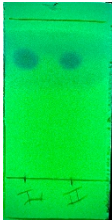
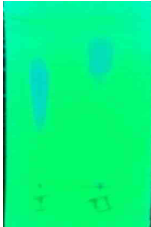


Table 1 — Physicochemical properties of synthesized compounds (*Contd.*)

Compound	Molecular Formula	M.Wt (g/mol)	Yield (%)	m.p. (°C)	Rf Value
SM-04	$C_{31}H_{27}ClN_4O_2$	523	87.77	226–235	0.90
					
SM-05	$C_{32}H_{30}N_4O_2$	502.6	86.74	230–232	0.80
					
SM-06	$C_{31}H_{26}Cl_2N_4O_2$	557.62	95.77	230–232	0.70
					
SM-07	$C_{33}H_{30}N_4O_2$	514.6	70.42	230–232	0.60
					
SM-08	$C_{31}H_{27}BrN_4O_2$	567.48	95.77	230–232	0.70
					

Experimental Data of synthesized compound (SM01-08)**2-(2-benzylhydrazineyl)-1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl) ethan-1-one (SM-01)**

Light yellow, Yield: 91.54%, M.P: 210-212 °C, Rf: 0.90, ¹H NMR (400 Hz, CDCl₃): δ 3.85-4.08 (7H, 3.90 (s), 3.97 (s), 4.03 (s)), 7.12 (2H, ddd, *J* = 8.7, 1.4, 0.4 Hz), 7.23-7.41 (5H, 7.29 (dddd, *J* = 7.7, 1.3, 0.9, 0.5 Hz), 7.32 (tt, *J* = 7.7, 1.3 Hz), 7.35 (tdd, *J* = 7.7, 1.8, 0.5 Hz)), 7.43-7.63 (6H, 7.50 (tdd, *J* = 7.4, 1.9, 1.4 Hz), 7.52 (dddd, *J* = 7.5, 6.1, 1.4, 1.3 Hz), 7.55 (dddd, *J* = 7.4, 6.8, 1.7, 0.5 Hz), 7.56 (dddd, *J* = 8.1, 7.4, 1.6, 0.4 Hz)), 7.70 (2H, ddd, *J* = 8.7, 1.9, 0.4 Hz), 7.91-8.13 (4H, 7.98 (dddd, *J* = 8.1, 1.7, 1.5, 0.4 Hz), 8.07 (dddd, *J* = 7.4, 1.6, 1.4, 0.5 Hz)). ¹³C NMR (100 Hz, CDCl₃): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 125.6 (1C, s), 127.2 (1C, s), 127.6-127.8 (6C, 127.6 (s), 127.7 (s), 127.7 (s)), 128.3-128.5 (4C, 128.3 (s), 128.4 (s), 128.4 (s)), 128.5-128.7 (4C, 128.6 (s), 128.6 (s)), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 137.0 (1C, s), 139.6 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass C₃₁H₂₈N₄O₂ m/z (%), calcd. (found): 488 (482.3, M-1).

2-(2-benzylhydrazineyl)-1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl) ethan-1-one (SM-02)

Yellow, Yield: 98.59%, M.P: 225-227°C, Rf: 0.98, ¹H NMR: δ 3.85-4.08 (7H, 3.90 (s), 3.97 (s), 4.03 (s)), 7.12 (2H, ddd, *J* = 8.7, 1.4, 0.4 Hz), 7.23-7.41 (5H, 7.29 (dddd, *J* = 7.7, 1.3, 0.9, 0.5 Hz), 7.32 (tt, *J* = 7.7, 1.3 Hz), 7.35 (tdd, *J* = 7.7, 1.8, 0.5 Hz)), 7.43-7.63 (6H, 7.50 (tdd, *J* = 7.4, 1.9, 1.4 Hz), 7.52 (dddd, *J* = 7.5, 6.1, 1.4, 1.3 Hz), 7.55 (dddd, *J* = 7.4, 6.8, 1.7, 0.5 Hz), 7.56 (dddd, *J* = 8.1, 7.4, 1.6, 0.4 Hz)), 7.70 (2H, ddd, *J* = 8.7, 1.9, 0.4 Hz), 7.91-8.13 (4H, 7.98 (dddd, *J* = 8.1, 1.7, 1.5, 0.4 Hz), 8.07 (dddd, *J* = 7.4, 1.6, 1.4, 0.5 Hz)). ¹³C NMR (100 Hz, CDCl₃): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 125.6 (1C, s), 126.7 (1C, s), 127.7-127.8 (4C, 127.7 (s), 127.7 (s)), 128.3-128.7 (7C, 128.4 (s), 128.4 (s), 128.5 (s), 128.6 (s), 128.6 (s)), 129.3 (1C, s), 129.5 (1C, s), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 132.4 (1C, s), 134.1 (1C, s), 137.0 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass C₃₁H₂₈N₄O₂ m/z (%), calcd. (found): 488 (480.6, M-1).

2-(2-(2-chlorobenzyl) hydrazineyl)-1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl) ethan-1-one (SM-03)

Pale yellow, Yield: 84.26%, M.P: 215-217°C, Rf: 0.75, ¹H NMR: δ 3.85-4.02 (5H, 3.90 (s), 3.97 (s)), 4.13 (2H, s), 7.05-7.38 (5H, 7.12 (ddd, *J* = 8.7, 1.4, 0.4 Hz), 7.18 (ddd, *J* = 7.9, 7.5, 1.6 Hz), 7.31 (ddd, *J* = 8.3, 7.5, 1.5 Hz), 7.32 (ddd, *J* = 7.9, 1.5, 0.5 Hz)), 7.39-7.63 (7H, 7.45 (ddd, *J* = 8.3, 1.6, 0.5 Hz), 7.50 (tdd, *J* = 7.4, 1.9, 1.4 Hz), 7.52 (dddd, *J* = 7.5, 6.1, 1.4, 1.3 Hz), 7.55 (dddd, *J* = 7.4, 6.8, 1.7, 0.5 Hz), 7.56 (dddd, *J* = 8.1, 7.4, 1.6, 0.4 Hz)), 7.70 (2H, ddd, *J* = 8.7, 1.9, 0.4 Hz), 7.91-8.13 (4H, 7.98 (dddd, *J* = 8.1, 1.7, 1.5, 0.4 Hz), 8.07 (dddd, *J* = 7.4, 1.6, 1.4, 0.5 Hz)). ¹³C NMR (100 Hz, CDCl₃): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 125.6 (1C, s), 126.7 (1C, s), 127.7-127.8 (4C, 127.7 (s), 127.7 (s)), 128.3-128.7 (7C, 128.4 (s), 128.4 (s), 128.5 (s), 128.6 (s), 128.6 (s)), 129.3 (1C, s), 129.5 (1C, s), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 132.4 (1C, s), 134.1 (1C, s), 137.0 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass C₃₁H₂₇ClN₄O₂ m/z (%), calcd. (found): 488 (482.3, M-1).

2-(2-(4-chlorobenzyl) hydrazineyl)-1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl) ethan-1-one (SM-04)

light yellow, Yield: 87.77%, MP: 226-228°C, Rf: 0.90, ¹H NMR: δ 3.85-4.06 (7H, 3.90 (s), 3.97 (s), 4.01 (s)), 7.12 (2H, ddd, *J* = 8.7, 1.4, 0.4 Hz), 7.31 (2H, ddd, *J* = 8.3, 1.2, 0.5 Hz), 7.39-7.63 (8H, 7.45 (ddd, *J* = 8.3, 1.3, 0.5 Hz), 7.50 (tdd, *J* = 7.4, 1.9, 1.4 Hz), 7.52 (dddd, *J* = 7.5, 6.1, 1.4, 1.3 Hz), 7.55 (dddd, *J* = 7.4, 6.8, 1.7, 0.5 Hz), 7.56 (dddd, *J* = 8.1, 7.4, 1.6, 0.4 Hz)), 7.70 (2H, ddd, *J* = 8.7, 1.9, 0.4 Hz), 7.91-8.13 (4H, 7.98 (dddd, *J* = 8.1, 1.7, 1.5, 0.4 Hz), 8.07 (dddd, *J* = 7.4, 1.6, 1.4, 0.5 Hz)). ¹³C NMR (100 Hz, CDCl₃): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 125.6 (1C, s), 127.7-127.8 (4C, 127.7 (s), 127.7 (s)), 128.3-128.7 (8C, 128.4 (s), 128.4 (s), 128.5 (s), 128.6 (s), 128.6 (s)), 129.4 (2C, s), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 133.3 (1C, s), 137.0 (1C, s), 139.6 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass C₃₁H₂₇ClN₄O₂ m/z (%), calcd. (found): 488 (482.3, M-1).

1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl)-2-(2-(4-methylbenzyl) hydrazineyl) ethan-1-one (SM-05)

yellow, Yield: 86.74%, MP: 230-232°C, Rf: 0.80, ¹H NMR: δ 2.25 (3H, s), 3.85-4.05 (7H, 3.90 (s), 3.97 (s), 4.00 (s)), 6.88-7.18 (6H, 6.94 (ddd, *J* = 8.0, 1.0, 0.5 Hz), 7.05 (ddd, *J* = 8.0, 1.2, 0.5 Hz), 7.12 (ddd, *J* = 8.7, 1.4, 0.4

Hz)), 7.43-7.63 (6H, 7.50 (tdd, $J = 7.4, 1.9, 1.4$ Hz), 7.52 (dddd, $J = 7.5, 6.1, 1.4, 1.3$ Hz), 7.55 (dddd, $J = 7.4, 6.8, 1.7, 0.5$ Hz), 7.56 (dddd, $J = 8.1, 7.4, 1.6, 0.4$ Hz)), 7.70 (2H, ddd, $J = 8.7, 1.9, 0.4$ Hz), 7.91-8.13 (4H, 7.98 (dddd, $J = 8.1, 1.7, 1.5, 0.4$ Hz), 8.07 (dddd, $J = 7.4, 1.6, 1.4, 0.5$ Hz)). ^{13}C NMR (100 Hz, CDCl_3): δ 21.4 (1C, s), 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 125.6 (1C, s), 127.7-127.8 (4C, 127.7 (s), 127.7 (s)), 128.3-128.5 (4C, 128.3 (s), 128.4 (s), 128.4 (s)), 128.5-128.8 (6C, 128.6 (s), 128.6 (s), 128.7 (s)), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 136.1 (1C, s), 137.0 (1C, s), 139.6 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass $\text{C}_{32}\text{H}_{30}\text{N}_4\text{O}_2$ m/z (%), calcd. (found):488 (482.3, M-1).

2-(2-(3,4-dichlorobenzyl) hydrazineyl)-1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl) ethan-1-one (SM-06)

Light yellow, Yield: 95.77%, MP: 230-232°C, Rf: 0.70, ^1H NMR: δ 3.85-4.02 (7H, 3.90 (s), 3.96 (s), 3.97 (s)), 7.12 (2H, ddd, $J = 8.7, 1.4, 0.4$ Hz), 7.28 (1H, dd, $J = 8.2, 1.3$ Hz), 7.43-7.63 (8H, 7.50 (tdd, $J = 7.4, 1.9, 1.4$ Hz), 7.50 (dd, $J = 8.2, 0.5$ Hz), 7.50 (dd, $J = 1.3, 0.5$ Hz), 7.52 (dddd, $J = 7.5, 6.1, 1.4, 1.3$ Hz), 7.55 (dddd, $J = 7.4, 6.8, 1.7, 0.5$ Hz), 7.56 (dddd, $J = 8.1, 7.4, 1.6, 0.4$ Hz)), 7.70 (2H, ddd, $J = 8.7, 1.9, 0.4$ Hz), 7.91-8.13 (4H, 7.98 (dddd, $J = 8.1, 1.7, 1.5, 0.4$ Hz), 8.07 (dddd, $J = 7.4, 1.6, 1.4, 0.5$ Hz)). ^{13}C NMR (100 Hz, CDCl_3): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 125.6 (1C, s), 127.7-127.8 (4C, 127.7 (s), 127.7 (s)), 128.3-128.5 (2C, 128.4 (s), 128.4 (s)), 128.5-128.7 (4C, 128.6 (s), 128.6 (s)), 129.4 (1C, s), 129.7 (2C, s), 130.3 (1C, s), 130.5 (1C, s), 130.7 (1C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 131.9 (1C, s), 132.7 (1C, s), 137.0 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass $\text{C}_{31}\text{H}_{26}\text{Cl}_2\text{N}_4\text{O}_2$ m/z (%), calcd. (found):488 (482.3, M-1).

