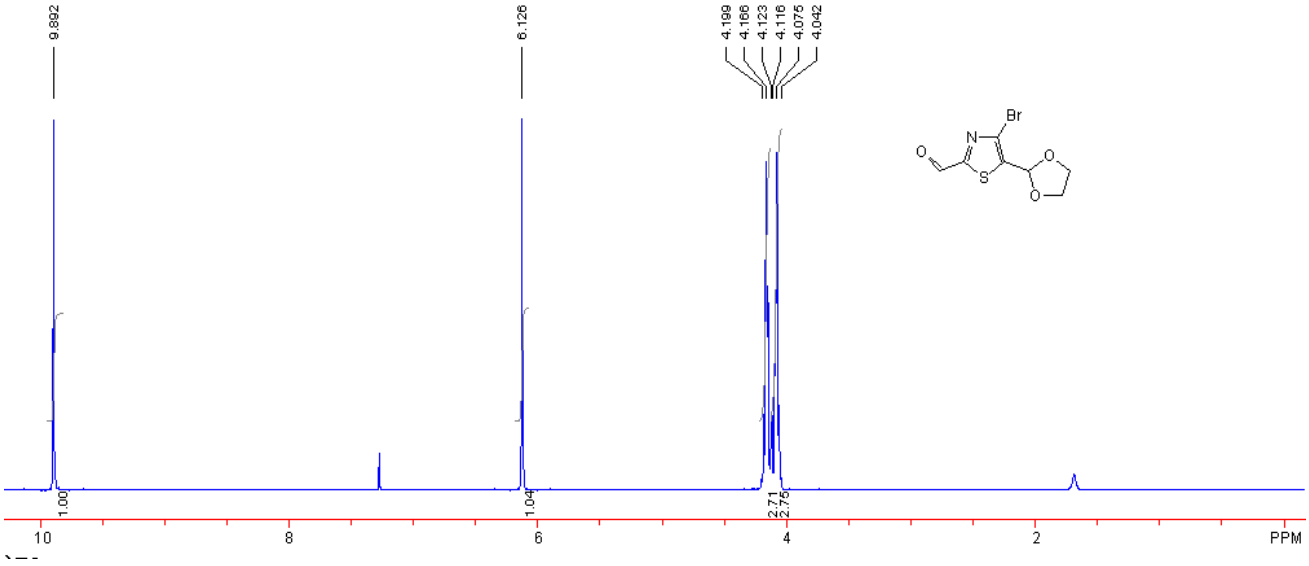
(D) GC/MS spectrum of compound **4**



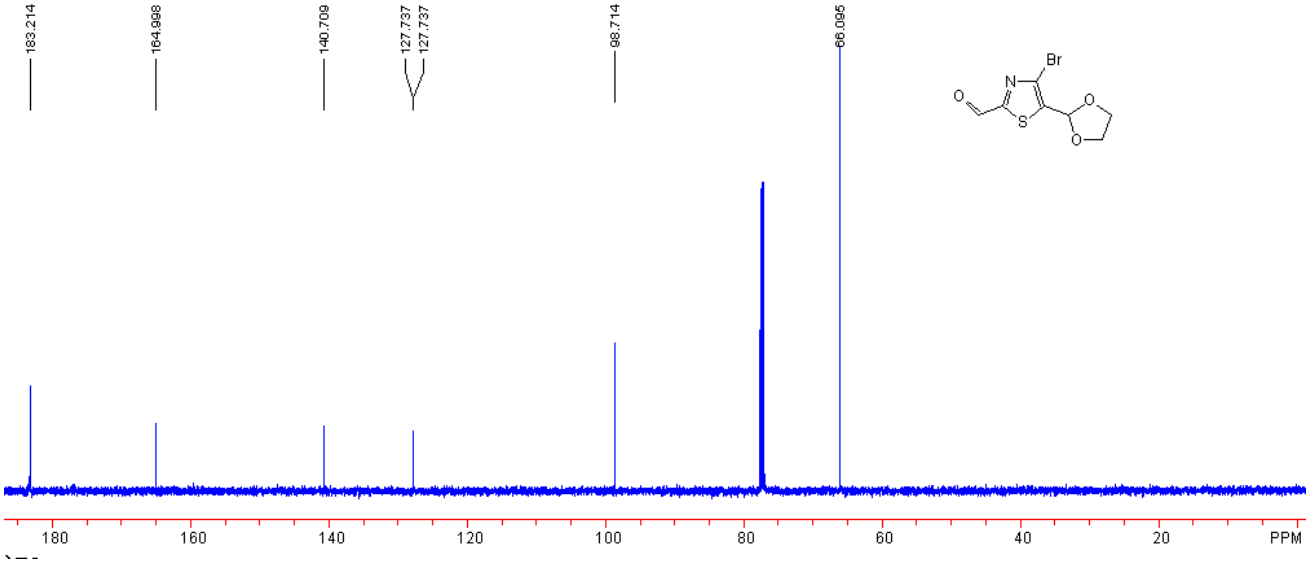
RT = 11.819 min

Figure S4. Compound 5

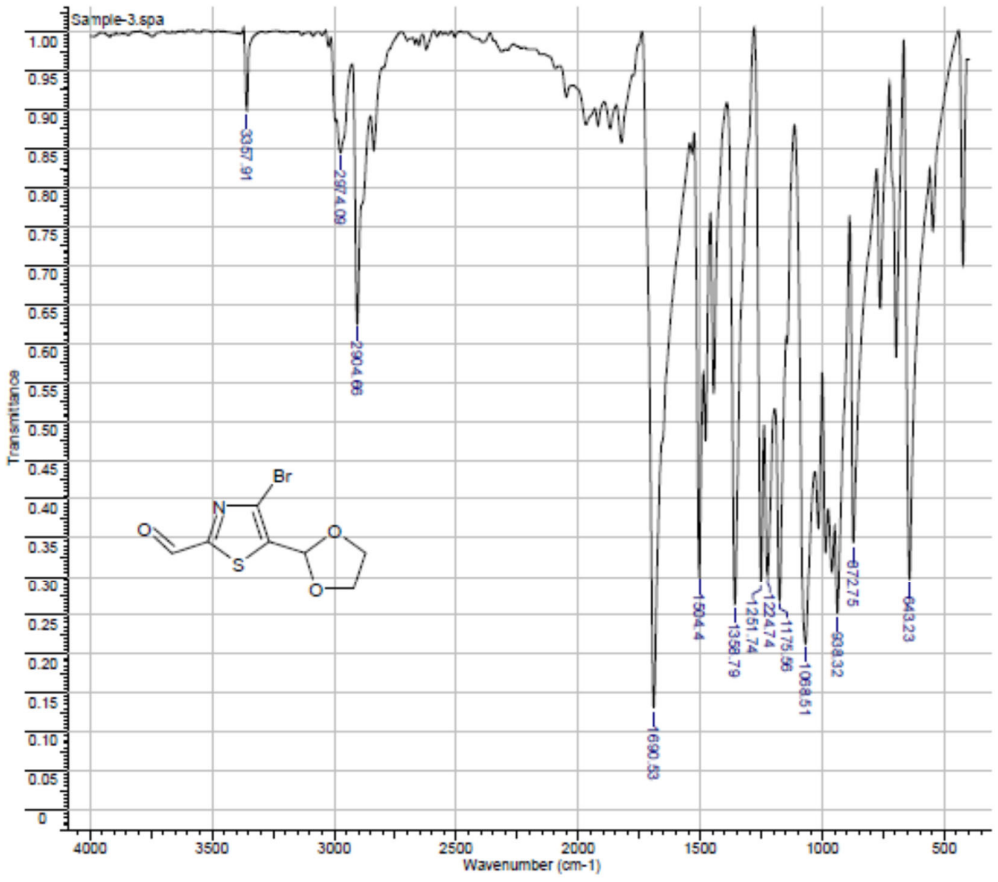
(A) ^{1}H-NMR spectrum ($CDCl_3$)



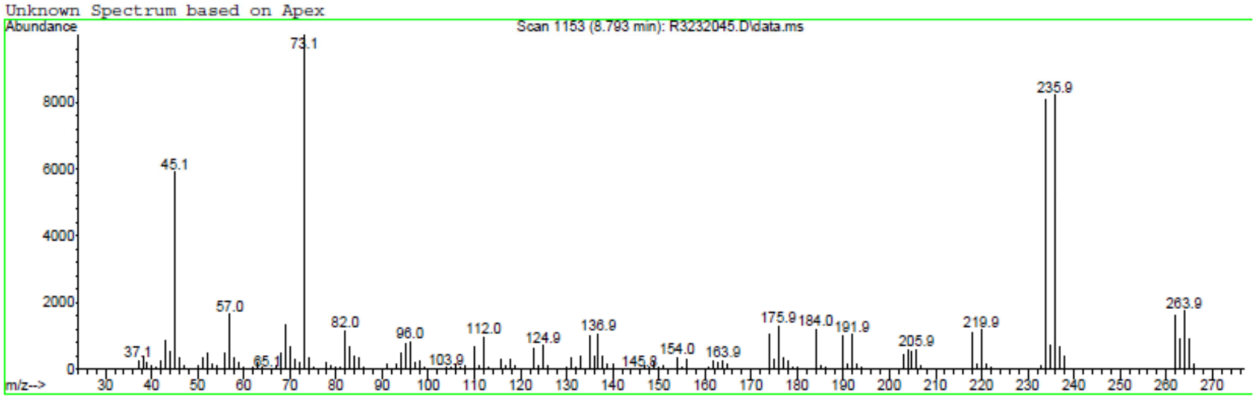
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



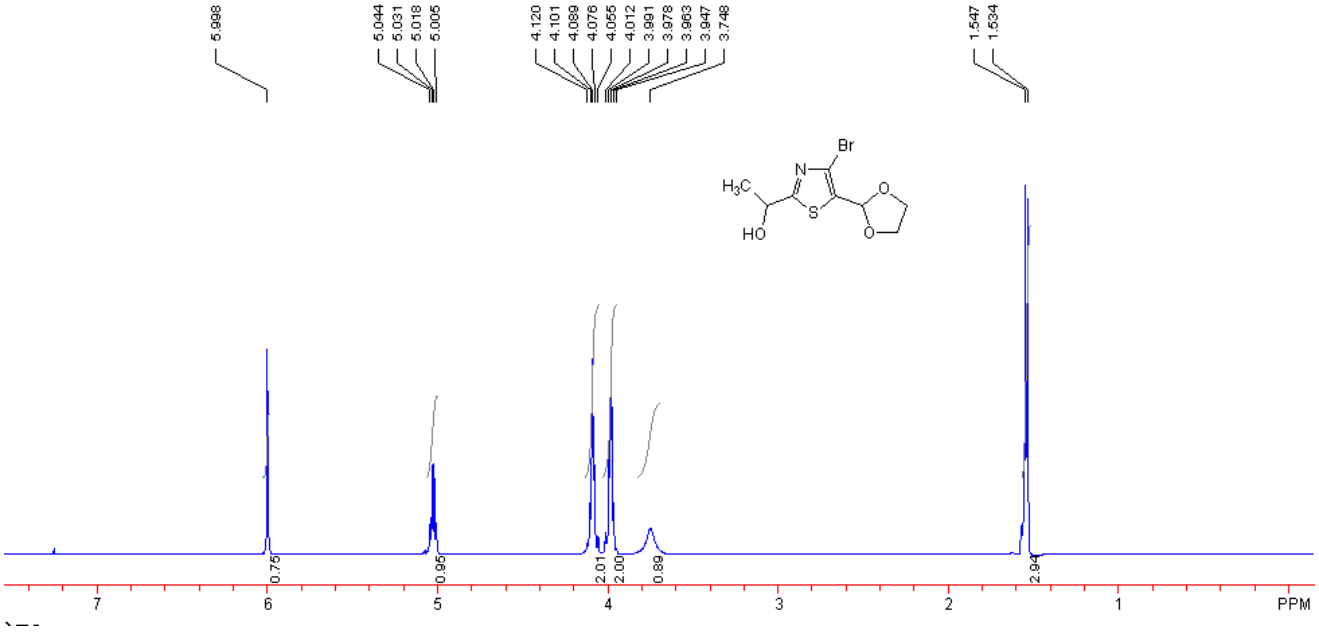
(D) GC/MS spectrum of compound **5**



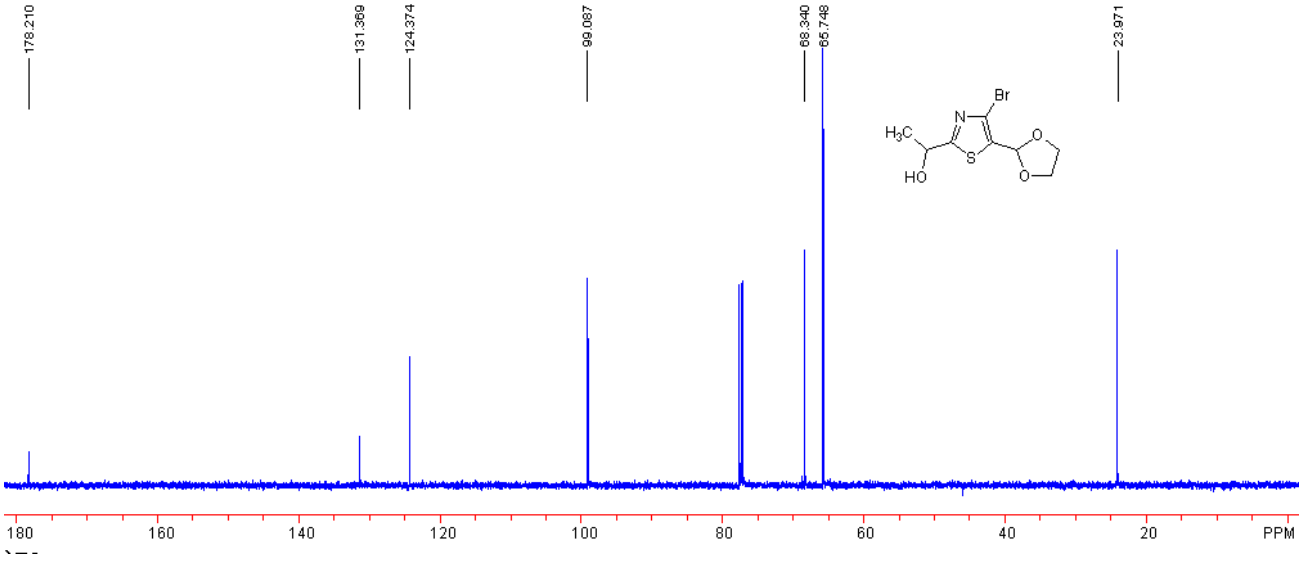
RT = 8.796 min

Figure S5. Compound 6

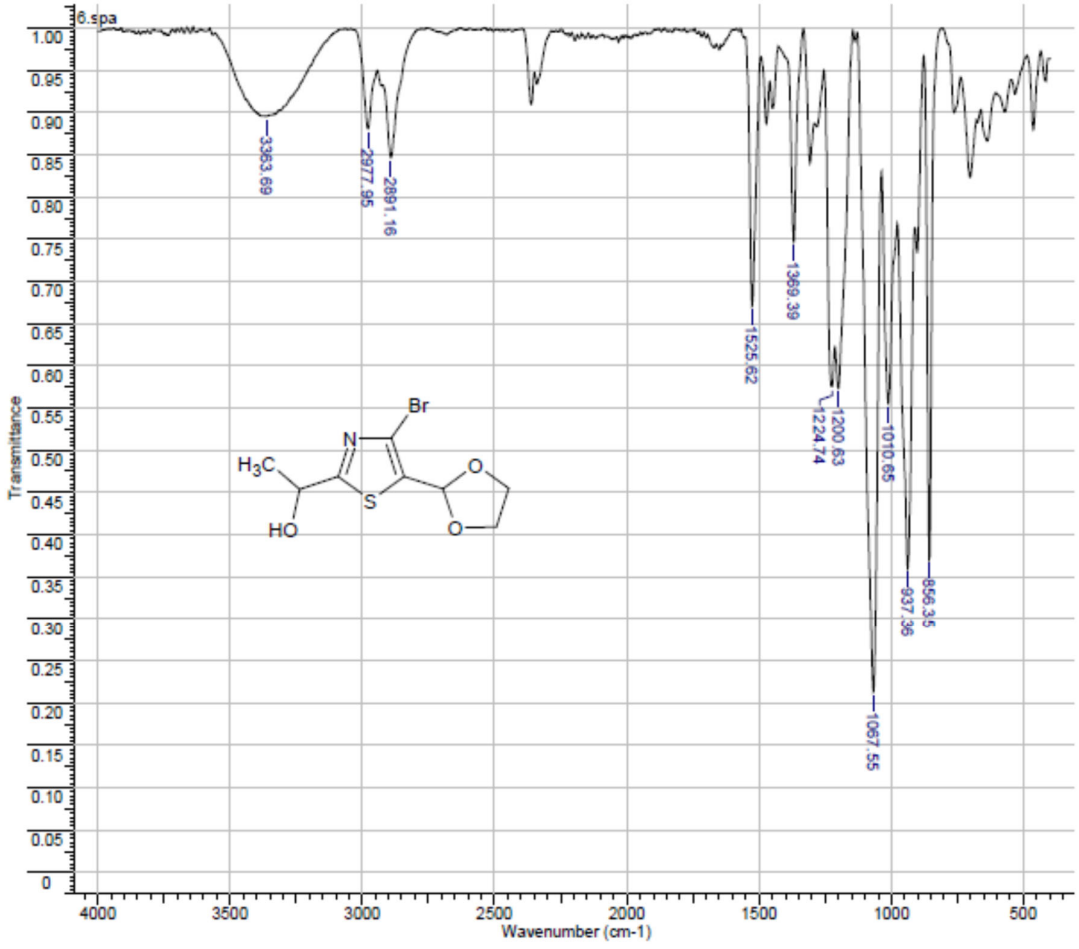
(A) ^{1}H-NMR spectrum ($CDCl_3$)



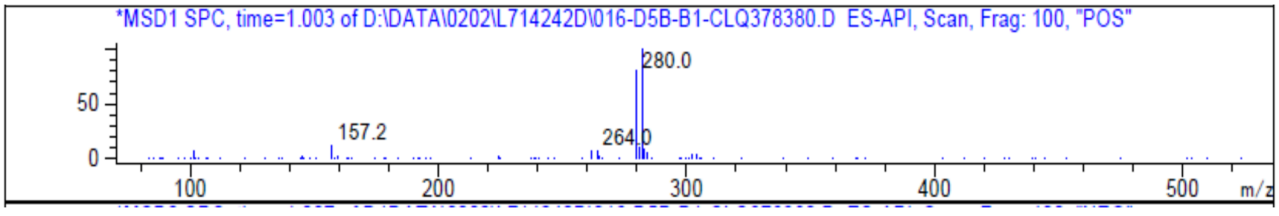
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) ATR-IR spectrum



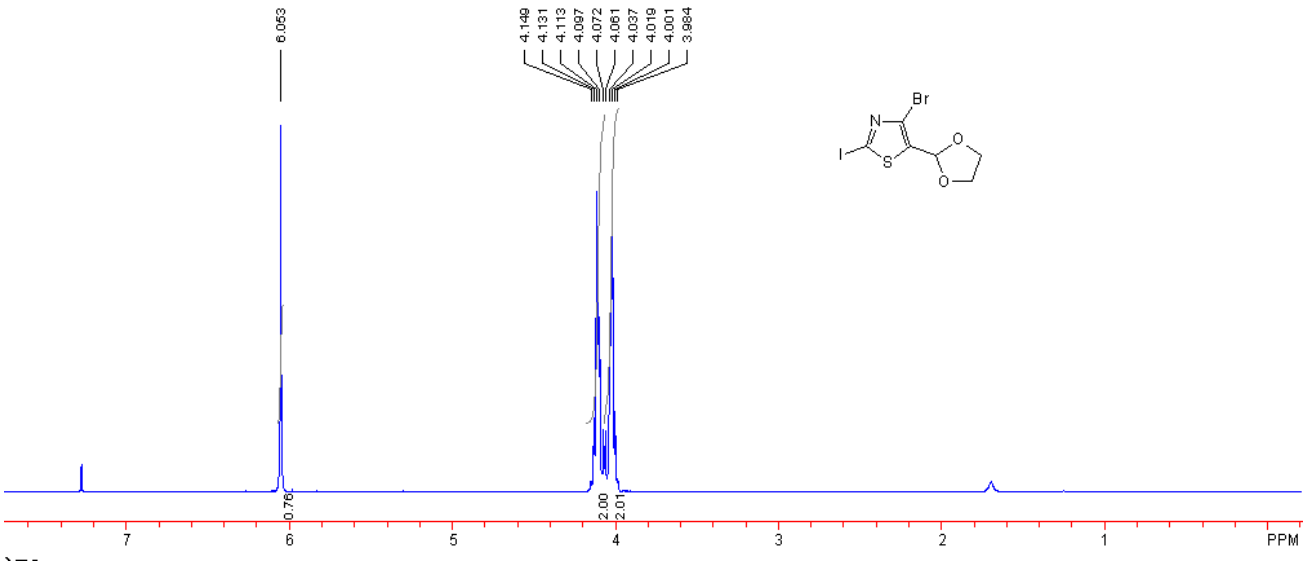
(D) LC/MS spectrum of compound **6**



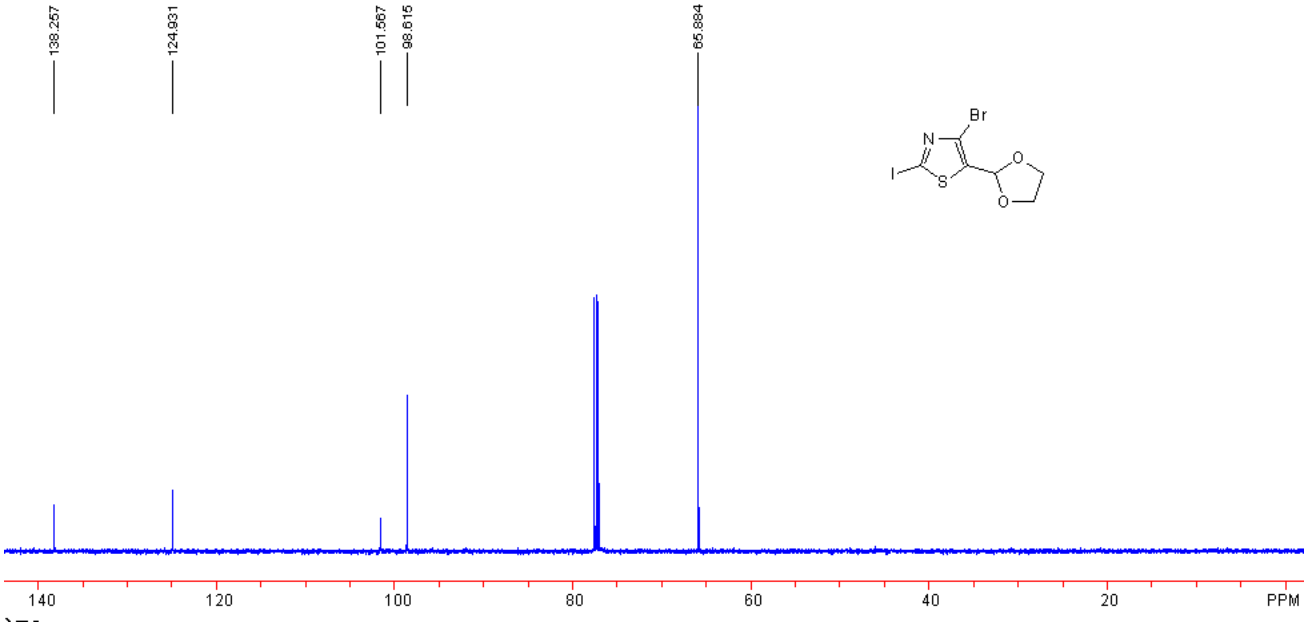
RT = 1.005 min

Figure S6. Compound 7

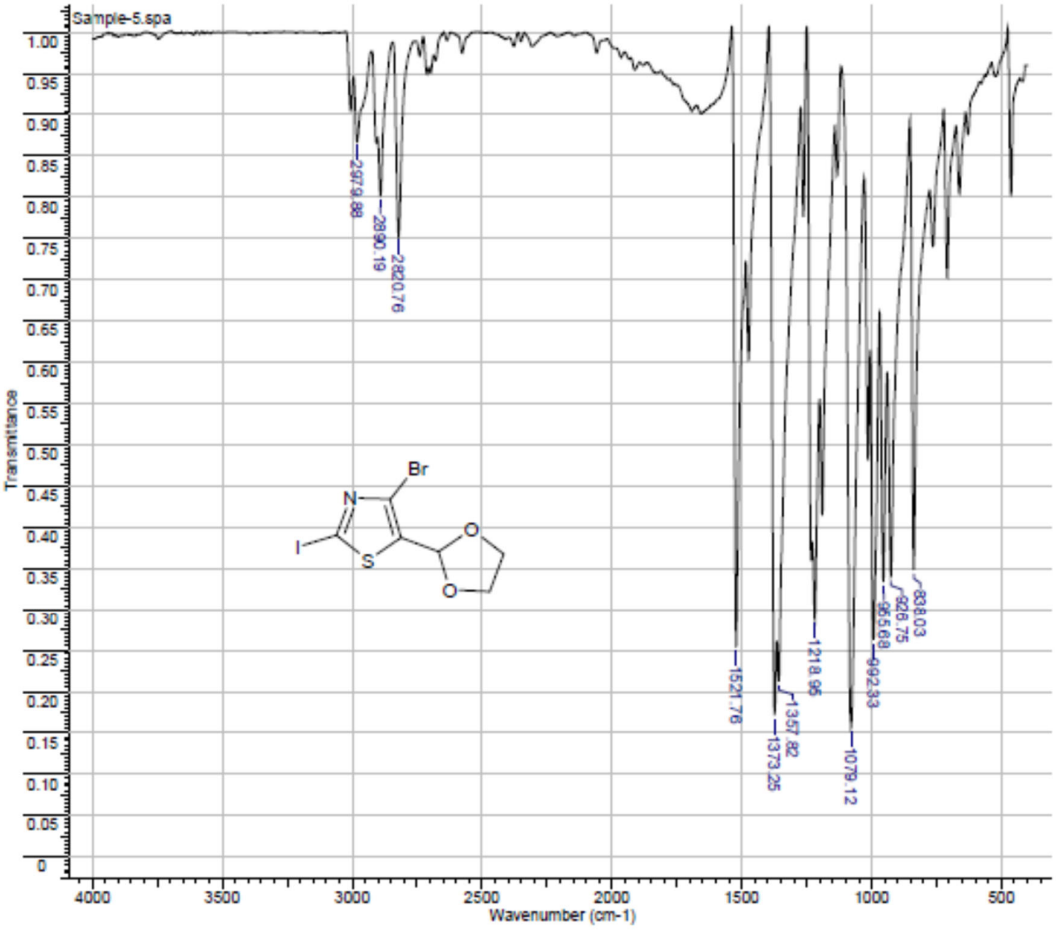
(A) ^{1}H-NMR spectrum ($CDCl_3$)



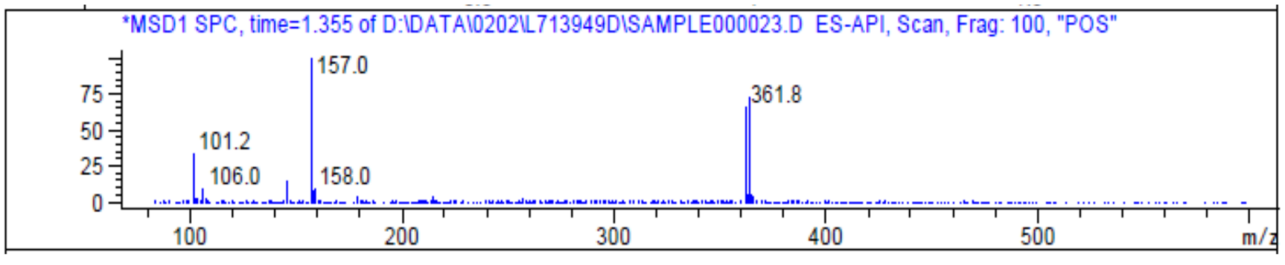
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



