Electronic supplementary materials *Mendeleev Commun.*, 2025, **35**, 14–17

One-pot synthesis of pyrrolooxazoles from pyrrolyl acetylenic ketones and natural aldehydes

Denis N. Tomilin, Sophia A. Stepanova, Lyubov N. Sobenina, Ludmila A. Oparina, Igor A. Ushakov and Boris A. Trofimov

Contents

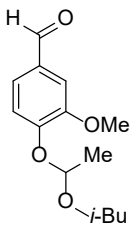
General Information

IR spectra were obtained on a "Bruker IFS-25" spectrometer (films) in 400-4000 cm^{-1} region. ^1H (400.13 MHz), ^{13}C (100.6 MHz) NMR spectra were recorded on a "Bruker Avance 400" instrument in $CDCl_3$. The assignment of signals in the ^1H NMR spectra was made using COSY and NOESY experiments. Resonance signals of carbon atoms were assigned based on ^1H-^{13}C HSQC and ^1H-^{13}C HMBC experiments. The ^1H chemical shifts (δ) were referenced to the residual solvent protons (7.26 ppm, $CDCl_3$), the ^{13}C chemical shifts were expressed with respect to the deuterated solvent (77.16 ppm). Coupling constants in hertz (Hz) were measured from one-dimensional spectra and multiplicities were abbreviated as following: br (broad), s (singlet), d (doublet), t (triplet), m (multiplet). The chemical shifts were recorded in ppm. The (C, H, N) microanalyses were performed on a Flash EA 1112 CHNS-O/MAS (CHN Analyzer) instrument. Sulfur was determined by complexometric titration with Chlorasenazo III.

Pyrrolyl acetylenic ketones **1a-d** were obtained according to the procedures.[s1] Methylation of vanillin and syringaldehyde was carried out according to the methodic, published in the paper.[s2]

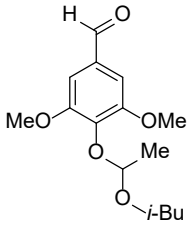
Synthesis of aldehydes 4c,d

Vanillin or syringaldehyde (1 g) was mixed with 2 g of isobutyl vinyl ether (VIBE) and 0.5 mol% of CF_3COOH. Reaction mixture was stirred at 50 ºC for 24 h in closed vessel. Then excess of VIBE was removed in vacuum, residue dissolved in 10 ml of Et_2O and washed 3 times by 1M NaOH aqueous solution to remove traces of unreacted aldehydes, ether solution dried over $CaCl_2$. Residue after removing solvent represented protected aldehydes **4c,d** as clean colorless oils.



4-(1-*iso*-Butoxyethoxy)-3-methoxybenzaldehyde (4c). Yield: 1.475 g (89%); colorless oil; ^1H NMR (400.13 MHz, $CDCl_3$): δ 9.89 (s, 1H, CHO), 7.44-7.43 (m, 2H, C_6H_3), 7.28 (s, 1H, C_6H_3), 5.56 (q, J = 5.5 Hz, 1H, CH), 3.94 (s, 3H, OMe), 3.55-3.51 (m, 1H, *i*-Bu), 3.29-3.26 (m, 1H, *i*-Bu), 1.89-1.82 (m, 1H, *i*-Bu), 1.61 (d, J = 5.5 Hz, 3H, CH_3), 0.92-0.88 (m, 6H, *i*-Bu); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 191.1, 151.9, 150.9, 131.1, 126.3, 116.8, 110.0, 100.8, 72.7, 56.1, 28.6,

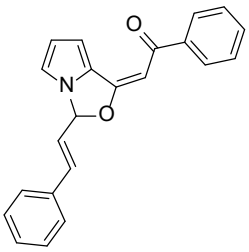
19.9, 19.5, 19.4; IR (film): 2957, 2873, 1687, 1588, 1504, 1467, 1423, 1386, 1270, 1123, 1032, 1069, 902, 731 cm^{-1}; Anal. Calcd for $C_{14}H_{20}O_4$: C, 66.65; H, 7.99%; Found: C, 66.41; H, 7.76%.



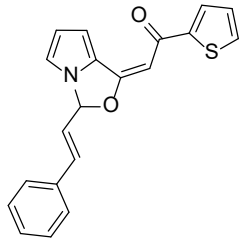
4-(1-*iso*-Butoxyethoxy)-3,5-dimethoxybenzaldehyde (4d). Yield: 1.394 g (90%); colorless oil; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 9.87 (s, 1H, CHO), 7.13 (s, 2H, C_6H_2), 5.39 (q, *J* = 5.2 Hz, 1H, CH), 3.92 (s, 6H, OMe), 3.59-3.55 (m, 1H, *i*-Bu), 3.29-3.26 (m, 1H, *i*-Bu), 1.82-1.77 (m, 1H, *i*-Bu), 1.53 (d, *J* = 5.5 Hz, 3H, CH_3), 0.93-0.90 (m, 6H, *i*-Bu); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 191.2, 153.9, 131.9, 106.8 (2C), 104.2 (2C), 74.6, 72.3, 56.3 (2C), 28.6, 21.1, 19.5, 19.4; IR (film): 2962, 2872, 1694, 1587, 1497, 1462, 1421, 1387, 1329, 1231, 1130, 1023, 899, 744, 627 cm^{-1}; Anal. Calcd for $C_{15}H_{22}O_5$: C, 63.81; H, 7.85%; Found: C, 63.52; H, 7.56%.

