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


# UiO-67 Metal-organic framework immobilized $Fe^{3+}$ catalyst for efficient Morita-Baylis-Hillman reaction

Yuzhen Zhao[a], Min Zhu[a], Hailing Shang[b], Daniele Ramella[c], Kaicheng Zhu[a,*], Yi Luan[b,*]

[a] *Xi'an Key Laboratory of Advanced Photo-electronics Materials and Energy Conversion Device, School of Sciences, Xijing University, Xi'an, 710123, China.*

[b] *School of Materials Science and Engineering, University of Science and Technology Beijing, 30 Xueyuan Road, Haidian District, Beijing 100083, P. R. China, E-mail: yiluan@ustb.edu.cn.*

[c] *Department of chemistry, Temple University-Beury Hall, 1901, N. 13th Street Philadelphia PA 19122, United States.*

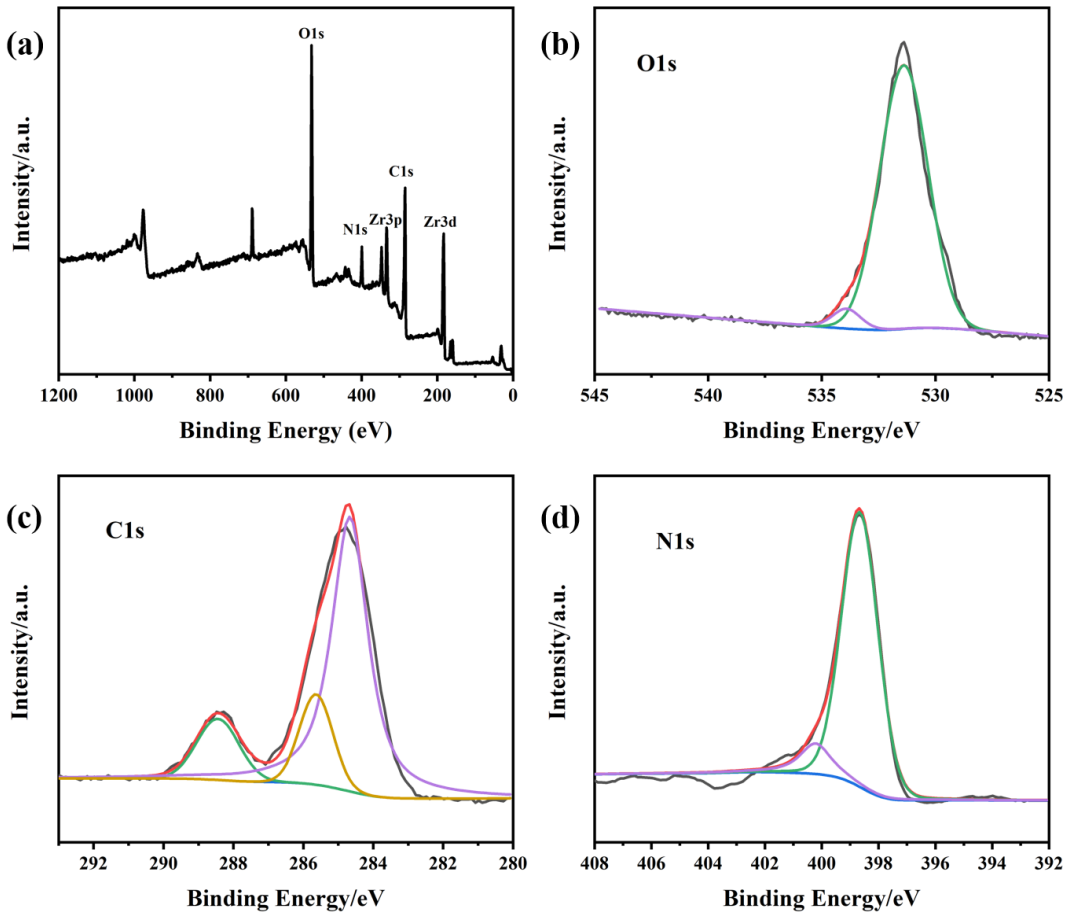



**Fig. S1** XPS spectra of UiO-67

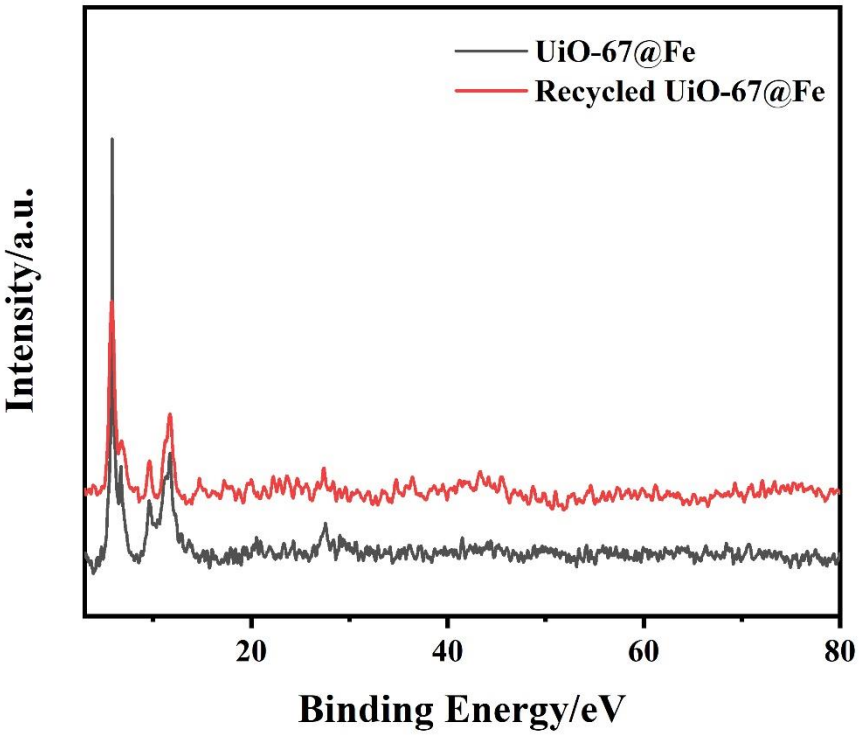



**Fig. S2** PXRD pattern of UiO-67@Fe and recycled UiO-67@Fe

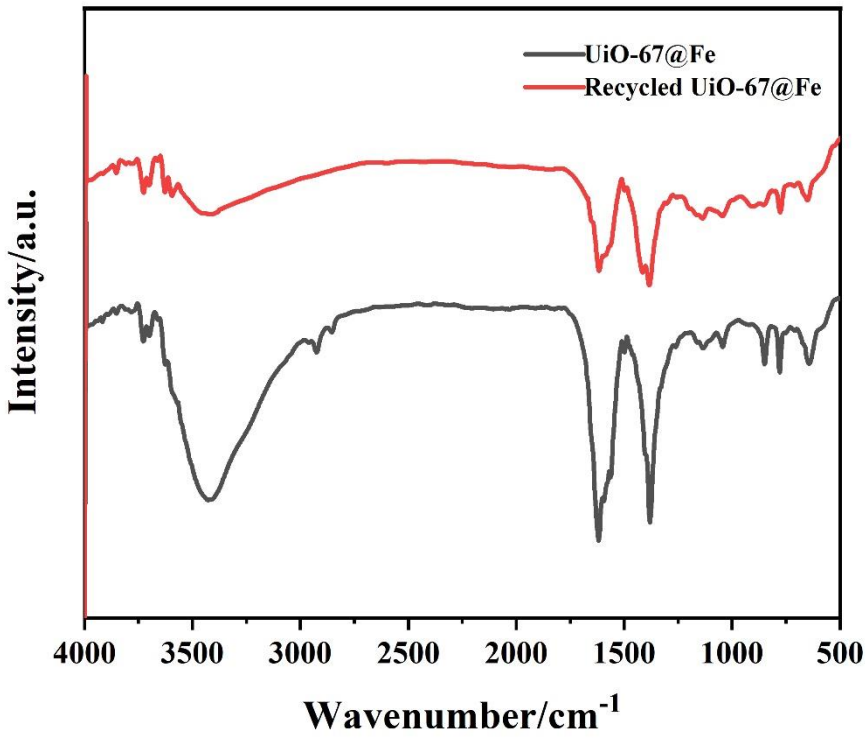



**Fig. S3** FT-IR pattern of UiO-67@Fe and recycled UiO-67@Fe

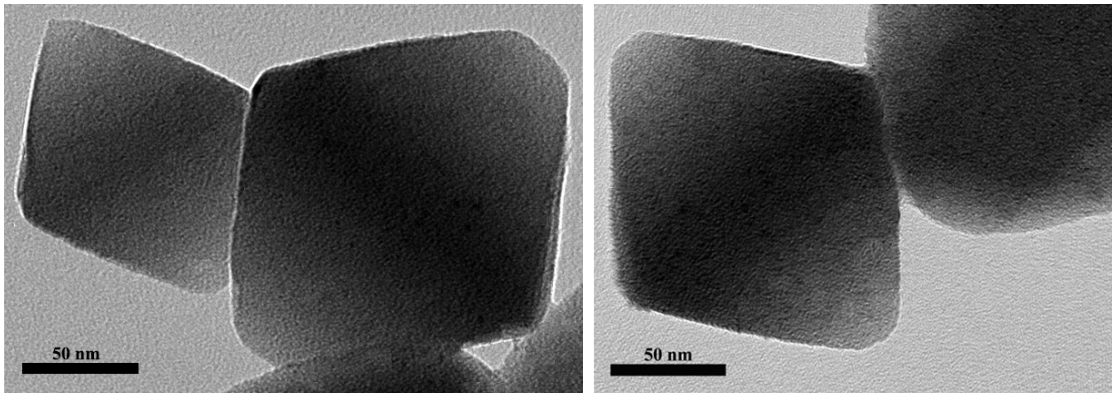
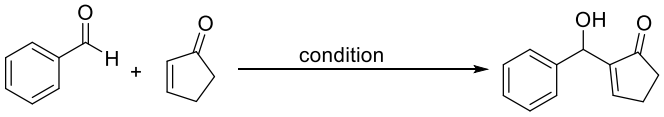



**Fig. S4** TEM observation of UiO-67

**Table S1** Various catalysts of MBH reaction of cyclopentenone with benzaldehyde.




| Entry | Catalyst | Solvent | Time (h) | Temp. (°C) | Yield (%) | TON [a] | TOF ($h^{-1}$) [b] | References |
|---|---|---|---|---|---|---|---|---|
| **1** | **UiO-67@Fe (1.0 mol%)** | **THF** | **6** | **23** | **93** | **93** | **15.5** | **This work** |
| 2 | NMP (5.0 mol%)/$Ba(OH)_2$ (1.5 mol%)[1] | $CH_3OH$ /$CH_2Cl_2$ | 9 | 0 | 72 | 48 | 5.3 | [1] |
| 3 | α-ZrP/Uracil/$Cu^{2+}$ (20mg)[2] | DMF | 15 | r.t. | 74 | - | - | [2] |
| 4 | Fu (+)-DMAP/(10mol%) $MgI_2$(50mol%)[3] | *i*-PrOH | 24 | -20 | 87 | 8.7 | 0.36 | [3] |
| 5 | IRMOF-3–thiourea (2 mol%)[4] | THF | 24 | 4 | 73 | 36.5 | 1.52 | [4] |

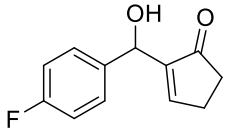
[a] Turnover number = mol converted/mol of active sites. [b] Turnover frequency =Turnover number/reaction time.