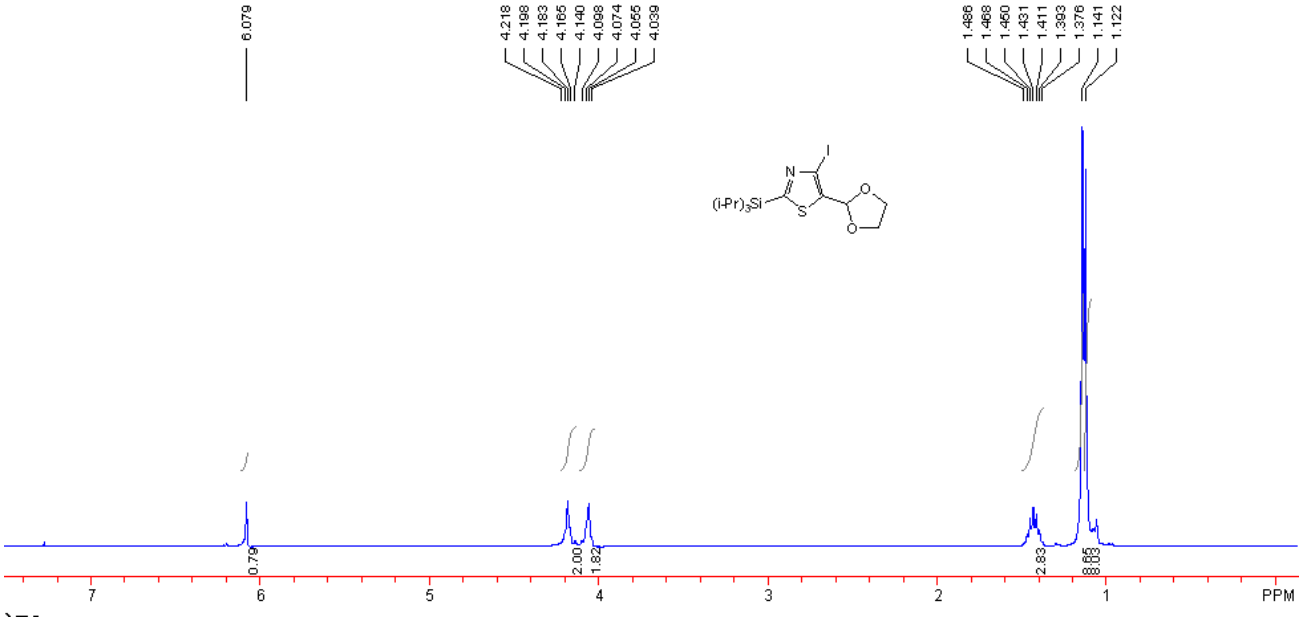
(D) LC/MS spectrum of compound **7**



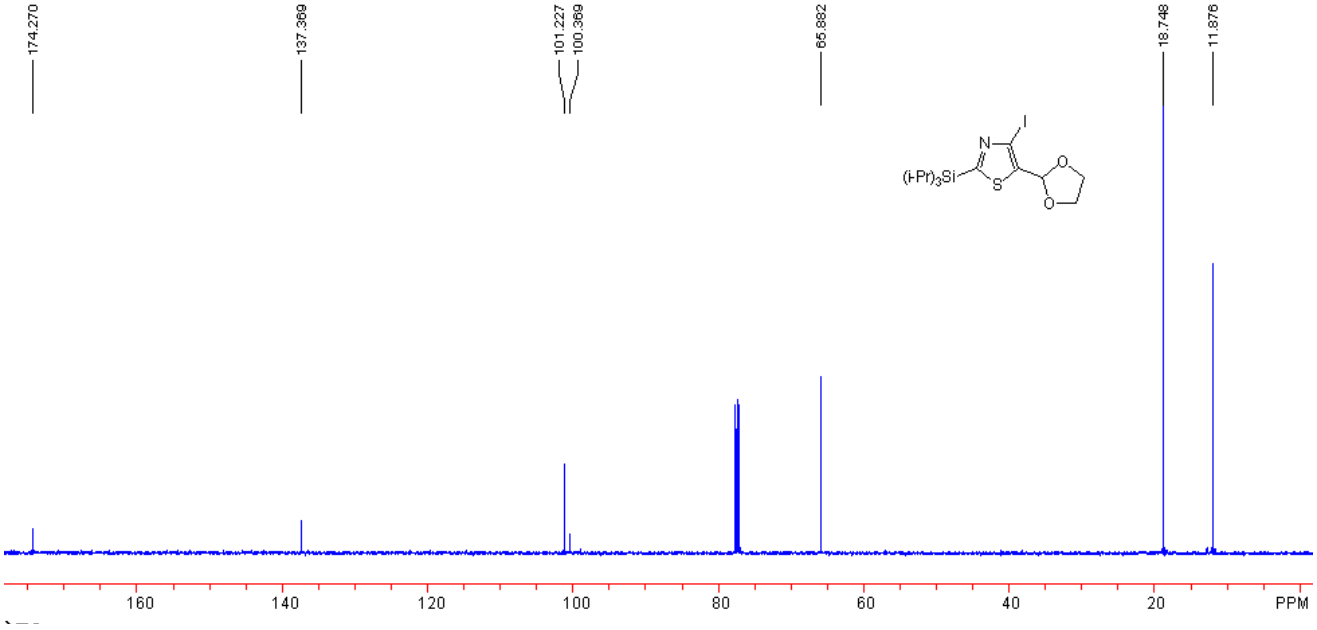
RT = 1.358 min

Figure S7. Compound 8

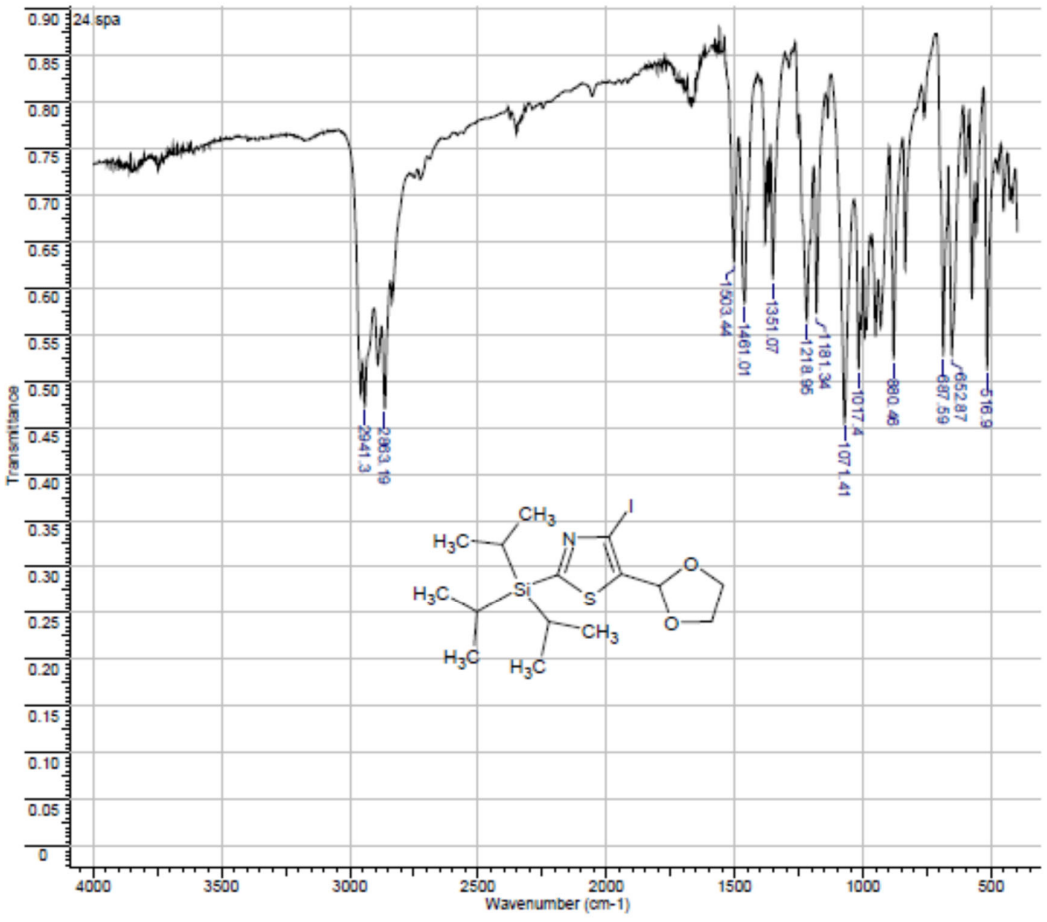
(A) ^{1}H-NMR spectrum ($CDCl_3$)



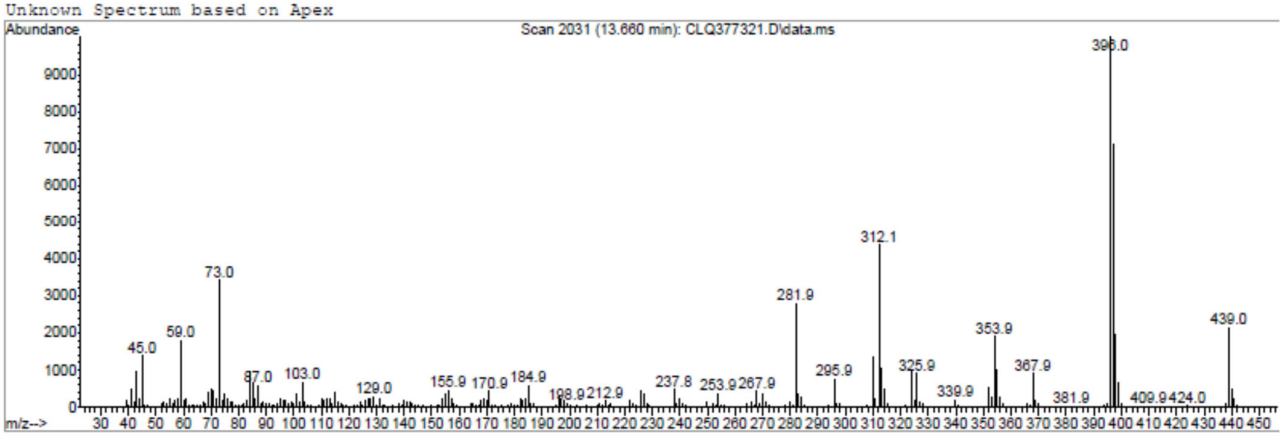
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



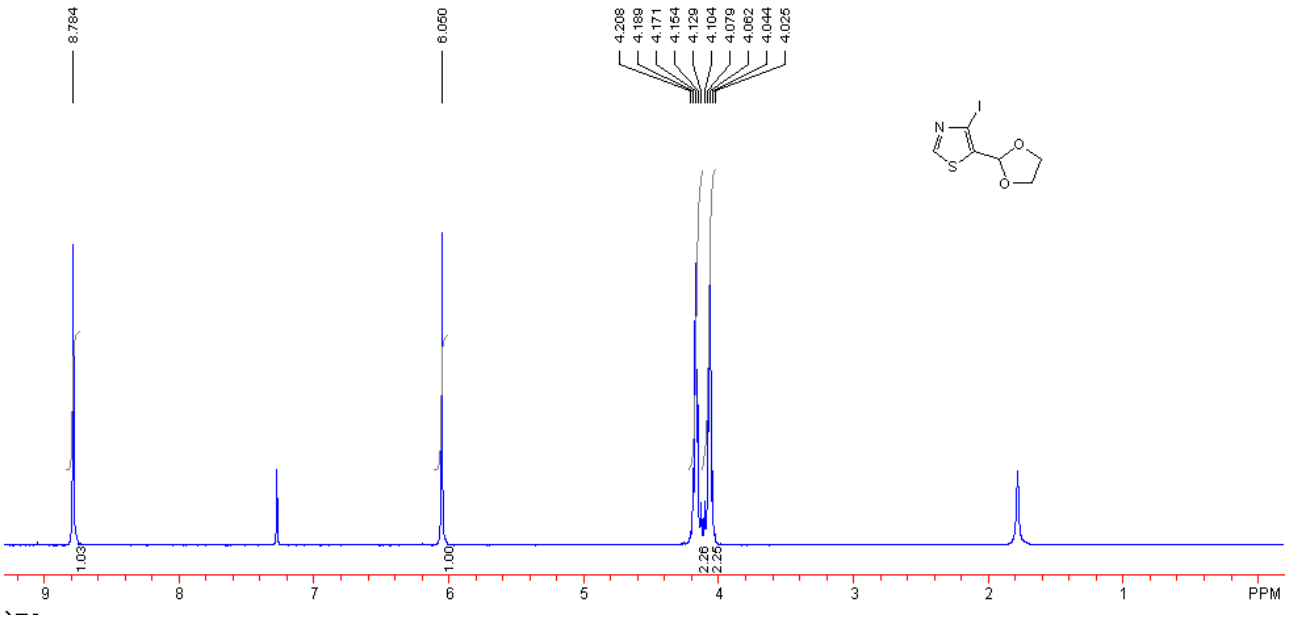
(D) GC/MS spectrum of compound **8**



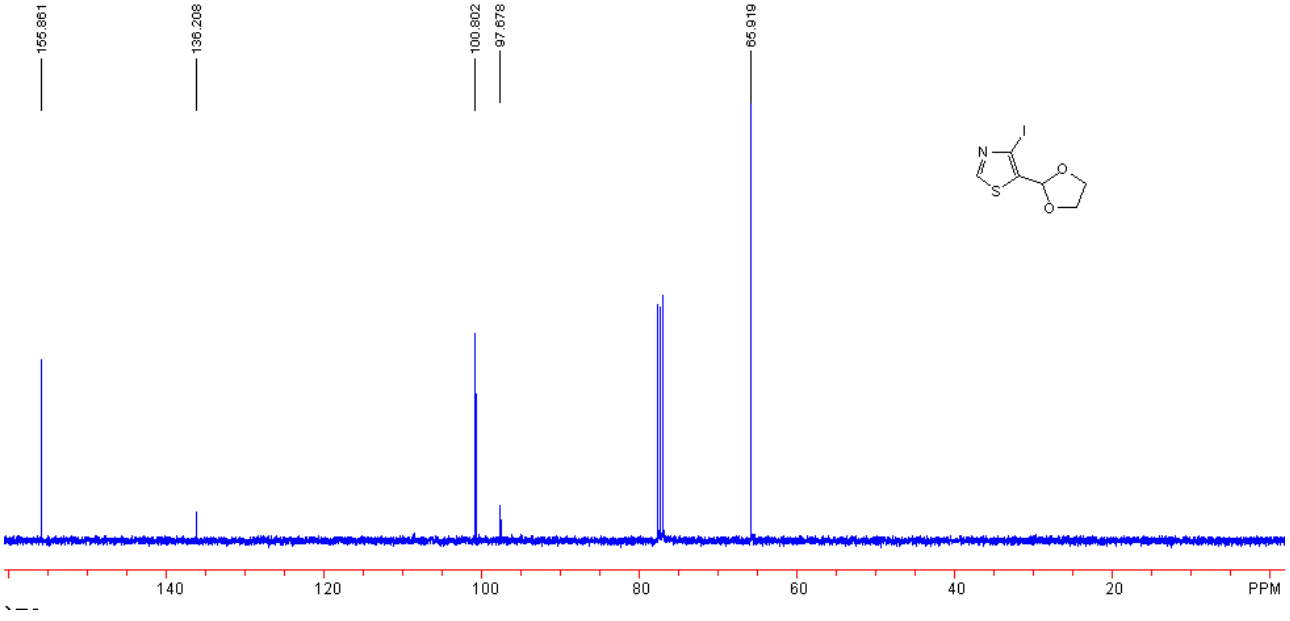
RT = 13.658 min

Figure S8. Compound 9

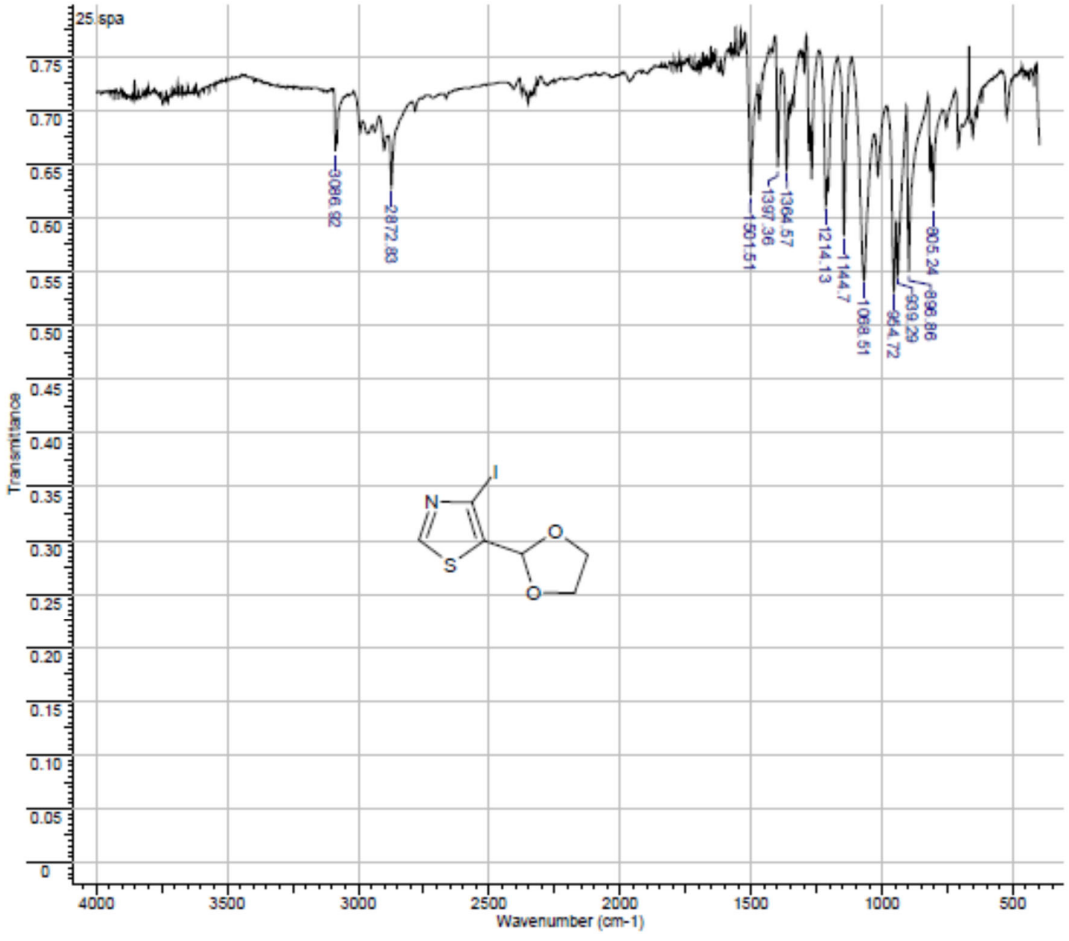
(A) ^{1}H-NMR spectrum ($CDCl_3$)



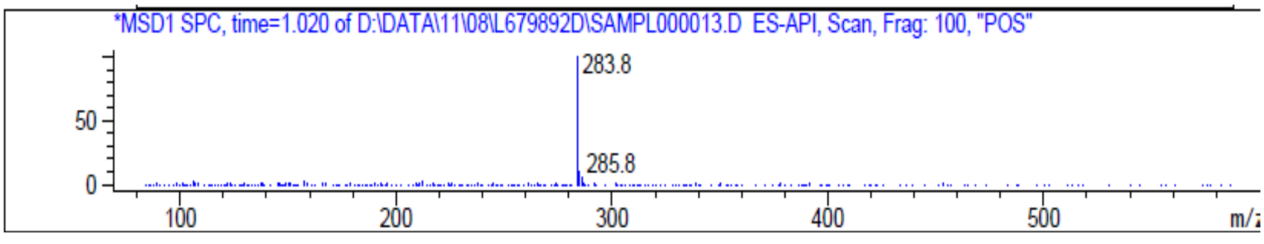
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



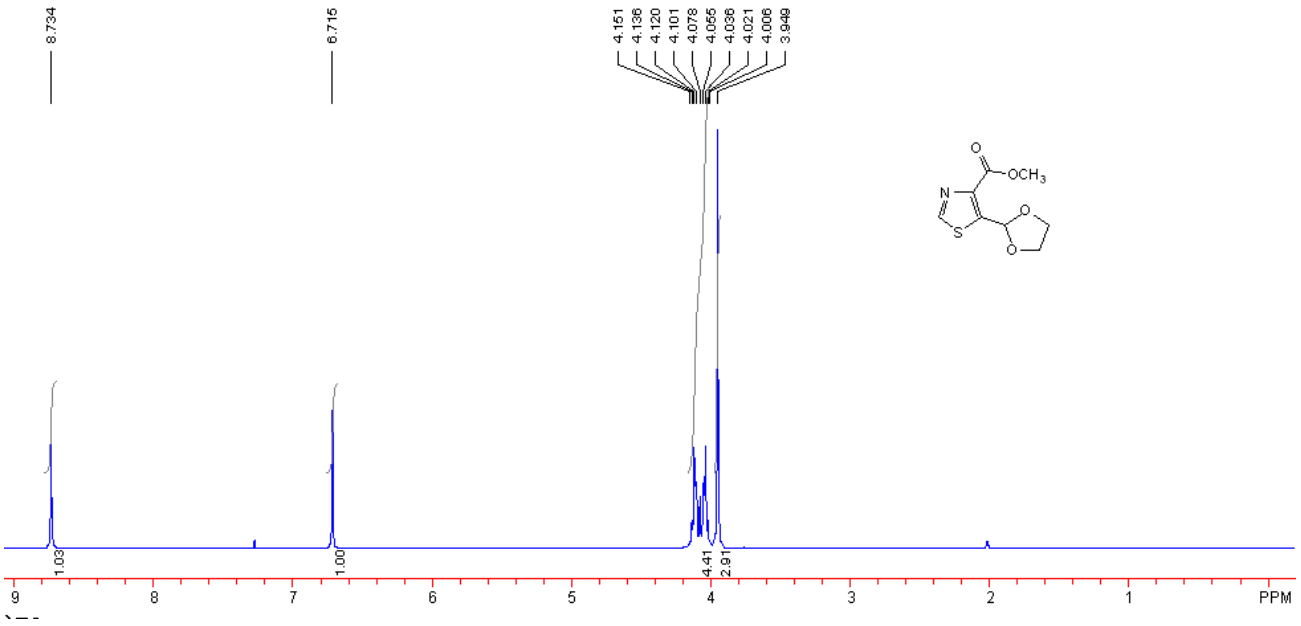
(D) LC/MS spectrum of compound **9**



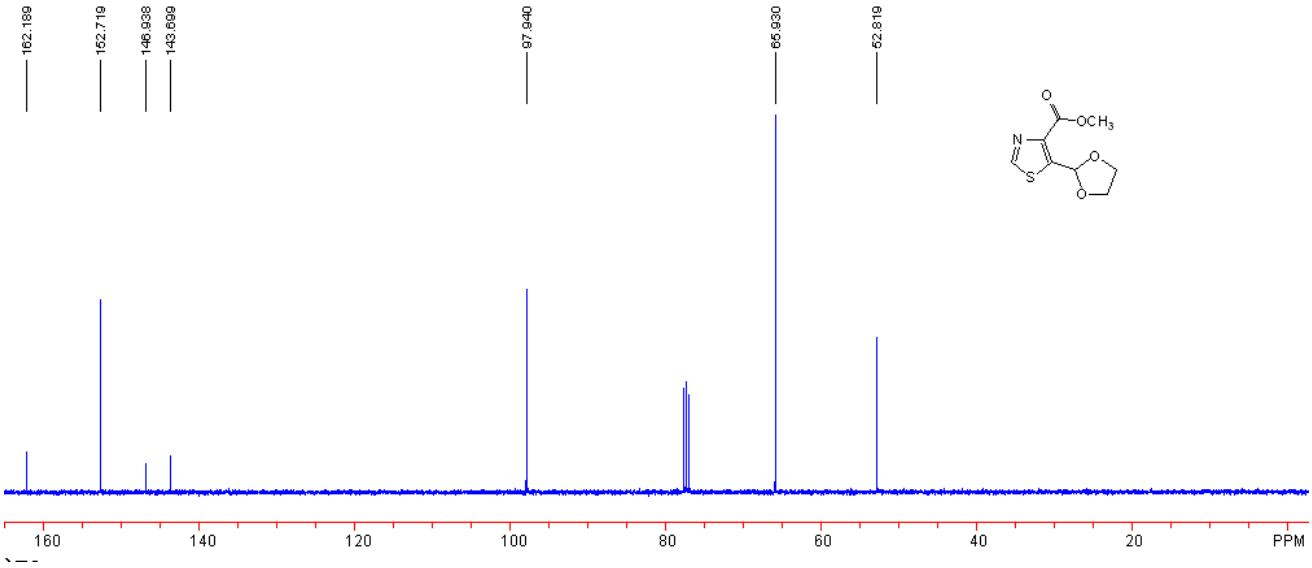
RT = 1.021 min

Figure S9. Compound 10

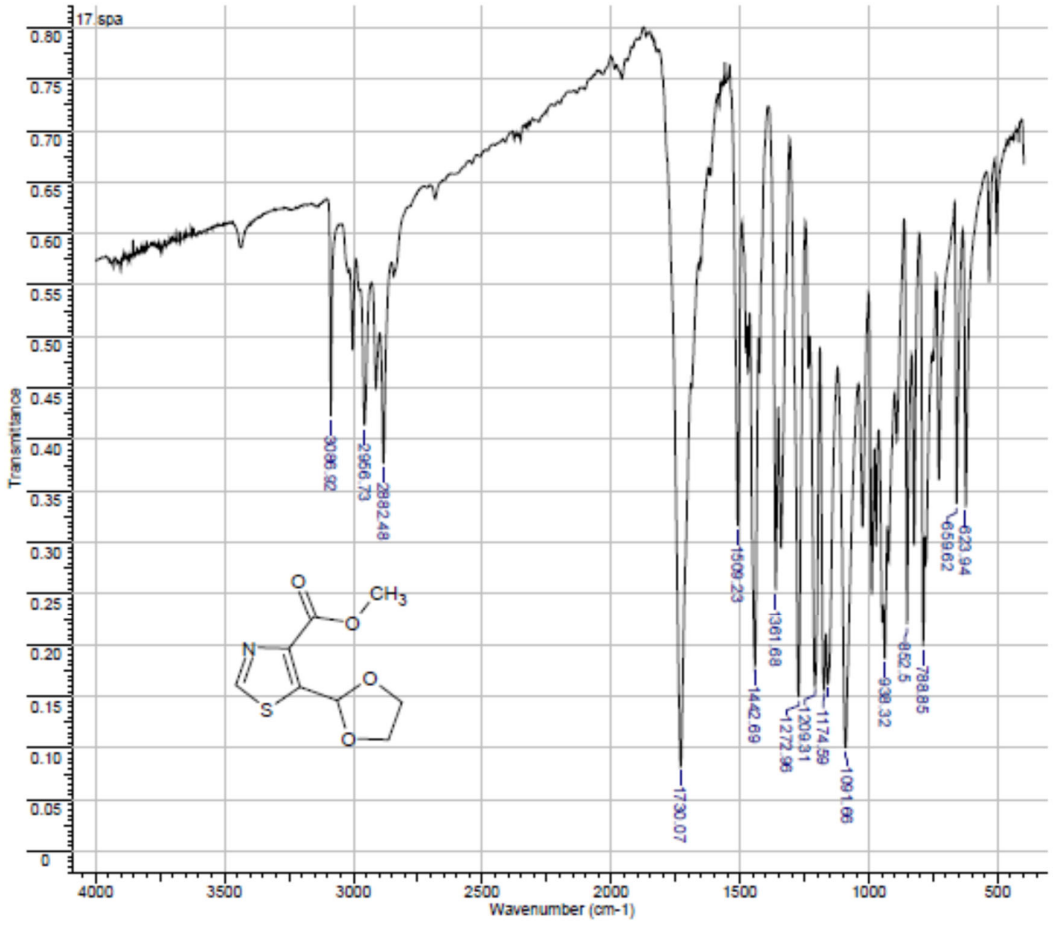
(A) ^{1}H-NMR spectrum ($CDCl_3$)



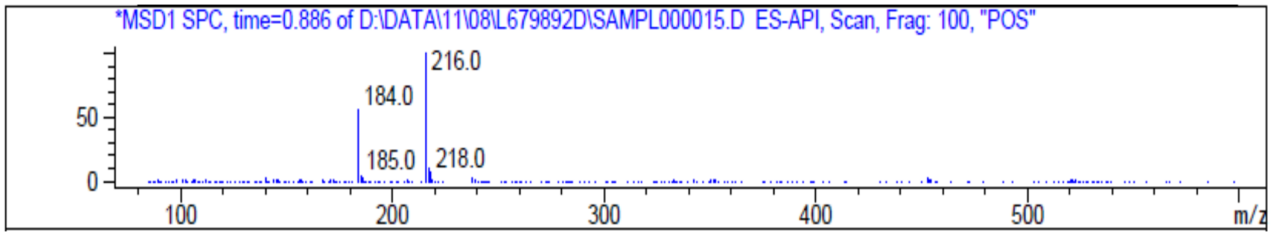
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



