

Phosphine Catalyzed Michael-Type Additions: The Synthesis of Glutamic Acid Derivatives from Arylidene- α -amino Esters [†]

Lesly V. Rodríguez-Flórez ¹, María González-Marcos ¹, Eduardo García-Mingüens ²,
María de Gracia Retamosa ¹, Misa Kawase ¹, Elisabet Selva ² and José M. Sansano ^{1,*}

¹ Departamento de Química Orgánica, Centro de Innovación en Química Avanzada (ORFEO-CINQA) and Instituto de Síntesis Orgánica, Universidad de Alicante, Ctra. Alicante-San Vicente s/n, 03080 Alicante, Spain

² Medalchemy, S. L. Ancha de Castelar, 46-48, entlo. A. San Vicente del Raspeig, 03690 Alicante, Spain

* Correspondence: jmsansano@ua.es

[†] Dedicated to the memory of Prof. David A. Evans.

TABLE OF CONTENTS

1. NMR COPIES.....	S1
2. REPRESENTATIVE FTIR COPIES	S29

1. NMR COPIES

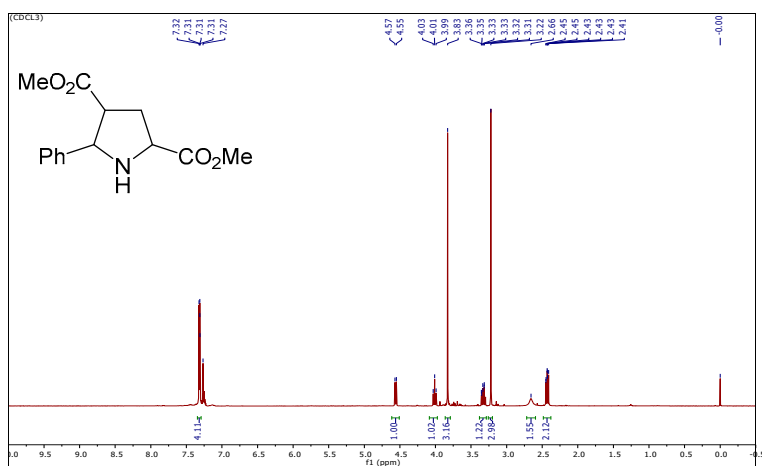


Figure S1, ¹H NMR of compound 3a

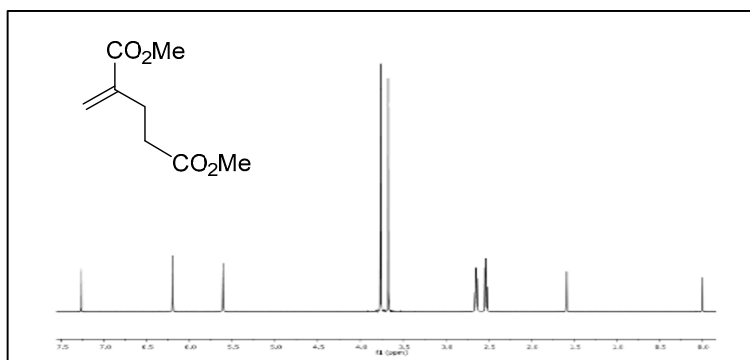


Figure S2, ¹H NMR of compound 4

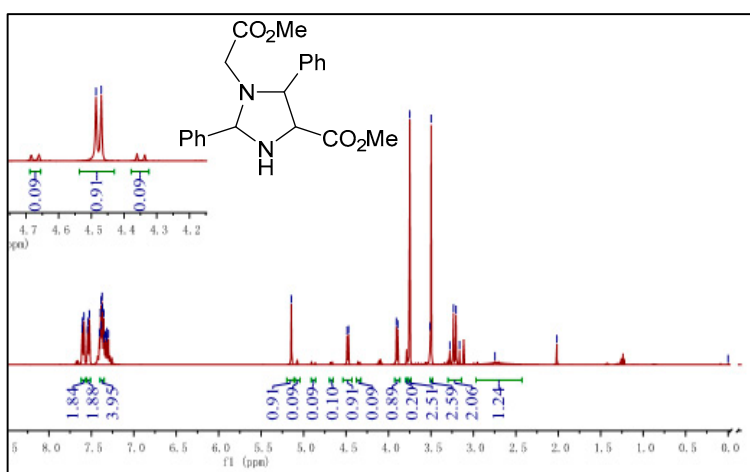