1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl)-2-(2-(4-vinylbenzyl) hydrazineyl) ethan-1-one (SM-07)

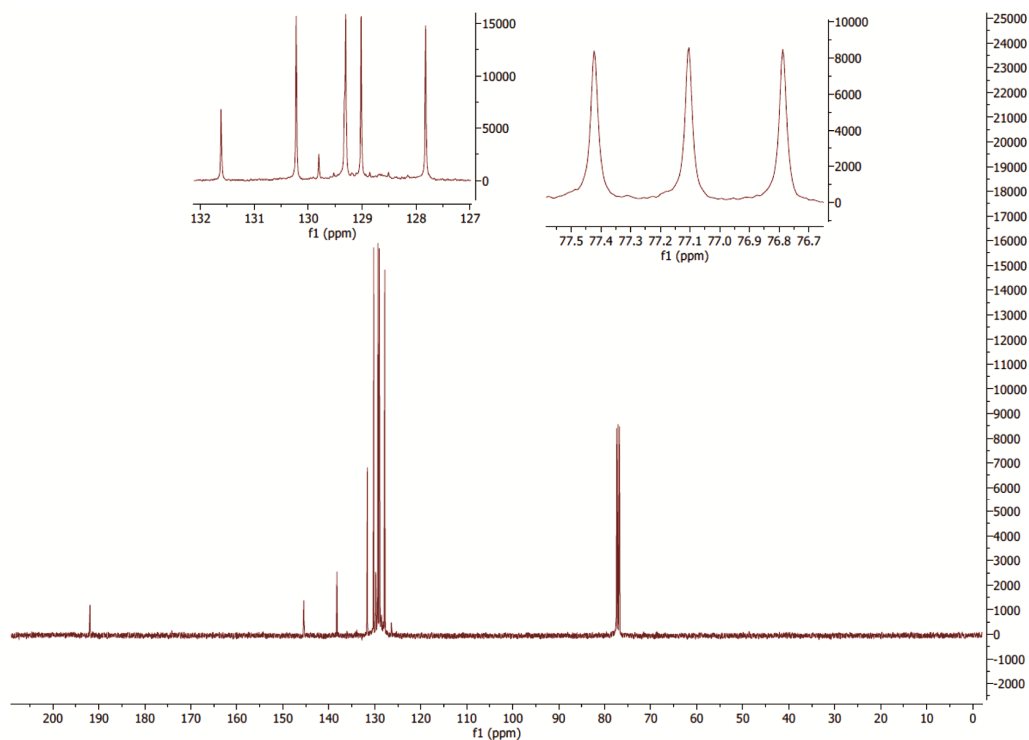
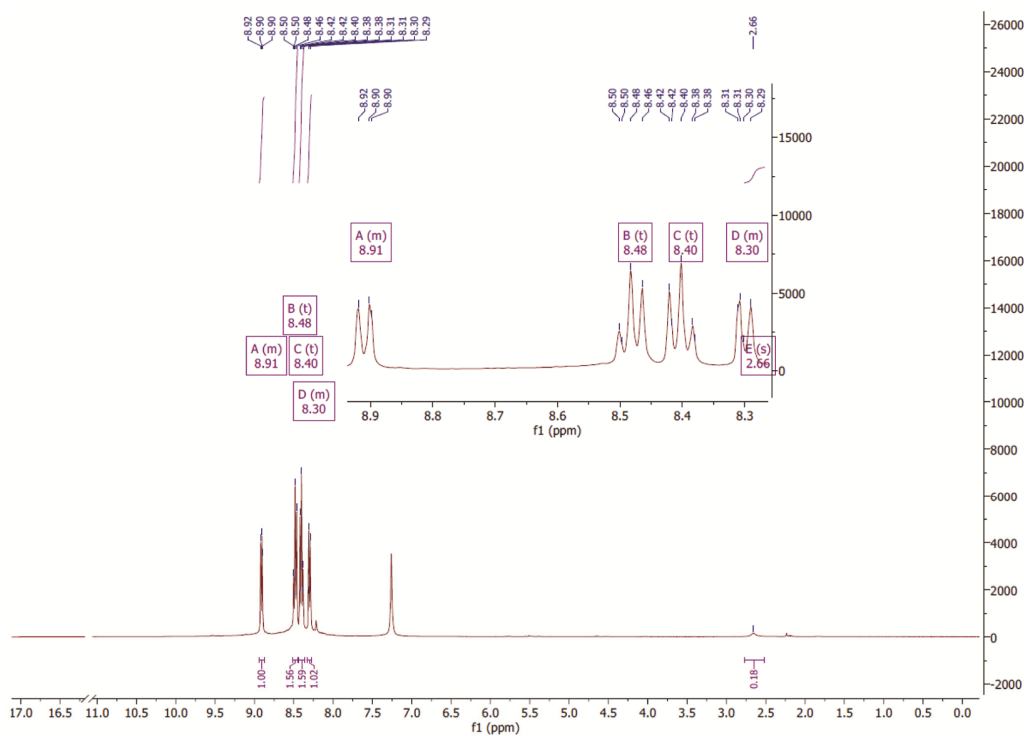
Yellow, Yield: 70.42%, MP: 230-232°C, Rf: 0.60, ^1H NMR: δ 3.85-4.06 (7H, 3.90 (s), 3.97 (s), 4.01 (s)), 5.14 (1H, dd, $J = 11.0, 1.1$ Hz), 5.85 (1H, dd, $J = 18.2, 1.1$ Hz), 6.84 (1H, dd, $J = 18.2, 11.0$ Hz), 7.05-7.18 (4H, 7.12 (ddd, $J = 8.2, 1.2, 0.5$ Hz), 7.12 (ddd, $J = 8.7, 1.4, 0.4$ Hz)), 7.26 (2H, ddd, $J = 8.2, 1.8, 0.5$ Hz), 7.43-7.63 (6H, 7.50 (tdd, $J = 7.4, 1.9, 1.4$ Hz), 7.52 (dddd, $J = 7.5, 6.1, 1.4, 1.3$ Hz), 7.55 (dddd, $J = 7.4, 6.8, 1.7, 0.5$ Hz), 7.56 (dddd, $J = 8.1, 7.4, 1.6, 0.4$ Hz)), 7.70 (2H, ddd, $J = 8.7, 1.9, 0.4$ Hz), 7.91-8.13 (4H, 7.98 (dddd, $J = 8.1, 1.7, 1.5, 0.4$ Hz), 8.07 (dddd, $J = 7.4, 1.6, 1.4, 0.5$ Hz)). ^{13}C NMR (100 Hz, CDCl_3): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 113.9-114.0 (3C, 113.9 (s), 114.0 (s)), 125.6 (1C, s), 127.6-127.8 (6C, 127.6 (s), 127.7 (s), 127.7 (s)), 128.3-128.5 (2C, 128.4 (s), 128.4 (s)), 128.5-128.7 (4C, 128.6 (s), 128.6 (s)), 129.4 (2C, s), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 136.3 (1C, s), 137.0 (1C, s), 137.3 (1C, s), 139.6 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass $\text{C}_{33}\text{H}_{30}\text{N}_4\text{O}_2$ m/z (%), calcd. (found):488 (482.3, M-1).

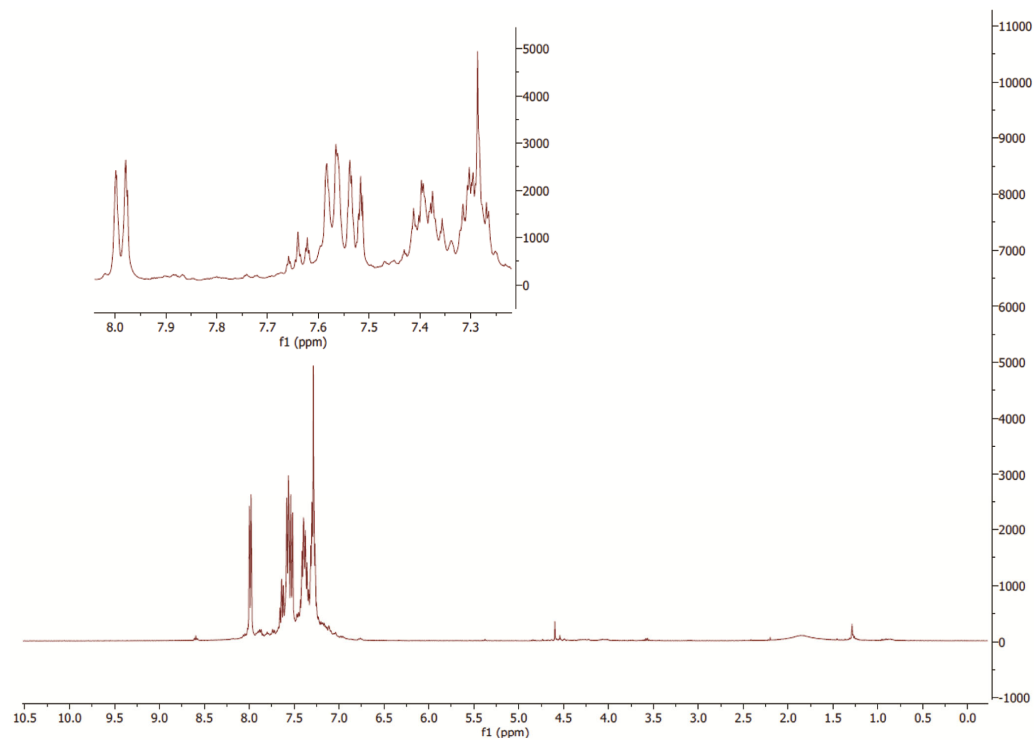
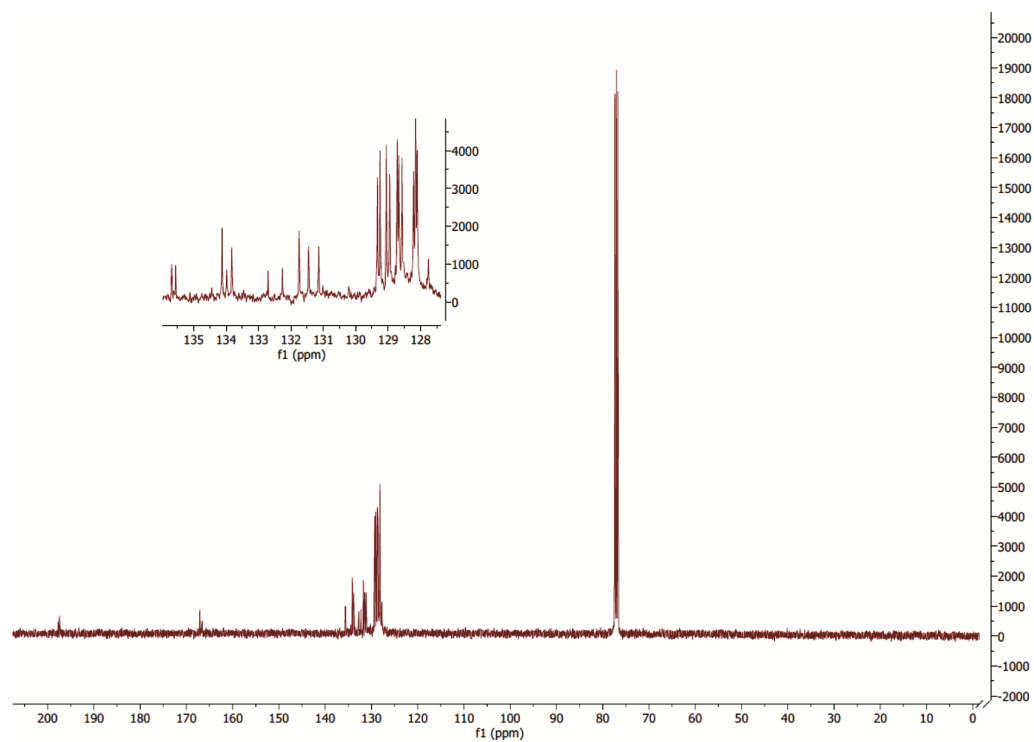
2-(2-(2-bromobenzyl) hydrazineyl)-1-(2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazol-1-yl) ethan-1-one (SM-08)

