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

Supplementary data

Core–Shell Superparamagnetic Metal Organic Framework: A Recyclable and Green Catalyst for the Synthesis of Propargylamines

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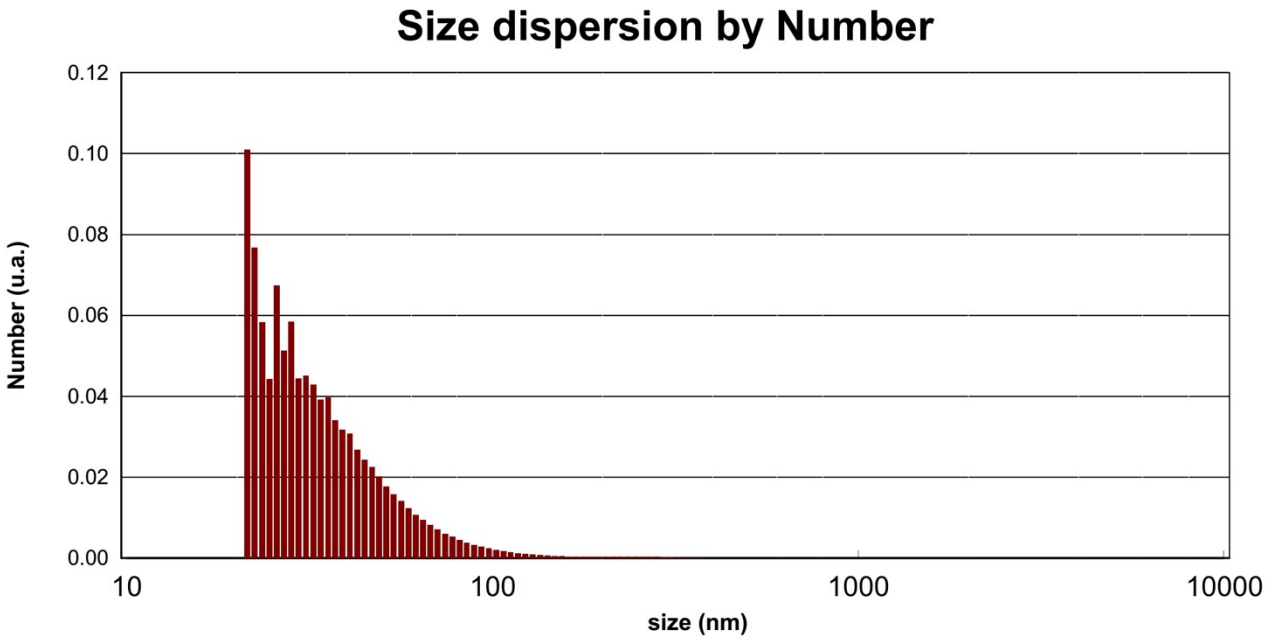