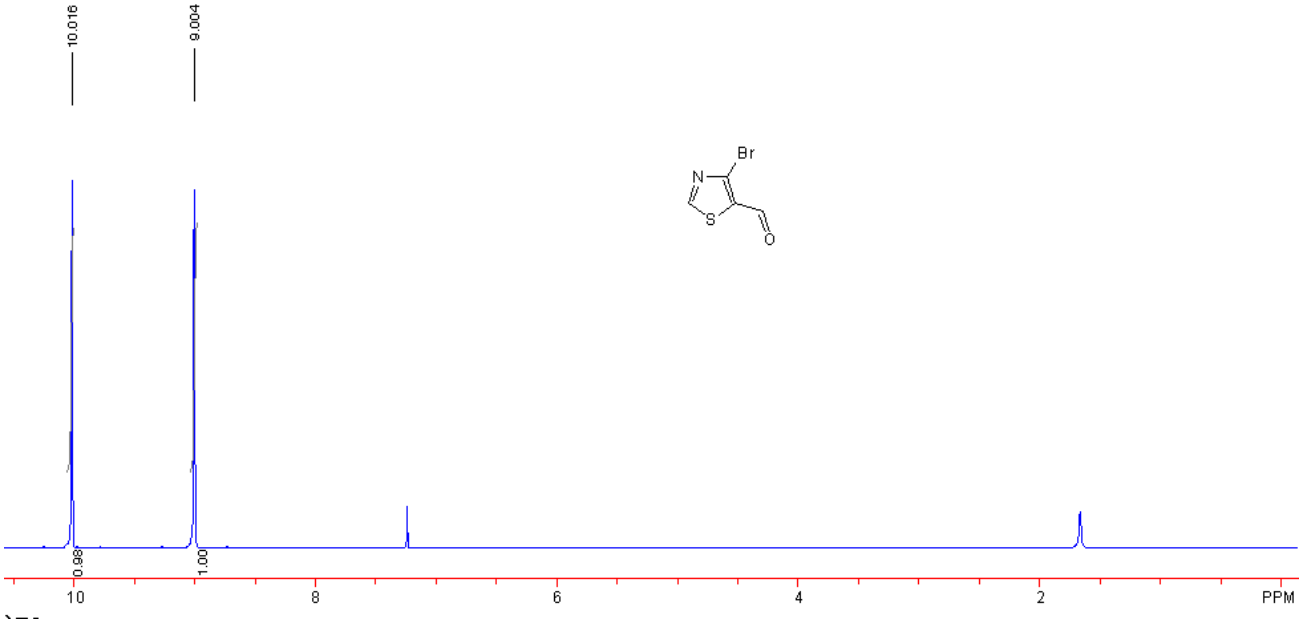
(D) LC/MS spectrum of compound **10**



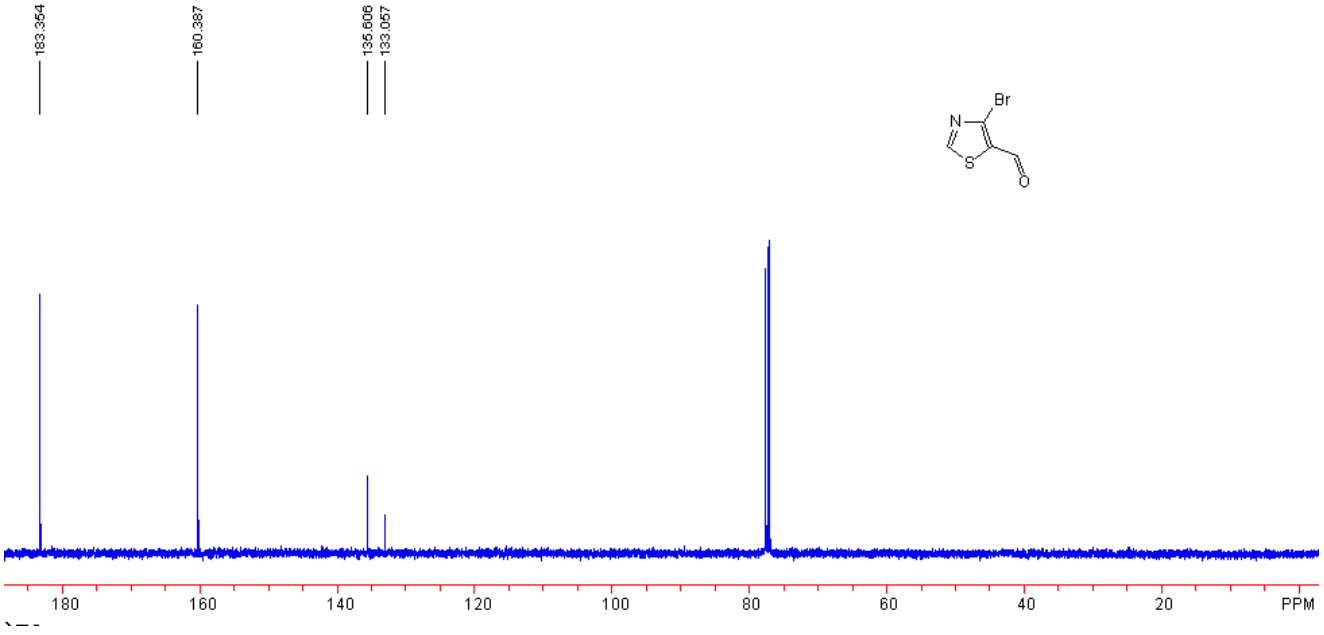
RT = 0.885 min

Figure S10. Compound 11

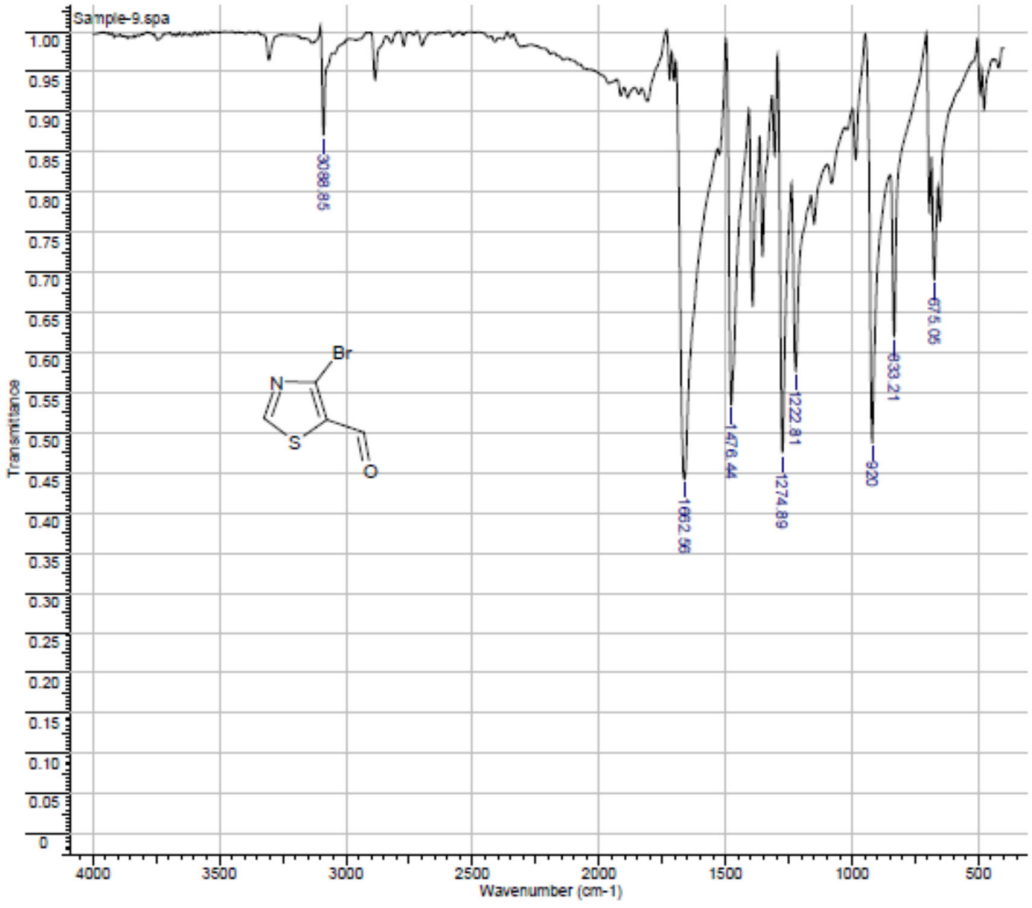
(A) ^{1}H-NMR spectrum ($CDCl_3$)



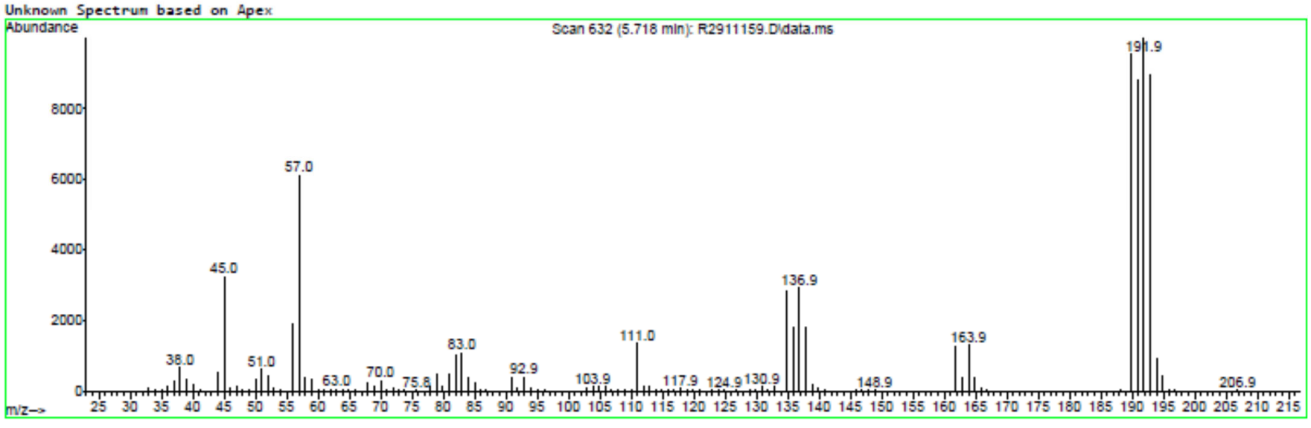
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



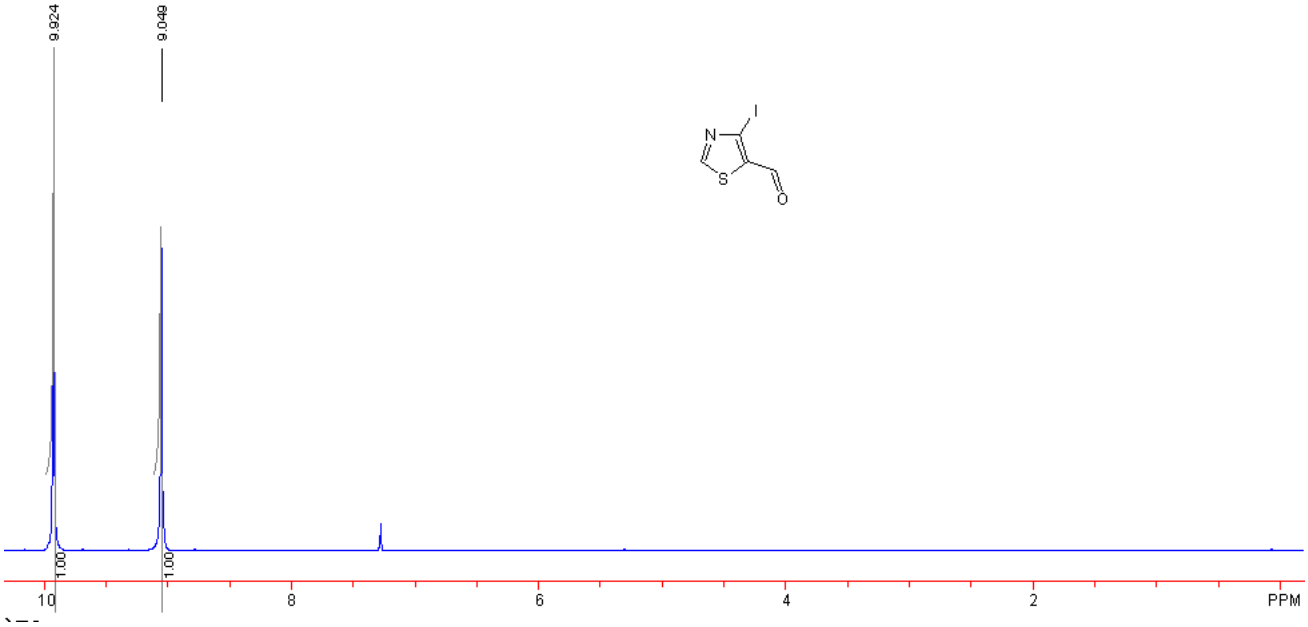
(D) GC/MS spectrum of compound **11**



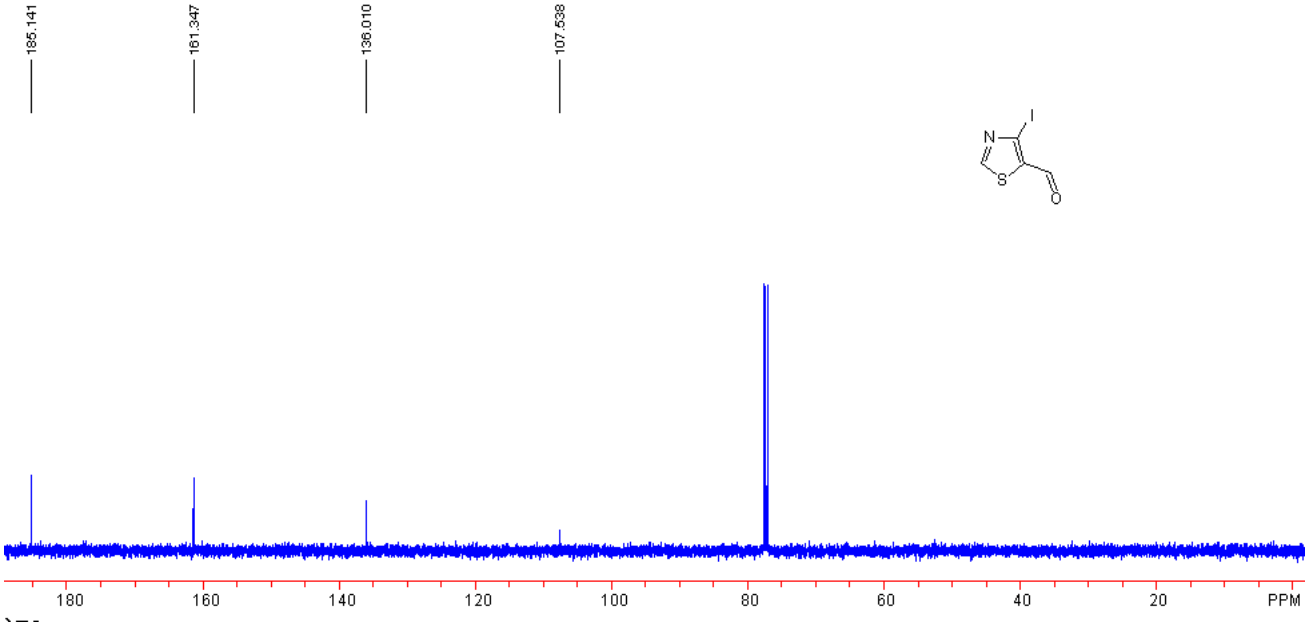
RT = 5.721 min

Figure S11. Compound 12

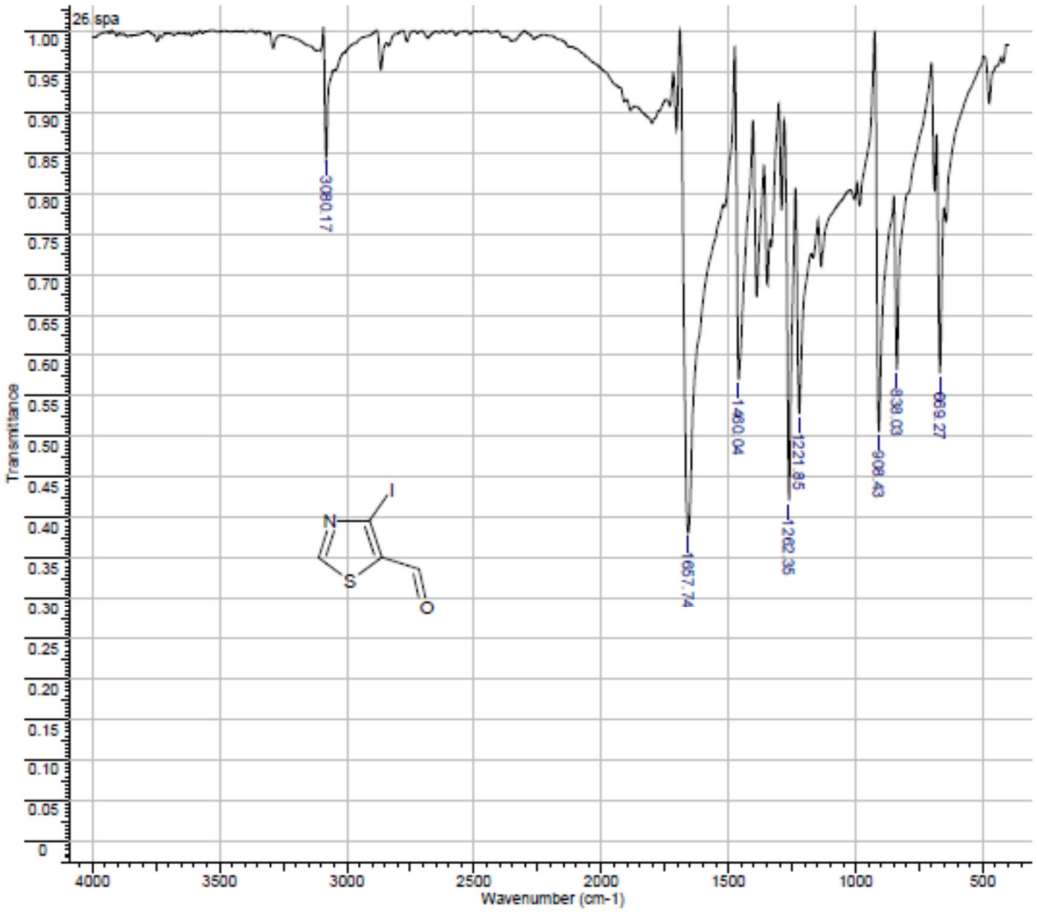
(A) ^{1}H-NMR spectrum ($CDCl_3$)



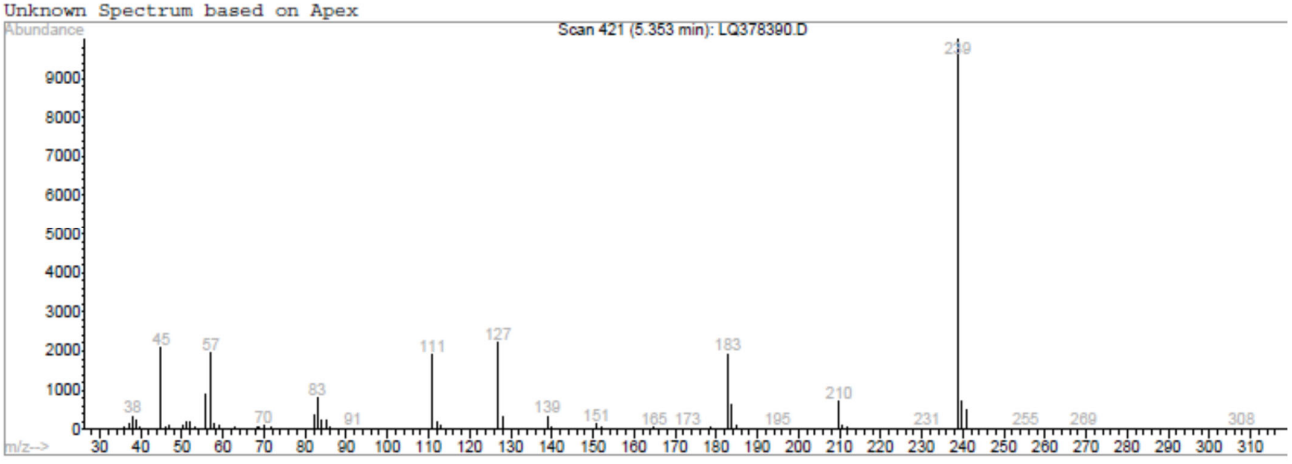
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



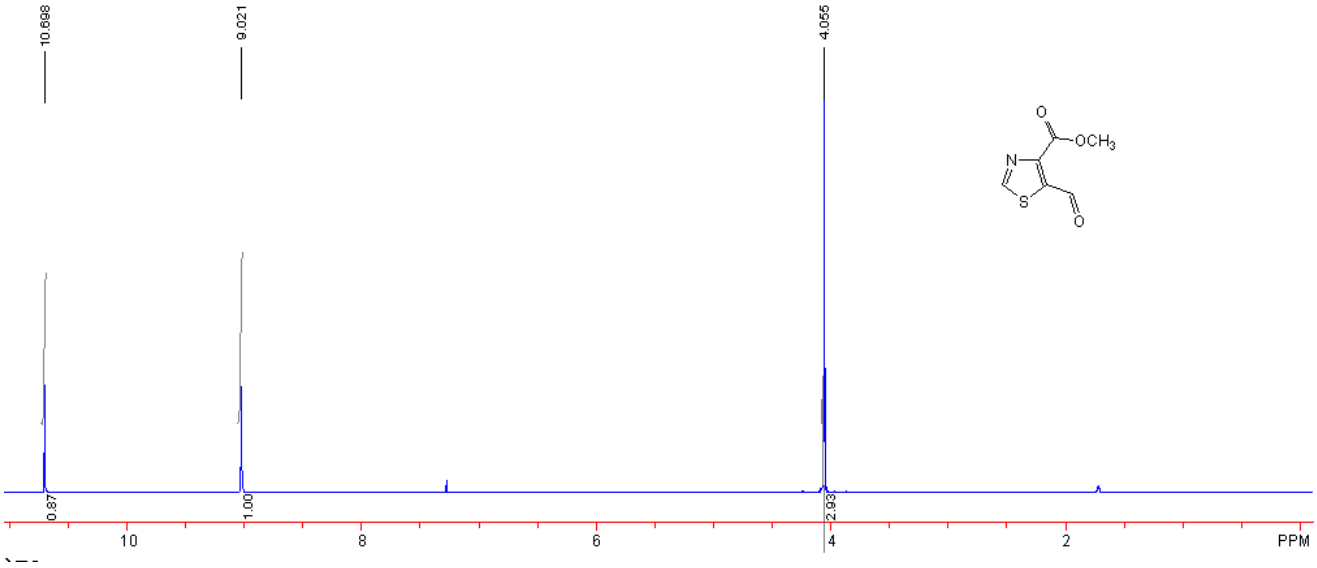
(D) GC/MS spectrum of compound **12**



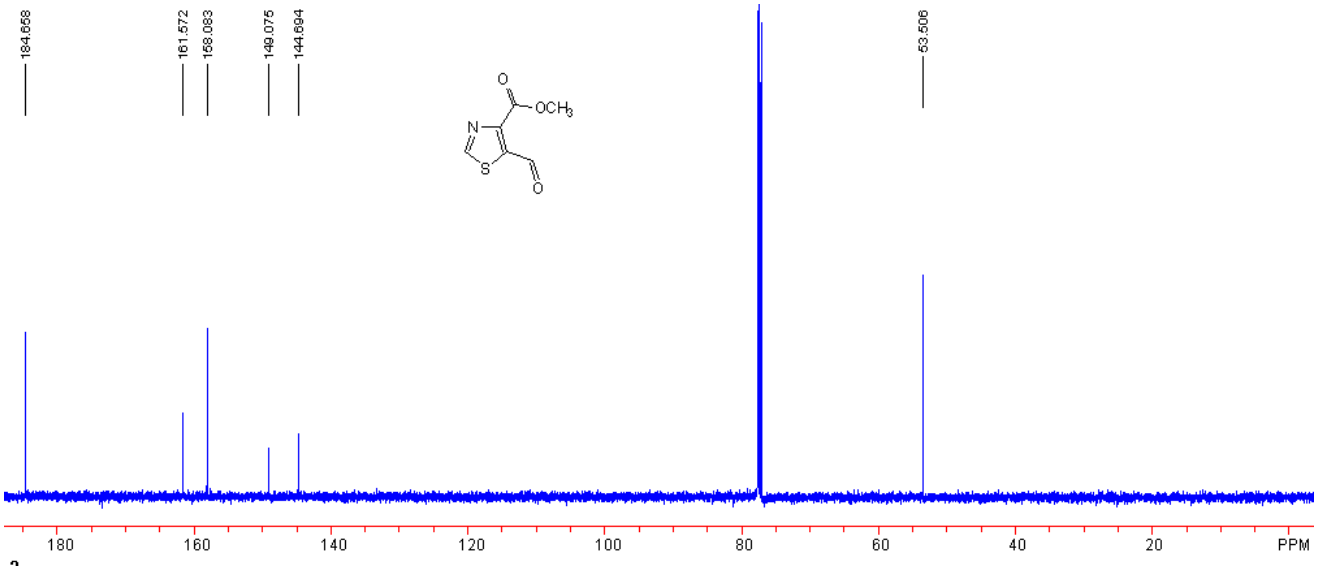
RT = 5.35 min

Figure S12. Compound 13

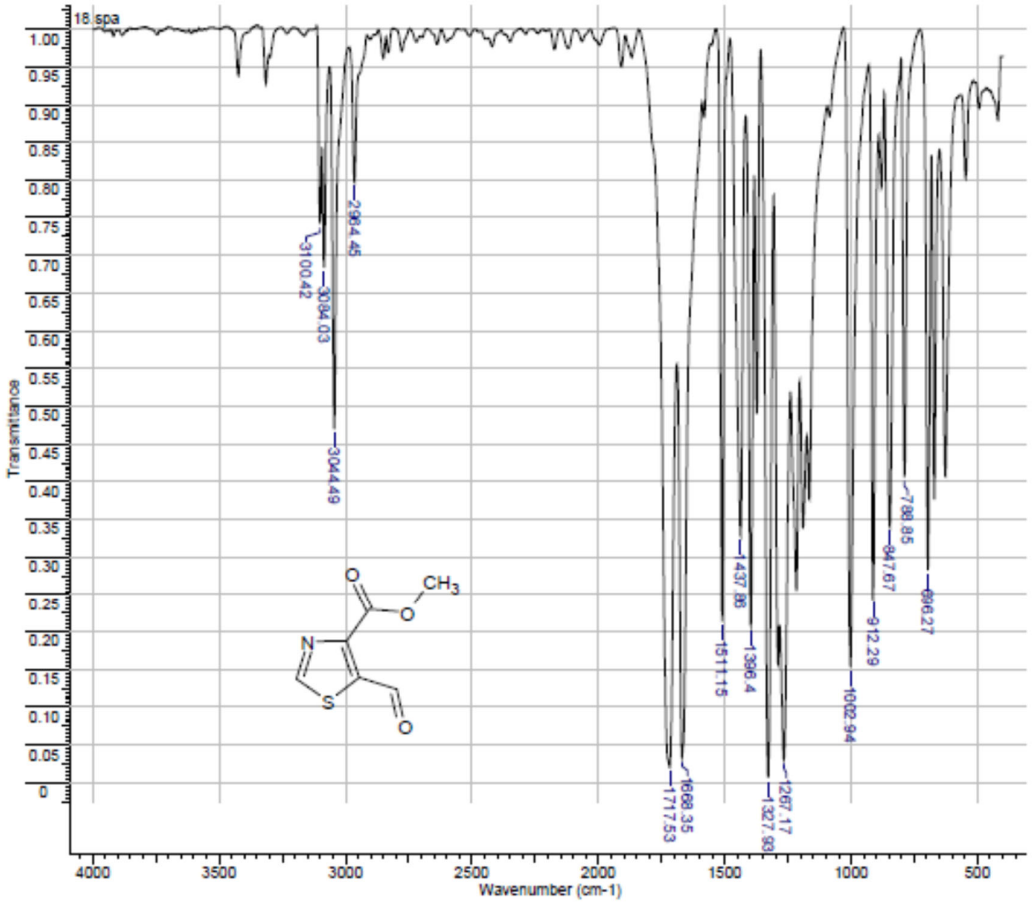
(A) ^{1}H-NMR spectrum ($CDCl_3$)



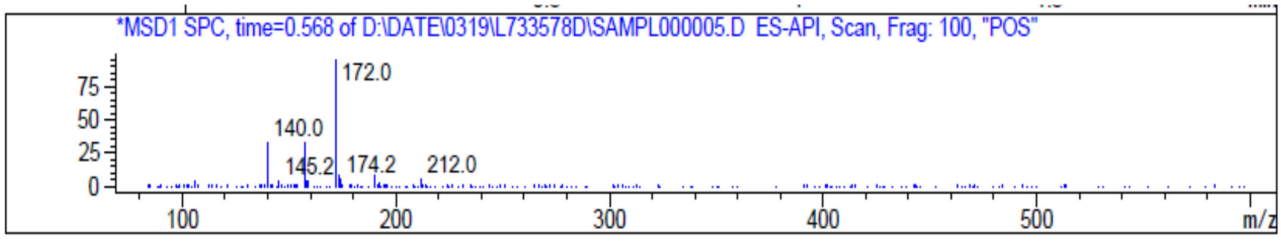
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