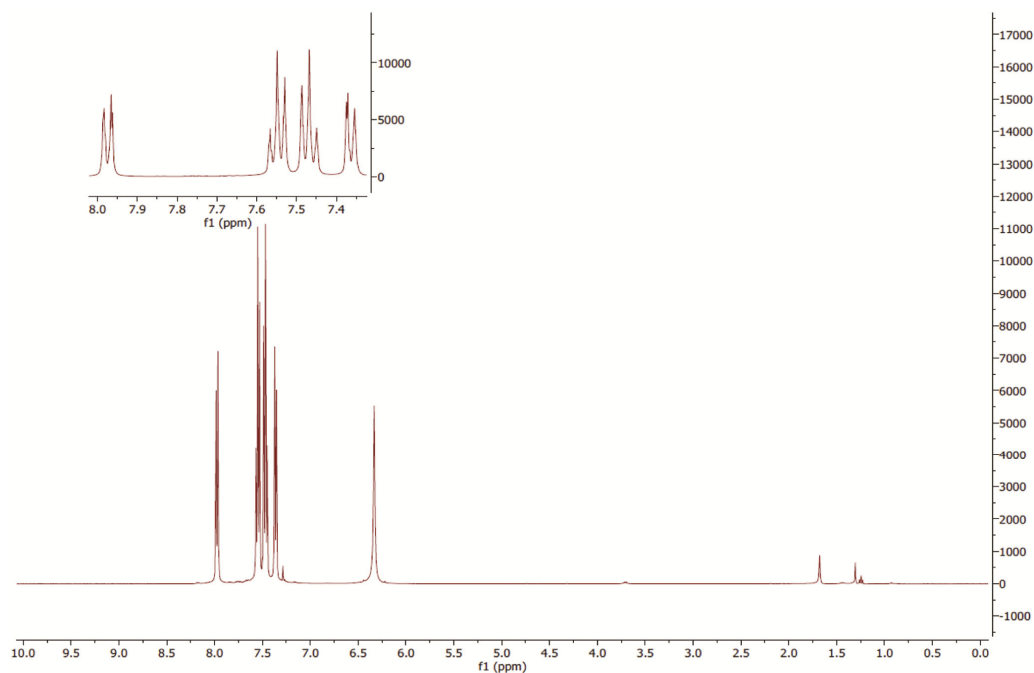
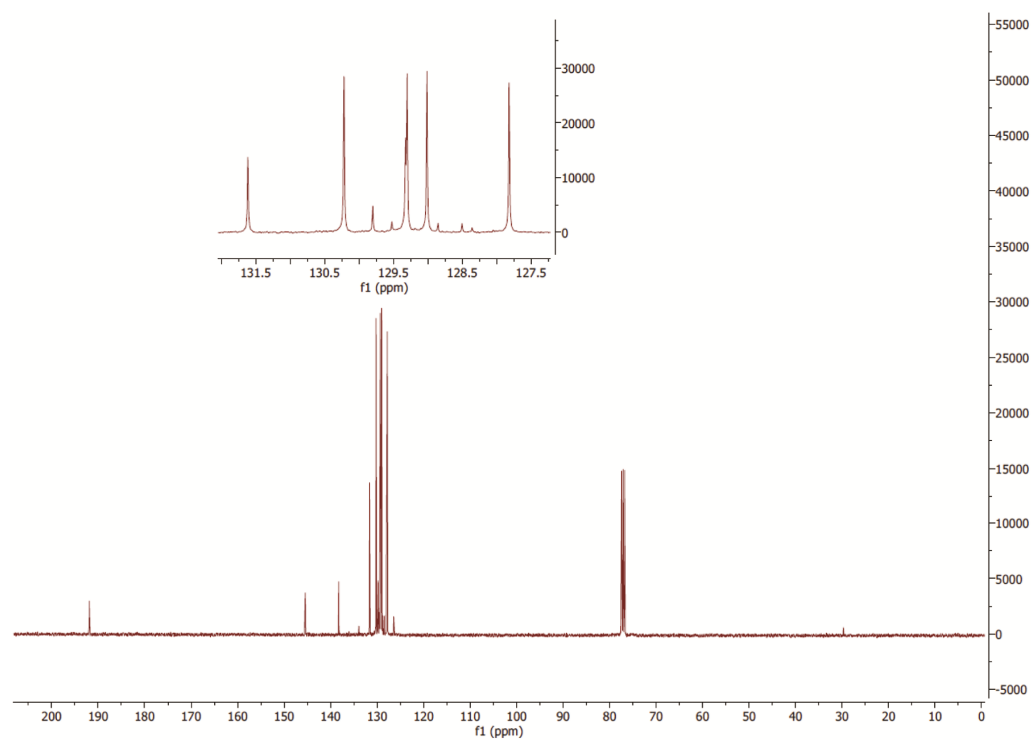
Pale yellow, Yield: 95.77%, MP: 230-232°C, Rf: 0.70, ^1H NMR: δ 3.85-4.02 (5H, 3.90 (s), 3.97 (s)), 4.11 (2H, s), 6.93 (1H, ddd, $J = 8.1, 7.7, 1.7$ Hz), 7.05-7.32 (4H, 7.12 (ddd, $J = 8.7, 1.4, 0.4$ Hz), 7.22 (ddd, $J = 8.1, 7.7, 1.3$ Hz), 7.26 (ddd, $J = 8.1, 1.3, 0.5$ Hz)), 7.40-7.63 (7H, 7.46 (ddd, $J = 8.1, 1.7, 0.5$ Hz), 7.50 (tdd, $J = 7.4, 1.9, 1.4$ Hz), 7.52 (dddd, $J = 7.5, 6.1, 1.4, 1.3$ Hz), 7.55 (dddd, $J = 7.4, 6.8, 1.7, 0.5$ Hz), 7.56 (dddd, $J = 8.1, 7.4, 1.6, 0.4$ Hz)), 7.70 (2H, ddd, $J = 8.7, 1.9, 0.4$ Hz), 7.91-8.13 (4H, 7.98 (dddd, $J = 8.1, 1.7, 1.5, 0.4$ Hz), 8.07 (dddd, $J = 7.4, 1.6, 1.4, 0.5$ Hz)). ^{13}C NMR (100 Hz, CDCl_3): δ 43.4 (1C, s), 48.9 (1C, s), 55.3 (1C, s), 114.0 (2C, s), 123.9 (1C, s), 125.6 (1C, s), 126.7 (1C, s), 127.7-127.8 (4C, 127.7 (s), 127.7 (s)), 128.3-128.5 (3C, 128.3 (s), 128.4 (s), 128.4 (s)), 128.5-128.7 (4C, 128.6 (s), 128.6 (s)), 129.3 (1C, s), 129.7 (2C, s), 130.9-131.1 (2C, 131.0 (s), 131.0 (s)), 132.4 (1C, s), 132.8 (1C, s), 137.0 (1C, s), 141.6 (1C, s), 153.6 (1C, s), 160.3 (1C, s), 168.6 (1C, s). Mass $\text{C}_{31}\text{H}_{27}\text{BrN}_4\text{O}_2$ m/z (%), calcd. (found):488 (482.3, M-1).

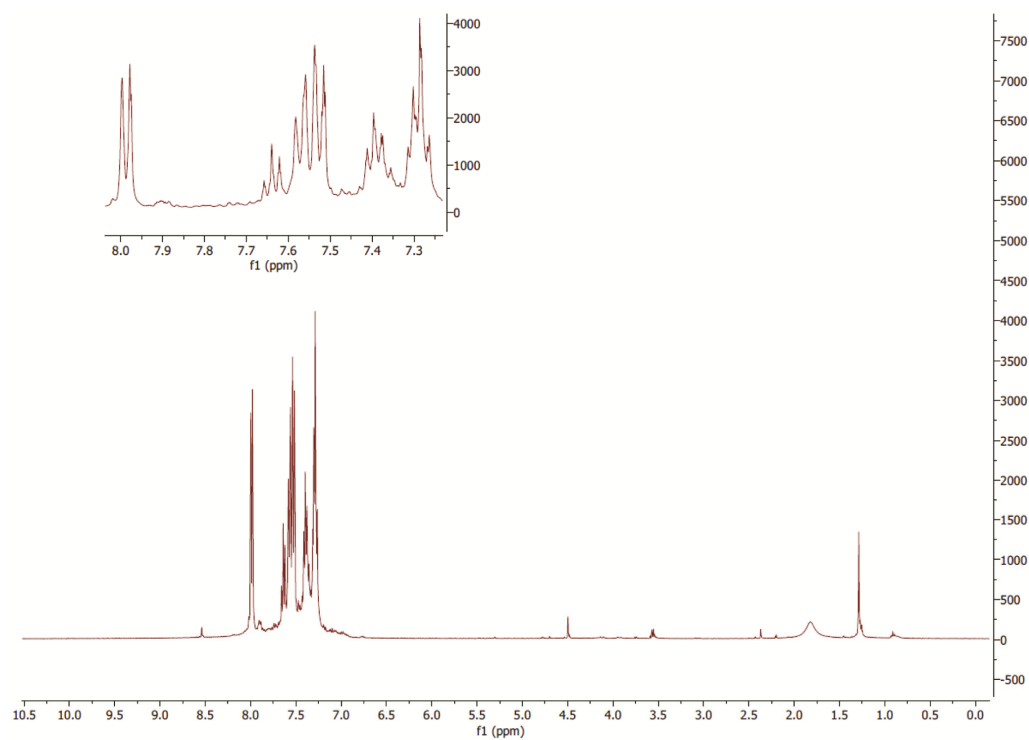
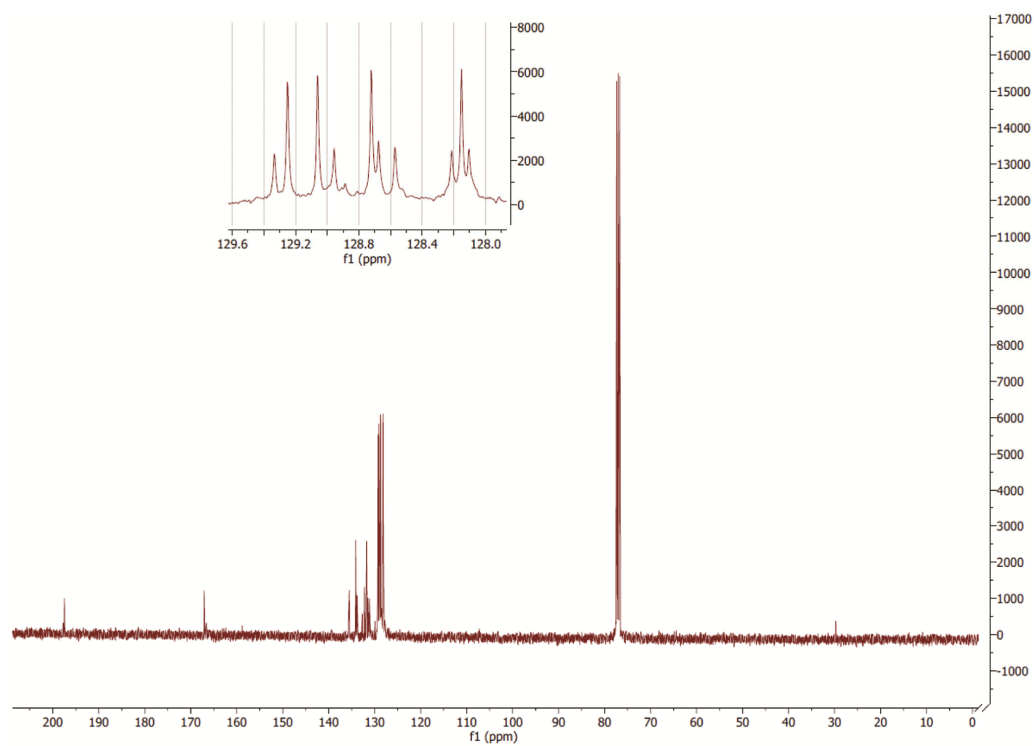
Spectroscopic analysis

