SUPPORTING INFORMATION

Asymmetric transfer hydrogenation of ketones catalyzed by rhodium complexes containing amino acid triazole ligands

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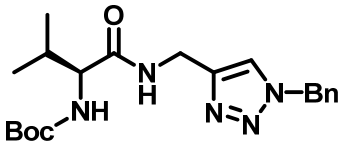
EXPERIMENTAL

General considerations.

Characterizations were made by ^{1}H and ^{13}C NMR spectroscopy. NMR spectra were recorded on Bruker Avance II (^{1}H, 400 MHz; ^{13}C, 100 MHz) and were referenced internally with CDCl3 (δH 7.26, δC 77.16 ppm). High resolution mass spectrometry was performed on a Bruker micrOTOF/ESI. Benzylazide[1], 1-(azidomethyl)naphthalene[1], 9-(azidomethyl)anthracene[1], (R)-(1-azidoethyl)benzene[2], Azidobenzene[3], 1-azido-4-methoxybenzene[3] and 1-azido-4-nitrobenzene[3] were prepared according to literature procedures.

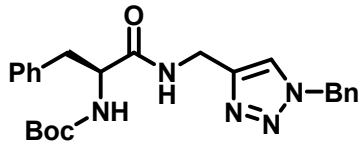
General procedure for the preparation of triazole substituted amide ligands

NMM (1.2 eq) was slowly added to a solution of the Boc-protected amino acid (1.0 eq) at -15 °C. Isobutyl chloroformate (1.1 eq) was added dropwise and the reaction mixture was stirred for 1 h. Propargylamine was added and the reaction mixture was stirred at r.t. for 3 h after which it was filtered through a plug of silica (4 x 4 cm) and eluted with EtOAc. The solvent was removed under reduced pressure and the crude was purified by recrystallization from dichloromethane:pentane unless otherwise stated. The triazoles were prepared according to literature procedure[4]



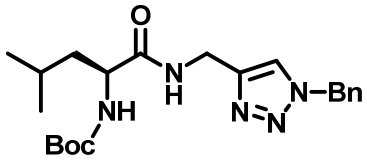
(*S*)-tert-butyl 1-((1-benzyl-1H-1,2,3-triazol-4-yl)methylamino)-3-methyl-1-oxobutan-2-ylcarbamate (5a)

Boc-L-Val was reacted on a 10.0 mmol scale and the pure product was obtained as a pale grey solid in 77 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.46 (s, 1 H), δ 7.37-7.22 (m, 5 H), δ 6.83 (m, 1 H), δ 5.47 (s, 2 H), δ 5.00 (m, 1 H), δ 4.48 (d, J = 5.81 Hz, 2 H), δ 3.92 (m, 1 H), δ 2.15-2.05 (m, 1 H), δ 1.39 (s, 9 H), δ 0.87 (d, J = 6.85 Hz, 3 H), δ 0.81 (d, J = 6.85 Hz, 3 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 171.75, 145.06, 134.56, 129.15, 128.80, 128.07, 123.54, 122.19, 79.98, 59.89, 54.23, 34.94, 30.88, 28.32, 19.27, 17.56.



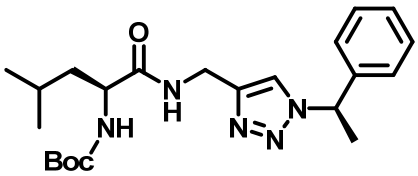
(*S*)-tert-butyl 1-((1-benzyl-1H-1,2,3-triazol-4-yl)methylamino)-1-oxo-3-phenylpropan-2-ylcarbamate (5b)

Boc-L-PhGly was reacted on a 5.0 mmol scale and the product was obtained as a brown solid in 76 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.44 (bs, 1 H), δ 7.41-7.09 (m, 10 H), δ 6.89 (bs, 1 H), δ 5.45 (s, 2 H), δ 5.14 (m, 1H), δ 4.44 (m, 1 H), δ 4.40 (m, 2 H), δ 3.02 (m, 2 H), δ 1.34 (s, 9 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 171.47, 155.41, 136.68, 134.60, 129.38, 129.20, 128.89, 128.62, 128.18, 126.93, 80.21, 55.83, 54.43, 38.68, 34.97, 28.33.



(*S*)-tert-butyl 1-((1-benzyl-1H-1,2,3-triazol-4-yl)methylamino)-4-methyl-1-oxopentan-2-ylcarbamate (5c)

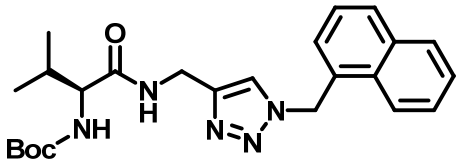
Boc-*L*-Leu was reacted on a 8.65 mmol scale and the product was obtained as a white solid in 72 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.54 (s, 1 H), δ 7.41-7.31 (m, 3 H), δ 7.27-7.24 (m, 2 H), δ 6.75 (s, 1 H), δ 5.49 (s, 2 H), δ 4.82 (s, 1 H), δ 4.51 (s, 1 H), δ 4.08 (s, 1 H) δ 1.63 (m, 3 H), δ 1.39 (s, 9 H), δ 0.90 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 172.82, 147.31, 134.56, 129.27, 128.98, 128.96, 128.36, 128.24, 80.29, 69.37, 41.39, 35.14, 31.37, 28.41, 24.88, 23.12, 21.95.



tert-butyl (*S*)-4-methyl-1-oxo-1-((1-((R)-1-phenylethyl)-1H-1,2,3-triazol-4-yl)methylamino)pentan-2-ylcarbamate (5f)

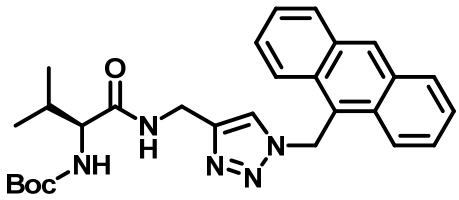
Boc-L-Leu was reacted on a 8.65 mmol scale and the product was obtained as a white solid in 19 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.44 (s, 1 H), δ 7.37-7.30 (m, 3 H), δ 7.26-7.23 (m,

2 H), δ 6.81 (bs, 1 H), δ 5.77 (q, *J* = 7.11 Hz, 1 H), δ 4.87 (bs, 1 H), δ 4.48 (d, *J* = 5.76 Hz, 2 H), δ 4.09 (bs, 1 H), δ 1.95 (d, *J* = 7.08 Hz, 3 H), δ 1.62 (m, 2 H), δ 1.43 (m, 1 H), δ 1.39 (s, 9 H), δ 0.89 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 172.83, 155.77, 144.66, 139.87, 129.16, 128.69, 126.60, 121.11, 80.19, 60.49, 53.32, 49.49, 35.08, 28.40, 24.86, 23.10, 21.95, 21.41



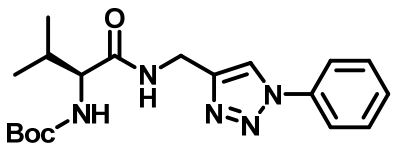
(*S*)-tert-butyl 3-methyl-1-((1-(naphthalen-1-ylmethyl)-1H-1,2,3-triazol-4-yl)methylamino)-1-oxobutan-2-ylcarbamate (5d)

Boc-L-Val was reacted on a 10.0 mmol scale and the pure product was obtained as a pale brown solid in 85 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.98-7.84 (m, 3 H), δ 7.55-7.38 (5 H), δ 6.63 (s, 1 H), δ 5.94 (s, 2 H), δ 4.96 (m, 1 H), δ 4.46 (s, 2 H), δ 3.89 (s, 1 H), δ 2.07 (m, 1 H), δ 1.39 (s, 9 H), δ 0.83 (d, *J* = 6.76 Hz, 3 H), δ 0.75 (d, *J* = 6.76 Hz, 3 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 171.81, 155.90, 134.01, 131.21, 130.14, 129.84, 129.03, 127.96, 126.83, 126.80, 126.45, 125.44, 123.57, 122.90, 79.89, 59.76, 52.47, 34.88, 31.05, 28.36, 19.24, 17.60.