Synthesis of pyrrolo[1,2-*c*]oxazoles 2a-p. General procedure

Pyrrolyl acetylenic ketone **1a-d** (1 mmol) and aldehyde (1 mmol) were dissolved in diethyl ether (5 ml), then KOH·0.5H_2O (65 mg, 1 mmol) was added. Reaction mixture was stirred at room temperature for 2 hours for citral, cinnamaldehyde, aldehydes **4c,d** and for 12 hours for veratraldehyde **4a** and TMBA **4b** (TLC silica gel control, *n*-hexane-diethyl ether, 1:1). Then reaction mixture was filtered, solvent was removed and the residue was purified by column chromatography (SiO_2, *n*-hexane-diethyl ether from 10:1 to 2:1) to give pure pyrrolo[1,2-*c*]oxazole **2a-p**.

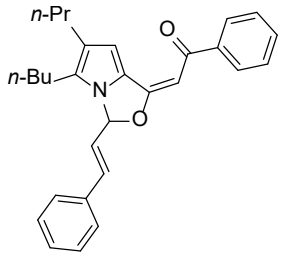


(*E*)-1-Phenyl-2-(3-((*E*)-styryl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)ethan-1-one (2a). Yield: 199 mg (61%); yellow oil with sweet odor; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 8.00-7.99 (m, 2H, H_o, COPh), 7.73 (d, *J* = 3.6 Hz, 1H, H-3, pyrrole), 7.52-7.45 (m, 5H, Ph, $H_{m,p}$, COPh), 7.38-7.36 (m, 3H, Ph), 6.99 (d, *J* = 15.8 Hz, 1H, =C<u>H</u>Ph), 6.95-6.94 (m, 1H, H-5, pyrrole), 6.59 (s, 1H, C(O)CH=), 6.57 (dd, *J* = 3.6, 2.5 Hz, 1H, H-4, pyrrole), 6.49 (d, *J* = 7.8 Hz, 1H, NC(H)O), 6.18 (dd, *J* = 15.8, 7.8 Hz, 1H, <u>H</u>C=CHPh); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 188.9, 160.3, 140.0, 138.5, 134.6, 131.8, 129.6, 129.0 (2C), 128.7, 128.5 (2C), 127.8 (2C), 127.4 (2C), 122.7, 117.4, 116.6, 112.7, 93.3, 91.3; IR (film): 3062, 3029, 2919, 1660, 1600, 1584, 1563, 1535, 1494, 1457, 1423, 1386, 1354, 1312, 1282, 1243, 1215, 1138, 1123, 1058, 1046, 1013, 964, 910, 862, 817, 775, 732, 693, 650, 638 cm^{-1}; Anal. Calcd for $C_{22}H_{17}NO_2$: C, 80.71; H, 5.23; N, 4.28%; Found: C, 80.44; H, 5.43; N, 4.11%; HRMS (ESI-TOF) calcd for $[C_{22}H_{17}NO_2+H]^+$ 328.133754; found 328.13397.

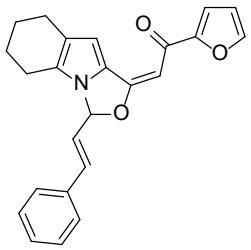


(*E*)-2-(3-((*E*)-Styryl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-(thiophen-2-yl)ethan-1-one (2b). Yield: 220 mg (66%), yellow oil with sweet odor; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.70-7.69 (m, 2H, H-3, pyrrole, H-3, thiophene), 7.56 (dd, *J* = 5.0, 1.1 Hz, 1H, H-5, thiophene), 7.47-7.45 (m, 2H, Ph), 7.38-7.36 (m, 3H, Ph), 7.12 (dd, *J* = 5.0, 3.7 Hz, 1H, H-4, thiophene), 6.99 (d, *J* = 15.8 Hz, 1H, =C<u>H</u>Ph), 6.94-6.93 (m, 1H, H-5,