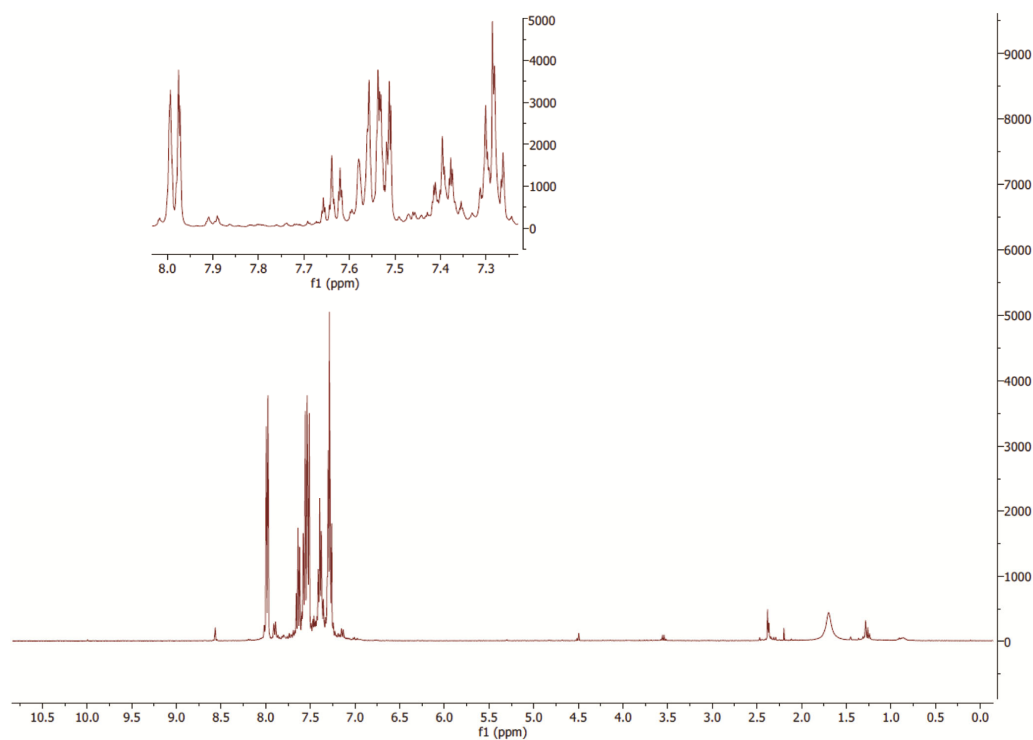
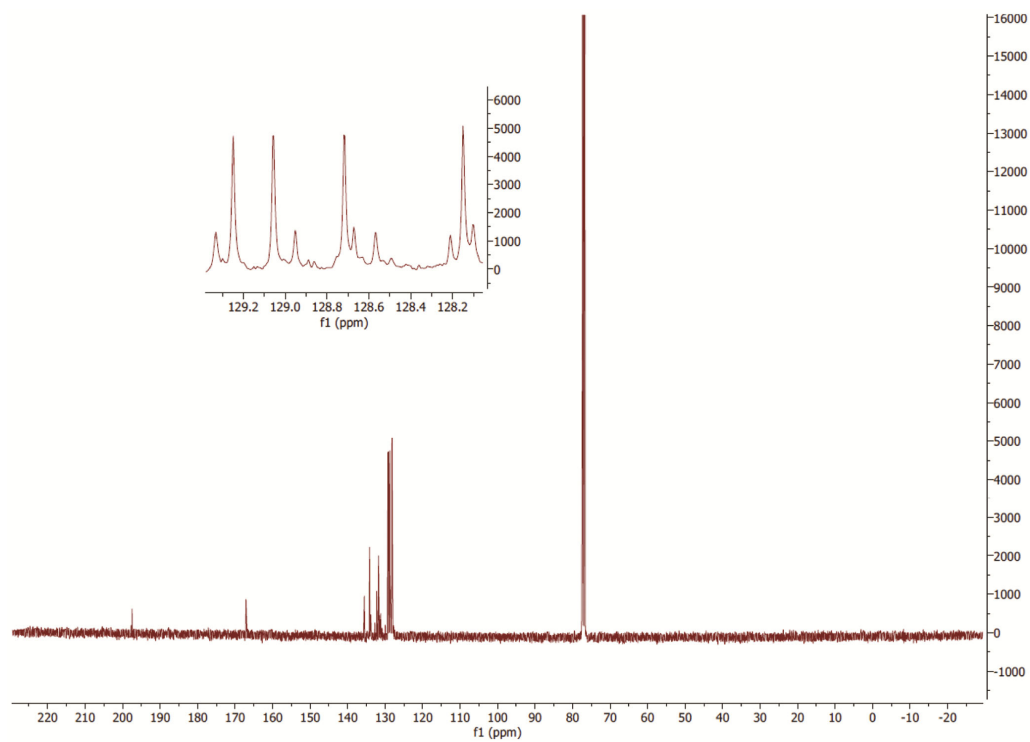
NMR (H & C) SM-01 TO SM-08

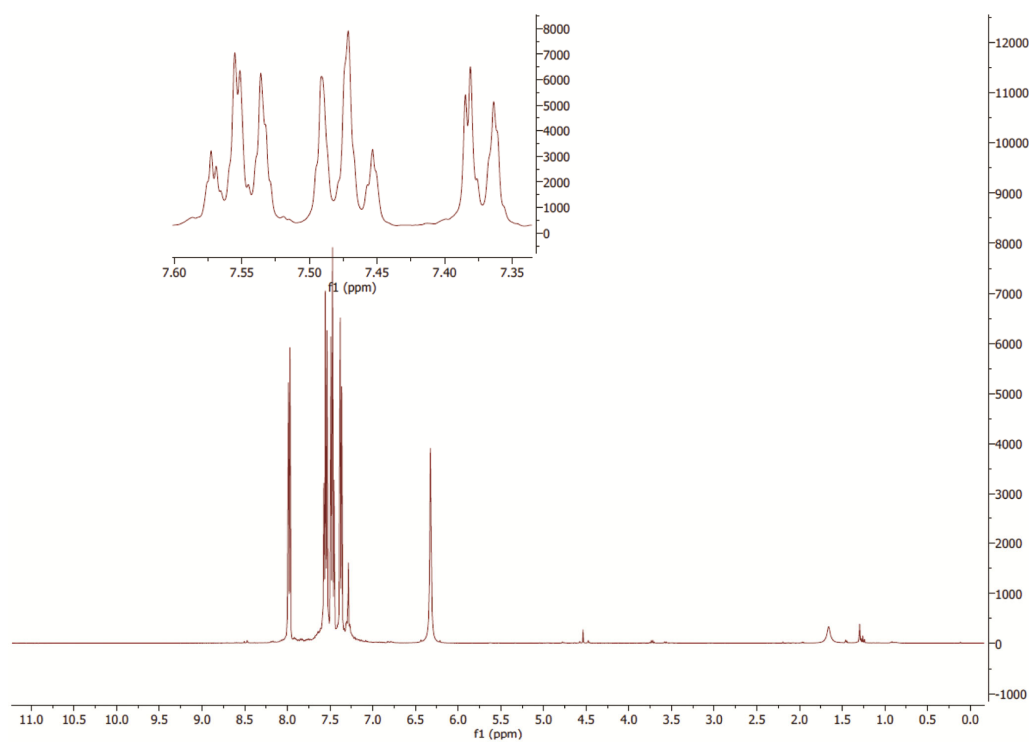
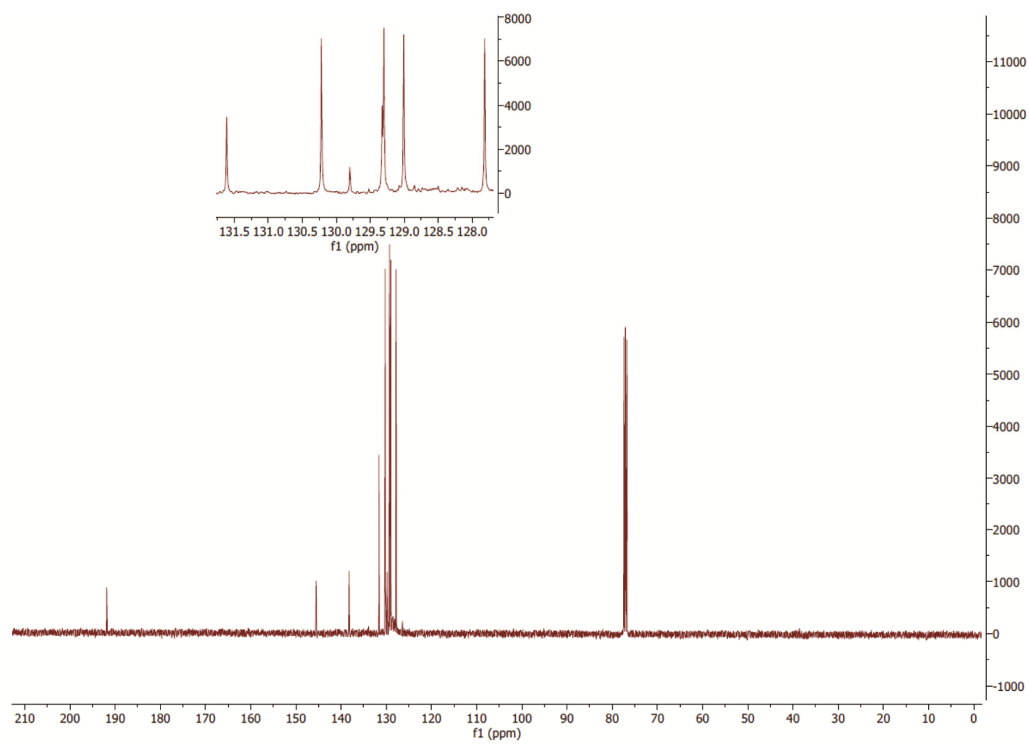
Suppl. Fig. S1a — ^{13}C -NMR Spectrum of compound (SM-01)Suppl. Fig. S1b — ^1H -NMR Spectrum of compound (SM-01)

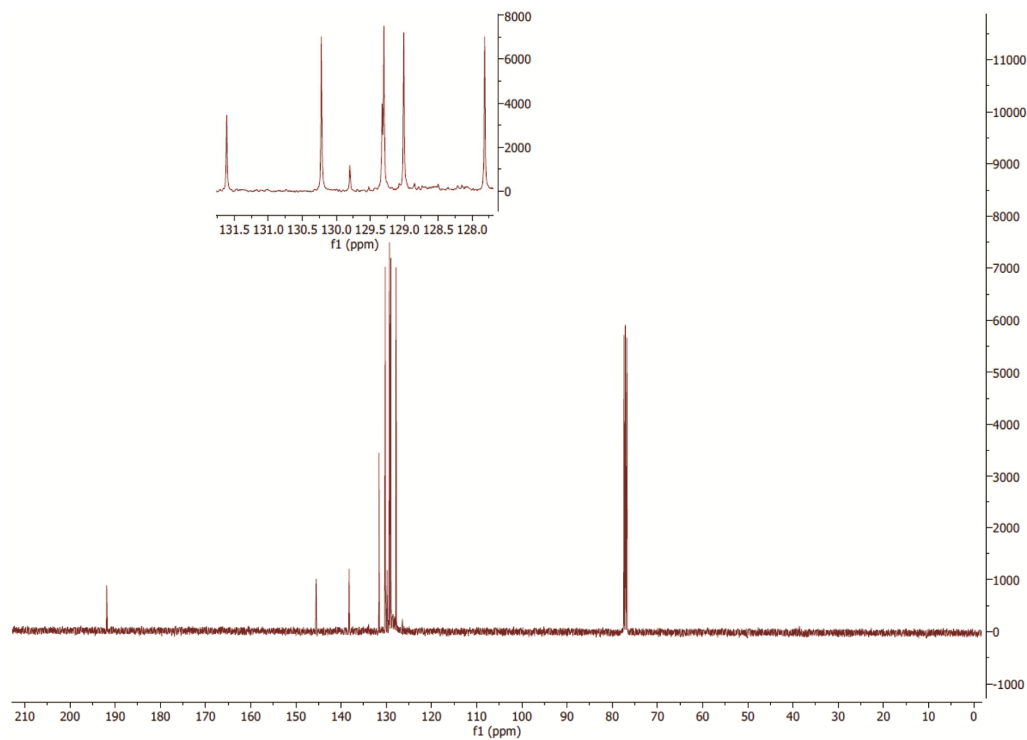
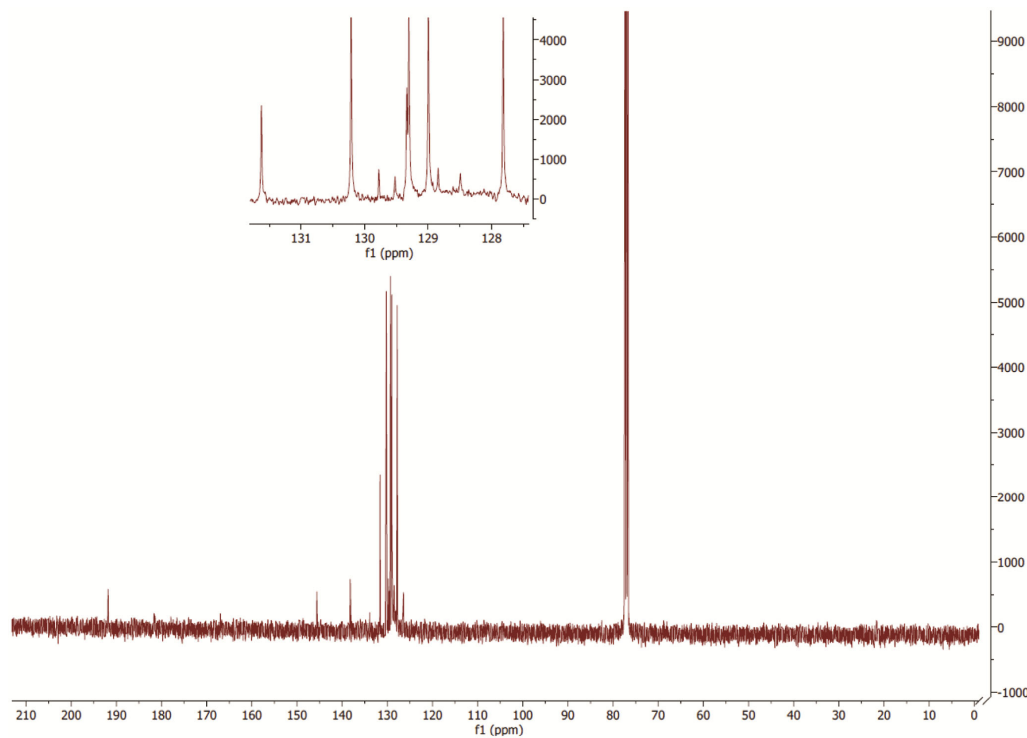
Suppl. Fig. S1c — ^1H -NMR Spectrum of compound (SM-02)Suppl. Fig. S1d — ^{13}C -NMR Spectrum of compound (SM-02)