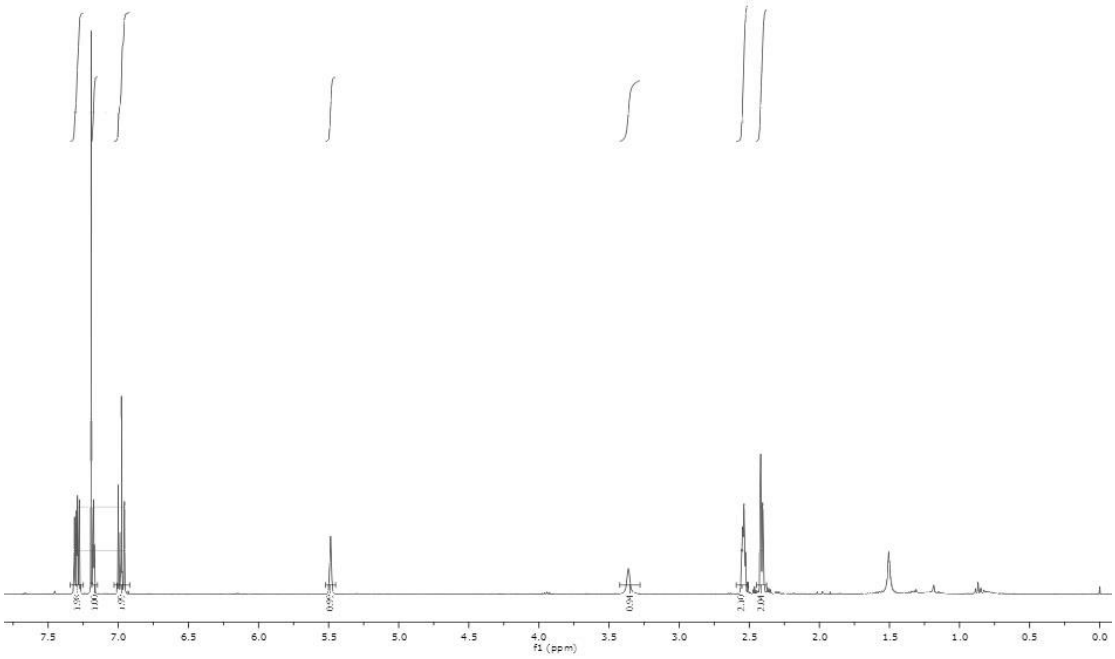
## References

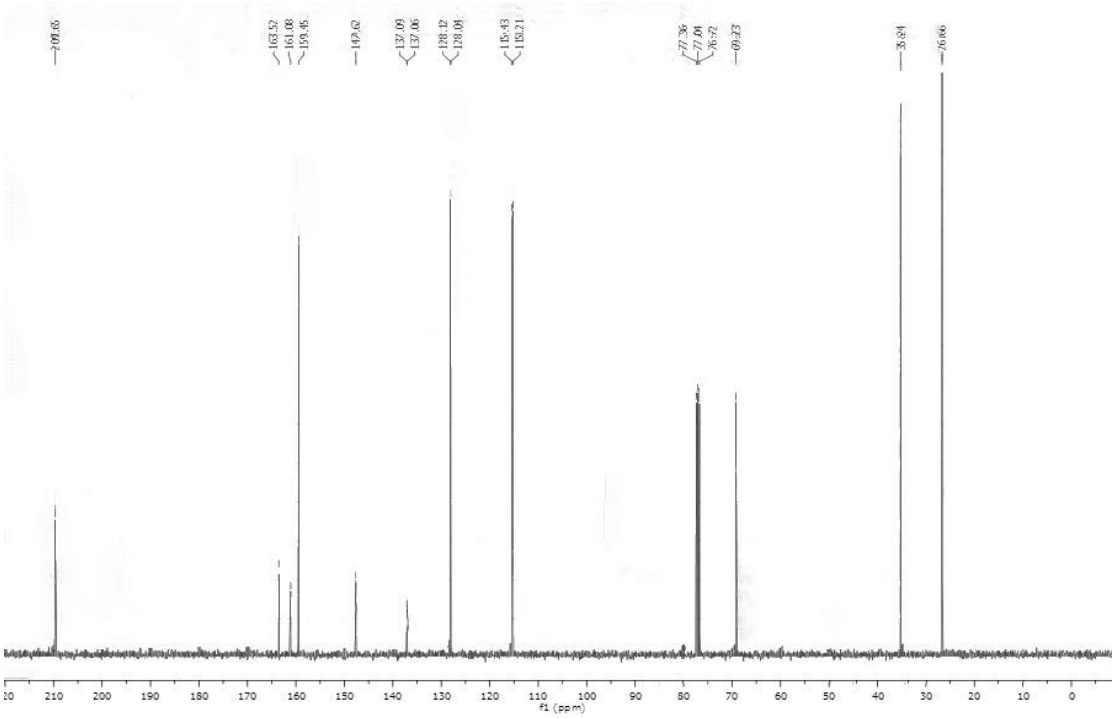

[1] K. P. Guerra, C. A. M. Afonso, Tetrahedron, 2011, 67, 2562-2569.
[2] R. Hajipour, S. Zakery, Appl Organometal Chem., 2018, 32, e4487.
[3] Bugarin, B. T. Connell, Chem. Commun., 2010, 46, 2644–2646.
[4] Y. Luan, N. Zheng, Y. Qi, J. Tang, G. Wang, Catal. Sci. Technol., 2014, 4, 925-929.

**NMR spectra:**

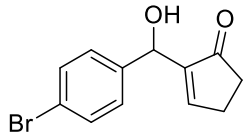
**3a** 2-[(4-Fluoro-phenyl)-hydroxy-methyl]-cyclopent-2-enone