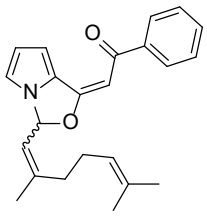
pyrrole), 6.55 (dd, J = 3.8, 2.6 Hz, 1H, H-4, pyrrole), 6.48 (d, J = 7.8 Hz, 1H, NC(H)O), 6.45 (s, 1H, C(O)CH=), 6.17 (dd, J = 15.8, 7.8 Hz, 1H, HC=CHPh); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 181.3, 159.9, 147.4, 138.5, 134.5, 131.9, 129.6, 129.6, 129.0 (2C), 128.6, 128.1, 127.4 (2C), 122.6, 117.4, 116.7, 112.9, 93.1, 91.3; IR (film): 3103, 3029, 2917, 1650, 1566, 1539, 1515, 1496, 1459, 1416, 1386, 1354, 1286, 1245, 1211, 1137, 1121, 1079, 1057, 1029, 961, 910, 843, 815, 787, 732, 691, 659, 636, 604, 558, 523 cm^{-1}; Anal. Calcd for $C_{20}H_{15}NO_2S$: C, 72.05; H, 4.54; N, 4.20; S, 9.62%; Found: C, 71.79; H, 4.29; N, 4.06; S, 9.44%.



(*E*)-2-(5-Butyl-6-propyl-3-((*E*)-styryl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2c). Yield: 285 mg (67%), yellow crystals, mp 93-94 °C; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.99-7.98 (m, 2H, H_o, COPh), 7.63 (s, 1H, H-3, pyrrole), 7.49-7.43 (m, 5H, Ph), 7.39-7.35 (m, 3H, $H_{m,p}$, COPh), 6.97 (d, J = 15.8 Hz, 1H, =CHPh), 6.48 (s, 1H, C(O)CH=), 6.44 (d, J = 8.3 Hz, 1H, NC(H)O), 6.13 (dd, J = 15.8, 8.3, 1H, HC=CHPh), 2.57-2.55 (m, 2H, CH_2), 2.46-2.42 (m, 2H, CH_2), 1.69-1.63 (m, 2H, CH_2), 1.50-1.43 (m, 2H, CH_2), 1.28-1.26 (m, 2H, CH_2), 1.00-0.96 (m, 3H, CH_3), 0.84-0.80 (m, 3H, CH_3); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 188.6, 160.5, 140.3, 138.0, 134.7, 131.7, 131.5, 129.5, 129.4, 129.0 (2C), 128.4 (2C), 127.7 (2C), 127.3 (2C), 126.0, 122.9, 113.0, 91.8, 90.8, 31.5, 28.5, 24.6, 24.2, 22.6, 14.2, 13.8; IR (film): 2958, 2929, 2871, 1656, 1600, 1583, 1553, 1497, 1466, 1452, 1387, 1362, 1282, 1235, 1177, 1154, 1101, 1060, 1036, 982, 966, 910, 863, 829, 771, 751, 735, 691, 658, 638, 531 cm^{-1}; Anal. Calcd for $C_{29}H_{31}NO_2$: C, 81.85; H, 7.34; N, 3.29%; Found: C, 81.56; H, 7.12; N, 3.61%.

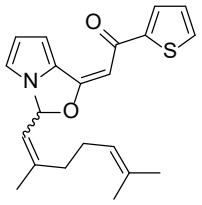


(*E*)-1-(Furan-2-yl)-2-(3-((*E*)-styryl)-5,6,7,8-tetrahydro-1*H*,3*H*-oxazolo[3,4-*a*]indol-1-ylidene)ethan-1-one (2d). Yield: 189 mg (51%), yellow crystals with sweet odor, mp 157-158 °C; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.53-7.52 (m, 2H, H-3 pyrrole, H-5 furan), 7.45-7.44 (m, 2H, Ph), 7.38-7.36 (m, 3H, Ph), 7.13-7.12 (m, 1H, H-3 furan), 6.95 (d, J = 15.8 Hz, 1H, =CHPh), 6.51-6.50 (m, 1H, H-4 furan), 6.40 (d, J = 8.2 Hz, 1H, NC(H)O), 6.39 (s, 1H, C(O)CH=), 6.12 (dd, J = 15.8, 8.2 Hz, 1H, HC=CHPh), 2.63-2.62 (m, 2H, CH_2-7), 2.55-2.54 (m, 2H, CH_2-4), 1.80-1.74 (m, 4H, CH_2-5,6); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 177.5, 160.5, 154.9, 144.9, 138.1, 134.7, 129.6, 129.5, 129.0 (2C), 127.4 (2C), 126.5 (2C), 122.5, 114.0, 112.2, 111.8, 91.5, 90.6, 23.5, 23.3, 22.8, 22.4; IR (film): 2935, 2855, 1652, 1574, 1547, 1504, 1468, 1384, 1333, 1304, 1287, 1246, 1196, 1165, 1151, 1128, 1093, 1052, 1010, 983, 968, 926, 910, 883, 846, 821, 800, 751, 732, 692 cm^{-1}; Anal. Calcd for $C_{24}H_{21}NO_3$: C, 77.61; H, 5.70; N, 3.77%; Found: C, 77.39; H, 5.61; N, 3.52%.