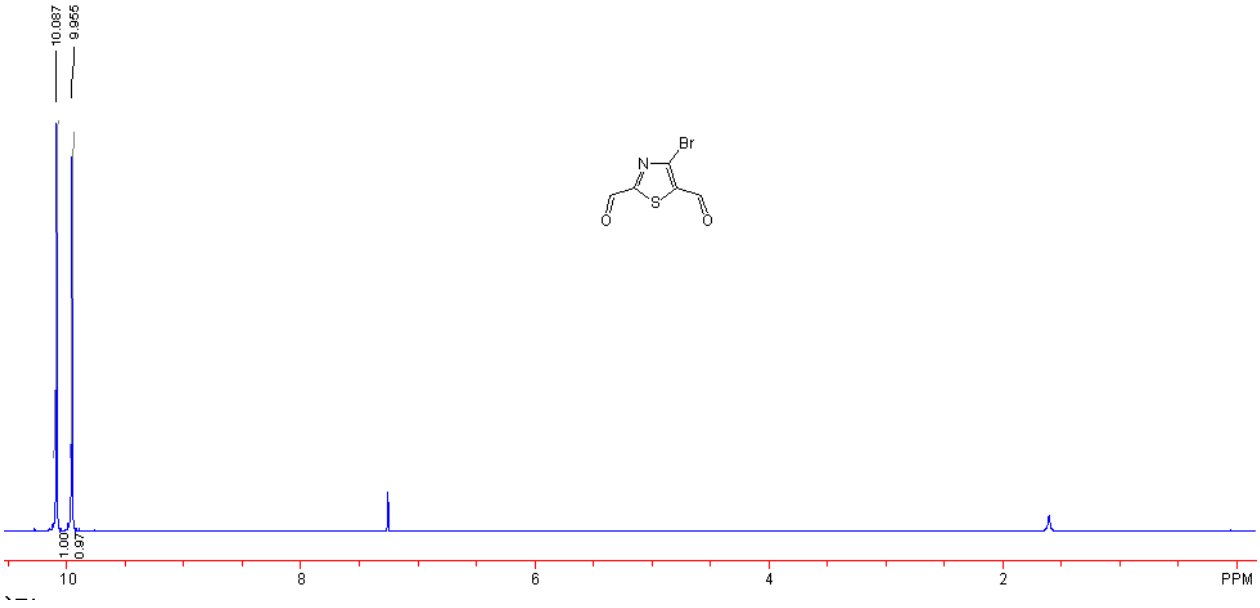
(D) LC/MS spectrum of compound **13**



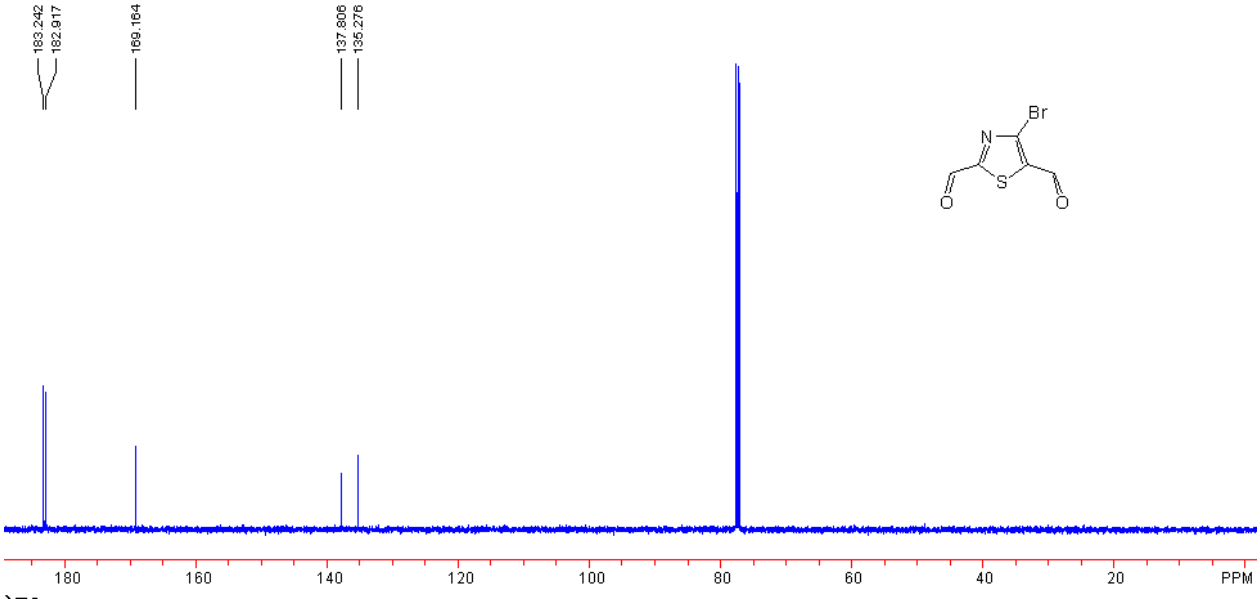
RT = 0.568 min

Figure S13. Compound 14

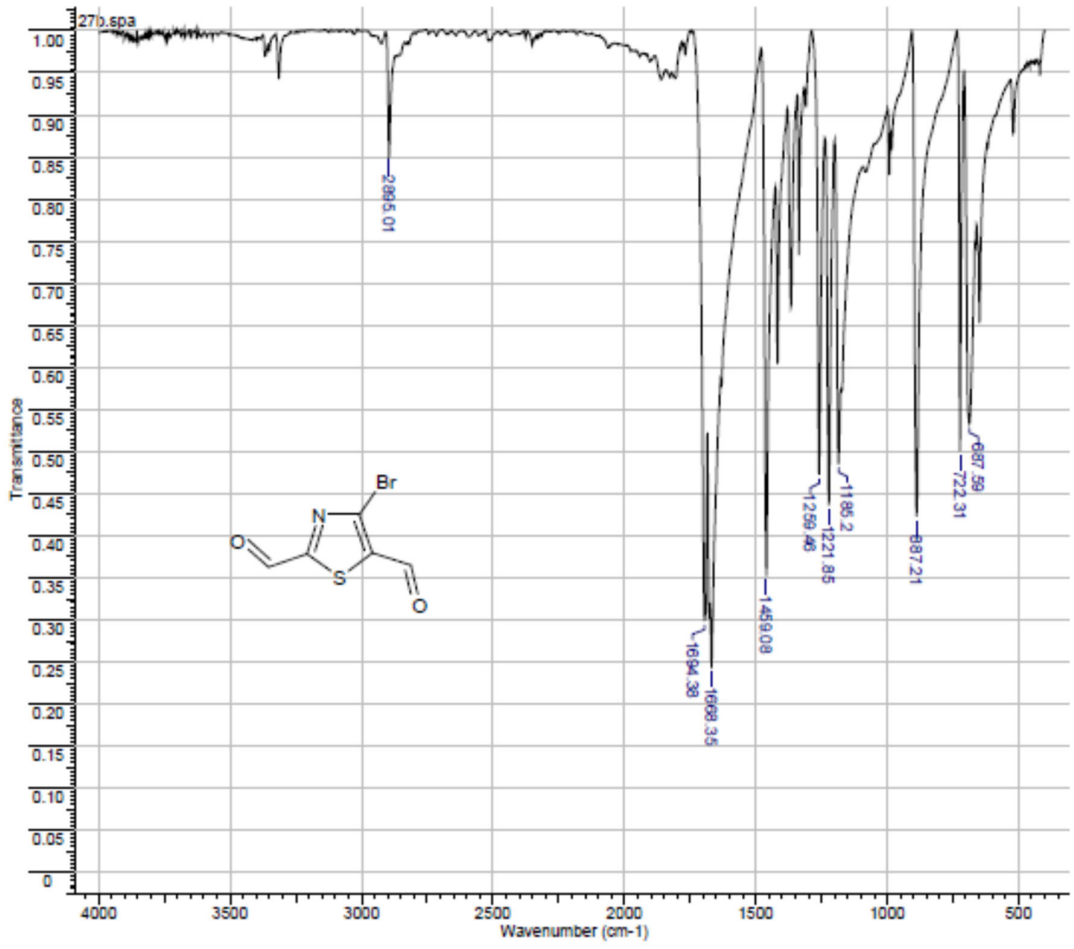
(A) ^{1}H-NMR spectrum ($CDCl_3$)



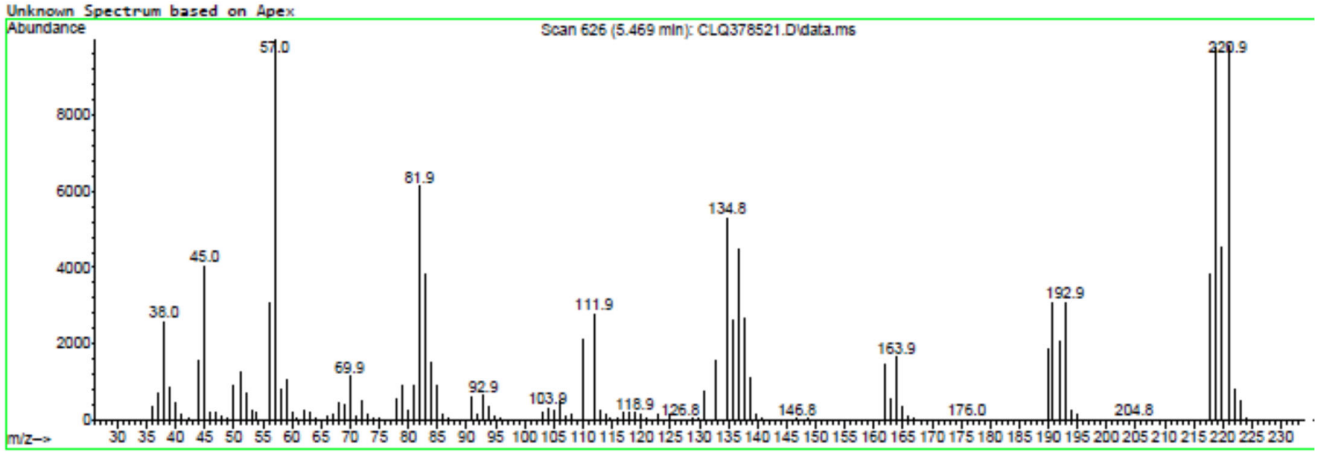
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



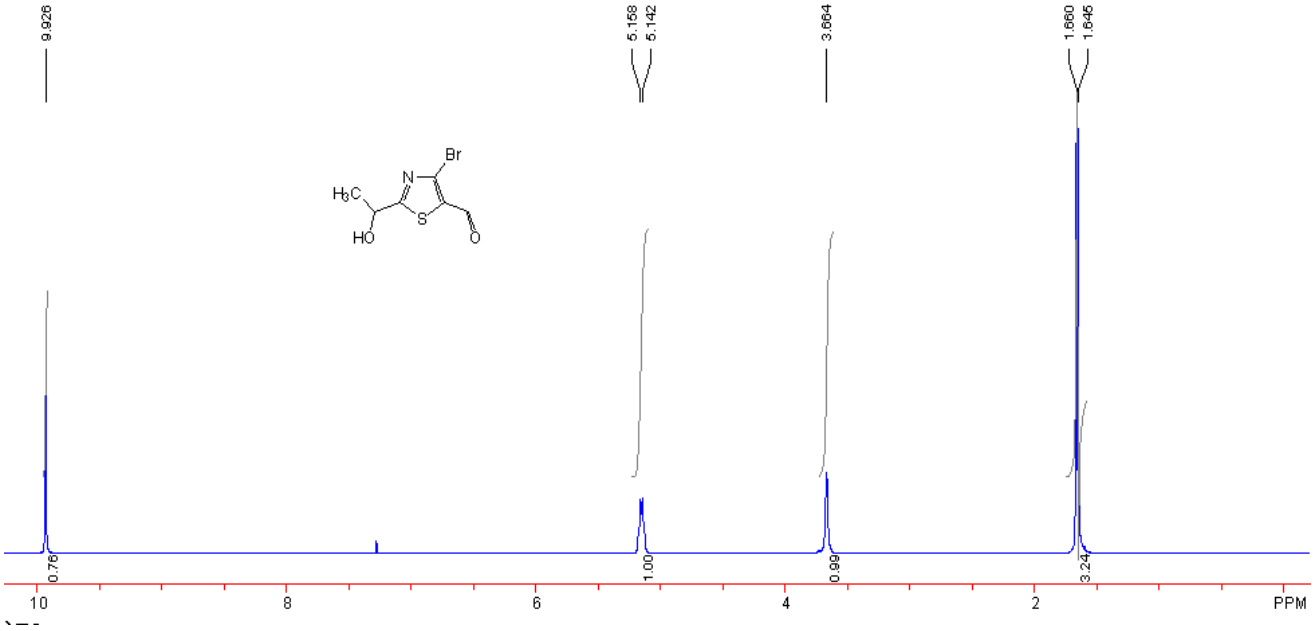
(D) GC/MS spectrum of compound **14**



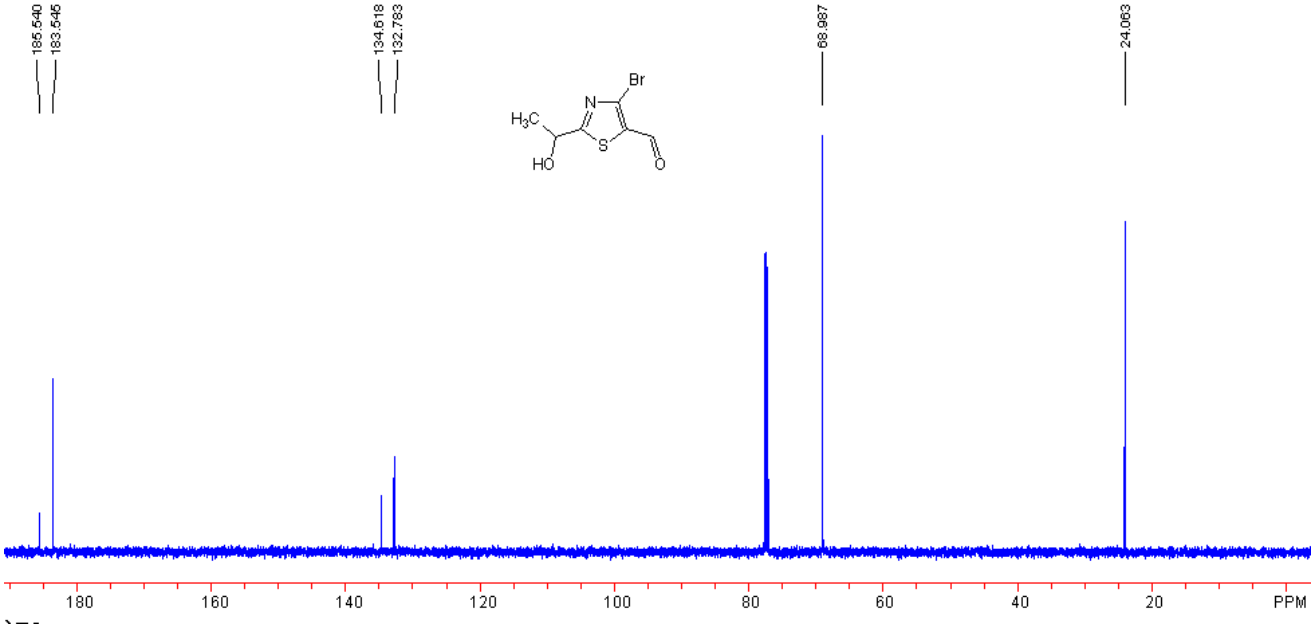
RT = 5.470 min

Figure S14. Compound 15

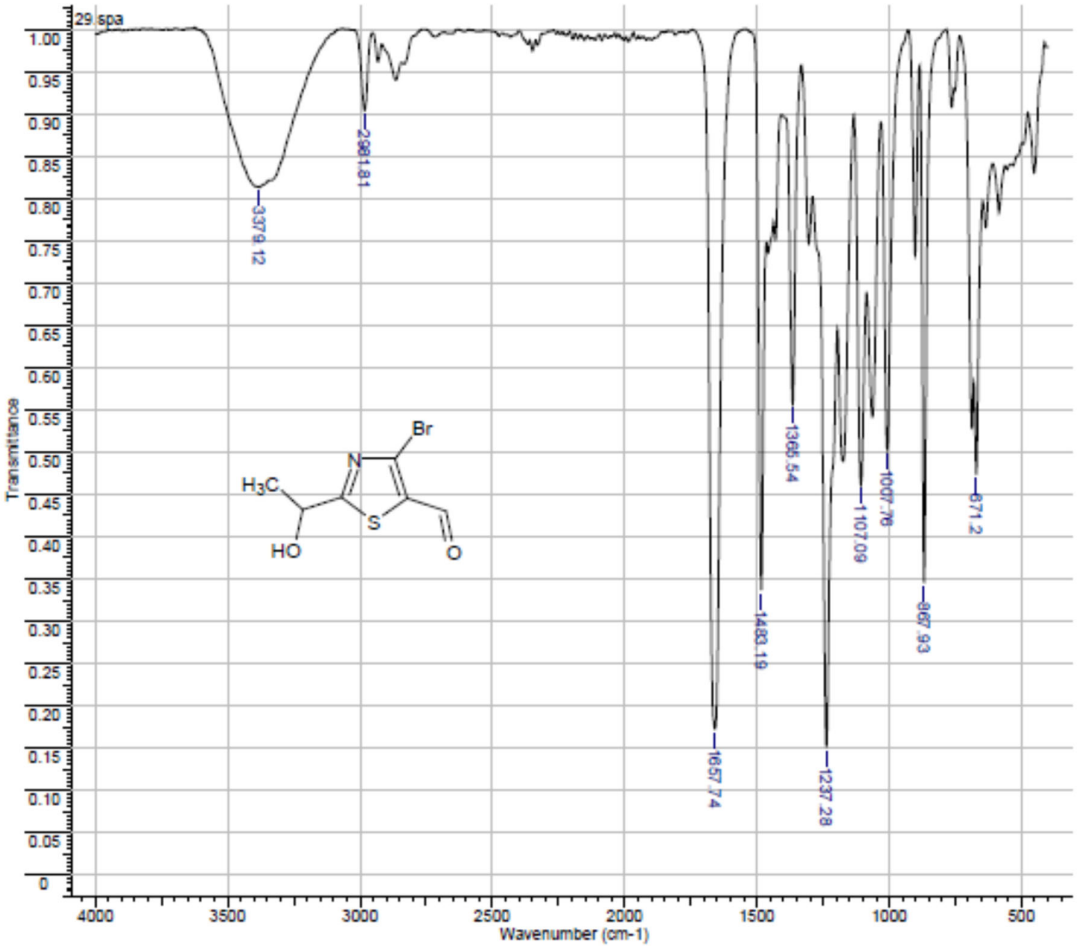
(A) ^{1}H-NMR spectrum ($CDCl_3$)



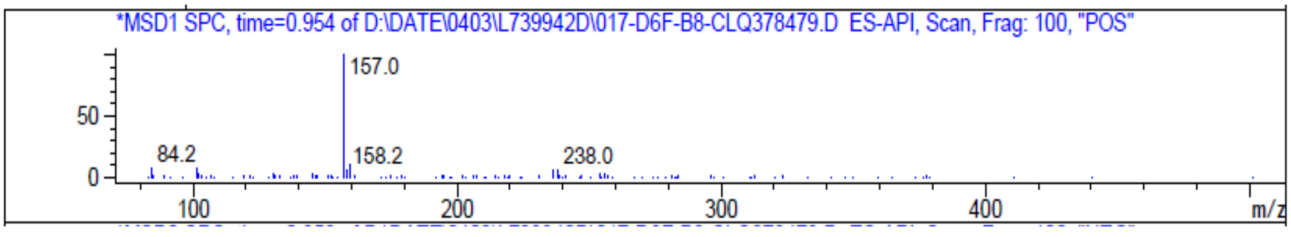
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) ATR-IR spectrum



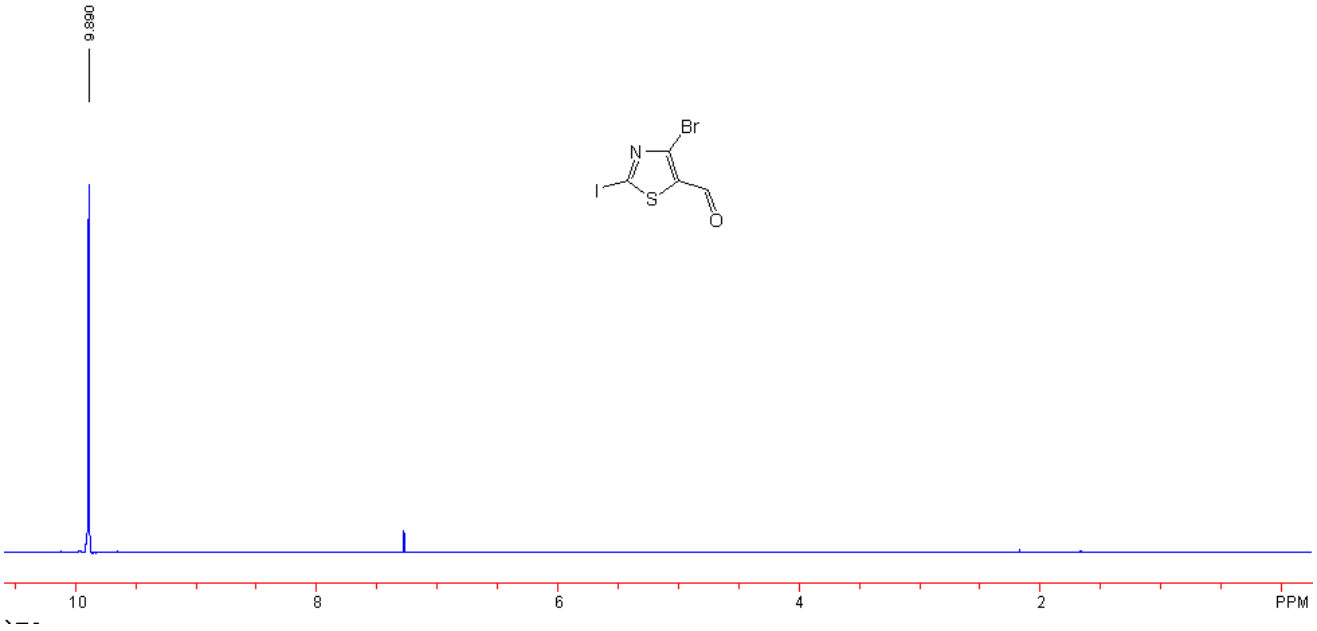
(D) LC/MS spectrum of compound **15**



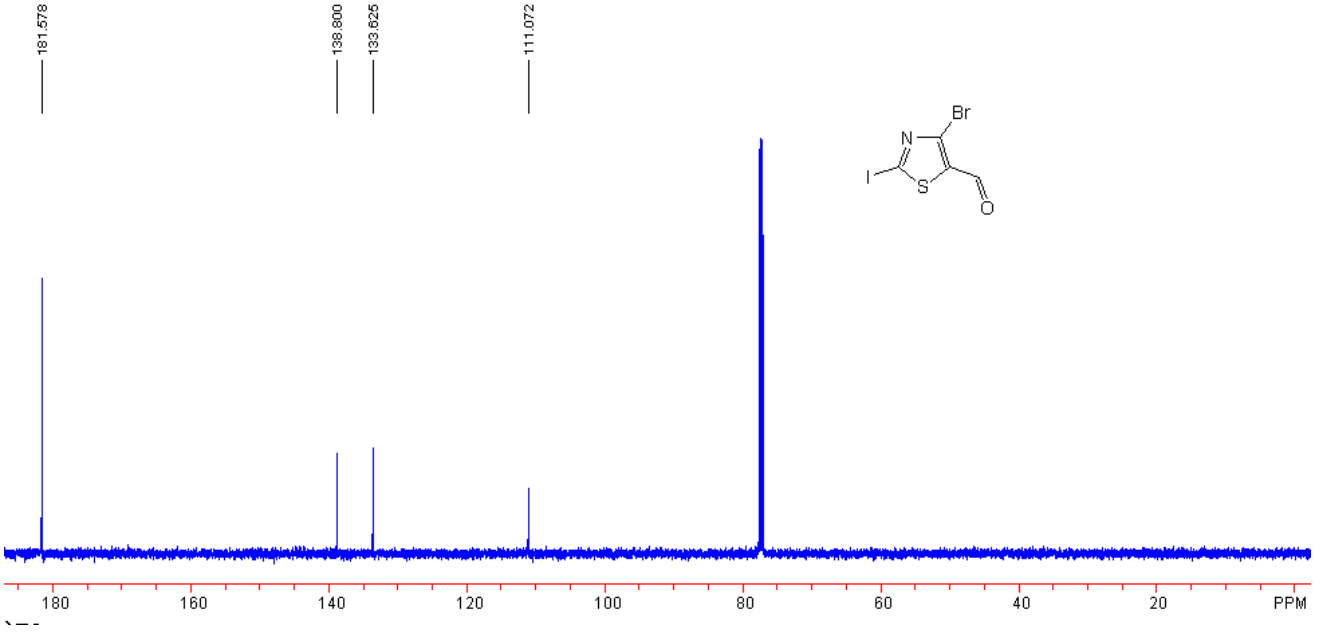
RT = 0.958 min

Figure S15. Compound 16

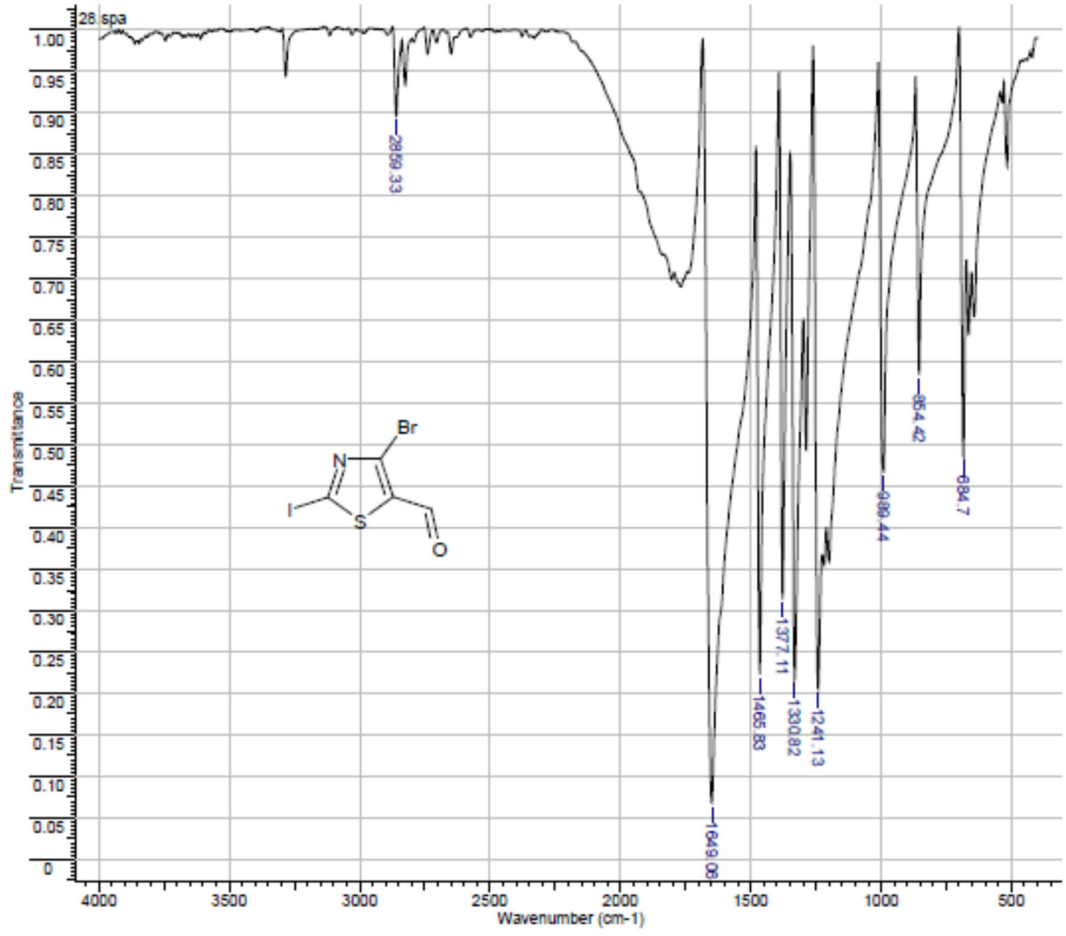
(A) ^{1}H-NMR spectrum ($CDCl_3$)



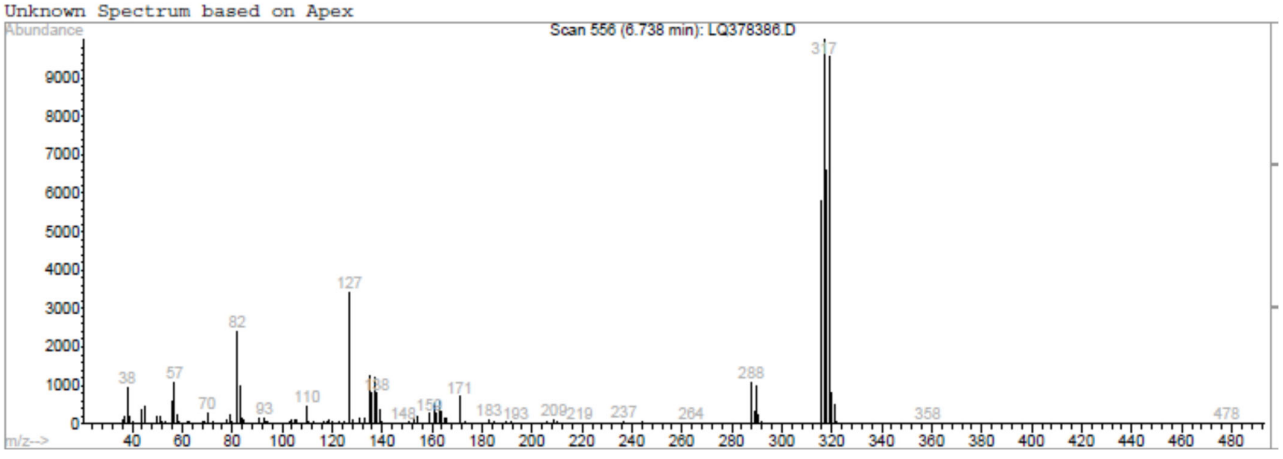
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)