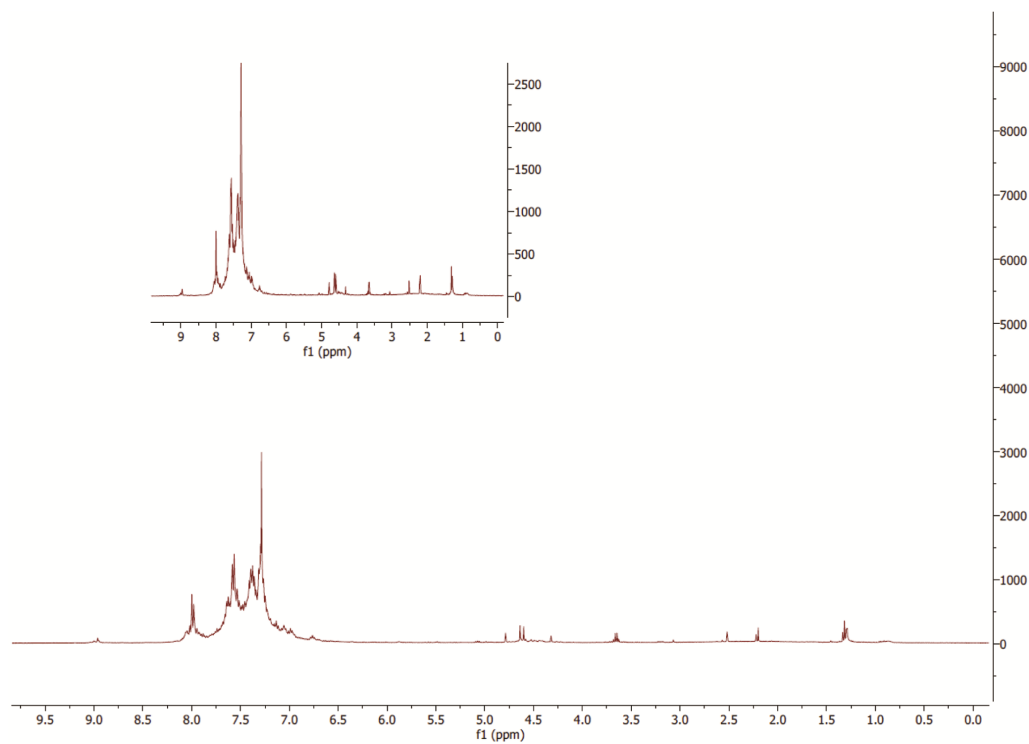
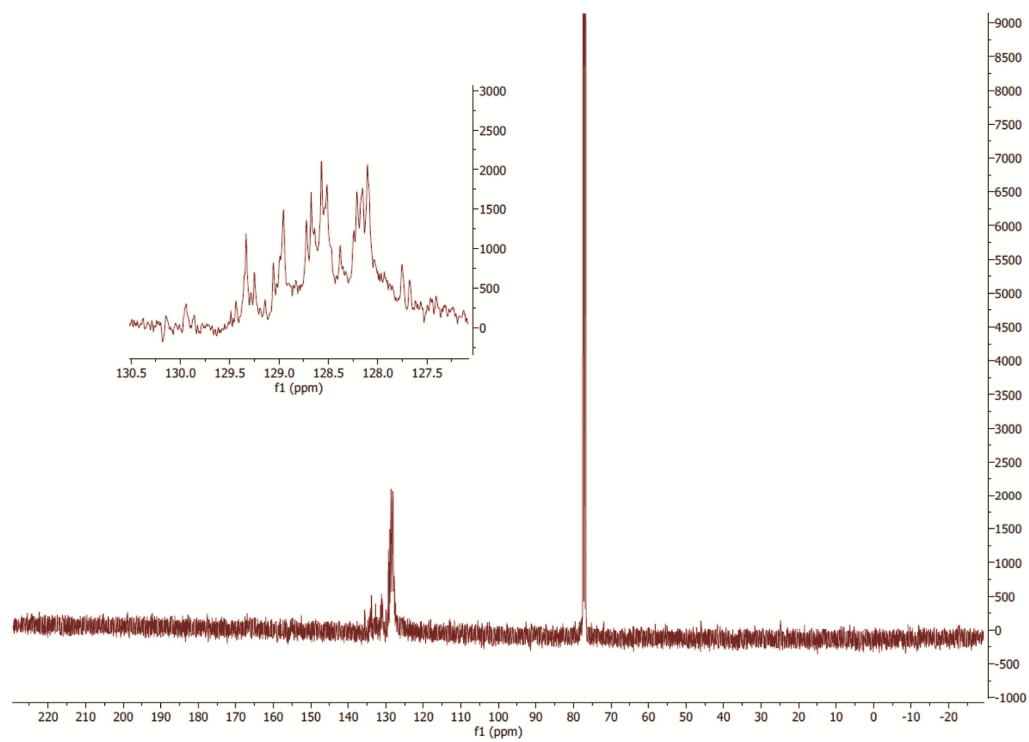
Suppl. Fig. S1e — ¹H-NMR Spectrum of compound (SM-03)Suppl. Fig. S1f — ¹³C-NMR Spectrum of compound (SM-03)

Suppl. Fig. S1g — ^1H -NMR Spectrum of compound (SM-04)Suppl. Fig. S1h — ^{13}C -NMR Spectrum of compound (SM-04)

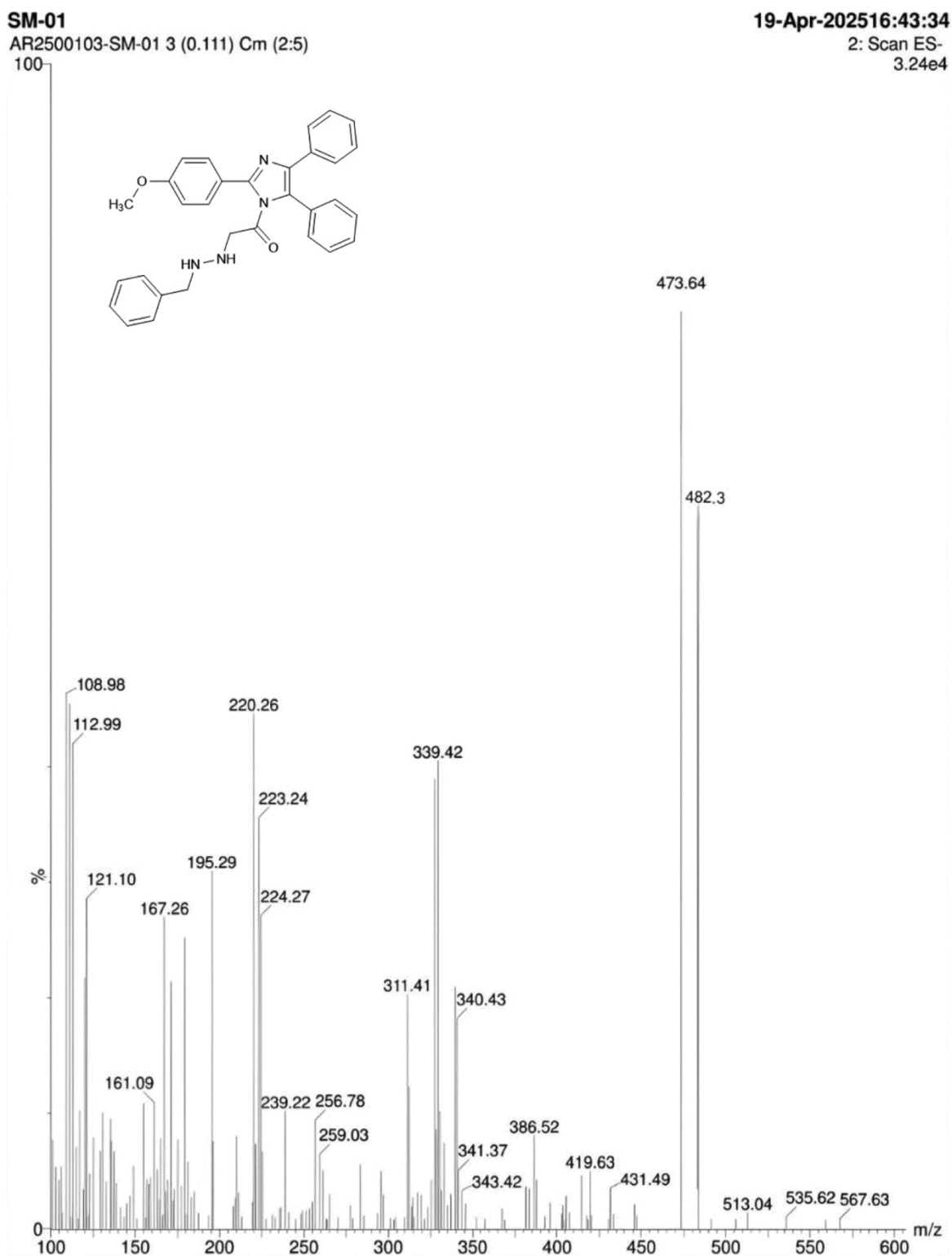
Suppl. Fig. S1i — ¹H-NMR Spectrum of compound (SM-05)Suppl. Fig. S1j — ¹³C-NMR Spectrum of compound (SM-05)

Suppl. Fig. S1k — ^1H -NMR Spectrum of compound (SM-06)Suppl. Fig. S1l — ^{13}C -NMR Spectrum of compound (SM-06)