Figure S1. The particle size distribution diagram of Fe_3O_4@MOF

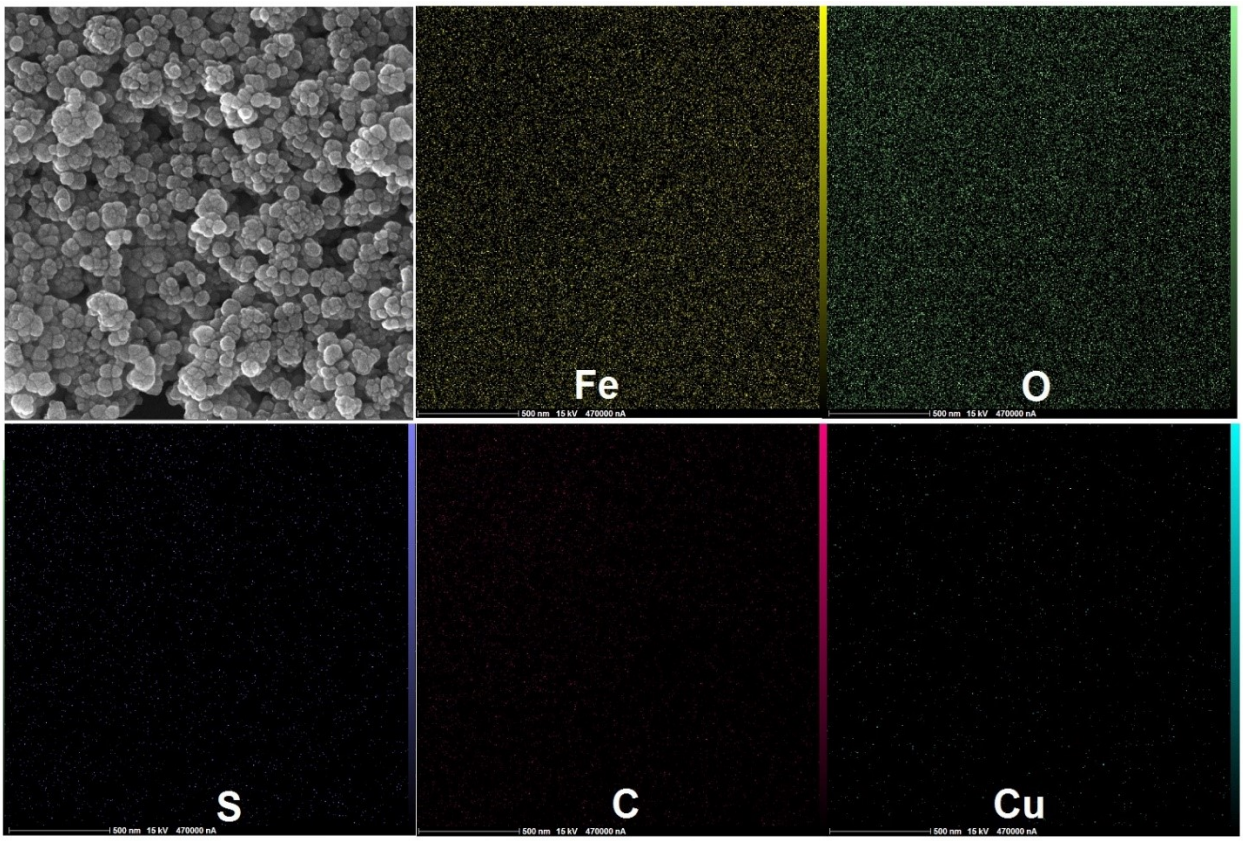


Figure S2. Elemental mapping of Fe_3O_4@MOF

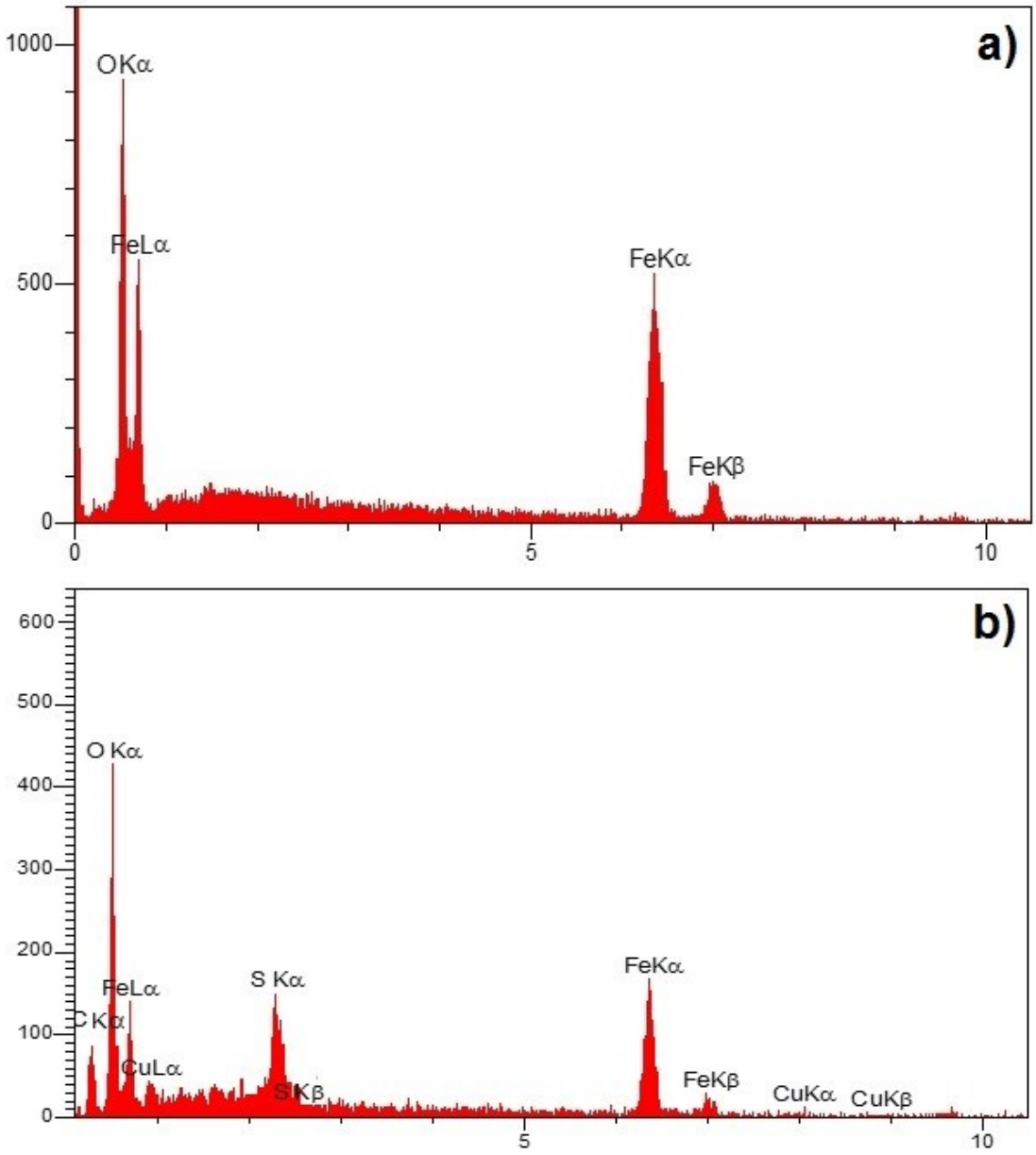


Figure S3. EDX patterns of (a) Fe_3O_4 and (b) Fe_3O_4@MOF

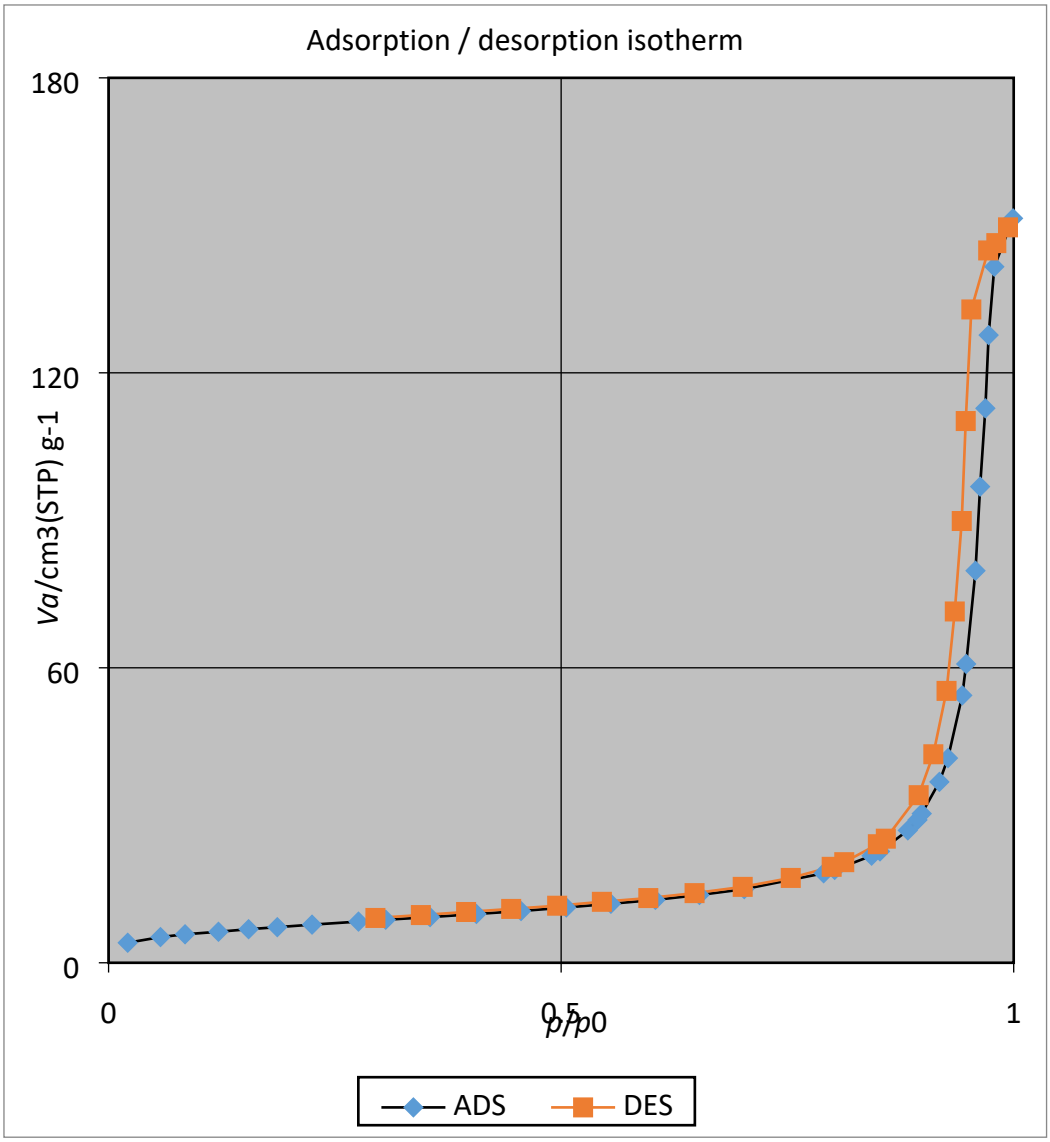


Figure S4. Nitrogen adsorption-desorption isotherms of bare Fe_3O_4

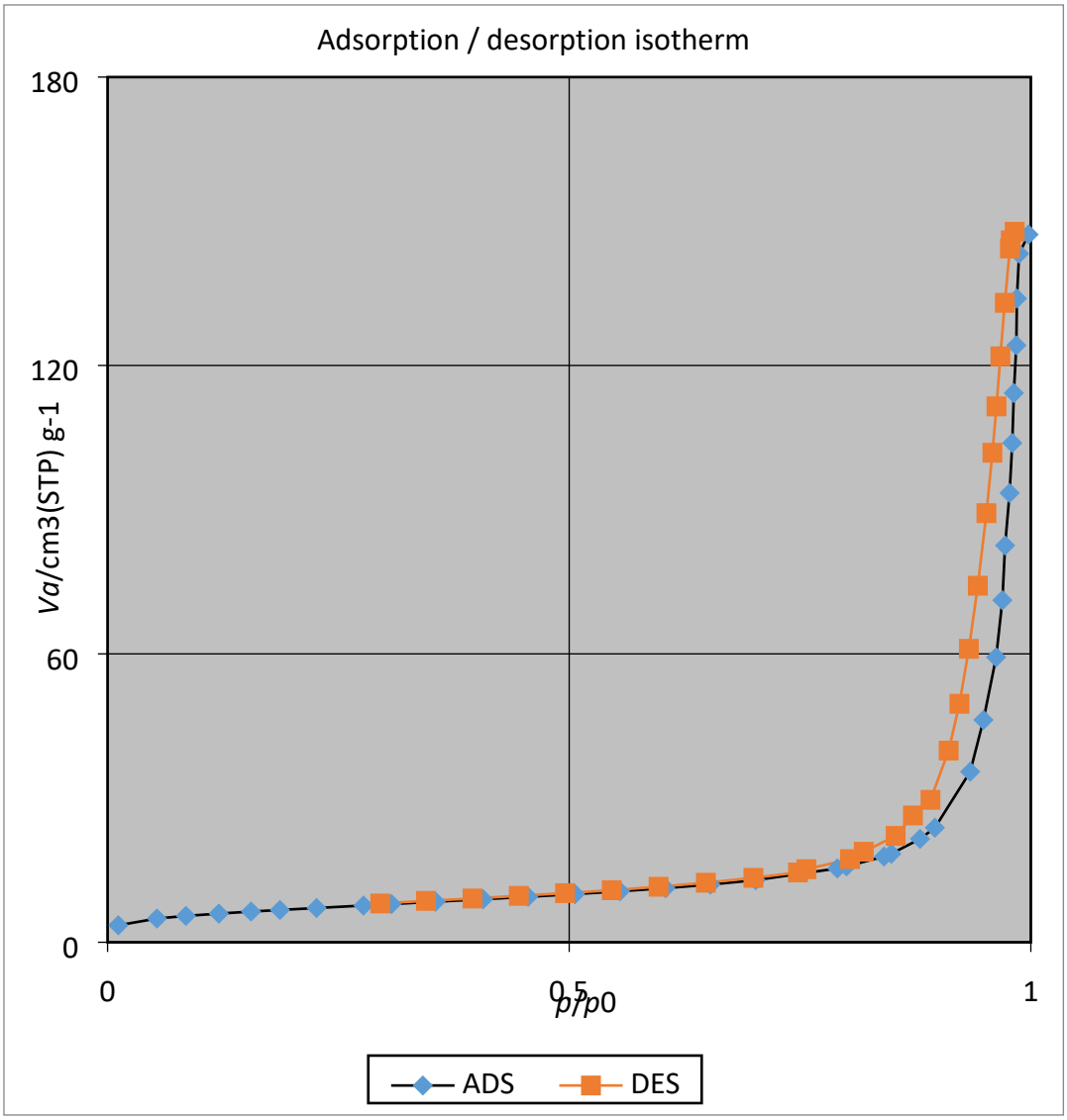


Figure S5. Nitrogen adsorption-desorption isotherms of Fe_3O_4@HKUST-1

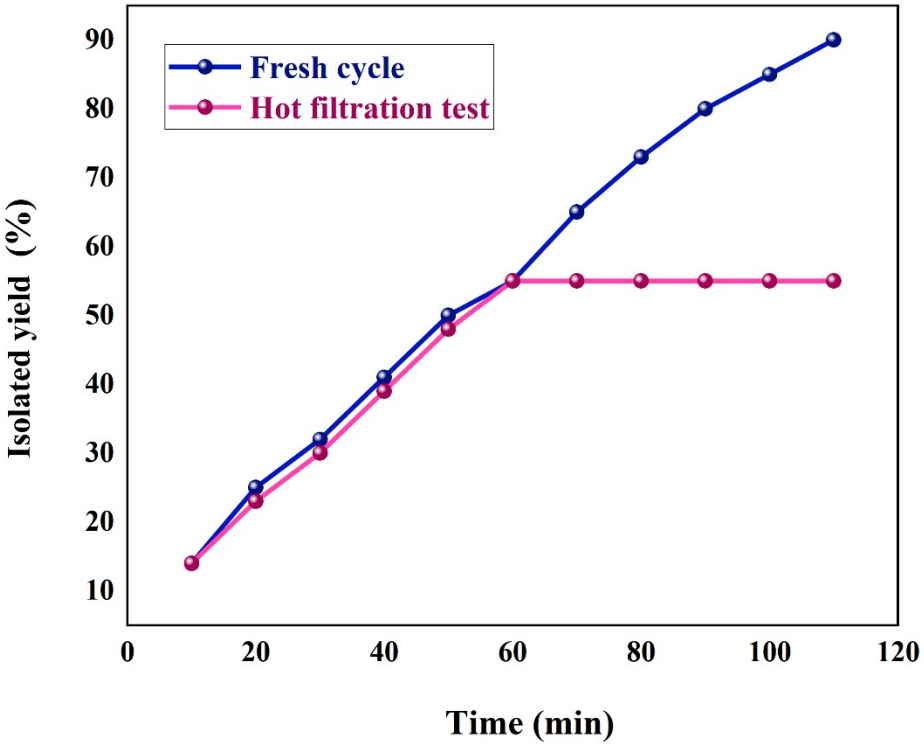


Figure S6. Hot filtration text diagram

4-(1,3-Diphenylprop-2-yn-1-yl)morpholine (Table 2, entry 1)

^{1}H-NMR (300 MHz, $CDCl_3$): δ= 2.69 (4H, t, J= 4.35), 3.76–3.80 (4H, m), 4.85 (1H, s), 7.35–7.42 (6H, m), 7.44-7.54 (2H, m),7.69 (2H, d, J= 7.2); ^{13}C-NMR ($CDCl_3$, 75 Hz): δ= 49.89, 62.06, 67.15, 85.01, 88.55, 122.98, 128.27, 128.30, 128.34, 128.65, 131.84, 137.74; M.S. (70 ev) m/z (%): 277 (M^+, 100).