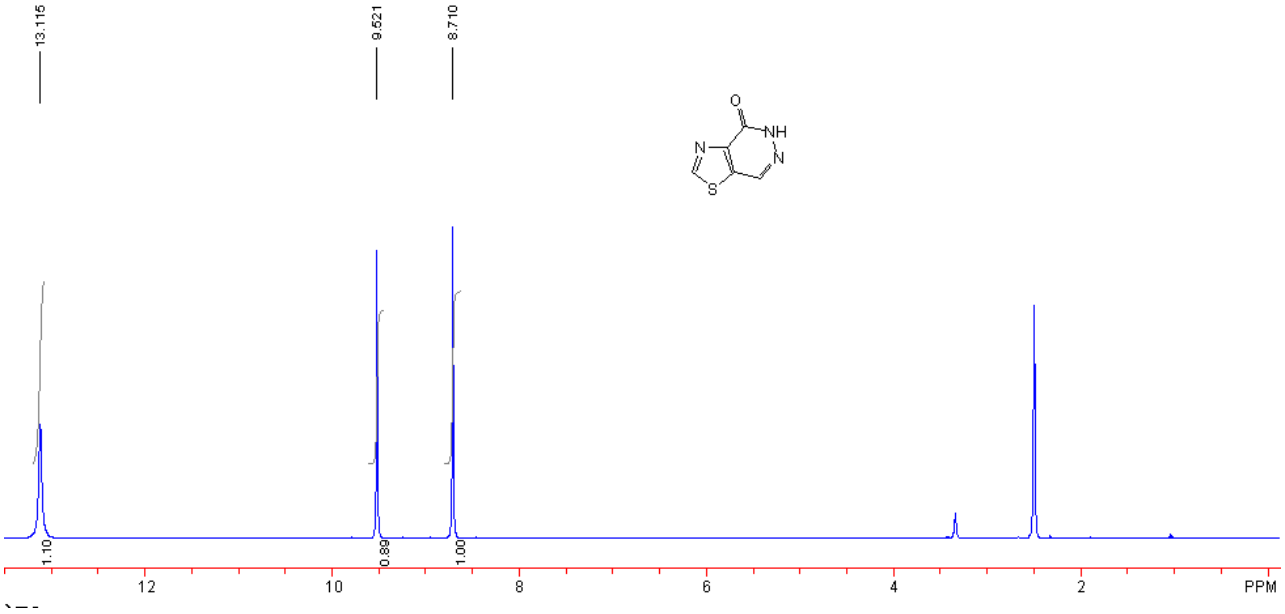
(D) GC/MS spectrum of compound **16**



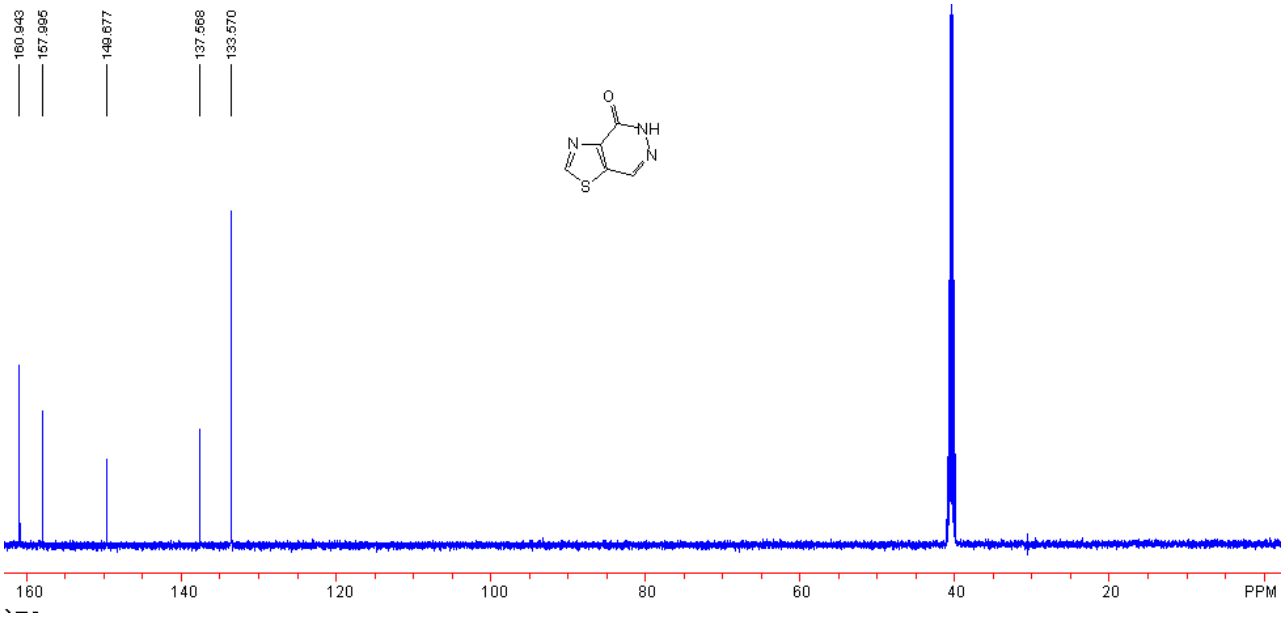
RT = 6.74 min

Figure S16. Compound 17

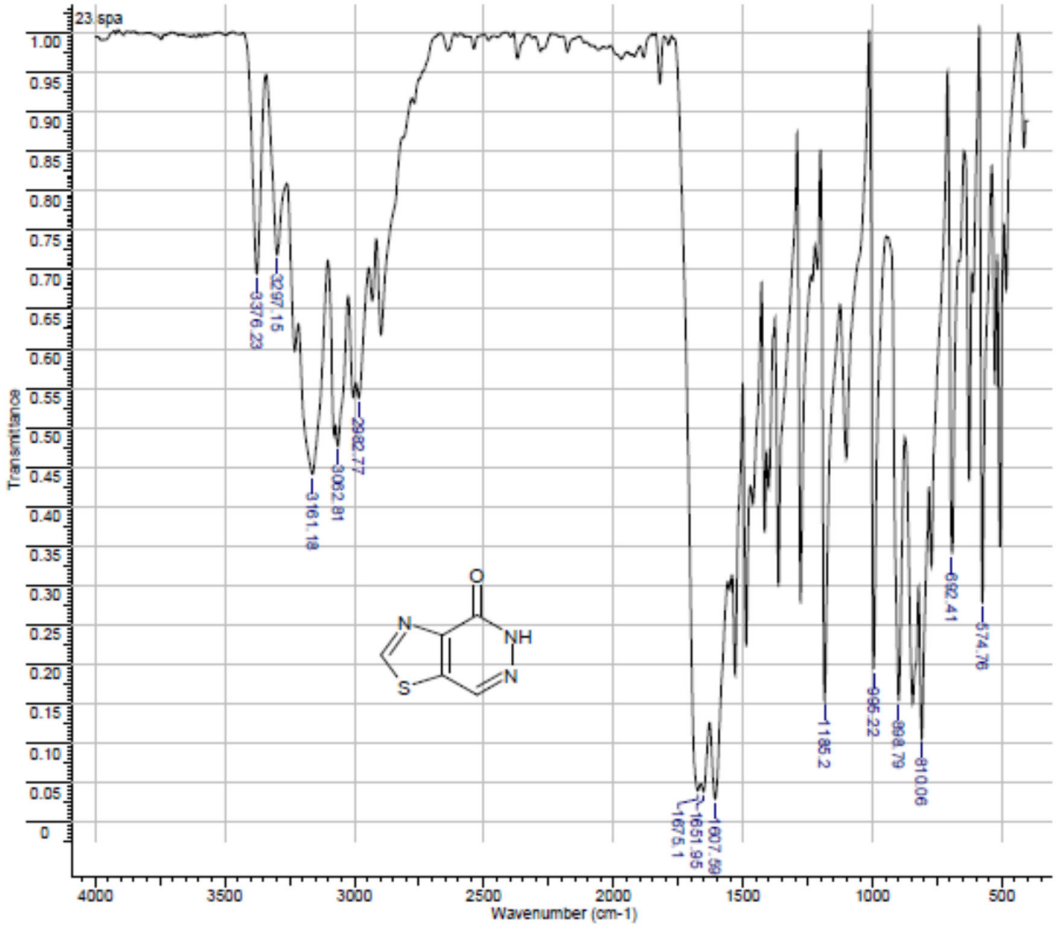
(A) ^{1}H-NMR spectrum (DMSO-d_6)



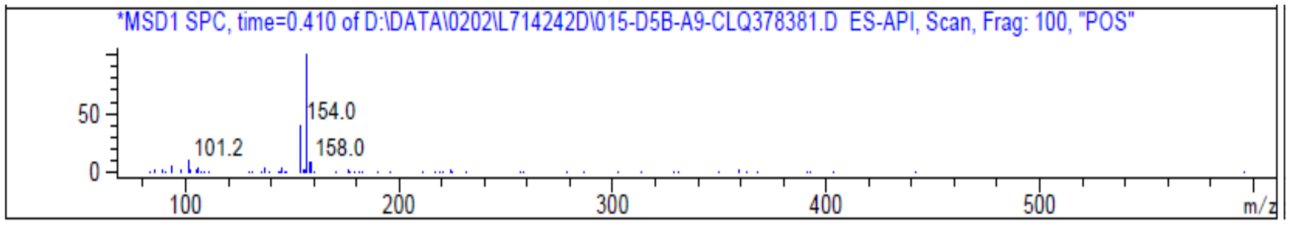
(B) ^{13}C-NMR spectrum (DMSO-d_6)



(C) IR spectrum (KBr)



(D) LC/MS spectrum of compound **17**



RT = 0.408 min

Figure S17. Compound 18. IR spectrum (KBr)

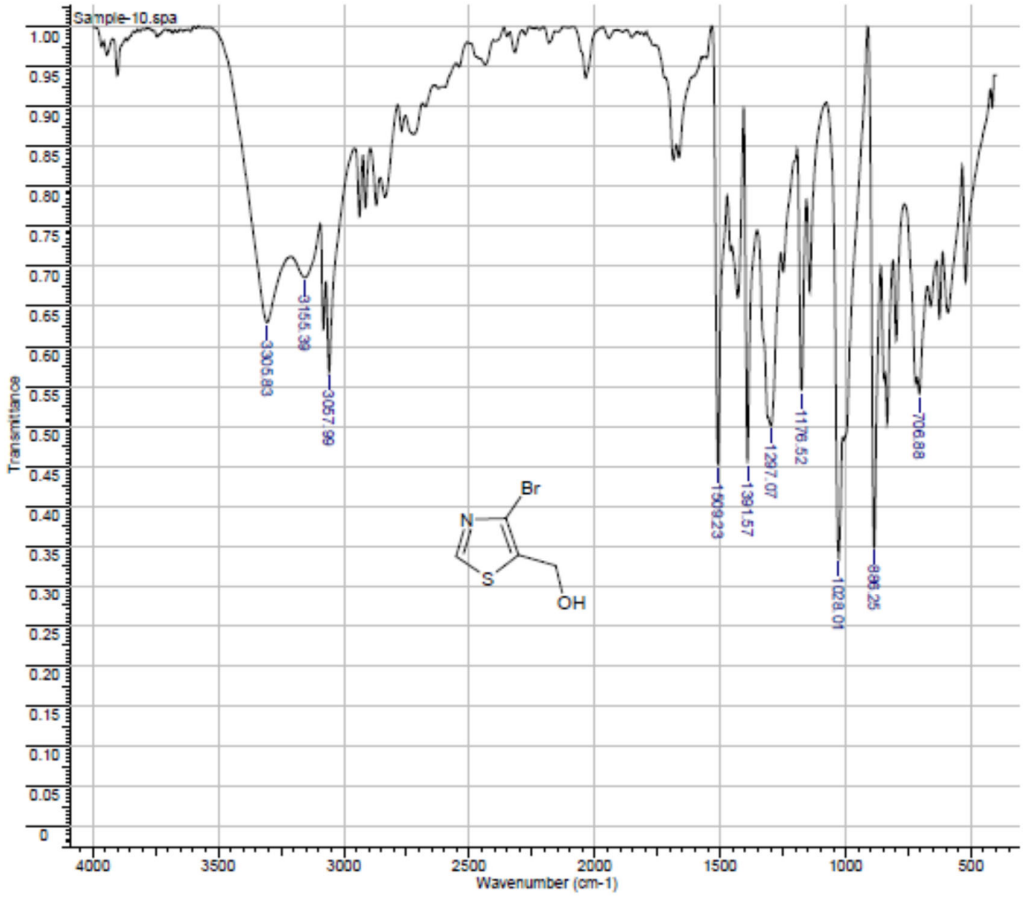
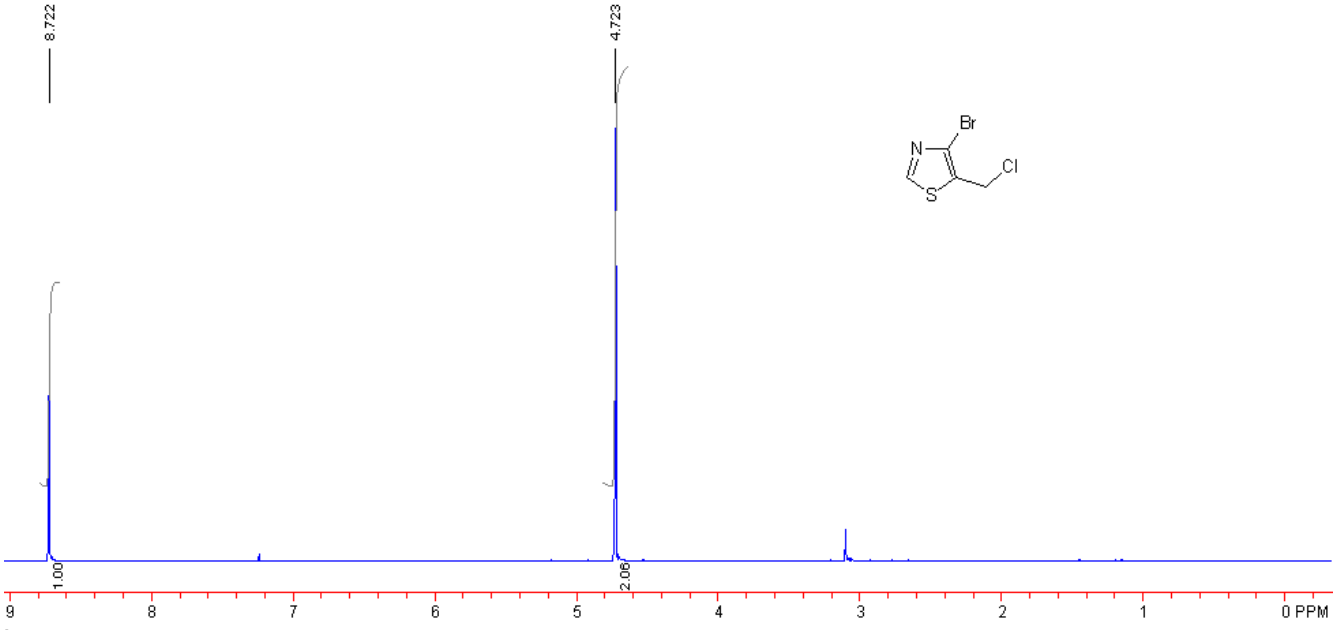
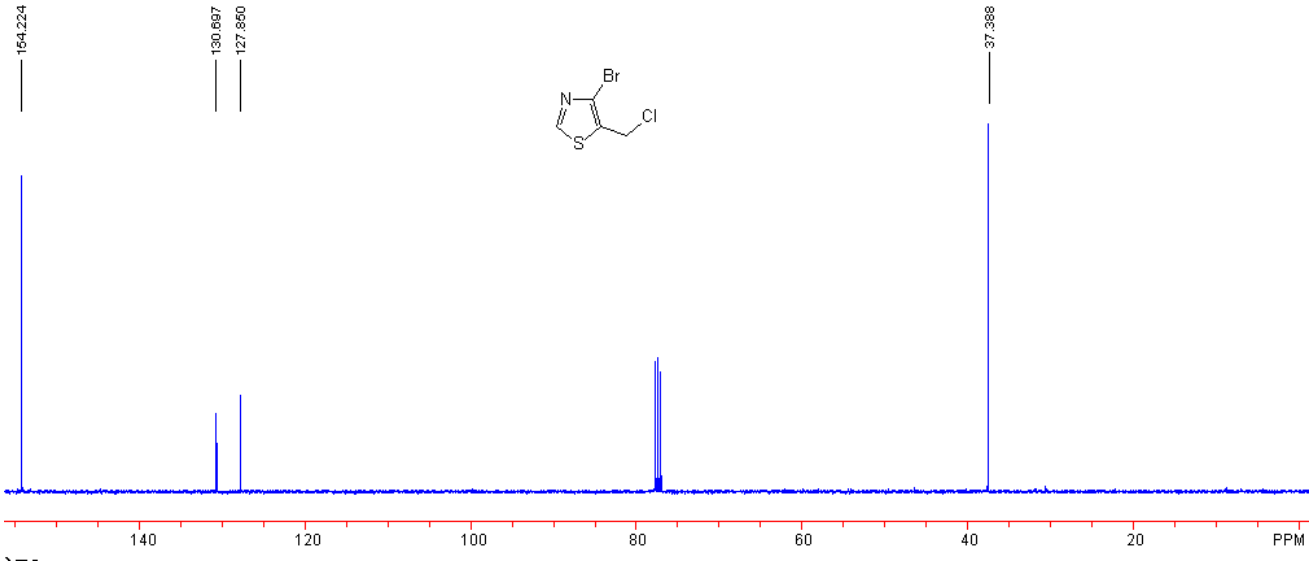


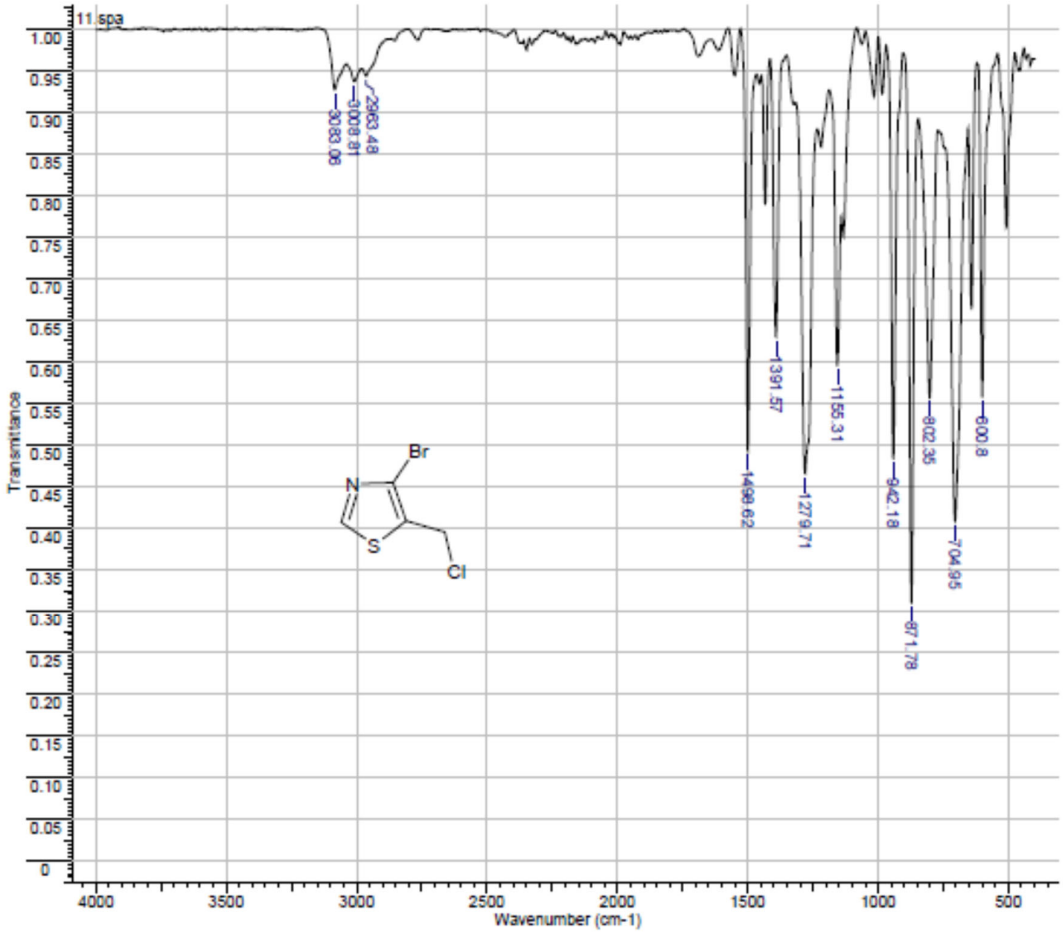
Figure S18. Compound 19
(A) ^{1}H-NMR spectrum ($CDCl_3$)



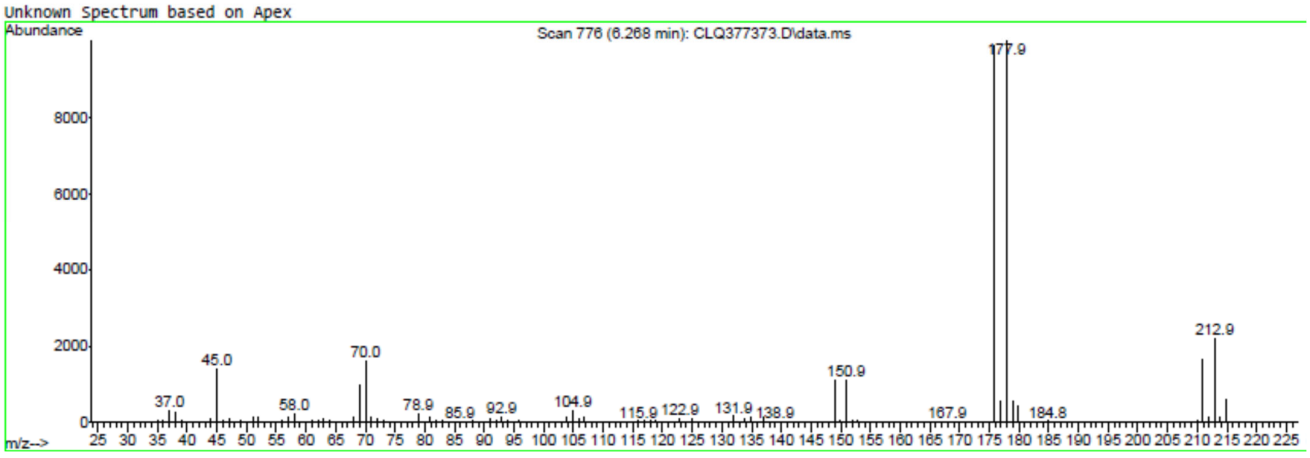
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) ATR-IR spectrum

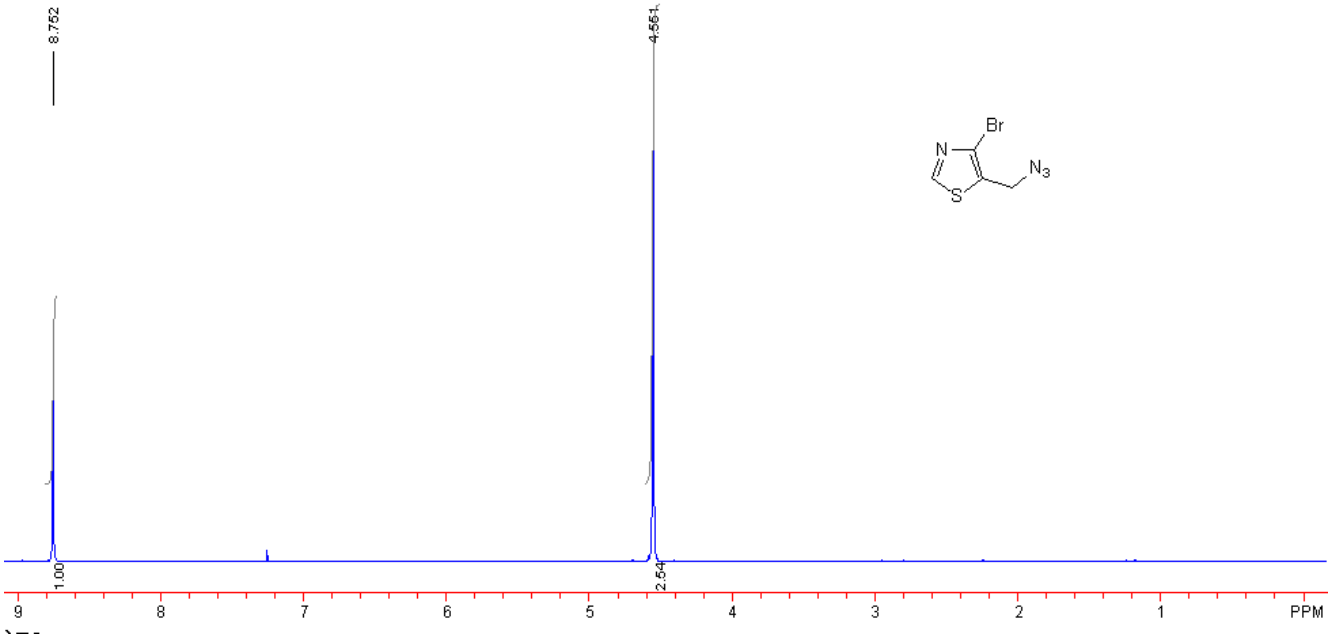


(D) GC/MS spectrum of compound **19**

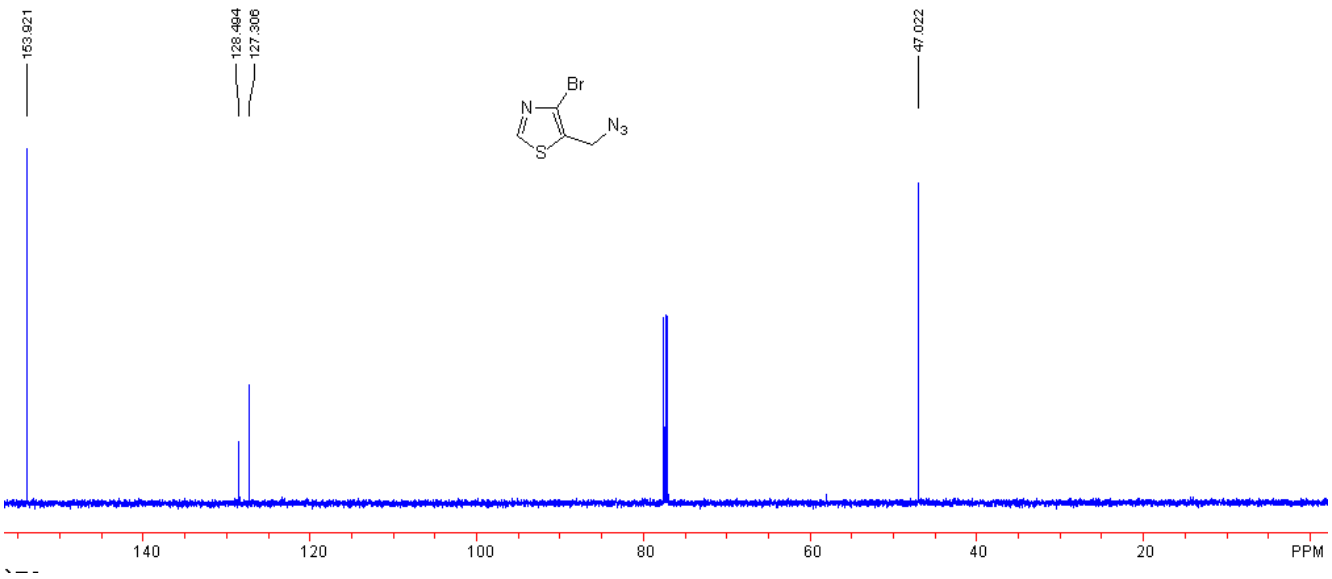


RT = 6.267 min

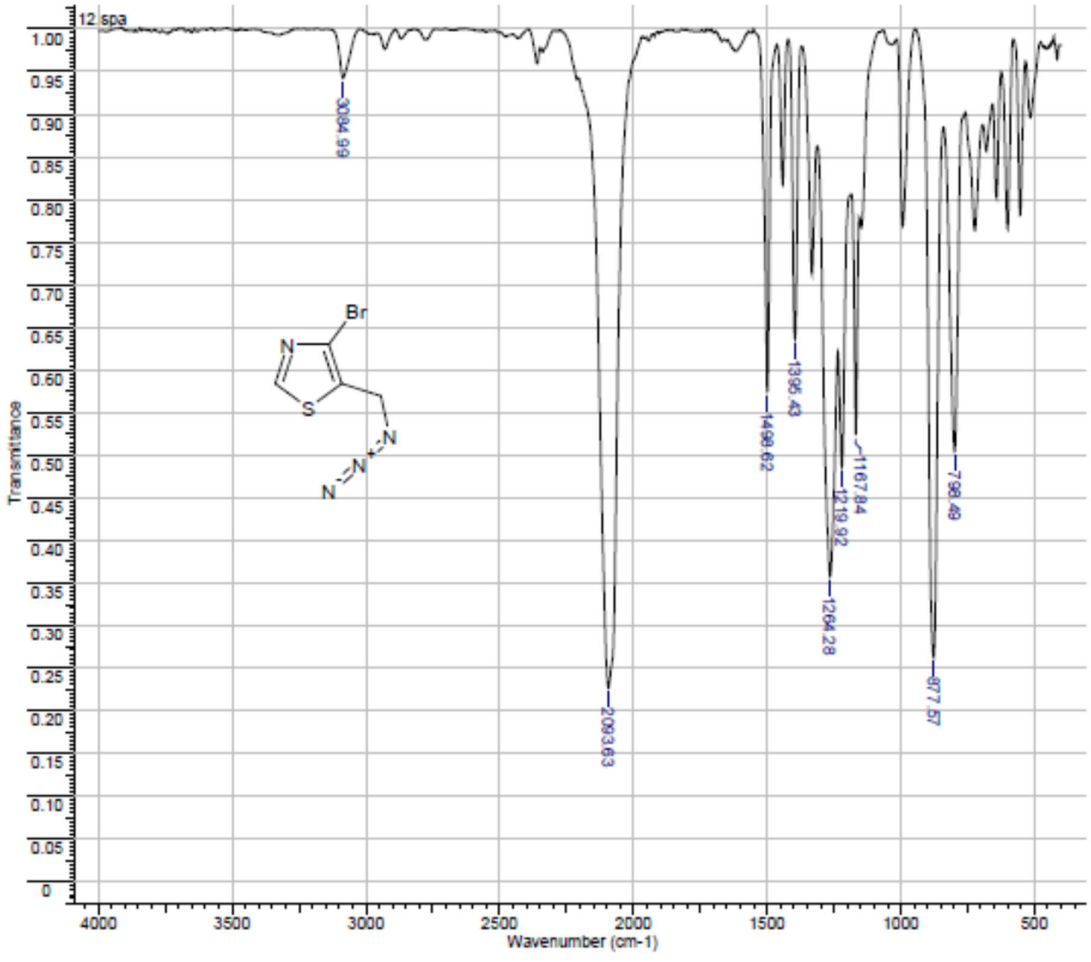
Figure S19. Compound 20
(A) ^{1}H-NMR spectrum ($CDCl_3$)