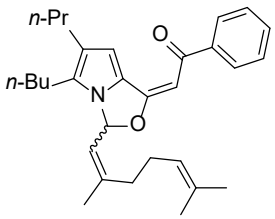


(*E*)-2-(3-(2,6-Dimethylhepta-1,5-dien-1-yl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2e). Yield: 167 mg (48%), yellow oil with citrus odor, *E*/*Z*-mixture 2:1; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.99-7.97 (m, 2H, H_o, COPh), 7.69 (dd, J = 3.7, 1.1 Hz, 1H, H-3, pyrrole), 7.49-7.45 (m, 3H, $H_{m,p}$, COPh), 6.86 (dd, J = 2.2, 1.1 Hz, 1H, H-5,

pyrrole), 6.67 (d, J = 8.5 Hz, 1H, NC(H)O), 6.54-6.53 (m, 2H, C(O)CH=, H-4, pyrrole), 5.22 (d, J = 8.5 Hz, 1H, CH=), 5.08-5.06 (m, 1H, C<u>H</u>=CMe$_2$), 2.17-2.15 (m, 4H, CH$_2$-CH$_2$), 1.96 (s, 3H, CH$_3$, *E*-isomer), 1.95 (s, 3H, CH$_3$, *Z*-isomer), 1.61 (s, 3H, CH$_3$), 1.57 (s, 3H, CH$_3$); ^{13}C NMR (100.6 MHz, CDCl$_3$): δ 188.6, 160.7, 148.3, 139.9, 132.4, 131.6, 128.6, 128.4 (2C), 127.6 (2C), 123.0, 119.4, 117.0, 116.2, 112.3, 92.7, 87.1, 39.4, 25.9, 25.7, 17.8, 17.1; IR (film): 2920, 2967, 2855, 1659, 1599, 1583, 1565, 1538, 1458, 1422, 1385, 1352, 1301, 1283, 1242, 1214, 1181, 1137, 1120, 1057, 1045, 1012, 1001, 963, 912, 864, 815, 776, 732, 710, 695, 655, 639, 604 cm^{-1}; Anal. Calcd for $C_{23}H_{25}NO_2$: C, 79.51; H, 7.25; N, 4.03%. Found: C, 79.22; H, 7.03; N, 4.38%; HRMS (ESI-TOF) calcd for $[C_{23}H_{25}NO_2+H]^+$ 348.196354; found 348.1966.

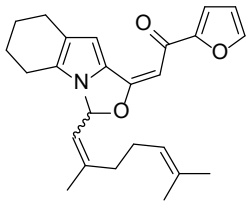


(*E*)-2-(3-(2,6-Dimethylhepta-1,5-dien-1-yl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-(thiophen-2-yl)ethan-1-one (2f). Yield: 184 mg (52%), yellow oil with citrus odor, *E/Z*-mixture 2:1; ^{1}H NMR (400.13 MHz, CDCl$_3$): δ 7.66-7.65 (m, 1H, H-3, thiophene), 7.63-7.62 (m, 1H, H-3, pyrrole), 7.53-7.51 (m, 1H, H-5, thiophene), 7.10-7.08 (m, 1H, H-4, thiophene), 6.83-6.82 (m, 1H, H-5, pyrrole), 6.61 (d, J = 8.7 Hz, 1H, NC(H)O), 6.50-6.49 (m, 1H, H-4, pyrrole), 6.39 (s, 1H, C(O)CH=), 5.22-5.21 (m, 1H, CH=), 5.07-5.06 (m, 1H, C<u>H</u>=CMe$_2$), 2.36-2.15 (m, 4H, CH$_2$CH$_2$), 1.93 (d, J = 1.3 Hz, 3H, CH$_3$, *E*-isomer), 1.87 (d, J = 1.3 Hz, 3H, CH$_3$, *Z*-isomer), 1.75 (d, J = 1.0 Hz, 3H, CH$_3$, *Z*-isomer), 1.69 (d, J = 1.0 Hz, 3H, CH$_3$, *E*-isomer), 1.66 (d, J = 1.0 Hz, 3H, CH$_3$, *Z*-isomer), 1.61 (d, J = 1.0 Hz, 3H, CH$_3$, *E*-isomer); ^{13}C NMR (100.6 MHz, CDCl$_3$), *E*-isomer: δ 181.2, 160.3, 148.4, 147.5, 133.5, 131.6, 129.4, 128.8, 128.0, 123.1, 119.6, 116.9, 116.4, 112.6, 92.8, 87.3, 39.6, 26.1, 25.7, 17.8, 17.1; *Z*-isomer: δ 181.2, 160.3, 148.6, 147.5, 133.2, 131.6, 129.4, 128.8, 128.0, 122.9, 120.3, 117.0, 116.4, 112.6, 92.7, 87.0, 32.7, 26.8, 25.8, 23.7, 17.8; IR (film): 2967, 2920, 2855, 1649, 1565, 1538, 1516, 1459, 1415, 1352, 1383, 1287, 1246, 1211, 1134, 1121, 1077, 1055, 1029, 947, 864, 794, 726, 662, 636 cm^{-1}; Anal. Calcd for $C_{21}H_{23}NO_2S$: C, 71.36; H, 6.56; N, 3.96; S, 9.07%. Found: C, 71.03; H, 6.29; N, 4.11; S, 9.31%.