Figure S3, ¹H NMR of compound 5

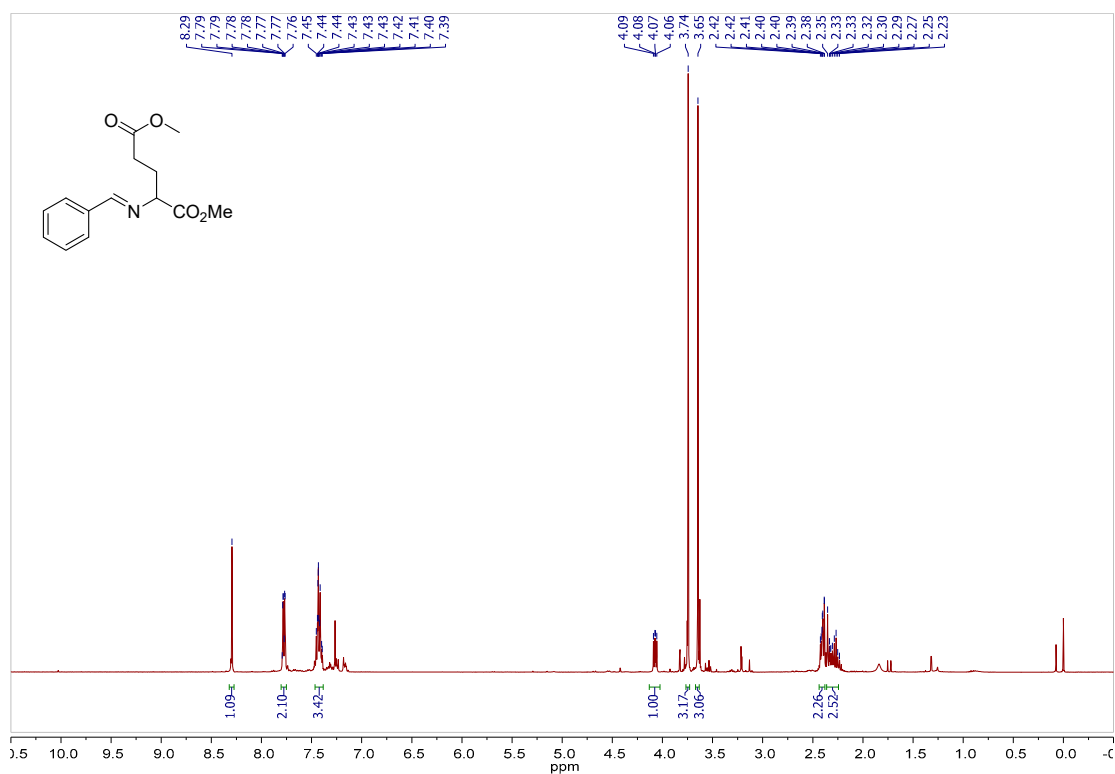


Figure S4, ¹H NMR of compound 2a

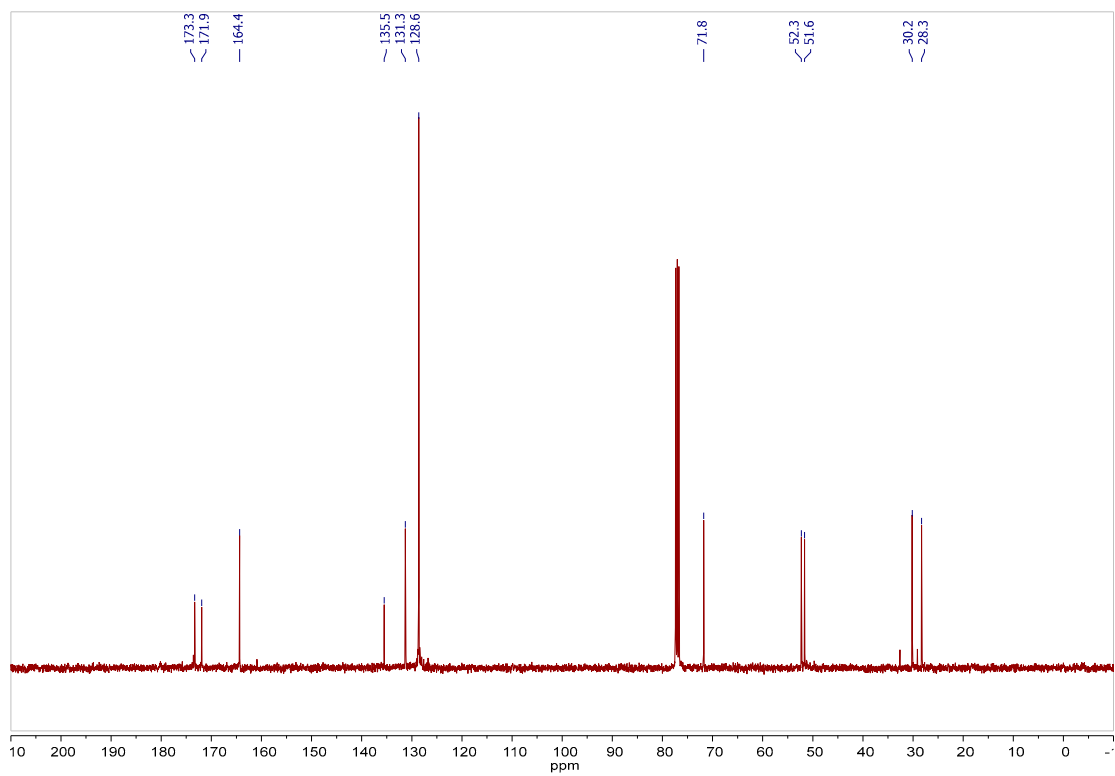


Figure S5, ¹³C NMR of compound 2a

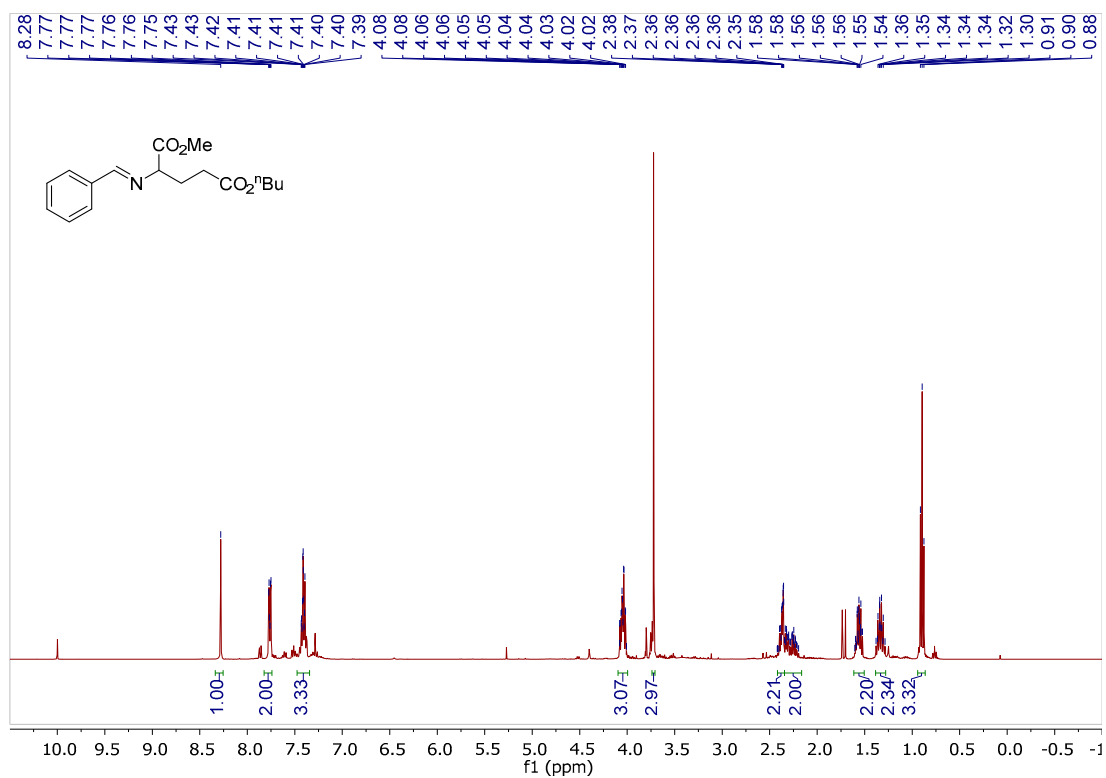


Figure S6, ¹H NMR of compound **2b**

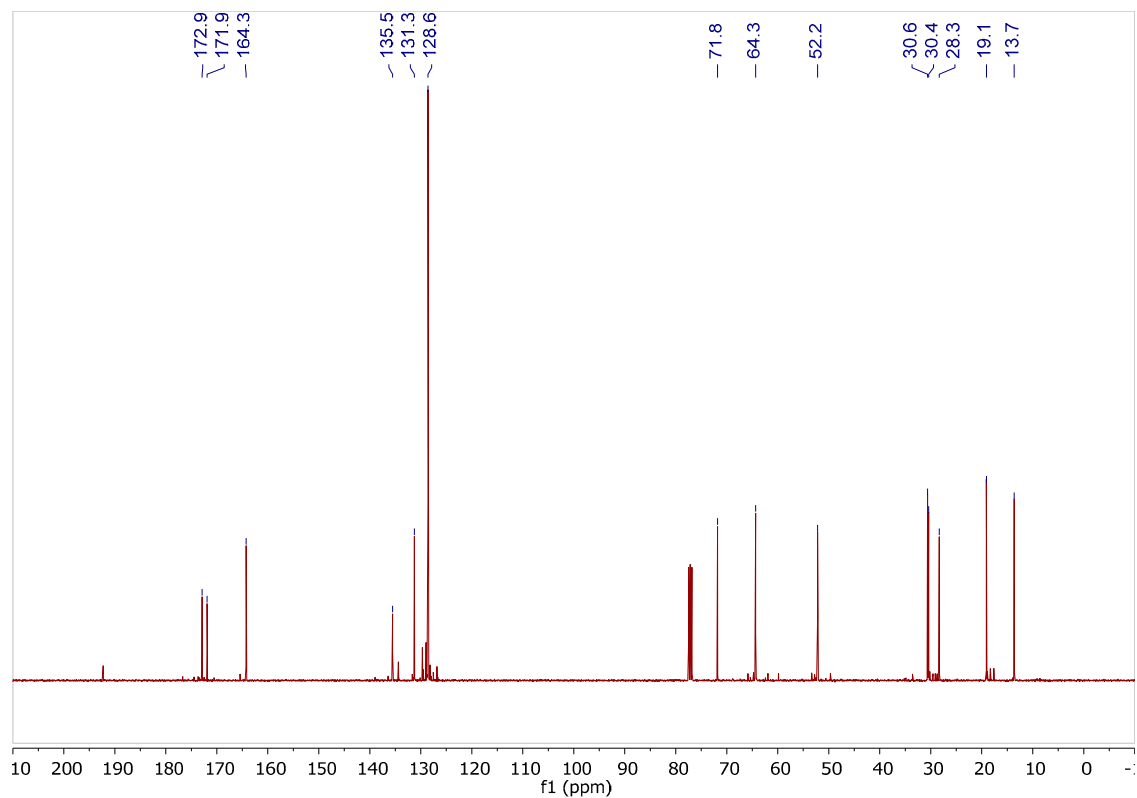


Figure S7, ¹³C NMR of compound **2b**

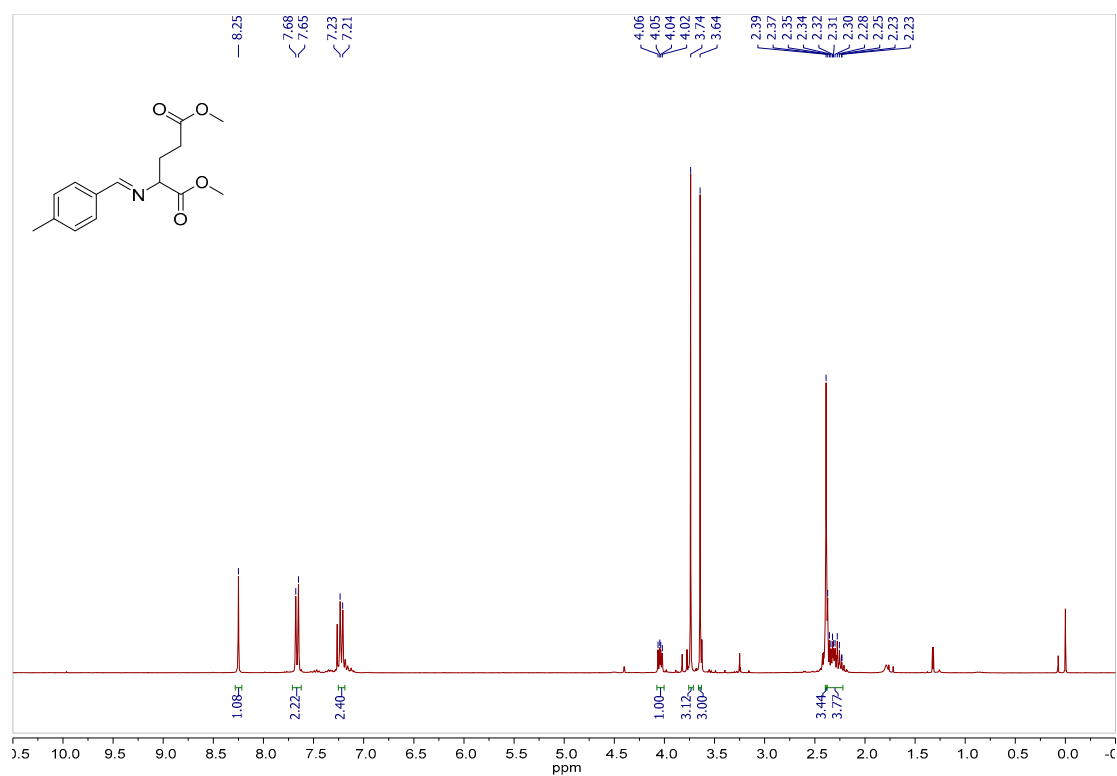


Figure S8, ¹H NMR of compound 2c

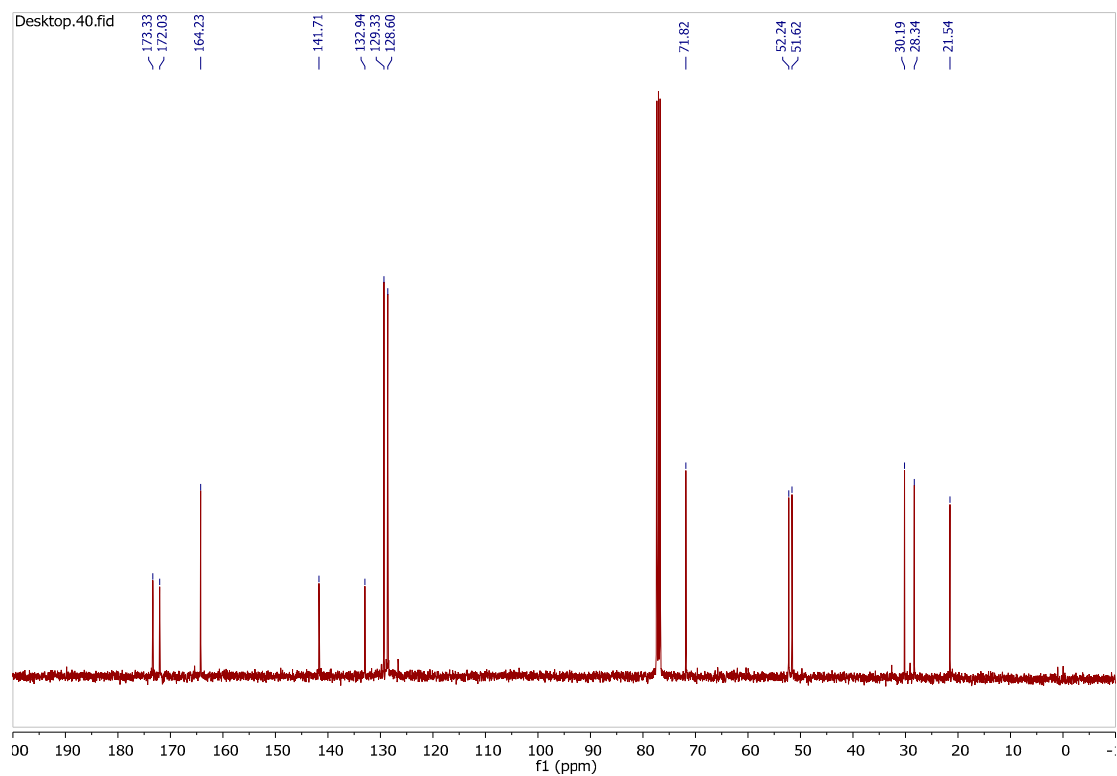


Figure S9, ¹³C NMR of compound 2c

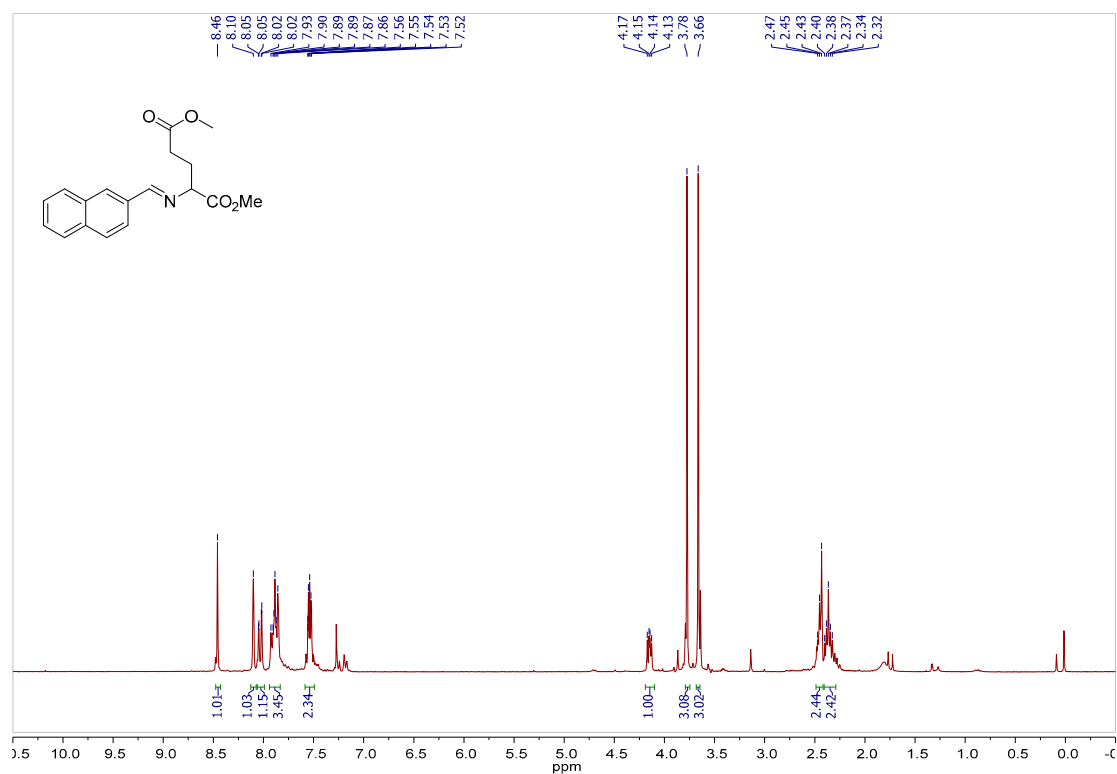


Figure S10, ¹H NMR of compound 2d

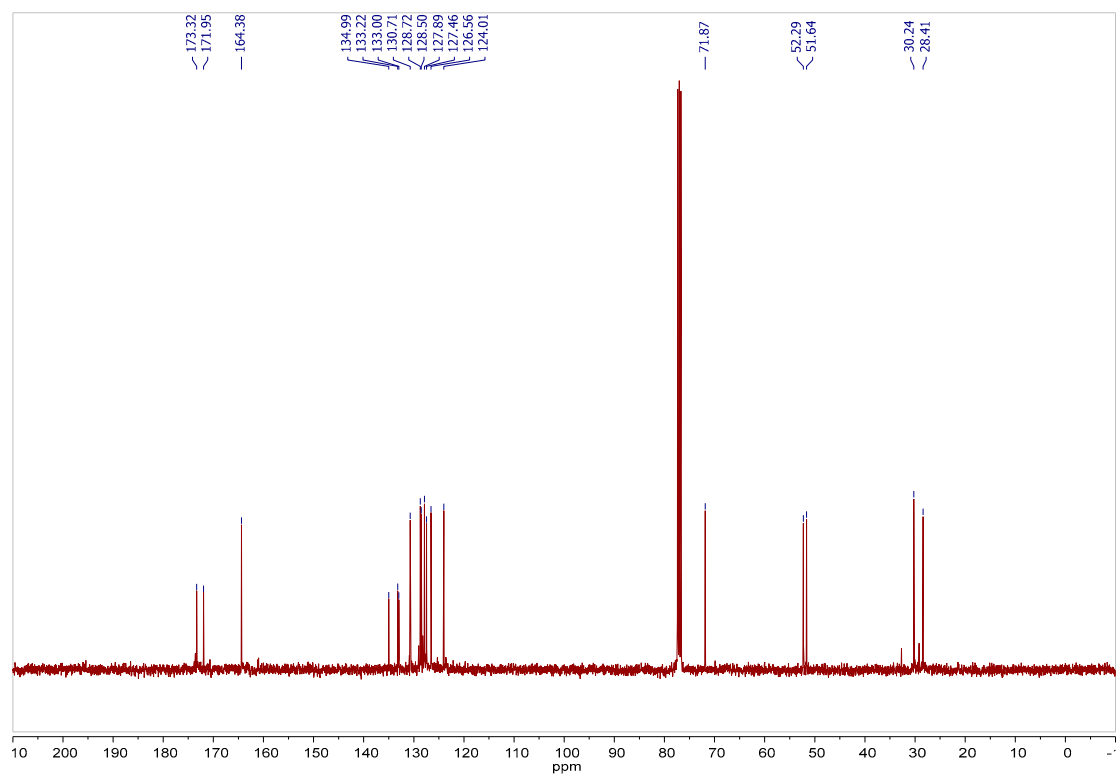


Figure S11, ¹³C NMR of compound 2d

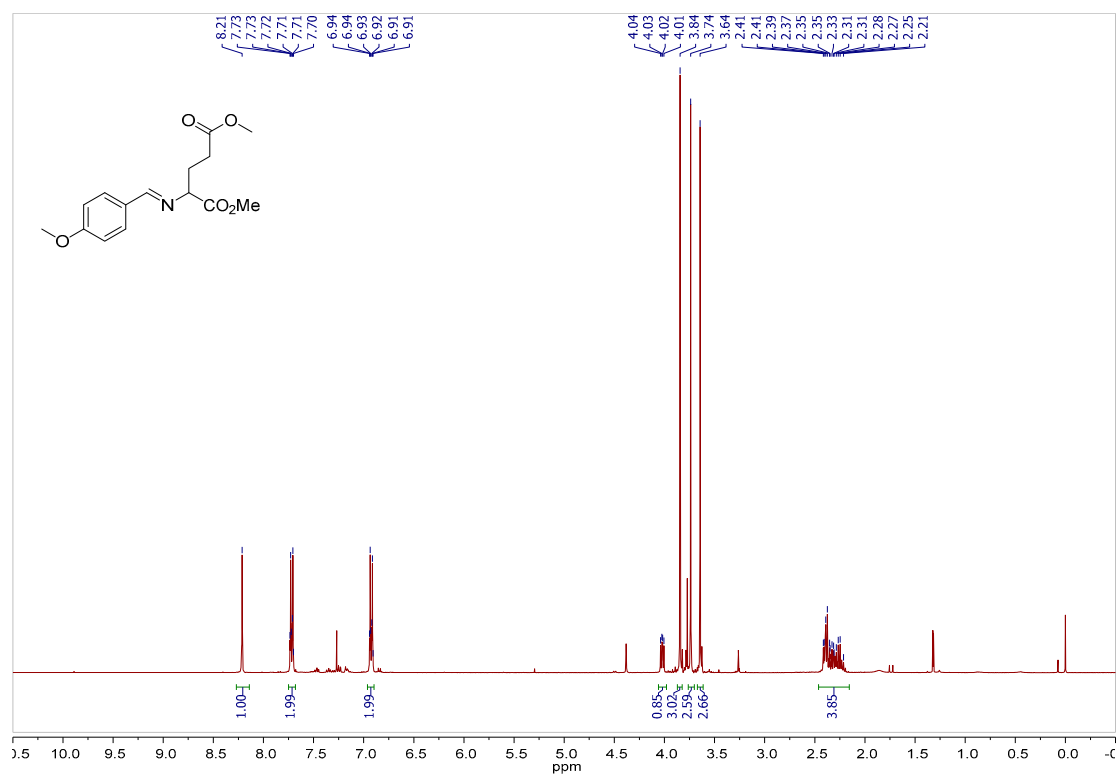


Figure S12, ¹H NMR of compound 2e

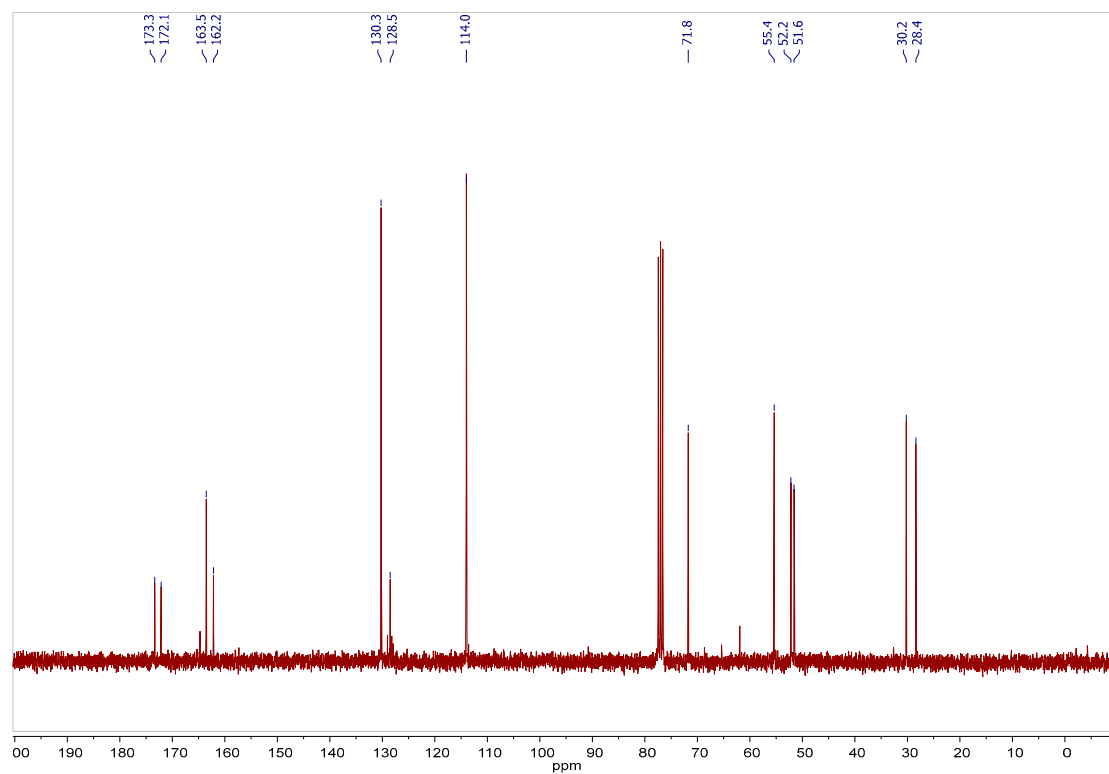


Figure S13, ¹³C NMR of compound 2e

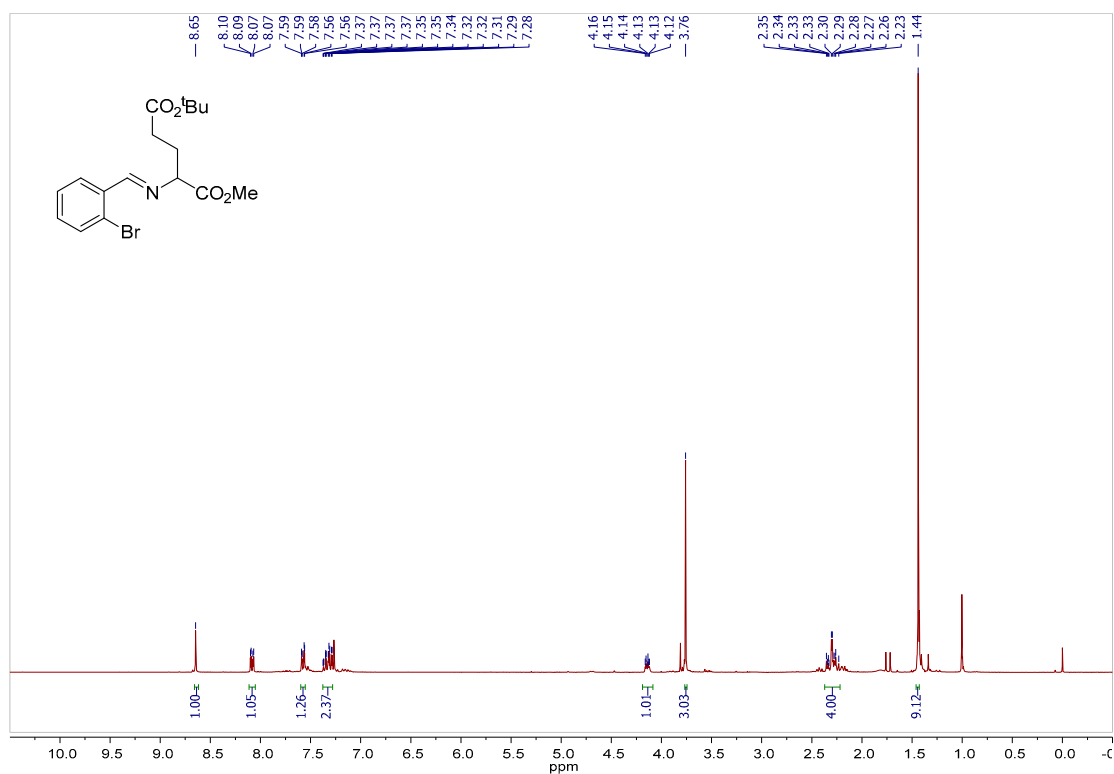


Figure S14, ¹H NMR of compound **2f**

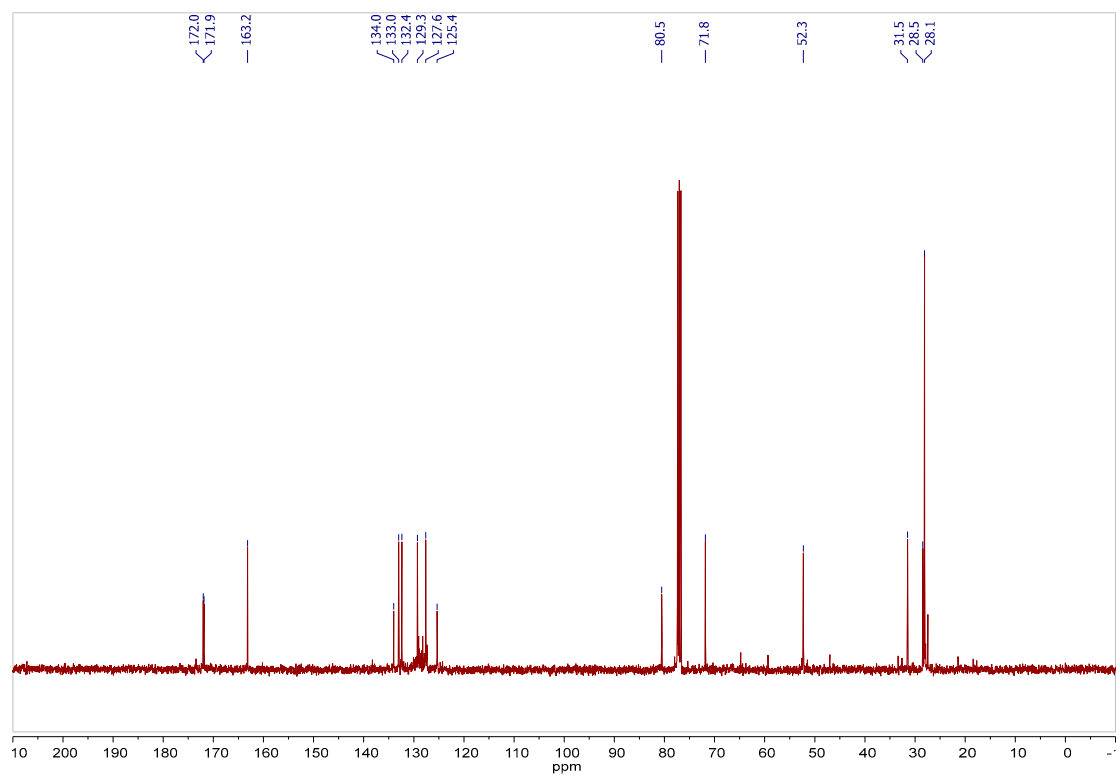


Figure S15, ¹³C NMR of compound **2f**