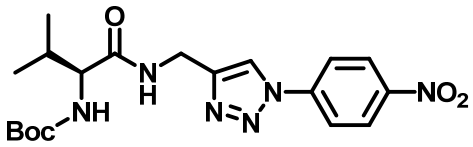
(*S*)-tert-butyl 1-((1-(anthracen-9-ylmethyl)-1H-1,2,3-triazol-4-yl)methylamino)-3-methyl-1-oxobutan-2-ylcarbamate (5e)

Boc-L-Val was reacted on a 10.0 mmol scale and the pure product was obtained as a pale grey solid in 84 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.54 (s, 1 H), δ 8.25 (d, *J* = 8.64 Hz, 2 H), δ 8.04 (d, *J* = 8.16, 2 H), δ 7.58-7.48 (m, 4 H), δ 7.14 (bs, 1 H), δ 6.87 (bs, 1 H), δ 6.44 (s, 2 H), δ 5.03 (m, 1 H), δ 4.32 (s, 2 H), δ 3.85 (m, 1 H), δ 1.96 (m, 1 H), δ 1.35 (s, 9 H), δ 0.74 (d, *J* = 6.44 Hz, 3 H), δ 0.67 (d, *J* = 6.84 Hz, 3 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 171.52, 155.90, 134.42, 131.55, 130.94, 130.16, 129.68, 127.88, 125.54, 123.72, 123.33, 122.97, 80.02, 59.77, 46.84, 34.81, 30.93, 28.38, 19.22, 17.48.



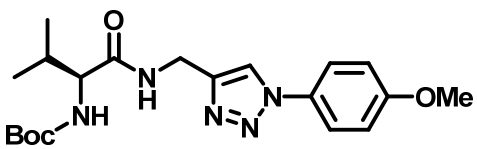
(*S*)-tert-butyl 3-methyl-1-oxo-1-((1-phenyl-1H-1,2,3-triazol-4-yl)methylamino)butan-2-ylcarbamate (5g)

Boc-L-Val was reacted on a 10.0 mmol scale and the pure product was obtained as a beige solid in 79 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.03, (s, 1 H), δ 7.72-7.69 (m, 2 H), δ 7.52-7.48 (m, 2 H), δ 7.44-7.40 (m, 1 H), δ 7.03 (s, 1 H), δ 5.11 (m, 1 H), δ 4.62 (d, *J* = 5.85 Hz, 2 H), δ 3.98 (m, 1 H), δ 2.16 (m, 1 H), δ 1.40 (s, 9 H), δ 0.94 (d, *J* = 6.76 Hz, 3 H), δ 0.88 (d, *J* = 6.84 Hz, 3 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 172.12, 156.03, 137.12, 129.87, 129.84, 128.92, 120.77, 120.64, 80.13, 60.17, 35.05, 30.96, 28.42, 19.46, 17.81.



(*S*)-tert-butyl 3-methyl-1-((1-(4-nitrophenyl)-1H-1,2,3-triazol-4-yl)methylamino)-1-oxobutan-2-ylcarbamate (5h)

Boc-L-Val was reacted on a 10.0 mmol scale and the pure product was obtained as a pale yellow solid in 78 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.42-8.39 (m, 2 H), δ 8.18 (s, 1 H), δ 7.99-7.95 (m, 2 H), δ 6.82 (bs, 1 H), δ 5.00 (bs, 1 H), δ 4.64 (d, *J* = 5.99 Hz, 2 H), δ 3.94 (m, 1 H), δ 2.18 (m, 1 H), δ 1.41 (s, 9 H), δ 0.96 (d, *J* = 6.63 Hz, 3 H), δ 0.91 (d, *J* = 6.87 Hz, 3 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 172.33, 156.23, 147.39, 146.74, 141.23, 125.77, 120.81, 120.57, 80.38, 60.41, 35.01, 30.71, 28.43, 19.49, 17.88.

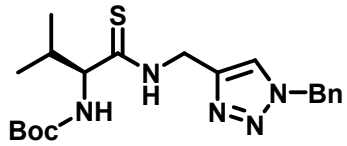


(*S*)-tert-butyl 1-((1-(4-methoxyphenyl)-1H-1,2,3-triazol-4-yl)methylamino)-3-methyl-1-oxobutan-2-ylcarbamate (5i)

Boc-L-Val was reacted on a 10.0 mmol scale and the pure product was obtained as a pale grey solid in 71 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 7.92 (s, 1 H), δ 7.62-7.58 (m, 2 H), δ 7.02-6.98 (m, 2 H), δ 6.79 (bs, 1 H), δ 5.02 (m, 1 H), δ 4.61 (d, J = 5.57 Hz, 2 H), δ 3.96 (m, 1 H), δ 3.86 (s, 3 H), δ 2.18 (m, 1 H), δ 1.41 (s, 9 H), δ 0.94 (d, J = 6.83 Hz, 3 H), δ 0.89 (d, J = 6.83 Hz, 3 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 172.01, 160.02, 156.05, 141.81, 130.99, 129.00, 122.39, 114.97, 80.21, 60.20, 55.78, 34.99, 30.87, 28.44, 19.48, 17.77

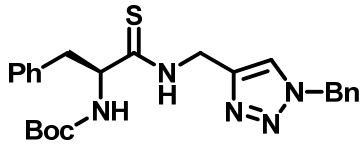
General procedure for the preparation of triazole substituted thioamide ligands

The triazole substituted amide ligand (1.0 eq) and Lawesson´s reagent (0.85 eq) were added to dry THF, heated to 65 ^{o}C and stirred over night. The solution was filtered through a plug of silica (4 x 4 cm), eluted with EtOAc and concentrated under reduced pressure. The crude product was purified with column chromatography using silica column.



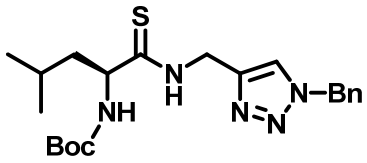
(*S*)-tert-butyl 1-((1-benzyl-1H-1,2,3-triazol-4-yl)methylamino)-3-methyl-1-thioxobutan-2-ylcarbamate (2a)

Compound **5a** was reacted on a 0.31 mmol scale to produce the ligand as a white solid in 82 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 9.57 (m, 1 H), δ 7.65 (s, 1 H), δ 7.35-7.29 (m, 3 H), δ 7.24-7.20 (m, 2 H), δ 5.46 (m, 2 H), δ 5.42 (m, 1 H), δ 4.91 (m, 2 H), δ 4.22 (t_{app}, J = 8.00 Hz, 1 H), δ 2.12 (m, 1 H), δ 1.34 (s, 9 H), δ 0.86-0.80 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 204.70, 155.71, 143.03, 134.52, 129.14, 128.80, 128.04, 123.24, 79.90, 66.04, 54.25, 40.42, 33.79, 28.34, 19.56, 17.98. HRMS *m/z* $[M + Na]^+$ calculated for $C_{20}H_{29}N_5O_2S$: 426.1934; found 426.1933.