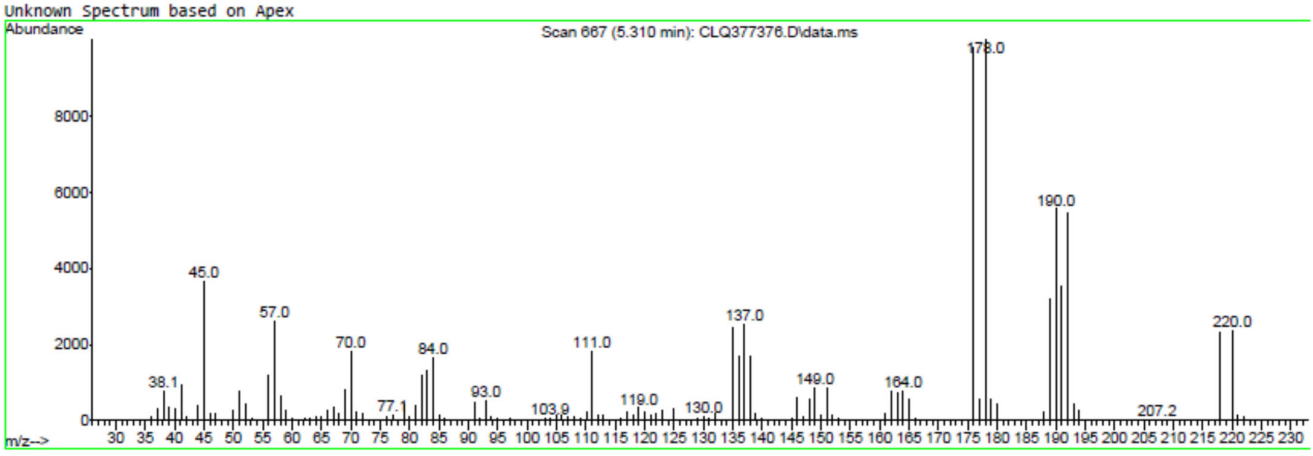
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) ATR-IR spectrum

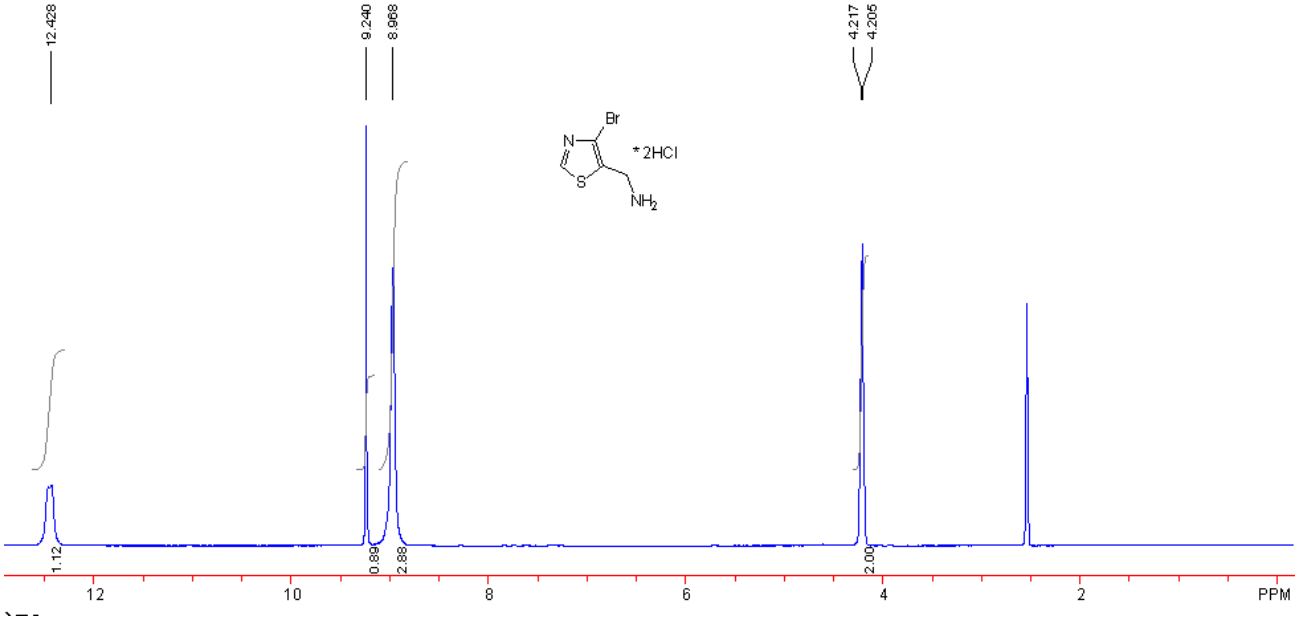


(D) GC/MS spectrum of compound **20**

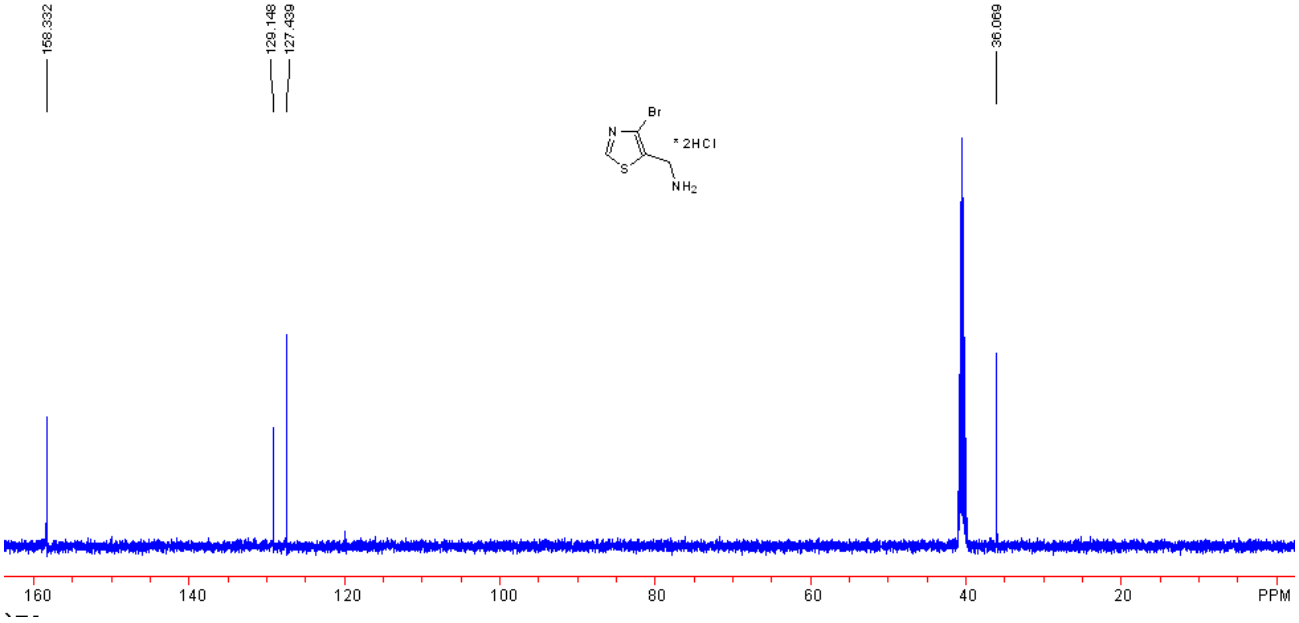


RT = 5.311 min

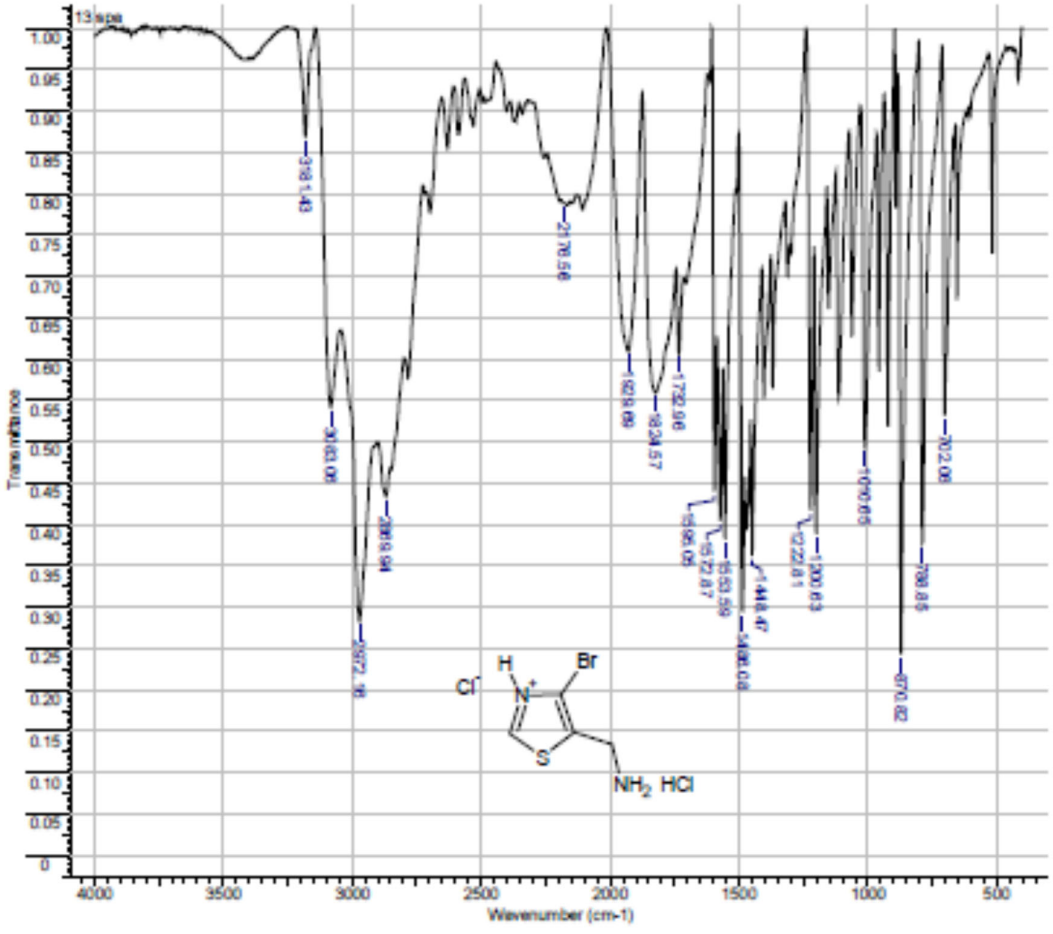
Figure S20. Compound 21
(A) ^{1}H-NMR spectrum (DMSO-d_6)



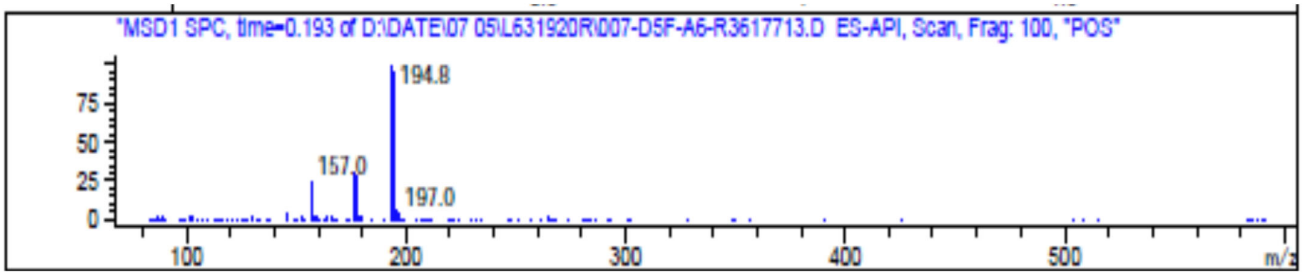
(B) ^{13}C-NMR spectrum (DMSO-d_6)



(C) IR spectrum (KBr)

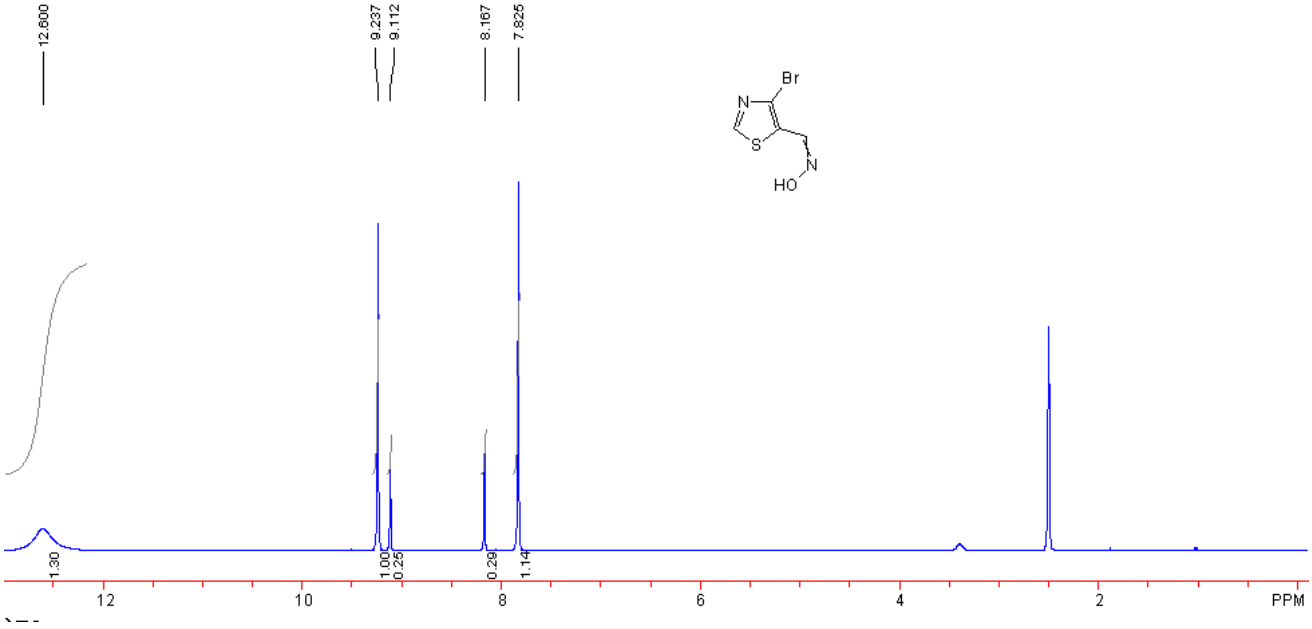


(D) LC/MS spectrum of compound **21**

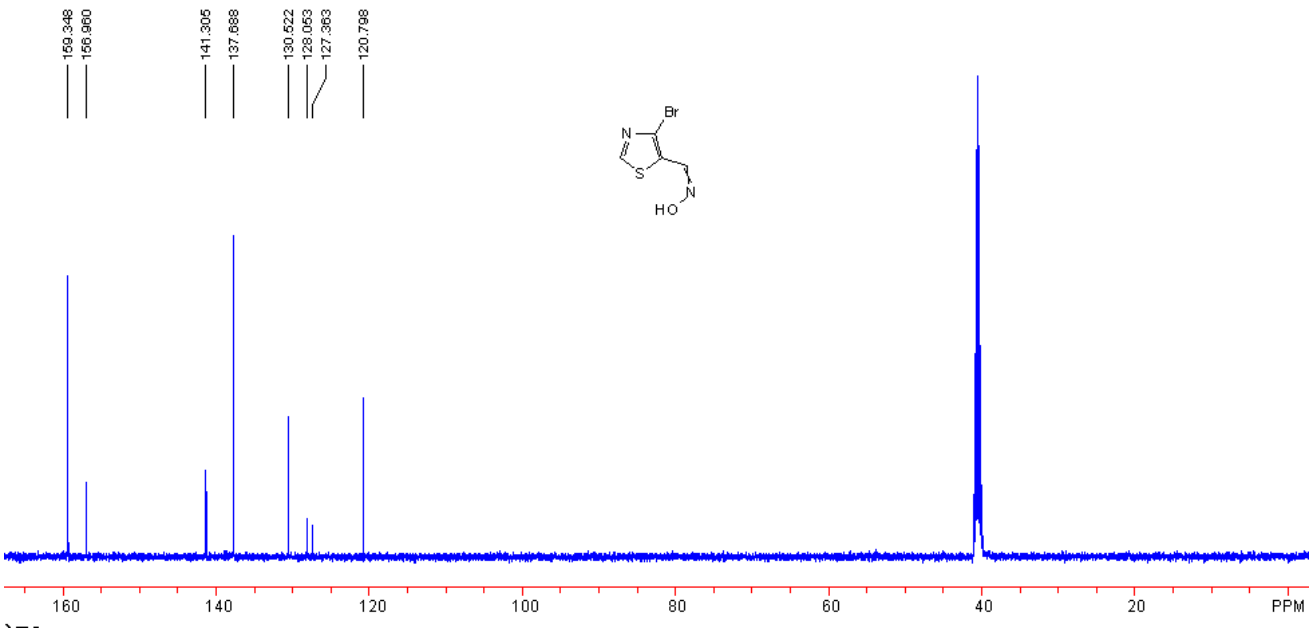


RT = 0.191 min

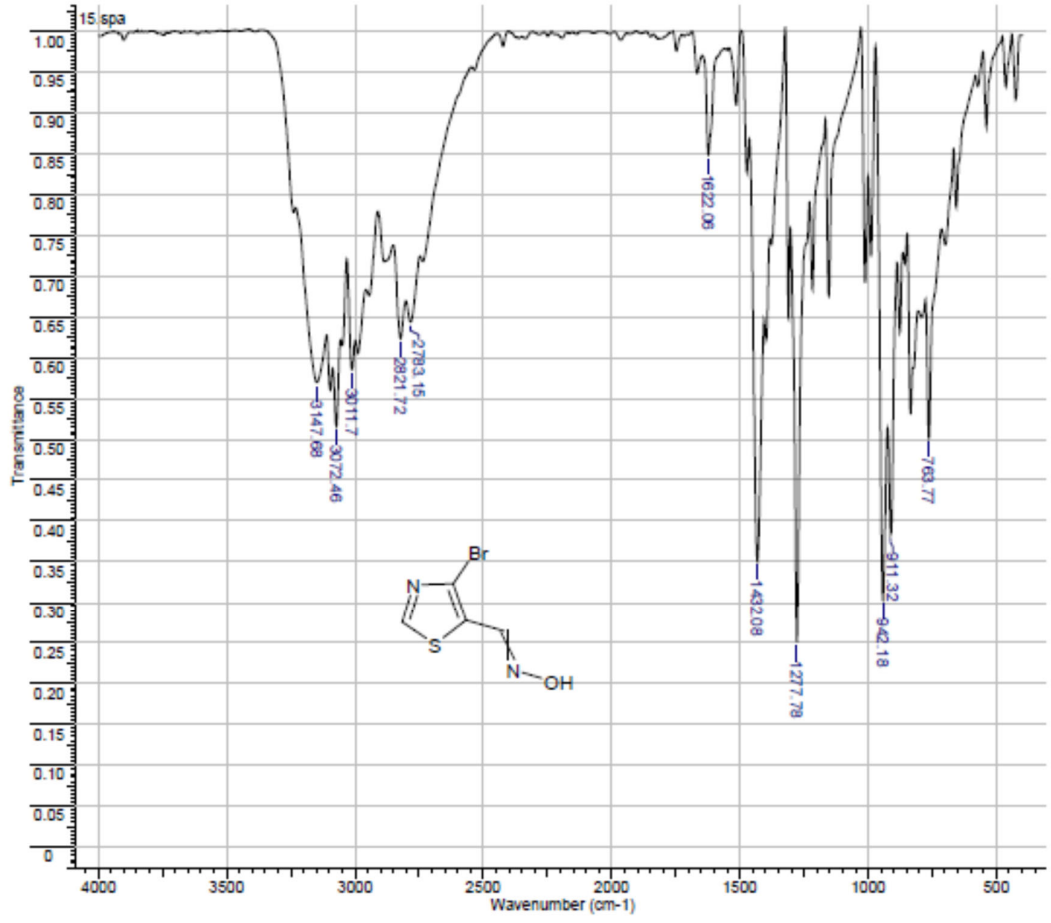
Figure S21. Compound 22
(A) ^{1}H-NMR spectrum (DMSO-d_6)



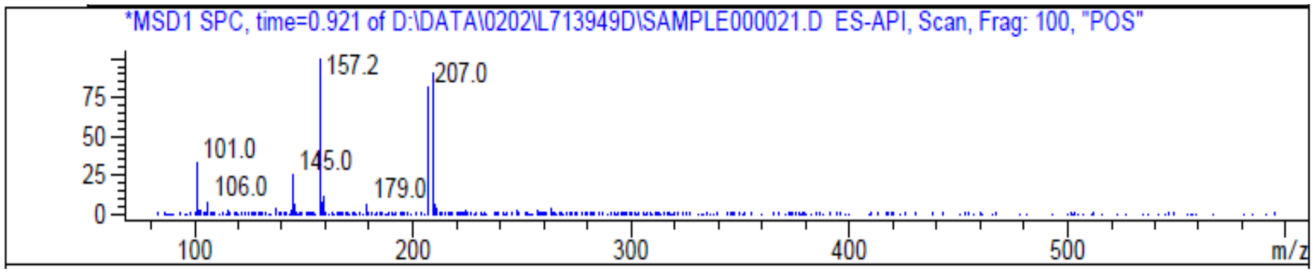
(B) ^{13}C-NMR spectrum (DMSO-d_6)



(C) IR spectrum (KBr)

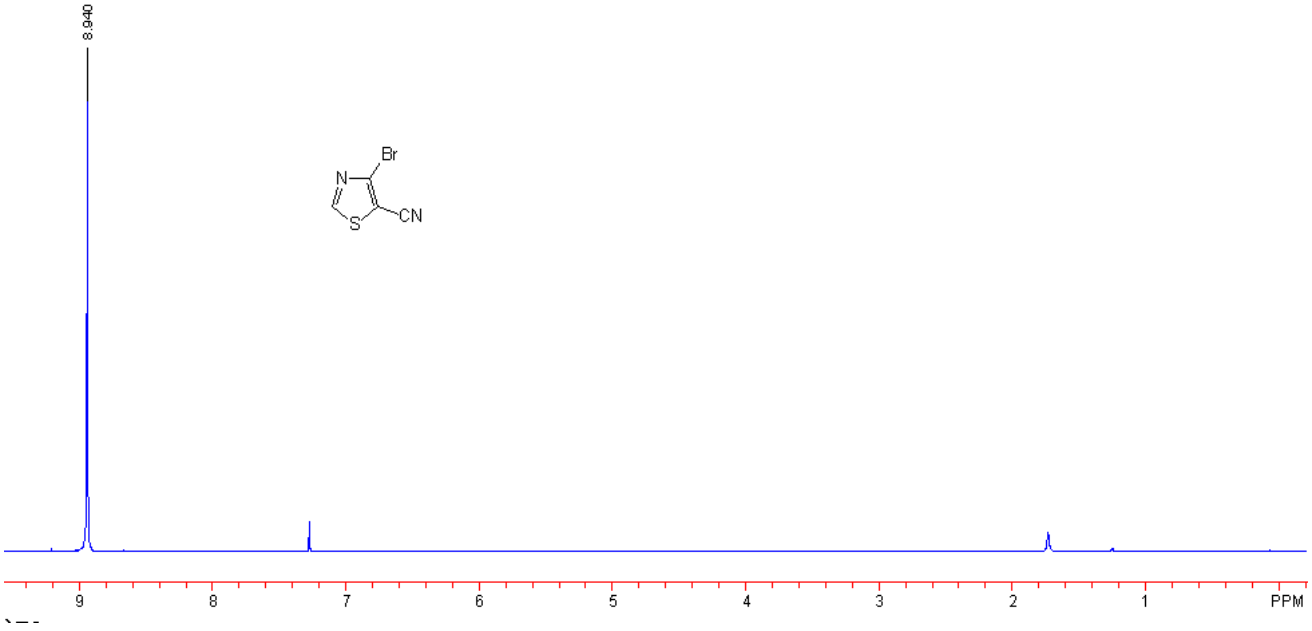


(D) LC/MS spectrum of compound **22**

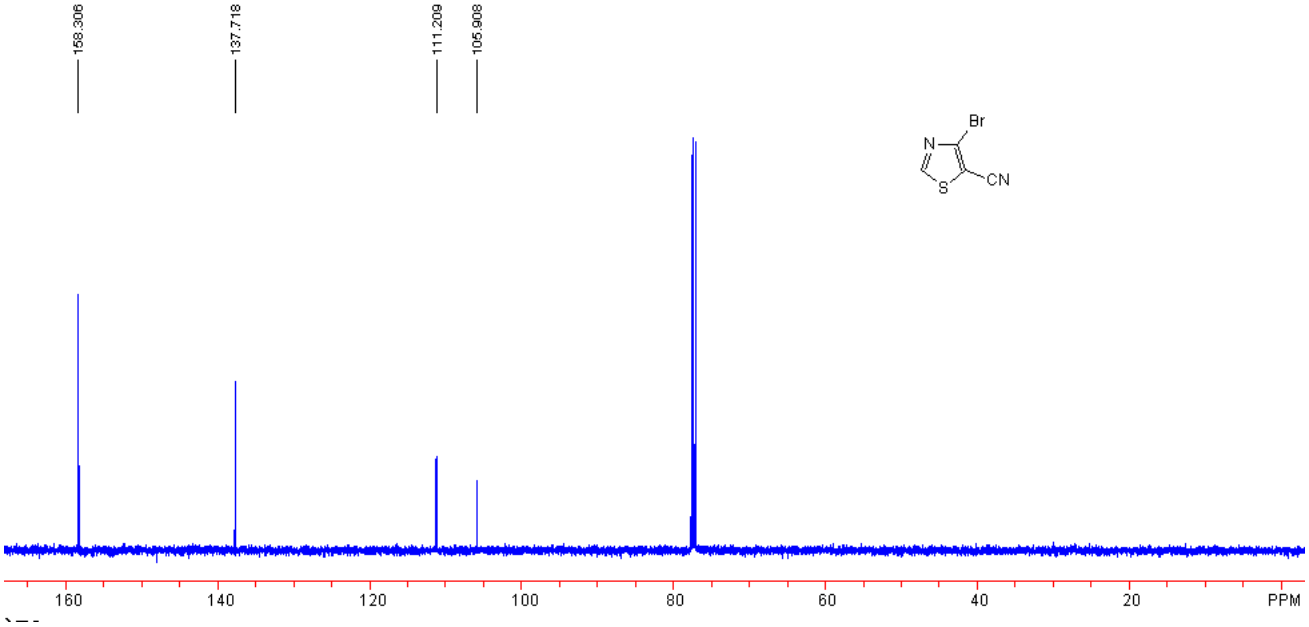


RT = 0.917 min

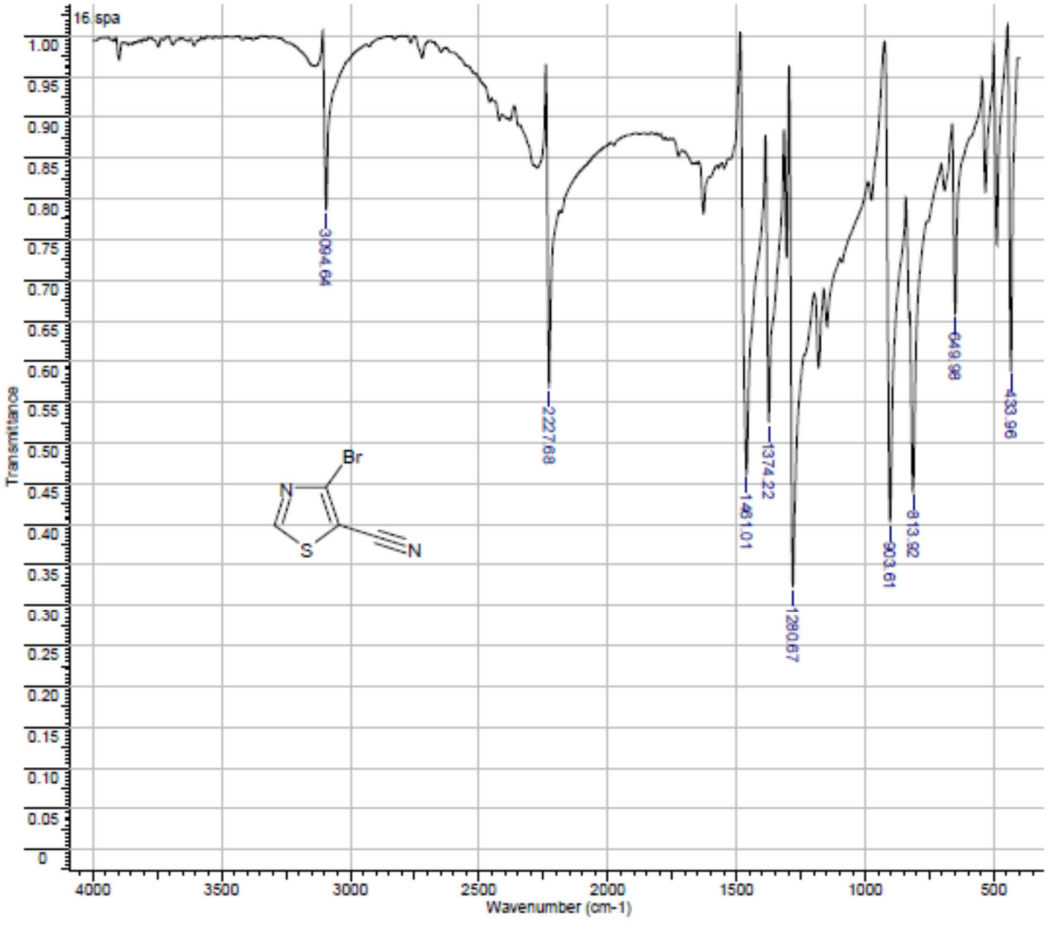
Figure S22. Compound 23
(A) ^{1}H-NMR spectrum ($CDCl_3$)