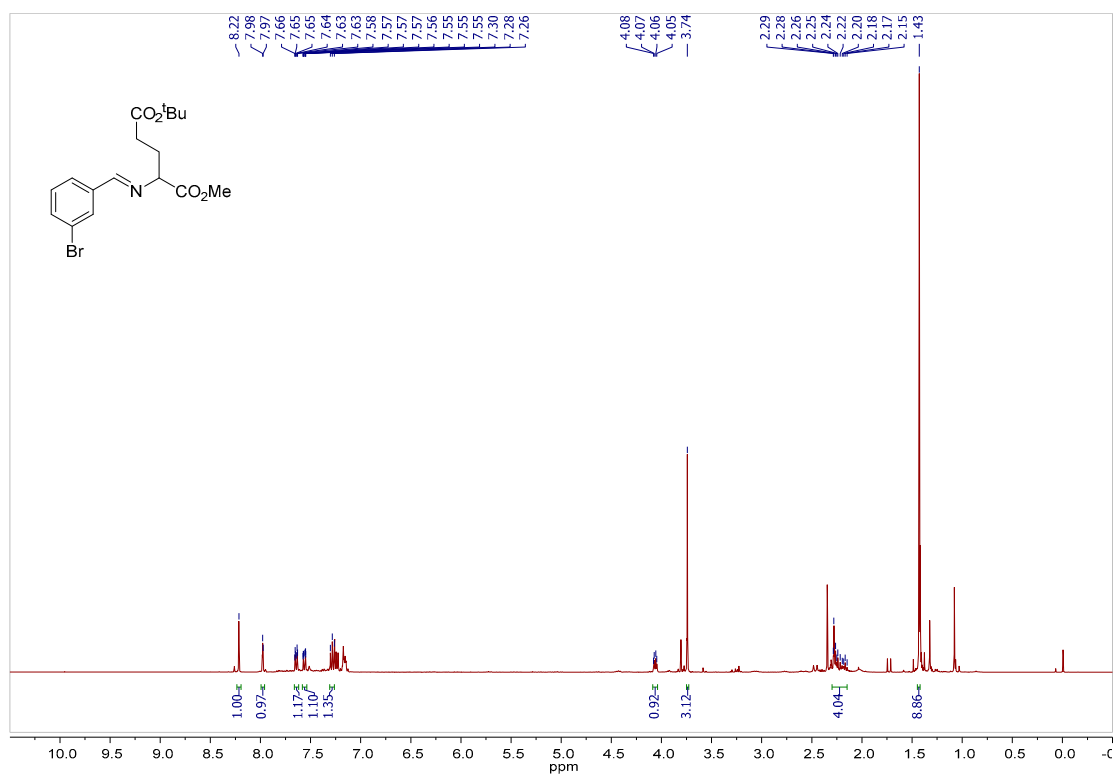


Figure S16, ¹H NMR of compound **2g**

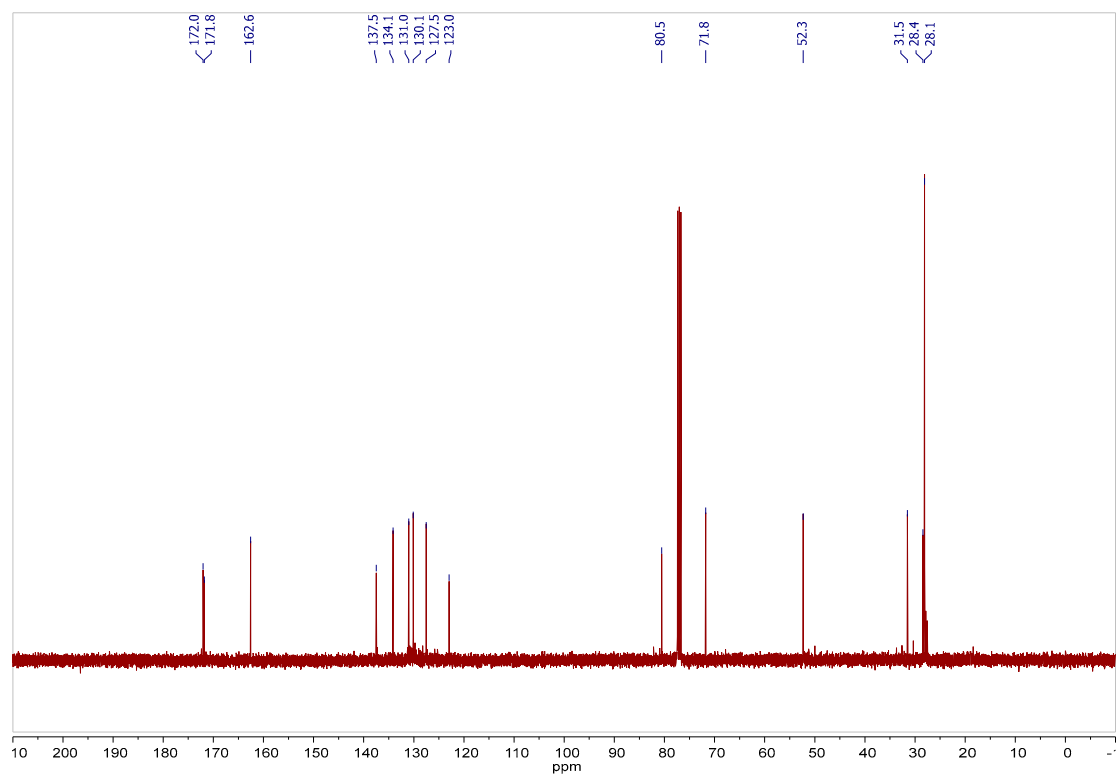


Figure S17, ¹³C NMR of compound **2g**

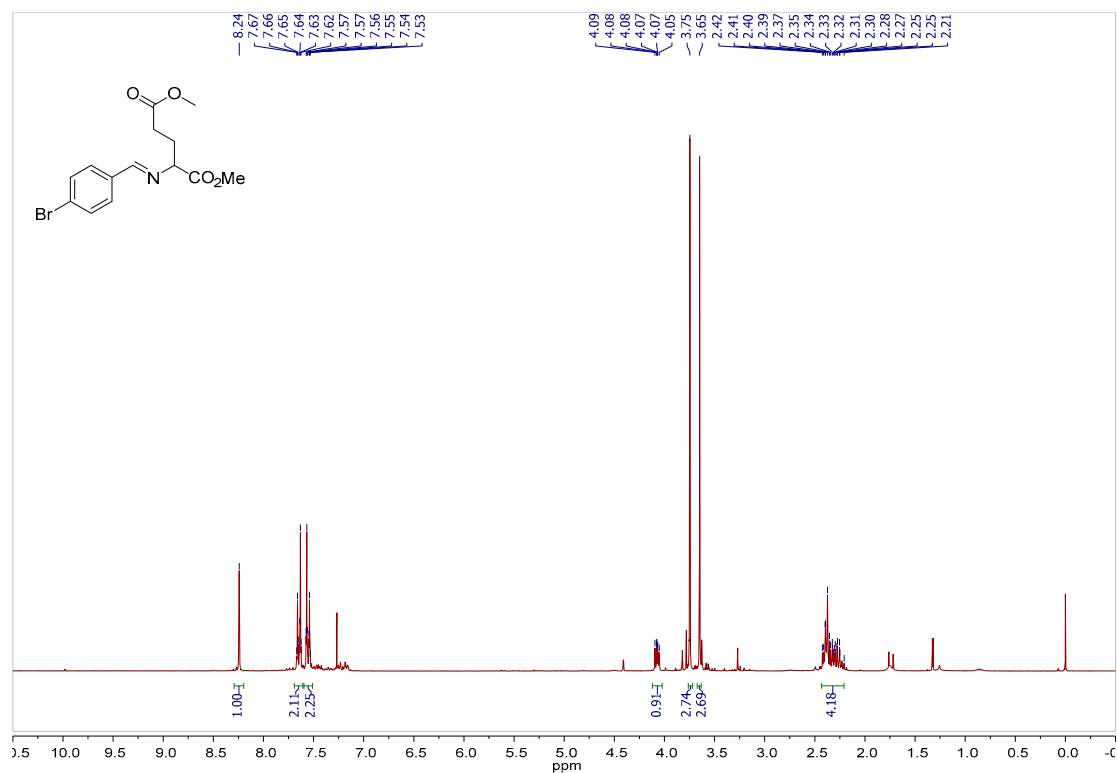


Figure S18, ¹H NMR of compound 2h

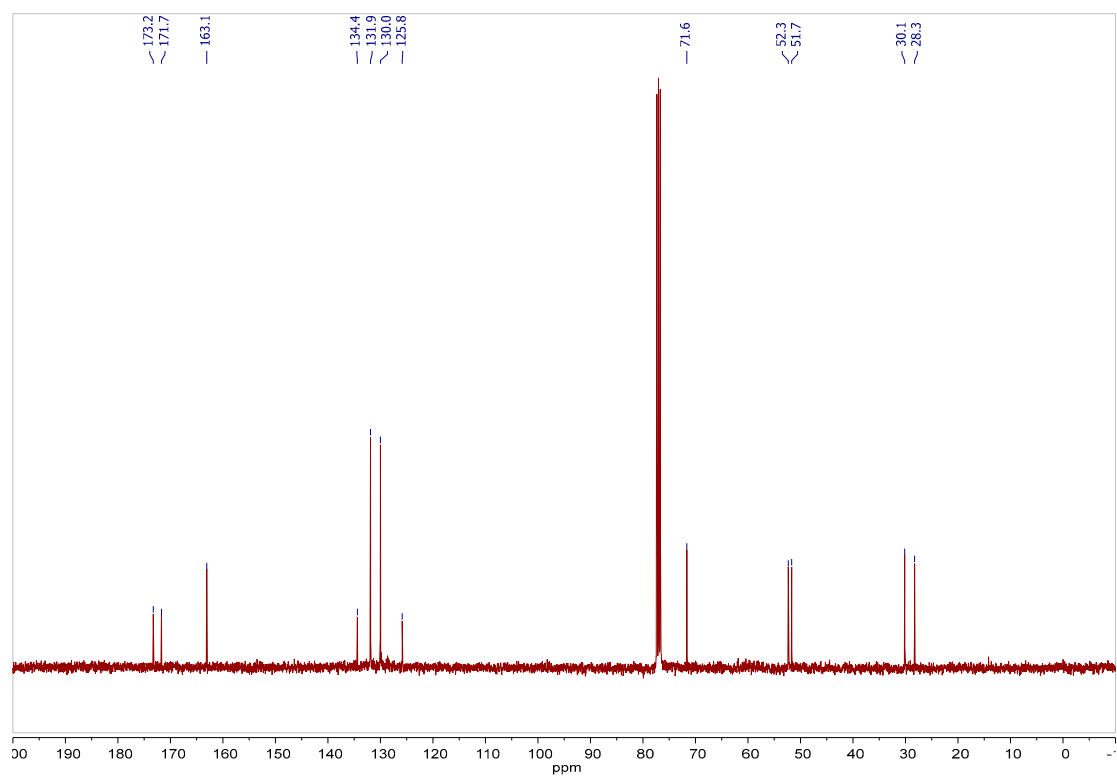


Figure S19, ¹³C NMR of compound 2h

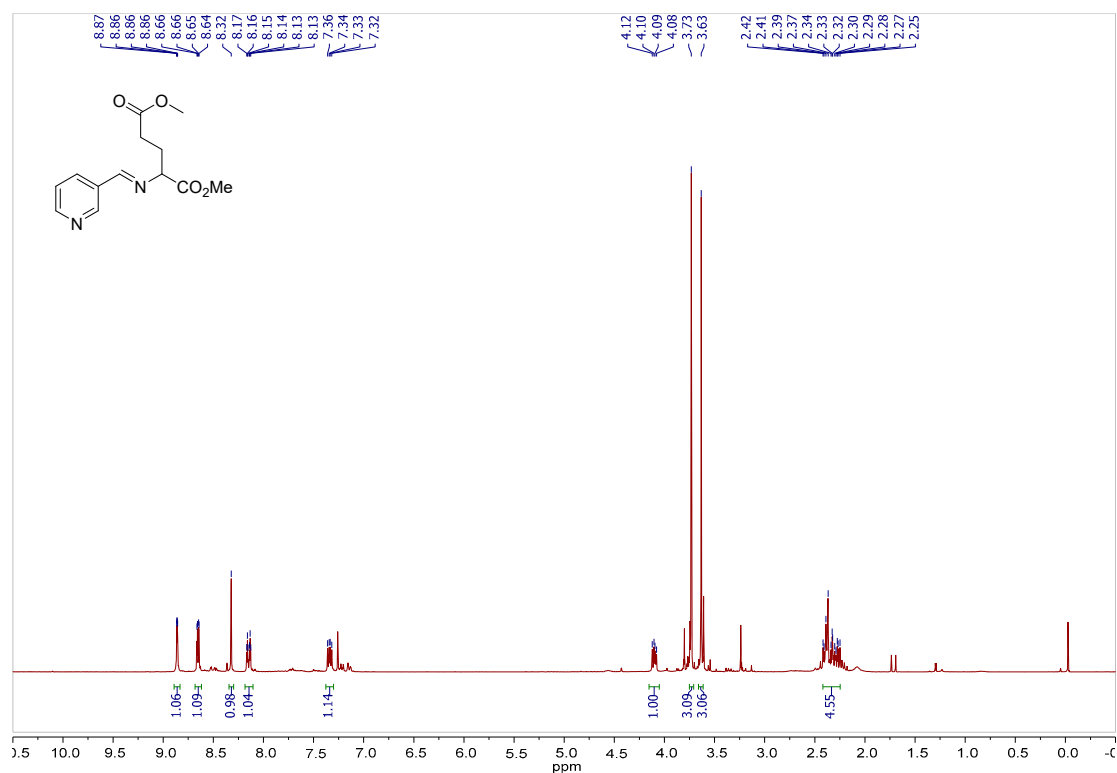


Figure S22, ¹H NMR of compound 2j

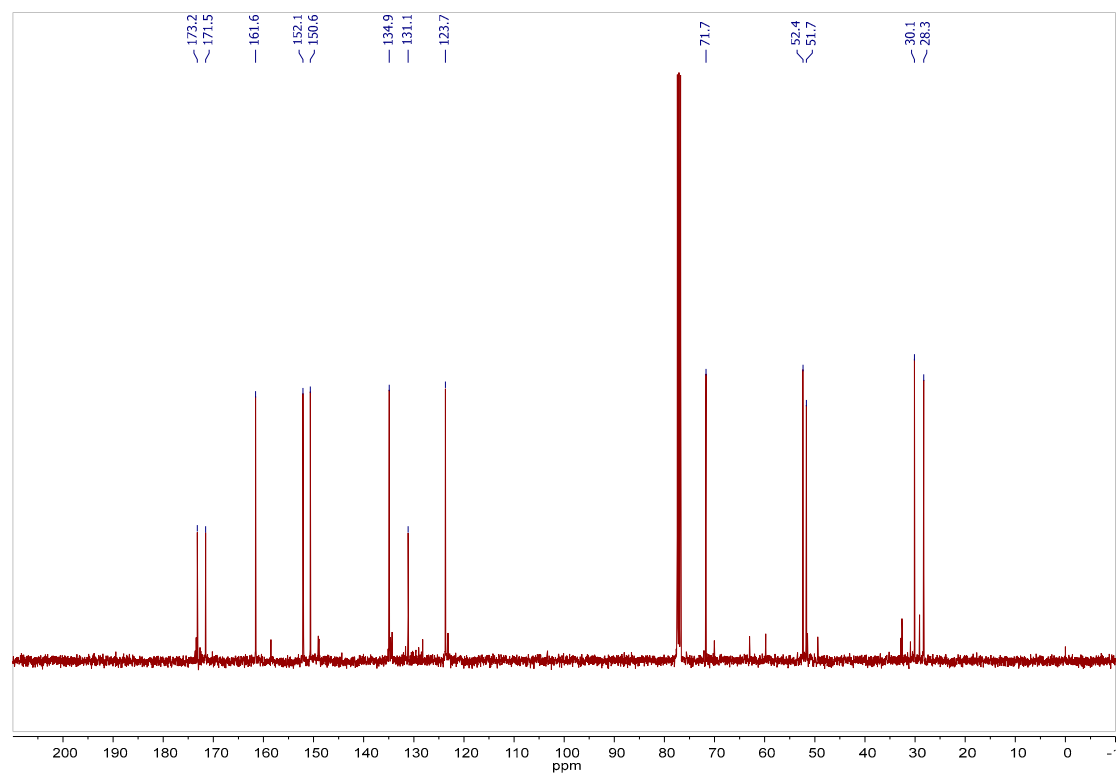


Figure S23, ¹³C NMR of compound 2j

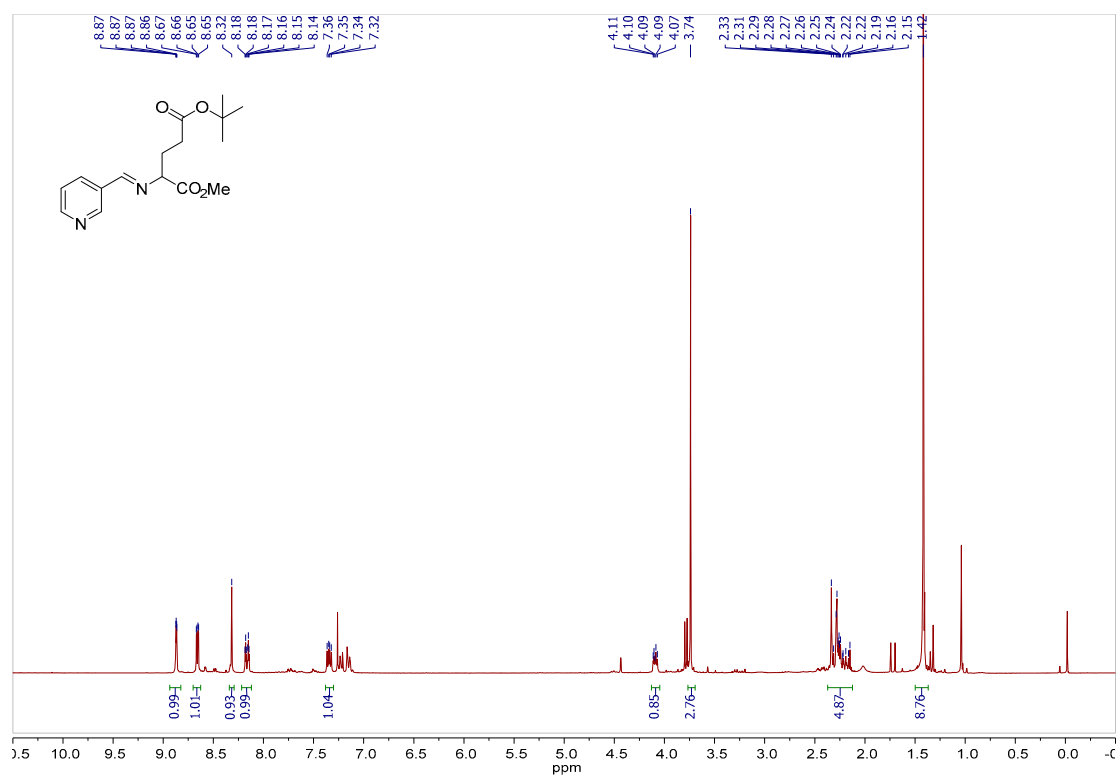


Figure S24, ¹H NMR of compound 2k

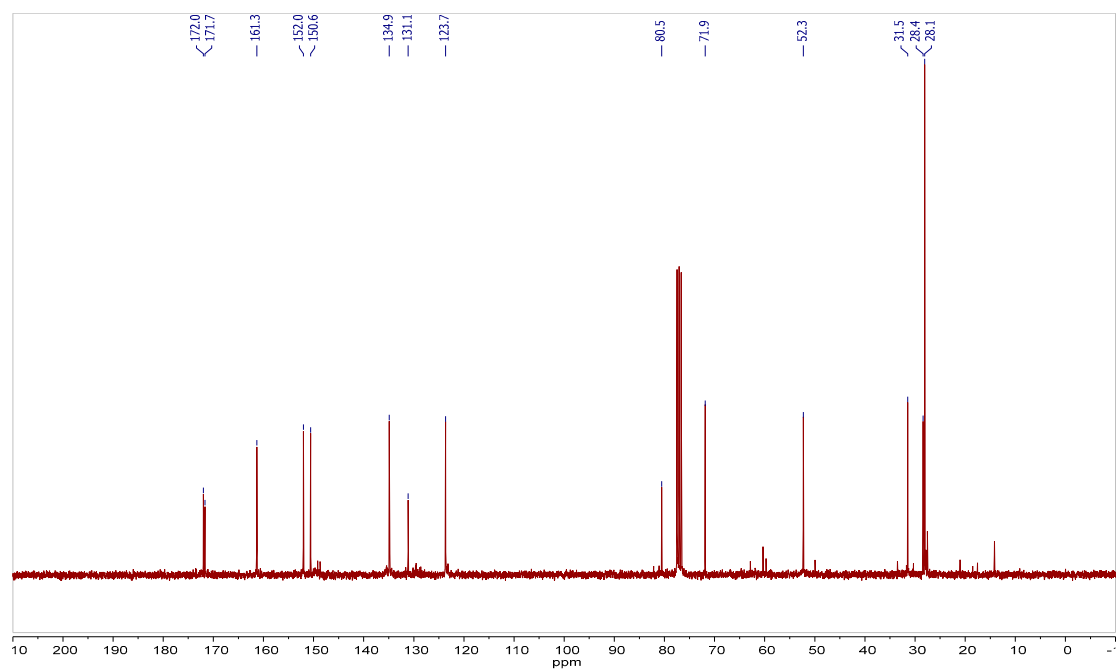


Figure S25, ¹³C NMR of compound 2k

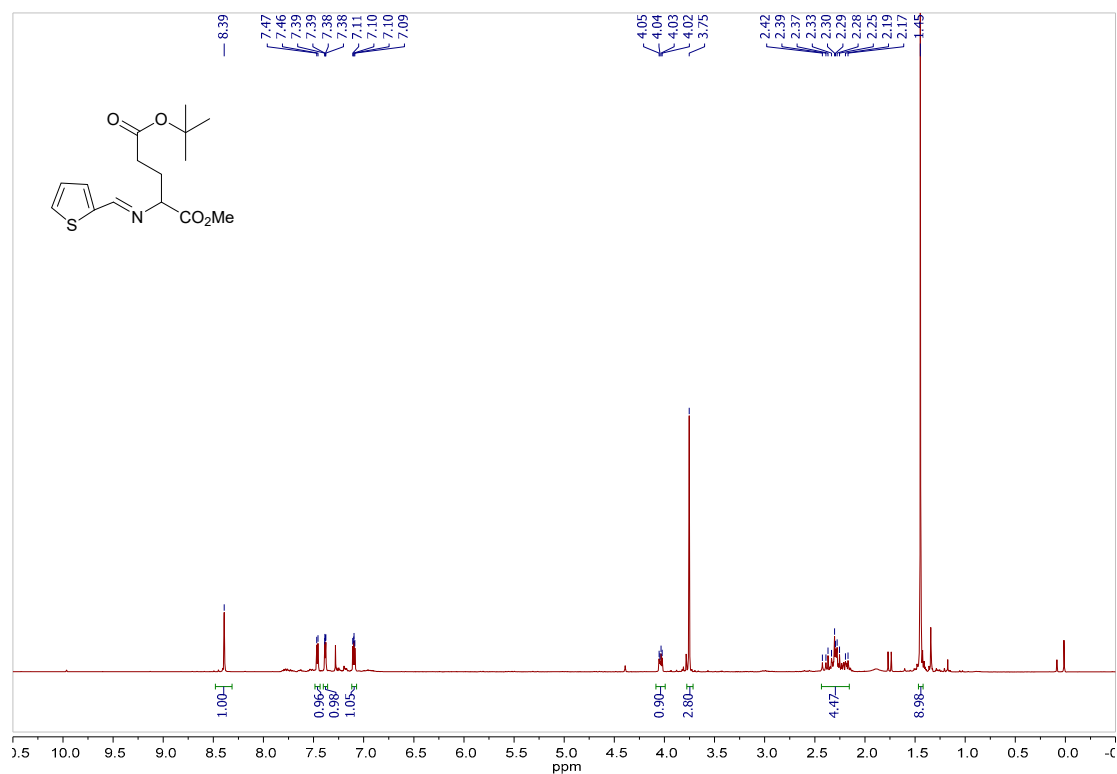


Figure S26, ¹H NMR of compound 2I

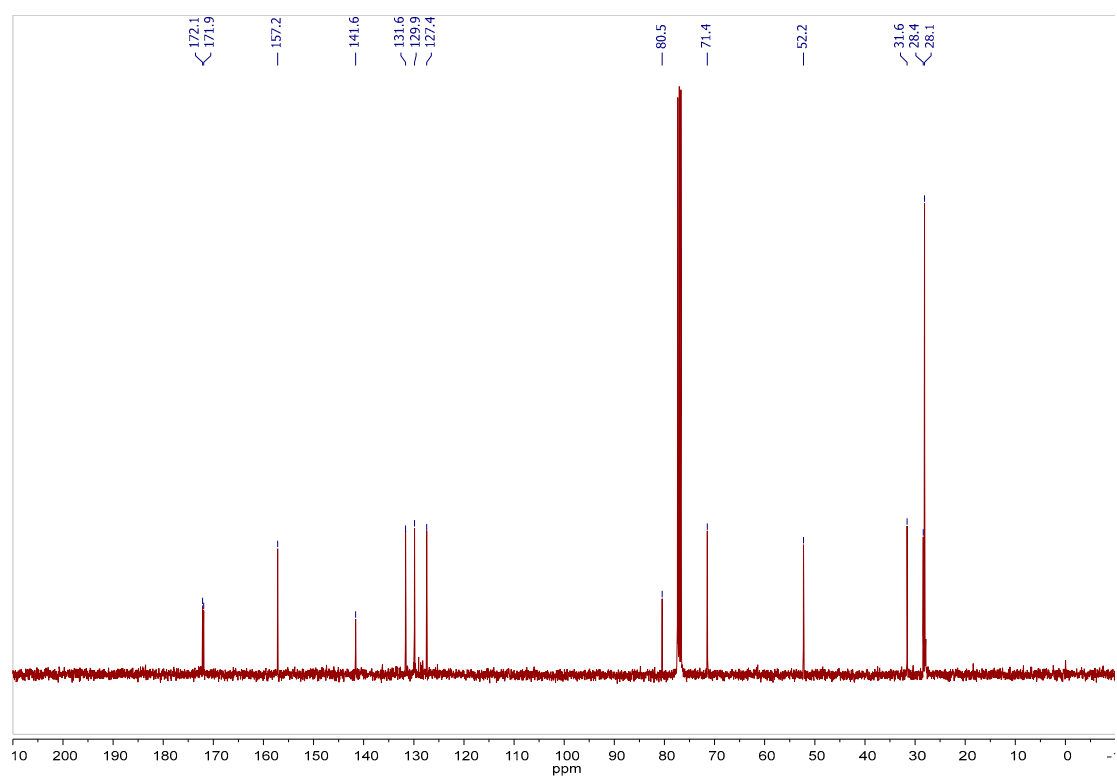


Figure S27, ¹³C NMR of compound 2I

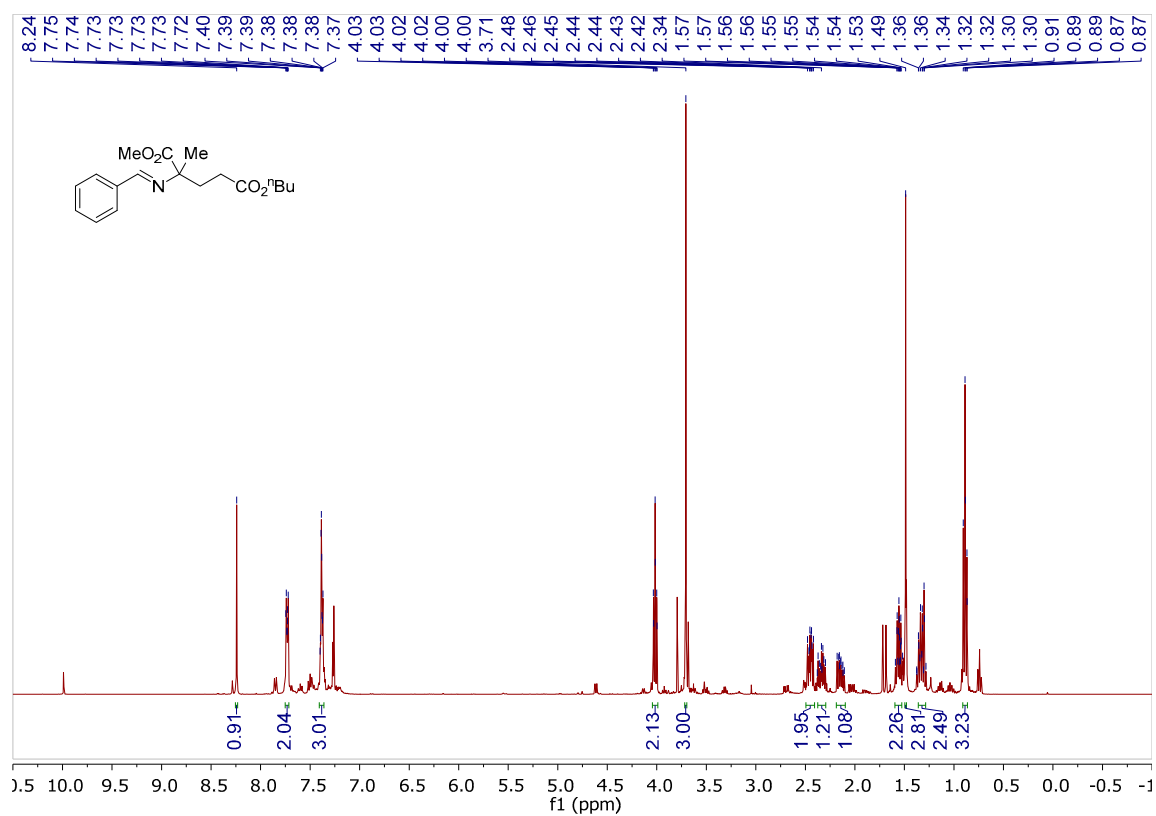


Figure S28, ¹H NMR of compound 2m

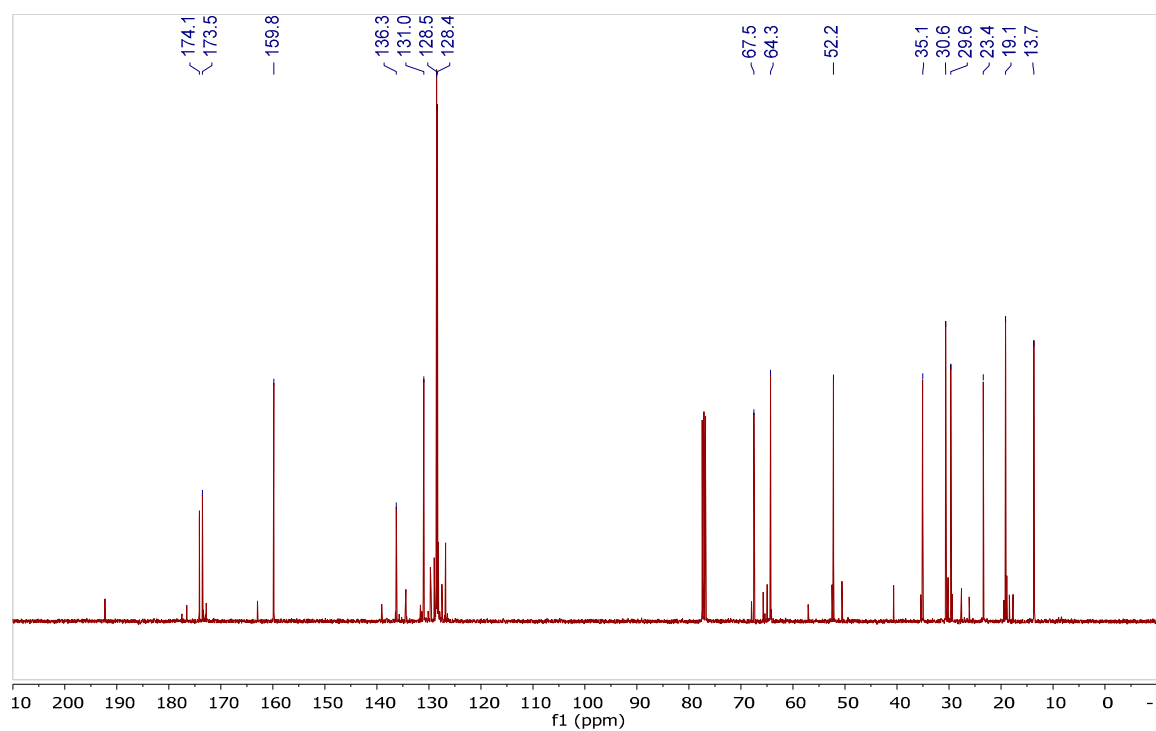


Figure S29, ¹³C NMR of compound 2m