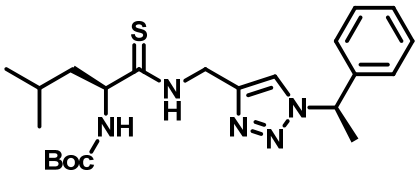
(*S*)-tert-butyl 1-((1-benzyl-1H-1,2,3-triazol-4-yl)methylamino)-3-phenyl-1-thioxopropan-2-ylcarbamate (2b)

Compound **5b** was reacted on a 1.86 mmol scale and the thioamide was obtained as a white solid after column chromatography using EtOAc:n-pentane 1:3 as eluent in 83 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 9.40 (s, 1 H), δ 7.45 (s, 1 H), δ 7.37-7.30 (m, 3 H), δ 7.25-7.23 (m, 2 H), δ 7.08 (s, 5 H), δ 5.61 (s, 1 H), δ 5.43 (s, 2 H), δ 4.75 (m, 3 H), δ 3.10 (m, 2 H), δ 1.29 (s, 9 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 203.53, 154.88, 142.64, 136.51, 134.33, 129.18, 128.99, 128.67, 128.19, 127.92, 126.58, 123.02, 79.88, 61.68, 54.03, 42.02, 40.17, 28.10. HRMS *m/z* $[M + Na]^+$ calculated for $C_{24}H_{29}N_5O_2S$: 474.1934; found 474.1935.



(*S*)-tert-butyl 1-((1-benzyl-1H-1,2,3-triazol-4-yl)methylamino)-4-methyl-1-thioxopentan-2-ylcarbamaten (2c)

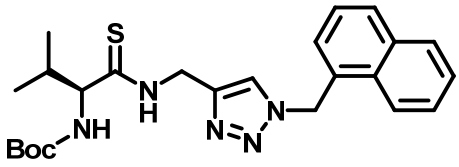
Compound **5c** was reacted on a 1.86 mmol scale and the thioamide was obtained as a white solid after column chromatography using EtOAc:n-pentane 1:2 as eluent in 62 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.96 (s, 1 H), δ 7.59 (s, 1 H), δ 7.39-7.32 (m, 3 H), δ 7.26-7.24 (m, 2 H), δ 5.49 (s, 2 H), δ 5.18 (s, 1 H), δ 4.91 (d, *J* = 5.40 Hz, 2 H), δ 4.43 (m, 1 H), δ 1.74-1.52 (m, 3 H), δ 1.36 (s, 9 H), δ 0.90 (d, *J* = 6.29 Hz, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 205.90, 155.62, 143.03, 134.50, 129.25, 128.93, 128.17, 123.01, 80.25, 59.61, 54.36, 44.88, 40.72, 28.36, 25.03, 23.14, 21.93. HRMS *m/z* $[M + Na]^+$ calculated for $C_{21}H_{31}N_5O_2S$: 440.2111; 440.2091.



tert-butyl (*S*)-4-methyl-1-((1-((R)-1-phenylethyl)-1H-1,2,3-triazol-4-yl)methylamino)-1-thioxopentan-2-ylcarbamate (2f)

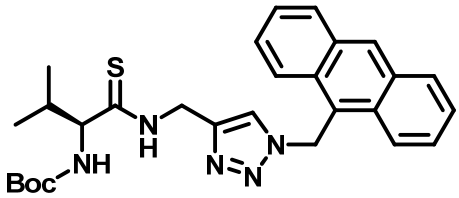
Compound **5f** was reacted on a 0.38 mmol scale and the thioamide was obtained as a white solid after column chromatography using EtOAc:n-pentane 1:2 as eluent in 40 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.98 (s, 1 H), δ 7.58 (s, 1 H), δ 7.38-7.29 (m, 3 H), δ 7.26-7.23 (m, 2 H), δ 5.77 (q, *J* = 7.10 Hz, 1 H), δ 5.19 (d, *J* = 7.99 Hz, 1 H), δ 4.90 (dd, *J* = 5.28, 3.16 Hz,

2 H), δ 4.43 (m, 1 H), δ 1.96 (d, *J* = 7.15 Hz, 3 H), δ 1.74-1.52 (m, 3 H), δ 1.36 (s, 9 H), δ 6.34 (d, *J* = 6.34 Hz, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 205.83, 155.55, 142.60, 139.80, 129.13, 128.70, 126.54, 121.97, 80.11, 60.58, 59.58, 44.91, 40.68, 28.35, 25.00, 23.12, 21.92, 21.43. HRMS *m/z* $[M + Na]^+$ calculated for $C_{22}H_{33}N_5O_2S$: 454.2270; 454.2247



(*S*)-tert-butyl-3-methyl-1-((1-(naphthalen-1-ylmethyl)-1H-1,2,3-triazol-4-yl)methylamino)-1-thioxobutan-2-ylcarbamate (2d)

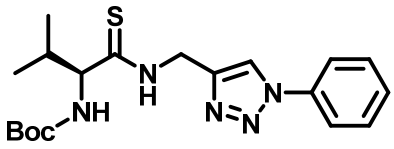
Compound **5d** was reacted on a 1.98 mmol scale to give the thioamide as a white solid after column chromatography using toluene:EtOAc 1:1 as the eluent in 40 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 9.09 (m, 1 H), δ 7.95-7.79(m, 3 H), δ 7.53-7.37 (m, 5 H), δ 5.93 (d, *J* = 3.02 Hz, 2 H), δ 5.29 (m, 1 H), δ 4.86 (m, 2 H), δ 4.17-4.13 (m, 1 H), δ 2.17 (m, 1 H), δ 1.35 (s, 9 H), δ 0.81 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 204.51, 155.71, 142.81, 134.04, 131.18, 130.20, 129.76, 129.08, 127.90, 127.41, 126.51, 125.48, 123.08, 122.87, 80.06, 65.95, 52.52, 40.52, 33.67, 28.38, 19.64, 17.82. HRMS *m/z* $[M + Na]^+$ calculated for $C_{24}H_{31}N_5O_2S$: 476.2091; found 476.2087.



(*S*)-tert-butyl-1-((1-(anthracen-9-ylmethyl)-1H-1,2,3-triazol-4-yl)methylamino)-3-methyl-1-thioxobutan-2-ylcarbamate (2e)

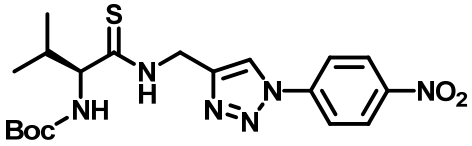
Compound **5e** was reacted on a 2.05 mmol scale to give the thioamide as a yellow solid after column chromatography using toluene:EtOAc 1:1 as the eluent in 24 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 8.77 (bs, 1 H), δ 8.55 (s, 1 H), δ 8.26 (d, *J* = 8.82 Hz, 2 H), δ 8.05 (d, *J* = 8.47 Hz, 2 H), δ 7.60-7.49 (m, 4 H), δ 7.26 (m, 1 H), δ 6.47 (s, 2 H), δ 5.21 (m, 1 H), δ 4.81-4.67 (m, 2 H), δ 4.08 (t_{app} , *J* = 7.72 Hz, 1 H), δ 2.16 (bs, 1 H), δ 1.33 (s, 9 H), δ 0.78-0.76 (m_{app}, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 204.18, 155.65, 142.52, 131.56, 130.88, 130.14, 129.65,

127.88, 125.56, 123.62, 122.97, 122.33, 80.11, 66.40, 46.66, 40.66, 33.58, 28.36, 19.65, 17.70. HRMS *m/z* $[M + Na]^+$ calculated for $C_{28}H_{33}N_5O_2S$: 526.2247; found 526.2240.