4-(1-(4-Methoxyphenyl)-3-phenylprop-2-yn-1-l)morpholine (Table 2, entry 2)

^{1}H-NMR (300 MHz, $CDCl_3$): δ= 1.36 (4H, m), 2.73 (4H, m), 3.66 (3H, m), 4.86 (1H, s, J= 8.7), 6.93-6.96 (2H, m, J= 6.3), 7.37–7.39 (3H, m, J = 8.2) 7.55-7.57 (4H, m); ^{13}C-NMR ($CDCl_3$, 75 Hz): δ= 49.76, 55.33, 61.60, 66.96, 84.60, 88.36, 113.71, 122.02, 127.76, 128.36, 130.02, 131.84, 159.47; M.S. (70 ev) m/z (%): 307 (M^+, 100).

4-(3-phenyl-1-(*p*-tolyl)prop-2-yn-1-yl)morpholine (Table 2, entry 5)

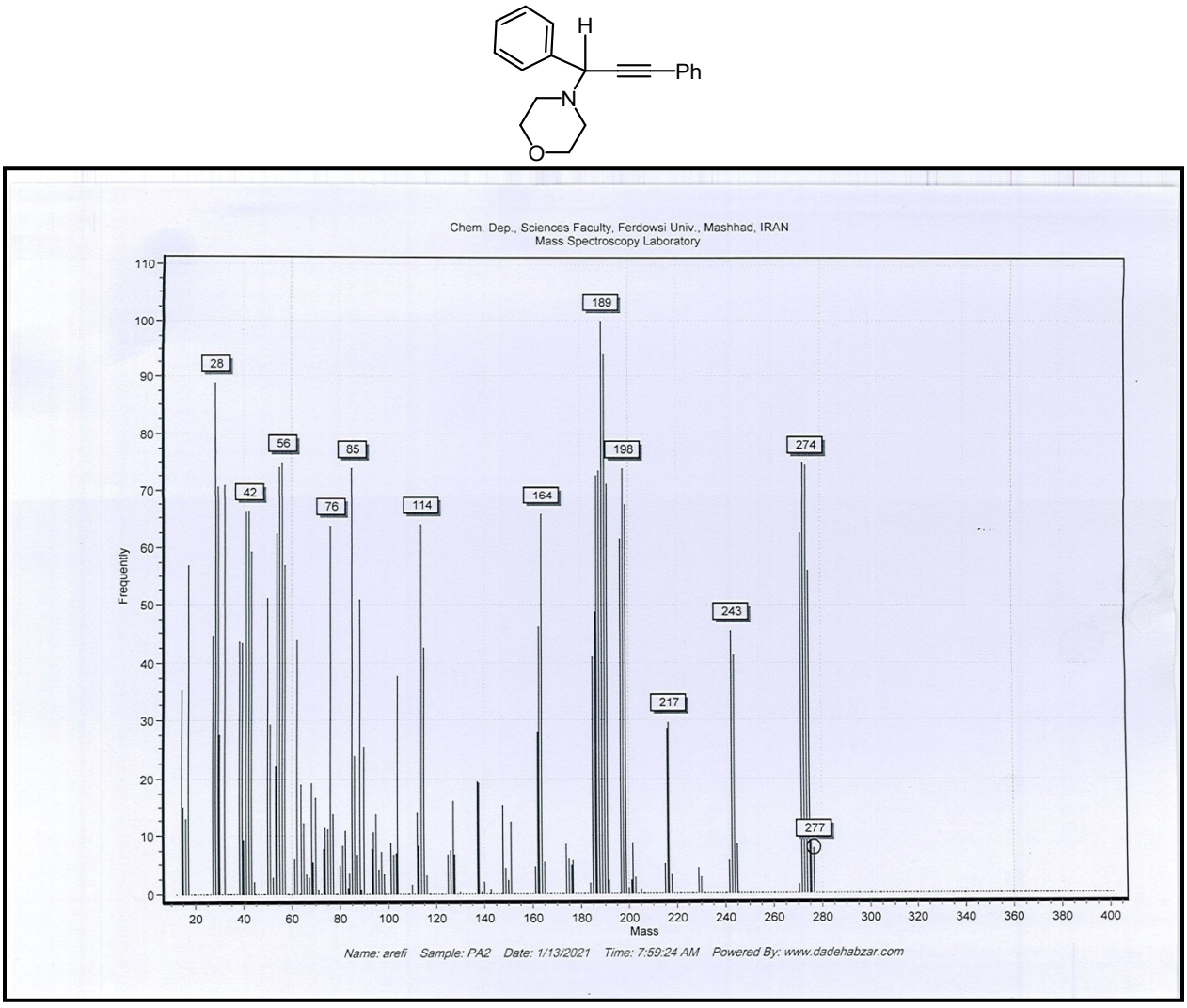
^{1}H-NMR (300 MHz, $CDCl_3$): δ= 2.29 (3H, s), 2.57-2.62 (4H, t, J= 4.3 Hz), 3.66-3.70 (4H, m) 4.72 (1H, s), 7.09 (2H, d, J= 7.9 Hz), 7.12 (2H, d, J= 7.3 Hz), 7.43-7.26 (5H, m); ^{13}C-NMR ($CDCl_3$, 75 Hz): δ= 21.16, 49.84, 61.84, 67.03, 83.67, 88.33, 123.16, 128.21, 128.33, 128.66, 128.99, 131.84, 137.81; M.S. (70 ev) m/z (%): 291 (M^+, 100).

1-(1,3-Diphenylprop-2-yn-1-yl)piperidine (Table 2, entry 6)

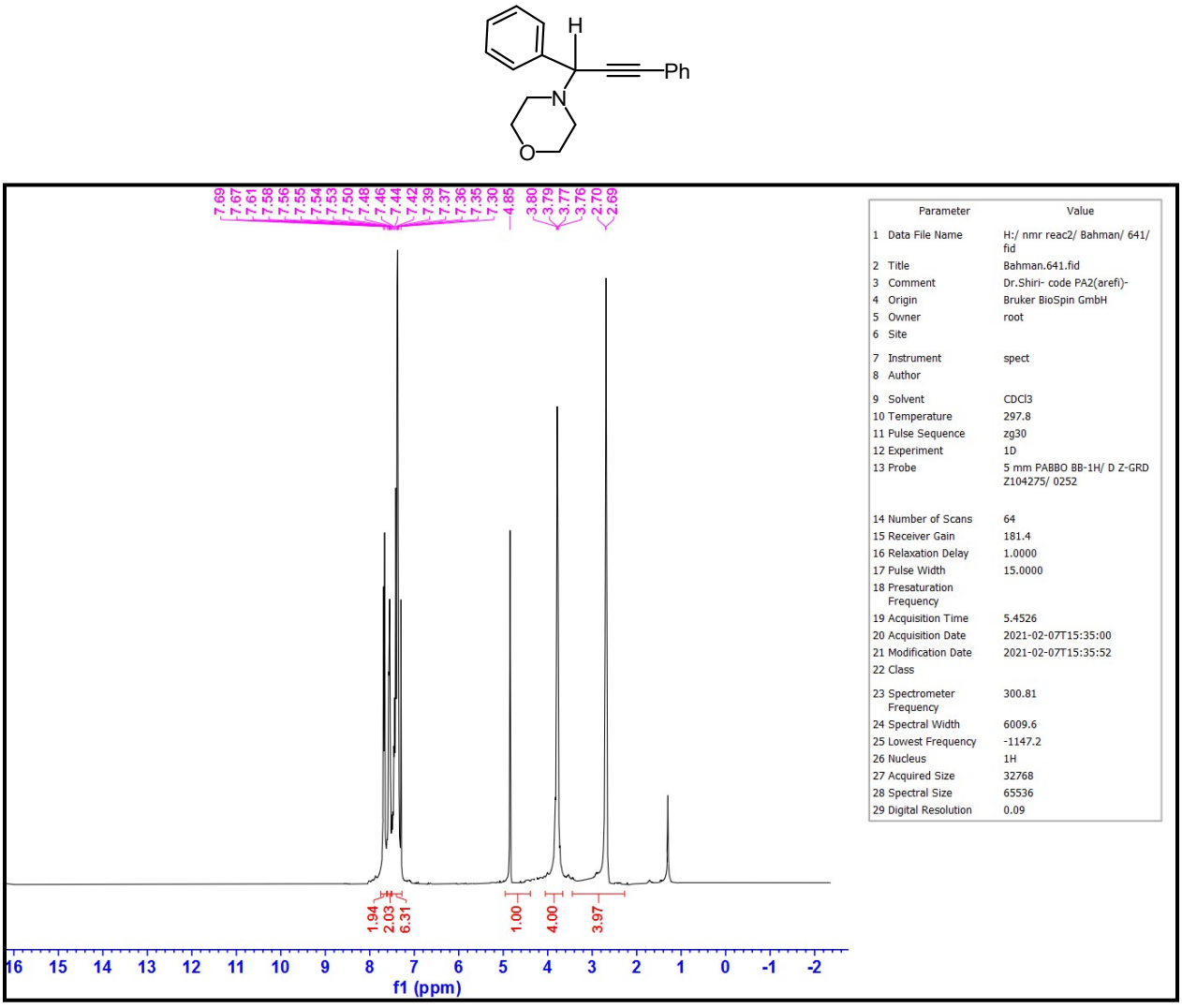
^{1}H-NMR (300 MHz, $CDCl_3$): δ= 1.49–1.66 (2H, m), 1.68–1.72 (4H, m), 2.67 (4H, t, J= 5.25), 4.89 (1H, s), 7.35–7.57 (6H, m), 7.58–7.69 (2H, m), 7.71–7.72 (2H, m); ^{13}C-NMR ($CDCl_3$, 75 Hz): δ= 24.44, 26.13, 50.69, 62.38, 86.02, 87.95, 123.34, 127.57, 128.13, 128.33, 128.66, 131.86, 138.42.