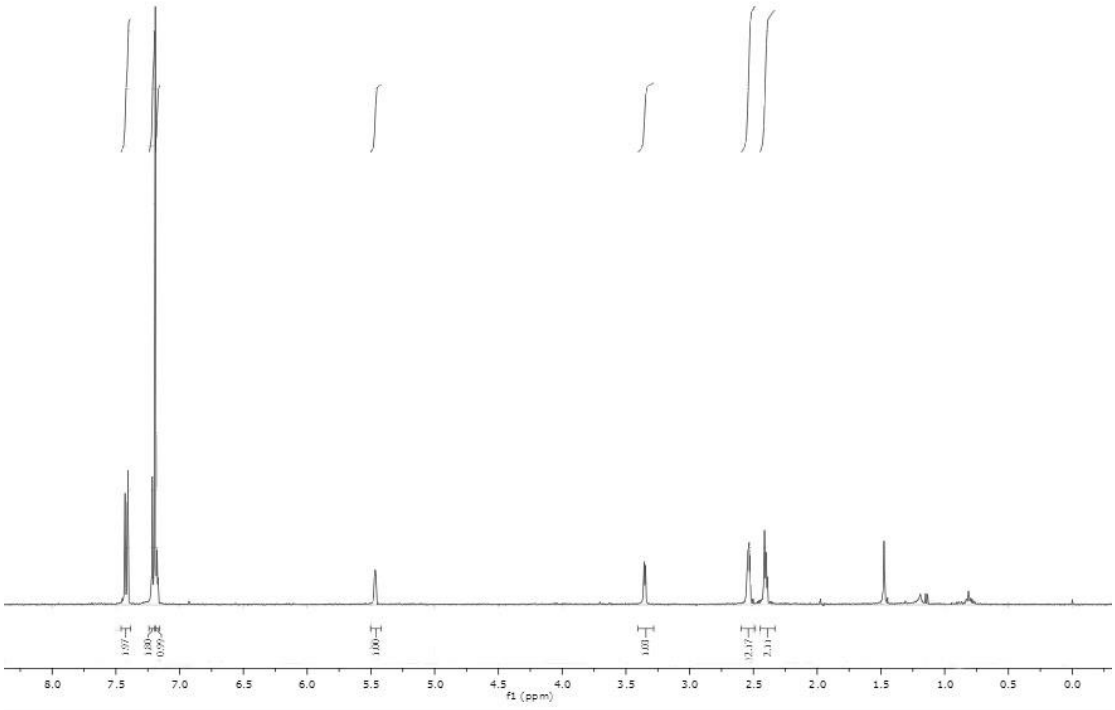


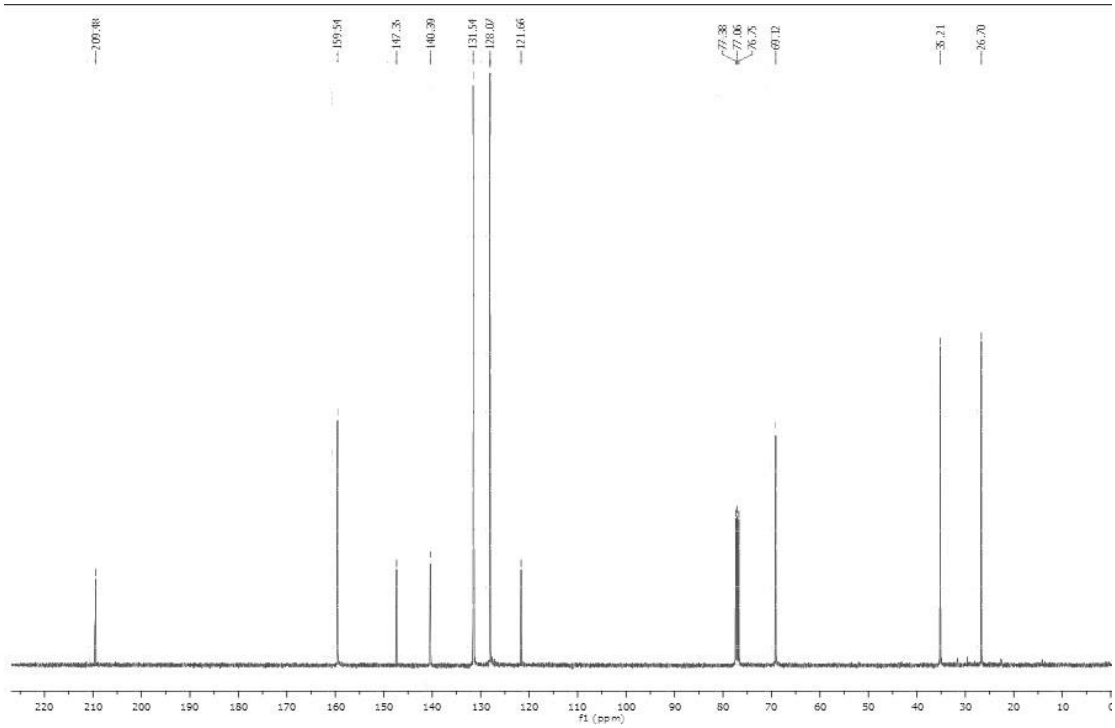



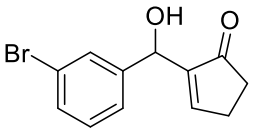
**3b** 2-[(4-Bromo-phenyl)-hydroxy-methyl]-cyclopent-2-enone