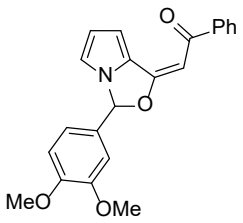


(*E*)-2-(5-Butyl-3-(2,6-dimethylhepta-1,5-dien-1-yl)-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2g). Yield: 218 mg (49%), yellow oil with citrus odor, *E/Z*-mixture 2:1; ^{1}H NMR (400.13 MHz, CDCl$_3$): δ 7.97-7.96 (m, 2H, H$_o$, COPh), 7.59 (s, 1H, H-3, pyrrole), 7.47-7.42 (m, 3H, H$_{m,p}$, COPh), 6.61 (d, J = 9.0 Hz, 1H, NC(H)O), 6.42 (s, 1H, C(O)CH=), 5.21 (d, J = 9.0 Hz, 1H, CH=), 5.09-5.07 (m, 1H, C<u>H</u>=CMe$_2$), 2.56-2.51 (m, 2H, CH$_2$), 2.45-2.42 (m, 2H, CH$_2$), 2.17-2.16 (m, 4H, CH$_2$CH$_2$), 1.97 (s, 3H, CH$_3$), 1.69 (s, 3H, CH$_3$), 1.67-1.63 (m, 2H, CH$_2$), 1.60 (s, 3H, CH$_3$), 1.51-1.44 (m, 2H, CH$_2$), 1.36-1.30 (m, 2H, CH$_2$), 1.00-0.96 (m, 3H, CH$_3$), 0.94-0.90 (m, 3H, CH$_3$); ^{13}C NMR (100.6 MHz, CDCl$_3$), *E*-isomer: δ 188.6, 161.0, 147.5, 140.4, 134.6, 131.4, 129.8 (2C), 128.8 (2C), 128.4, 127.7, 123.2, 119.4, 112.8, 91.5, 86.5, 80.9, 39.7, 31.6, 28.6, 26.0, 25.8, 24.7, 24.3, 22.8, 17.8, 17.1, 14.2, 14.0; *Z*-isomer: δ 188.6, 161.0, 147.8, 140.4, 136.3, 132.7, 129.8 (2C), 128.8 (2C), 128.4, 127.7, 123.0, 120.5, 112.8, 91.5, 86.3, 80.4, 39.7, 32.7, 29.8, 26.8, 25.8, 24.8, 23.8, 22.7, 17.8, 17.1, 14.2, 14.0; IR (film): 2959, 2930, 2870, 1658, 1599, 1582, 1548, 1498, 1446, 1390, 1362,

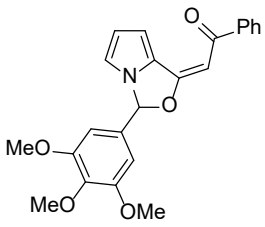
1283, 1231, 1177, 1154, 1101, 1036, 967, 859, 835, 770, 699, 658 cm^{-1}; Anal. Calcd for $C_{30}H_{39}NO_2$: C, 80.86; H, 8.82; N, 3.14%; Found: C, 80.58; H, 8.61; N, 2.98%.



(*E*)-2-(3-(2,6-Dimethylhepta-1,5-dien-1-yl)-5,6,7,8-tetrahydro-1*H*,3*H*-oxazolo[3,4-*a*]indol-1-ylidene)-1-(furan-2-yl)ethan-1-one (2h). Yield: 239 mg (61%), yellow oil with citrus odor, *E/Z*-mixture 2:1; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.52-7.50 (m, 1H, H-3, pyrrole), 7.46-7.45 (m, 1H, H-5, furan), 7.09-7.08 (m, 1H, H-3, furan), 6.55 (d, *J* = 8.8 Hz, 1H, NC(H)O), 6.49-6.48 (m, 1H, H-4, furan), 6.32 (s, 1H, C(O)CH=); 5.16 (d, *J* = 8.8 Hz, 1H, CH=), 5.05-5.03 (m, 1H, C<u>H</u>=CMe_2), 2.61-2.58 (m, 2H, CH_2-7), 2.53-2.51 (m, 2H, CH_2-4), 2.16-2.12 (m, 4H, CH_2CH_2), 1.92 (s, 3H, CH_3), 1.82-1.78 (m, 2H, CH_2-6), 1.73-1.71 (m, 2H, CH_2-5), 1.67 (s, 3H, CH_3), 1.59 (s, 3H, CH_3); ^{13}C NMR (100.6 MHz, $CDCl_3$), *E*-isomer: δ 177.3, 160.9, 154.9, 148.0, 144.7, 133.0, 129.2, 126.5, 126.1, 123.1, 118.8, 113.8, 112.0, 111.5, 91.0, 86.4, 39.6, 32.5, 25.7, 23.5, 23.2, 22.8, 22.0, 17.8, 16.9; *Z*-isomer: δ 177.3, 160.9, 154.9, 147.5, 144.7, 132.5, 129.2, 126.5, 126.1, 123.0, 119.6, 113.8, 112.0, 111.5, 91.0, 86.1, 39.6, 32.5, 25.8, 23.6, 23.2, 22.7, 22.2, 17.8, 16.9; IR (film): 2923, 2854, 1651, 1575, 1551, 1473, 1444, 1385, 1287, 1334, 1244, 1196, 1150, 1086, 1054, 1009, 973, 922, 883, 817, 754, 593 cm^{-1}; Anal. Calcd for $C_{25}H_{29}NO_3$: C, 76.70; H, 7.47; N, 3.58%; Found: C, 77.01; H, 7.59; N, 3.34%.