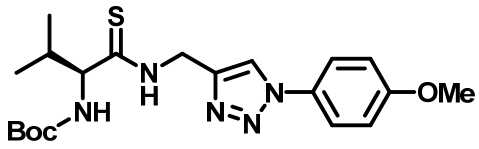
(*S*)-tert-butyl 3-methyl-1-((1-phenyl-1H-1,2,3-triazol-4-yl)methylamino)-1-thioxobutan-2-ylcarbamate (2g)

Compound **5g** was reacted on a 1.60 mmol scale and the thioamide was obtained as a white solid after column chromatography using EtOAc:n-pentane 1:3 as eluent in 63 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 9.35 (s, 1 H), δ 8.19 (s, 1 H), δ 7.70 (m, 2 H), δ 7.51 (m, 2 H), δ 7.44 (m, 1 H), δ 5.37 (d, J = 8.60 Hz, 1 H), δ 5.06 (m, 2 H), δ 4.25 (t_{app}, J = 7.79 Hz, 1 H), δ 2.25 (s, 1 H), δ 1.37 (s, 9 H), δ 0.91 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 204.99, 155.86, 143.38, 136.95, 129.90, 129.05, 121.57, 120.67, 80.18, 66.56, 40.51, 33.64, 28.40, 19.77, 18.00. HRMS *m/z* $[M + Na]^+$ calculated for $C_{19}H_{27}N_5O_2S$: 412.1778; found 412.1779.



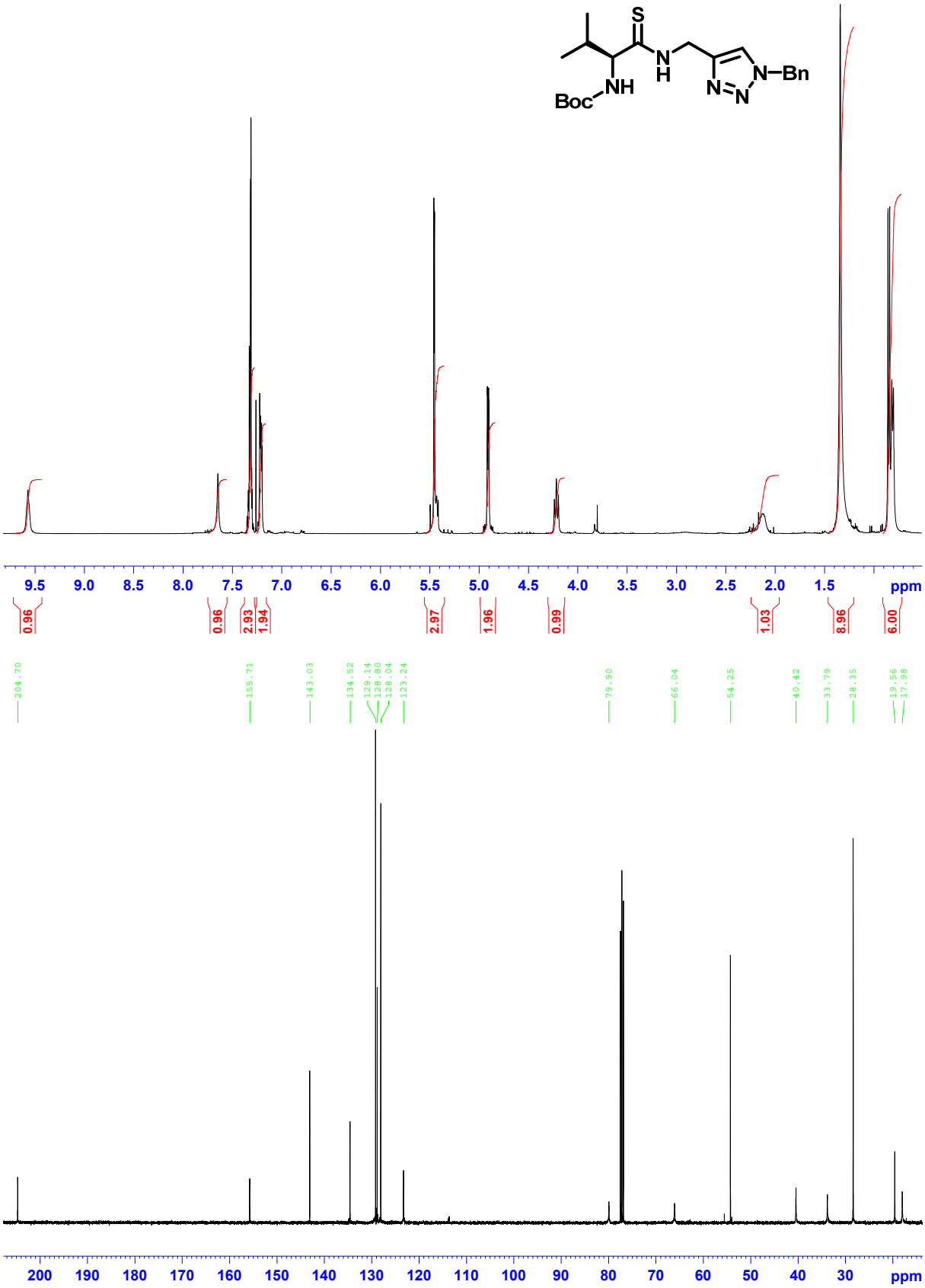
(*S*)-tert-butyl 3-methyl-1-((1-(4-nitrophenyl)-1H-1,2,3-triazol-4-yl)methylamino)-1-thioxobutan-2-ylcarbamate (2h)

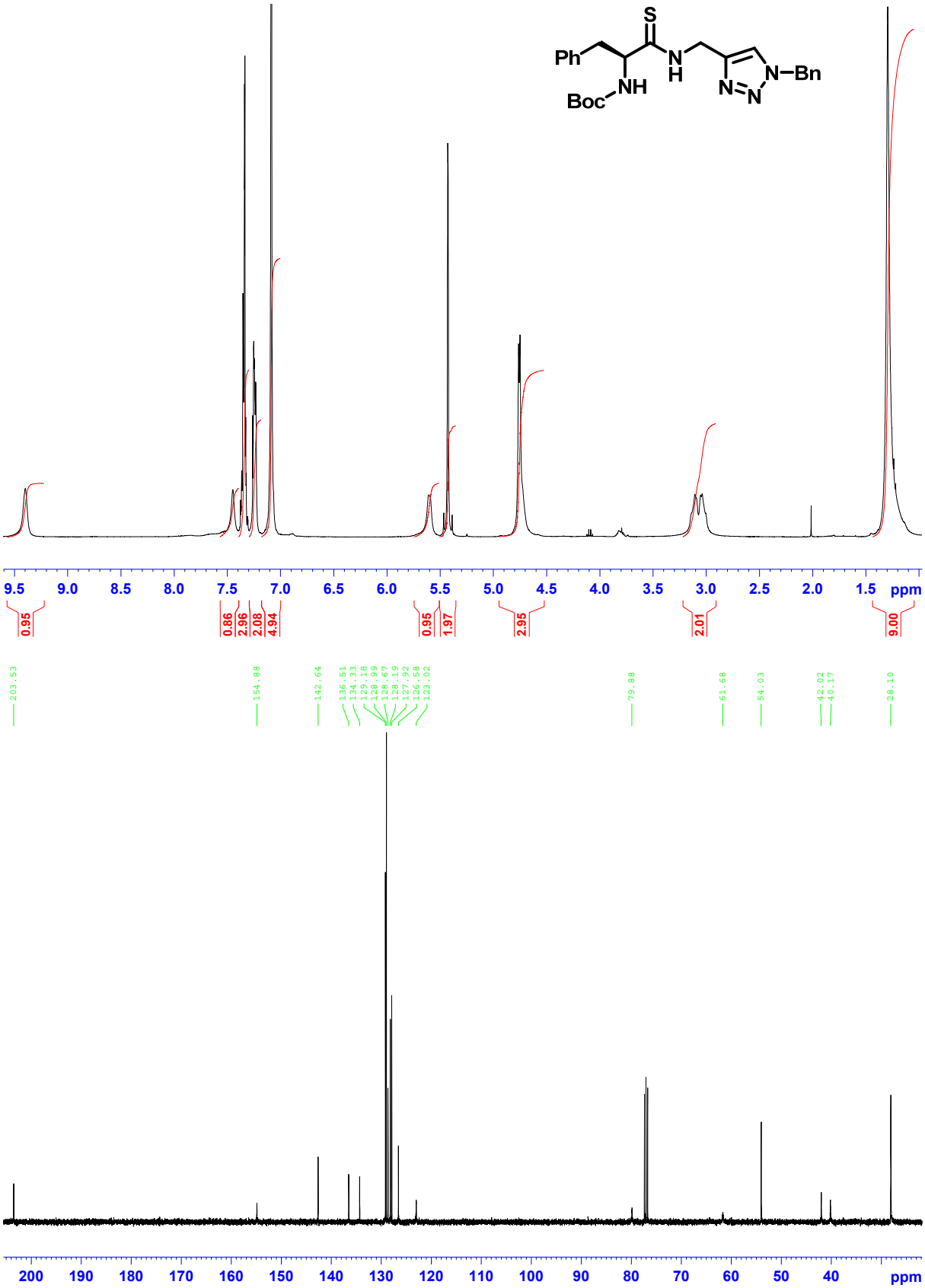
Compound **5h** was reacted on a 1.69 mmol scale and the thioamide was obtained as a yellow solid after column chromatography using EtOAc:n-pentane 1:2 as eluent in 44 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 9.10 (s, 1 H), δ 8.42-8.39 (m, 2 H), δ 8.33 (s, 1 H), δ 8.00-7.96 (m, 2 H), δ 5.28 (m, 1 H), δ 5.08 (d, J = 5.58 Hz, 2 H), δ 4.21 (m, 1 H), δ 2.25 (m, 1 H), δ 1.37 (s, 9 H), δ 0.91 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 205.40, 156.02, 147.46, 144.29, 141.09, 125.67, 121.49, 120.69, 80.50, 66.89, 40.39, 33.47, 28.41, 19.79, 18.07. HRMS *m/z* $[M + Na]^+$ calculated for $C_{19}H_{26}N_6O_4S$: 457.1628; found 457.1644.