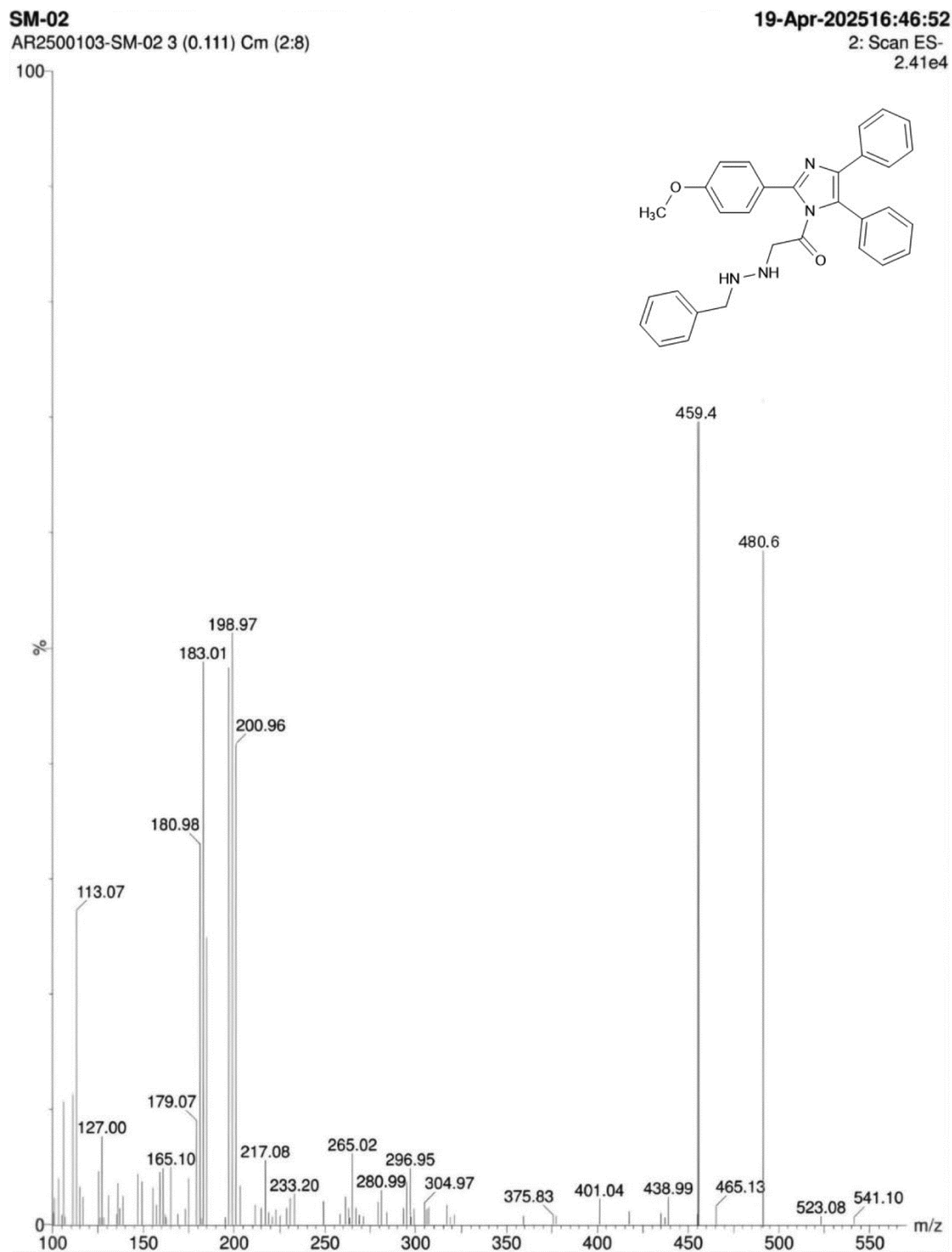
Suppl. Fig. S1m — ¹H-NMR Spectrum of compound (SM-07)Suppl. Fig. S1n — ¹³C-NMR Spectrum of compound (SM-07)

Suppl. Fig. S1o — ^1H -NMR Spectrum of compound (SM-08)Suppl. Fig. S1p — ^{13}C -NMR Spectrum of compound (SM-08)

Mass Spectra SM-01 TO SM-08



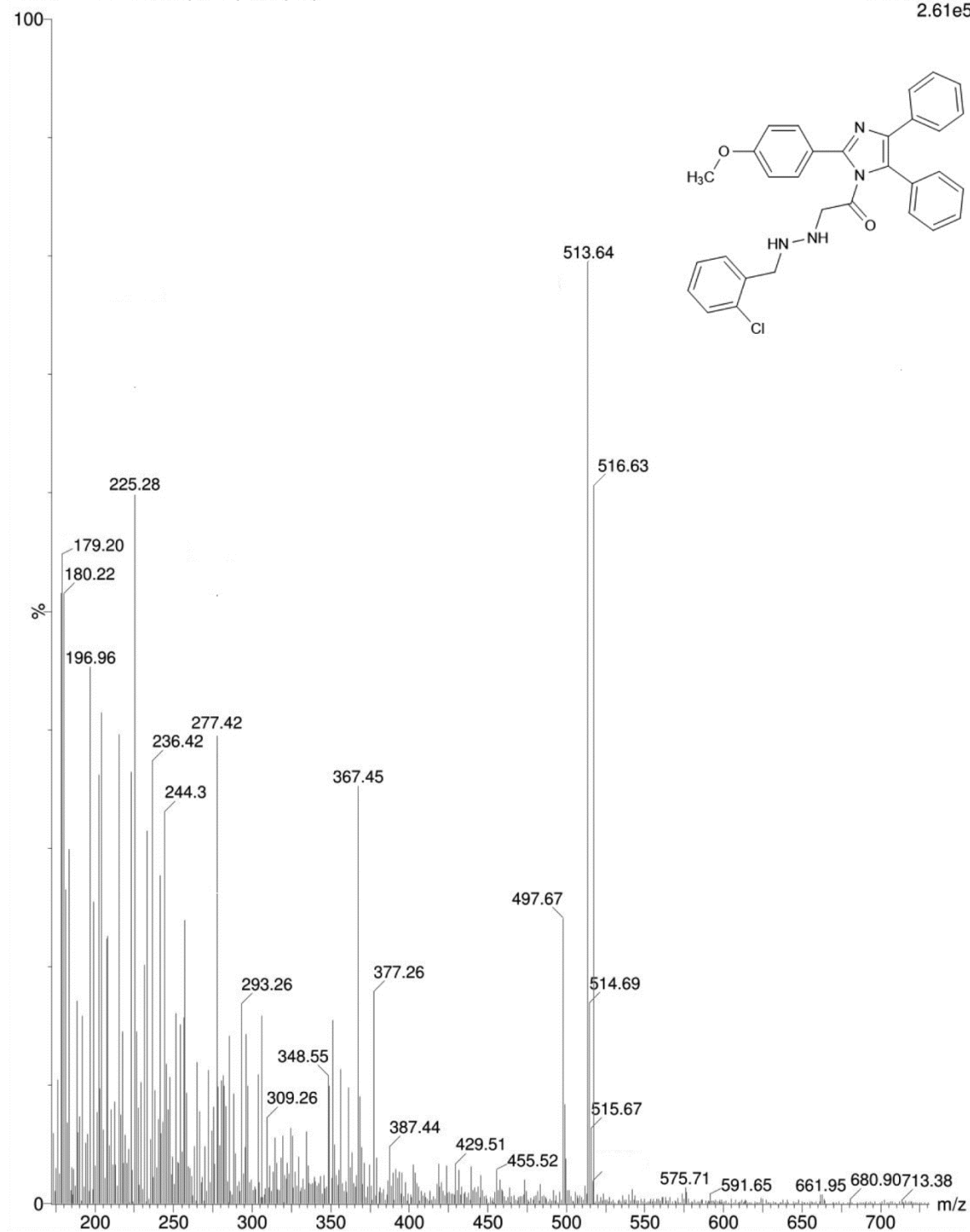
Suppl. Fig. S2a — Mass Spectrum of compound (SM-01)



Suppl. Fig. S2b — Mass Spectrum of compound (SM-02)

SM-03

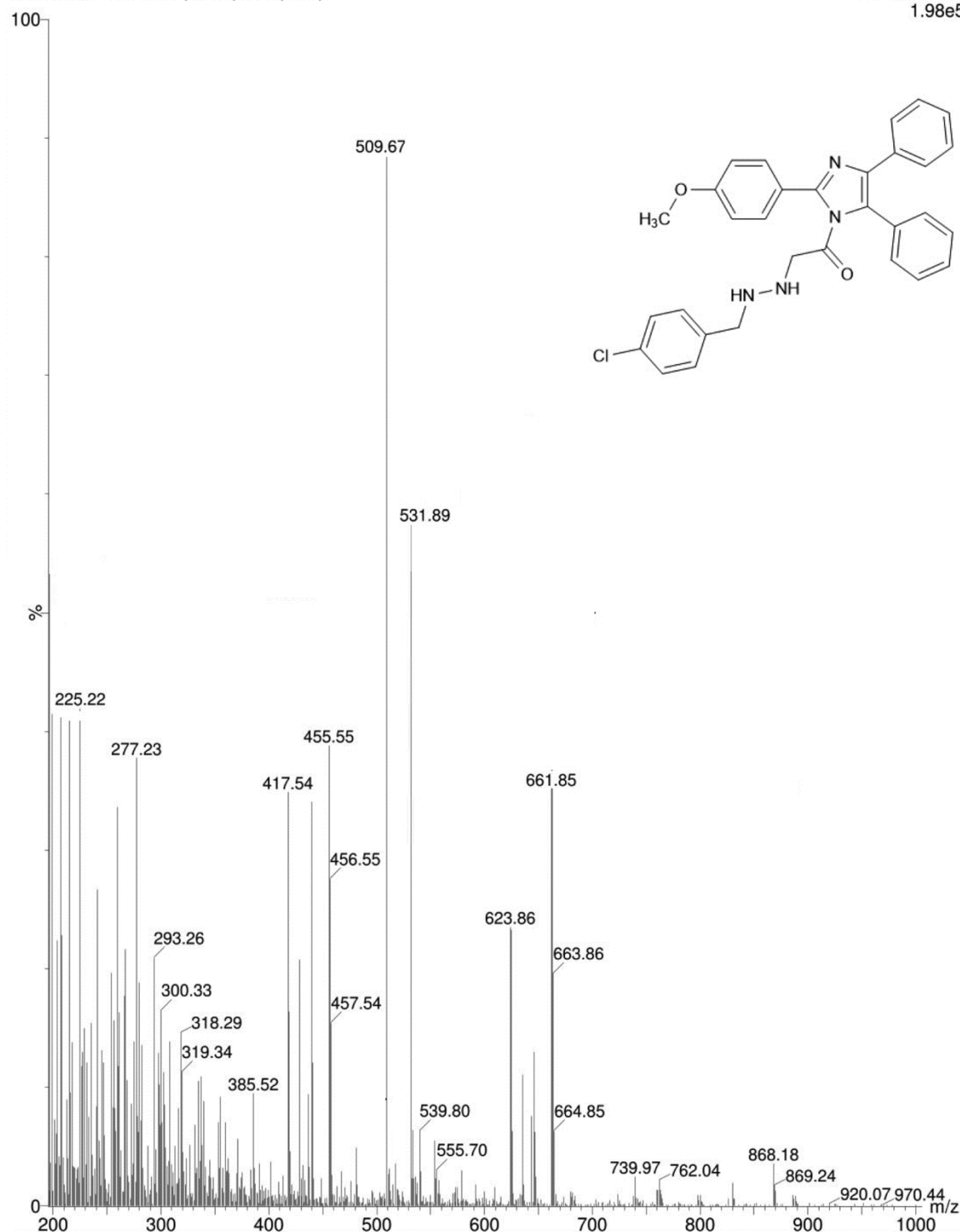
AR2500103-SM-03 6 (0.203) Cm (2:9)

