Supplementary Information

Ring-opening reaction of Bus- and SES-protected aziridines using lithiated dithianes

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Identification data of newly synthesized compounds

***rac*-6 *rac*-1-(1,3-Dithian-2-yl)-2-(*tert*-butylsulfonamido)-3-phenylpropane:**
white solid; mp 182–183 °C; R_f = 0.15 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.30 (s, 9H), 1.82–2.13 (m, 4H), 2.75–3.01 (m, 6H), 3.89–4.01 (dd, *J* = 6.5, 8.1 Hz, 1H), 7.20–7.27 (m, 3H), 7.31 (t, *J* = 7.3 Hz, 2H); ^{13}C NMR ($CDCl_3$): δ 24.28, 25.83, 29.58, 29.80, 40.87, 42.11, 43.34, 54.06, 60.16, 127.03, 128.77, 130.00, 136.86; IR (KBr disc): 1055, 1078, 1126, 1294, 1420, 1455, 1497, 2893, 2932, 3283 cm^{-1}. Anal. Calcd. for $C_{17}H_{27}NO_2S_3$: C, 54.65; H, 7.28; N, 3.75. Found: C, 54.52; H, 7.29; N, 3.76.

(*S*)-6 (*S*)-1-(1,3-Dithian-2-yl)-2-(*tert*-butylsulfonamido)-3-phenylpropane:
Enantiopurity was confirmed by chiral HPLC (CHIRALPAK IB column hexane: ^{i}PrOH = 92:8, 1.0 mL/min, t_R (*R*) = 8.87 min, t_R (*S*) = 9.44 min). $[\alpha]^{20}_D$ = 1.26 (c 3.00 in THF)

***rac*-7**
(*S*)-1-(*tert*-Butylsulfonyl)-2-benzyl-4-[4,5]-(1,3-dithian-2-yl)-5-pyrrolidinone:
white solid; mp 167–168 °C; R_f = 0.30 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.55 (s, 9H), 1.83–19.3 (m, 1H), 2.03 (dd, *J* = 3.2, 14.3 Hz, 1H), 2.16–2.24 (m, 1H), 2.54–2.65 (m, 1H), 2.95 (dd, *J* = 11.7, 12.6 Hz, 1H), 3.66–3.77 (m, 2H), 3.83 (dt, *J* = 2.5, 13.5 Hz, 1H), 4.21–4.29 (m, 1H), 7.21–7.27 (m, 3H), 7.31 (t, *J* = 7.3, 2H); ^{13}C NMR ($CDCl_3$): δ 24.08, 25.04, 27.10, 27.61, 38.15, 42.76, 45.90, 59.62, 65.25, 127.06, 128.87, 129.63, 136.66, 172.40; IR (KBr disc): 1018, 1074, 1088, 1107, 1136, 1175, 1242, 1279, 1339, 1387, 1398, 1414, 1423, 1433, 1456, 1474, 1501, 1583, 1605, 1724, 2923, 2982, 2995, 3080 cm^{-1}. Anal. Calcd. for $C_{18}H_{25}NO_3S_3$: C, 54.10; H, 6.31; N, 3.51. Found: C, 54.05; H, 6.30; N, 3.50.
(*S*)-7
(*S*)-1-(*tert*-Butylsulfonyl)-2-benzyl-4-[4,5]-(1,3-dithian-2-yl)-5-pyrrolidinone:
Enantiopurity was confirmed by chiral HPLC (CHIRALPAK IA column hexane: ^{i}PrOH = 90:10, 1.0 mL/min, t_R (*R*) = 8.45 min, t_R (*S*) = 9.72 min). $[\alpha]^{20}_D$ = 4.08 (c 3.00 in THF)

***rac*-8 *rac*-1-(2-Trimethylsilyl-1,3-dithian-2-yl)-2-(*tert*-butylsulfonamido)-3-phenylpropane:**
white solid; mp 59–60 °C; R_f = 0.30 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.11 (s, 9H), 1.31 (s, 9H), 1.85–1.96 (m, 1H), 2.02–2.18 (m, 1H), 2.31 (dd, *J* = 4.7, 15.2 Hz, 1H), 2.49–2.64 (m, 3H), 2.85 (dd, *J* = 7.9, 13.2 Hz, 1H), 3.01–3.14 (m, 2H),

3.19 (dd, *J* = 5.2, 13.3 Hz, 1H), 3.94–4.02 (m, 1H), 5.44 (d, *J* = 3.9 Hz, 1H), 7.19–7.33 (m, 5H); ^{13}C NMR ($CDCl_3$): δ −2.49, 24.00, 24.15, 24.20, 24.52, 37.01, 41.16, 42.90, 56.10, 59.54, 126.77, 128.64, 129.96, 138.30; IR (KBr disc): 1018, 1069, 1124, 1250, 1298, 1364, 1420, 1458, 1499, 2905, 3275 cm^{-1}. Anal. Calcd. for $C_{20}H_{35}NO_2S_3Si$: C, 53.89; H, 7.91; N, 3.14. Found: C, 53.73; H, 7.91; N, 3.10.

***rac*-9 *rac*-1-(2-Phenyl-1,3-dithian-2-yl)-2-(*tert*-butylsulfonamido)-3-phenyl propane:**

white solid; mp 122–123 °C; R_f = 0.15 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.09 (s, 9H), 1.85–2.03 (m, 2H), 2.33–2.46 (m, 2H), 2.61 (dd, *J* = 3.6, 14.8 Hz, 1H), 2.66–2.78 (m, 4H), 2.80–2.87 (m, 1H), 3.67–3.75 (m, 1H), 3.84 (d, *J* = 9.2 Hz, 1H), 7.09 (d, *J* = 7.1 Hz, 2H), 7.14–7.31 (m, 4H), 7.37–7.43 (m, 2H), 7.92 (d, *J* = 7.6 Hz, 2H); ^{13}C NMR ($CDCl_3$): δ 23.97, 24.79, 27.72, 28.00, 42.35, 49.47, 54.48, 56.71, 60.05, 126.71, 127.63, 128.52, 128.56, 128.96, 130.10, 137.67, 141.43; IR (KBr disc): 1038, 1072, 1124, 1300, 1364, 1394, 1423, 1481, 2345, 2907, 3273 cm^{-1}. Anal. Calcd. for $C_{23}H_{31}NO_2S_3$: C, 61.43; H, 6.95; N, 3.11. Found: C, 61.20; H, 6.96; N, 2.92.

***rac*-15 *rac*-1-(2-Phenyl-1,3-dithian-2-yl)-2-(*tert*-butylsulfonamido)-5-hexene:**

white solid; mp 105–106 °C; R_f = 0.25 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.31 (s, 9H), 1.41–1.51 (m, 1H), 1.85–2.04 (m, 4H), 2.29 (dd, *J* = 7.8, 14.3 Hz, 1H), 2.50 (dd, *J* = 4.2, 9.7 Hz, 1H), 2.66–2.79 (m, 1H), 3.47–3.57 (m, 1H), 3.79 (d, *J* = 8.9 Hz, 1H), 4.85–4.91 (m, 2H), 5.54–5.66 (m, 1H), 7.23–7.30 (m, 1H), 7.36–7.41 (m, 2H), 7.88–7.92 (m, 2H); ^{13}C NMR ($CDCl_3$): δ 24.36, 24.84, 27.71, 27.99, 29.42, 35.82, 50.49, 52.36, 57.10, 59.85, 115.03, 127.56, 128.73, 128.95, 137.81, 141.22; IR (KBr disc): 1126, 1304, 1425, 1477, 1560, 1638, 1653, 2909, 3277 cm^{-1}. Anal. Calcd. for $C_{20}H_{31}NO_2S_3$: C, 58.07; H, 7.55; N, 3.39. Found: C, 57.90; H, 7.57; N, 3.28.

***rac*-16 *rac*-1-(2-Phenyl-1,3-dithian-2-yl)-2-(*tert*-butylsulfonamido)-dodecane:**

colourless liquid; R_f = 0.40 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.88 (t, *J* = 6.9 Hz, 3H), 0.97–1.39 (m, 29H), 1.86–2.01 (m, 2H), 2.27 (dd, J = 7.7, 15.9 Hz, 1H), 2.48 (dd, *J* = 3.7, 14.7 Hz, 1H), 2.65–2.81 (m, 4H), 3.44–3.53 (m, 1H), 3.64 (d, *J* = 9.0 Hz, 1H), 7.23–7.30 (m, 1H), 7.36–7.41 (m, 2H), 7.90 (d, *J* = 3.5, 2H); ^{13}C NMR ($CDCl_3$): δ 14.28, 22.84, 24.40, 24.91, 24.98, 27.73, 28.04, 29.45, 29.56, 29.69, 29.71, 32.06, 36.68, 50.50, 52.67, 57.14, 59.88, 127.54, 128.77, 128.92, 141.31; IR

(KBr disc): 1018, 1034, 1078, 1126, 1279, 1304, 1364, 1443, 1481, 2853, 2924, 3275 cm^{-1}. HRMS-FAB$^+$ (m/z) calcd for $C_{26}H_{45}NO_2S_3$ 499.2612, found 499.2617.

***rac*-17 *rac*-1-(2-Phenyl-1,3-dithian-2-yl)-2-(*tert*-butylsulfonamido)-3-(benzyloxy) propane:**

colourless liquid; R_f = 0.20 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.51 (s, 9H), 1.86–2.02 (m, 2H), 2.48 (dd, *J* = 2.5, 14.7 Hz, 1H), 2.62–2.89 (m, 5H), 2.97 (dd, J = 2.5, 9.4 Hz, 1H), 3.33 (dd, *J* = 2.5, 9.5 Hz, 1H), 3.59–3.69 (m, 1H), 4.19 (dd, *J* = 11.5, 16.1 Hz, 1H), 4.35 (d, *J* = 9.6 Hz, 1H), 7.21–7.38 (m, 8H), 7.86 (d, *J* = 7.6, 2H); ^{13}C NMR ($CDCl_3$): δ 24.24, 24.80, 27.48, 27.90, 46.08, 52.28, 56.34, 59.08, 71.82, 72.96, 127.51, 127.72, 127.77, 128.39, 128.74, 137.95, 141.26; IR (KBr disc): 1028, 1076, 1128, 1207, 1279, 1306, 1394, 1421, 1443, 1479, 1595, 2868, 3281 cm^{-1}. HRMS-FAB$^+$ (m/z) calcd for $C_{24}H_{33}NO_3S_3$ 479.1623, found 479.1637.

(*R*)-18 (*R*)-1-(2-Phenyl-1,3-dithian-2-yl)-2-(*tert*-butylsulfonamido)-3-(trityloxy) propane:

white solid; mp 62–63 °C; R_f = 0.30 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.28 (s, 9H), 1.80–1.95 (m, 2H), 2.49–2.71 (m, 5H), 2.73–2.82 (m, 1H), 2.92 (dd, *J* = 4.4, 9.6 Hz, 1H), 3.18 (dd, *J* = 3.7, 9.6 Hz, 1H), 3.33 (dd, *J* = 2.5, 9.5 Hz, 1H), 3.66–3.74 (m, 1H), 4.15 (d, *J* = 8.7 Hz, 1H), 7.16–7.34 (m, 18H), 7.73 (d, *J* = 7.4, 2H); ^{13}C NMR ($CDCl_3$): δ 24.37, 24.72, 27.64, 27.94, 47.69, 52.83, 56.60, 60.02, 65.90, 87.05, 127.21, 127.39, 127.92, 128.38, 128.83, 129.01, 141.46, 143.57; IR (KBr disc): 1034, 1071, 1129, 1222, 1304, 1420, 1448, 1490, 1596, 2870, 2909, 3057, 3265 cm^{-1}. Anal. Calcd. for $C_{36}H_{41}NO_3S_3$: C, 68.43; H, 6.54; N, 2.22. Found: C, 68.49; H, 6.68; N, 2.15. $[\alpha]^{20}_D$ = −3.02 (c 3.00 in THF)

***rac*-19 *rac*-1-(1,3-Dithian-2-yl)-2-(*tert*-butylsulfonamido)-2-phenylethane and *rac*-1-(1,3-Dithian-2-yl)-1-phenyl-2-(*tert*-butylsulfonamido)-ethane:**

(mixture of regio-isomers, major:minor = ~3:1) Regio-isomers are inseparable via any means. white solid; mp 110–125 °C; R_f = 0.15 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): major δ 1.29 (s, 9H), 1.81–1.98 (m, 2H, overlapped by another isomer's peak), 2.54–2.84 (m, 4H, overlapped by another isomer's peak), 3.30–3.59 (m, 3H), 4.01–4.14 (m, 1H), 6.93 (d, *J* = 7.8 Hz, 2H), 7.16–7.38 (m, 6H, overlapped by another isomer's peak), 7.71 (d, *J* = 8.0 Hz, 2H); minor δ 1.15 (s, 9H), 1.81–1.98 (m, 2H, overlapped by another isomer's peak), 2.54–2.84 (m, 6H, overlapped by another isomer's peak), 4.41 (d, *J* = 6.9 Hz,1H), 4.51 (q, *J* = 6.8 Hz,1H), 7.10 (d, *J* =

7.8 Hz, 2H), 7.16–7.38 (m, 6H, overlapped by another isomer's peak), 7.81 (d, *J* = 8.5 Hz, 2H); ^{13}C NMR ($CDCl_3$): major δ 24.20, 24.68, 27.42, 27.59, 45.01, 58.98, 59.73, 62.57, 127.22, 127.84, 128.25, 128.50, 130.24, 135.46, 138.41; minor δ 23.97, 24.61, 27.45, 27.77, 52.06, 56.02, 56.69, 59.62, 126.97, 127.41, 127.93, 128.34, 130.18, 140.64, 142.51; IR (KBr disc): 1020, 1078, 1128, 1279, 1310, 1420, 1443, 1481, 2343, 2361, 2905, 3277 cm^{-1}. Anal. Calcd. for $C_{22}H_{29}NO_3S_3$: C, 60.65; H, 6.71; N, 3.22. Found: C, 60.65; H, 6.86; N, 3.19.

***rac*-21 *rac*-*N*-[2-(1,3-Dithian-2-yl)-cyclohexyl]-*tert*-butylsulfonamide:**
white solid; mp 156–157 °C; R_f = 0.15 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 1.12–1.37 (m, 3H), 1.39–1.51 (m, 10H), 1.55–1.64 (m, 1H), 1.67–1.75 (m, 2H), 1.70–1.90 (m, 1H), 1.95–2.05 (m, 1H), 2.06–2.15 (m, 1H), 2.26–2.36 (m, 1H), 2.77–2.93 (m, 3H), 2.97–3.01 (m, 1H), 3.48 (dq, *J* = 4.2, 10.0 Hz, 1H), 3.63 (d, *J* = 10.1 Hz, 1H), 4.61 (d, *J* = 2.6 Hz, 1H); ^{13}C NMR ($CDCl_3$): δ 24.20, 24.68, 27.42, 27.59, 45.01, 58.98, 59.73, 62.57, 127.22, 127.84, 128.25, 128.50, 130.24, 135.46, 138.41; IR (KBr disc): 1020, 1057, 1072, 1115, 1130, 1238, 1281, 1298, 1366, 1421, 1458, 2855, 2899, 2934, 3245 cm^{-1}. Anal. Calcd. for $C_{14}H_{27}NO_2S_3$: C, 49.81; H, 8.06; N, 4.15. Found: C, 49.64; H, 7.97; N, 4.10.

(*S*)-24
(*S*)-1-[2-(Trimethylsilyl)ethylsulfonyl]-2-benzyl-4-[4,5]-(1,3-dithian-2-yl)-5-pyrrolidinone:
white solid; mp 131–132 °C; R_f = 0.20 (hexane/EtOAc = 10:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.08 (s, 9H), 1.02 (dt, *J* = 4.0, 13.8 Hz, 1H), 1.11 (dt, *J* = 4.1, 13.8 Hz, 1H), 1.82–1.94 (m, 1H), 2.04–2.14 (m, 2H), 2.17–2.25 (m, 1H), 2.54–2.67 (m, 2H), 2.97 (dd, *J* = 11.5, 12.8 Hz, 1H), 3.39 (dd, *J* = 4.0, 14.2 Hz, 1H), 3.56 (dd, *J* = 4.0, 14.4 Hz, 1H), 3.61–3.73 (m, 2H), 3.83 (dt, *J* = 2.5, 13.4 Hz, 1H), 4.27–4.36 (m, 1H), 7.22–7.28 (m, 3H), 7.32 (d, *J* = 7.4, 2H); ^{13}C NMR ($CDCl_3$): δ −0.19, 10.09, 24.08, 27.33, 27.60, 38.49, 42.15, 46.01, 50.16, 57.89, 127.13, 128.88, 129.67, 136.34, 172.39; IR (KBr disc): 1084, 1123, 1161, 1194, 1249, 1362, 1420, 1719, 2947 cm^{-1}. Anal. Calcd. for $C_{19}H_{29}NO_3S_3Si$: C, 51.43; H, 6.59; N, 3.16. Found: C, 51.22; H, 6.50; N, 2.93. $[\alpha]^{27}_D$ = 3.09 (c 4.00 in THF)

(*S*)-25
(*S*)-1-(2-Phenyl-1,3-dithian-2-yl)-2-[2-(trimethylsilyl)ethylsulfonyl]-3-phenylpropane:

white solid; mp 76–77 °C; R_f = 0.15 (hexane/EtOAc = 10:1, v/v); ^{1}H NMR ($CDCl_3$): δ −0.04 (s, 9H), 0.62–0.89 (m, 2H), 1.85–2.01 (m, 2H), 2.33 (dd, J = 5.9, 14.8 Hz, 1H), 2.44–2.61 (m, 4H), 2.64–2.83 (m, 5H), 3.58–3.71 (m, 1H), 4.09 (d, *J* = 8.0 Hz, 1H), 7.05 (d, *J* = 6.9, 2H), 7.15–7.31 (m, 4H), 7.39 (t, *J* = 7.8, 2H), 7.86 (d, J = 7.3 Hz, 2H); ^{13}C NMR ($CDCl_3$): δ −1.83, 10.02, 24.81, 27.71, 27.90, 43.08, 49.08, 49.80, 53.34, 56.85, 126.92, 127.71, 128.47, 128.72, 130.00, 129.77, 137.66, 141.46; IR (KBr disc): 1032, 1069, 1140, 1175, 1250, 1277, 1312, 1420, 1443, 1483, 2343, 2361, 2907, 2951, 3026, 3057, 3258 cm^{-1}. Anal. Calcd. for $C_{24}H_{35}NO_2S_3Si$: C, 58.37; H, 7.14; N, 2.84. Found: C, 58.27; H, 7.18; N, 2.75. $[\alpha]^{27}_D$ = −1.15 (c 10.0 in THF)

***syn*-27**

***N*-({(1*S*)-benzyl-2-[(2*R*)-(*tert*-Butyl-dimethyl-silyloxy)-3-benzyloxy-propyl]-[1,3]dithian-2-ylmethyl})-*tert*-butylsulfonamide:**

colourless liquid; R_f = 0.50 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.10 (s, 3H), 0.14 (s, 3H), 0.91 (s, 9H), 1.38 (s, 9H), 1.75 (m, 2H), 1.96–2.05 (m, 1H), 2.19–2.45 (m, 4H), 2.50–2.72 (m, 4H), 3.28–3.39 (m, 2H), 3.46 (dd, *J* = 4.5, 9.5 Hz, 1H), 4.08 (m, 1H), 4.33 (m, 1H), 4.49 (dd, *J* = 12.0, 13.3 Hz, 2H), 5.00 (d, *J* = 6.4 Hz, 1H), 7.18–7.37 (m, 10H); ^{13}C NMR ($CDCl_3$): δ −3.99, −3.36, 18.36, 24.33, 25.00, 25.45, 25.97, 26.37, 40.24, 42.17, 44.63, 51.28, 54.31, 59.60, 69.56, 73.17, 74.57, 126.58, 127.64, 127.80, 128.34, 128.52, 129.85, 138.07, 138.51; IR (KBr disc): 1028, 1092, 1126, 1254, 1306, 1364, 1458, 2343, 2361, 2857, 2905, 2930, 3265 cm^{-1}. Anal. Calcd. for $C_{33}H_{53}NO_4S_3Si$: C, 60.78; H, 8.19; N, 2.15. Found: C, 60.55; H, 8.13; N, 2.15. $[\alpha]^{23}_D$ = −0.387 (c 10.5 in THF)

***anti*-27**

***N*-({(1*S*)-benzyl-2-[(2*S*)-(*tert*-Butyl-dimethyl-silyloxy)-3-benzyloxy-propyl]-[1,3]dithian-2-ylmethyl})-*tert*-butylsulfonamide:**

colourless liquid; R_f = 0.50 (hexane/EtOAc = 5:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.01 (s, 3H), 0.08 (s, 3H), 0.84 (s, 9H), 1.32 (s, 9H), 1.85 (m, 2H), 2.04–2.16 (m, 2H), 2.24 (dd, *J* = 5.3, 14.8 Hz, 1H), 2.39–2.49 (m, 1H), 2.58 (dd, *J* = 4.4, 15.2 Hz, 1H), 2.63–2.82 (m, 3H), 3.01 (dd, *J* = 6.9, 13.5 Hz, 1H), 3.09 (dd, *J* = 5.5, 13.5 Hz, 1H), 3.36 (dd, *J* = 6.0, 9.6 Hz, 1H), 3.46 (dd, *J* = 4.3, 9.8 Hz, 1H), 4.05 (m, 1H), 4.14 (m, 1H), 4.44–4.56 (m, 3H), 7.18–7.36 (m, 10H); ^{13}C NMR ($CDCl_3$): δ −4.08, −4.02, 18.06, 24.20, 24.69, 26.02, 26.12, 26.52, 43.90, 43.97, 45.36, 51.38, 55.01, 60.09, 68.84, 73.15, 74.42, 126.65, 127.70, 127.87, 128.38, 128.50, 130.10, 137.99, 138.14;