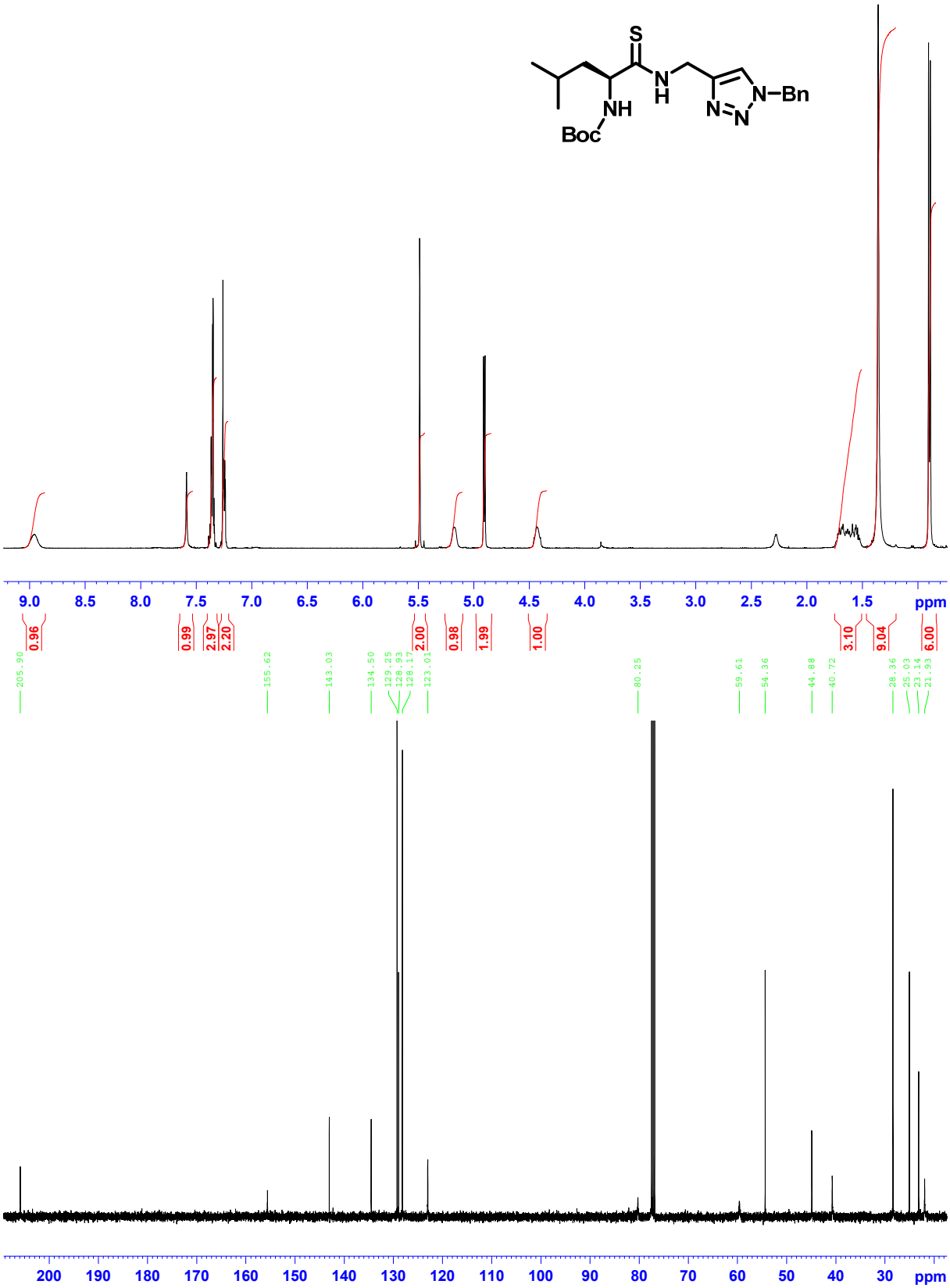


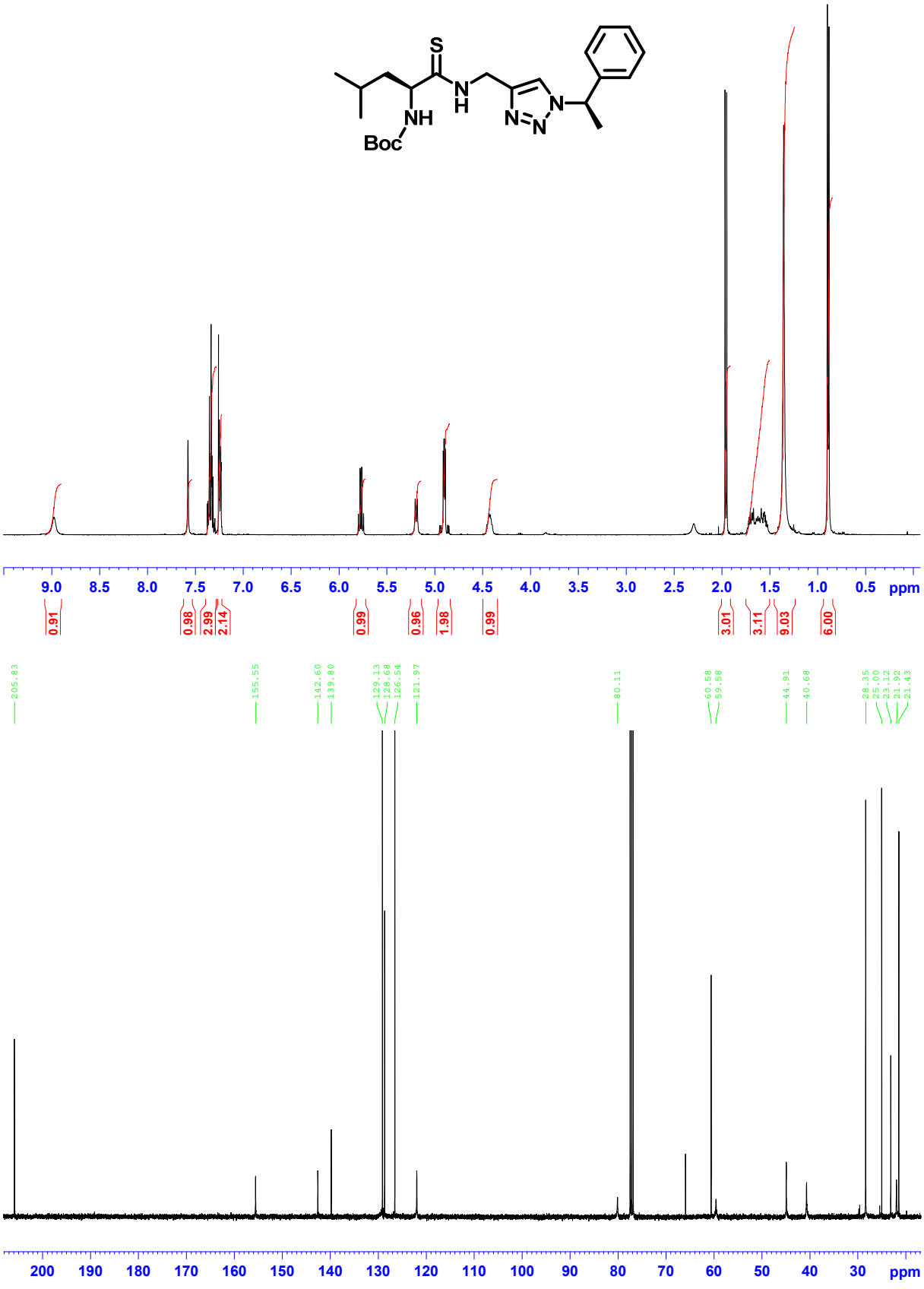
(*S*)-tert-butyl 1-((1-(4-methoxyphenyl)-1H-1,2,3-triazol-4-yl)methylamino)-3-methyl-1-thioxobutan-2-ylcarbamate (2i)

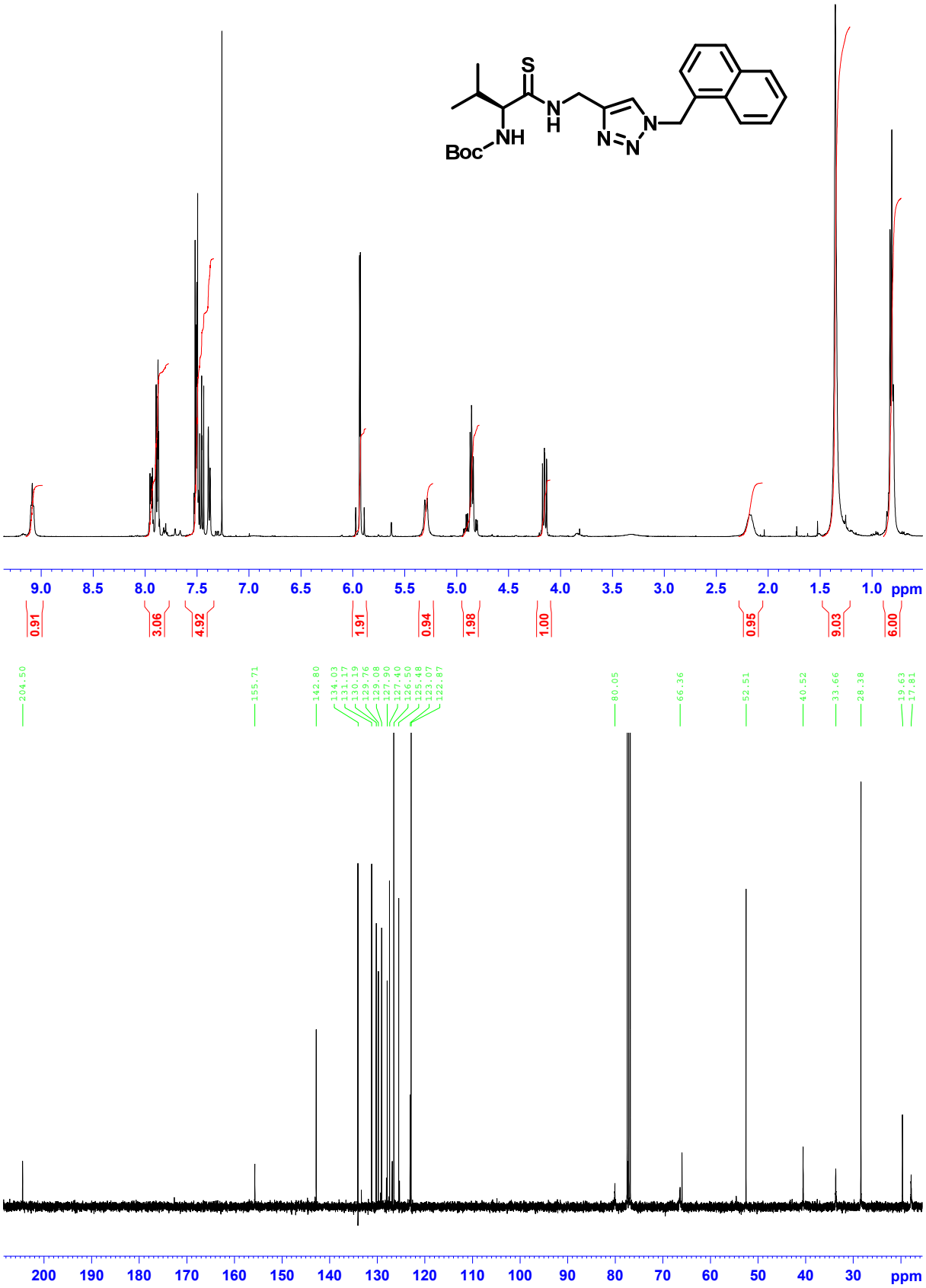
Compound **5i** was reacted on a 1.54 mmol scale and the thioamide was obtained as a white solid after column chromatography using EtOAc:n-pentane 1:1 as eluent in 67 % yield. ^{1}H-NMR (400 MHz, $CDCl_3$) δ 9.23 (bs, 1 H), δ 8.08 (s, 1 H), δ 7.61-7.57 (m, 2 H), δ 7.01-6.98 (m, 2 H), δ 5.33 (m, 1 H), δ 5.09-5.00 (m, 2 H), δ 4.25-4.21 (m, 1 H), δ 3.86 (s, 3 H), δ 2.27 (m, 1 H), δ 1.37 (s, 9 H), δ 0.91-0.89 (m, 6 H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ 204.84, 160.05, 155.81, 143.11, 130.38, 122.29, 121.59, 144.89, 80.16, 66.58, 55.75, 40.56, 33.60, 28.39, 19.78, 17.96. HRMS *m/z* $[M + Na]^+$ calculated for $C_{20}H_{29}N_5O_3S$: 442.1883; found 442.1870 .