1-(1-(phenylethynyl)cyclohexyl)piperidine (Table 2, entry 12)

^{1}H-NMR (300 MHz, $CDCl_3$): δ= 1.42–1.63 (12H, m), 2.17–2.19 (4H, m), 3.30 (4H, t, J= 4.8 Hz), 7.24-7.29 (3H, m, J= 4.8 Hz), 7.43–7.47 (2H, m); ^{13}C-NMR ($CDCl_3$, 75 Hz): δ= 23.12, 23.49, 24.55, 25.27, 33.38, 47.69, 73.96, 81.59, 87.48, 121.79, 128.48, 129.26,132.51; M.S. (70 ev) m/z (%): 267 (M^+, 100).



Mass spectrum of 4-(1,3-Diphenylprop-2-yn-1-yl)morpholine (Table 2, entry 1)



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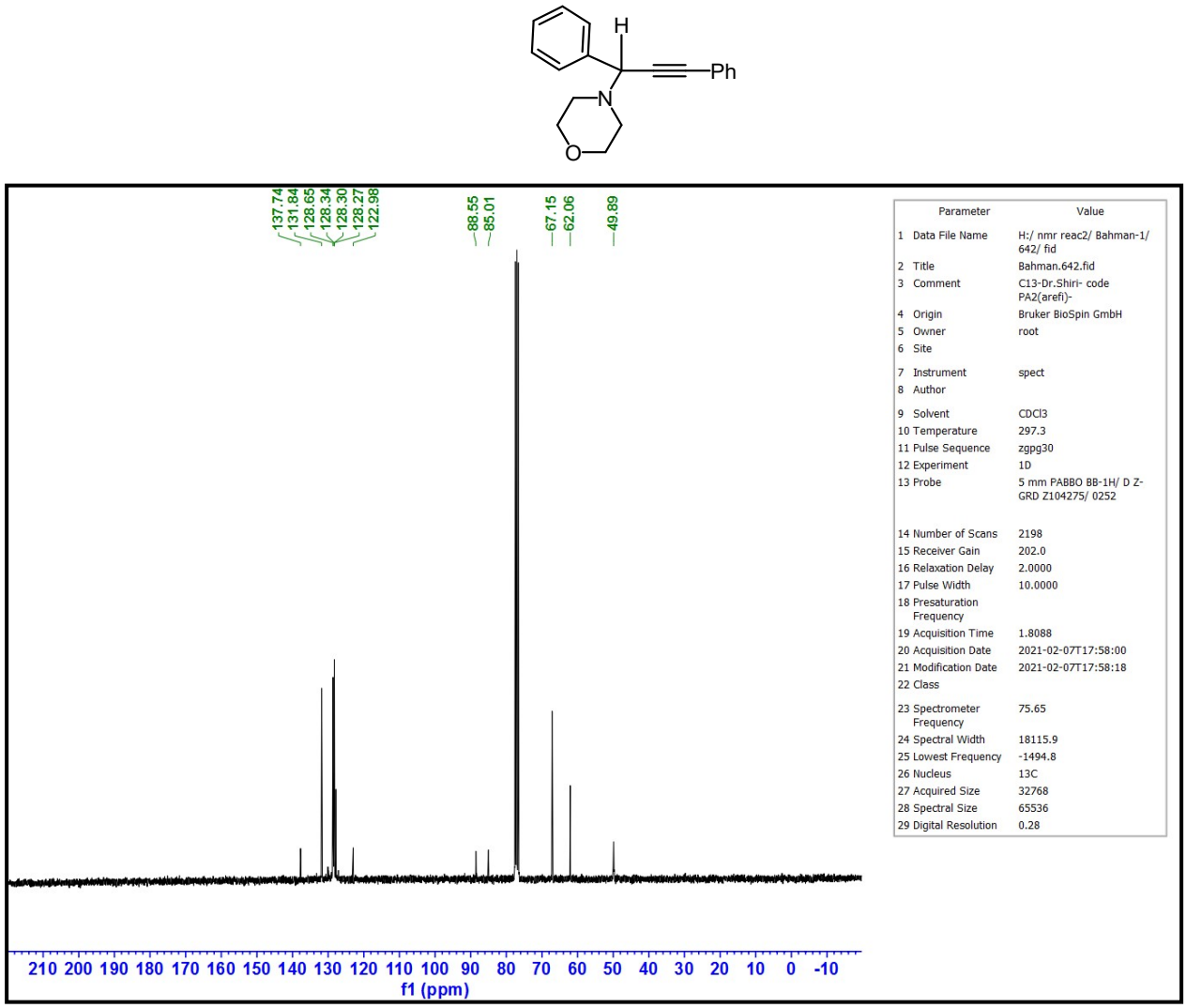
^{1}H-NMR of 4-(1,3-Diphenylprop-2-yn-1-yl)morpholine (Table 2, entry 1)



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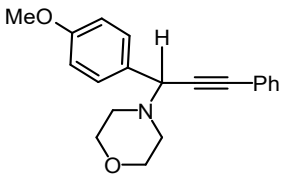
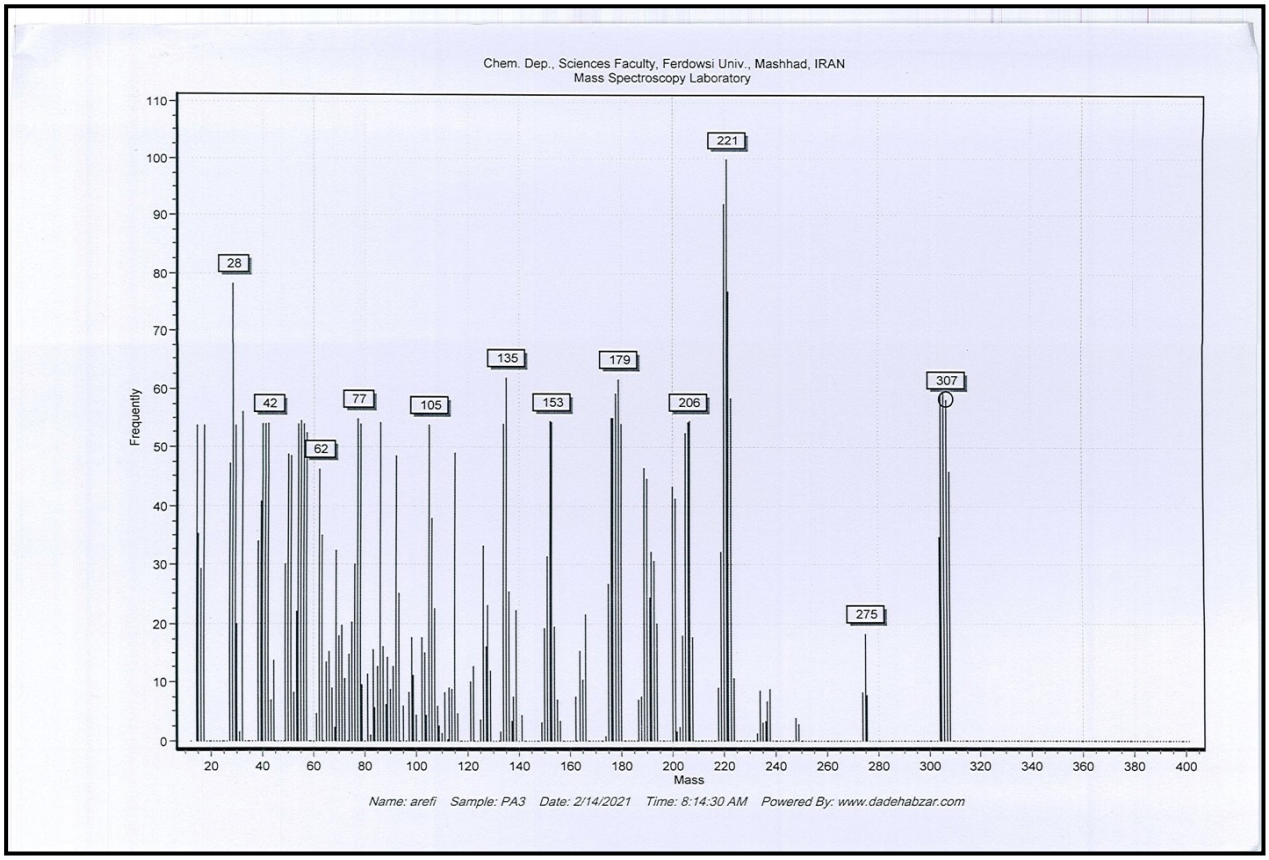
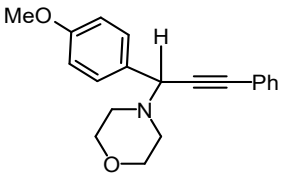
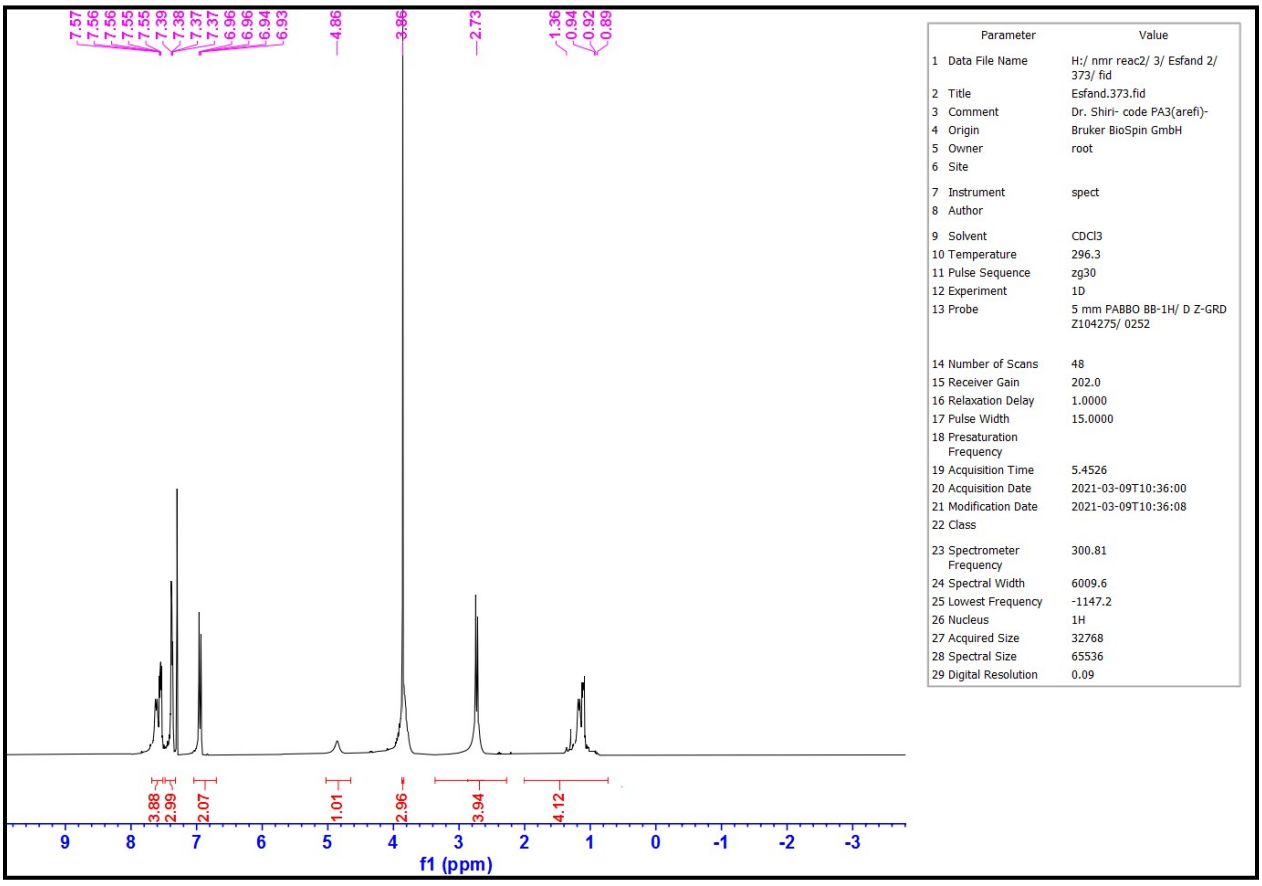
^{13}C-NMR of 4-(1,3-Diphenylprop-2-yn-1-yl)morpholine (Table 2, entry 1)