IR (KBr disc): 1005, 1088, 1126, 1207, 1252, 1304, 1364, 1456, 2855, 2905, 2928, 3028 cm^{-1}. Anal. Calcd. for $C_{33}H_{53}NO_4S_3Si$: C, 60.78; H, 8.19; N, 2.15. Found: C, 60.57; H, 8.16; N, 2.14. $[\alpha]^{23}_D = -0.543$ (c 10.5 in THF)

***syn*-28**

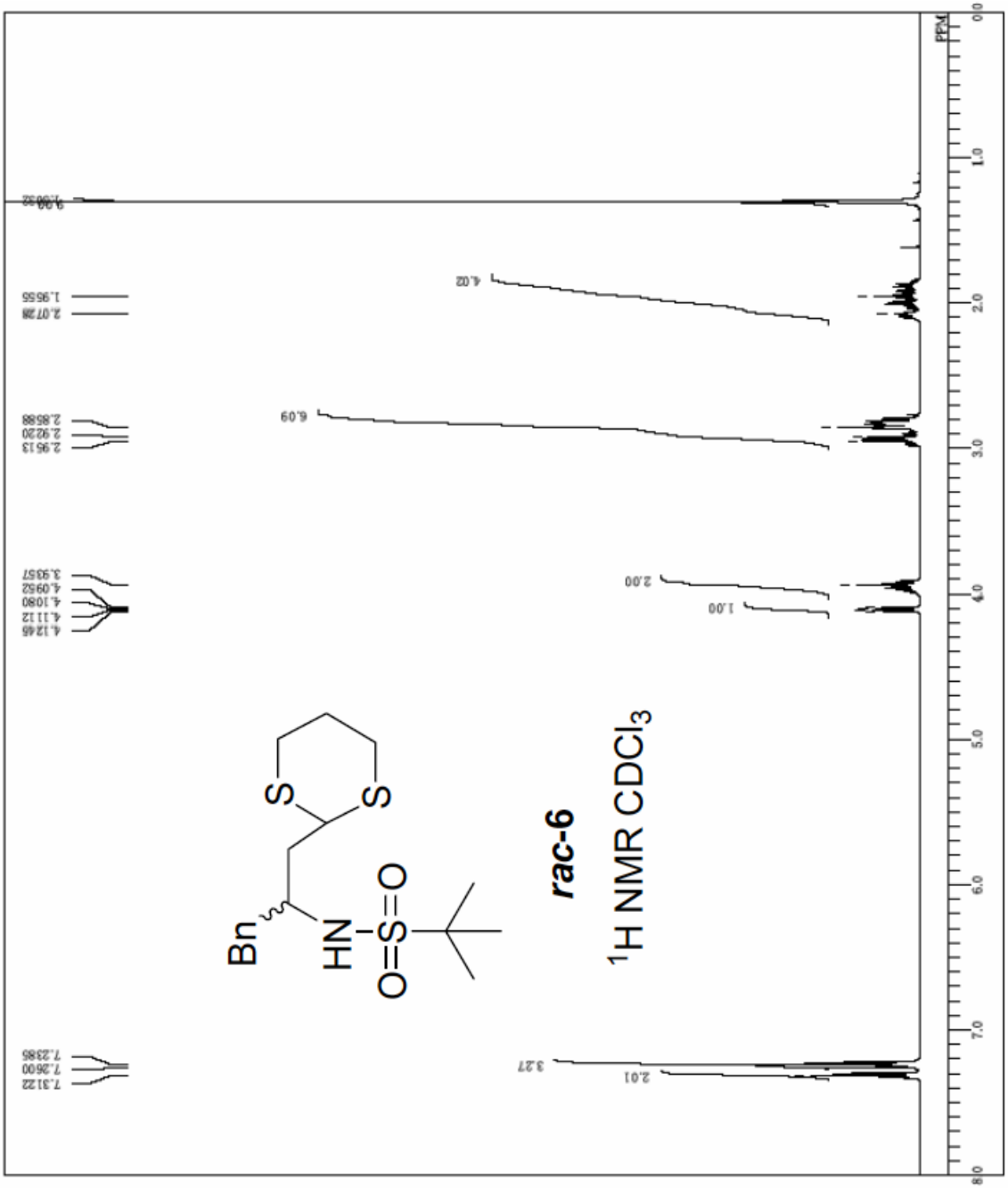
***N*-({(1*R*)-trityloxymethyl-2-[(2*R*)-(*tert*-Butyl-dimethyl-silyloxy)-3-benzyloxy-propyl]-[1,3]dithian-2-ylmethyl})-*tert*-butylsulfonamide:**

white solid; mp 51–52 °C; R_f = 0.50 (hexane/EtOAc = 1:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.05 (s, 3H), 0.06 (s, 3H), 0.84 (s, 9H), 1.28 (s, 9H), 1.90 (m, 2H), 2.22–2.43 (m, 3H), 2.61–2.86 (m, 5H), 3.12 (dd, *J* = 7.0, 9.1 Hz, 1H), 3.36 (dd, *J* = 6.4, 9.4 Hz, 1H), 3.45 (dd, *J* = 4.8, 9.4 Hz, 1H), 3.50 (dd, *J* = 3.5, 9.0 Hz, 1H), 4.11 (m, 1H), 4.30 (m, 1H), 4.49 (dd, *J* = 11.9, 16.5 Hz, 2H), 4.84 (d, *J* = 6.9,1H), 7.20–7.35 (m, 14H), 7.44 (d, *J* = 7.4 Hz, 6H); ^{13}C NMR ($CDCl_3$): δ −3.93, −3.37, 18.33, 24.44, 25.12, 26.14, 26.18, 26.37, 40.71, 42.77, 51.58, 52.21, 59.63, 66.79, 69.74, 73.21, 74.73, 86.96, 127.16, 127.60, 127.77, 127.86, 128.35, 128.89, 138.29, 143.74; IR (KBr disc): 1074, 1128, 1217, 1254, 1308, 1364, 1420, 1448, 1491, 2857, 2930 cm^{-1}. Anal. Calcd. for $C_{46}H_{63}NO_5S_3Si$: C, 66.22; H, 7.61; N, 1.68. Found: C, 65.96; H, 7.69; N, 1.69. $[\alpha]^{23}_D$ = 0.400 (c 3.50 in THF)

***anti*-28**

***N*-({(1*R*)-trityloxymethyl-2-[(2*S*)-(*tert*-Butyl-dimethyl-silyloxy)-3-benzyloxy-propyl]-[1,3]dithian-2-ylmethyl})-*tert*-butylsulfonamide:**

white solid; mp 50–51 °C; R_f = 0.50 (hexane/EtOAc = 1:1, v/v); ^{1}H NMR ($CDCl_3$): δ 0.04 (s, 3H), 0.10 (s, 3H), 0.86 (s, 9H), 1.34 (s, 9H), 1.82 (m, 2H), 1.96 (dd, *J* = 5.3, 15.4 Hz, 1H), 2.30 (dd, *J* = 4.7, 15.4 Hz, 1H), 2.37 (dd, *J* = 4.7, 15.4 Hz, 1H), 2.52 (dd, *J* = 7.1, 15.4 Hz, 1H), 2.64 (m, 2H), 2.78 (m, 2H), 3.28–3.50 (m, 4H), 3.98 (m, 1H), 4.20 (m, 1H), 4.52 (s, 2H), 4.60 (d, *J* = 5.4,1H), 7.19–7.35 (m, 14H), 7.43 (d, *J* = 7.4 Hz, 6H); ^{13}C NMR ($CDCl_3$): δ −3.98, −3.86, 18.12, 24.38, 24.59, 26.13, 26.21, 26.46, 43.45, 45.42, 51.60, 53.13, 59.90, 66.51, 69.07, 73.15, 74.86, 86.90, 127.19, 127.58, 127.76, 127.91, 128.34, 128.90, 138.29, 143.59; IR (KBr disc): 1092, 1128, 1184, 1215, 1252, 1279, 1304, 1394, 1423, 1448, 1645, 2855, 2903, 2928, 3030, 3059 cm^{-1}. Anal. Calcd. for $C_{46}H_{63}NO_5S_3Si$: C, 66.22; H, 7.61; N, 1.68. Found: C, 66.11; H, 7.72; N, 1.68. $[\alpha]^{23}_D$ = 1.05 (c 5.00 in THF)


rac-6
^{1}H NMR CDCl$_3$
Bn
HN
O=S=O
S
S
7.3122
7.2600
7.2386
4.1246
4.1112
4.1080
4.0952
3.9357
2.8588
2.9220
2.9513
2.0728
1.9556
9.00
7.2600
3.27
2.01
6.09
4.02
2.00
1.00
PPM
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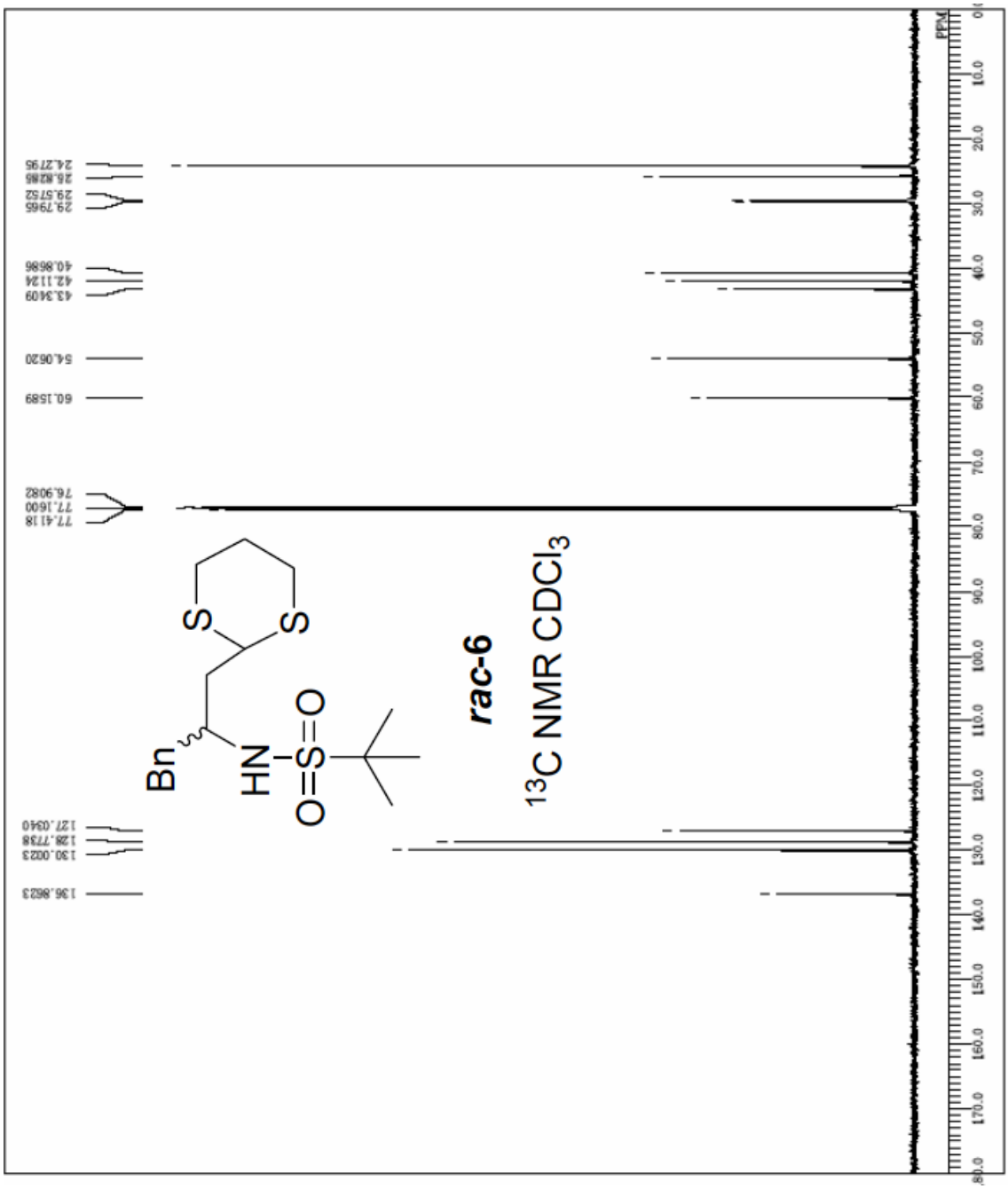
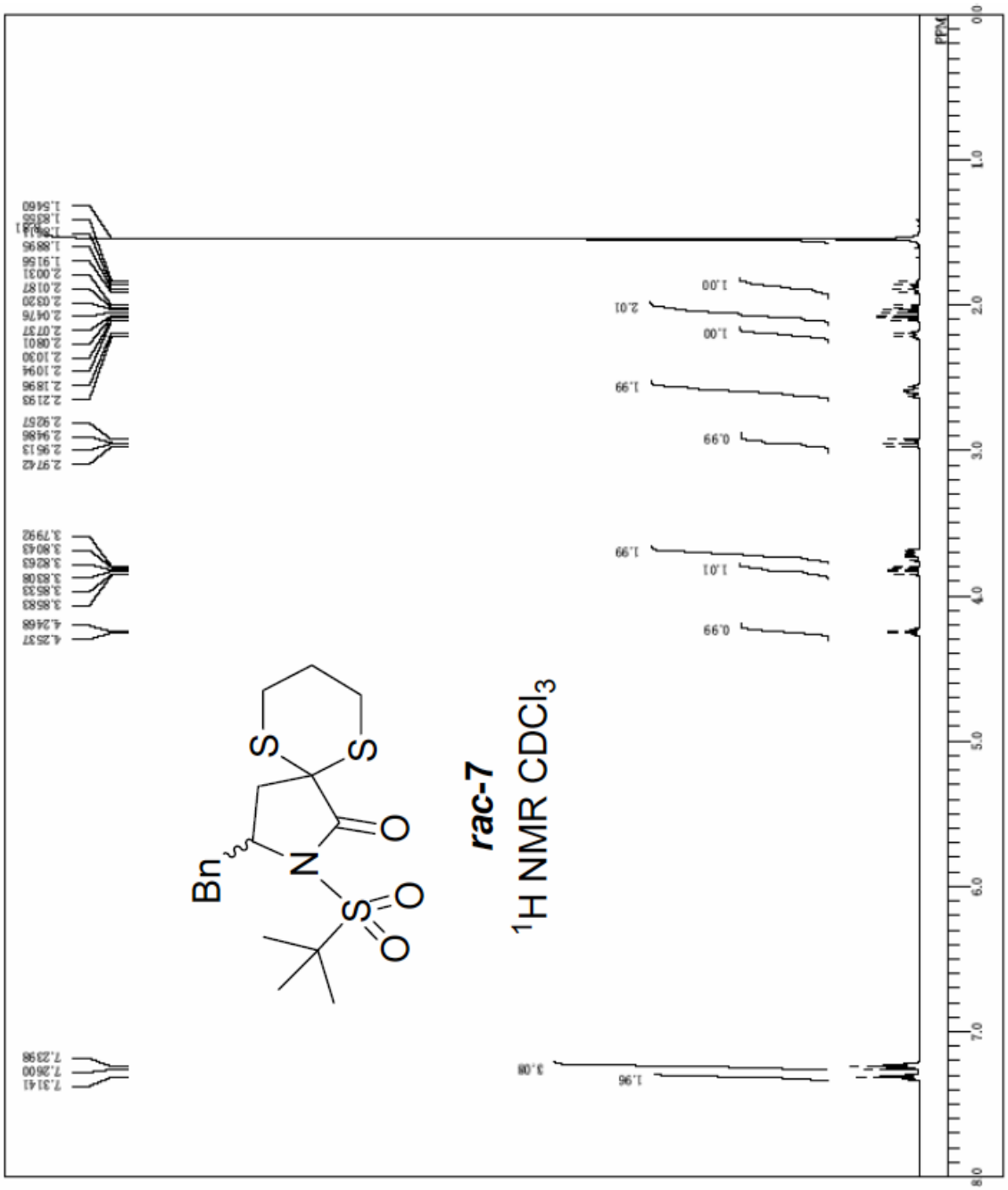
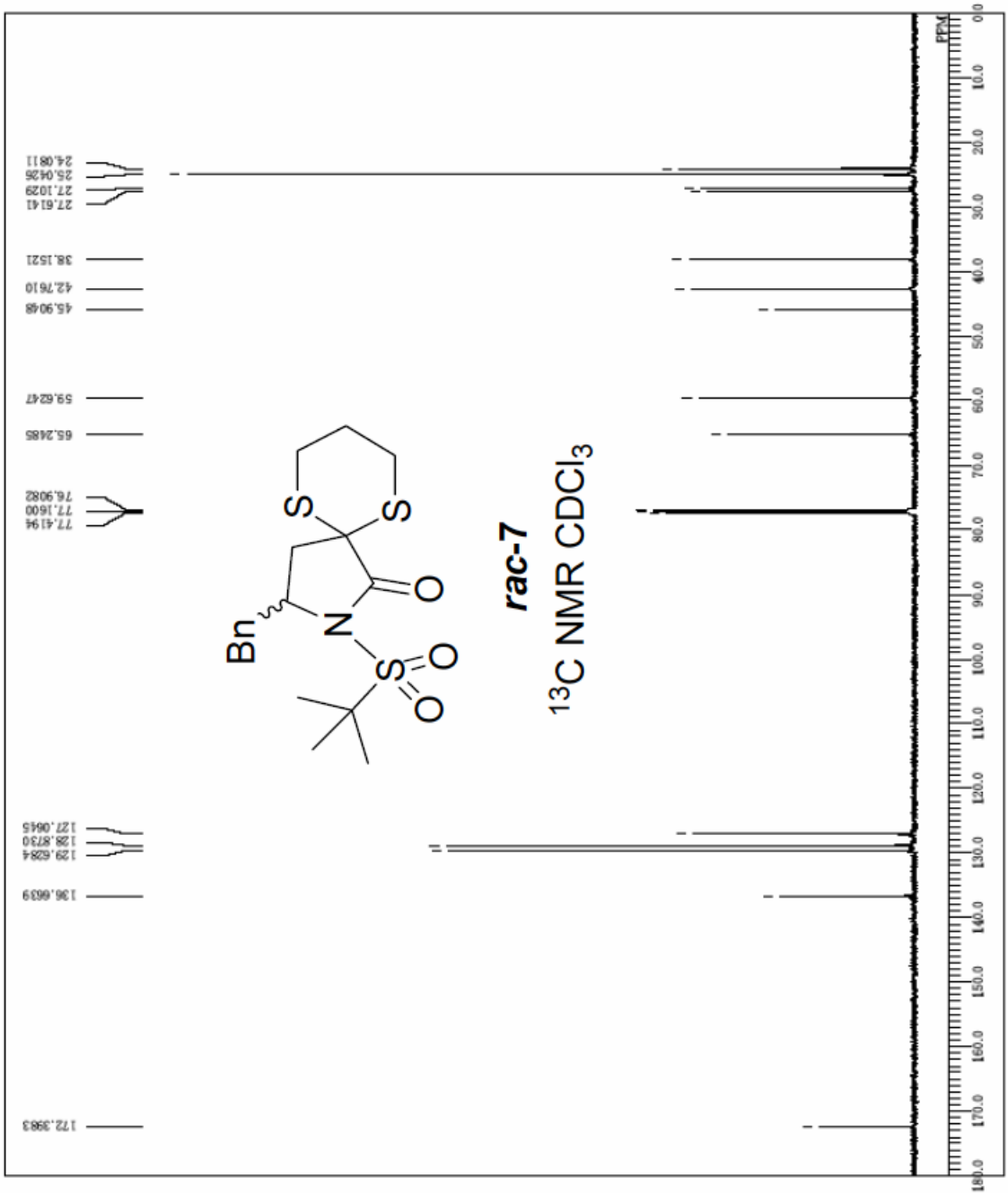
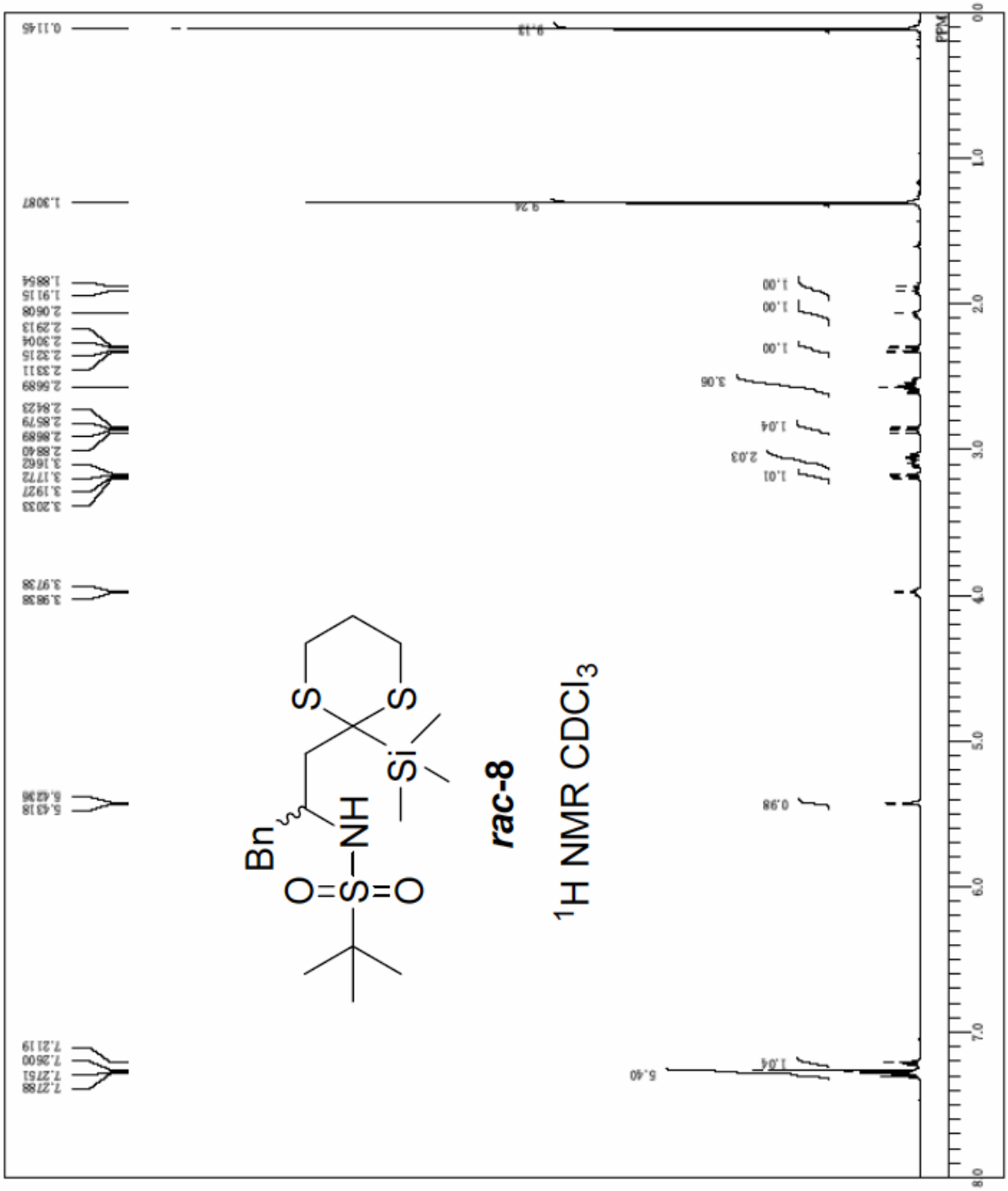
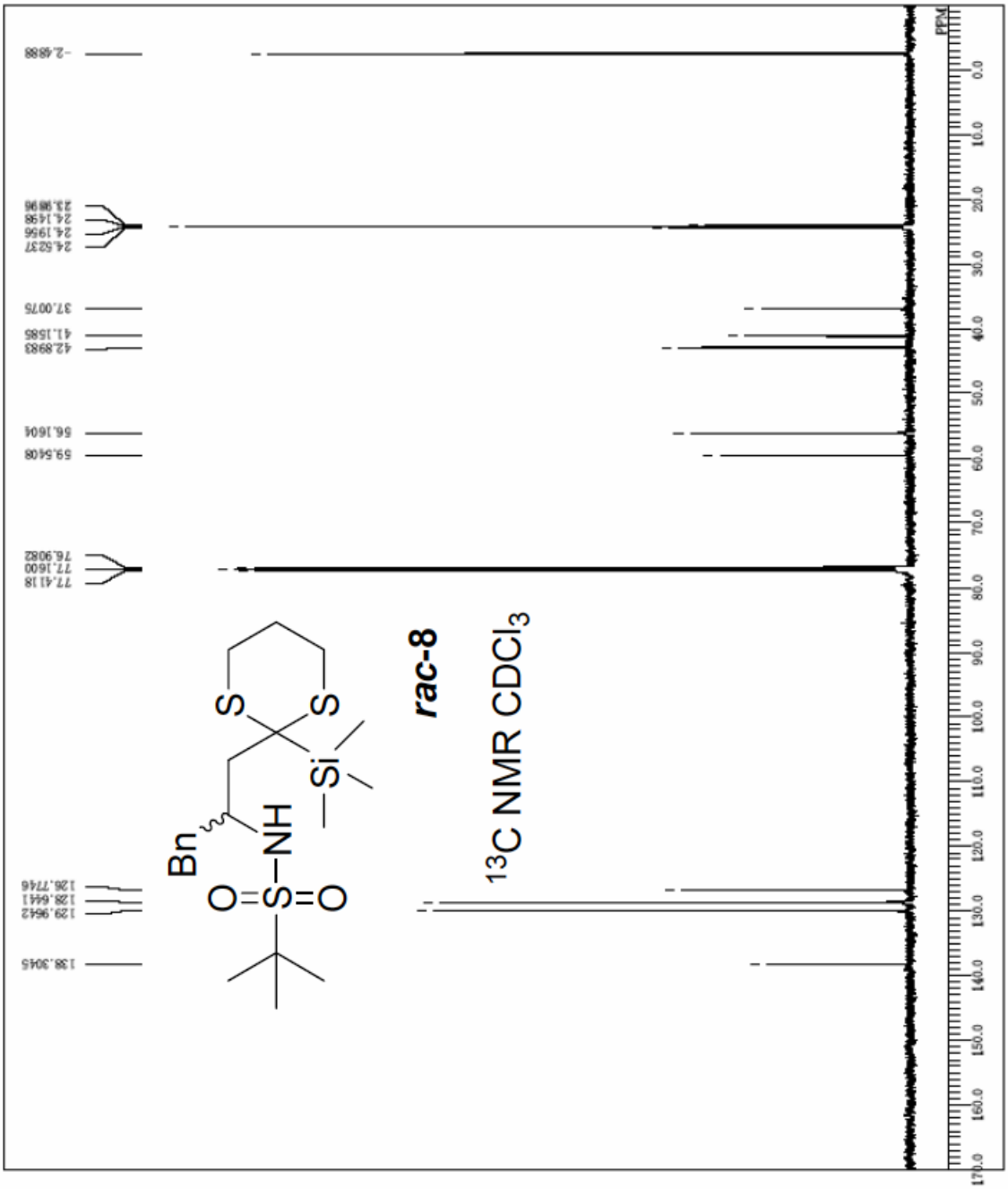
2.0
3.0
4.0
5.0
6.0
7.0
8.0