S
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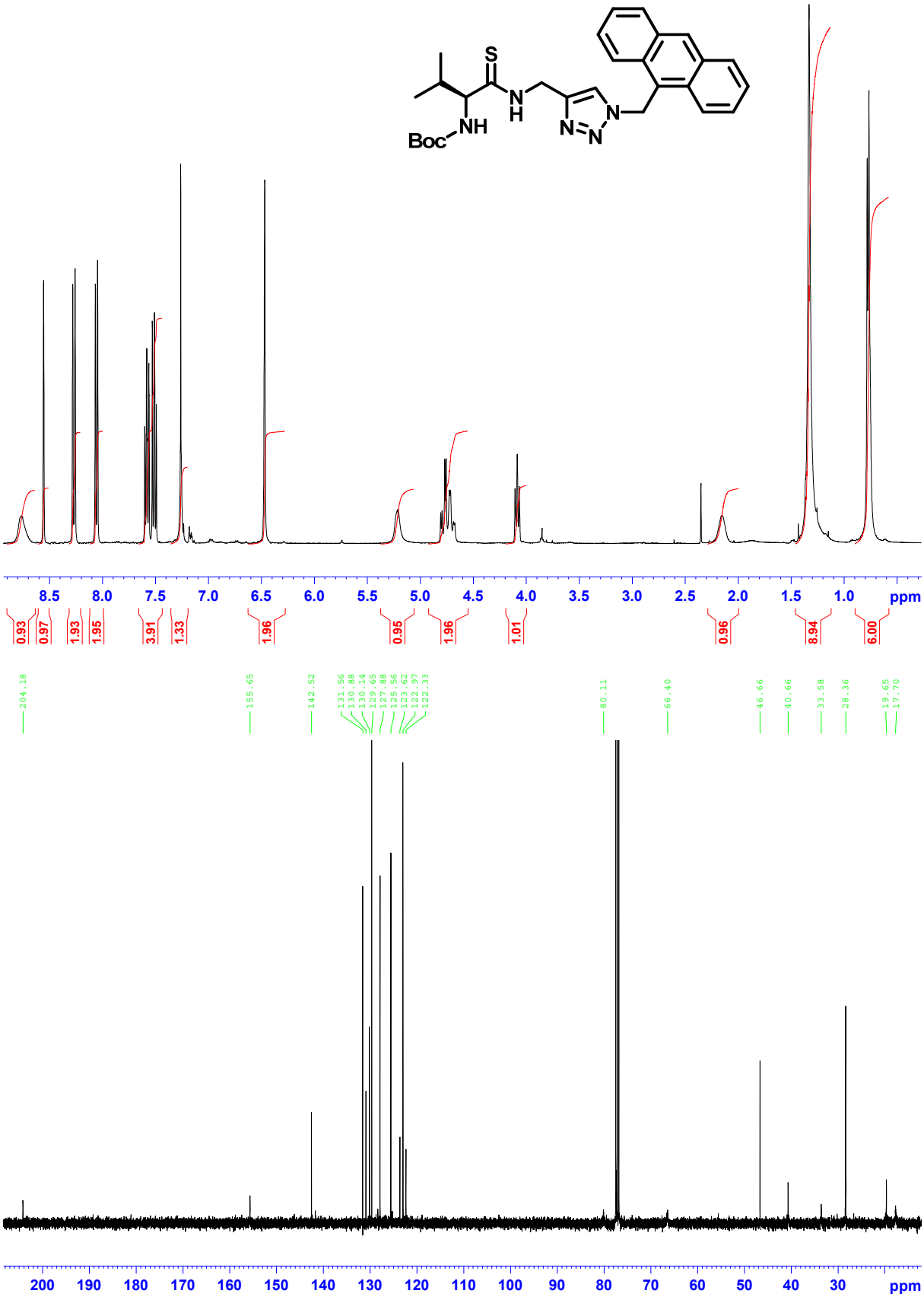