Mass spectrum of 4-(1-(4-Methoxyphenyl)-3-phenylprop-2-yn-1-l) morpholine (Table 2, entry 2)





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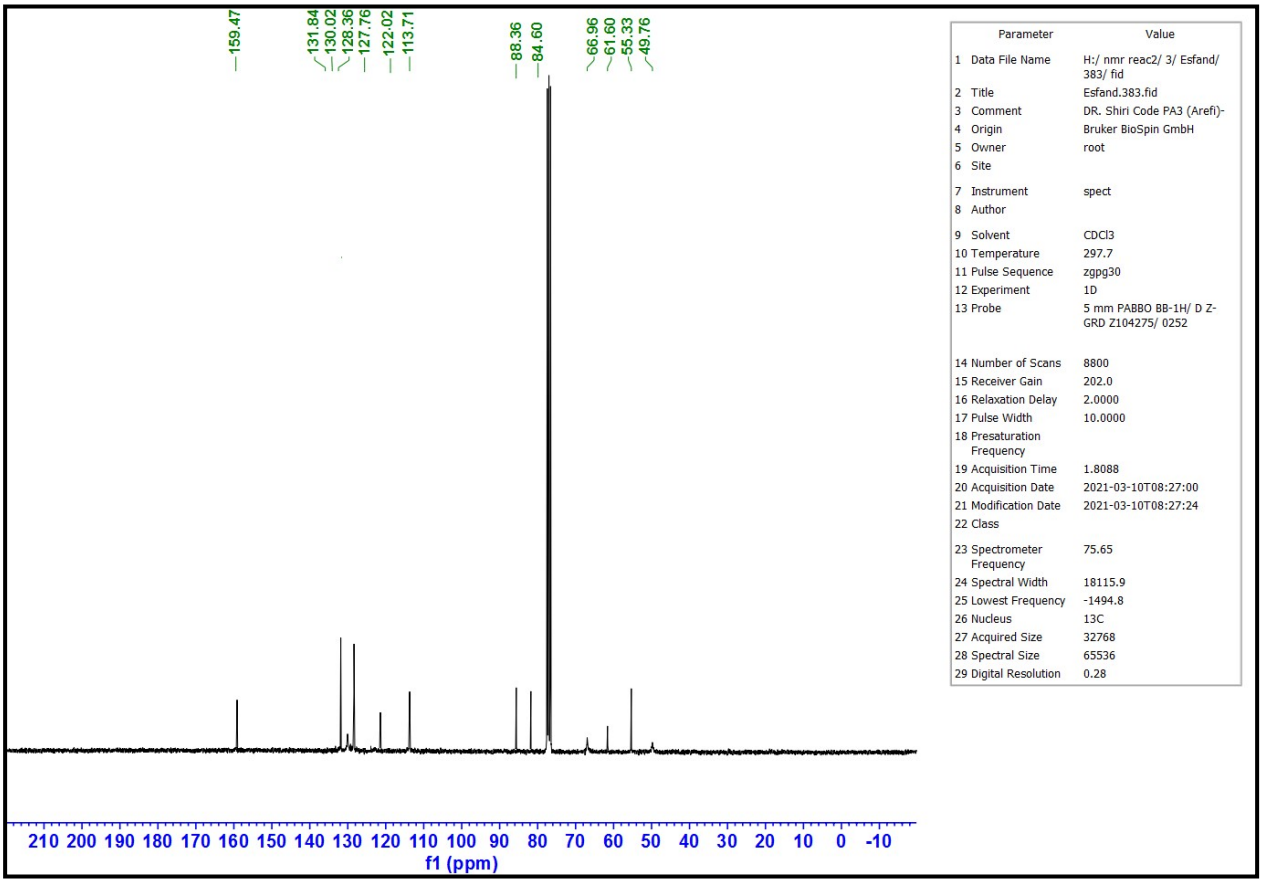
^{1}H NMR of 4-(1-(4-Methoxyphenyl)-3-phenylprop-2-yn-1-l) morpholine (Table 2, entry 2)



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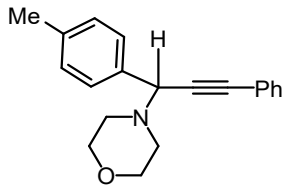
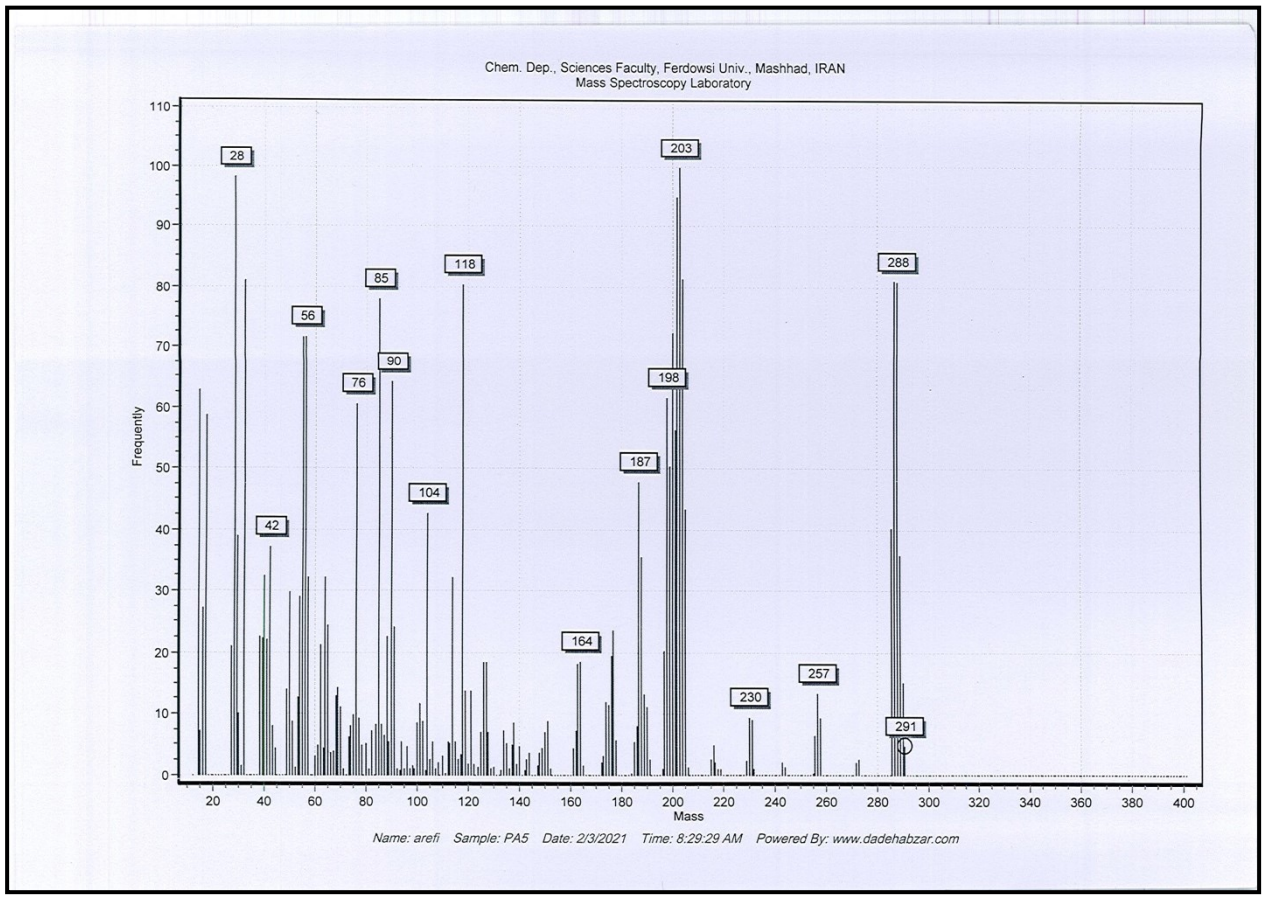
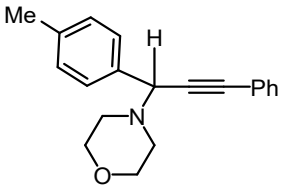
25	Lowest Frequency	-1494.8
26	Nucleus	13C
27	Acquired Size	32768
28	Spectral Size	65536
29	Digital Resolution	0.28