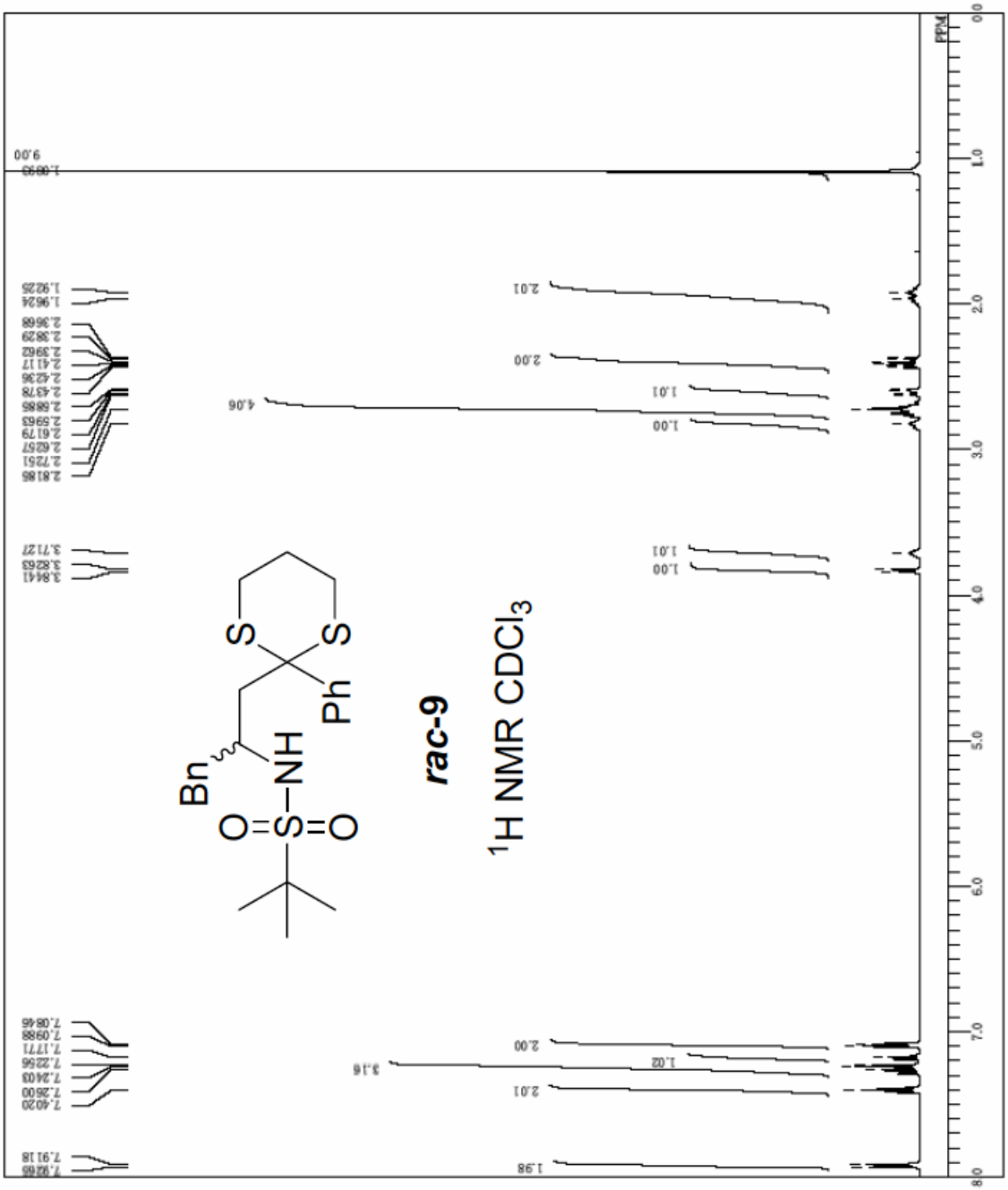

24.2795
26.8286
29.5752
29.7965
40.8686
42.1124
43.3409
54.0620
60.1589
76.9082
77.1600
77.4118
127.0340
128.7738
130.0023
136.8623
Bn
HN
S
S
O=S=O
rac-6
^{13}C NMR CDCl$_3$
PPM

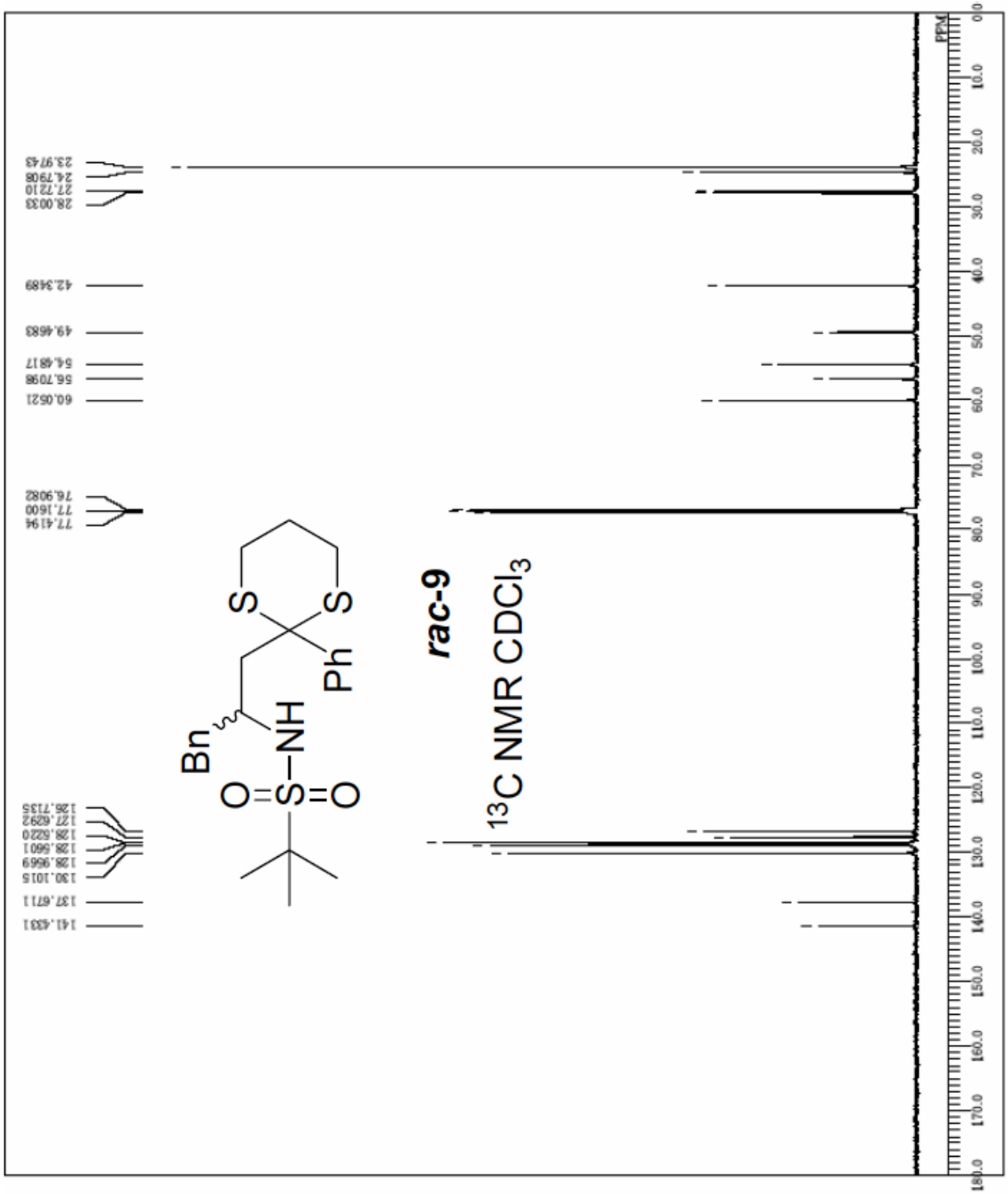

rac-7
^{1}H NMR $CDCl_3$
Bn
N
S
S
S
O
O
O
O
PPM

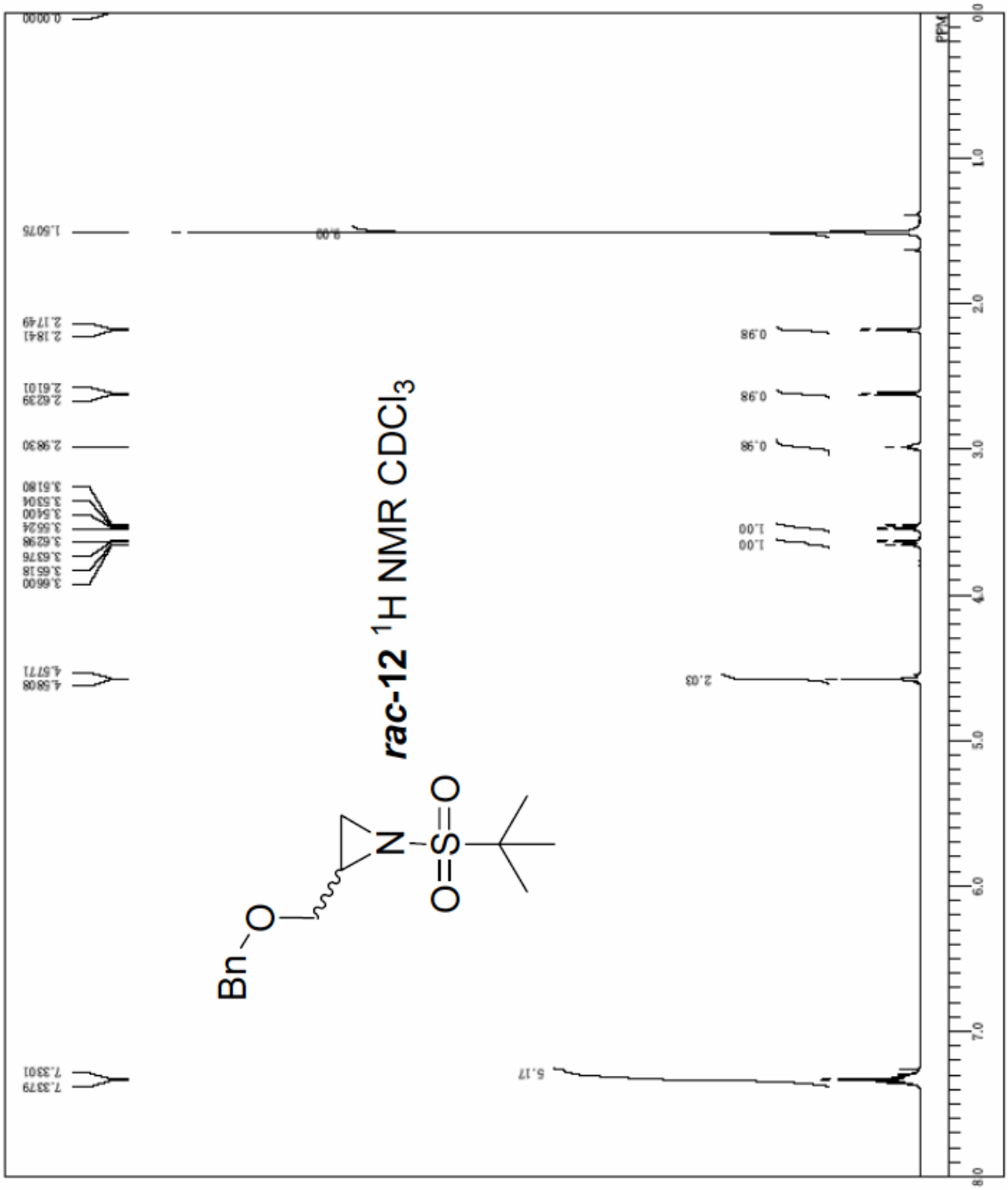

24.0811
25.0425
27.1029
27.6141
38.1521
42.7610
45.9048
59.6247
65.2485
76.9082
77.1600
77.4194
127.0645
128.8730
129.6284
136.6039
172.3983
Bn
N
S
S
S
O
O
O
O
rac-7
^{13}C NMR CDCl$_3$
PPM
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0