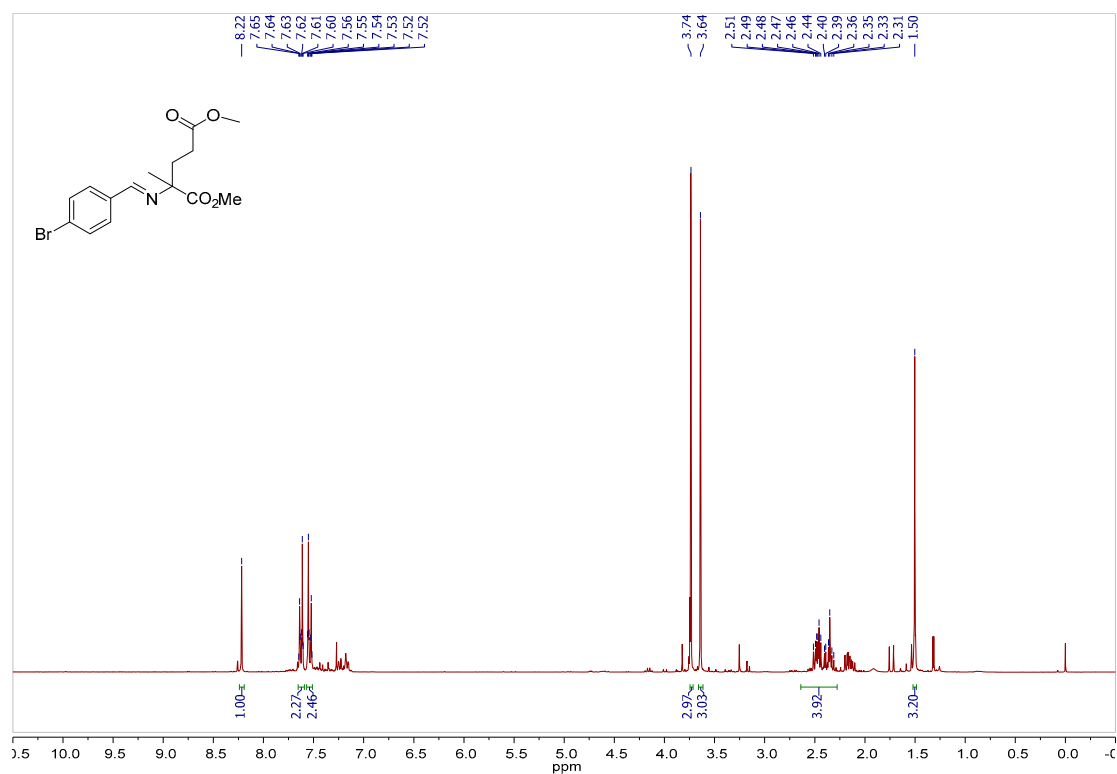


Figure S30, ¹H NMR of compound 2n

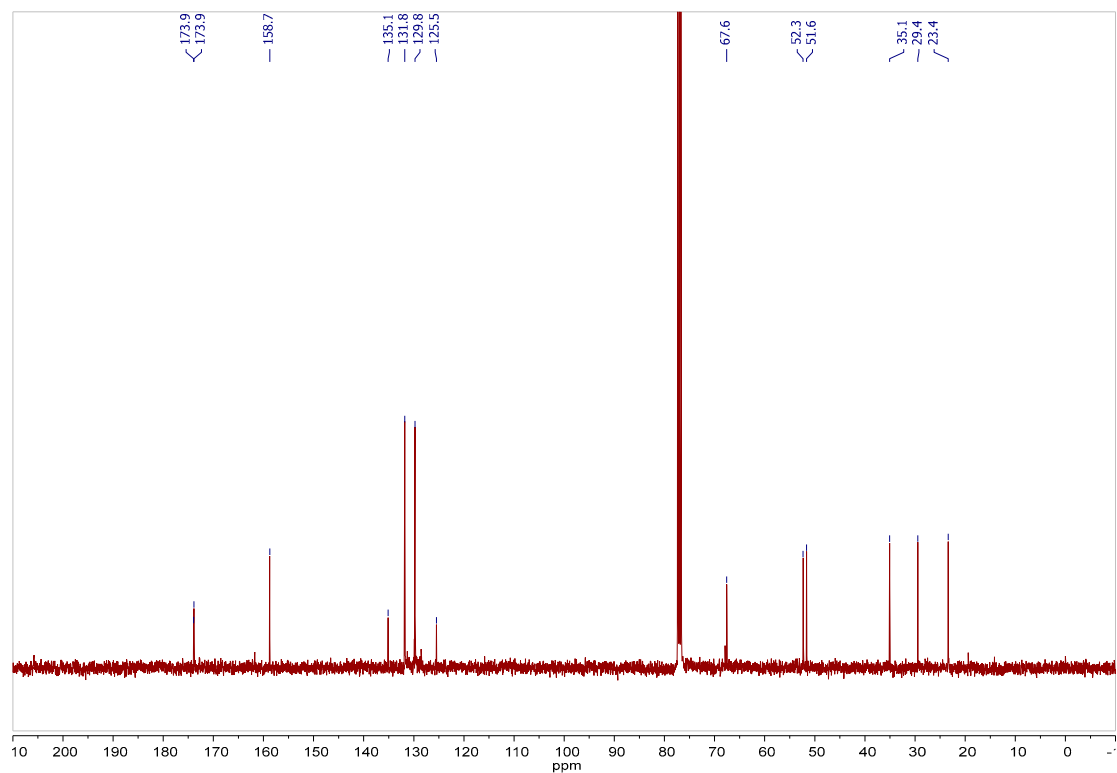


Figure S31, ¹³C NMR of compound 2n

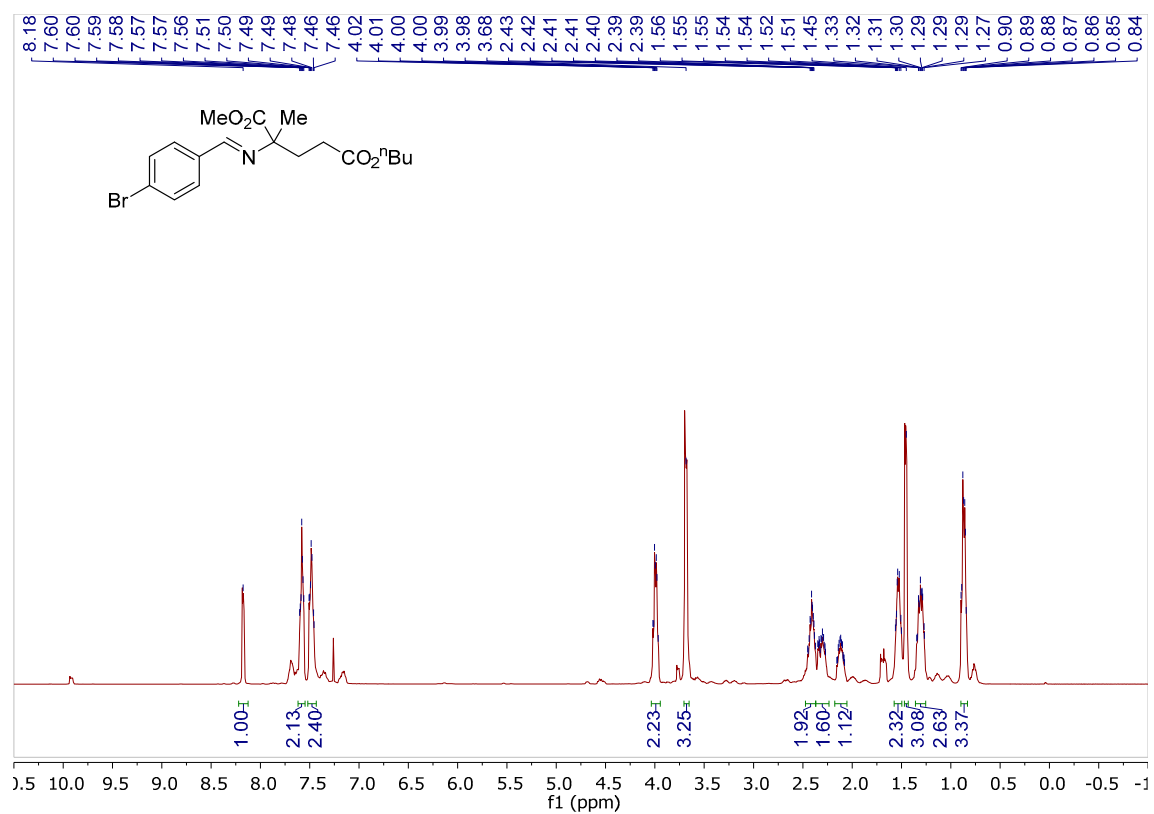


Figure S32, ¹H NMR of compound **2o**

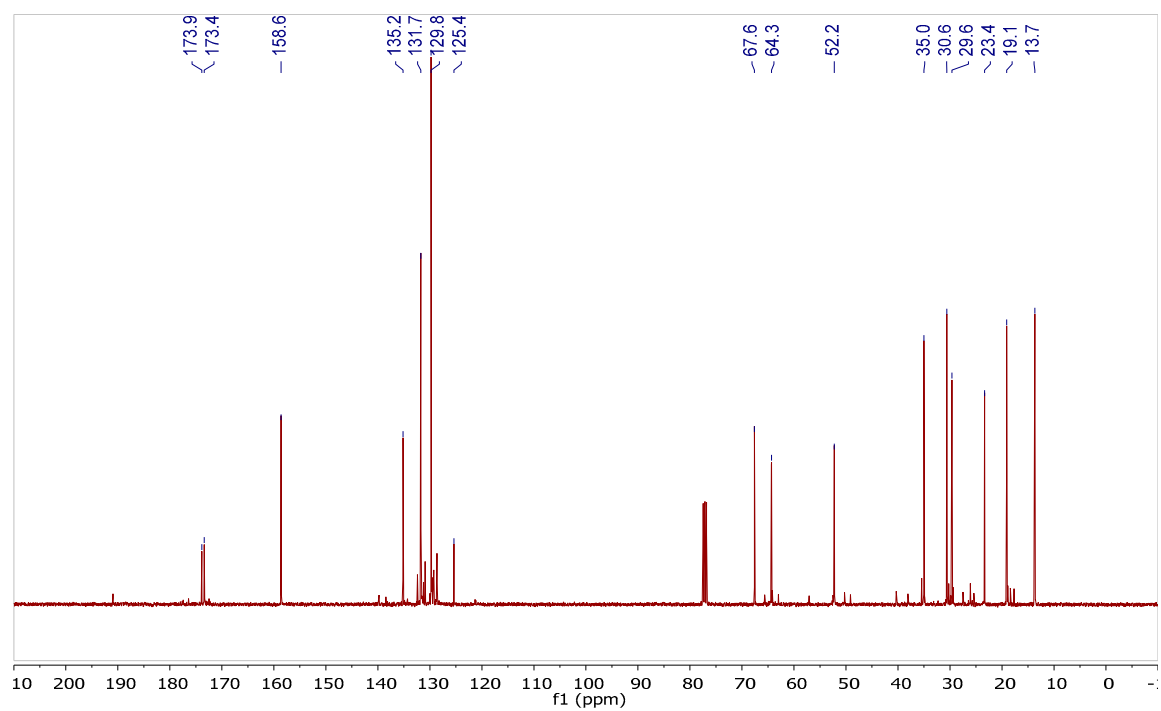


Figure S33, ¹³C NMR of compound **2o**

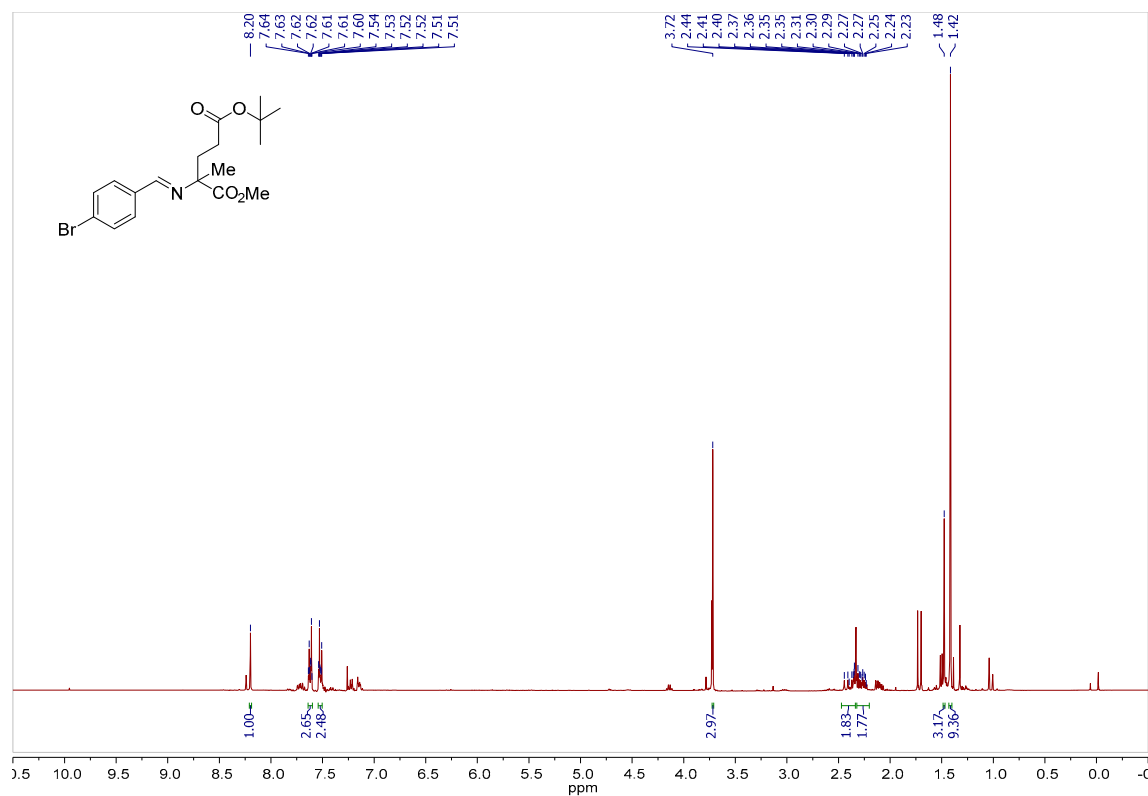


Figure S34, ¹H NMR of compound 2p

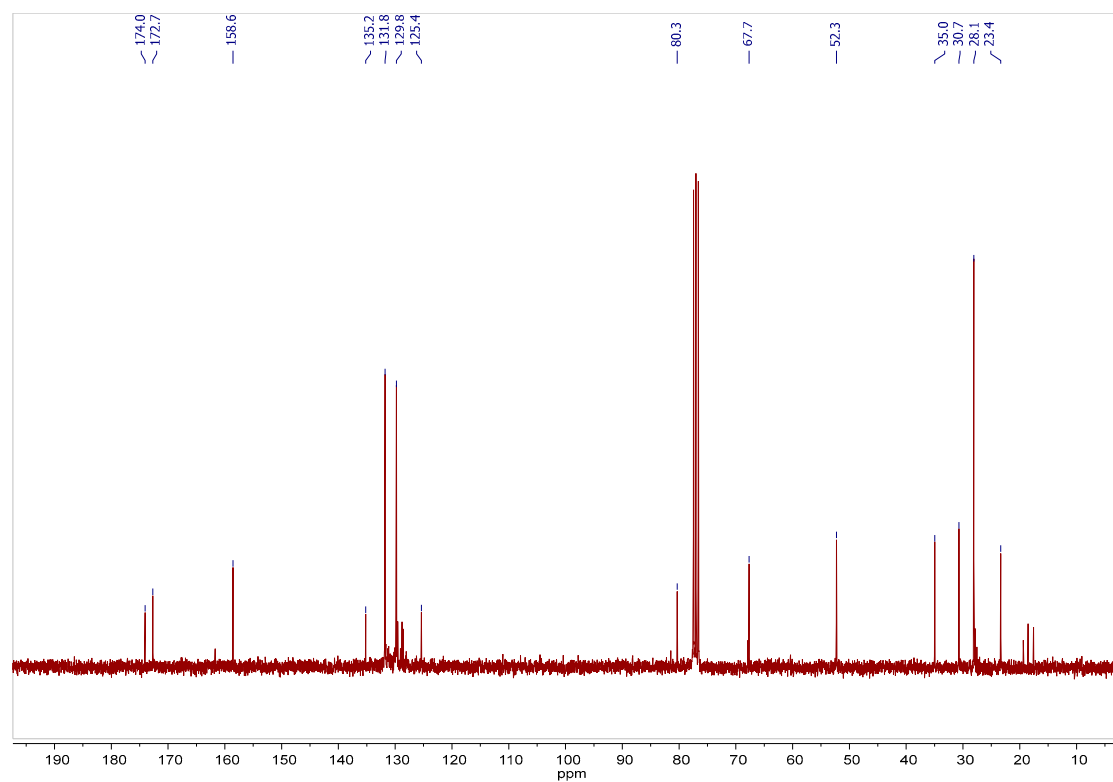


Figure S35, ¹³C NMR of compound 2p

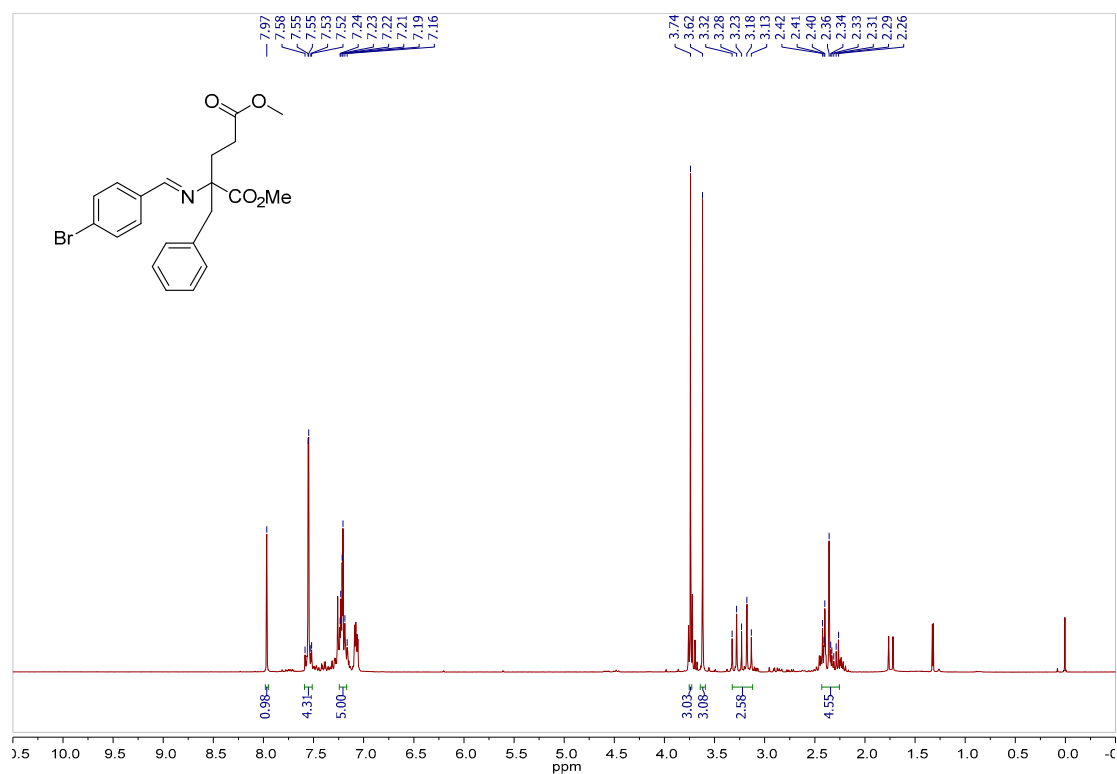


Figure S36, ¹H NMR of compound 2q

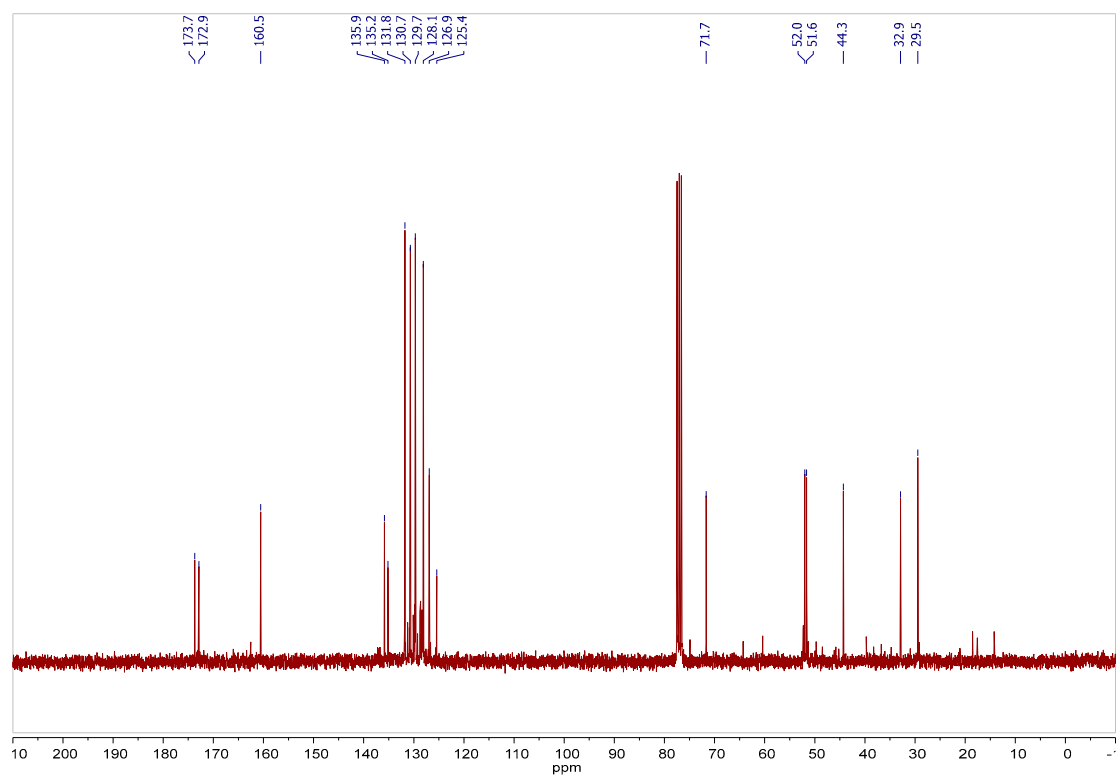


Figure S37, ¹³C NMR of compound 2q

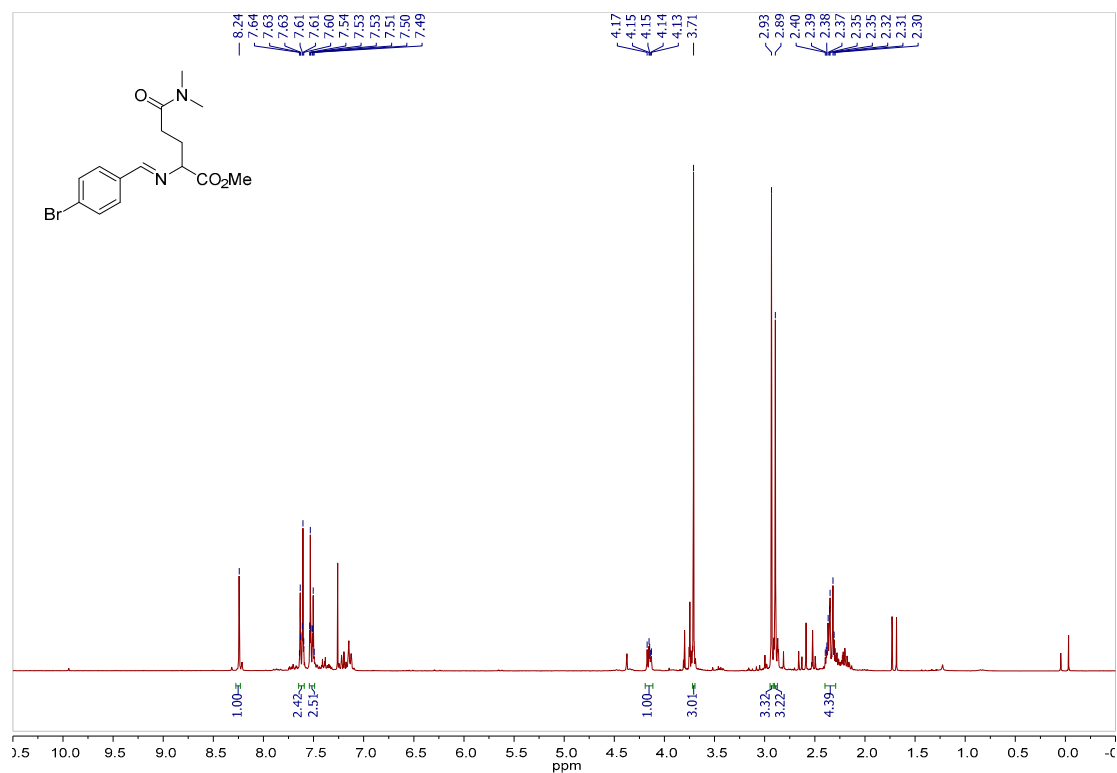


Figure S38, ¹H NMR of compound 2u

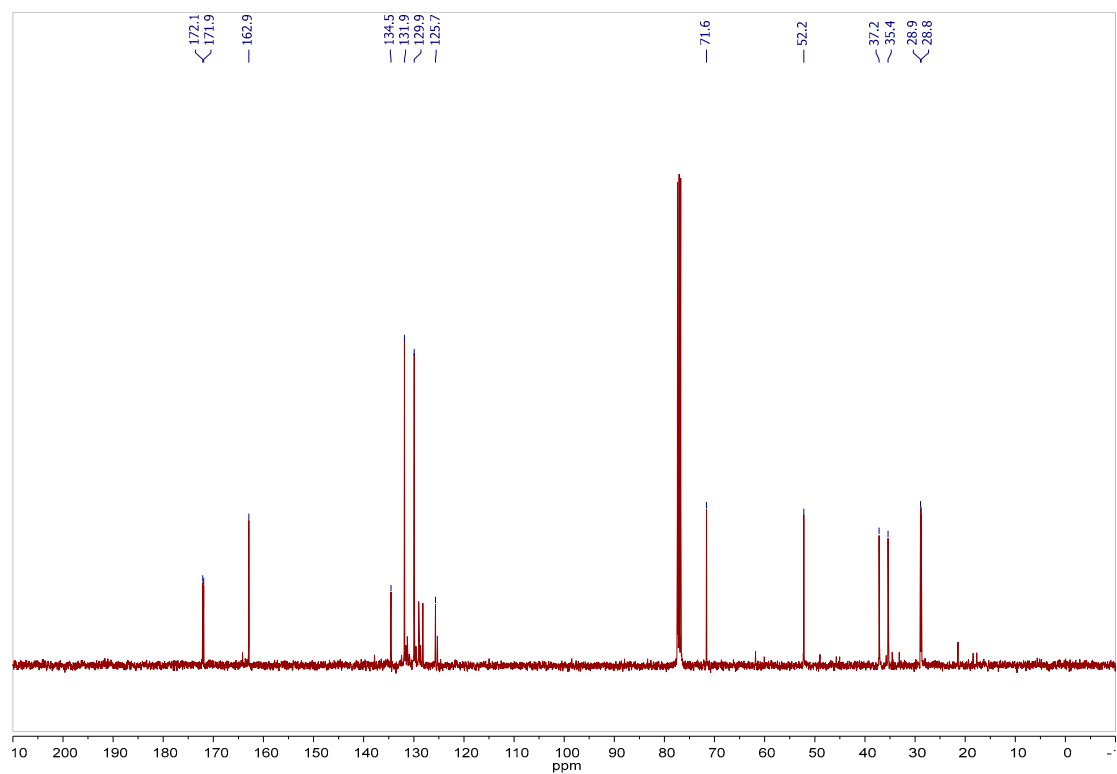


Figure S39, ¹³C NMR of compound 2u

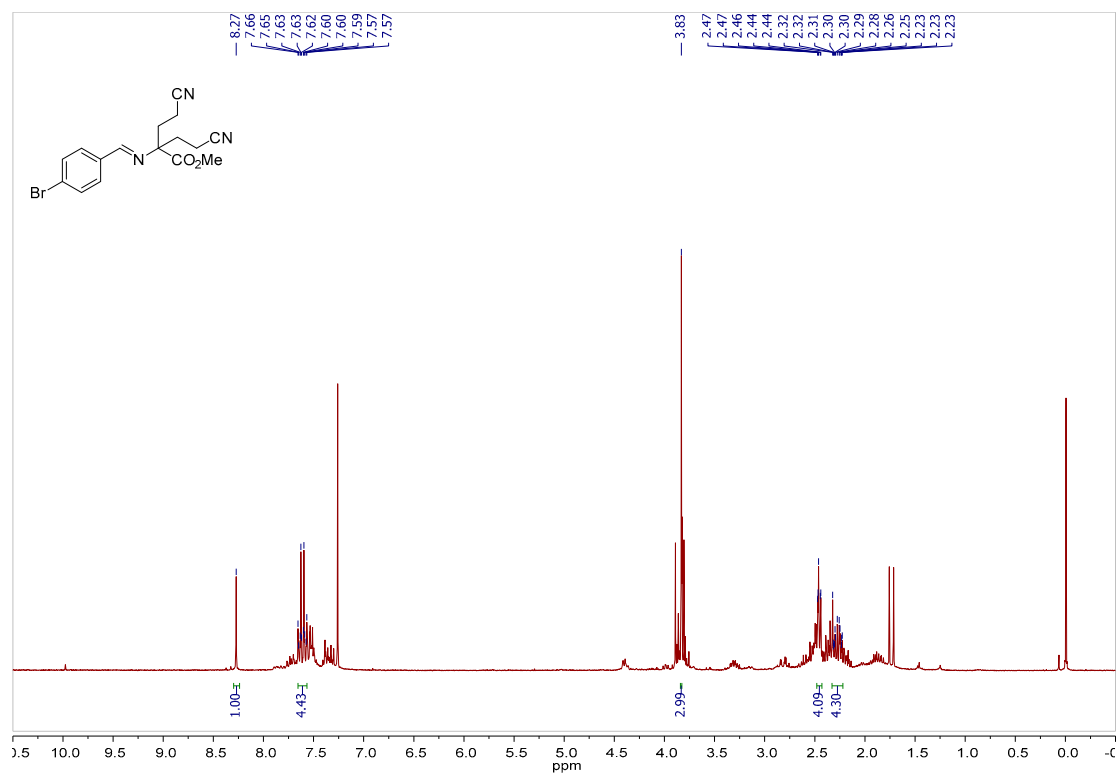


Figure S40, ¹H NMR of compound 6v

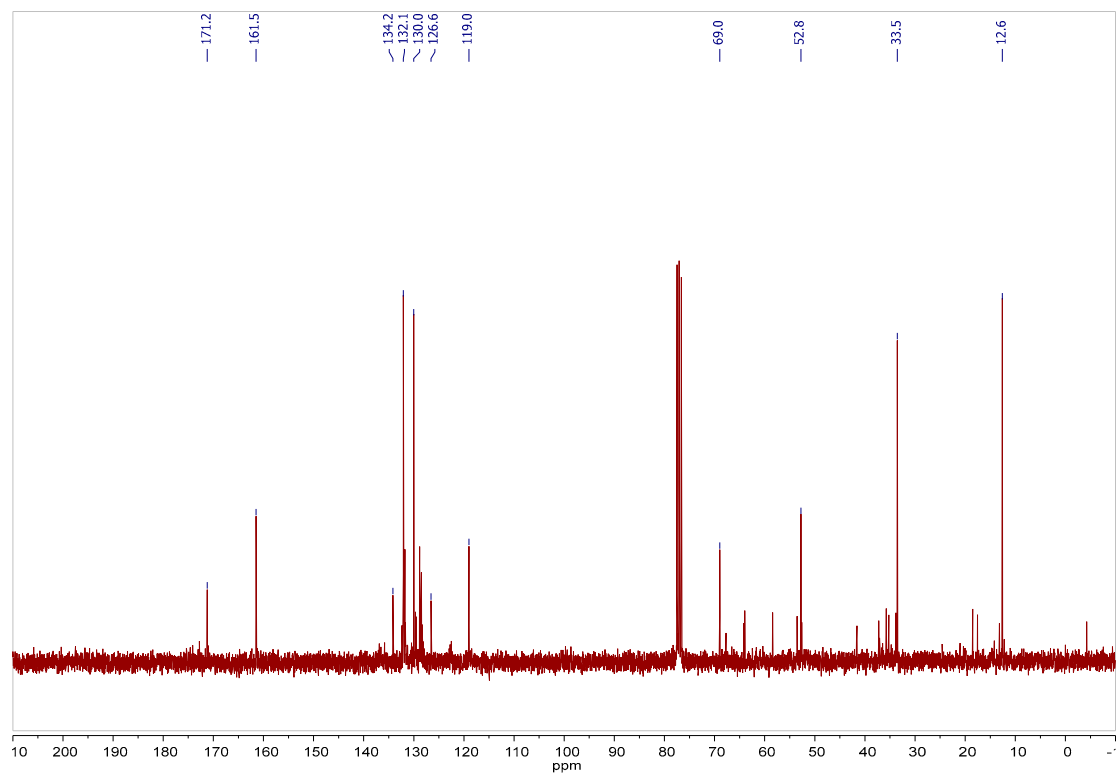


Figure S41, ¹³C NMR of compound 6v

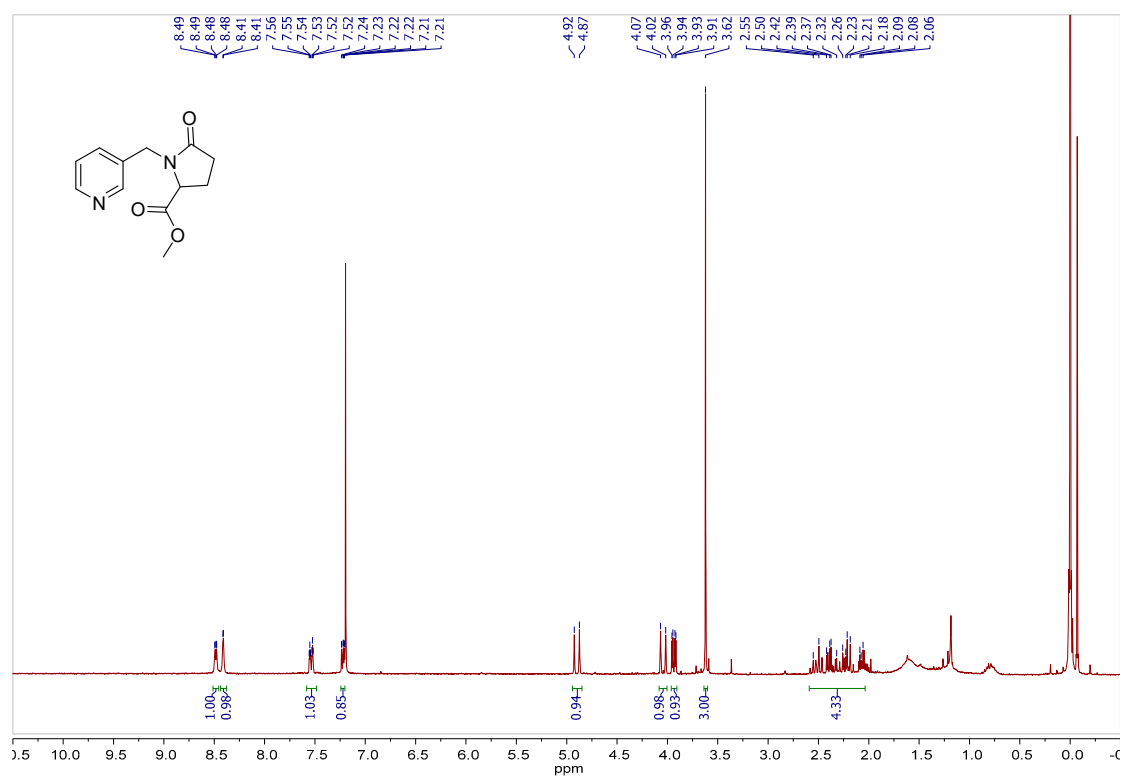