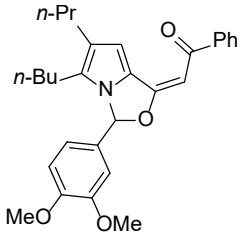


(*E*)-2-(3-(3,4-Dimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2i). Yield: 195 mg (54%), red oil; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 8.00-7.98 (m, 2H, H_o, COPh), 7.77 (d, *J* = 3.6 Hz, 1H, H-3, pyrrole), 7.52-7.42 (m, 3H, $H_{m,p}$, COPh), 6.94-6.88 (m, 2H, CH, C_6H_3), 6.83-6.81 (m, 2H, H-5, pyrrole, C(O)CH=), 6.67 (m, 1H, NC(H)O), 6.59-6.57 (m, 2H, H-4, pyrrole, CH, C_6H_3), 3.90 (s, 3H, OMe), 3.81 (s, 3H, OMe); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 189.0, 160.3, 151.2, 149.9, 139.9, 131.8, 129.3, 128.5 (2C), 127.75, 127.7 (2C), 120.4, 117.9, 116.7, 112.4, 111.2, 109.1, 93.1, 91.4, 56.1 (2C); IR (film): 2933, 2839, 1658, 1599, 1582, 1563, 1516, 1457, 1426, 1386, 1353, 1264, 1241, 1214, 1165, 1130, 1044, 1025, 972, 812, 776, 742 cm^{-1}; Anal. Calcd for $C_{22}H_{19}NO_4$: C, 73.12; H, 5.30; N, 3.88%; Found: C, 72.82; H, 5.16; N, 3.57%; HRMS (ESI-TOF) calcd for $[C_{22}H_{19}NO_4+H]^+$ 362.139234; found 362.13931.

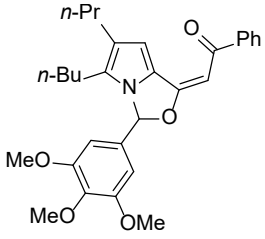


(*E*)-1-Phenyl-2-(3-(3,4,5-trimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)ethan-1-one (2j). Yield: 246 mg (63%), red oil; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 8.00-7.98 (m, 2H, H_o, COPh), 7.78 (d, *J* = 3.7 Hz, 1H, H-3, pyrrole), 7.53-7.44 (m, 3H, $H_{m,p}$, COPh), 6.86-6.85 (m, 1H, H-5, pyrrole), 6.79 (s, 1H, NC(H)O) 6.60 (s, 1H, C(O)CH=), 6.59-6.58 (m, 1H, H-4, pyrrole), 6.48 (s, 2H, CH, C_6H_2), 3.87 (s, 3H, OMe), 3.83 (s, 6H, OMe); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 189.0, 160.1, 154.0 (2C), 140.1, 139.8, 131.8, 130.7, 129.3, 128.5 (2C), 127.7 (2C), 117.9, 116.8, 112.5, 104.0 (2C), 93.2, 91.3, 60.9, 56.3 (2C); IR (film): 2938, 2841, 2250, 2172, 1660, 1583, 1559, 1457, 1439, 1426, 1386, 1352, 1285, 1223, 1215, 1183, 1130, 1044, 1001, 957, 911, 858, 819, 776, 731, 638, 527 cm^{-1}; Anal. Calcd for $C_{23}H_{21}NO_5$: C, 70.58; H, 5.41; N,

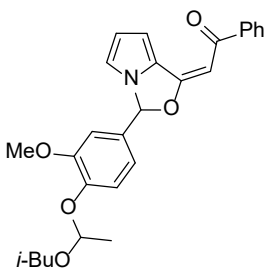
3.58%; Found: C, 70.25; H, 5.39; N, 3.68%; HRMS (ESI-TOF) calcd for $[C_{23}H_{21}NO_5+H]^+$ 392.149799; found 392.14994.