19-Apr-2025 16:49:541: Scan ES+
2.61e5

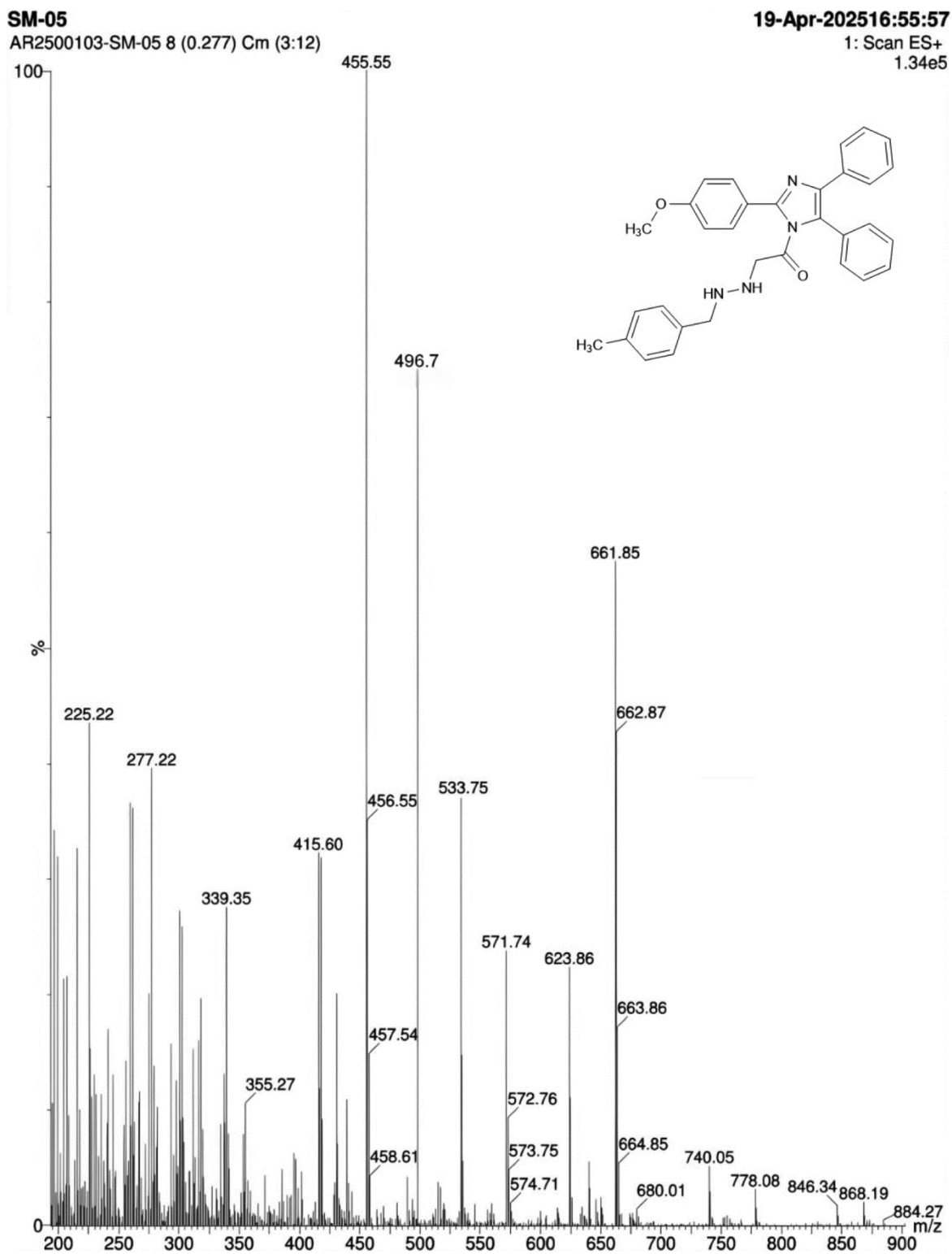
Suppl. Fig. S2c — Mass Spectrum of compound (SM-03)

SM-04

AR2500103-SM-04 6 (0.203) Cm (3:10)

19-Apr-2025 16:52:551: Scan ES+
1.98e5

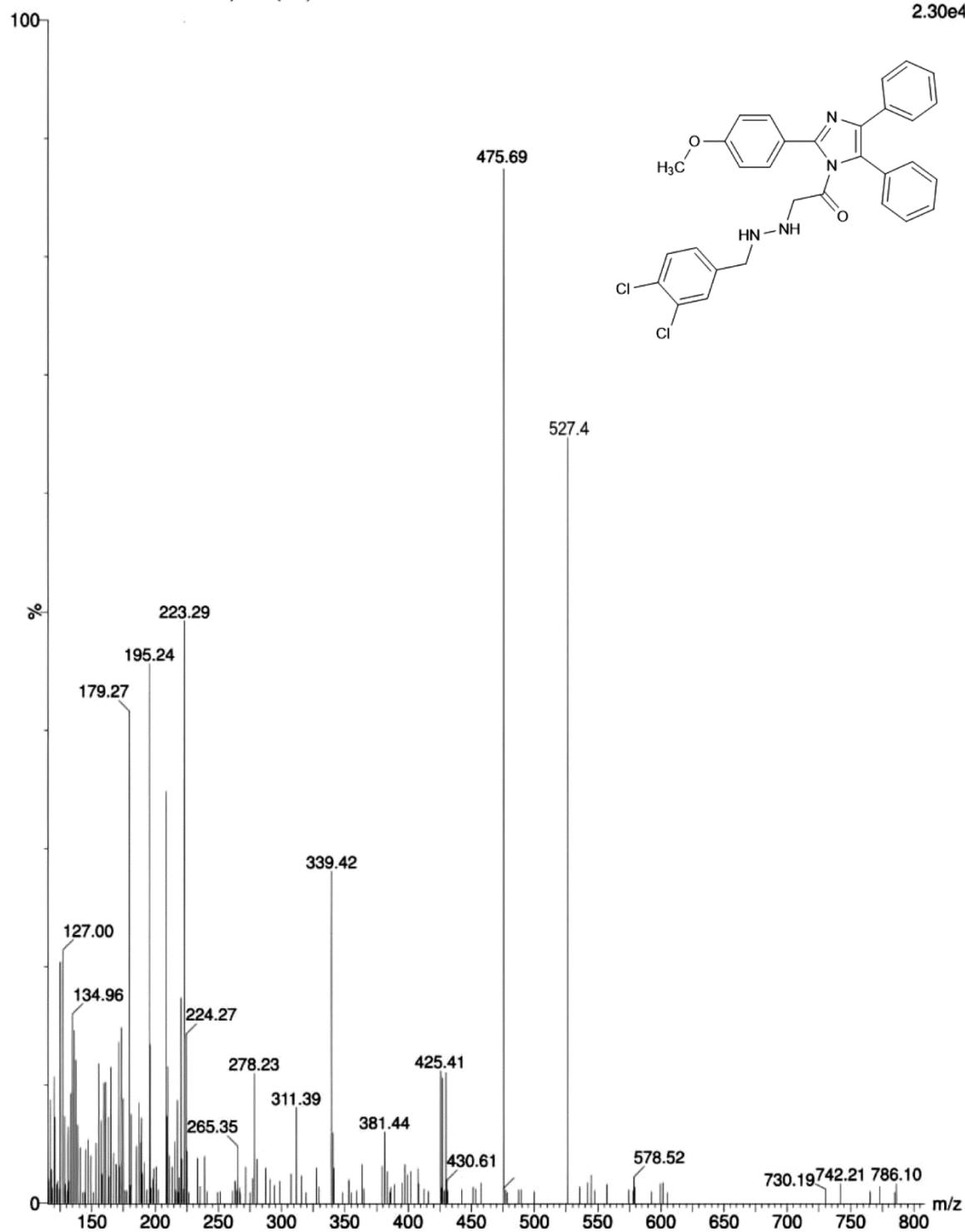
Suppl. Fig. S2d — Mass Spectrum of compound (SM-04)



Suppl. Fig. S2e — Mass Spectrum of compound (SM-05)

SM-06

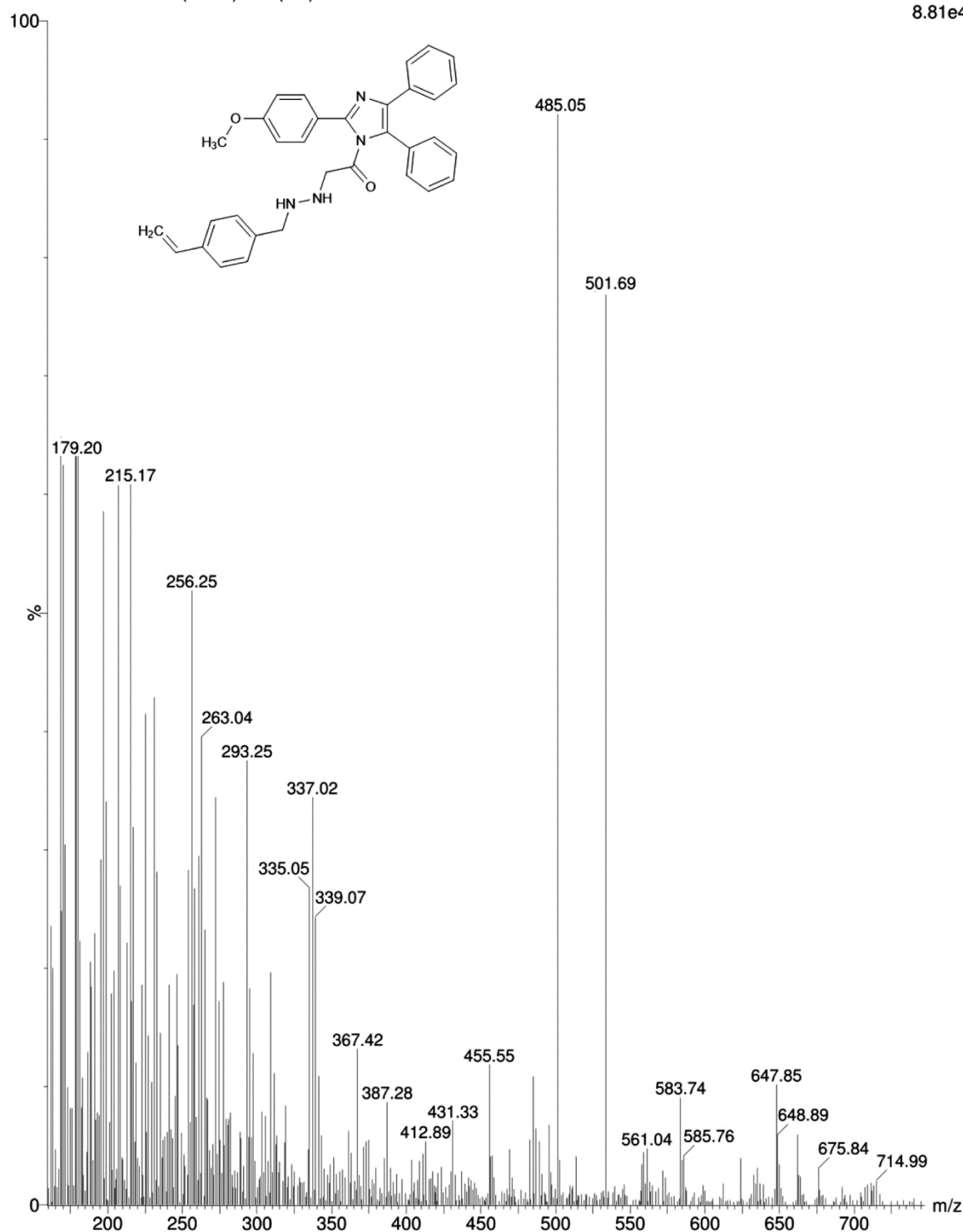
AR2500103-SM-06 3 (0.111) Cm (2:6)

19-Apr-2025 16:58:582: Scan ES-
2.30e4

Suppl. Fig. S2f — Mass Spectrum of compound (SM-06)