Figure S42, ¹H NMR of compound 8a

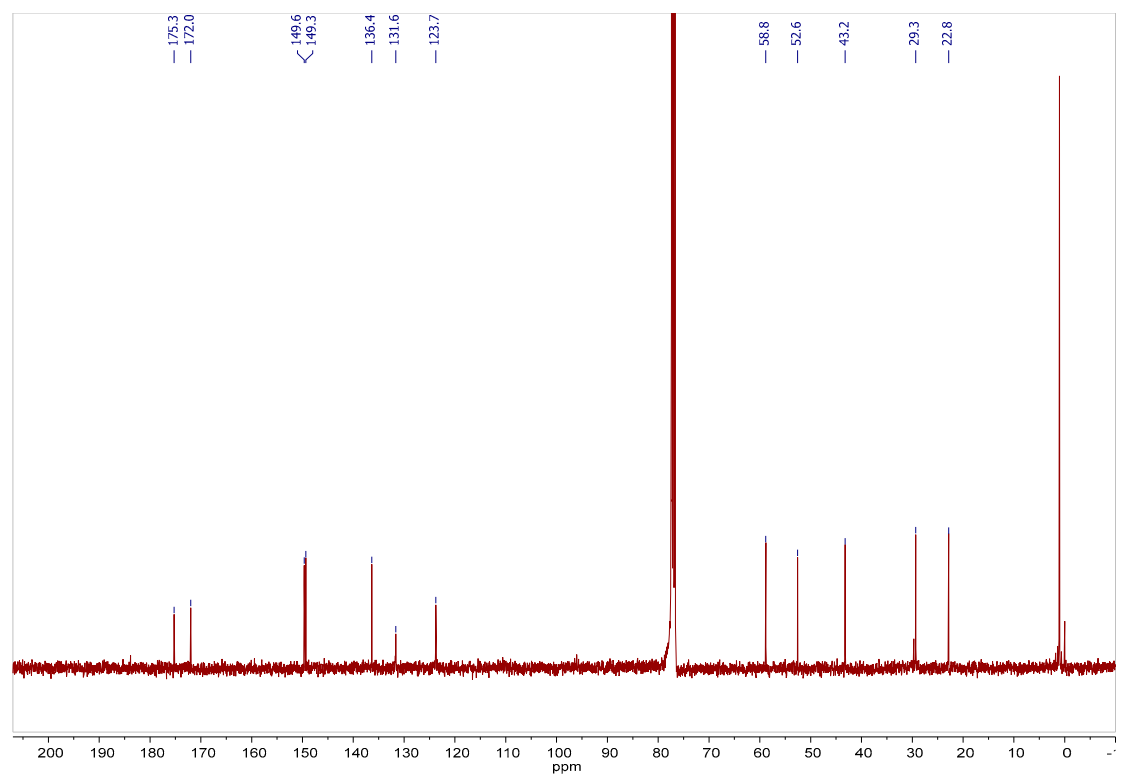


Figure S43, ¹³C NMR of compound 8a

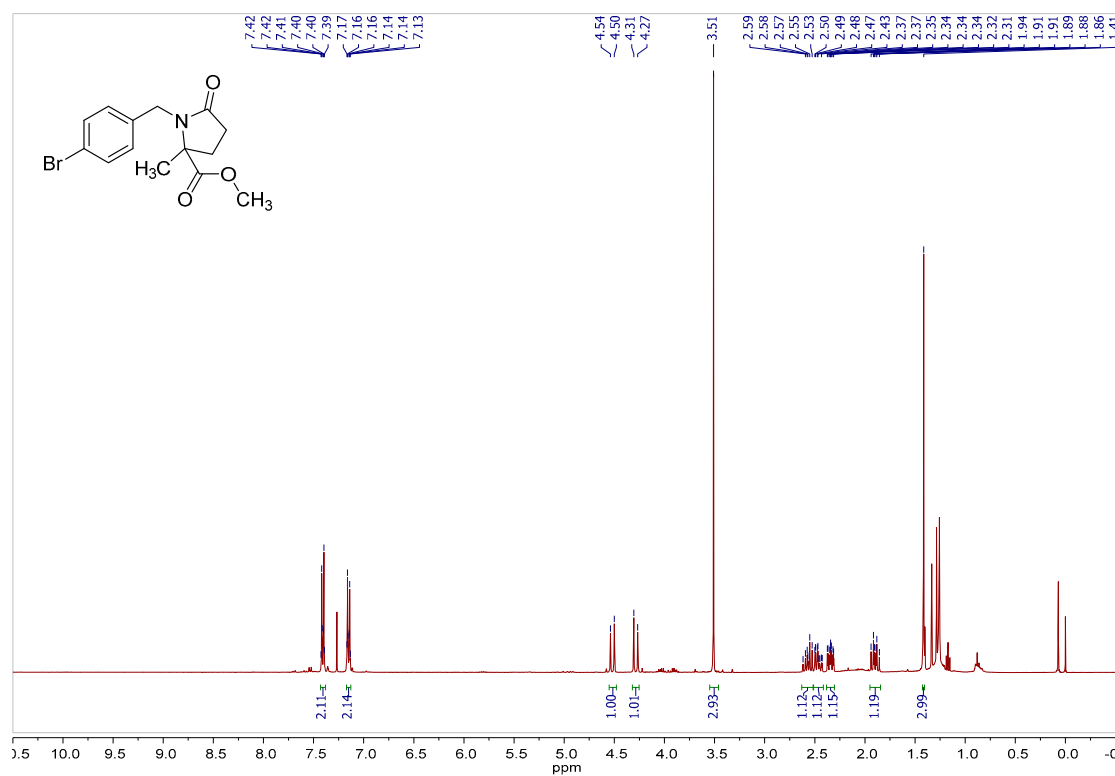


Figure S44, ¹H NMR of compound **8b**

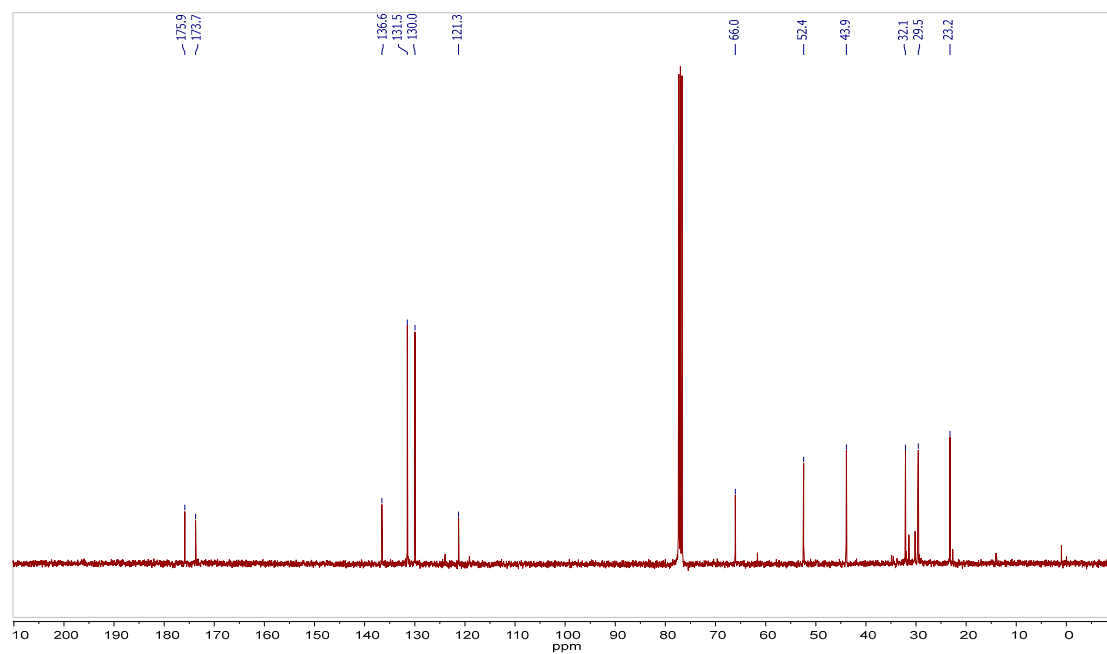


Figure S45, ¹³C NMR of compound **8b**

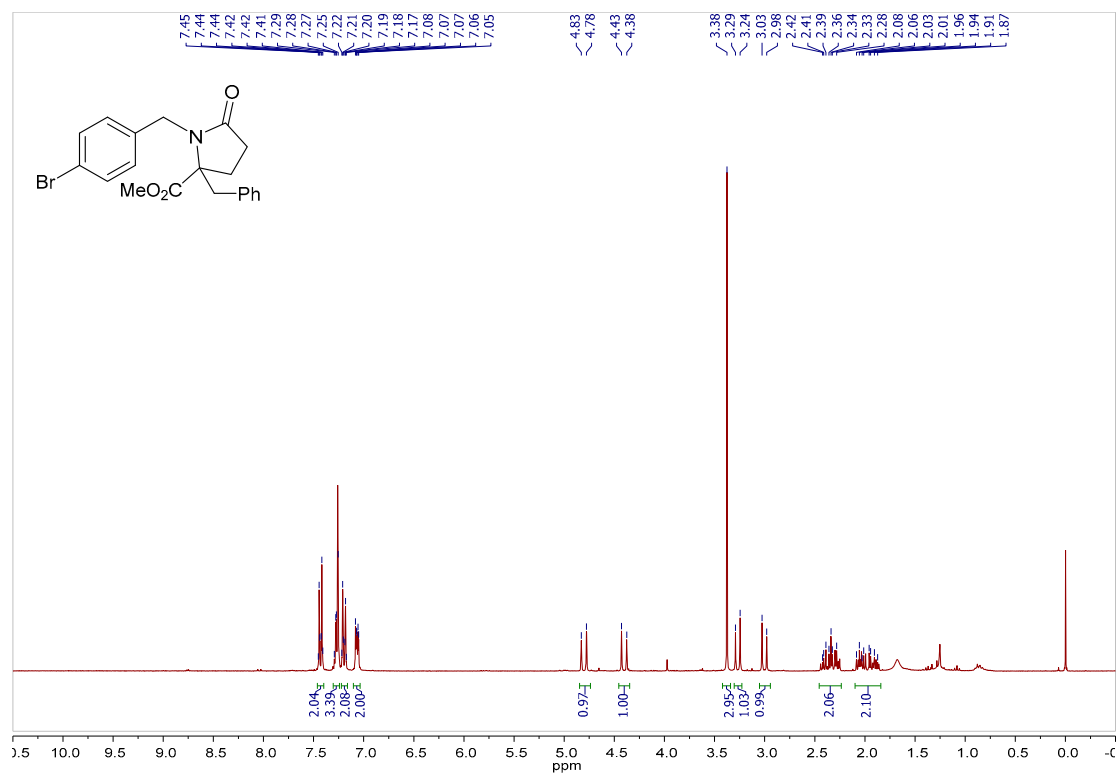


Figure S46, ¹H NMR of compound 8c

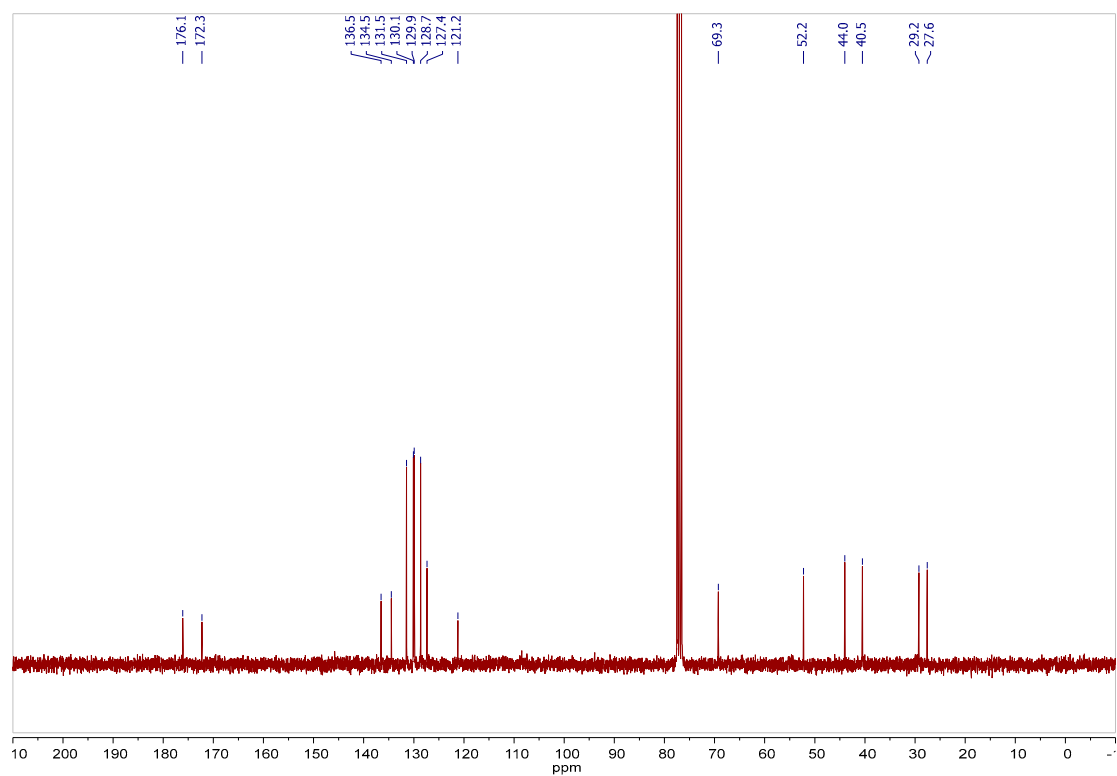


Figure S47, ¹³C NMR of compound 8c

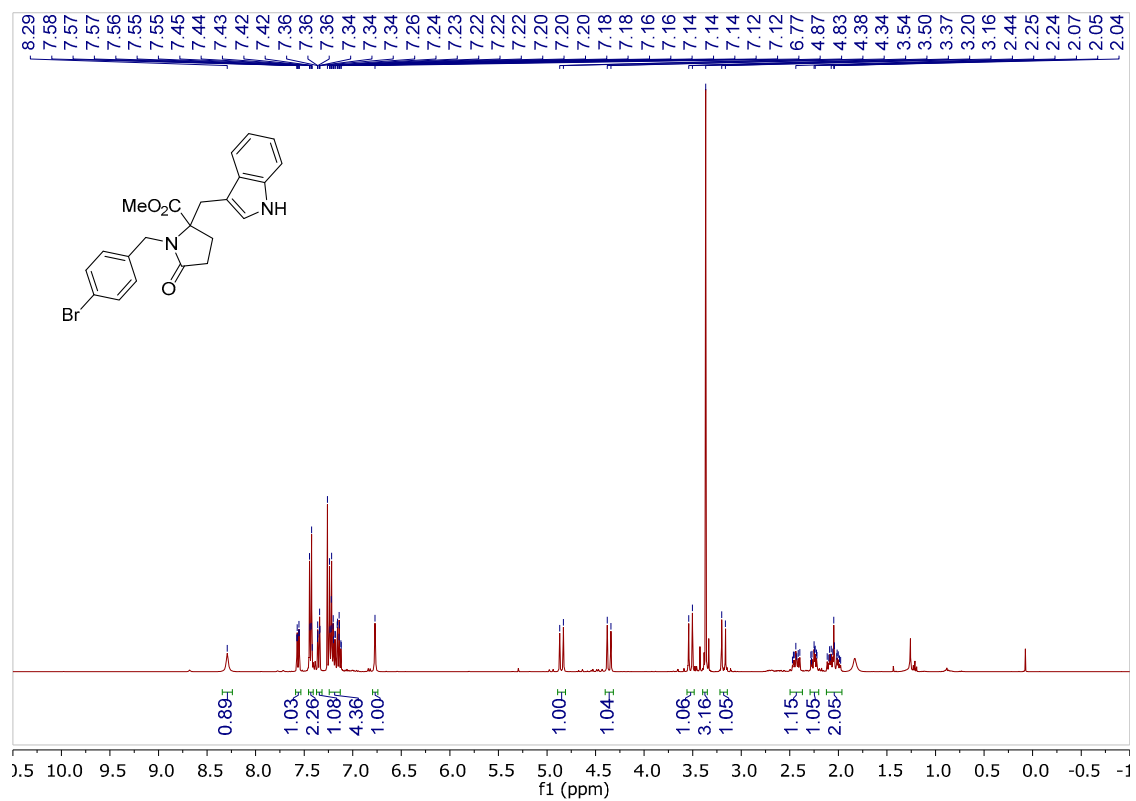


Figure S48, ¹H NMR of compound 8d

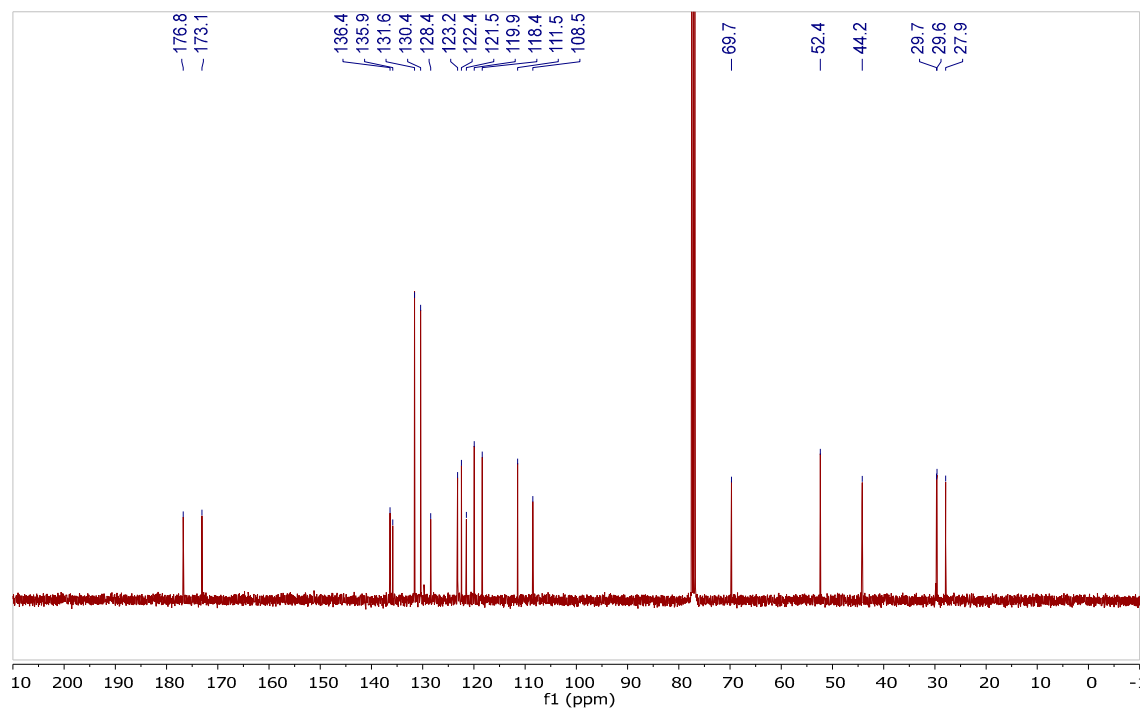


Figure S49, ¹³C NMR of compound 8d

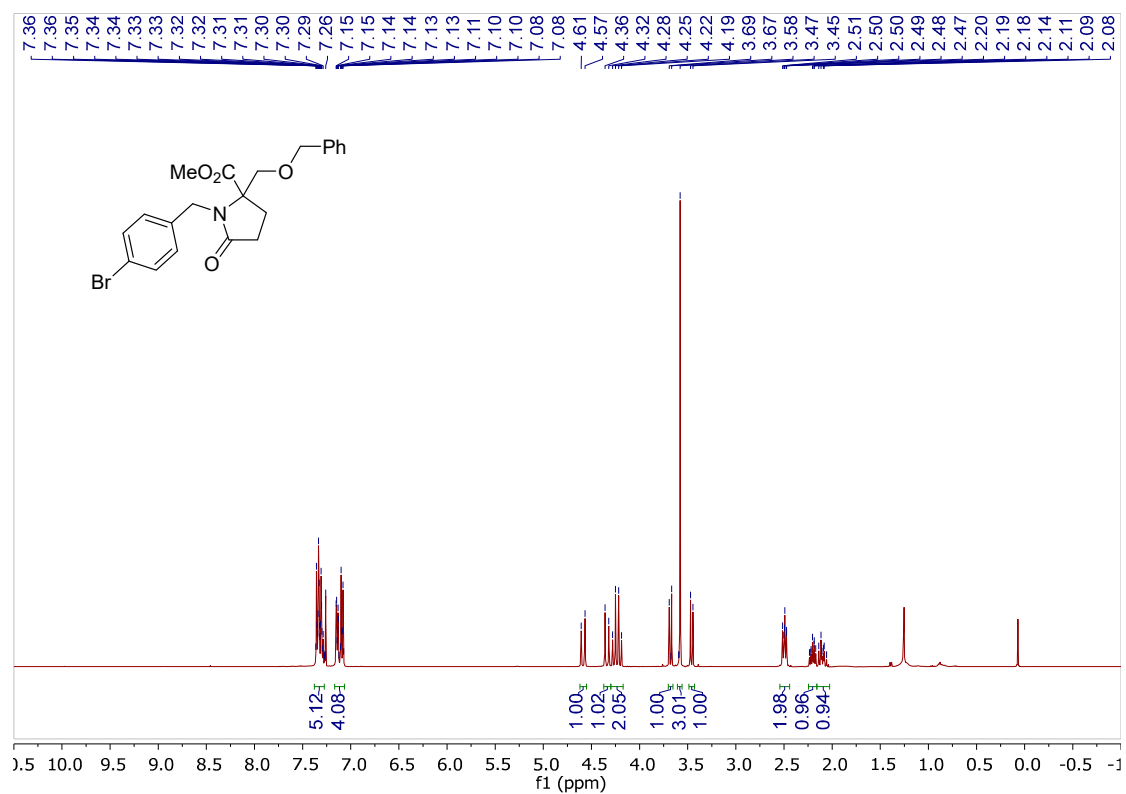


Figure S50, ¹H NMR of compound **8e**

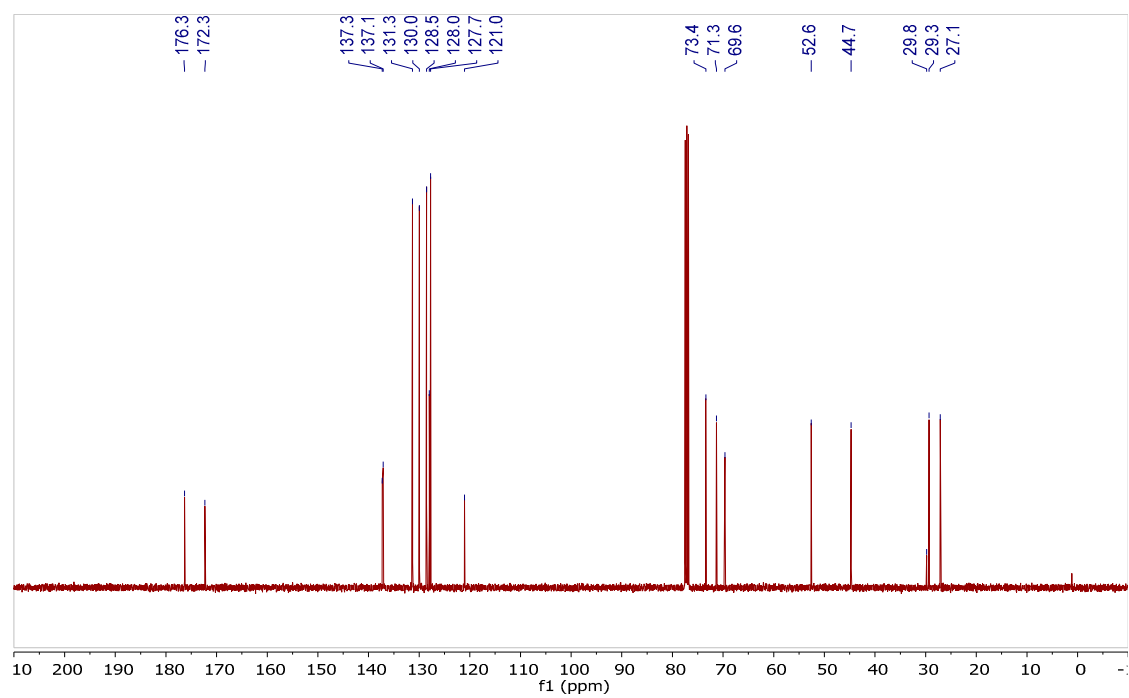


Figure S51, ¹³C NMR of compound **8e**

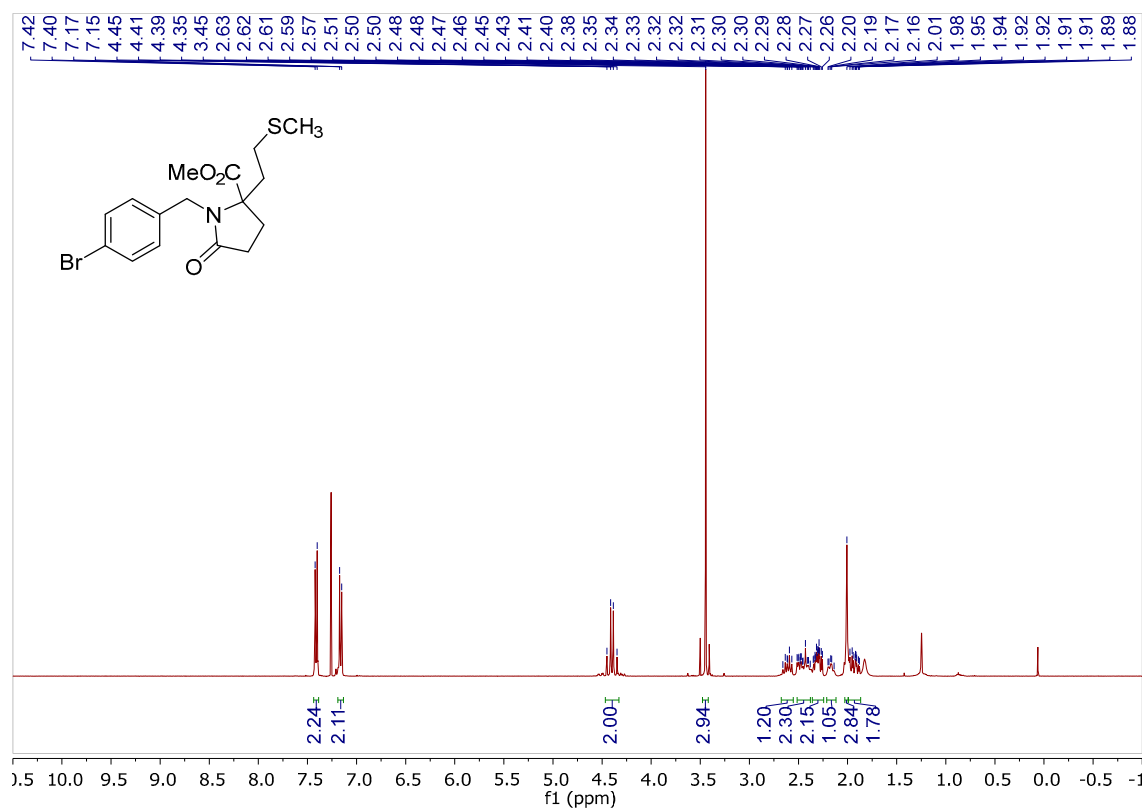


Figure S52, ¹H NMR of compound 8f

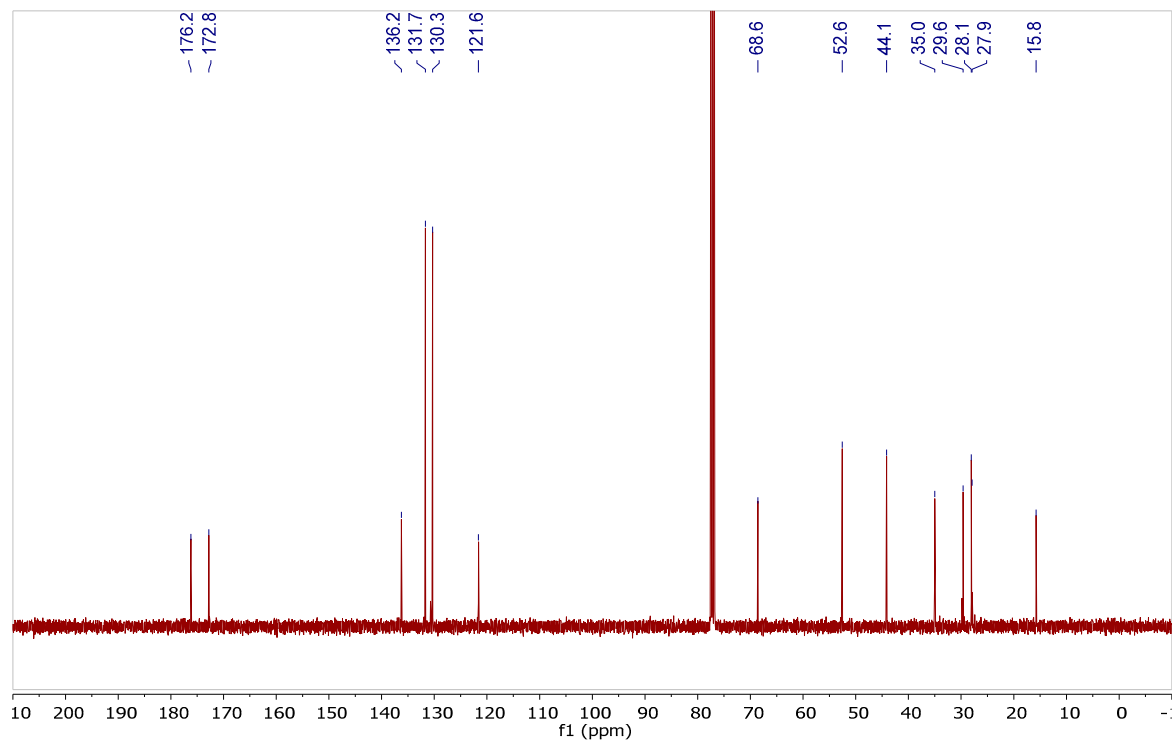


Figure S53, ¹³C NMR of compound 8f

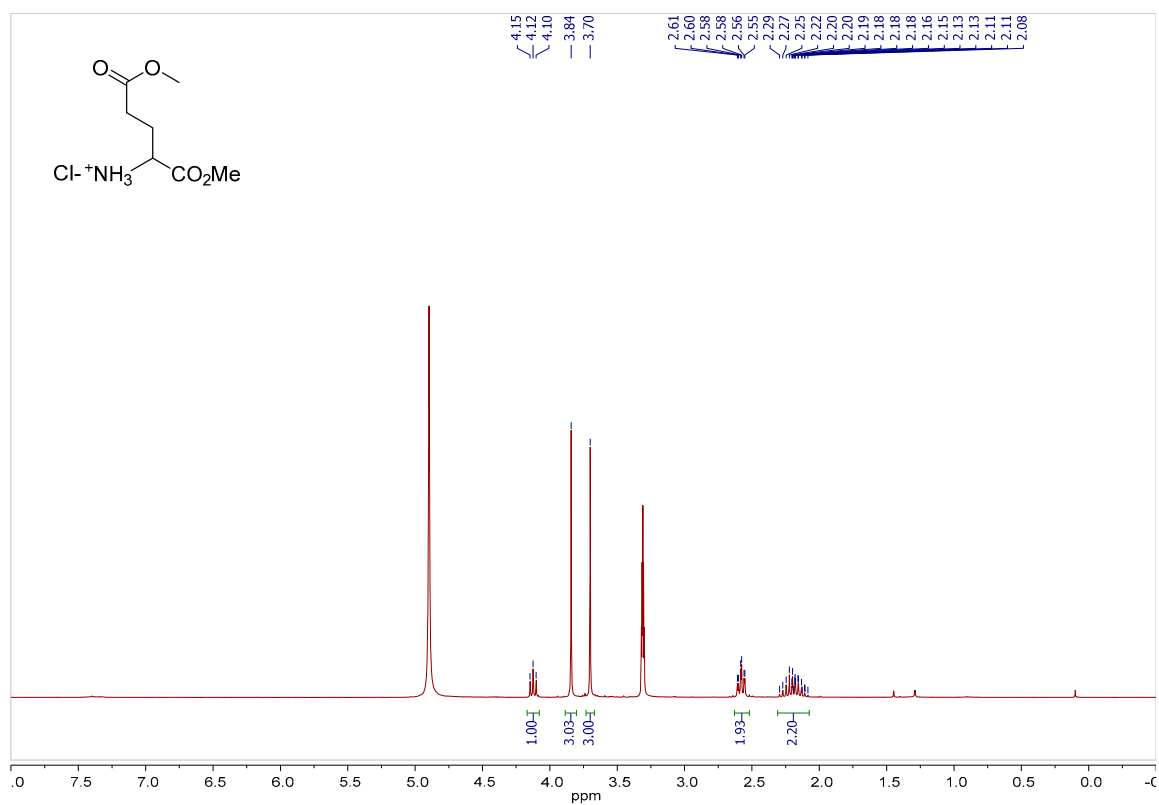