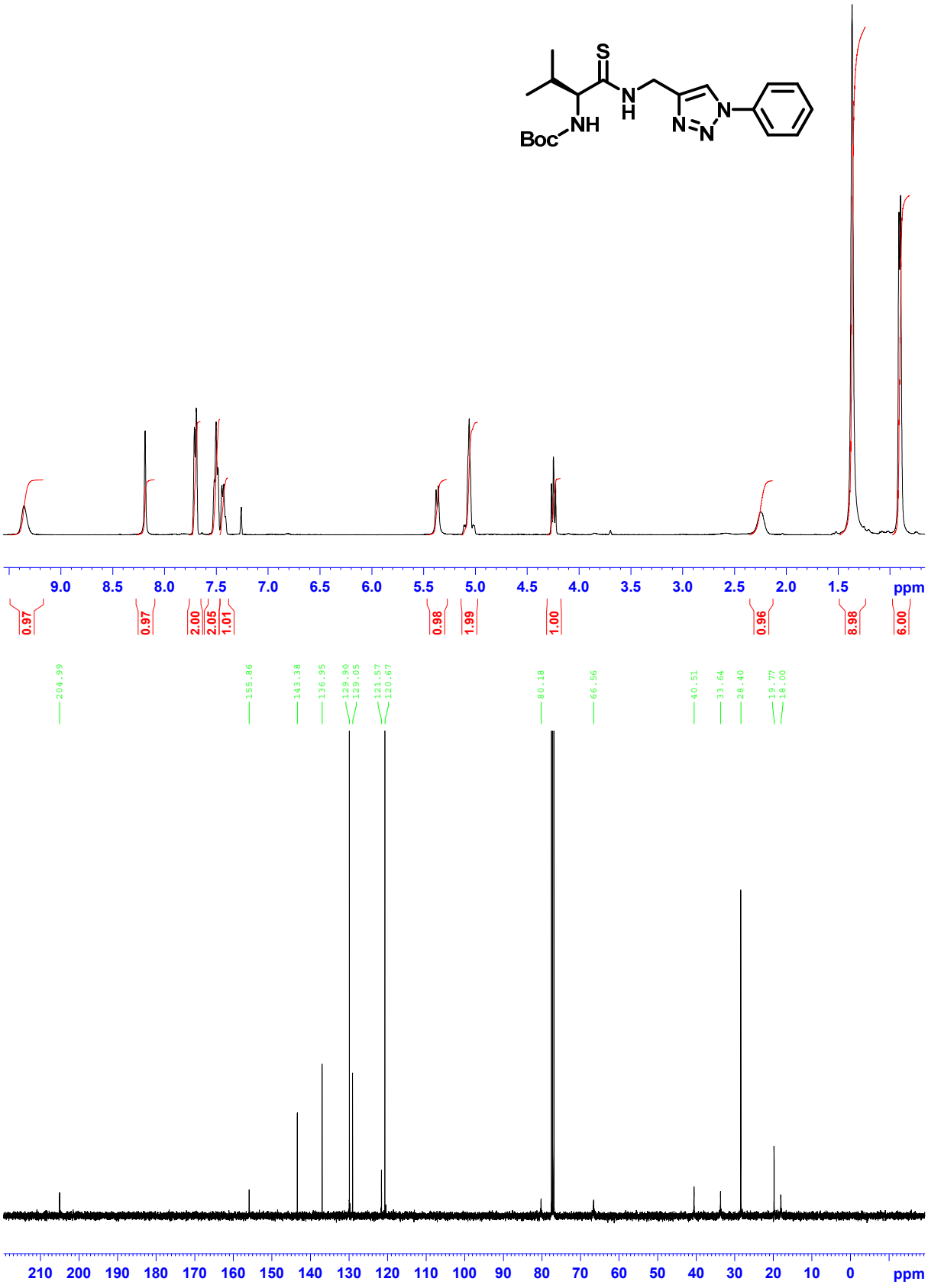

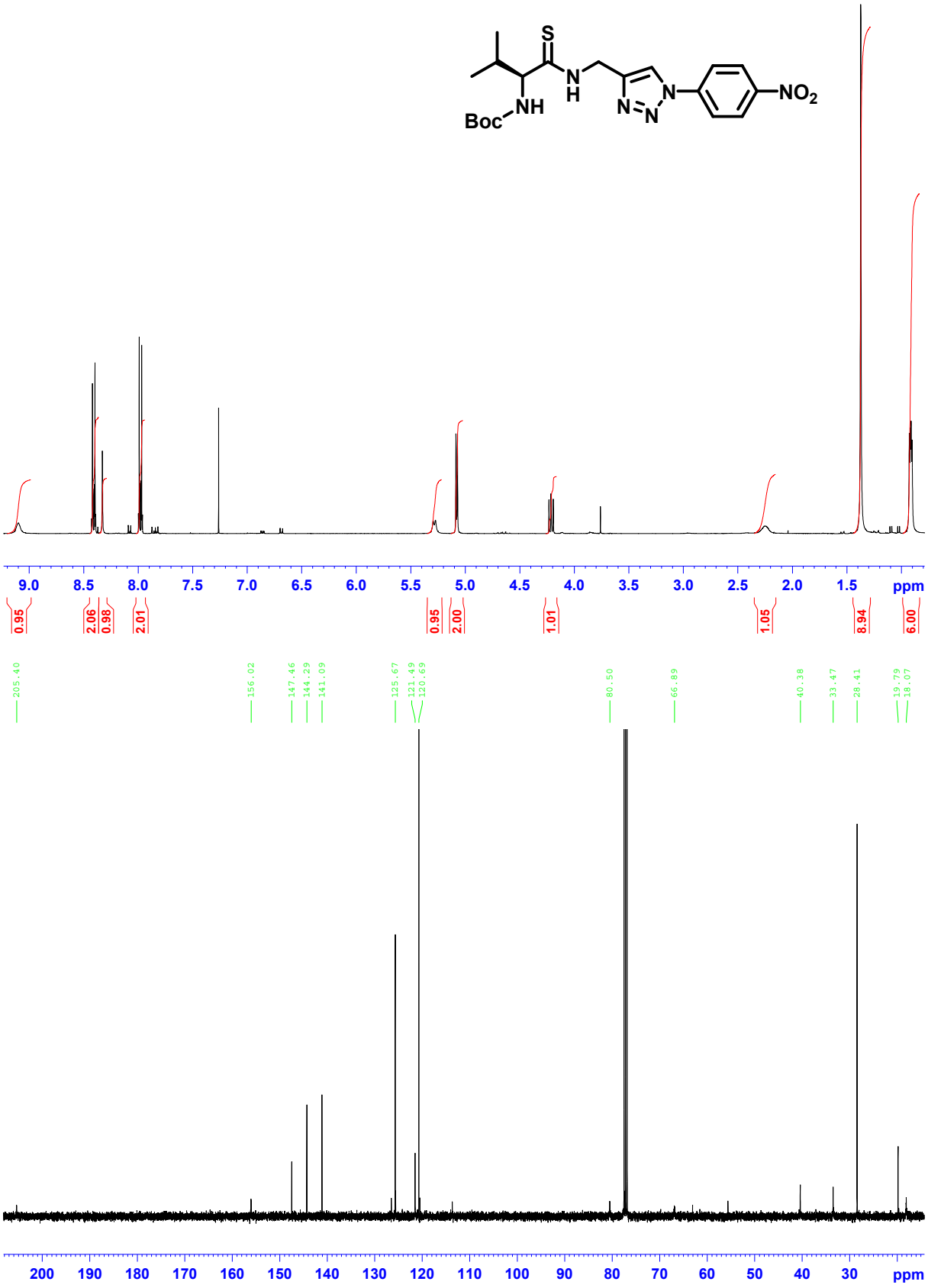

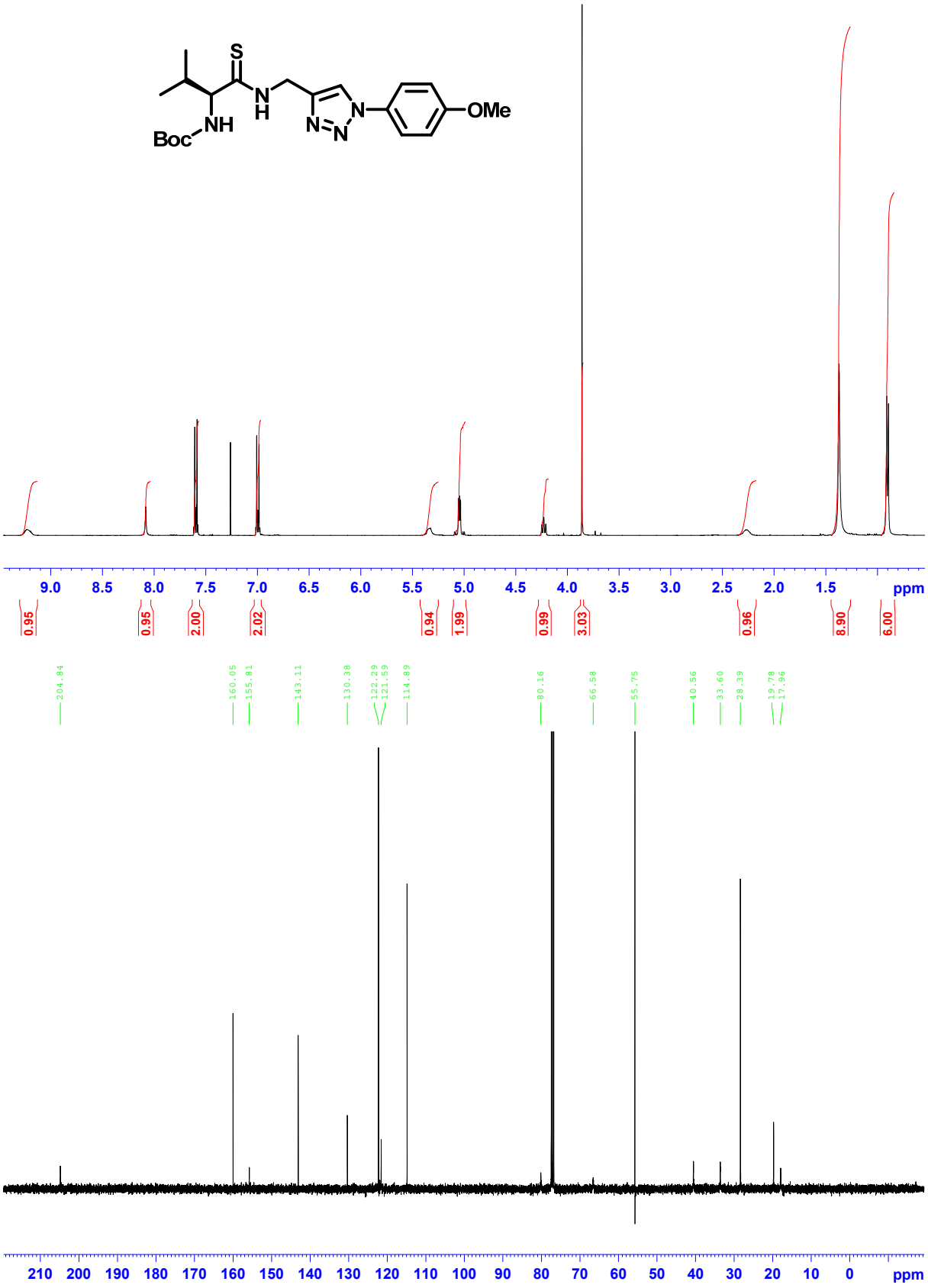

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