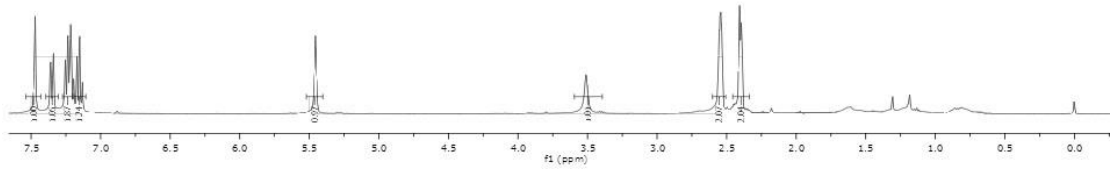


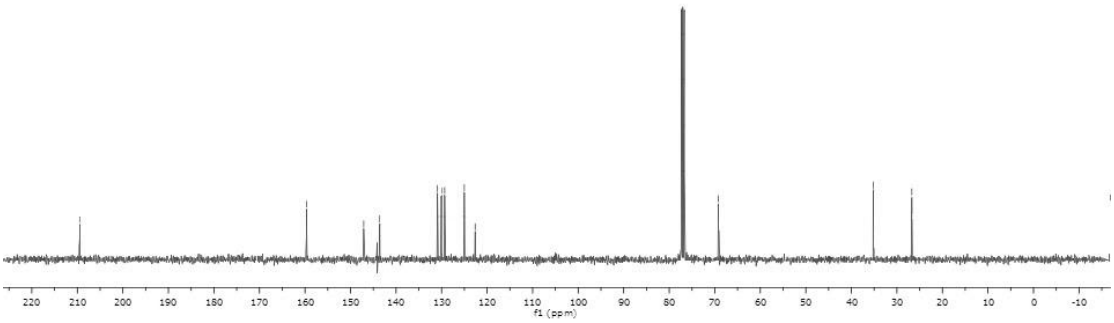



**3c** 2-[(3-Bromo-phenyl)-hydroxy-methyl]-cyclopent-2-enone

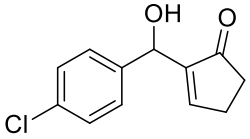


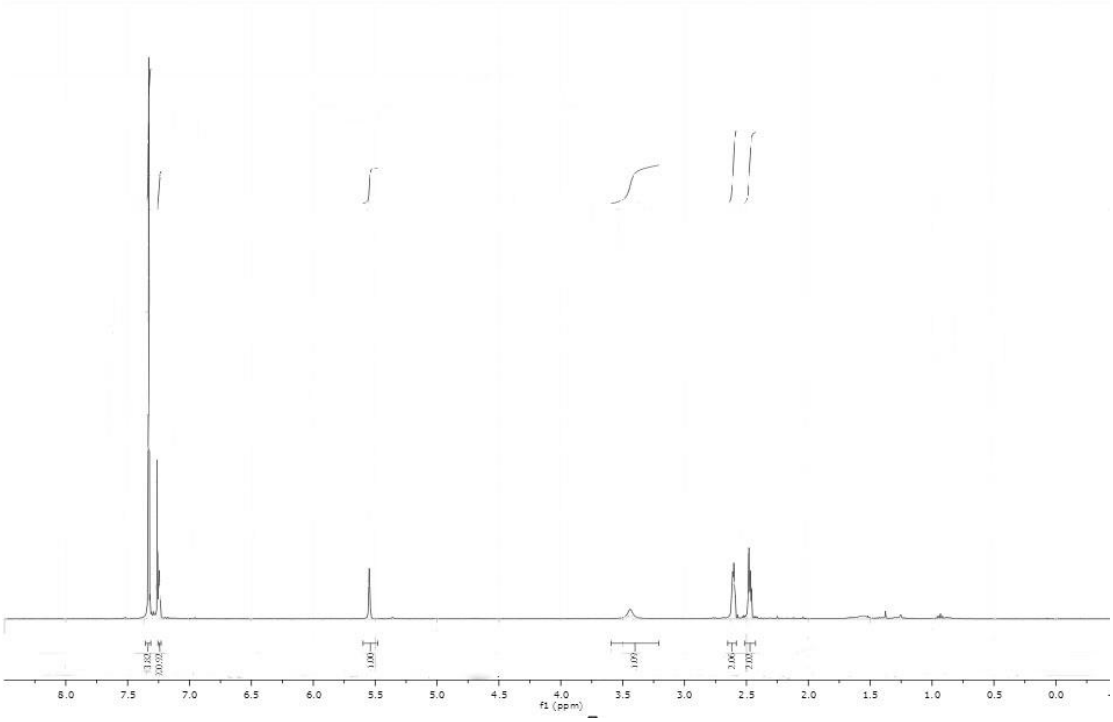



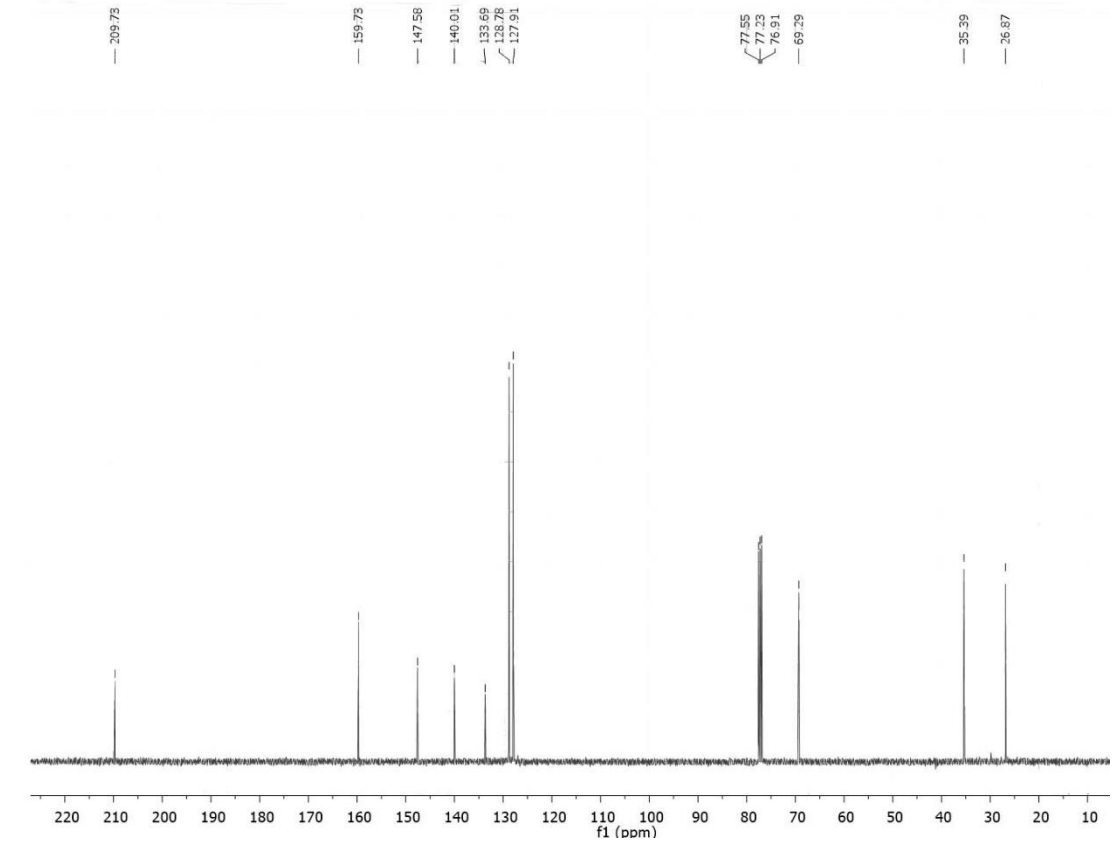