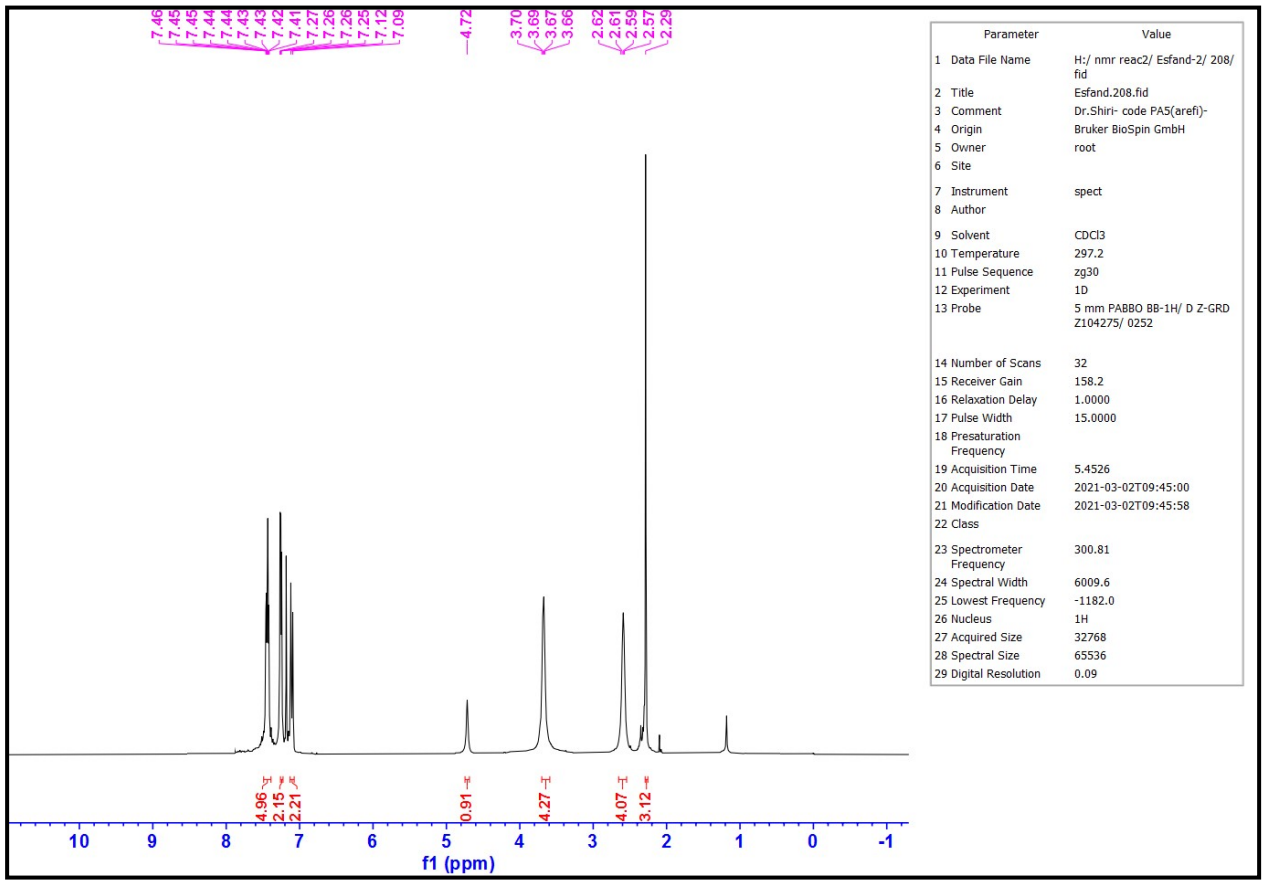
^{13}C-NMR of 4-(1-(4-Methoxyphenyl)-3-phenylprop-2-yn-1-l) morpholine (Table 2, entry 2)





Mass spectrum of 4-(3-phenyl-1-(p-tolyl)prop-2-yn-1-yl)morpholine (Table 2, entry 5)





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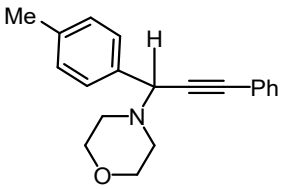
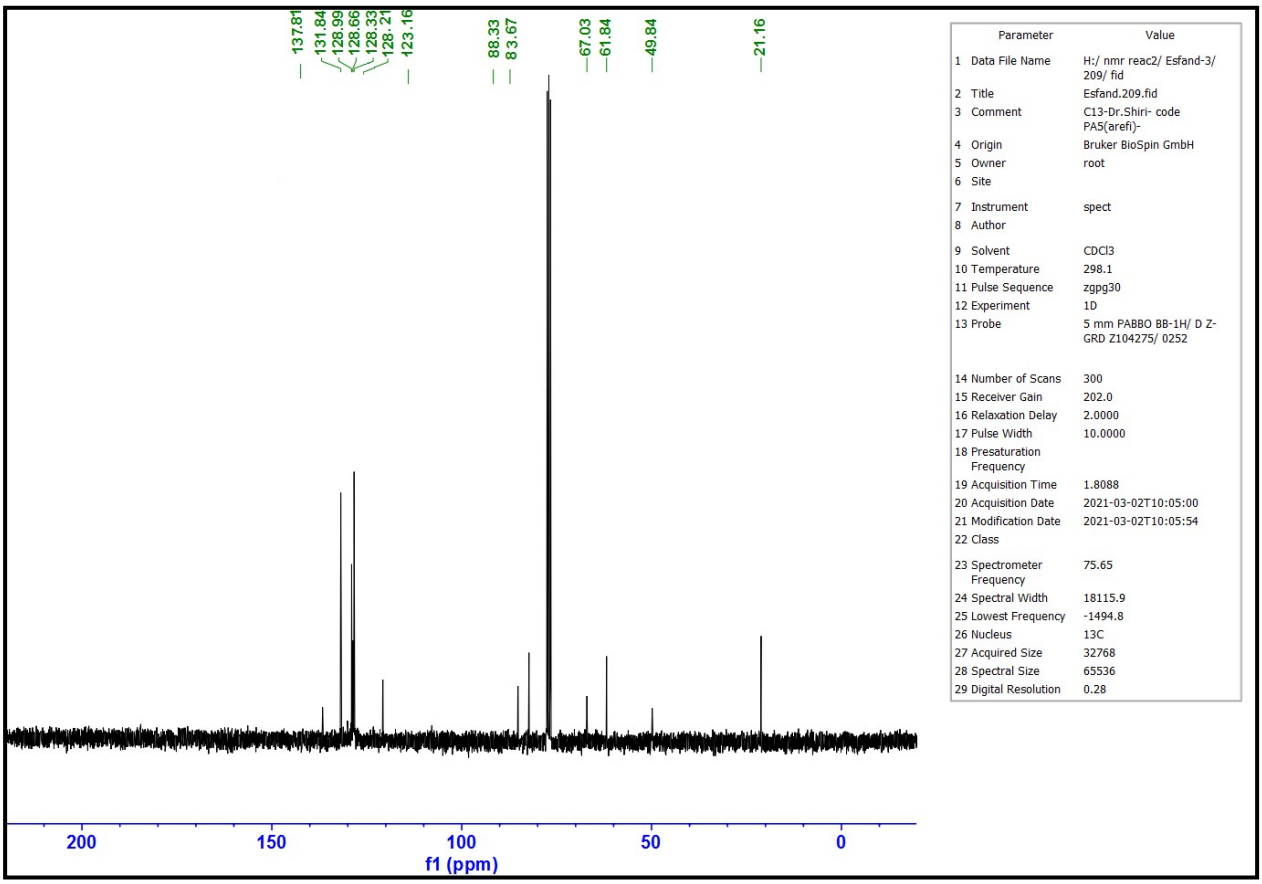
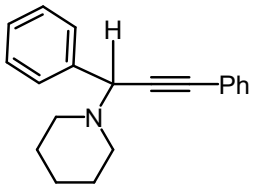
27 Acquired Size	32768
28 Spectral Size	65536
29 Digital Resolution	0.09

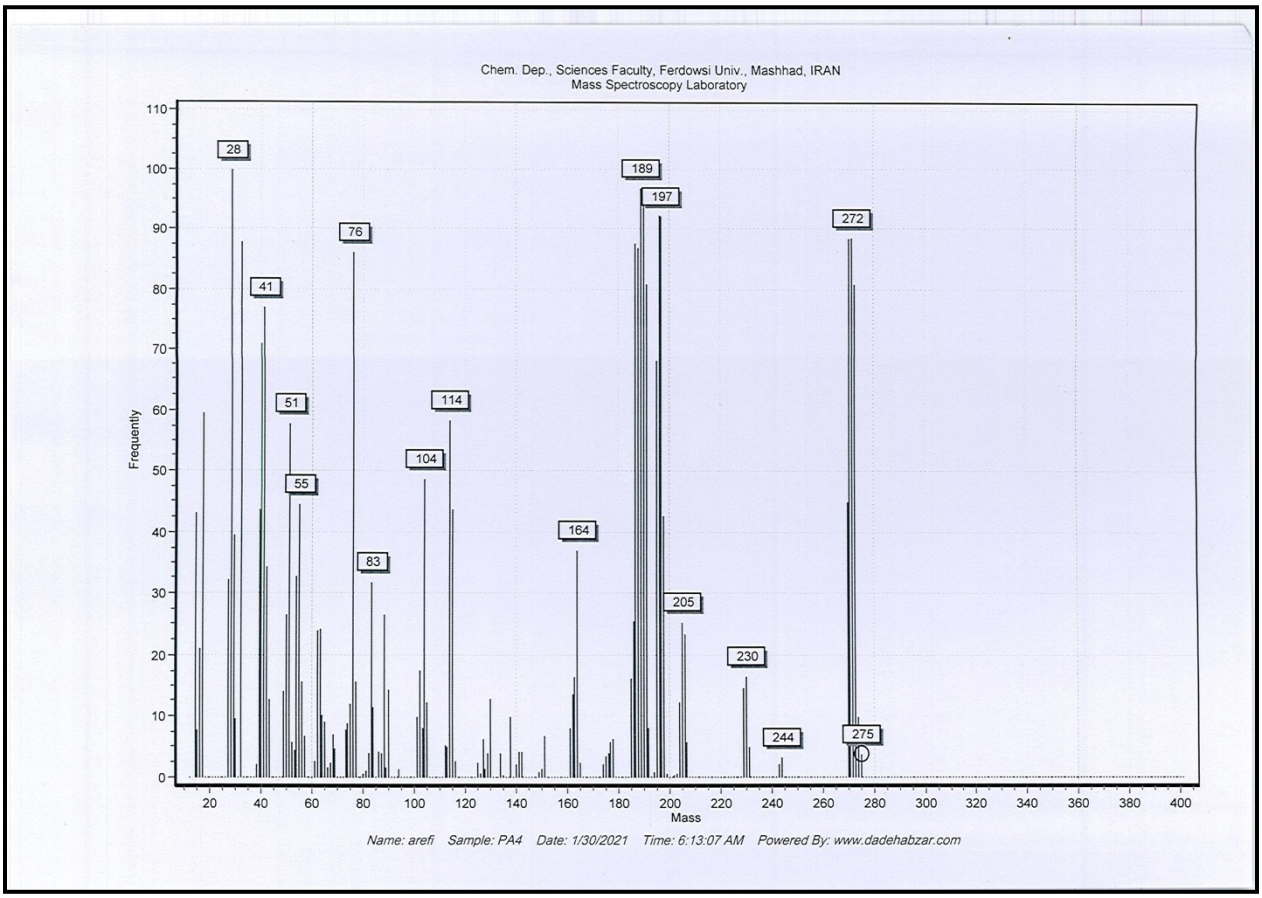
^{1}H-NMR of 4-(3-phenyl-1-(p-tolyl)prop-2-yn-1-yl)morpholine (Table 2, entry 5)