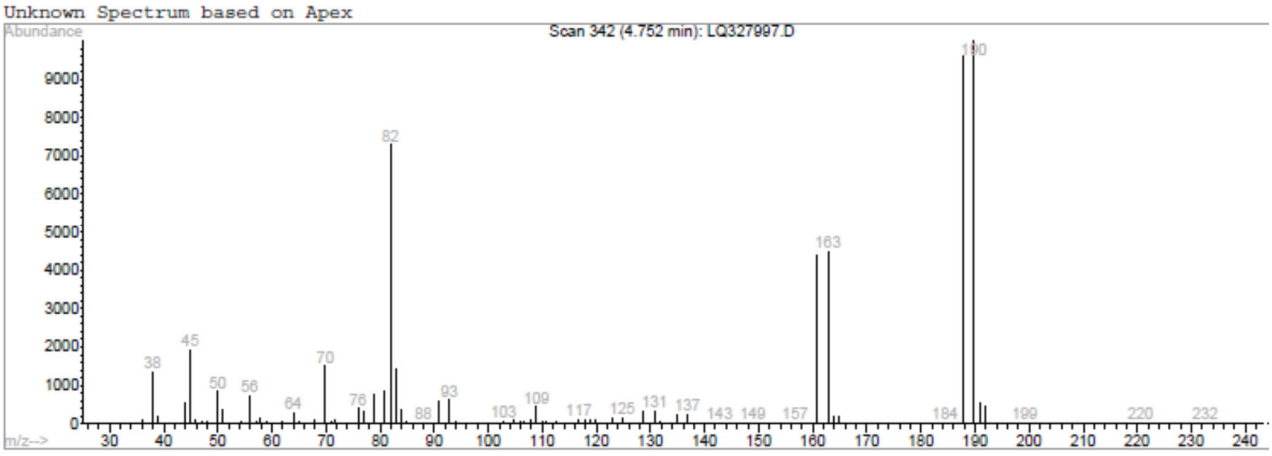
(B) ^{13}C-NMR spectrum ($CDCl_3$)



(C) IR spectrum (KBr)

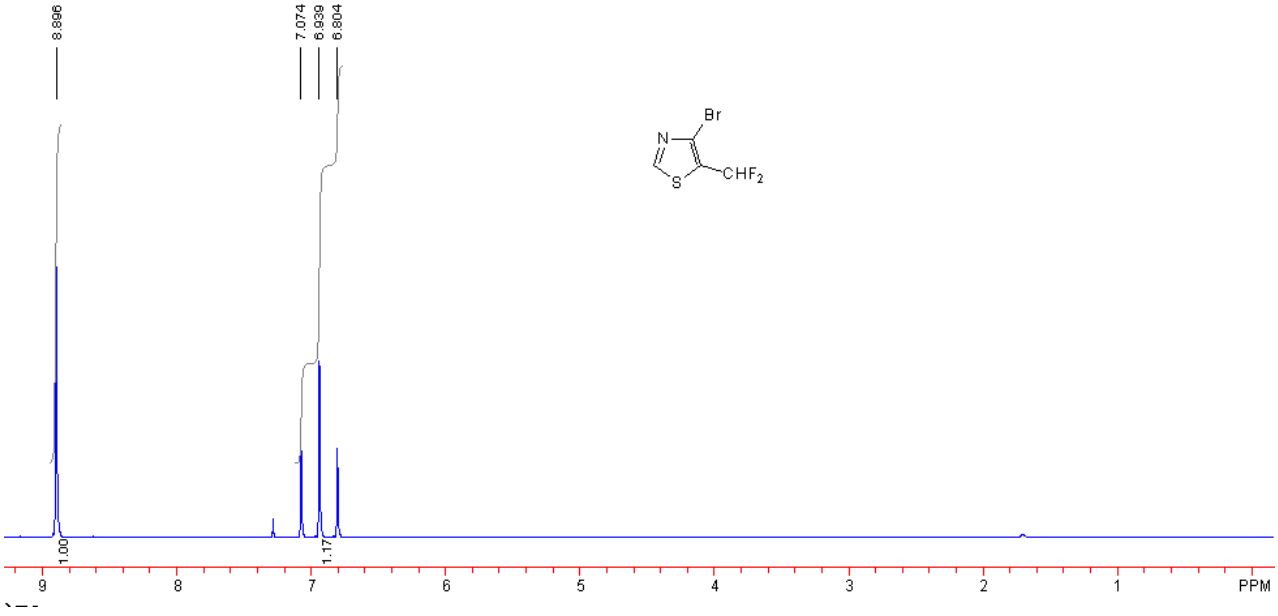


(D) GC/MS spectrum of compound **23**

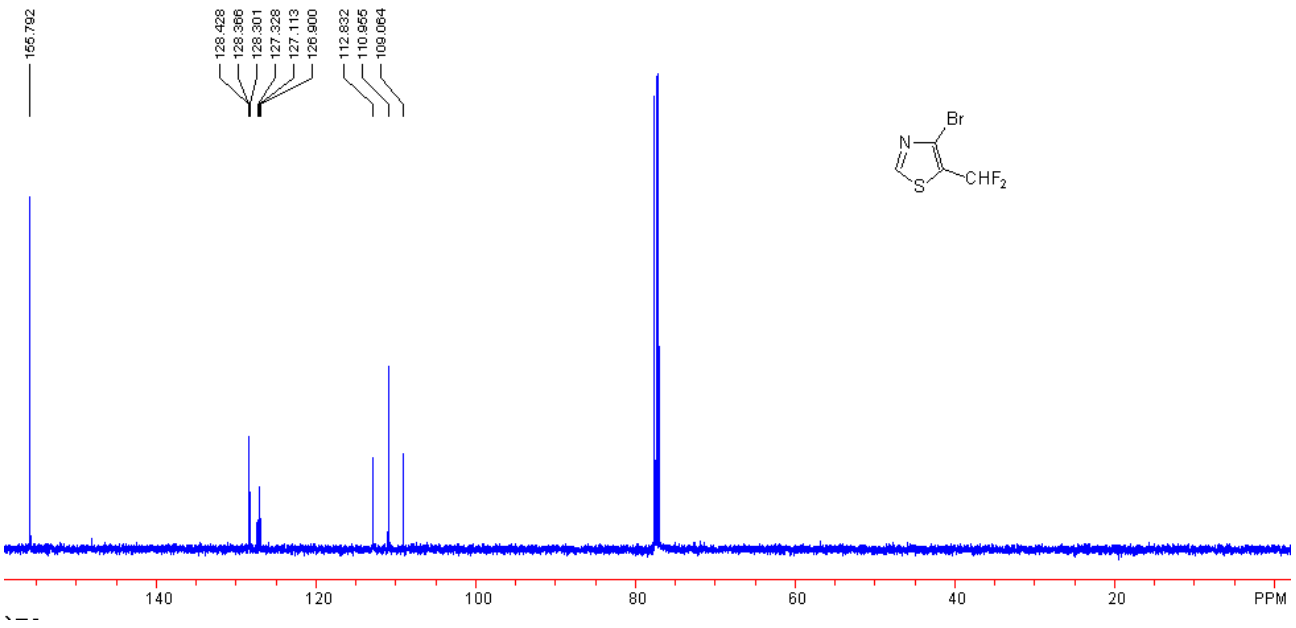


RT = 4.75 min

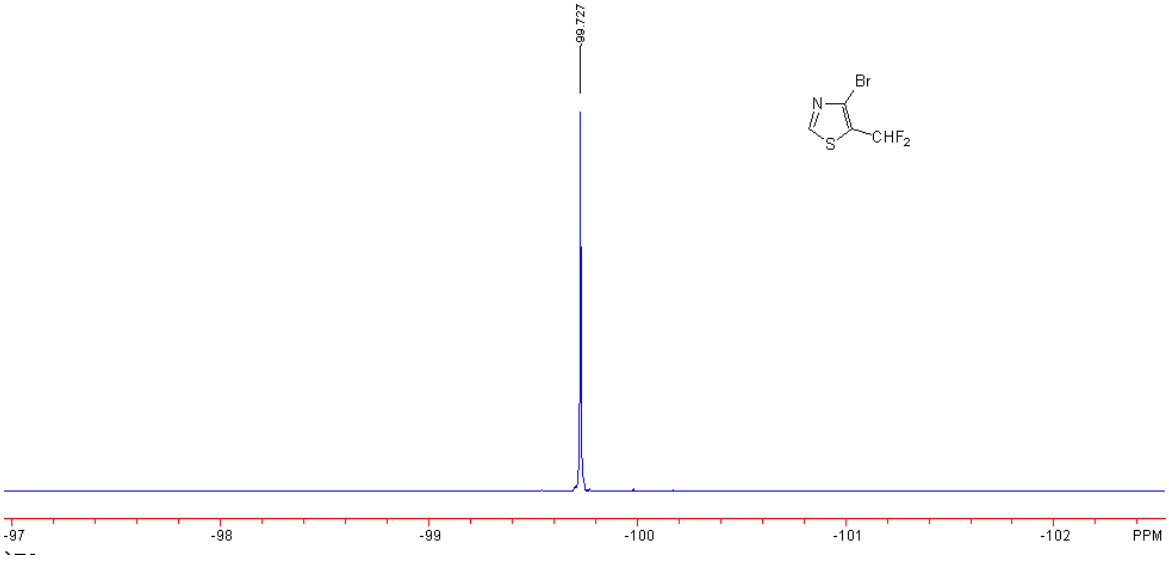
Figure S23. Compound 24
(A) ^{1}H-NMR spectrum ($CDCl_3$)



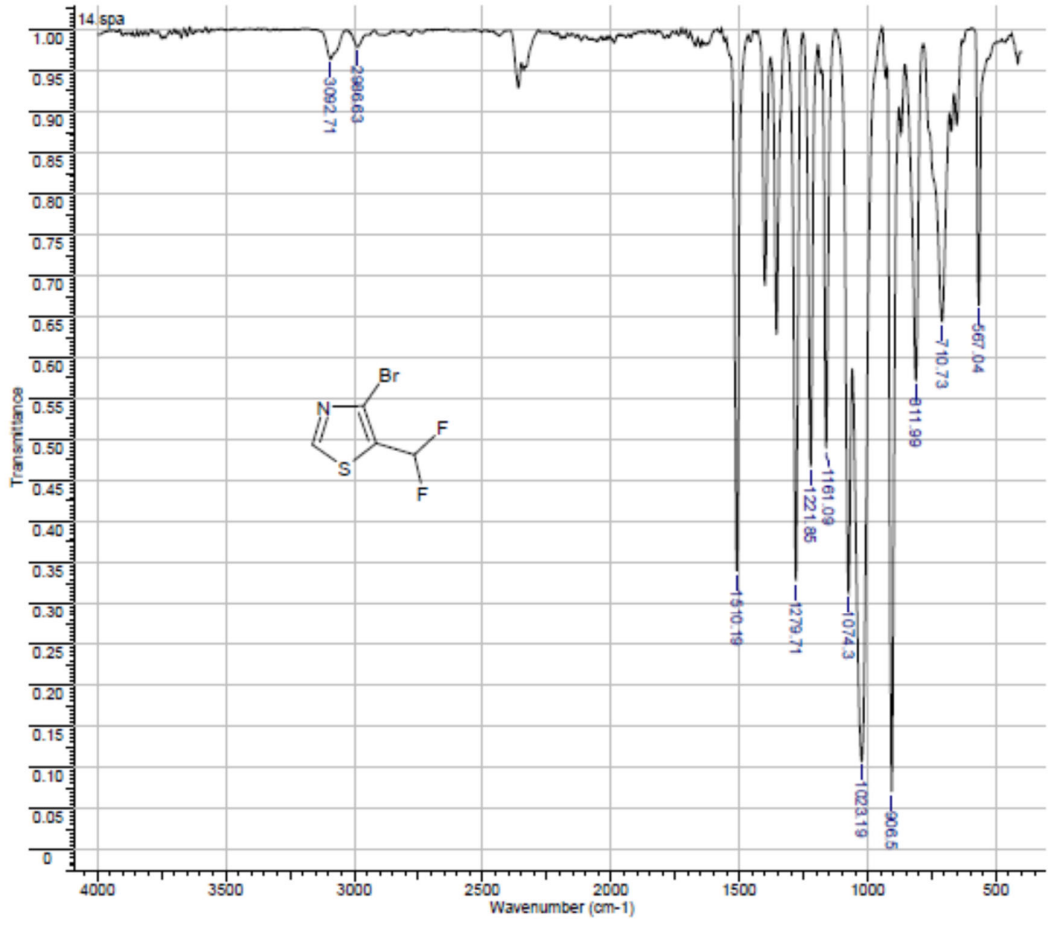
(B) ^{13}C-NMR spectrum ($CDCl_3$)



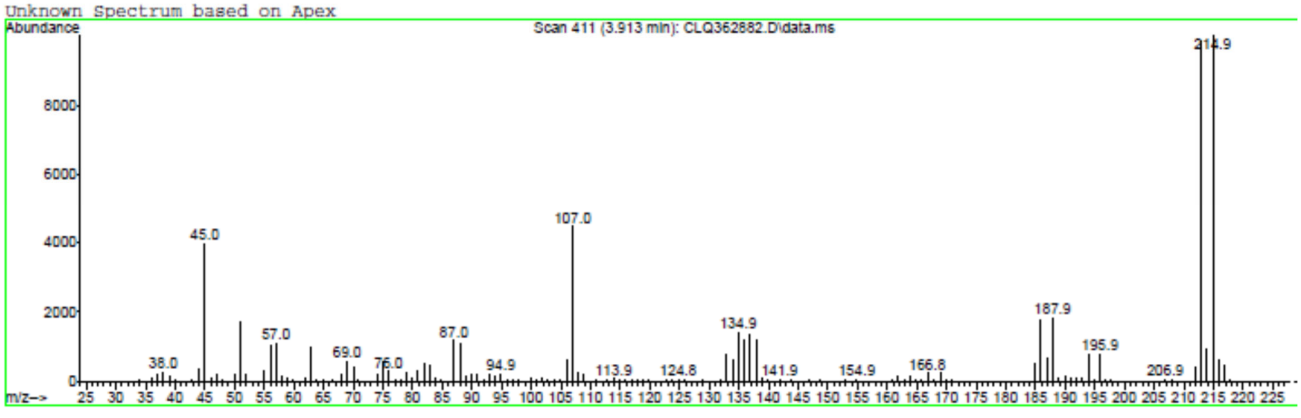
(C) ^{19}F-NMR spectrum ($CDCl_3$)



(D) ATR-IR spectrum



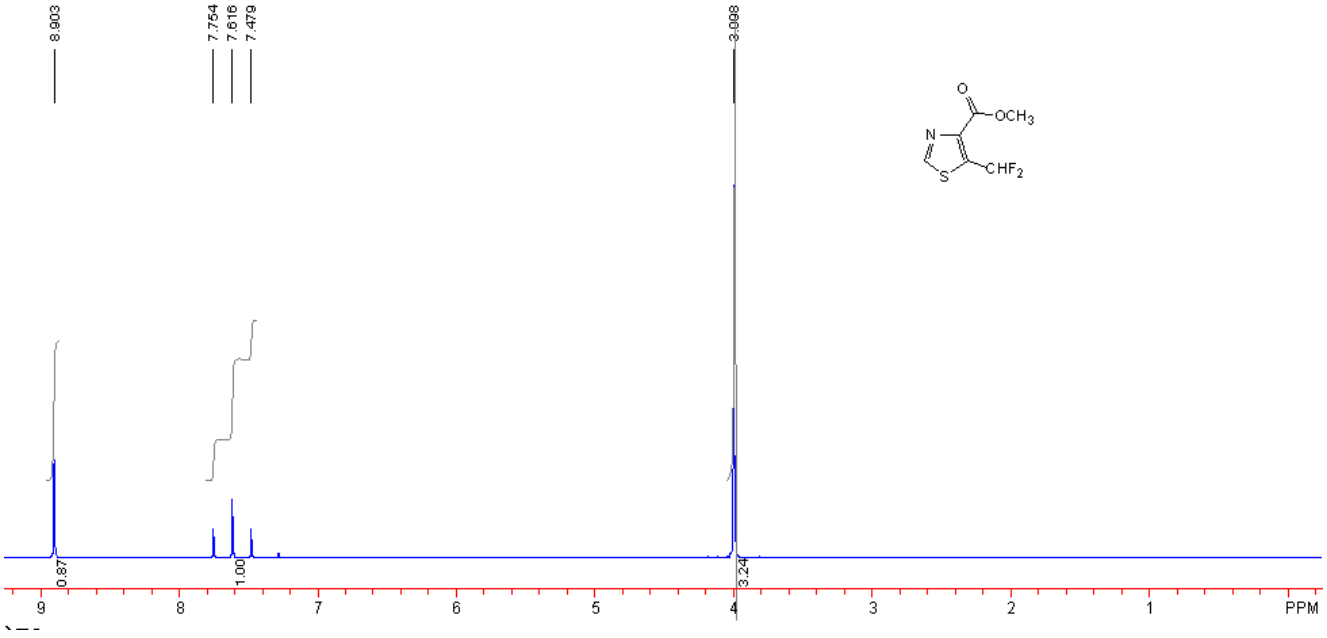
(E) LC/MS spectrum of compound **24**



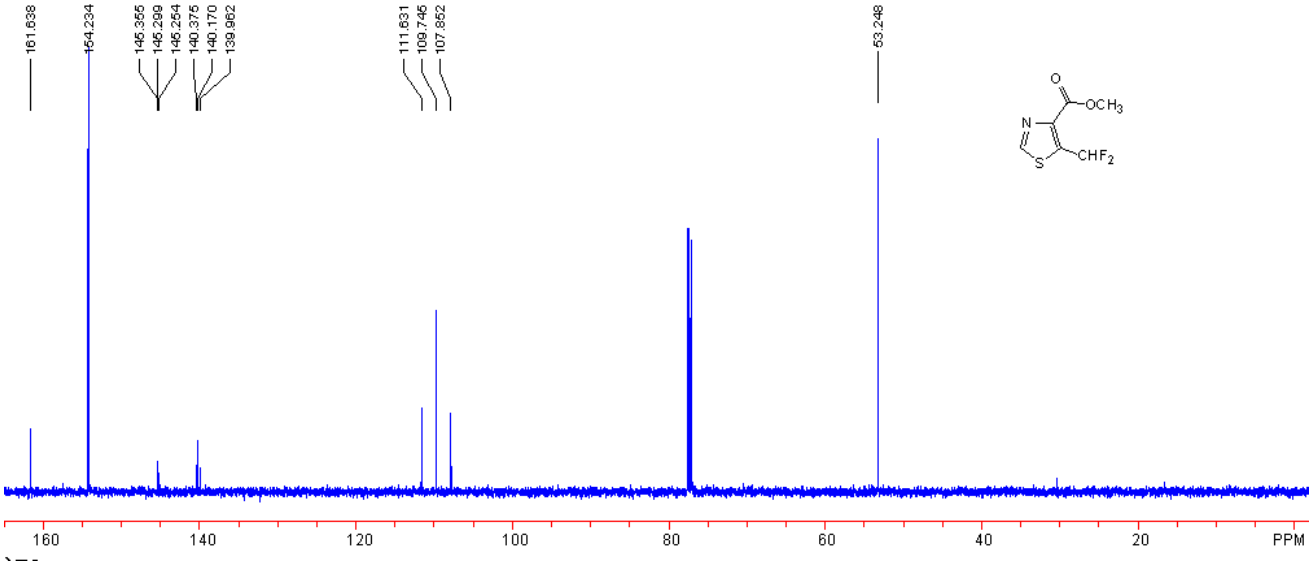
RT = 3.915 min

Figure S24. Compound 25

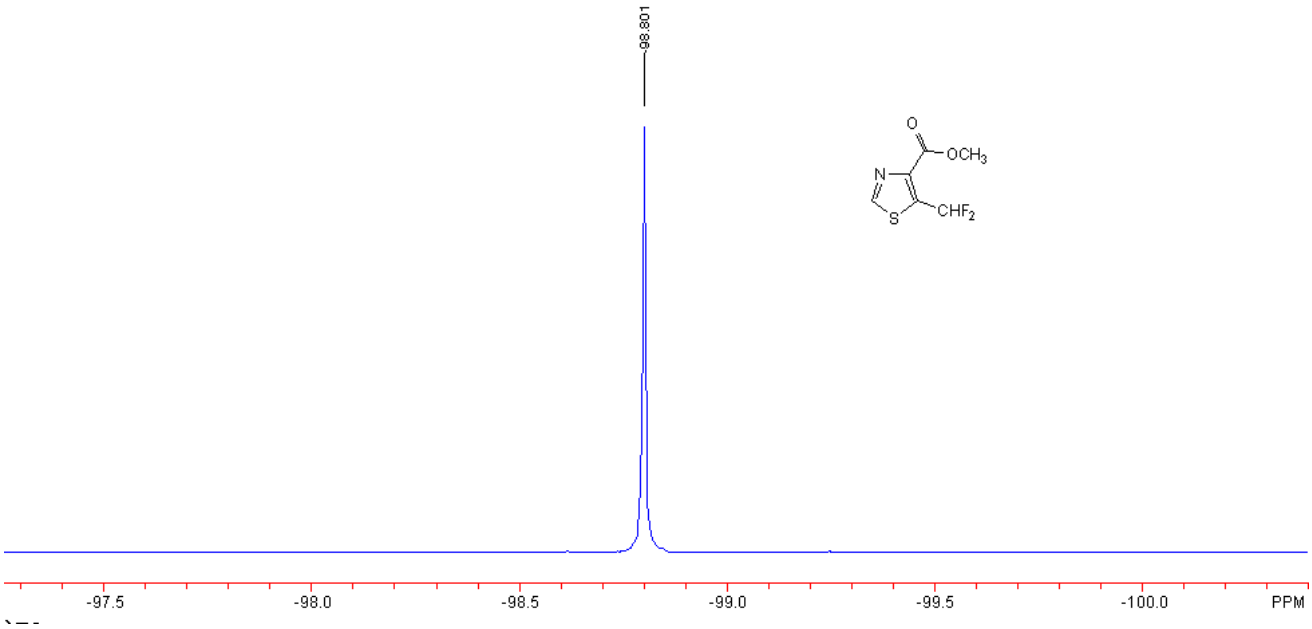
(A) ^{1}H-NMR spectrum ($CDCl_3$)



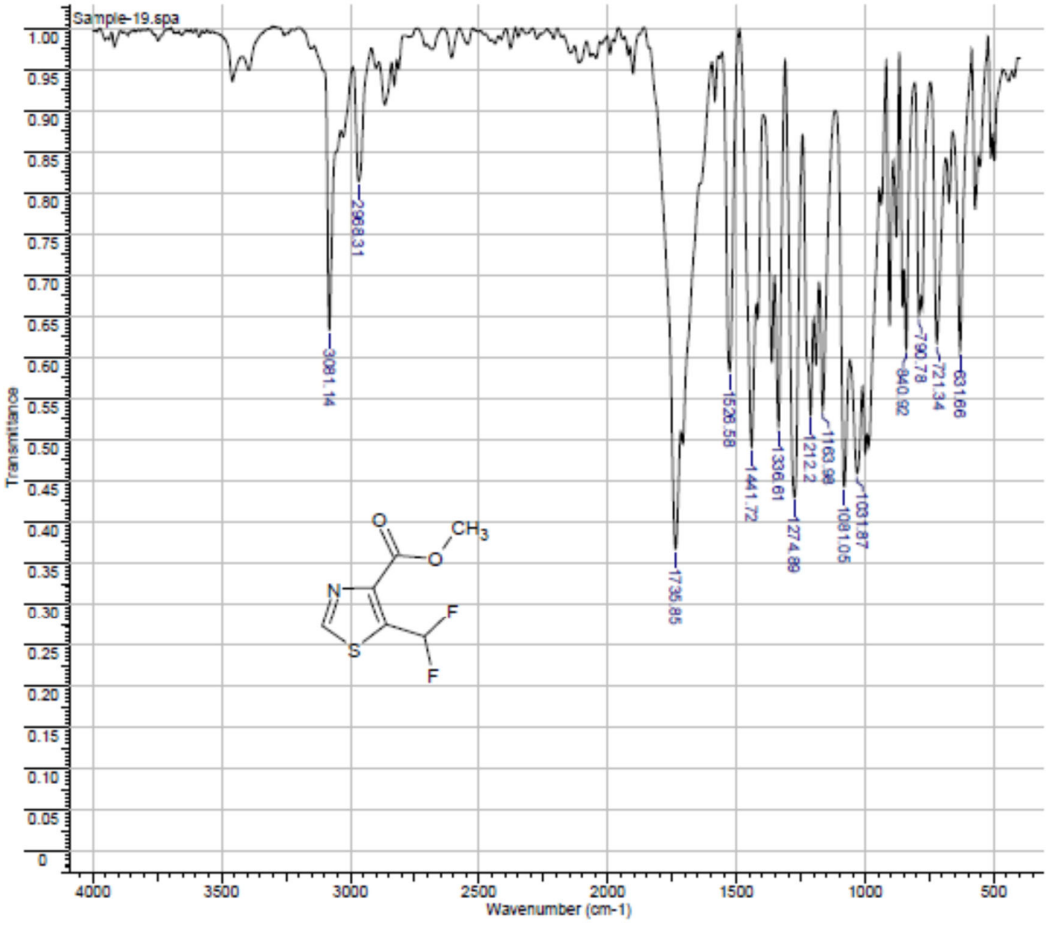
(B) ^{13}C-NMR spectrum ($CDCl_3$)



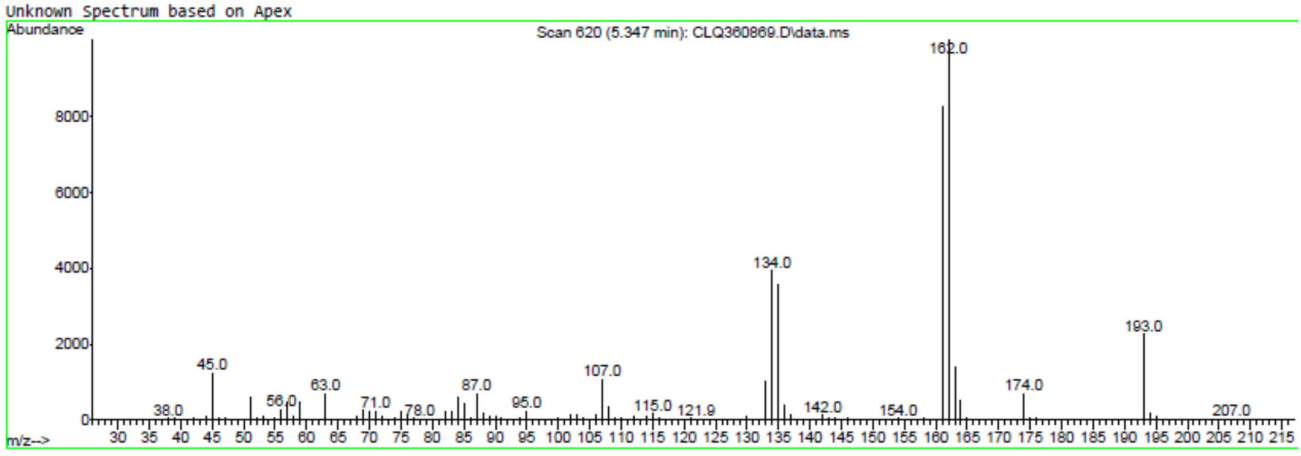
(C) ^{19}F-NMR spectrum ($CDCl_3$)



(D) IR spectrum (KBr)