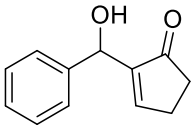
**3d** 2-[(4-Chloro-phenyl)-hydroxy-methyl]-cyclopent-2-enone

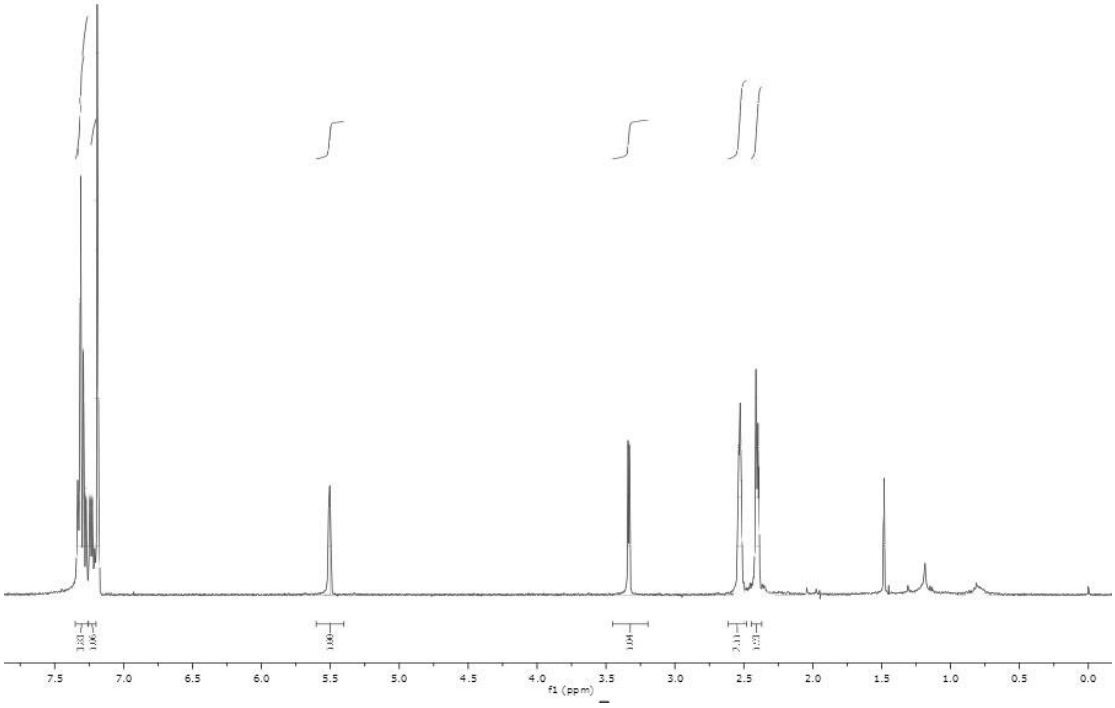


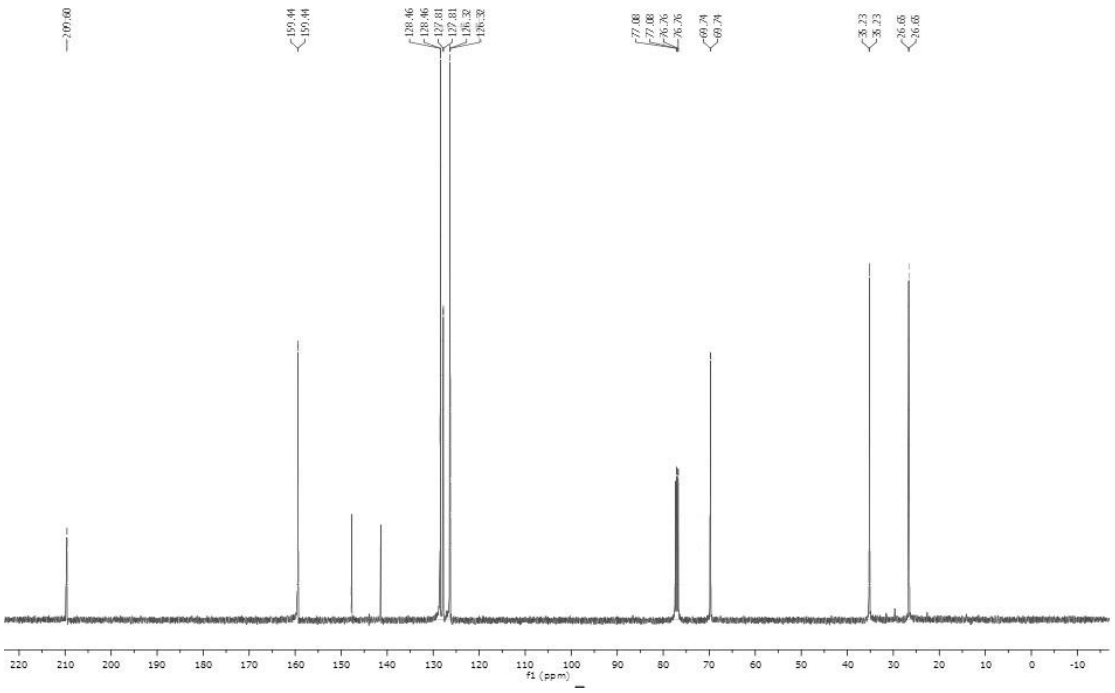



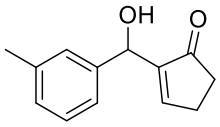
**3e** 2-(Hydroxy-phenyl-methyl)-cyclopent-2-enone