Figure S54, ¹H NMR of compound 9

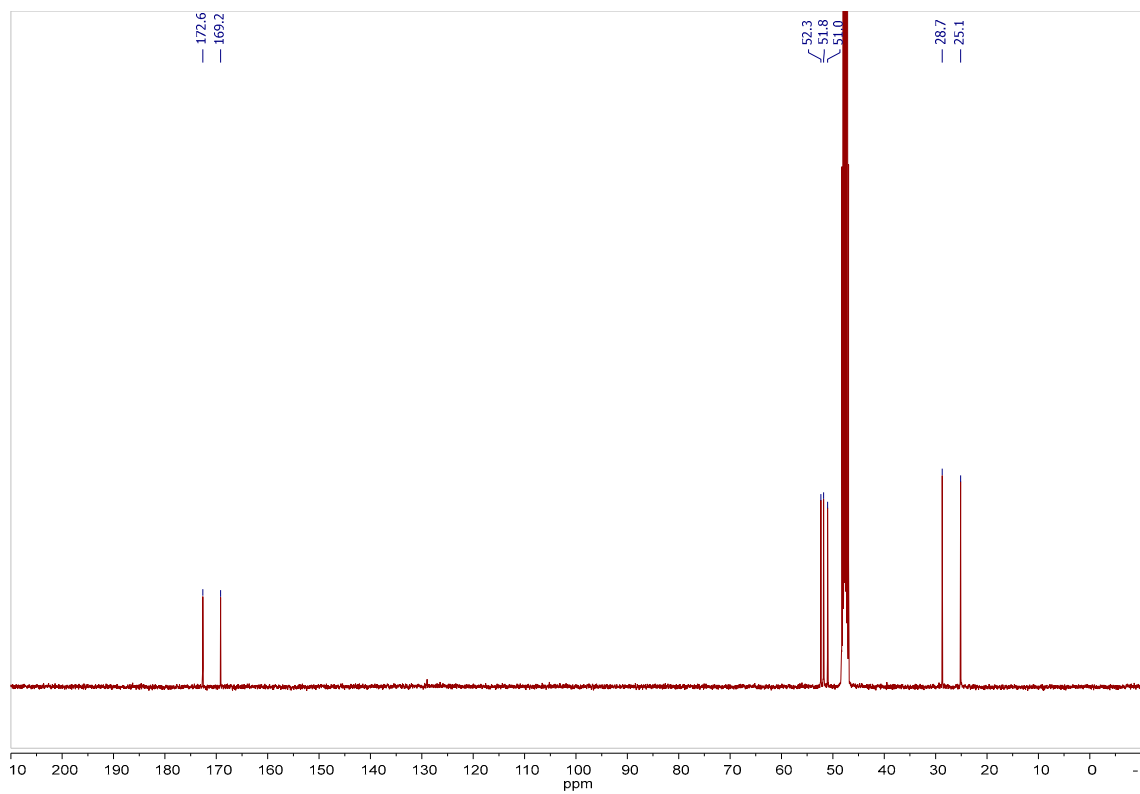
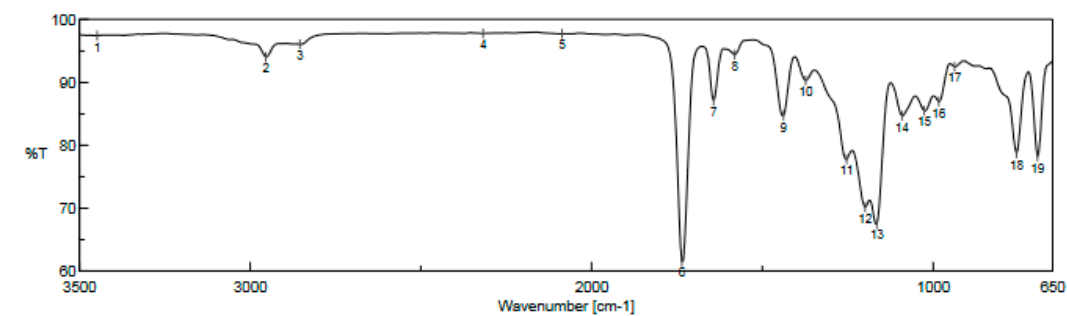


Figure S55, ¹³C NMR of compound 9

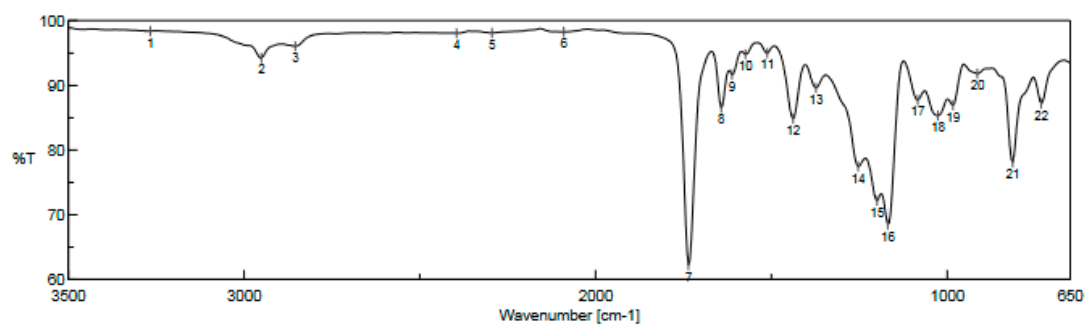
2. REPRESENTATIVE FTIR COPIES



[Comments]
Sample name
Comment
User
Division
Company Universidad de Alicante

[Result of Peak Picking]											
No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity			
1	3448.1	97.42	2	2954.41	94.01	3	2854.13	96.03	4	2318.02	97.75
5	2086.6	97.89	6	1735.62	61.49	7	1643.05	87.07	8	1581.34	94.40
9	1438.64	84.86	10	1373.07	90.29	11	1253.5	77.73	12	1199.51	70.17
13	1164.79	67.48	14	1091.51	84.69	15	1025.94	85.47	16	983.518	86.92
17	937.235	92.48	18	755.959	78.72	19	694.248	78.19			

Figure S56, FTIR of compound 2a



[Comments]
Sample name
Comment
User
Division
Company Universidad de Alicante

[Result of Peak Picking]											
No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity
1	3266.82	98.37	2	2950.55	94.22	3	2854.13	96.04	4	2395.16	98.06