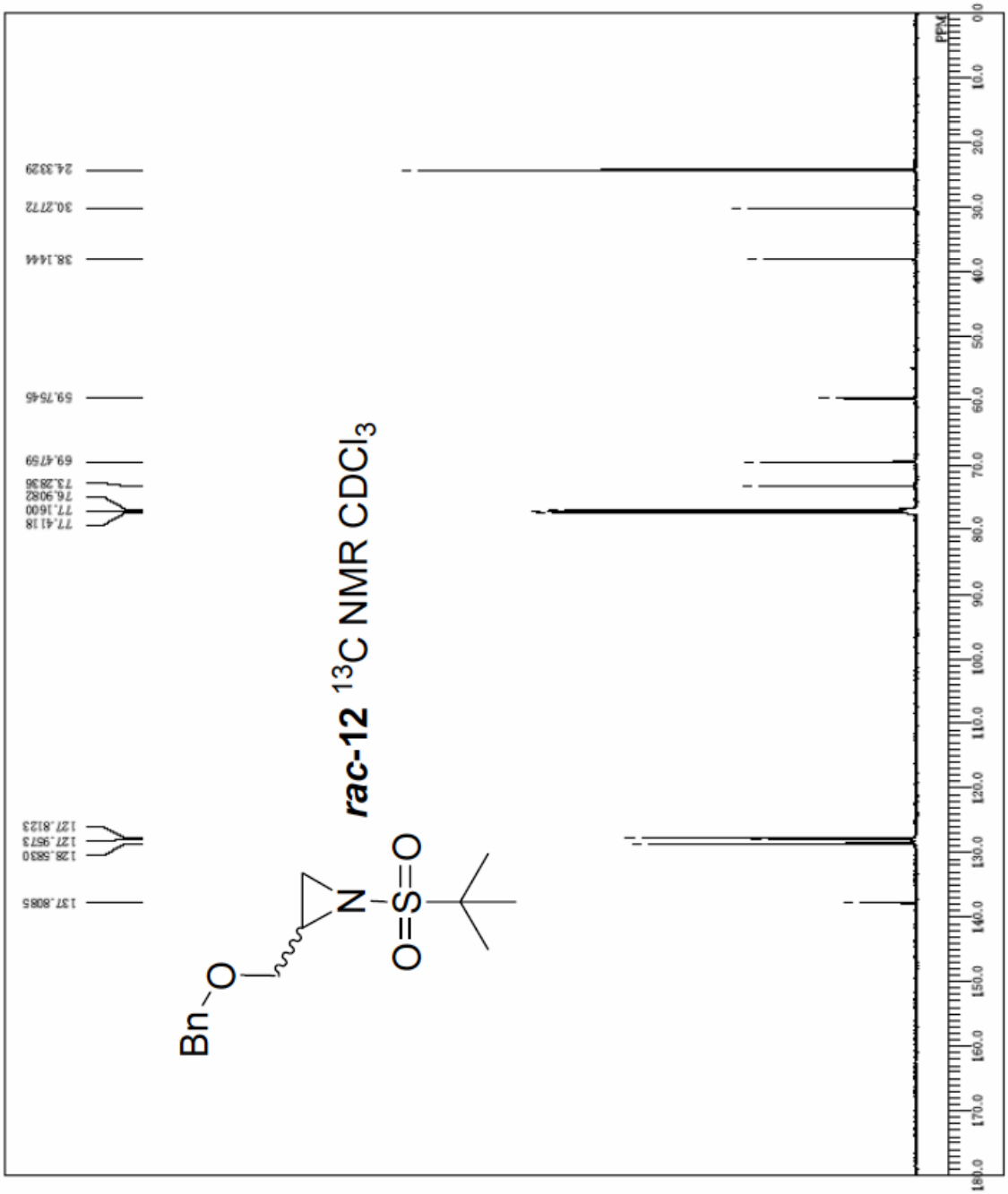

rac-8
^{1}H NMR $CDCl_3$
Bn
NH
Si
S
S
O=S=O
PPM

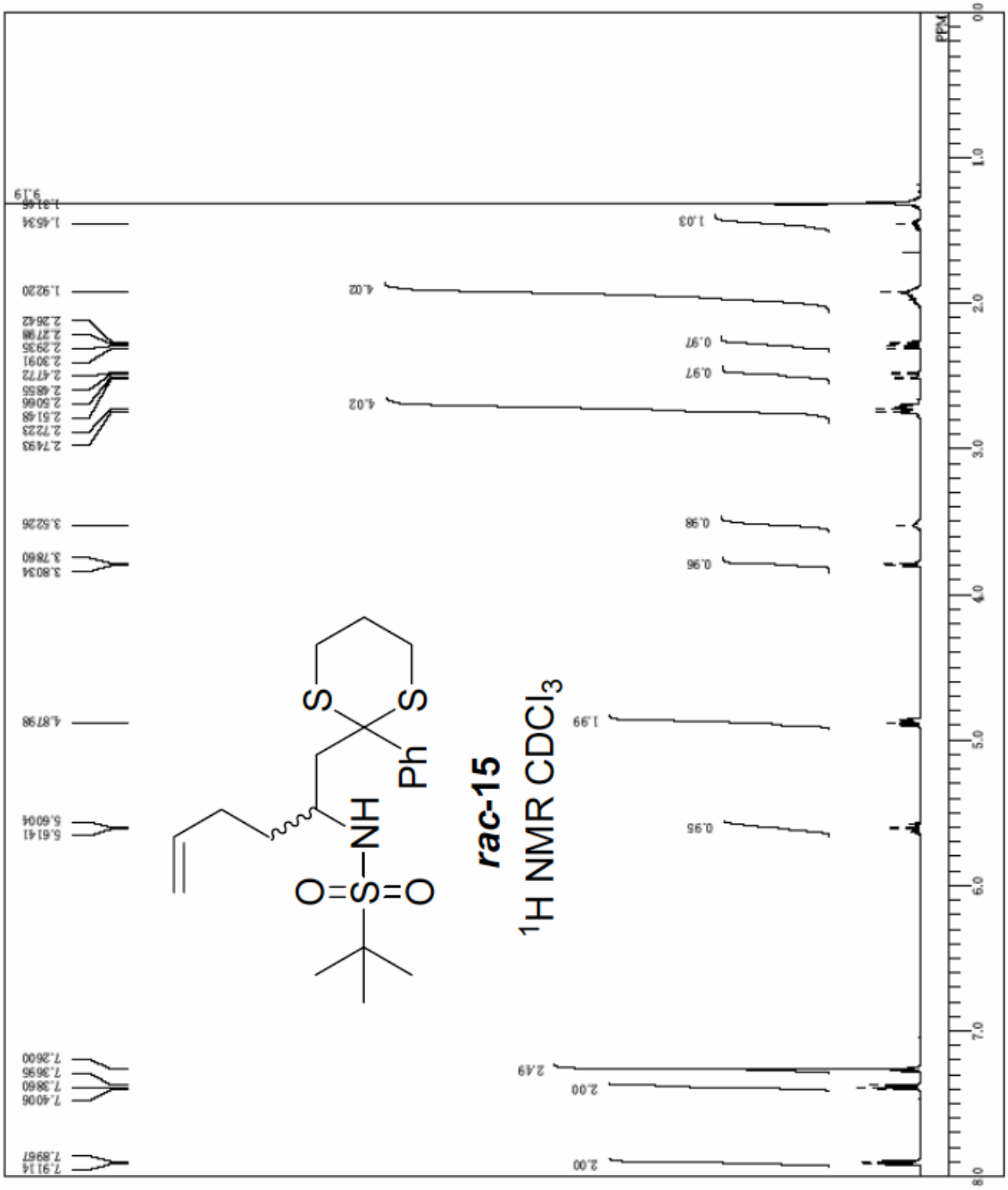

rac-8
^{13}C NMR CDCl$_3$
Bn
NH
Si
S
S
O
S
O
-2.4888
23.9896
24.1458
24.1956
24.6237
37.0075
41.1585
42.8983
56.1604
59.5408
76.9082
77.1600
77.4118
126.7746
128.6441
129.9642
138.3045
PPM
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0

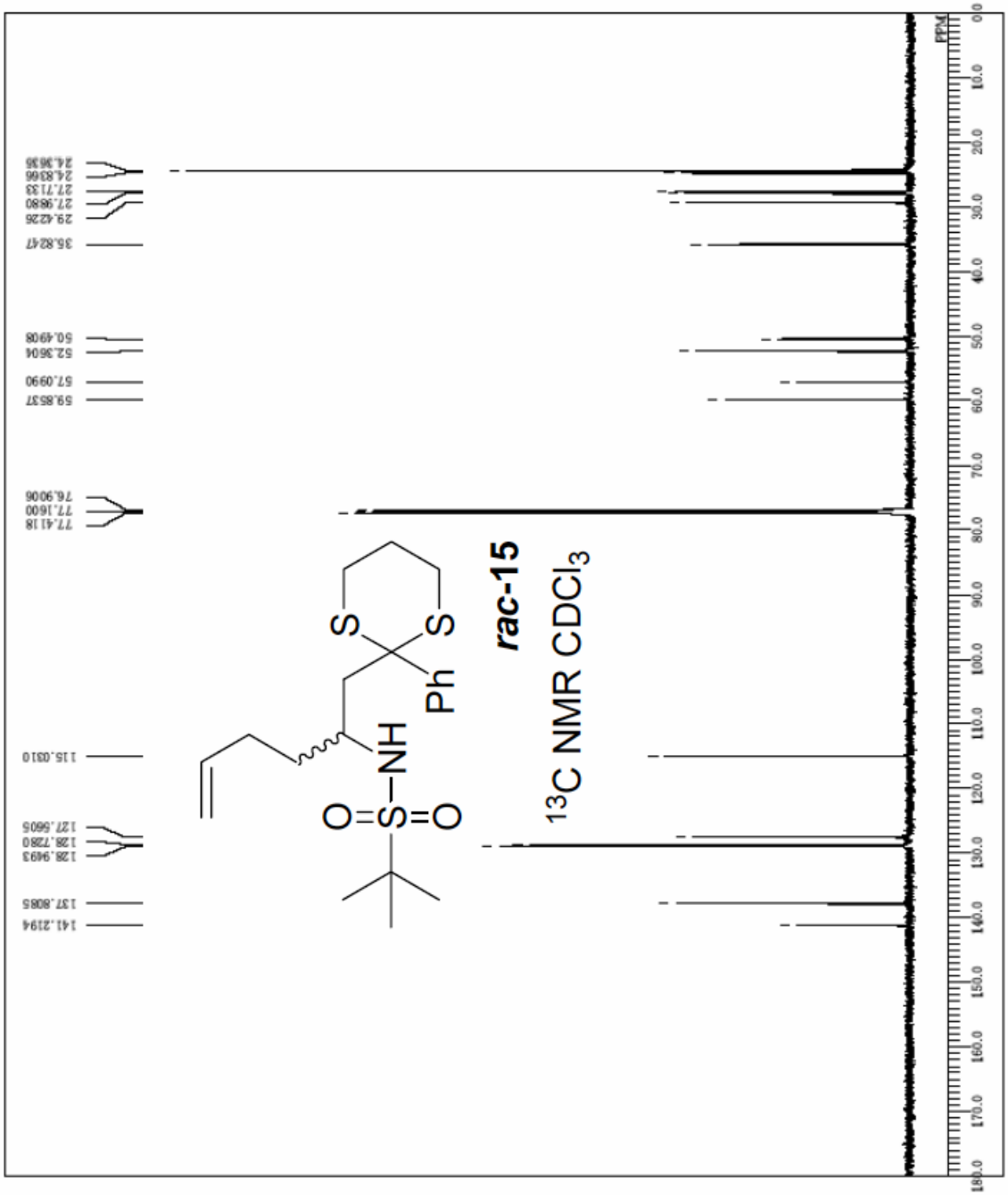

rac-9
^{1}H NMR CDCl$_3$
Bn
NH
Ph
S
S
O=S=O
PPM

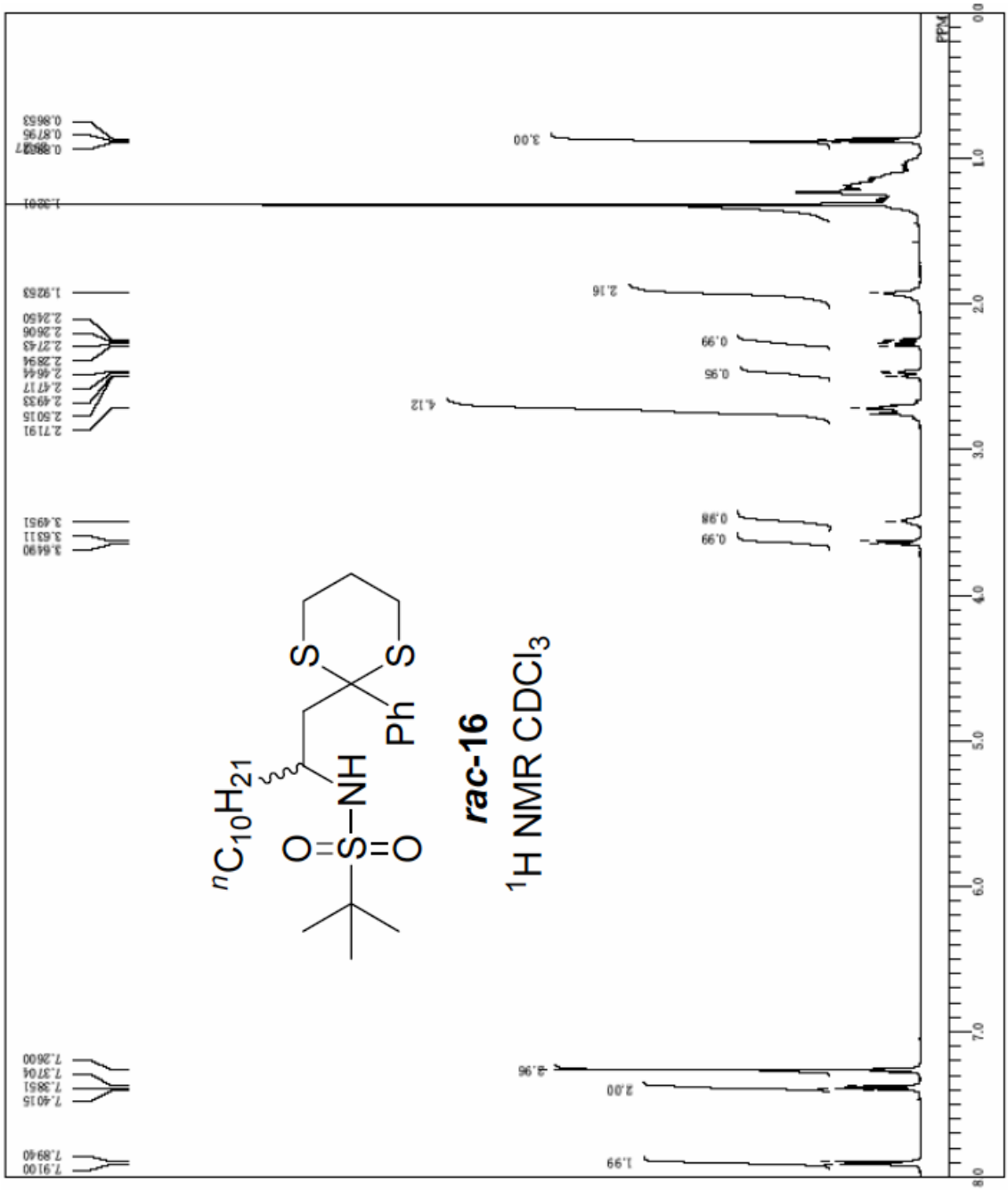

rac-9
^{13}C NMR CDCl$_3$
Bn
NH
Ph
S
S
O
S
O
23.9745
24.7908
27.7210
28.0033
42.3489
49.4683
54.4817
56.7098
60.0521
76.9082
77.1600
77.4194
126.7155
127.6292
128.6220
128.6601
128.9669
130.1015
137.6711
141.4331
PPM

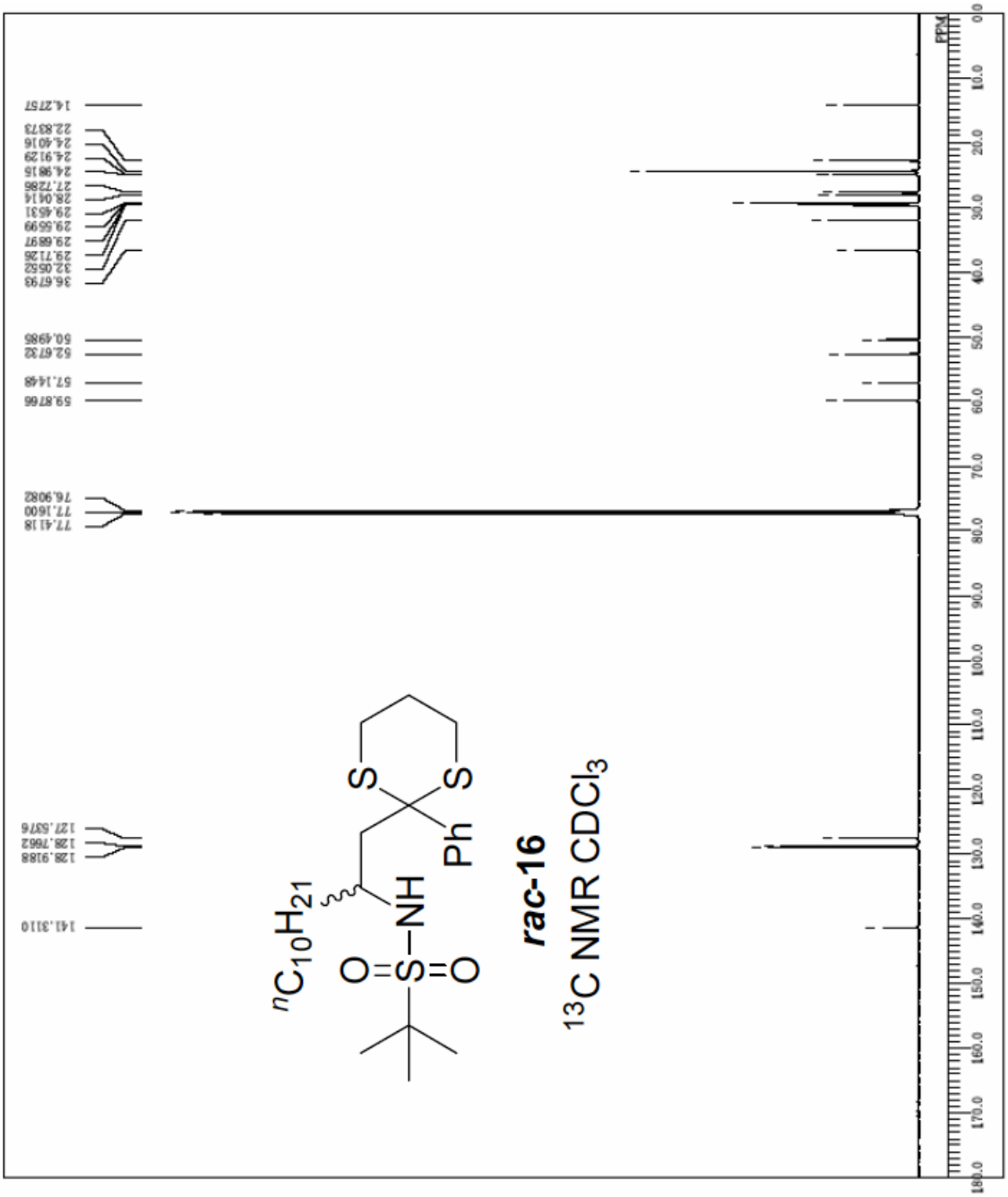

rac-12 1H NMR CDCl3
Bn
O
N
O=S=O
PPM
0.0000
1.6075
9.00
2.1749
2.1841
2.6239
2.6101
2.9830
3.5524
3.6298
3.6376
3.6518
3.6600
4.5808
4.5771
7.3301
7.3379
5.17
2.03
0.98
0.98
0.98
1.00
1.00

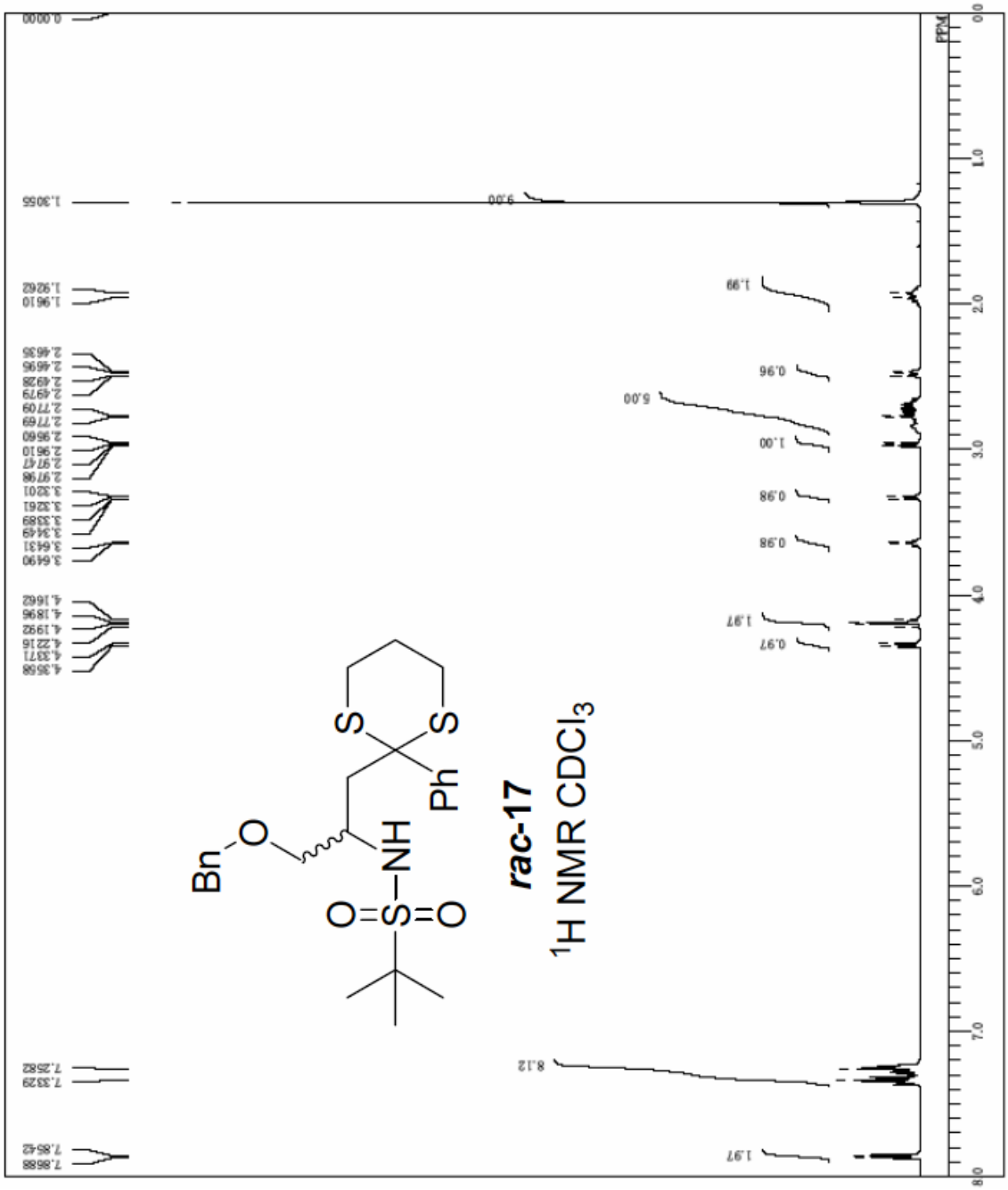

rac-12 13C NMR CDCl3
Bn
O
N
O=S=O
24.3329
30.2772
38.1444
59.7545
69.4759
73.2836
76.9082
77.1600
77.4118
127.8123
127.9573
128.5850
137.8085
PPM