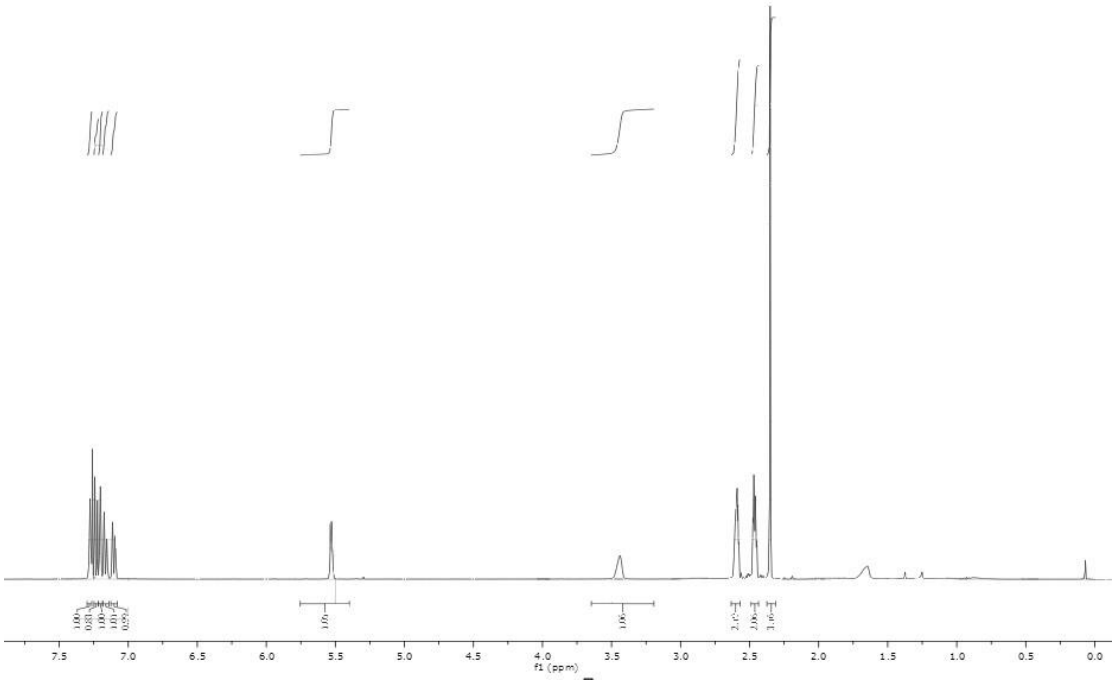


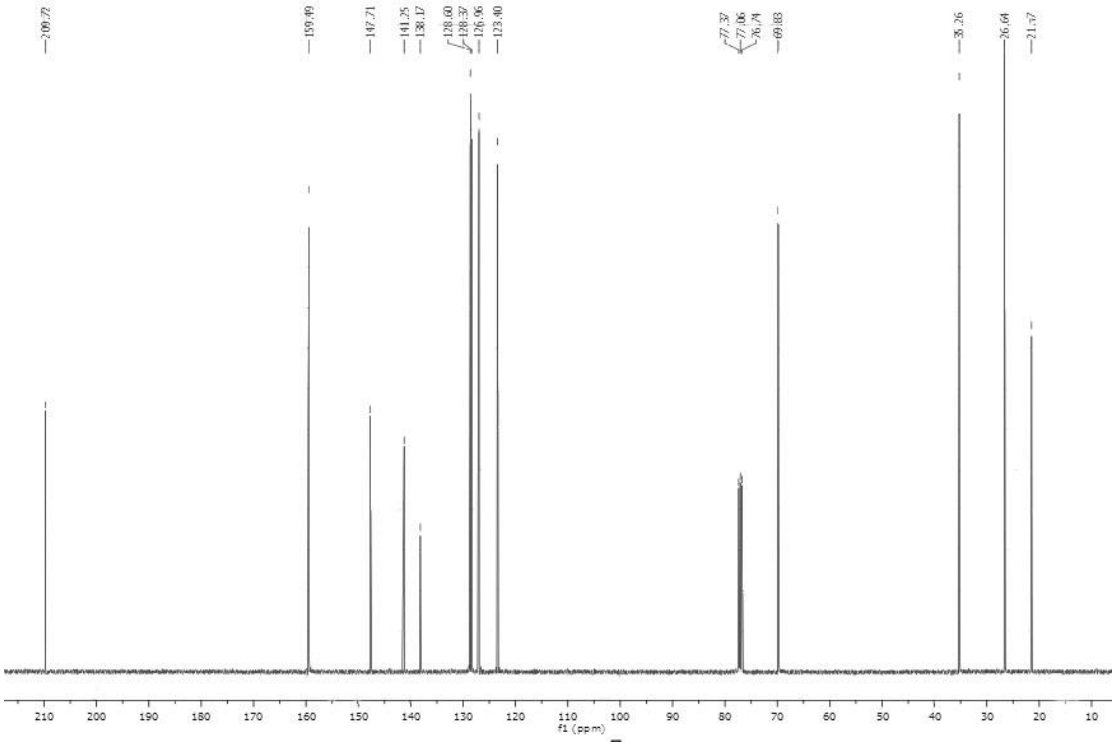



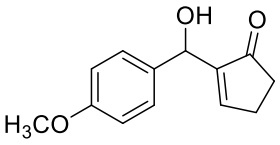
**3f** 2-(Hydroxy-m-tolyl-methyl)-cyclopent-2-enone