5	2294.88	98.10	6	2090.46	98.24	7	1735.62	62.22	8	1643.05	86.50
9	1612.2	91.66	10	1573.63	94.80	11	1511.92	94.98	12	1438.64	84.80
13	1373.07	89.60	14	1253.5	77.45	15	1199.51	72.14	16	1168.65	68.48
17	1083.8	87.71	18	1025.94	85.30	19	983.518	86.92	20	914.093	91.80
21	813.813	78.08	22	732.817	87.17						

Figure S57, FTIR of compound 2b

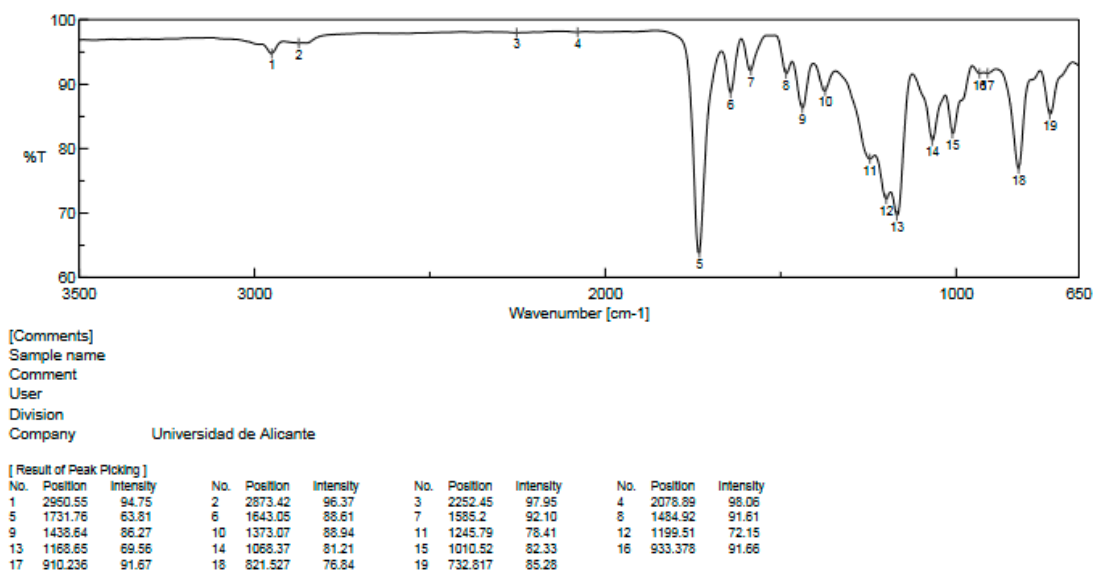


Figure S58, FTIR of compound 2g

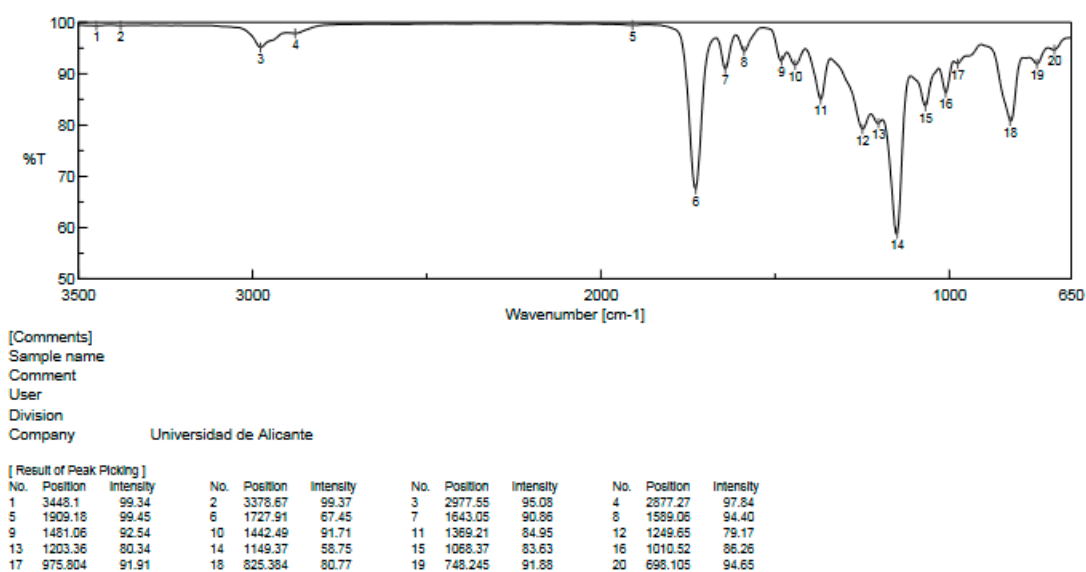


Figure S59, FTIR of compound 2h

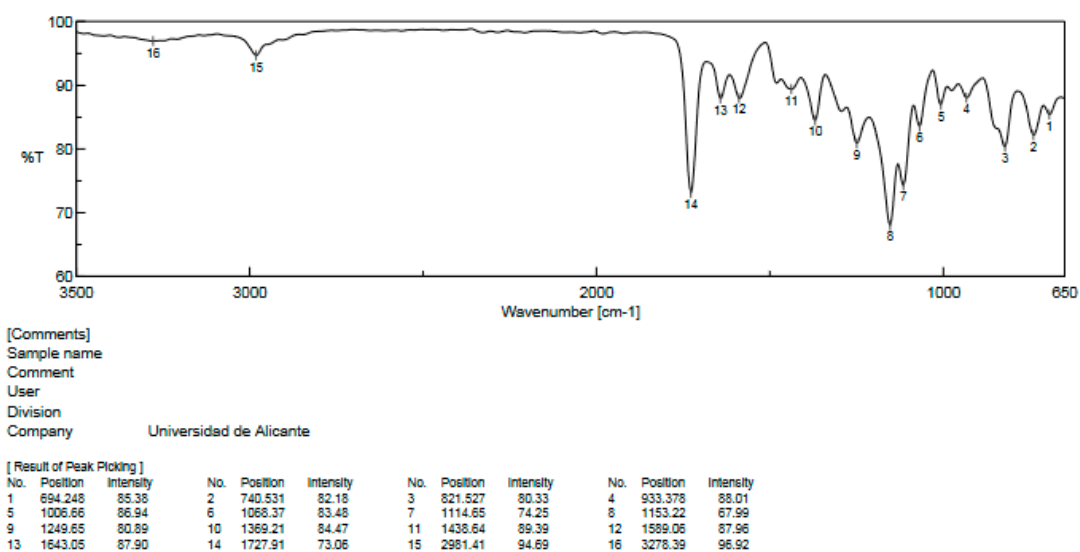


Figure S60, FTIR of compound **2m**

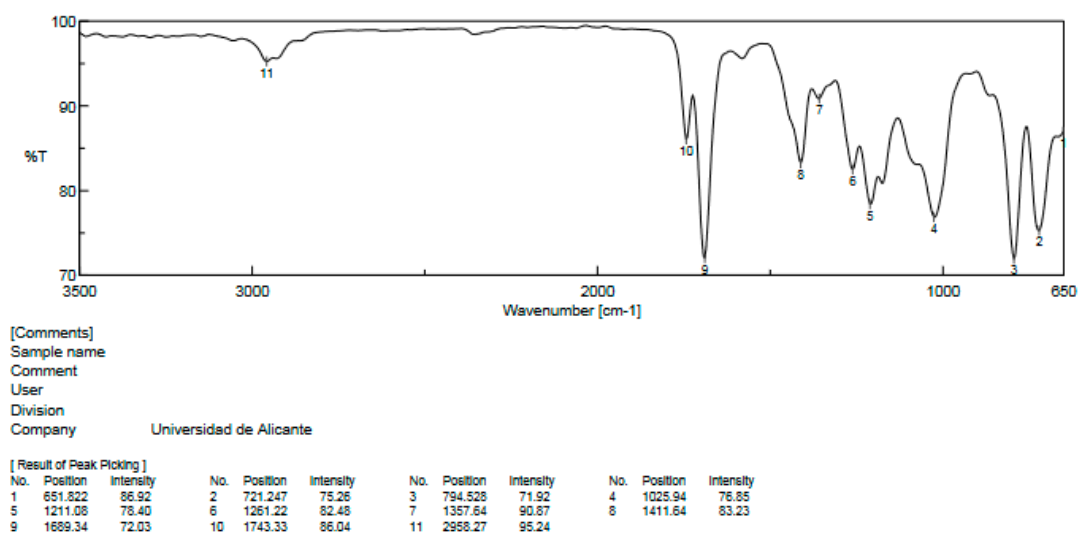
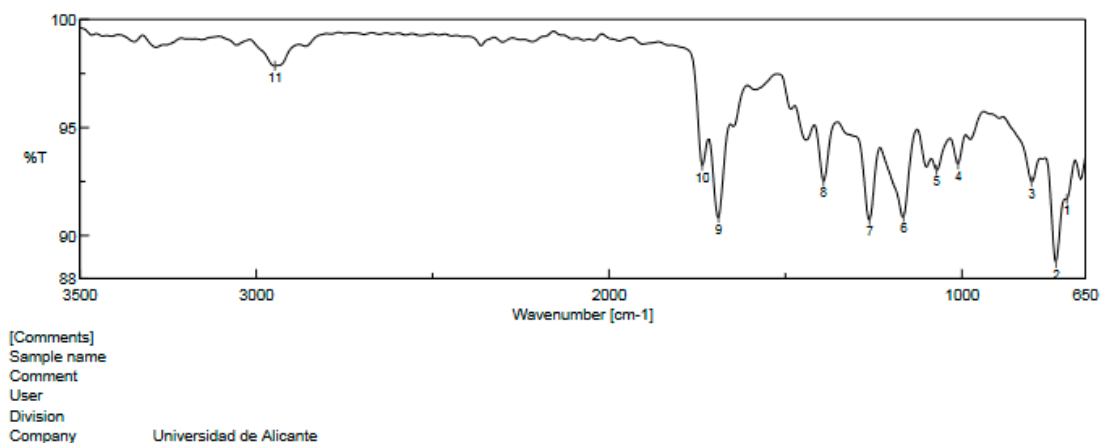
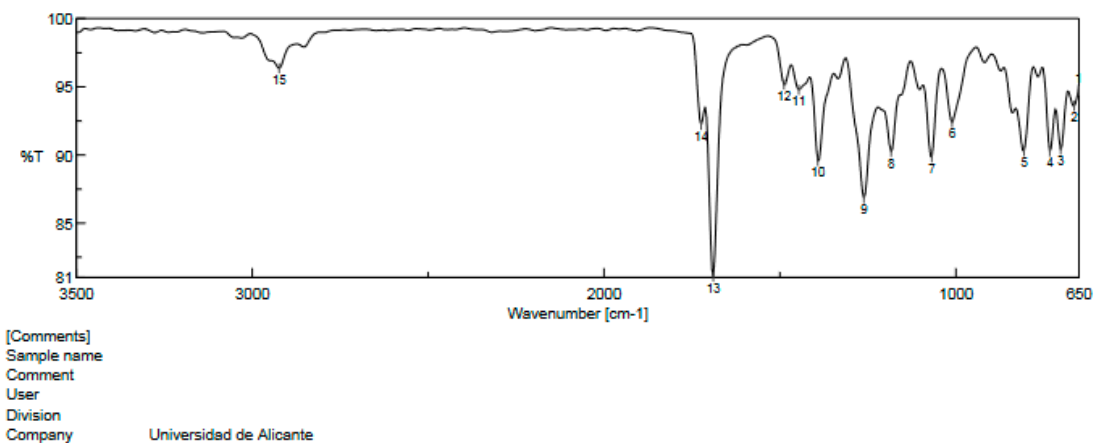


Figure S61, FTIR of compound **8a**



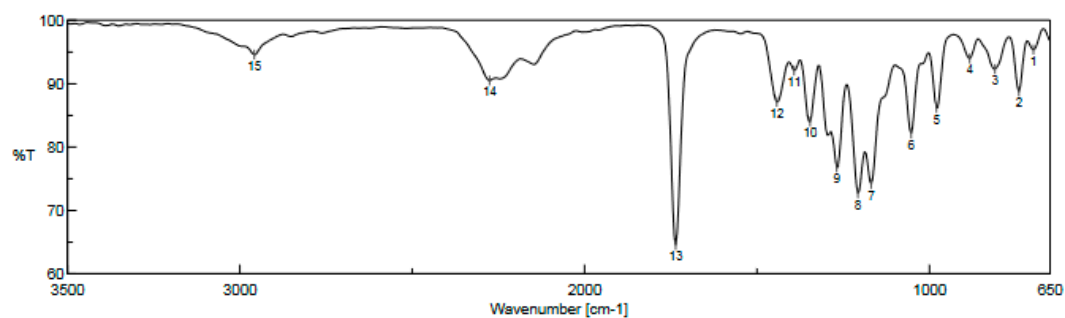
[Result of Peak Picking]											
No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity
1	701.962	91.68	2	732.817	88.73	3	802.242	92.49	4	1010.52	93.30
5	1072.23	93.02	6	1164.79	90.86	7	1261.22	90.69	8	1392.35	92.50
9	1689.34	90.81	10	1735.62	93.24	11	2946.7	97.86			

Figure S62, FTIR of compound 8b



[Result of Peak Picking]											
No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity
1	651.822	94.70	2	663.393	93.59	3	701.962	90.38	4	732.817	90.25
5	806.099	90.26	6	1010.52	92.39	7	1068.37	89.81	8	1184.08	90.22
9	1261.22	86.81	10	1392.35	89.54	11	1446.35	94.78	12	1488.78	95.16
13	1689.34	81.06	14	1724.05	92.19	15	2923.56	96.35			

Figure S63, FTIR of compound 8c



[Comments]

Sample name

Comment

User

Division

Company Universidad de Alicante

[Result of Peak Picking]

No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity	No.	Position	Intensity
1	696.105	95.34	2	740.531	86.76	3	809.956	92.30	4	883.238	93.94
5	979.661	86.19	6	1052.94	82.14	7	1168.65	74.17	8	1207.22	72.73
9	1268.93	76.80	10	1346.07	84.00	11	1392.35	92.06	12	1442.49	87.11
13	1735.62	64.55	14	2275.59	90.50	15	2958.27	94.55			

Figure S64, FTIR of compound **9**