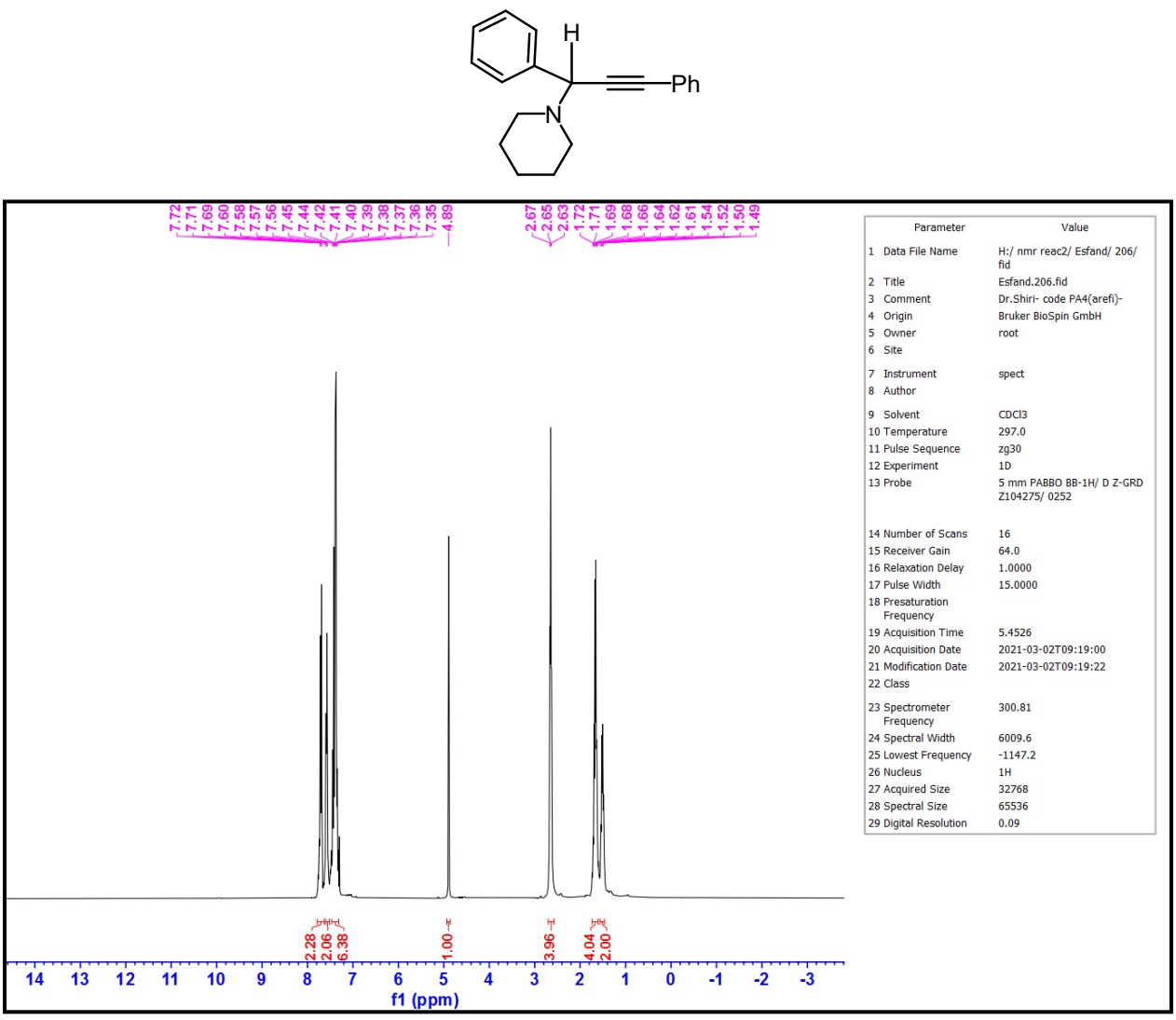


^{13}C-NMR of 4-(3-phenyl-1-(*p*-tolyl)prop-2-yn-1-yl)morpholine (Table 2, entry 5)

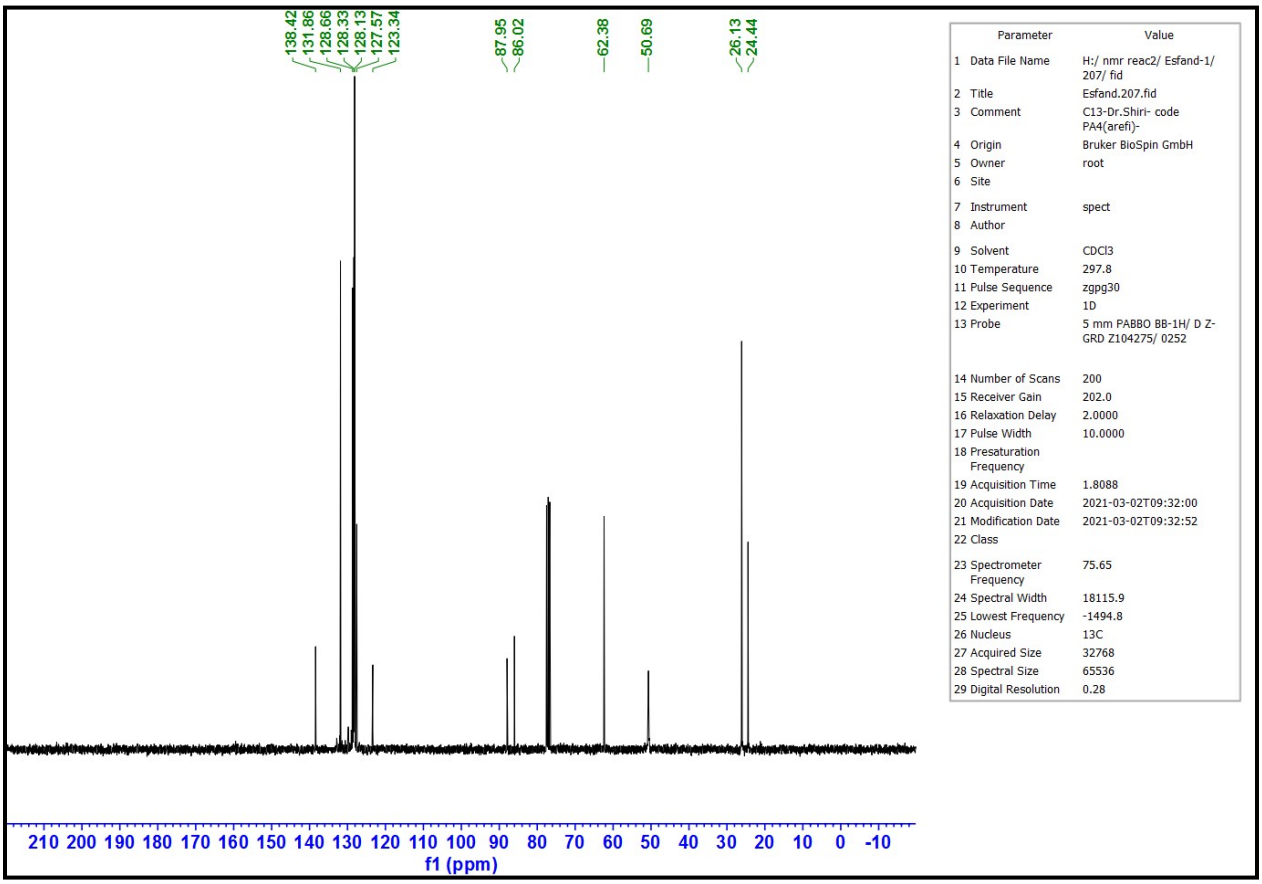




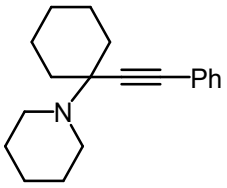
Mass spectrum of 1-(1,3-Diphenylprop-2-yn-1-yl) piperidine (Table 2, entry 6)