SM-07

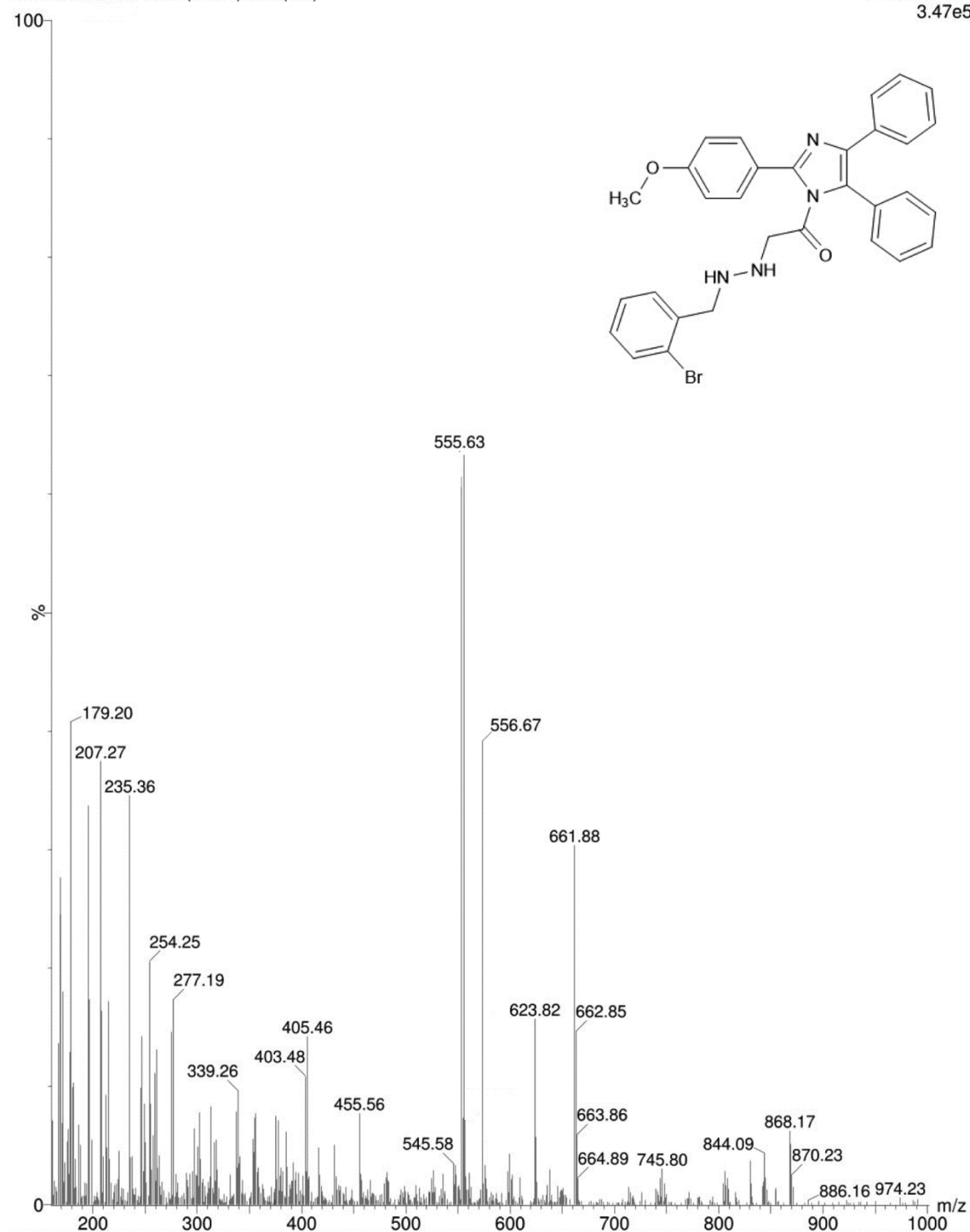
AR2500103-SM-07 8 (0.277) Cm (4:8)

19-Apr-2025 17:02:001: Scan ES+
8.81e4

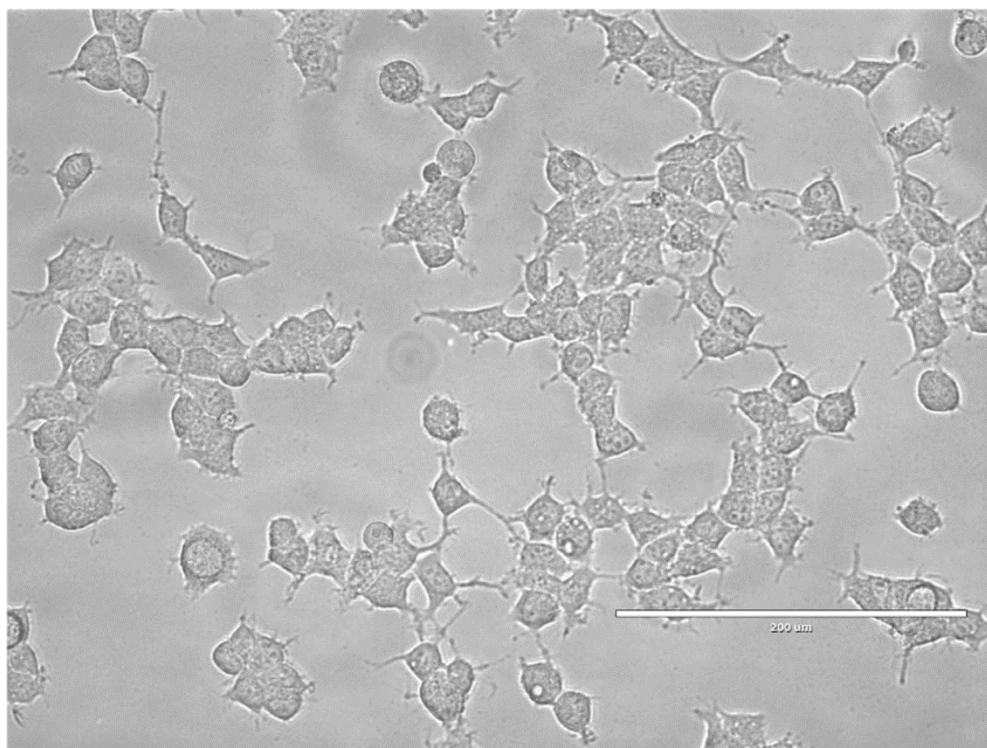
Suppl. Fig. S2g — Mass Spectrum of compound (SM-07)

SM-08

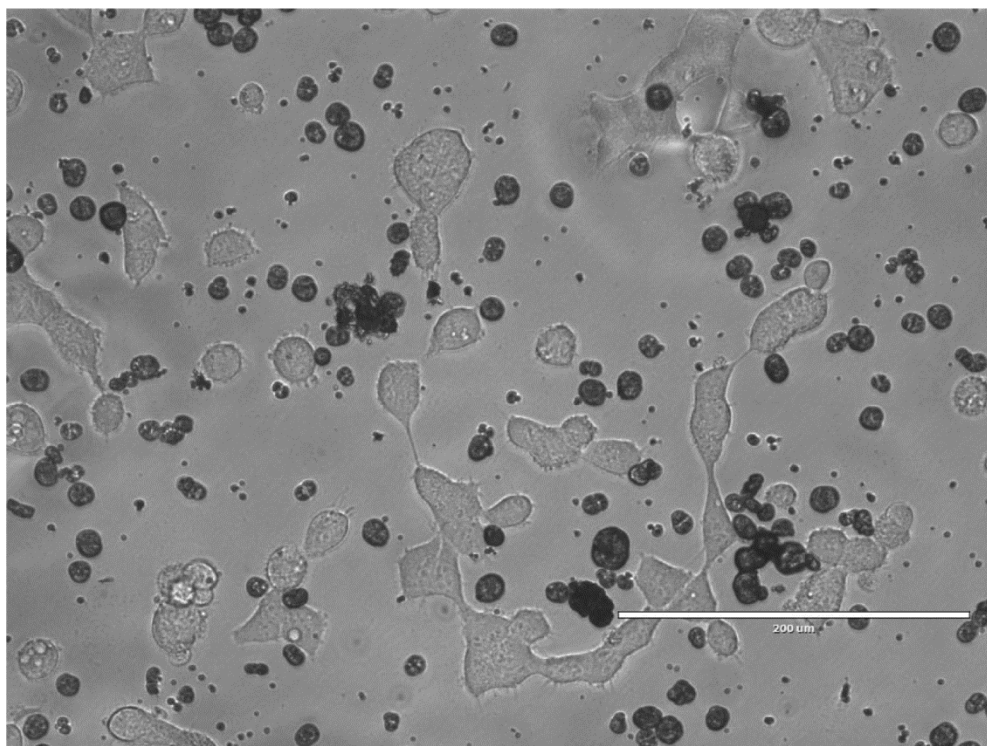
AR2500103-SM-08 5 (0.166) Cm (4:5)

19-Apr-2025 17:05:011: Scan ES+
3.47e5

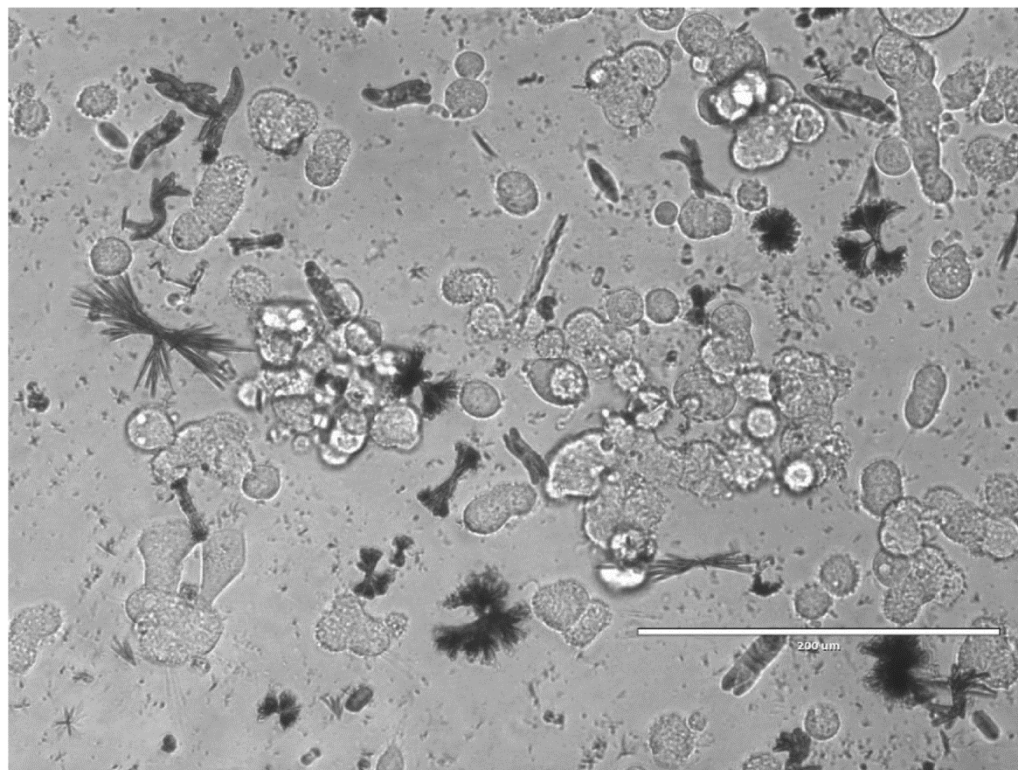
Suppl. Fig. S2h — Mass Spectrum of compound (SM-08)

***In vitro* antidiabetic activity of cell line and alpha-amylase inhibition**

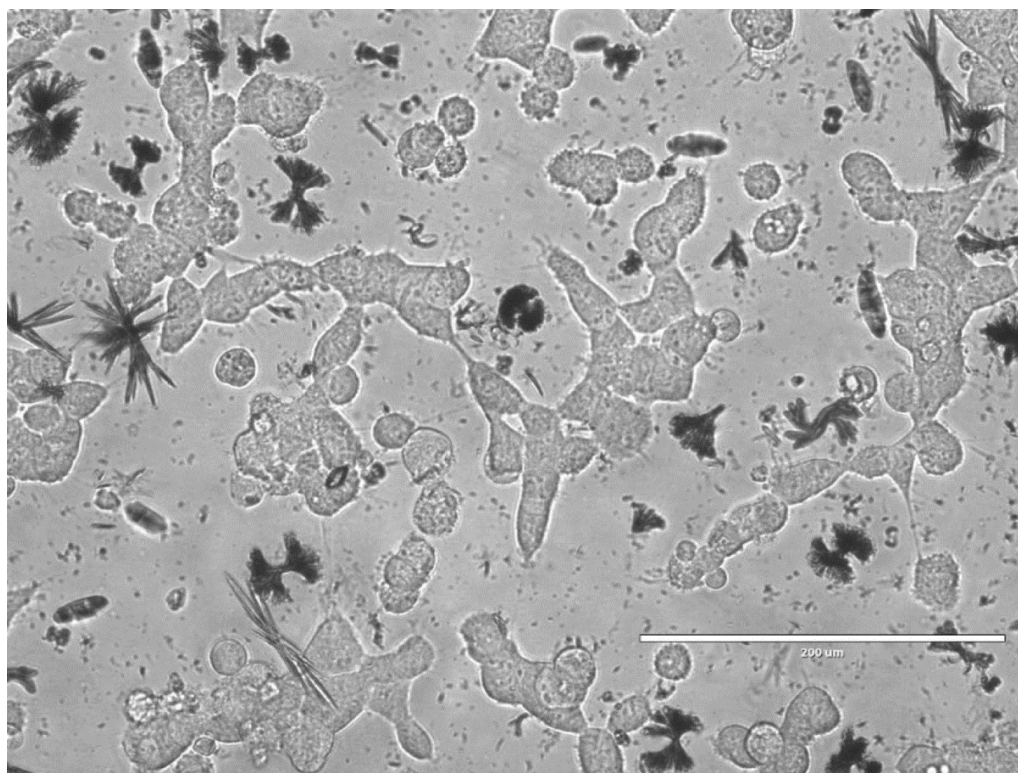
Suppl. Fig. S3a — Control



Suppl. Fig. S3b — Standard



Suppl. Fig. S3c — SM-03



Suppl. Fig. S3d — SM-04