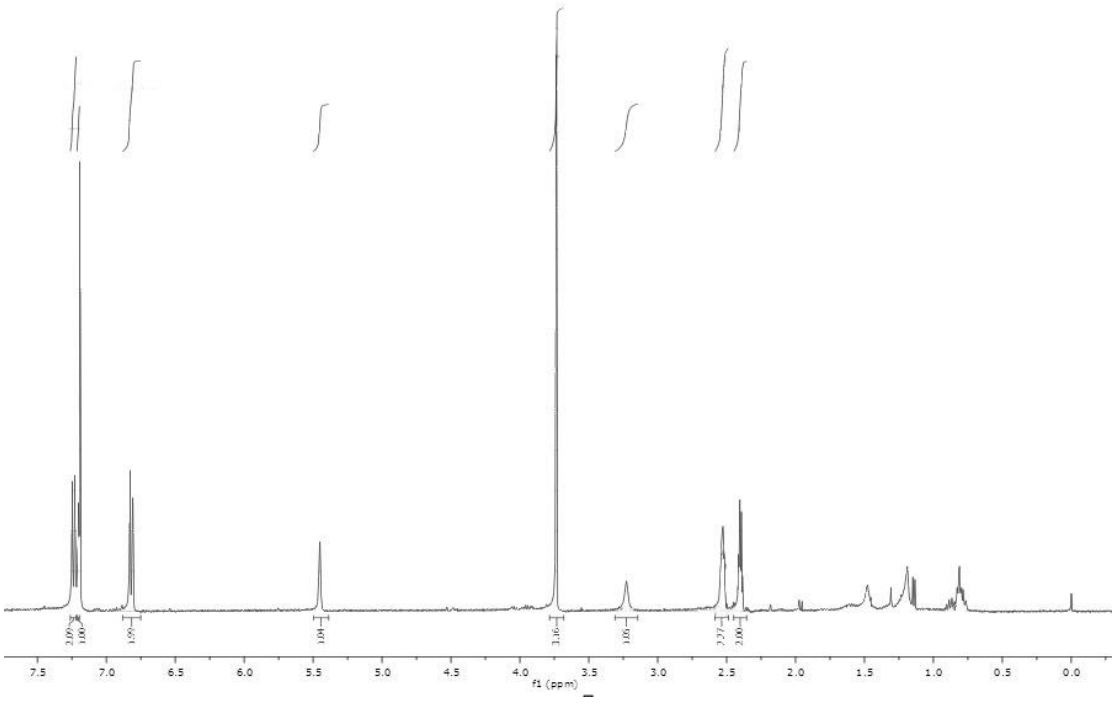


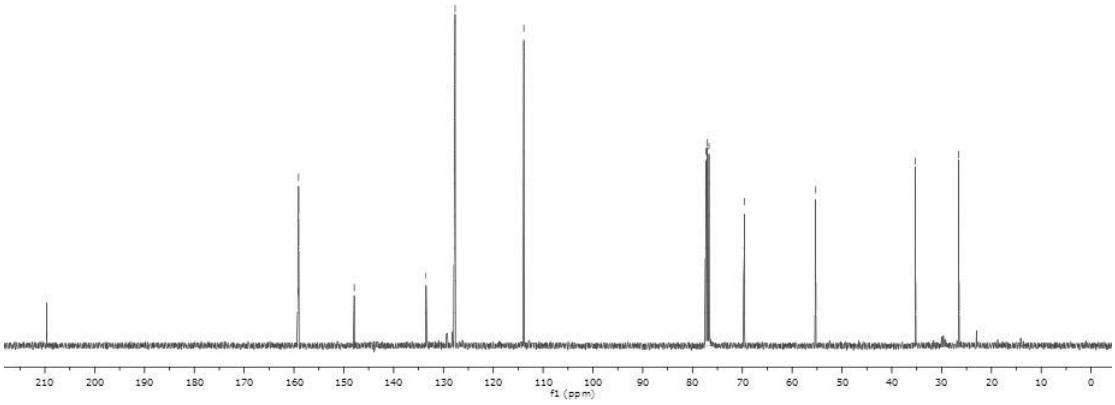



**3g** 2-[Hydroxy-(4-methoxy-phenyl)-methyl]-cyclopent-2-enone

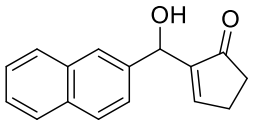


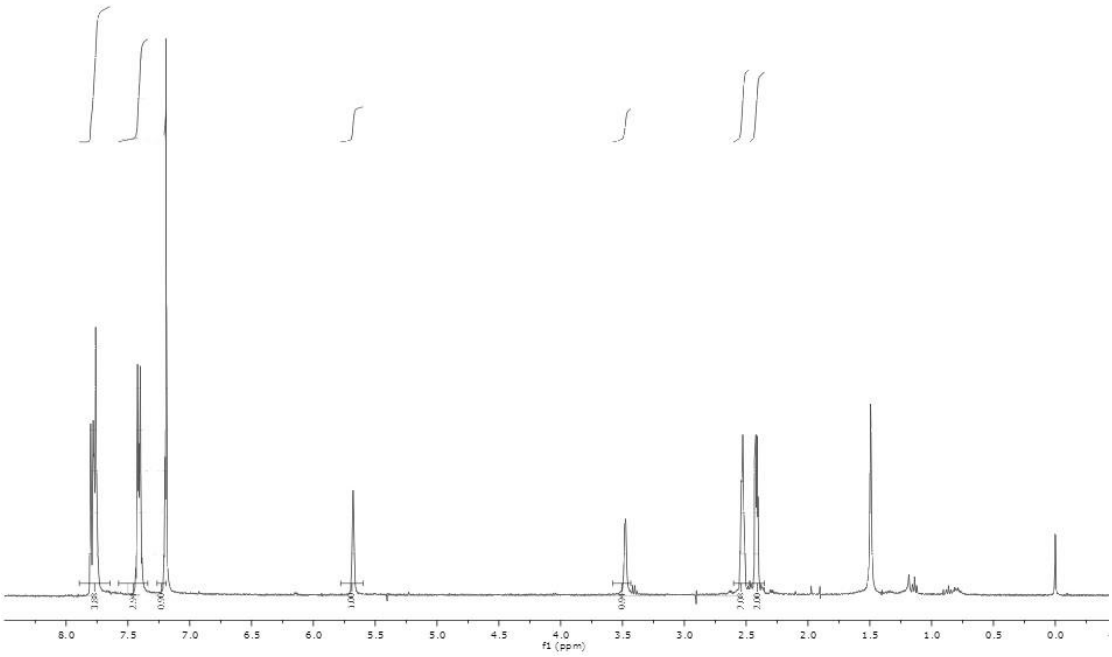



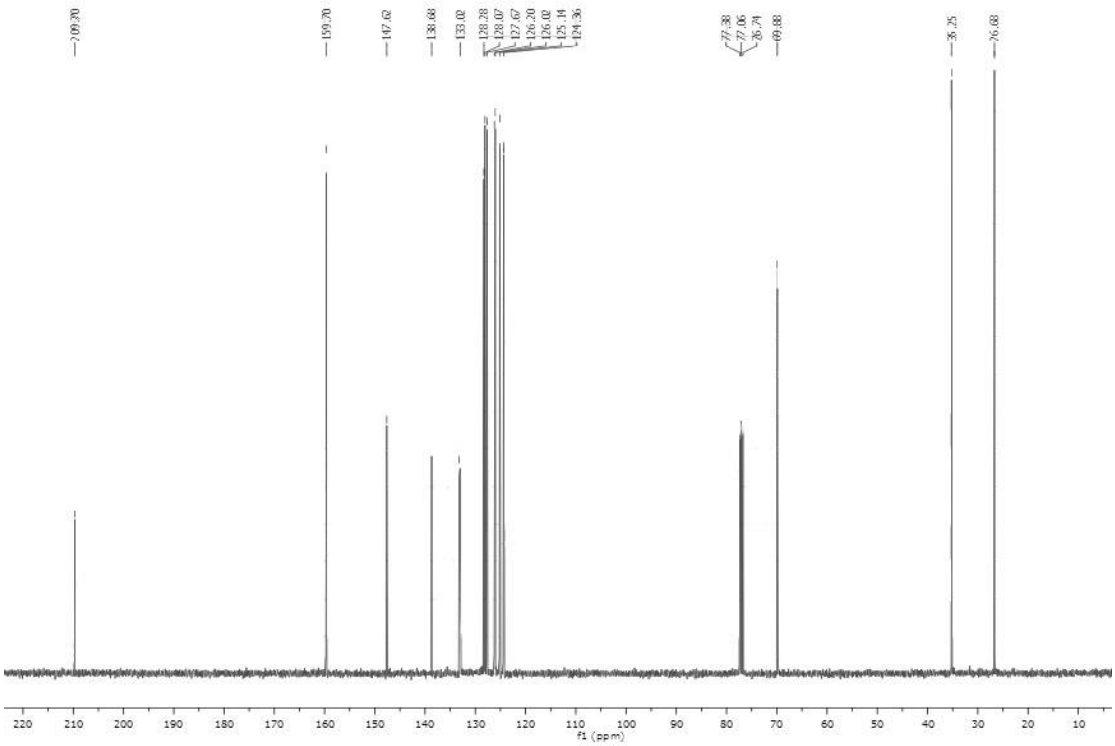

209.66
159.24
159.08
147.90
133.49
127.66
113.86
77.38