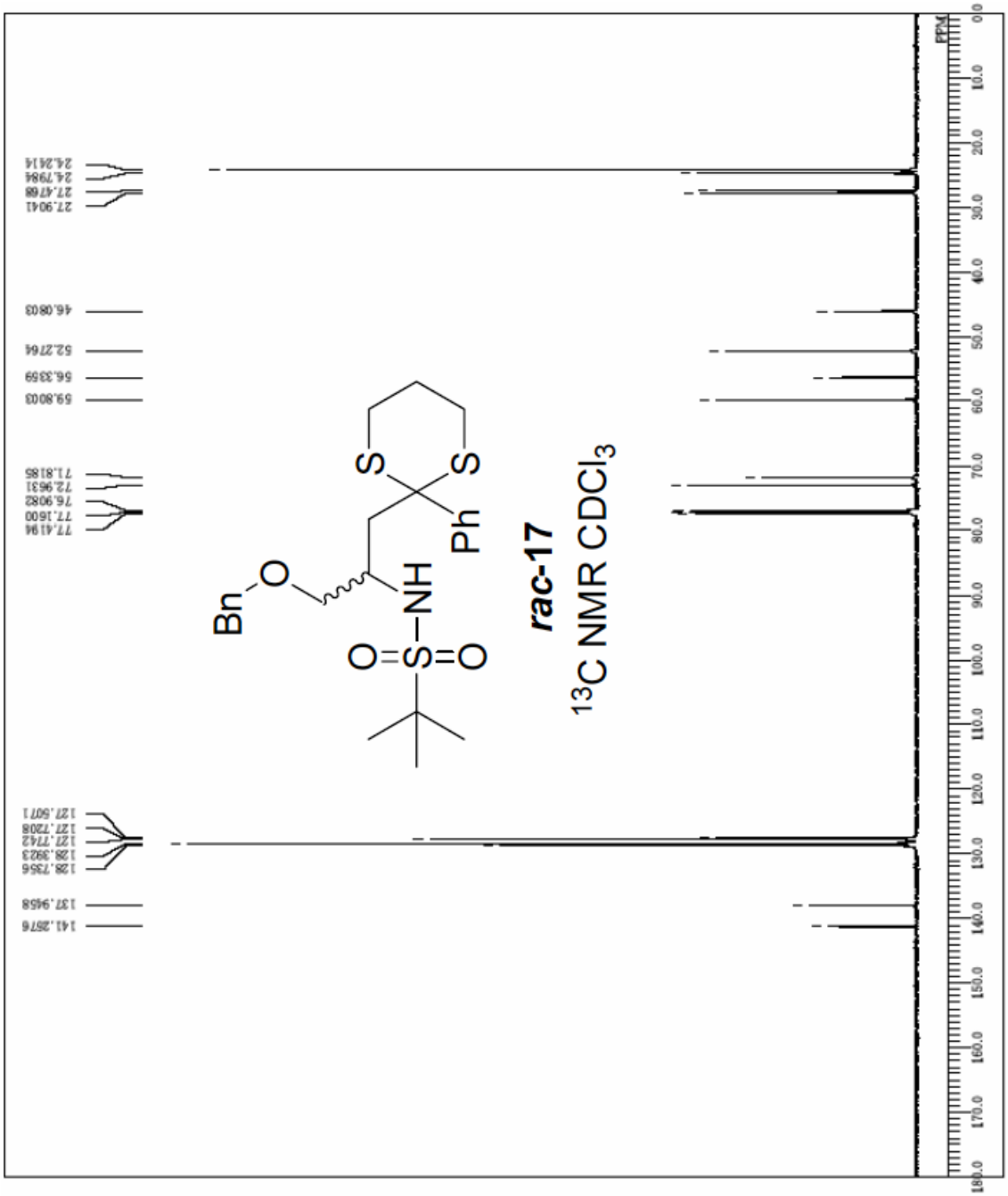

rac-15
1H NMR CDCl3
S
S
Ph
NH
O=S=O
PPM

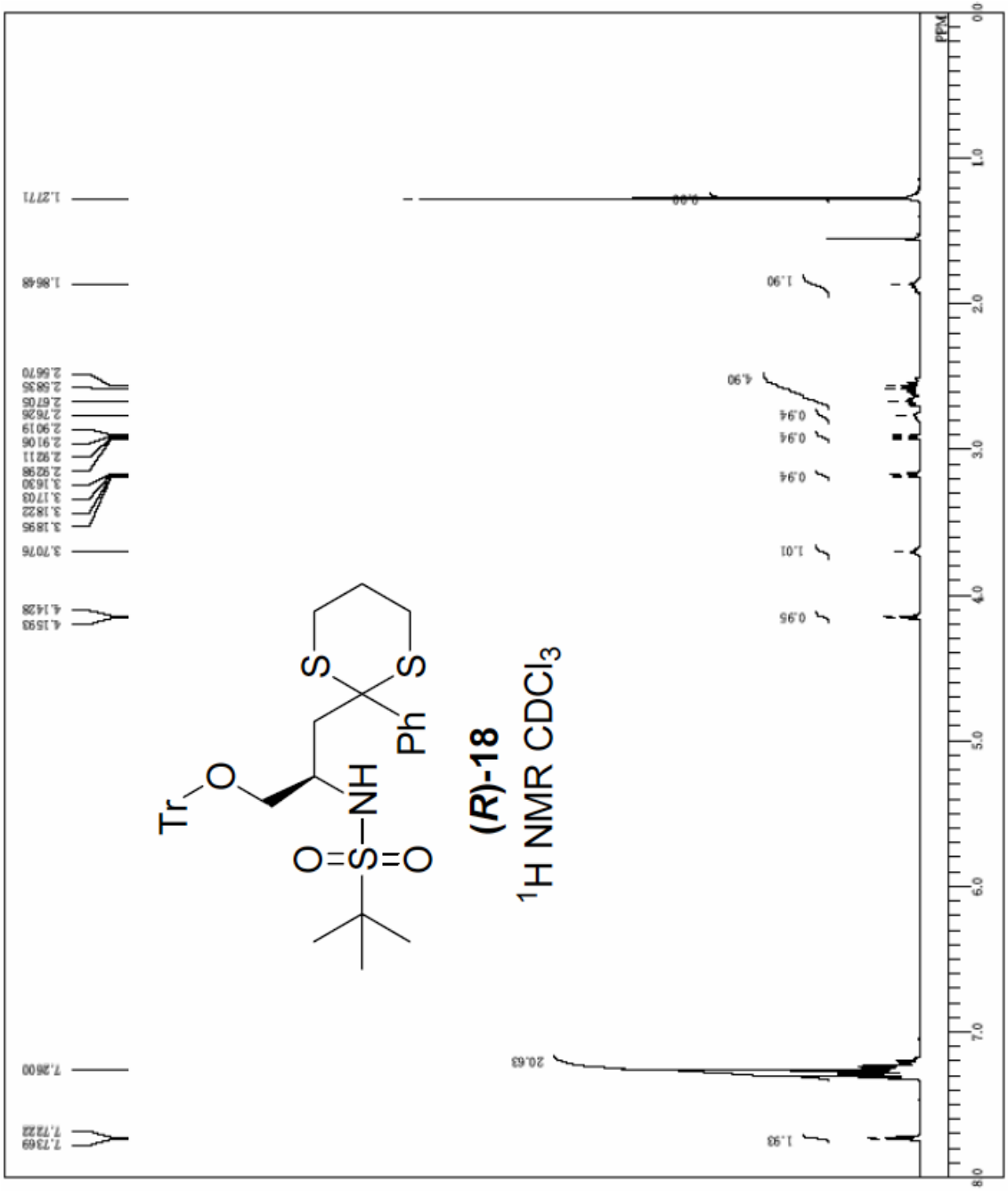

rac-15
^{13}C NMR $CDCl_3$
Ph
S
S
NH
O=S=O
24.3635
24.8366
27.7133
27.9880
29.4226
36.8247
50.4908
52.3604
57.0990
59.8537
76.9006
77.1600
77.4118
115.0310
127.6605
128.7280
128.9693
137.8085
141.2194
PPM

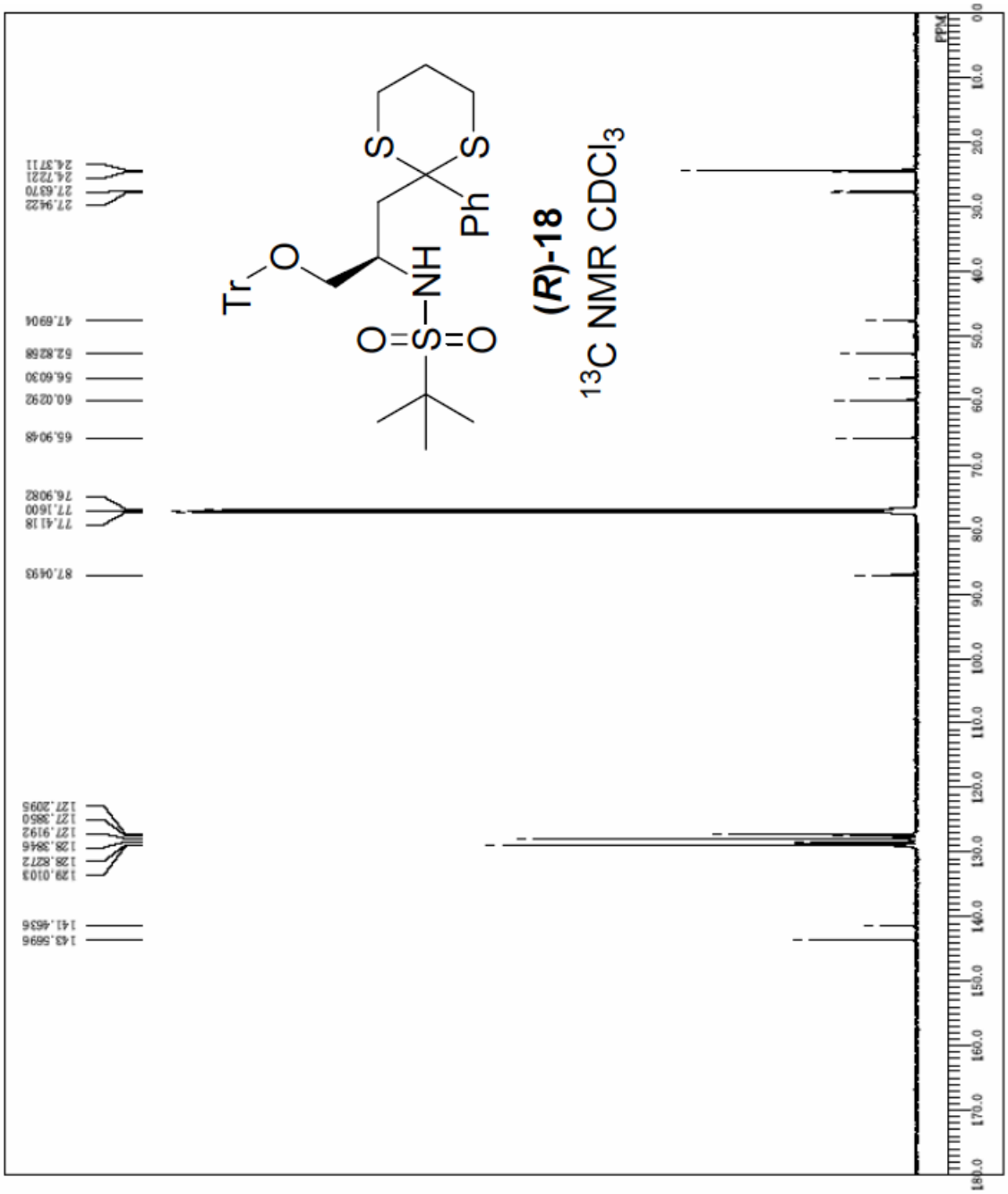

rac-16
1H NMR CDCl3
nC10H21
Ph
NH
S
O
PPM

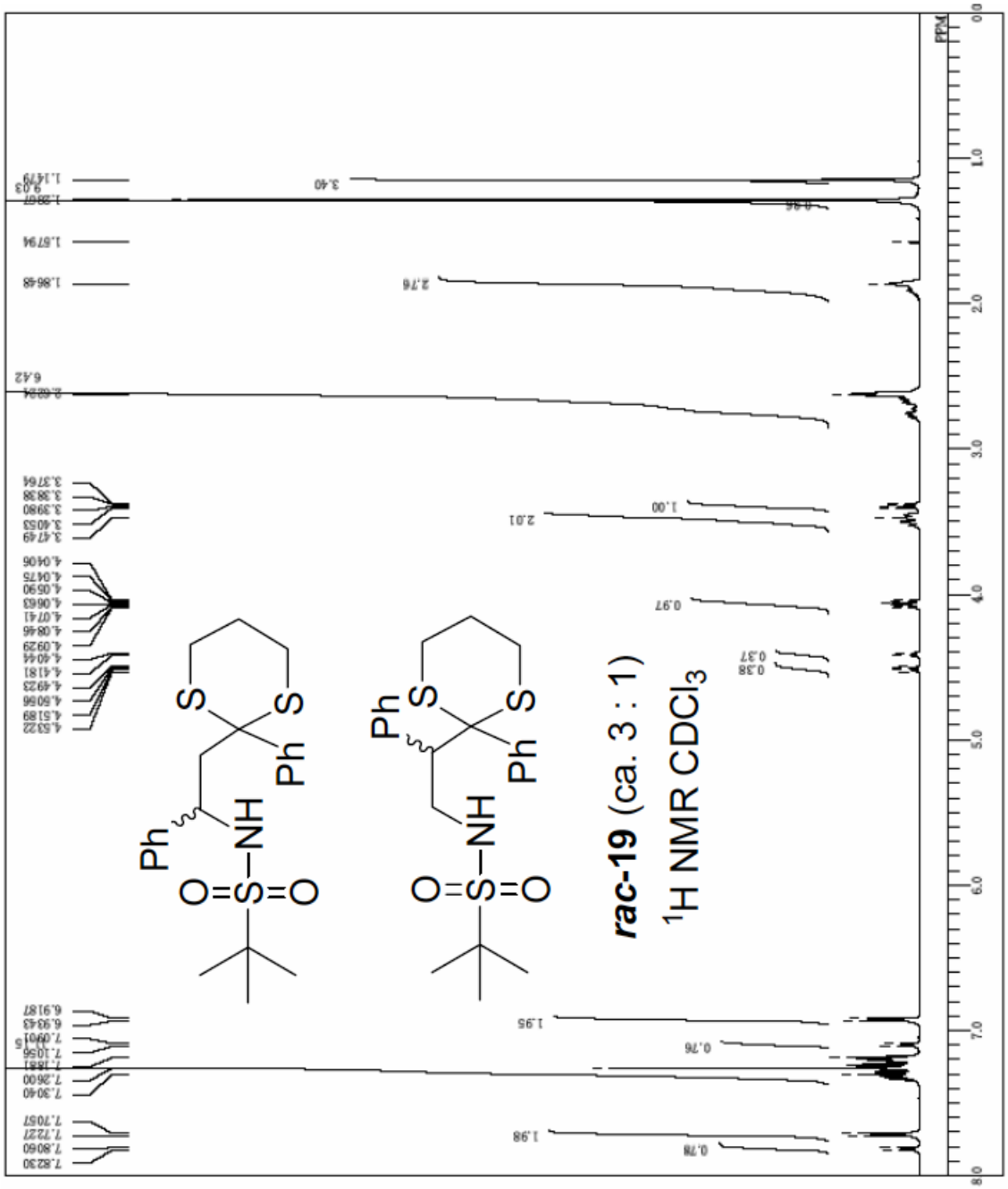

14.2757
22.8373
24.4016
24.9129
24.9815
27.7286
28.0614
29.4531
29.5599
29.6897
29.7126
32.0562
36.6793
50.4985
52.6732
57.1448
59.8766
76.9082
77.1600
77.4118
127.5376
128.7662
128.9188
141.3110
$^{n}C_{10}H_{21}$
O=S=O
NH
S
S
Ph
rac-16
^{13}C NMR $CDCl_3$
PPM
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
160.0
170.0
180.0

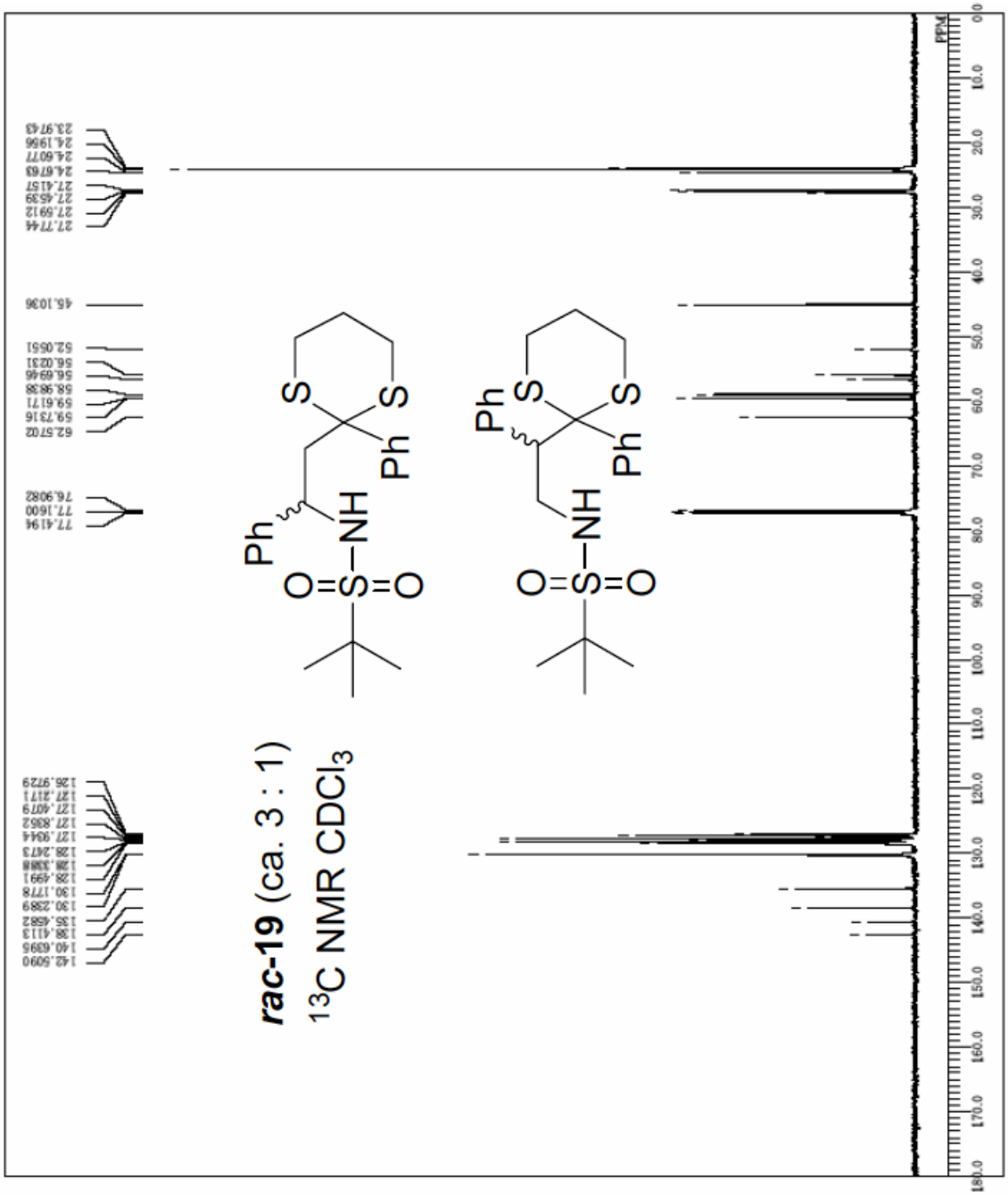

rac-17
^{1}H NMR CDCl$_3$
Bn
O
NH
S
O
O
S
S
Ph
PPM

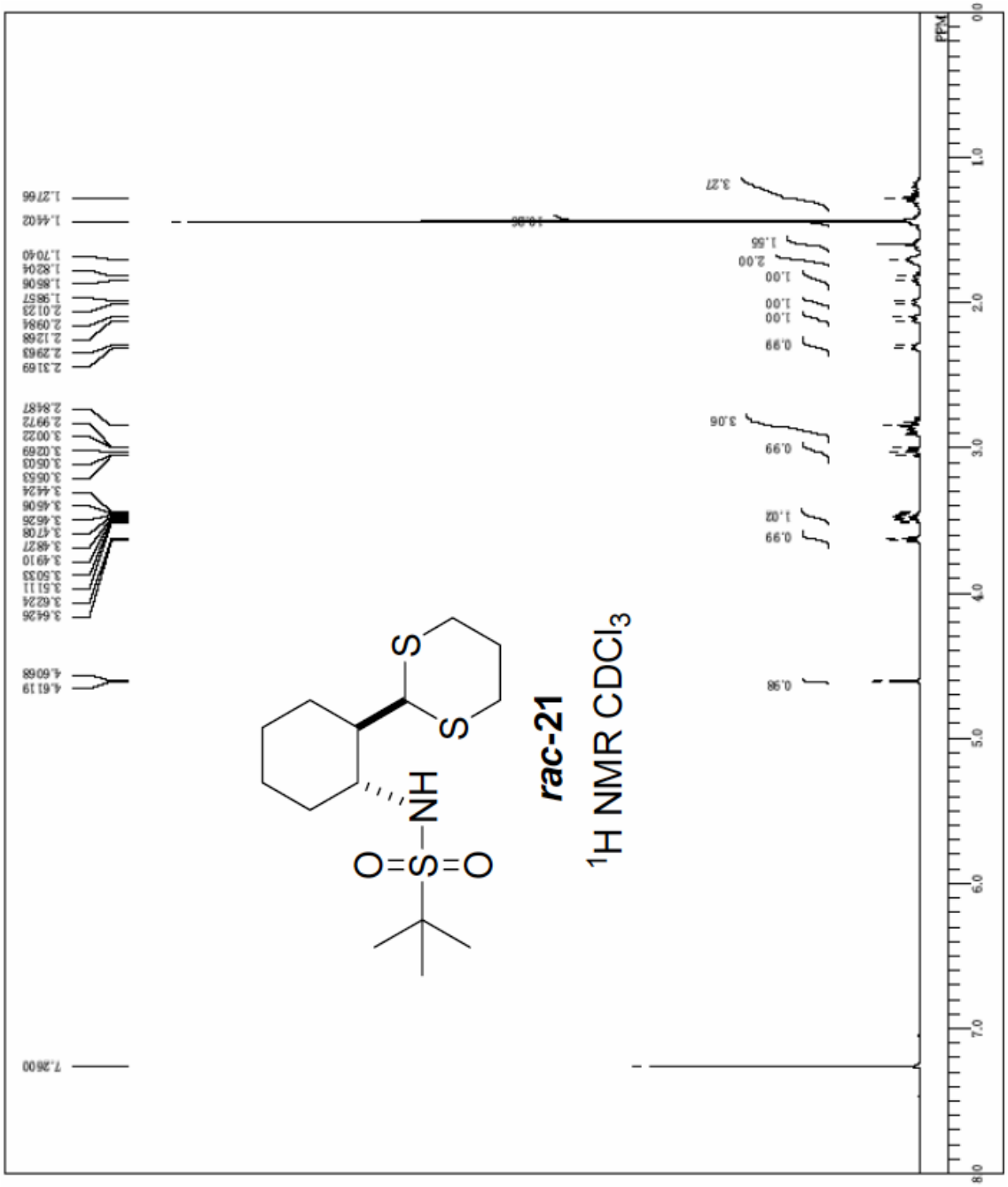

rac-17
^{13}C NMR CDCl$_3$
Bn
O
NH
S
O
O
S
S
Ph
24.2614
24.7984
27.4768
27.9041
46.0803
52.2764
56.3359
59.8003
71.8185
72.9631
76.9082
77.1600
77.4194
127.5071
127.7208
127.7742
128.3923
128.7556
137.9458
141.2876
PPM