(*E*)-2-(5-Butyl-3-(3,4-dimethoxyphenyl)-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2k). Yield: 353 mg (77%), yellow crystals, mp 98-100 °C; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.99-7.97 (m, 2H, H_o, COPh), 7.67 (s, 1H, H-3, pyrrole), 7.51-7.42 (m, 3H, $H_{m,p}$, COPh), 6.95-6.88 (m, 2H, CH, C_6H_3), 6.73 (s, 1H, CH, C_6H_3), 6.60 (s, 1H, NC(H)O), 6.47 (s, 1H, C(O)CH=), 3.91 (s, 3H, OMe), 3.79 (s, 3H, OMe), 2.45-2.41 (m, 2H, CH_2), 2.39-2.33 (m, 1H, CH_2), 2.17-2.10 (m, 1H, CH_2), 1.69-1.63 (m, 2H, CH_2), 1.34-1.27 (m, 1H, CH_2), 1.20-1.11 (m, 3H, CH_2), 0.96 (t, J = 7.3 Hz, 3H, CH_3), 0.78 (t, J = 7.0 Hz, 3H, CH_3); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 188.8, 160.6, 151.3, 150.0, 140.3, 131.9, 131.5, 129.6, 128.4 (2C), 127.9, 127.7 (2C), 126.7, 120.7, 112.9, 111.1, 109.2, 91.8, 91.1, 56.2, 56.2, 31.0, 28.6, 24.7, 24.2, 22.5, 14.1, 13.8; IR (film): 2957, 2928, 2869, 1654, 1599, 1582, 1546, 1517, 1463, 1424, 1389, 1362, 1319, 1265, 1235, 1176, 1157, 1140, 1101, 1026, 978, 933, 852, 810, 771, 702 cm^{-1}; Anal. Calcd for $C_{29}H_{33}NO_4$: C, 75.79; H, 7.24; N, 3.05%; Found: C, 76.05; H, 7.42; N, 3.19%.

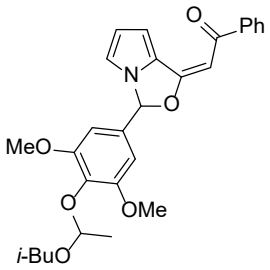


(*E*)-2-(5-Butyl-6-propyl-3-(3,4,5-trimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2l). Yield: 367 mg (75%), yellow crystals, mp 128-129 °C; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.99-7.97 (m, 2H, H_o, COPh), 7.67 (s, 1H, H-3, pyrrole), 7.51-7.42 (m, 3H, $H_{m,p}$, COPh), 6.70 (s, 1H, NC(H)O), 6.48 (s, 1H, C(O)CH=), 6.45 (s, 2H, CH, C_6H_2), 3.86 (s, 3H, OMe), 3.81 (s, 6H, OMe), 2.46-2.42 (m, 2H, CH_2), 2.40-2.35 (m, 1H, CH_2), 2.22-2.16 (m, 1H, CH_2), 1.69-1.63 (m, 2H, CH_2), 1.34-1.28 (m, 1H, CH_2), 1.20-1.14 (m, 3H, CH_2), 0.96 (t, J = 7.3 Hz, 3H, CH_3), 0.78 (t, J = 7.0 Hz, 3H, CH_3); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 188.9, 160.5, 154.1 (2C), 140.2, 140.2, 131.9, 131.6, 130.9, 129.8, 128.5 (2C), 127.7 (2C), 126.7, 113.0, 104.2 (2C), 92.0, 91.1, 61.0, 56.5 (2C), 31.1, 28.6, 24.8, 24.2, 22.5, 14.1, 13.8; IR (film): 2958, 2935, 2871, 1650, 1598, 1583, 1547, 1503, 1464, 1427, 1392, 1350, 1289, 1239, 1127, 1154, 1176, 1103, 1049, 1001, 966, 853, 831, 771, 700, 630 cm^{-1}; Anal. Calcd for $C_{30}H_{35}NO_5$: C, 73.60; H, 7.21; N, 2.86%; Found: C, 73.42; H, 7.50; N, 2.58%.

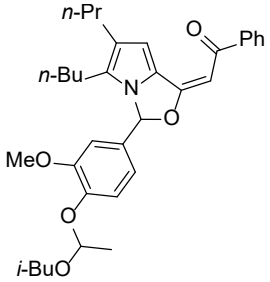


(*E*)-2-(3-(4-(1-*iso*-*B*utoxyethoxy)-3-methoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2m). Yield: 277 mg (62%), yellow oil; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 8.01-7.99 (m, 2H, H_o, COPh), 7.79 (d, J = 3.7 Hz, 1H, H-3, pyrrole), 7.52-7.45 (m, 3H, $H_{m,p}$, COPh), 7.19-7.17 (m, 1H, CH, C_6H_3), 6.91-6.88 (m, 1H, CH, C_6H_3), 6.85-6.84 (m, 1H, H-5, pyrrole), 6.82 (s, 1H, C(O)CH=), 6.71-6.69 (m, 1H, CH, C_6H_3), 6.60 (s, 1H, NC(H)O), 6.59 (dd, J = 3.7, 2.4 Hz, 1H, H-4, pyrrole), 5.42 (q, J = 5.4 Hz, 1H, CH, acetal), 3.80 (s, 3H, OMe), 3.55-3.51 (m, 1H, *i*-Bu), 3.29-3.25 (m, 1H, *i*-Bu), 1.88-1.81 (m, 1H, *i*-Bu),