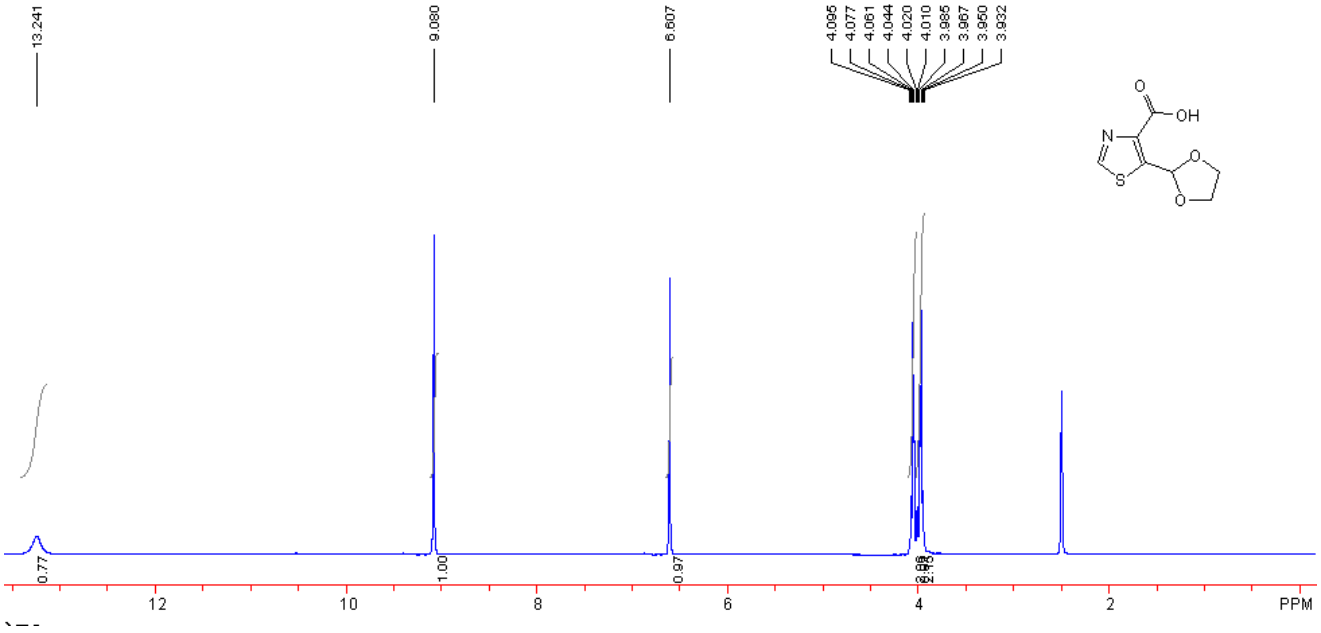
(E) GC/MS spectrum of compound **25**



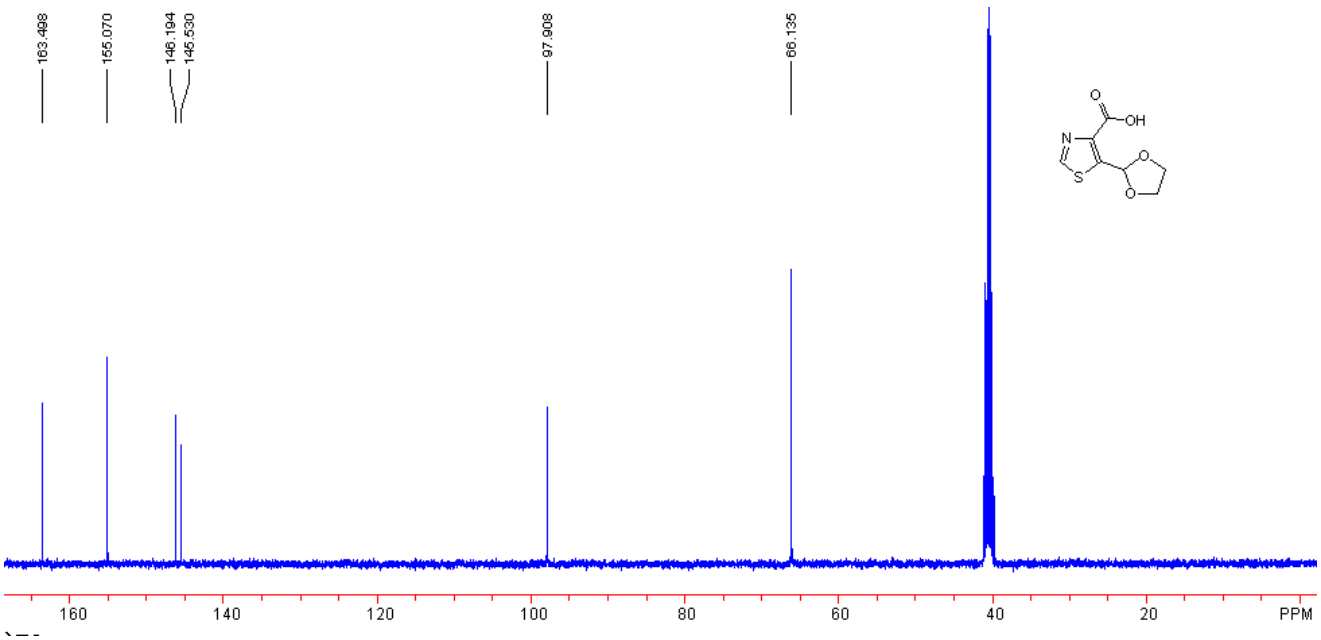
RT = 5.347 min

Figure S25. Compound 26

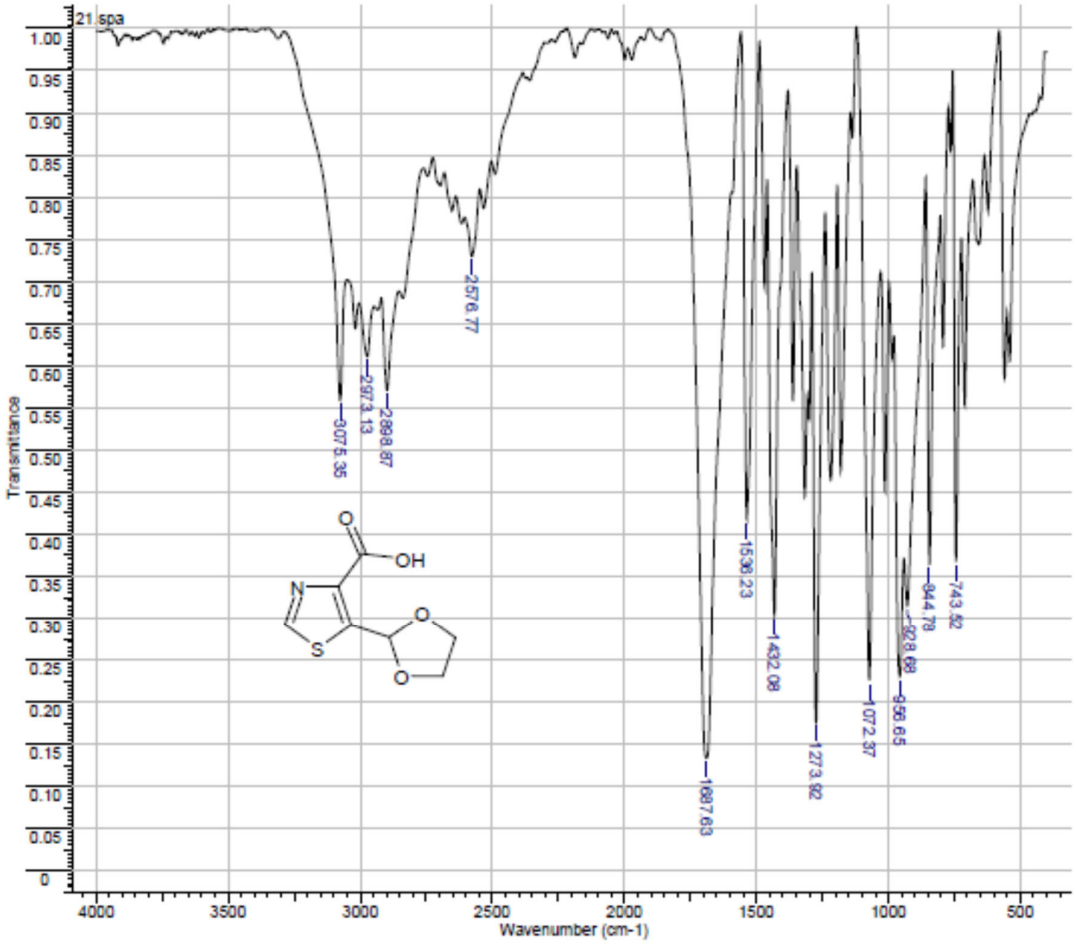
(A) ^{1}H-NMR spectrum (DMSO-d_6)



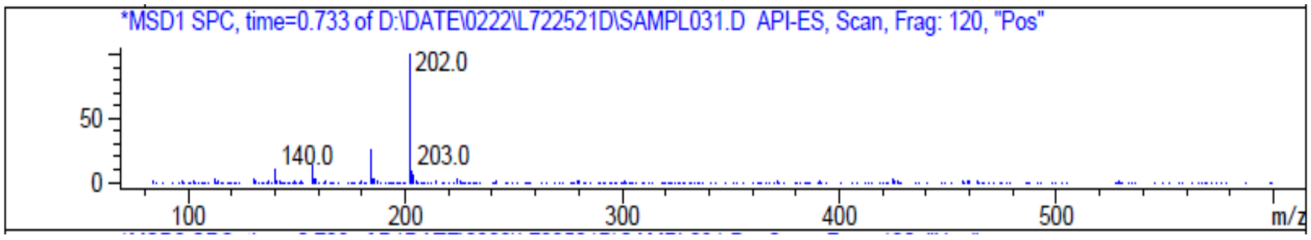
(B) ^{13}C-NMR spectrum (DMSO-d_6)



(C) IR spectrum (KBr)

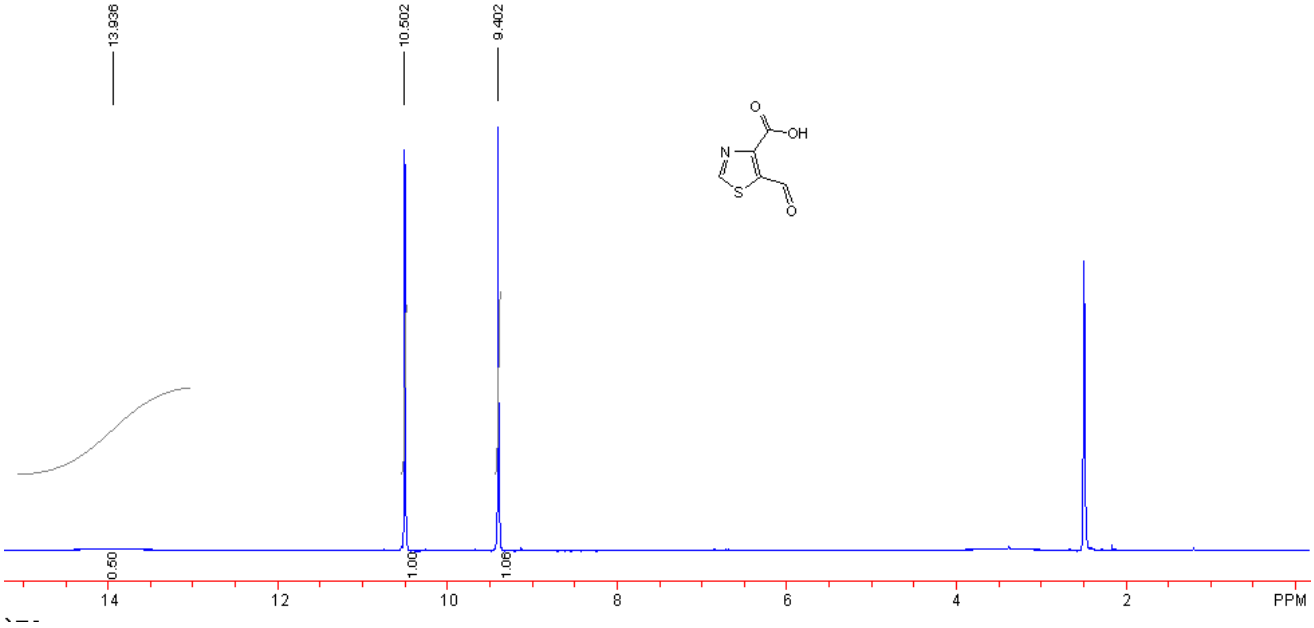


(D) LC/MS spectrum of compound **26**

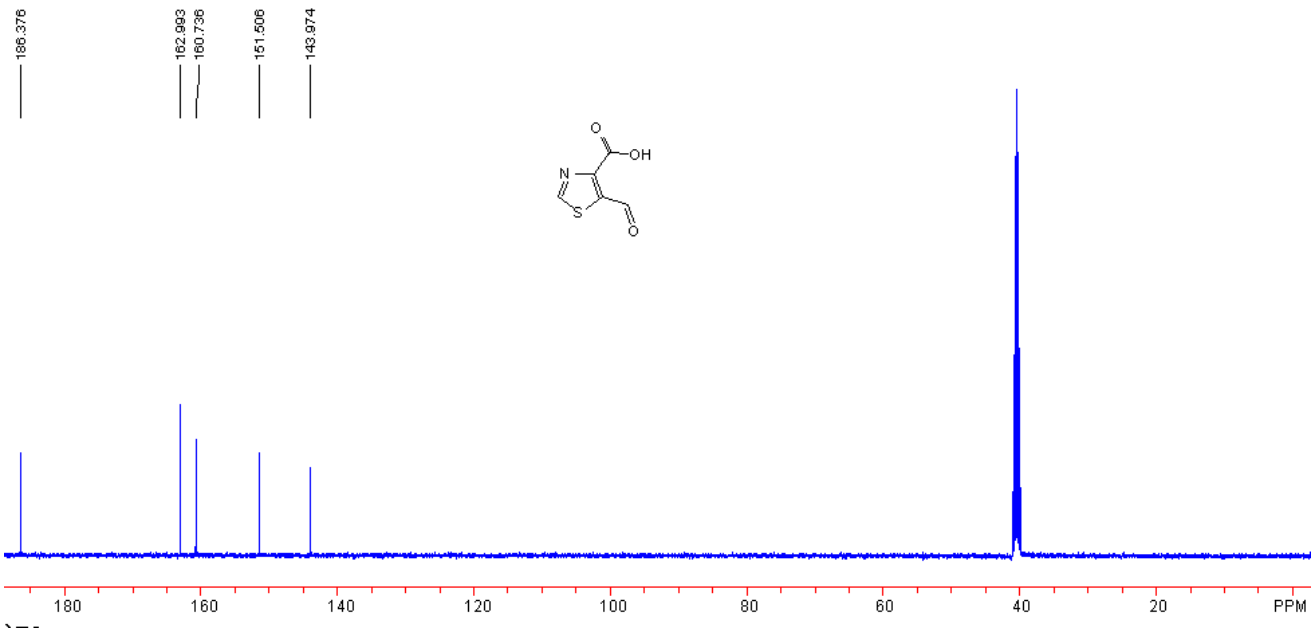


RT = 0.734 min

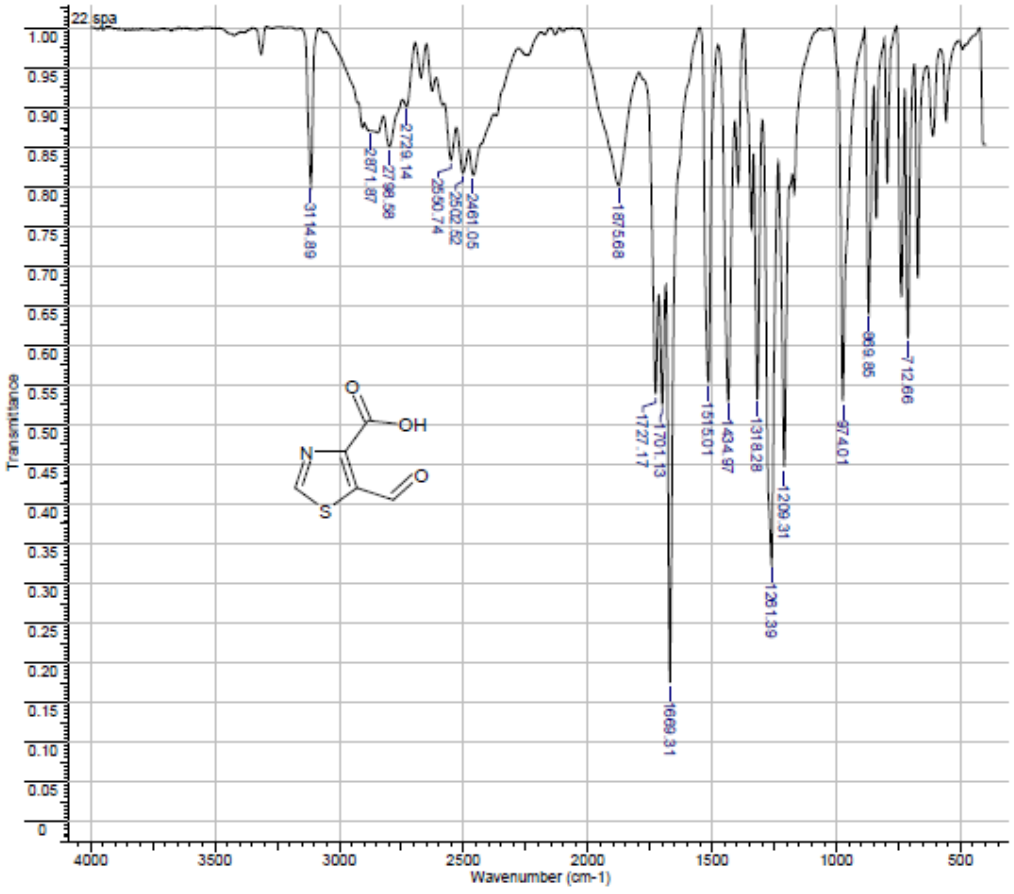
Figure S26. Compound 27
(A) ^{1}H-NMR spectrum (DMSO-d_6)



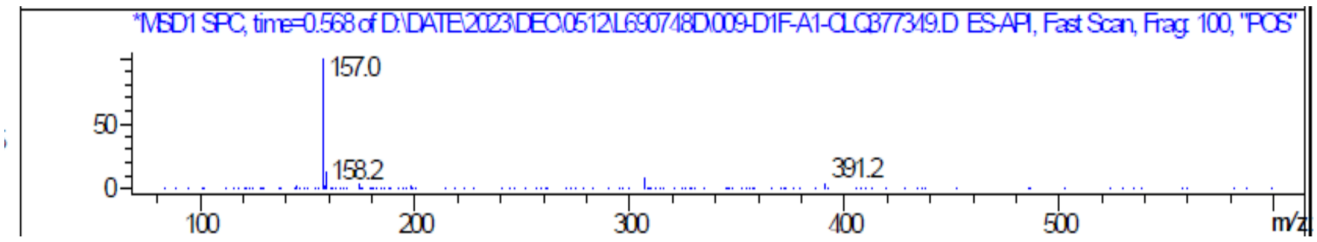
(B) ^{13}C-NMR spectrum (DMSO-d_6)



(C) IR spectrum (KBr)

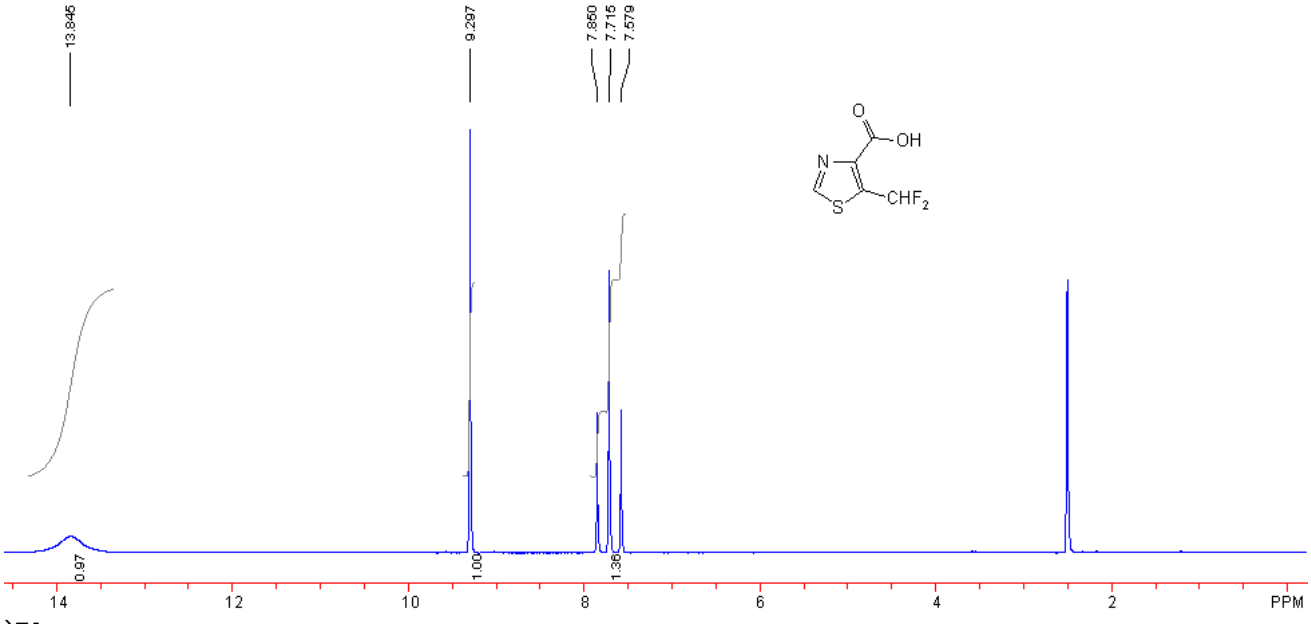


(D) LC/MS spectrum of compound **27**

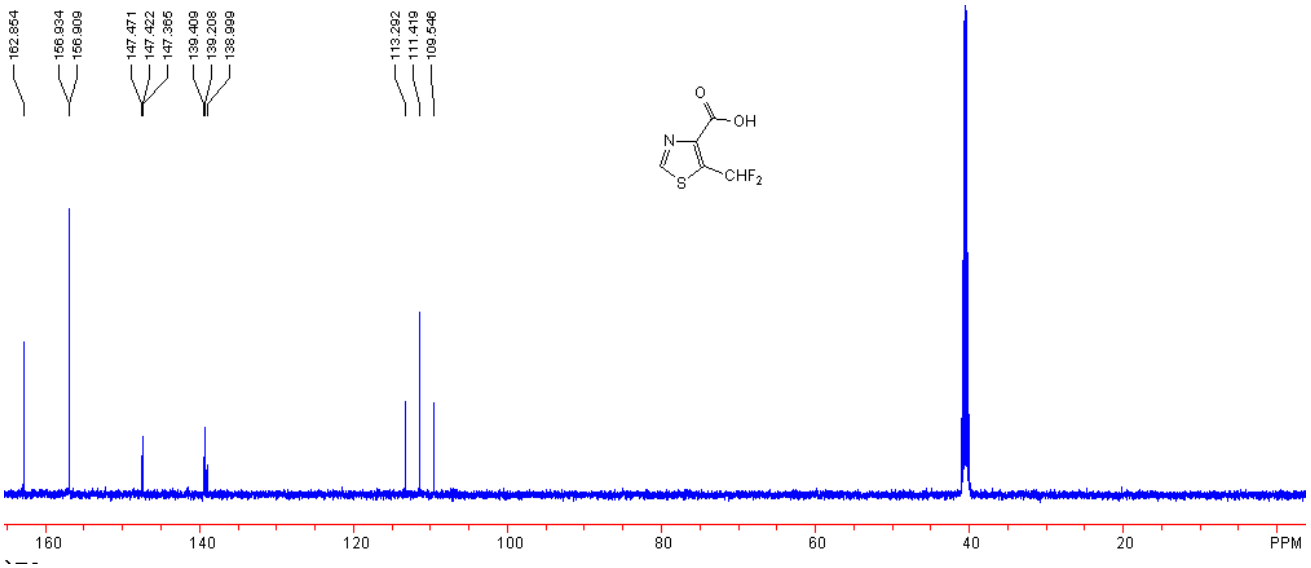


RT = 0.565 min

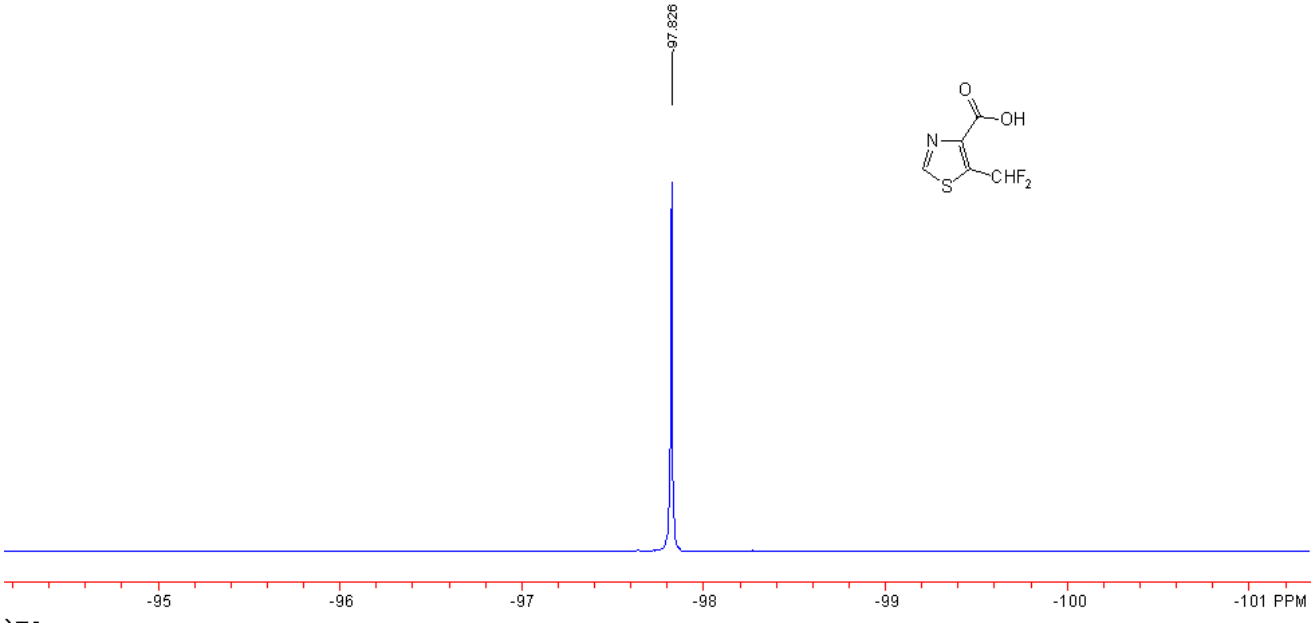
Figure S27. Compound 28
(A) ^{1}H-NMR spectrum (DMSO-d_6)



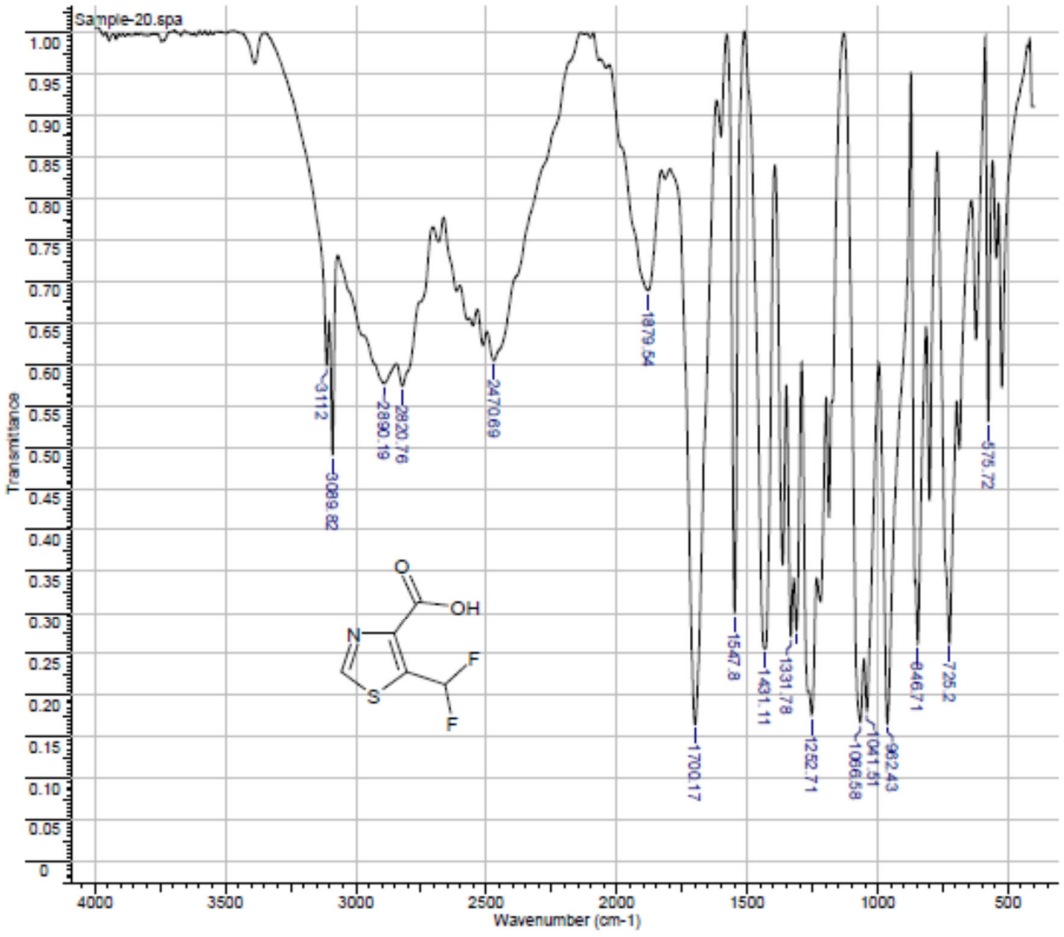
(B) ^{13}C-NMR spectrum (DMSO-d_6)



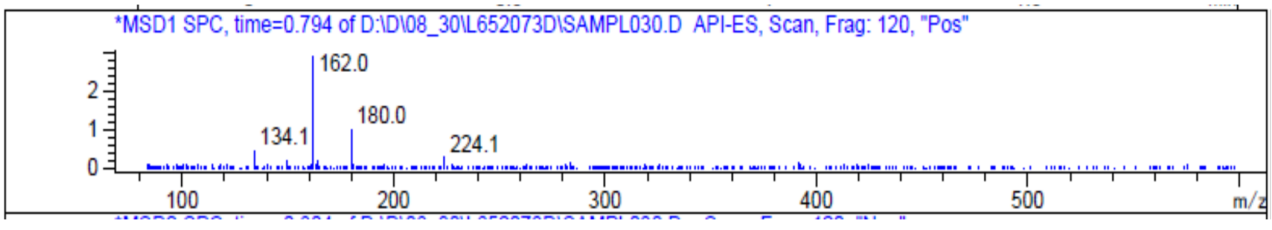
(C) ^{19}F-NMR spectrum (DMSO-d$_6$)



(D) IR spectrum (KBr)



(E) LC/MS spectrum of compound **28**



RT = 0.802 min