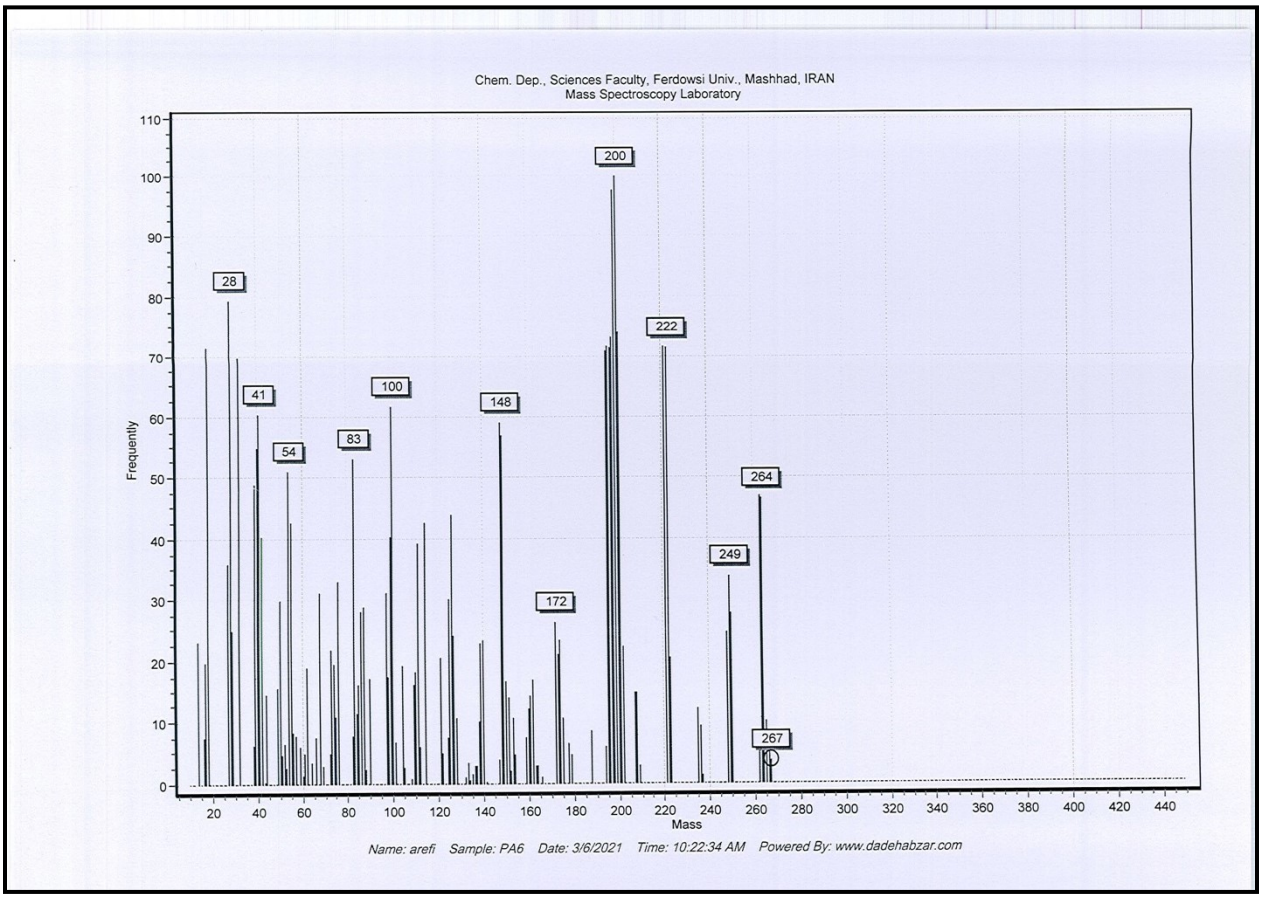


^{1}H-NMR of 1-(1,3-Diphenylprop-2-yn-1-yl) piperidine (Table 2, entry 6)

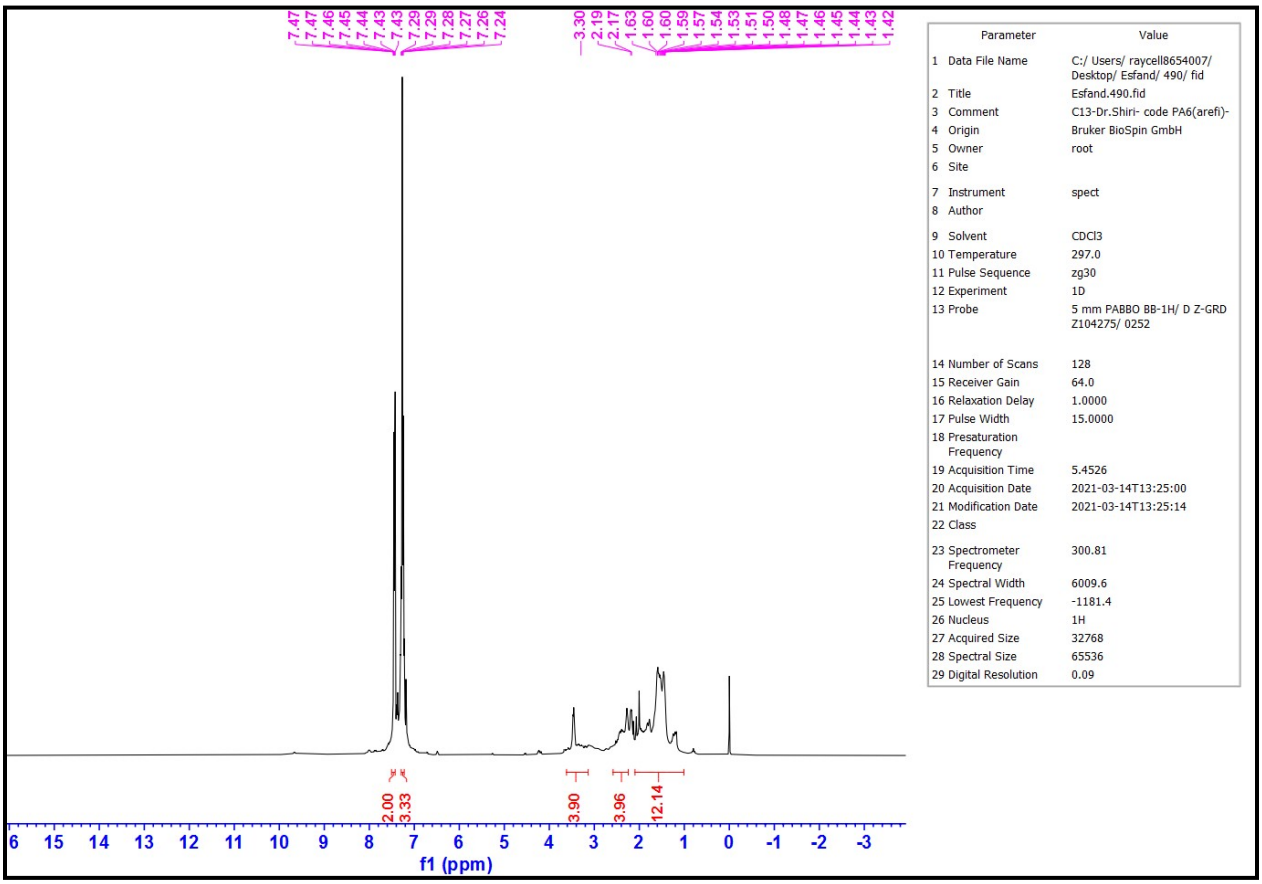


^{13}C-NMR of 1-(1,3-Diphenylprop-2-yn-1-yl) piperidine (Table 2, entry 6)

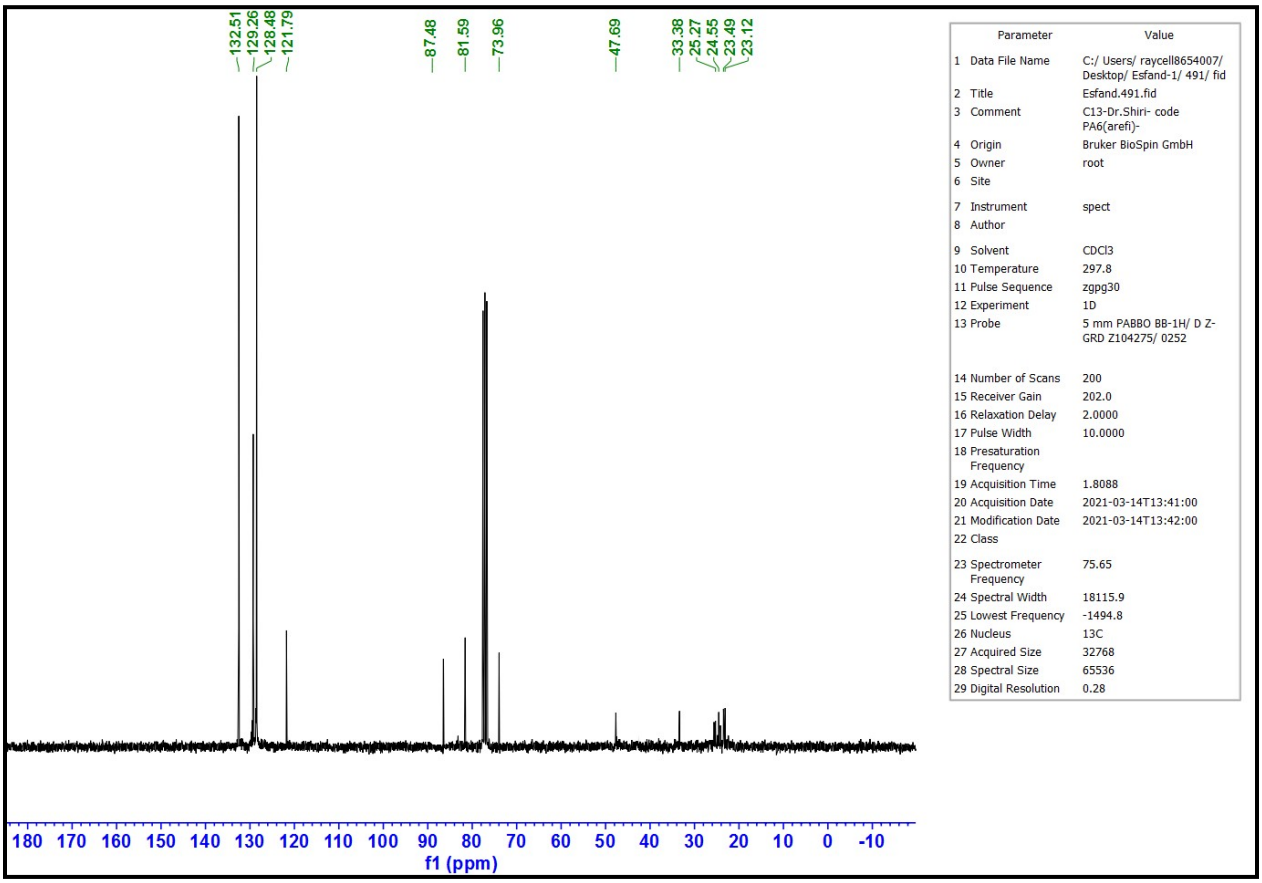




Mass spectrum of 1-(1-(phenylethynyl)cyclohexyl)piperidine (Table 2, entry 12)



^{1}H-NMR of 1-(1-(phenylethynyl)cyclohexyl)piperidine (Table 2, entry 12)



^{13}C-NMR of 1-(1-(phenylethynyl)cyclohexyl)piperidine (Table 2, entry 12)