77.01
76.70
69.68
55.27
35.28
26.60



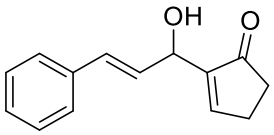
**3h** 2-(Hydroxy-naphthalen-2-yl-methyl)-cyclopent-2-enone

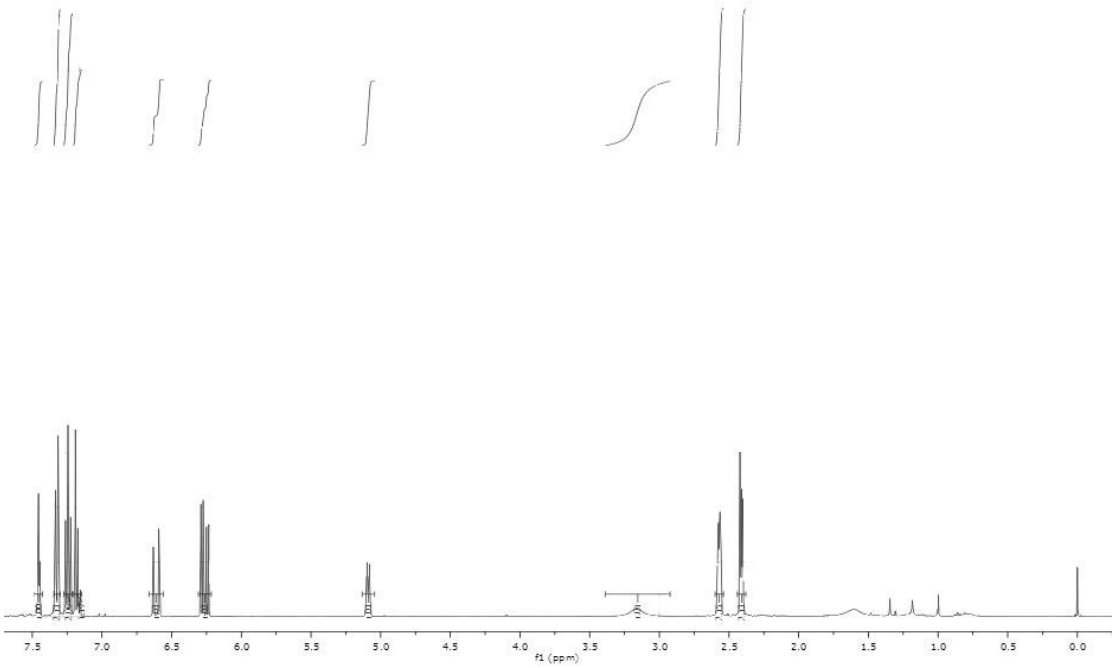


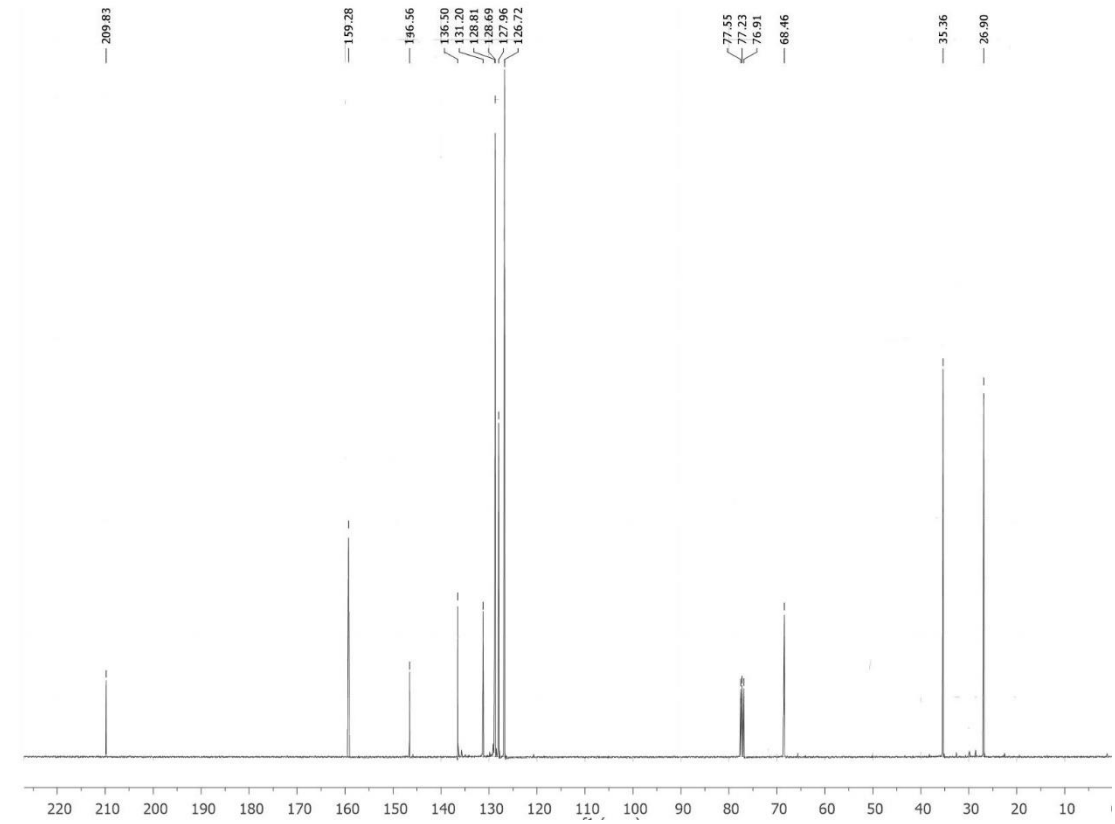



**3i** 2-(1-Hydroxy-3-phenyl-allyl)-cyclopent-2-enone



**3j** 2-(1-Hydroxy-3-phenyl-propyl)-cyclopent-2-enone