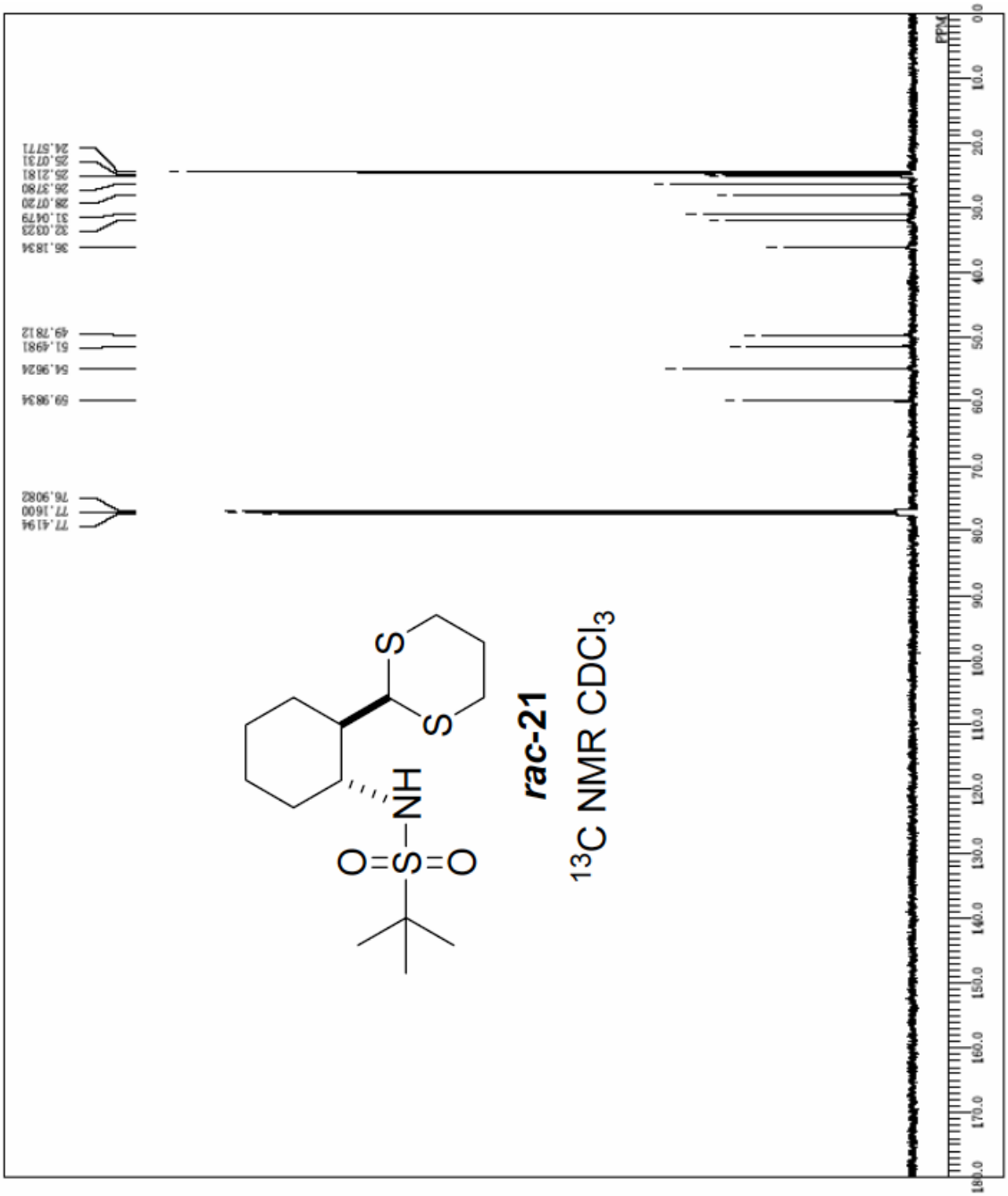

(R)-18
^{1}H NMR CDCl$_3$
Tr
O
NH
S
O
O
S
S
Ph
PPM
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
1.2771
1.8648
2.6670
2.5835
2.6705
2.7626
2.9019
2.9106
2.9211
2.9298
3.1630
3.1703
3.1822
3.1895
3.7076
4.1428
4.1590
7.2800
7.7322
7.7369
0.88
1.90
4.90
0.94
0.94
0.94
1.01
0.95
20.63
1.93

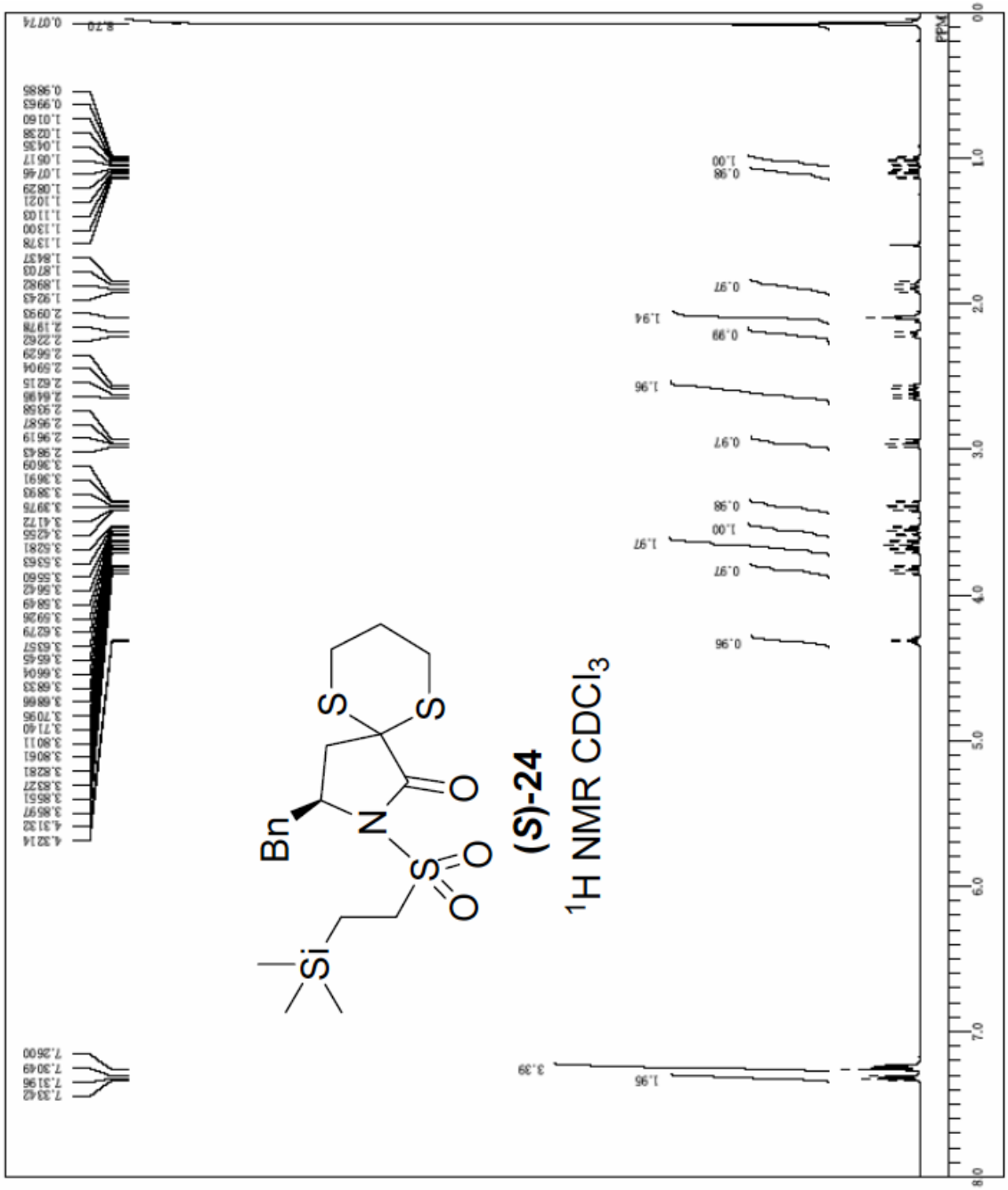

(R)-18
13C NMR CDCl3
Tr
O
NH
S
O
O
S
S
Ph
24.3711
24.7221
27.6370
27.9422
47.6904
52.8268
56.6030
60.0292
65.9048
76.9082
77.1600
77.4118
87.0493
127.2095
127.3850
127.9192
128.3846
128.8272
129.0103
141.4636
143.5696
PPM

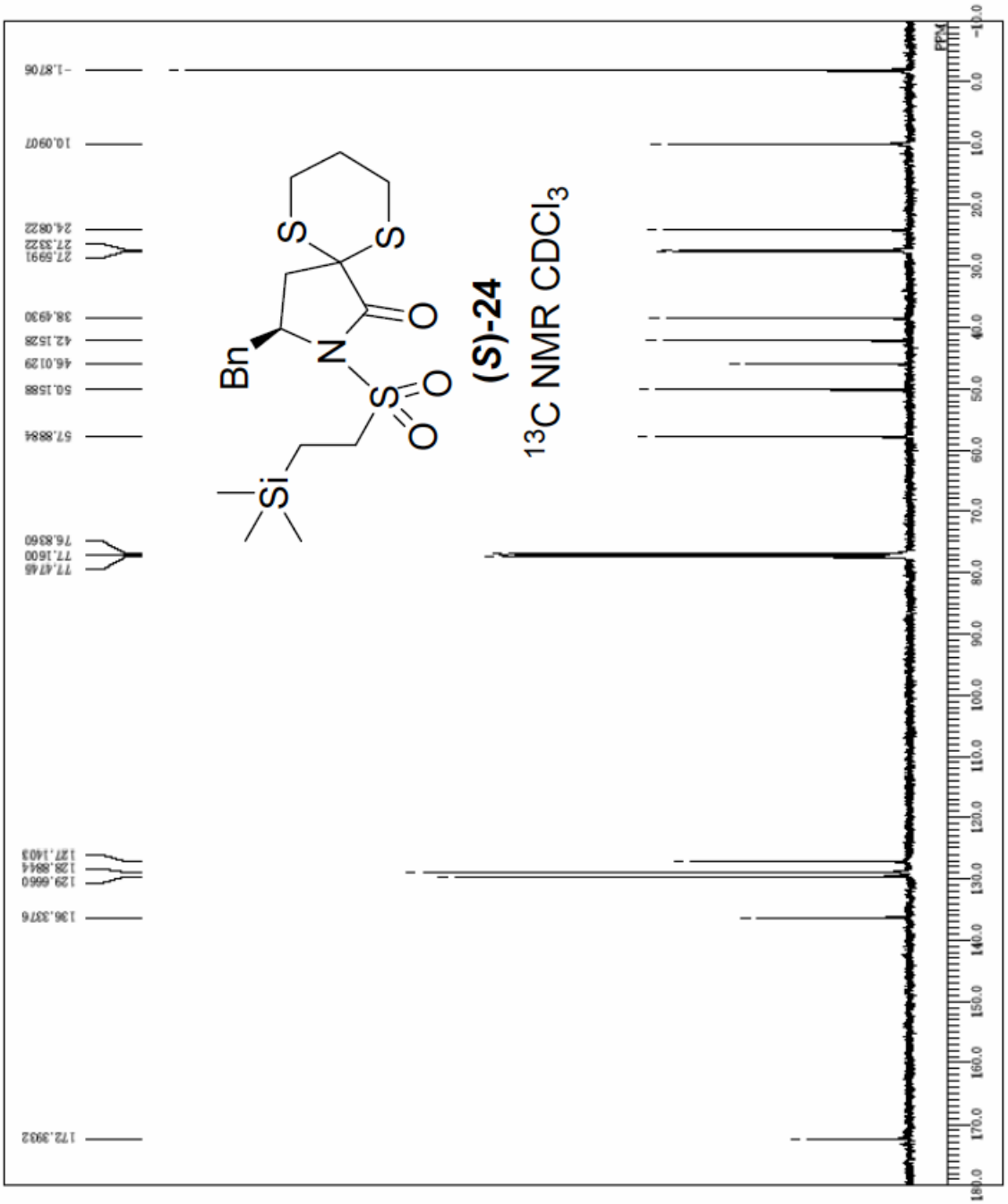

rac-19 (ca. 3 : 1)
1H NMR CDCl3
Ph
S
S
Ph
NH
O=S=O
FPM

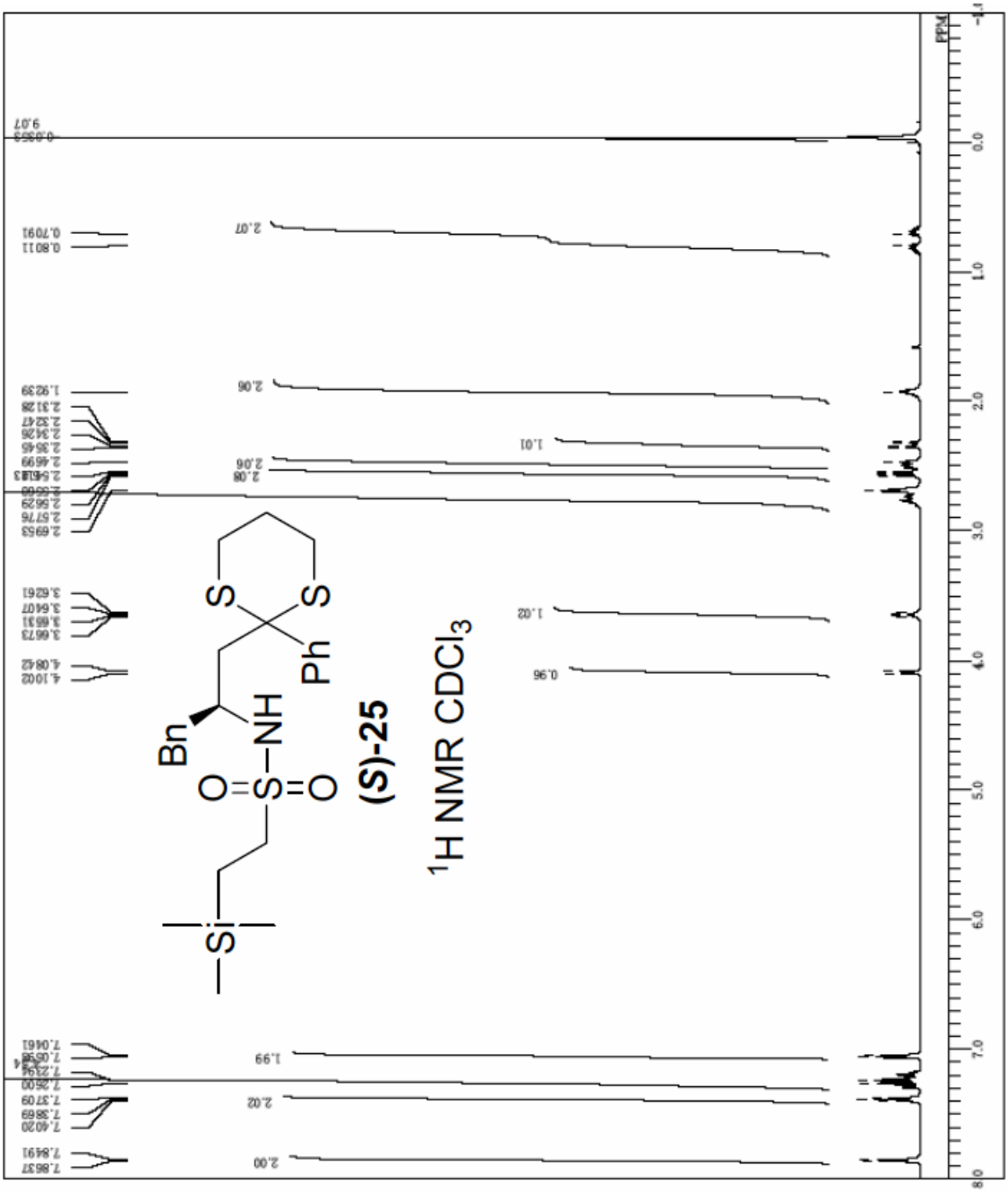

rac-19 (ca. 3 : 1)
13C NMR CDCl3
Ph
S
S
Ph
O
S
NH
O
Ph
S
S
Ph
O
S
NH
O
PPM

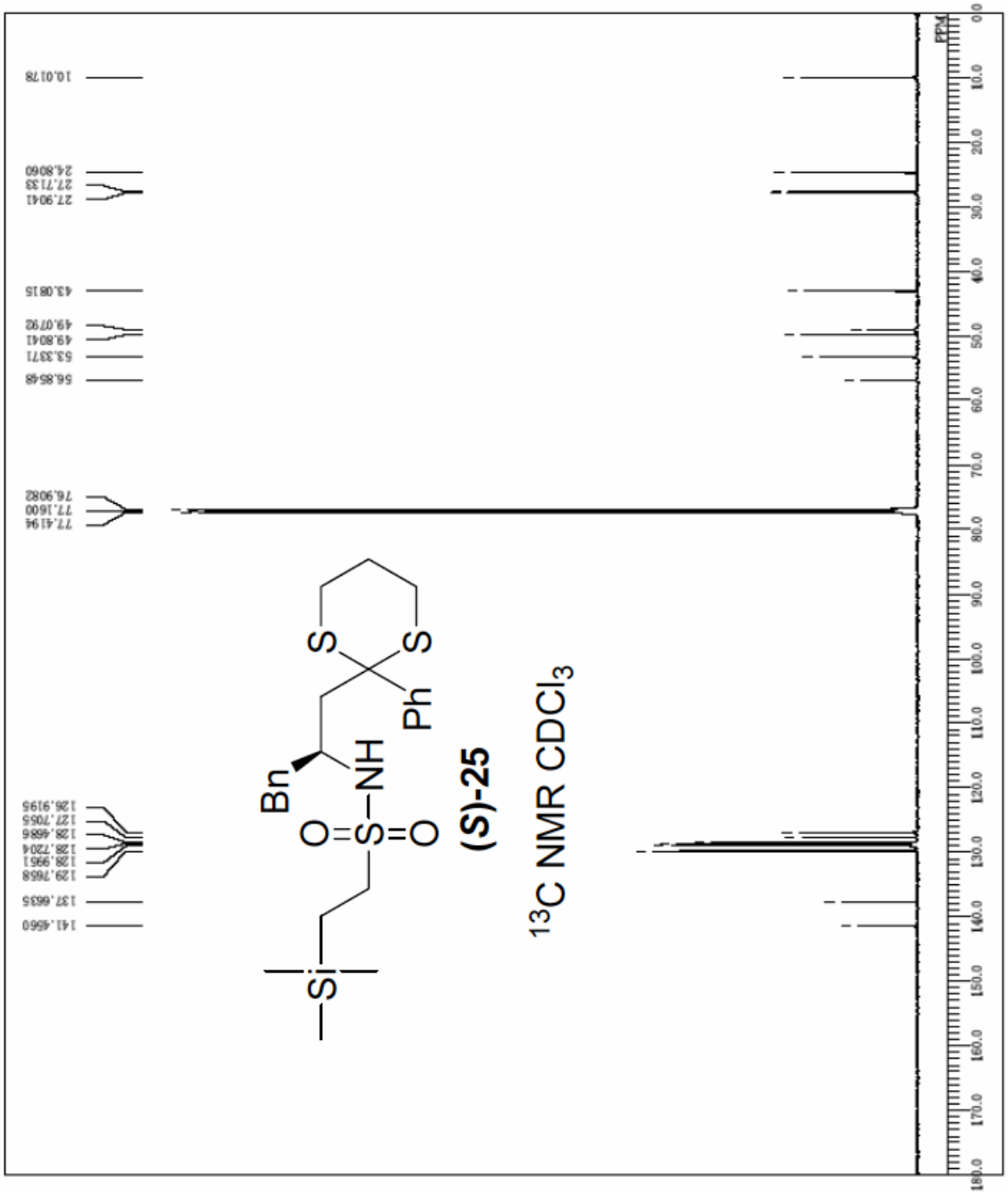

rac-21
^{1}H NMR CDCl$_3$
S
S
NH
O=S=O
PPM
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
0.98
1.02
0.99
3.06
0.99
1.00
1.00
1.00
2.00
1.55
10.86
3.27
7.2600
4.6119
4.6068
3.6426
3.6224
3.5111
3.5033
3.4910
3.4827
3.4708
3.4626
3.4506
3.4424
3.0653
3.0523
3.0269
3.0022
2.9972
2.8487
2.3169
2.2963
2.1268
2.0984
2.0123
1.9857
1.8606
1.8204
1.7040
1.4402
1.2766

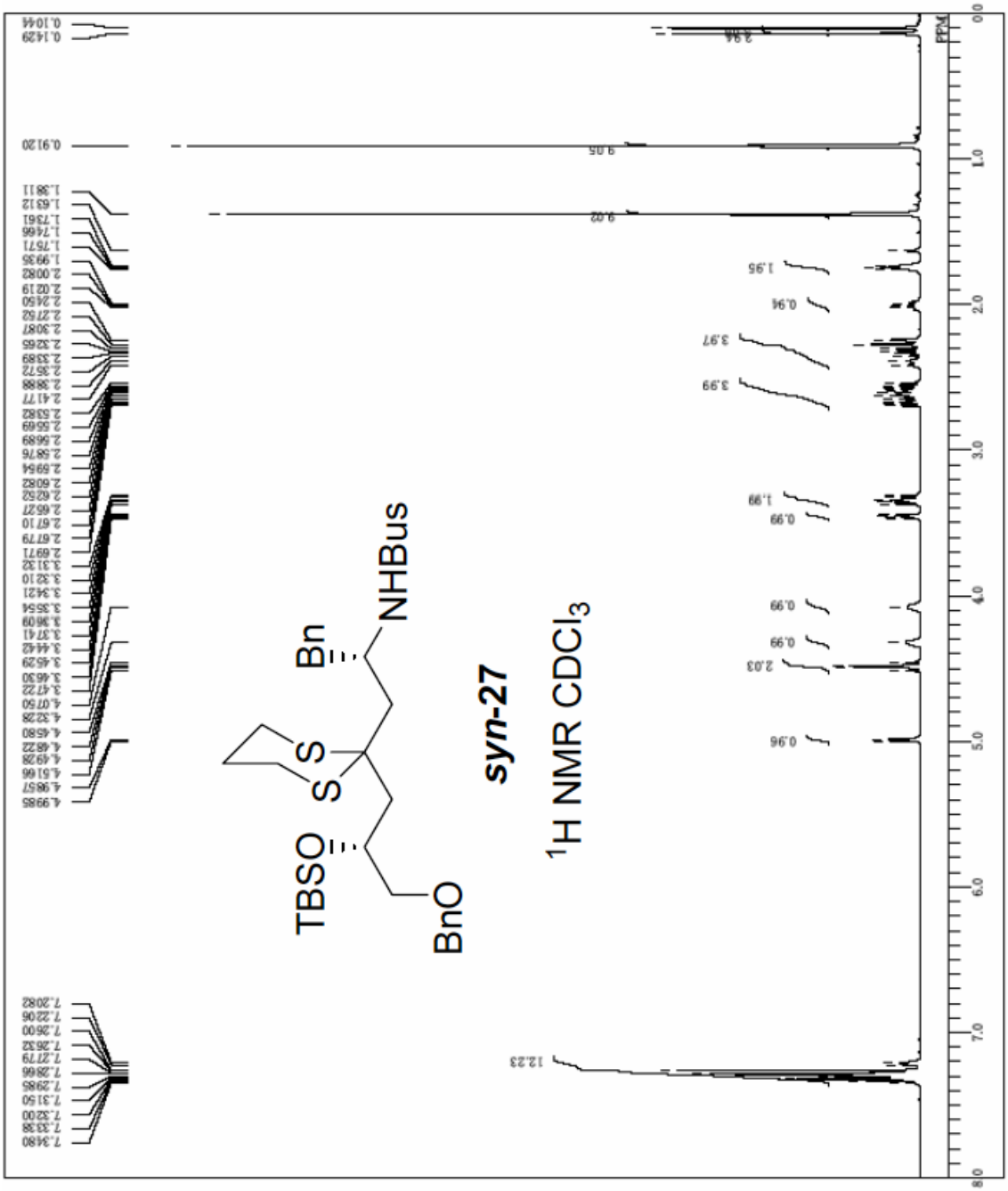

rac-21
^{13}C NMR $CDCl_3$
NH
S
S
O=S=O
24.5771
25.0731
25.2181
26.3780
28.0720
31.0479
32.0323
36.1834
49.7812
51.4981
54.9624
59.9834
76.9082
77.1600
77.4194
PPM

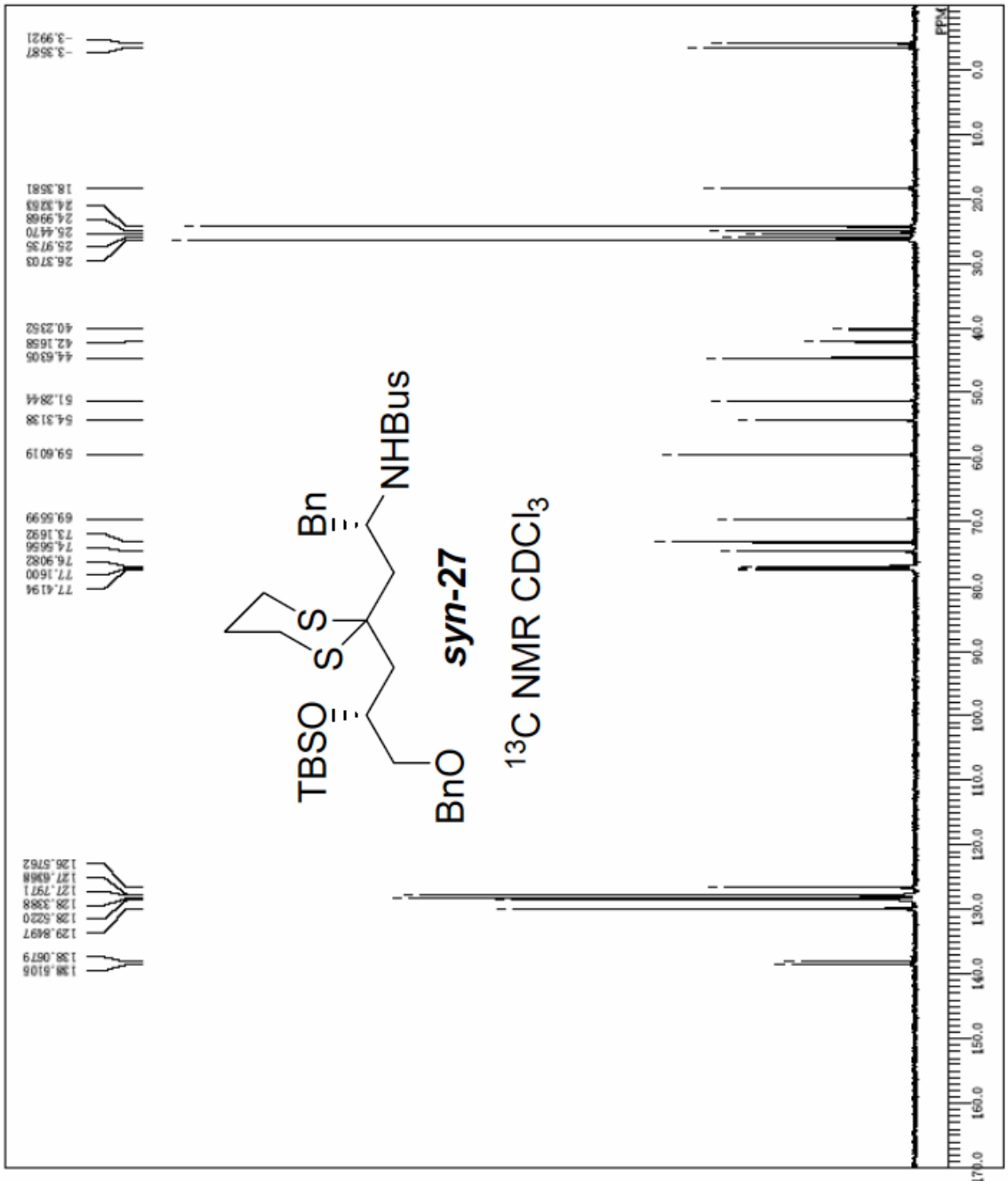

(S)-24
^{1}H NMR $CDCl_3$
Bn
S
S
O
O
N
S
O
O
Si

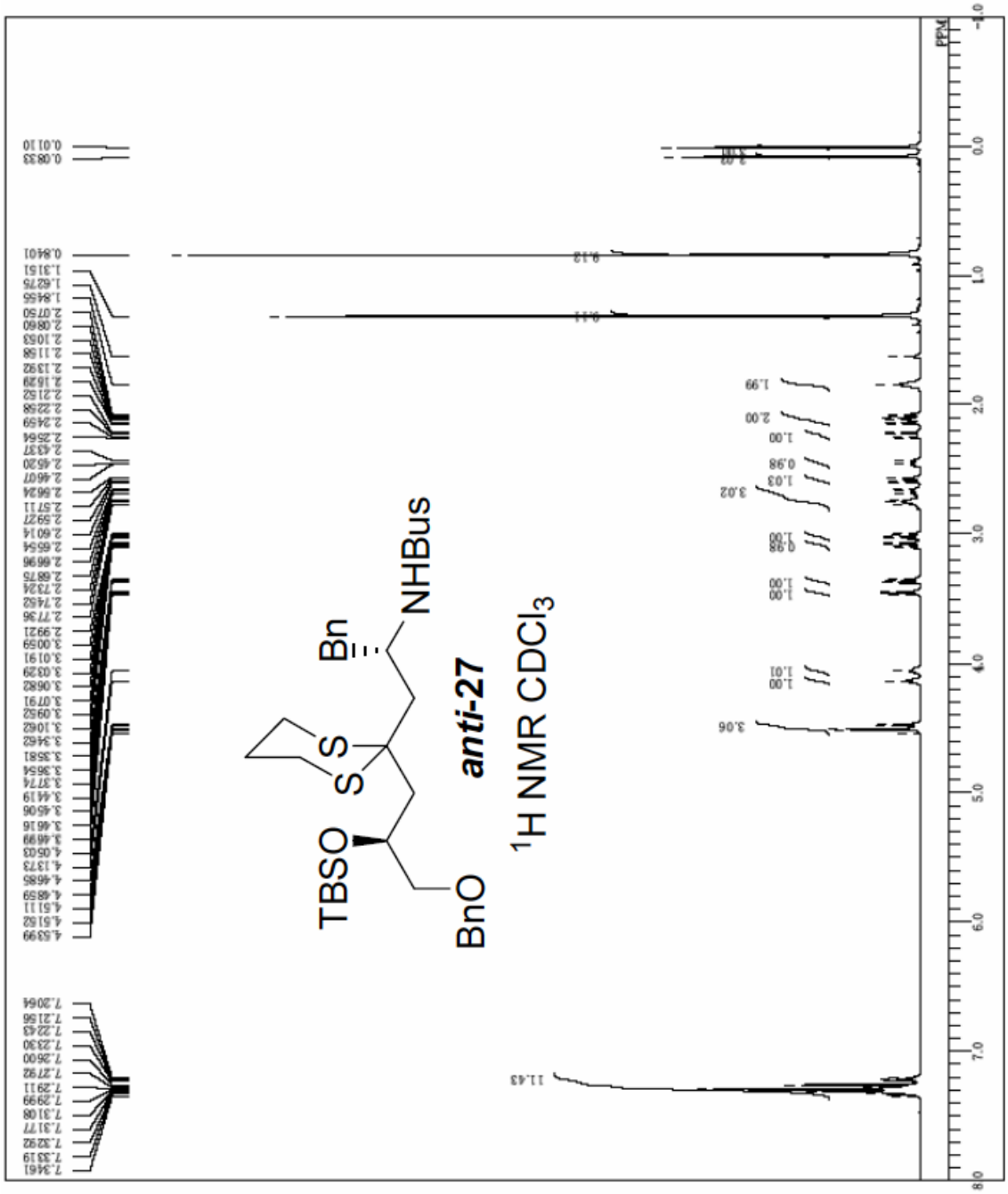

(S)-24
^{13}C NMR $CDCl_3$
Bn
S
S
N
O
O
S
O
O
Si
-1.8706
10.0907
24.0822
27.3322
27.5991
38.4930
42.1528
46.0129
50.1588
57.8884
76.8360
77.1600
77.4746
127.1403
128.8844
129.6660
136.3376
172.3982
PPM

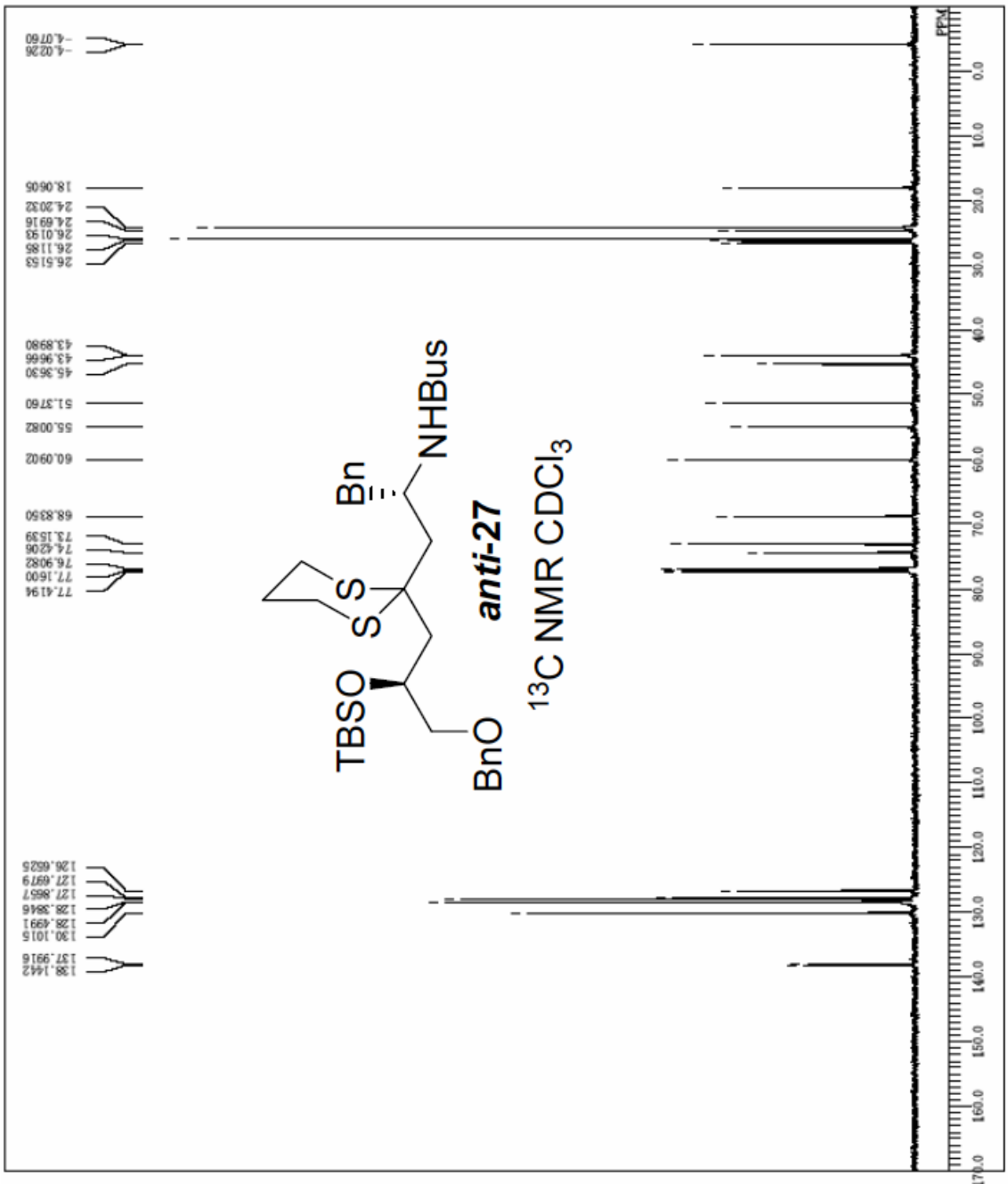

(S)-25
^{1}H NMR $CDCl_3$
Bn
NH
Ph
S
O
Si
PPM


(S)-25
^{13}C NMR CDCl$_3$
Bn
NH
Ph
S
O
Si
10.0178
24.8060
27.2133
27.9041
43.0815
49.0792
49.8041
53.3371
56.8548
76.9082
77.1600
77.4194
126.9195
127.7065
128.4686
128.7204
128.9961
129.7658
137.6635
141.4660
PPM


TBSO
Bn
NHBus
BnO
S
S
syn-27
^{1}H NMR CDCl$_3$


TBSO
Bn
NHBus
S
S
BnO
syn-27
^{13}C NMR CDCl$_3$


TBSO
S
S
Bn
NHBus
BnO
anti-27
^{1}H NMR CDCl$_3$


-4.0760
-4.0226
18.0605
24.2032
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26.0193
26.1185
26.5153
43.8980
43.9656
45.3630
51.3760
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60.0902
68.8350
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74.4206
76.9082
77.1600
77.4194
126.6525
127.6979
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128.3846
128.4991
130.1015
137.9916
138.1442
TBSO
S
S
Bn
NHBus
BnO
anti-27
^{13}C NMR CDCl$_3$
PPM
0.0
10.0
20.0
30.0
40.0
50.0
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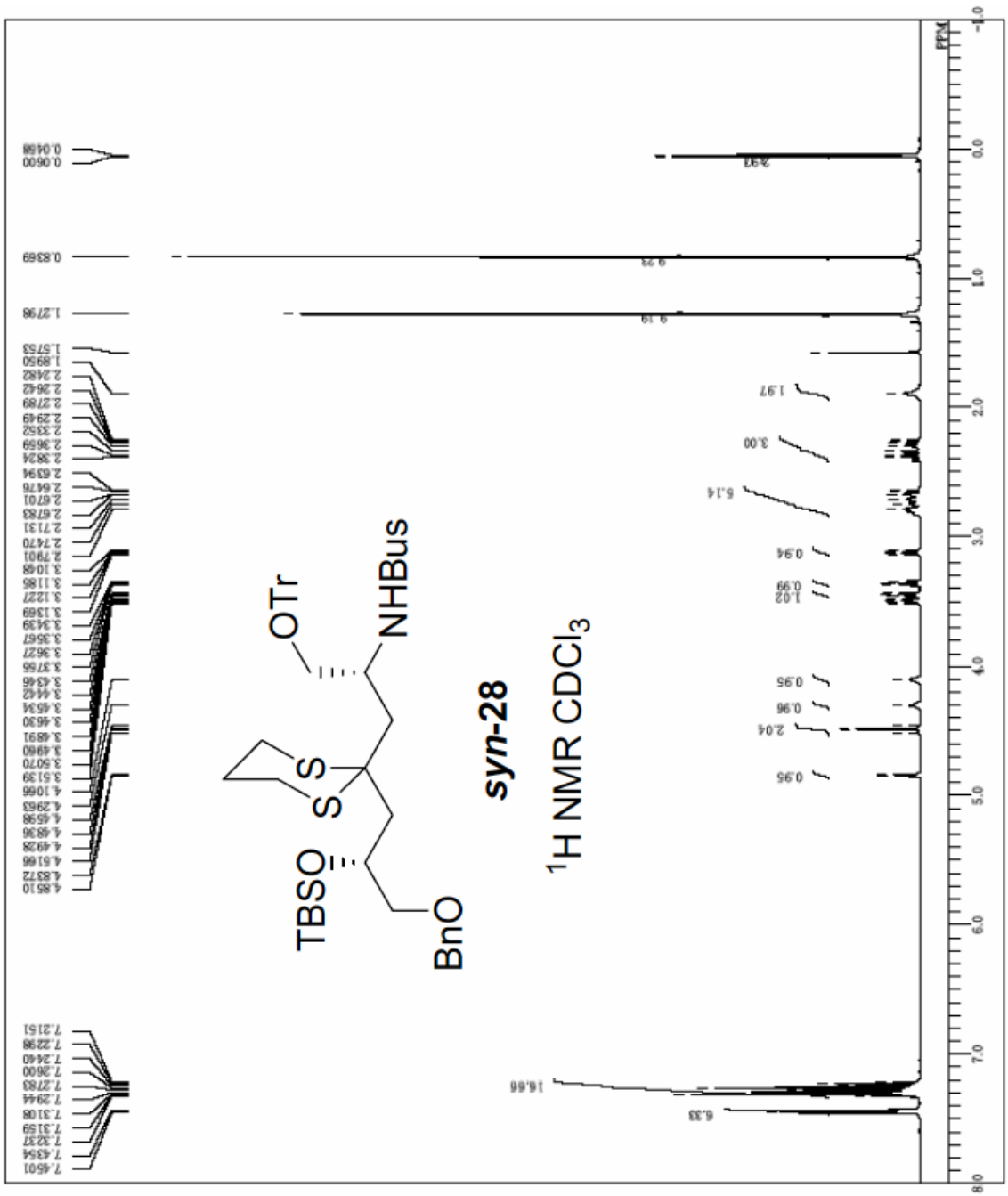
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NHBus
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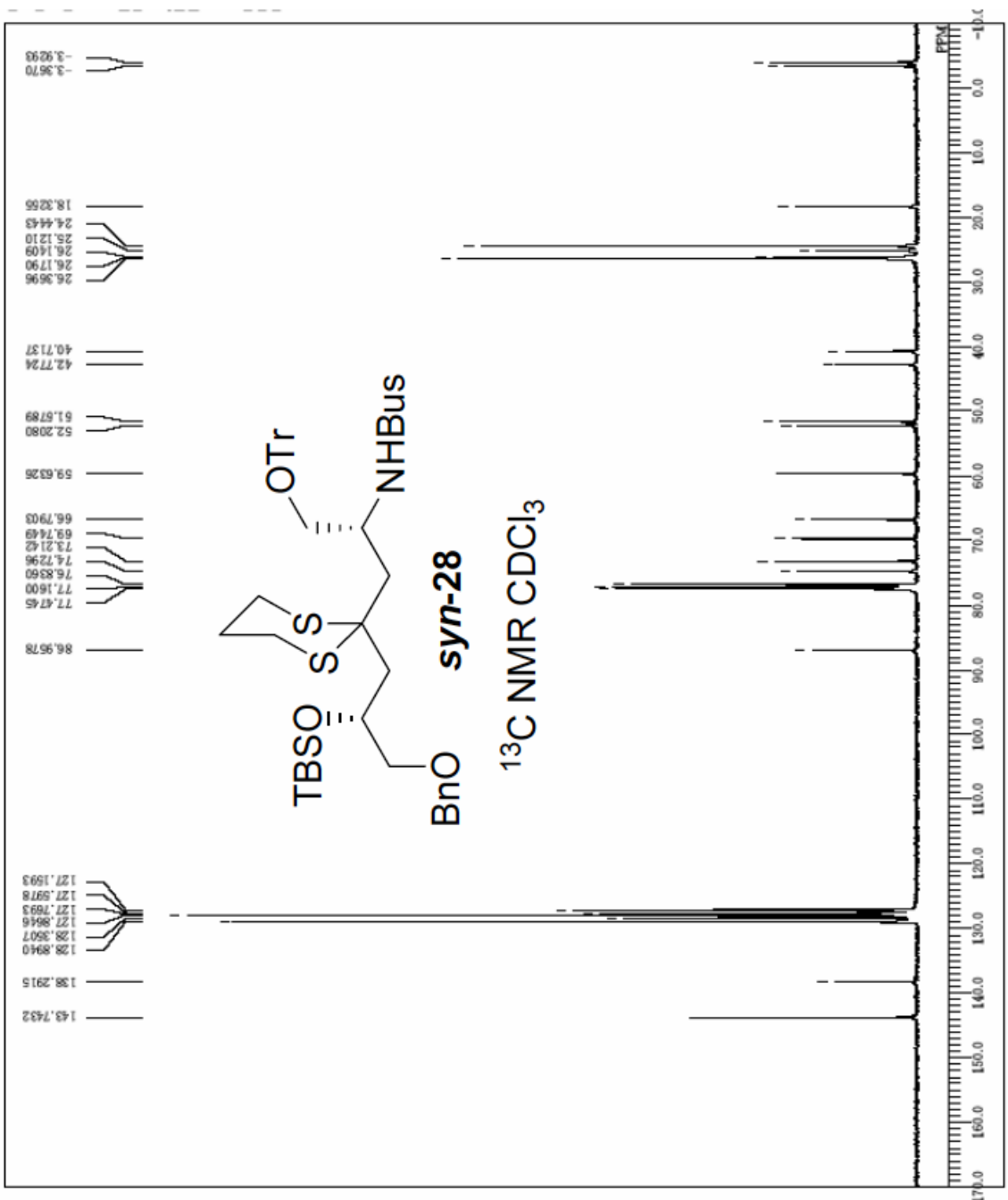
S
S
BnO
syn-28
1H NMR CDCl3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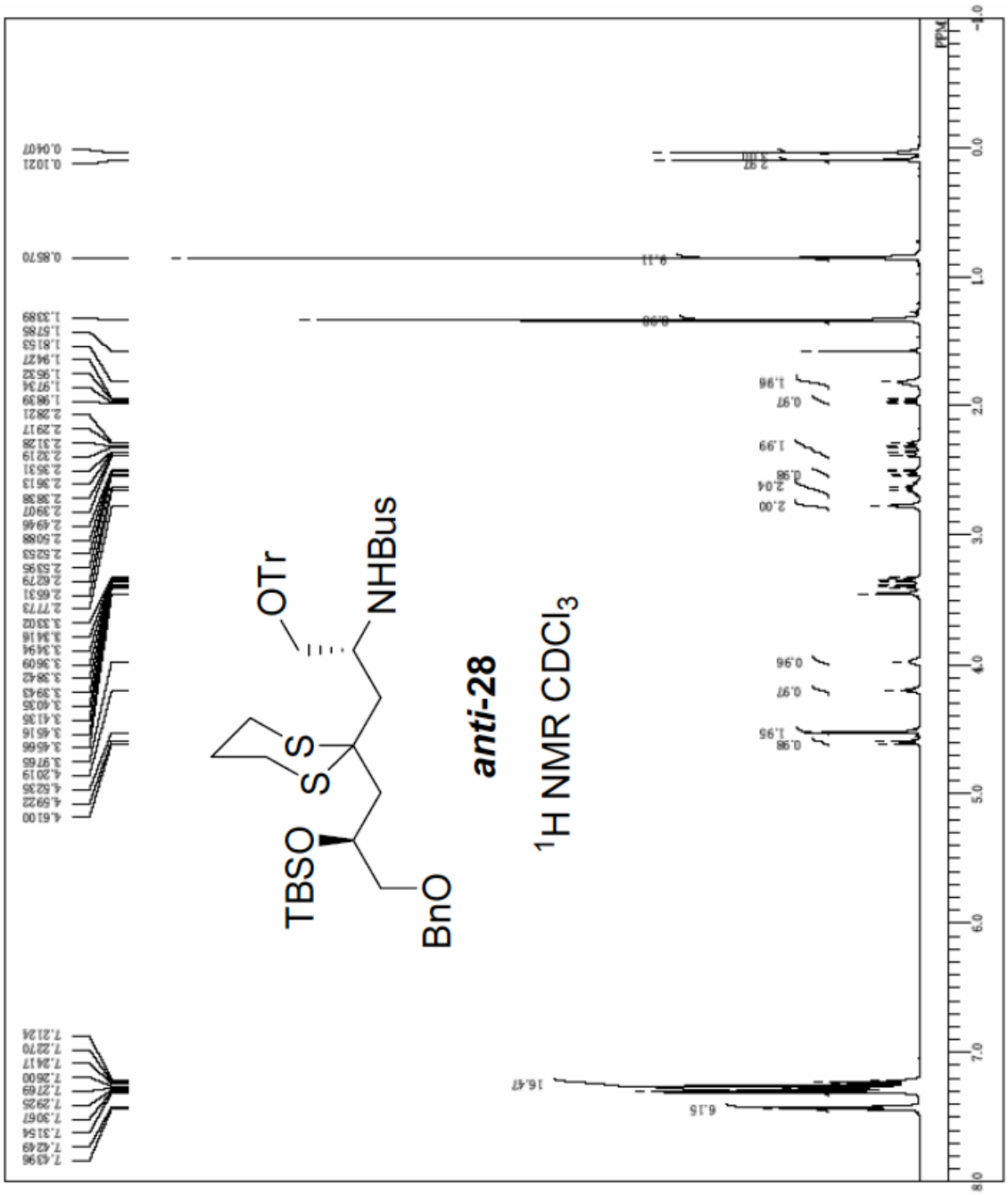
S
S
TBSO
BnO
syn-28
13C NMR CDCl3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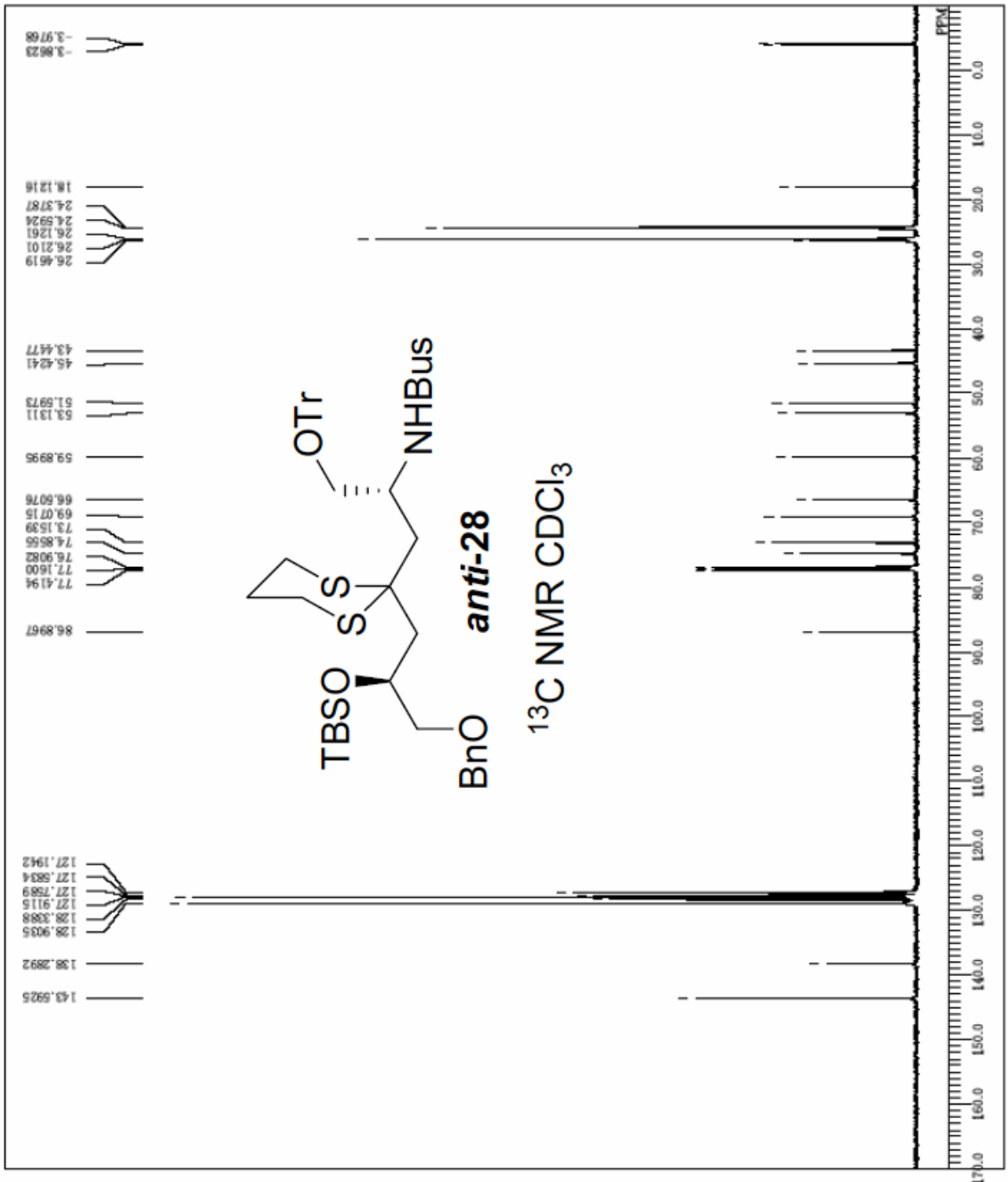
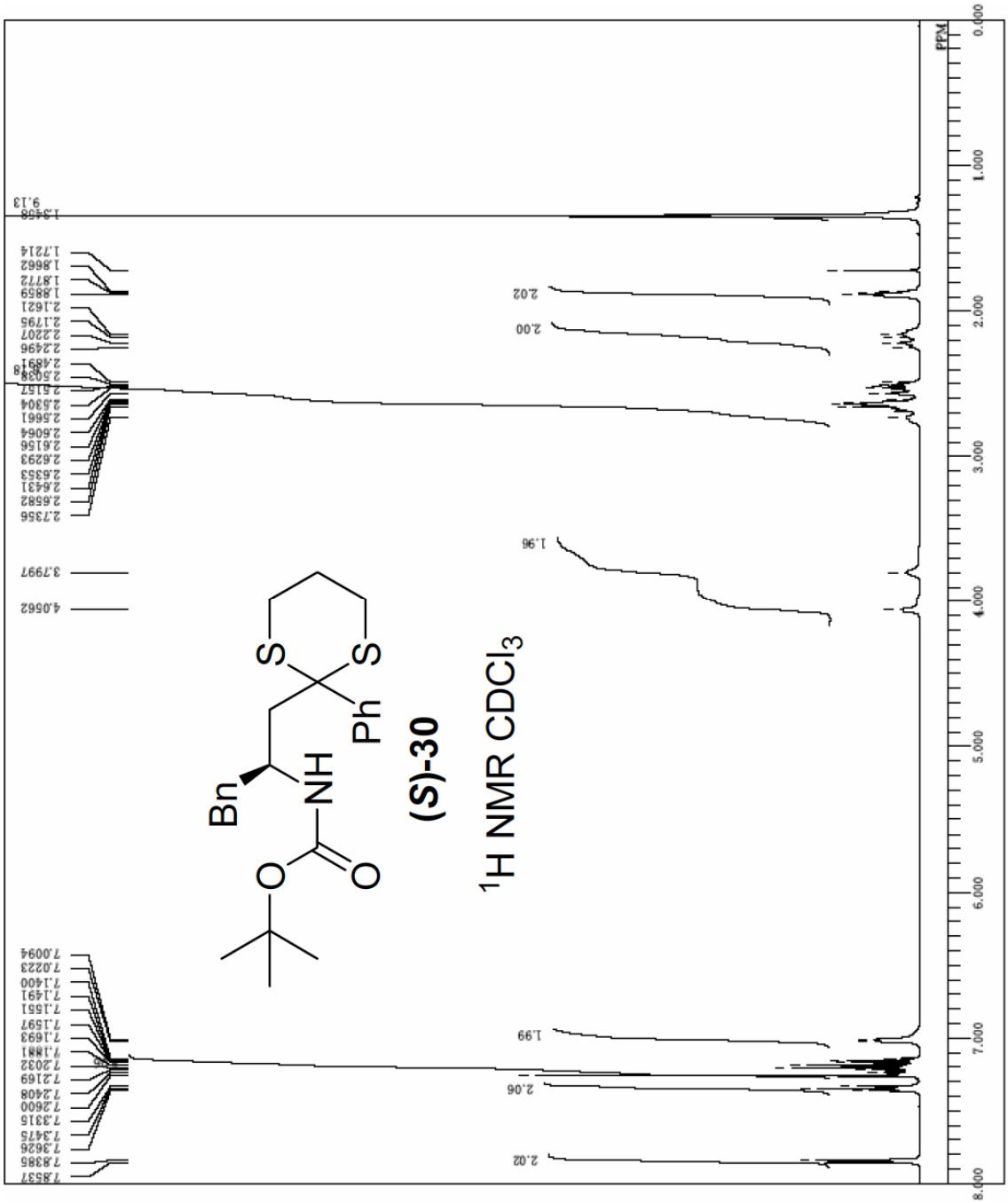
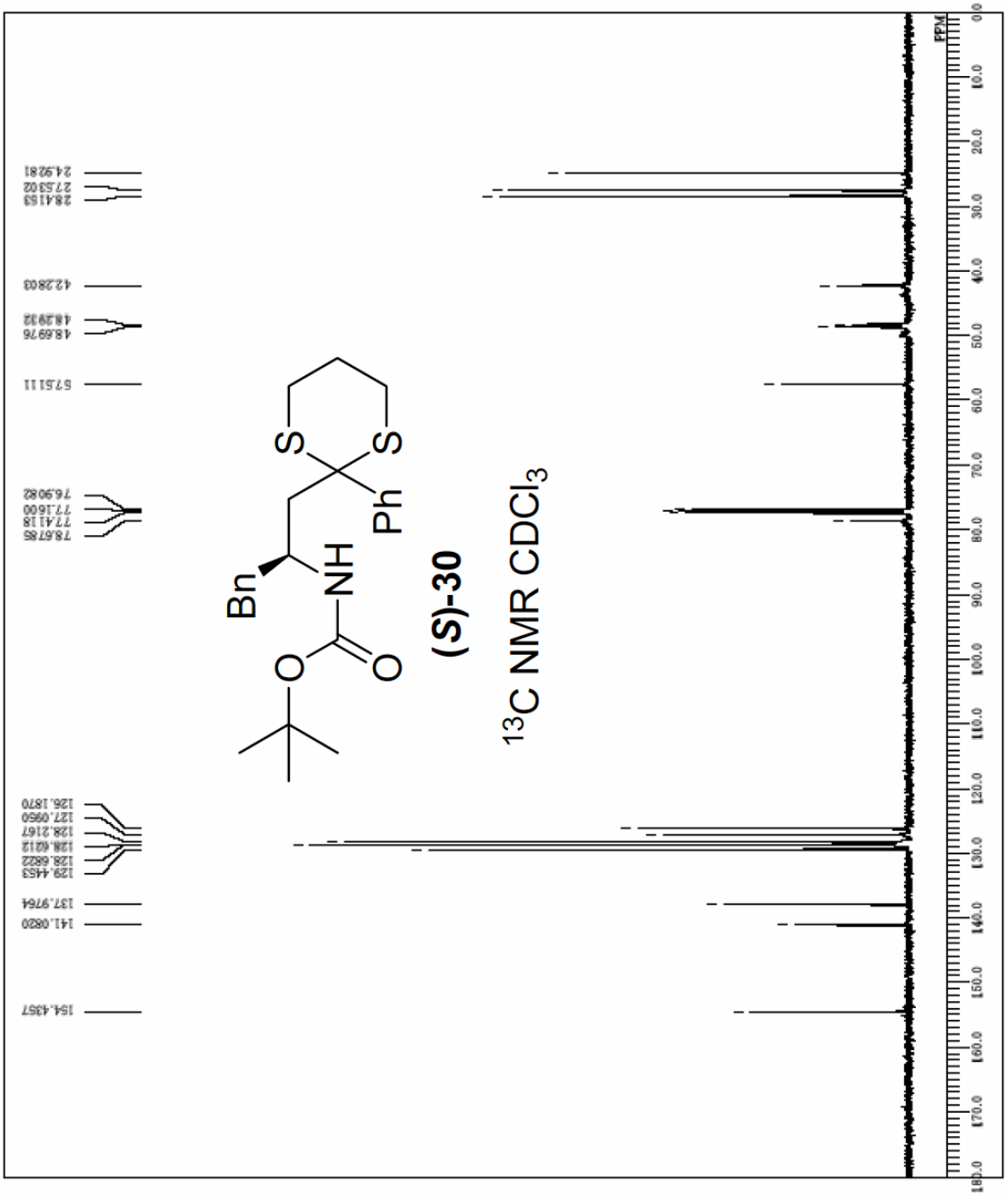
NHBus
TBSO
S
S
BnO
anti-28
^{1}H NMR CDCl$_3$


OTr
NHBus
TBSO
S
S
BnO
anti-28
^{13}C NMR $CDCl_3$


(S)-30
^{1}H NMR CDCl$_3$
Bn
NH
O
O
S
S
Ph
PPM
0.000
1.000
2.000
3.000
4.000
5.000
6.000
7.000
8.000


(S)-30
^{13}C NMR CDCl$_3$
Bn
NH
O
O
S
S
Ph
PPM
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78.6785
126.1870
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128.2167
128.4012
128.6822
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141.0820
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