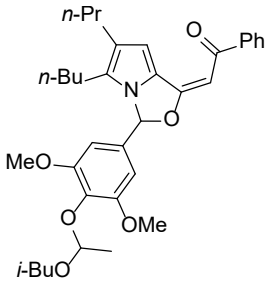
1.55-1.53 (m, 3H, *i*-Bu), 0.91-0.88 (m, 6H, Me, *i*-Bu); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 189.1, 160.3, 151.4, 148.4, 140.0, 131.8, 129.3, 128.5 (2C), 127.8 (2C), 120.3, 120.2, 118.5, 117.9, 116.8, 112.5, 110.0, 109.9, 101.2, 93.2, 91.4, 72.9, 56.1, 28.6, 20.1, 19.5; IR (film): 1660, 1598, 1584, 1564, 1513, 1459, 1426, 1385, 1355, 1313, 1264, 1241, 1214, 1132, 1034, 1016, 973, 864, 773, 733, 696, 637 cm^{-1}; Anal. Calcd for $C_{27}H_{29}NO_5$: C, 72.46; H, 6.53; N, 3.13%; Found: C, 72.67; H, 6.31; N, 2.98%; HRMS (ESI-TOF) calcd for $[C_{27}H_{29}NO_5+H]^+$ 448.212399; found 448.22526.



(*E*)-2-(3-(4-(1-*iso*-Butoxyethoxy)-3,5-dimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2n). Yield: 305 mg (64%), yellow oil; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 8.00-7.99 (m, 2H, H_o, COPh), 7.79 (d, *J* = 3.7 Hz, 1H, H-3, pyrrole), 7.54-7.45 (m, 3H, $H_{m,p}$, COPh), 6.86-6.85 (m, 1H, H-5, pyrrole), 6.79 (s, 1H, C(O)CH=), 6.61 (s, 1H, NC(H)O), 6.59-6.58 (m, 1H, H-4, pyrrole), 6.48 (s, 2H, CH, C_6H_2), 5.27 (q, *J* = 5.1 Hz, 1H, CH, acetal), 3.80 (s, 6H, OMe), 3.61-3.57 (m, 1H, *i*-Bu), 3.33-3.29 (m, 1H, *i*-Bu), 1.84-1.78 (m, 1H, *i*-Bu), 1.50-1.49 (m, 3H, CH_3, alkyl), 0.88-0.86 (m, 6H, *i*-Bu); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 189.1, 160.2, 154.1 (2C), 139.9, 137.3 (2C), 131.9, 130.7, 129.4, 128.6 (2C), 127.8 (2C), 118.0, 116.9, 112.6, 104.0 (2C), 103.9, 93.4, 91.5, 74.5, 56.3 (2C), 28.7, 21.0, 19.5 (2C); IR (film): 2959, 2926, 1660, 1599, 1583, 1565, 1501, 1457, 1427, 1386, 1352, 1285, 1243, 1216, 1132, 1045, 1018, 960, 901, 860, 819, 777, 739, 697, 639 cm^{-1}; Anal. Calcd for $C_{28}H_{31}NO_6$: C, 70.42; H, 6.54; N, 2.93 %; Found: C, 70.19; H, 6.83; N, 2.67 %; HRMS (ESI-TOF) calcd for $[C_{28}H_{31}NO_6+H]^+$ 478.222964; found 478.22280.



(*E*)-2-(3-(4-(1-(*iso*-Butoxy)ethoxy)-3-methoxyphenyl)-5-butyl-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2o). Yield: 371 mg (68%), yellow crystals, mp 22-24 °C; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.99-7.97 (m, 2H, H_o, COPh), 7.67 (s, 1H, H-3, pyrrole), 7.49-7.42 (m, 3H, $H_{m,p}$, COPh), 7.17-7.15 (m, 1H, CH, C_6H_3), 6.89-6.87 (m, 1H, CH, C_6H_3), 6.72 (s, 1H, C(O)CH=), 6.64-6.62 (m, 1H, CH, C_6H_3), 6.48 (s, 1H, NC(H)O), 5.41 (q, *J* = 5.3 Hz, 1H, CH, acetal), 3.76 (s, 3H, OMe), 3.53-3.49 (m, 1H, *i*-Bu), 3.27-3.23 (m, 1H, *i*-Bu), 2.43-2.41 (m, 2H, CH_2, alkyl), 2.39-2.32 (m, 1H, CH_2, alkyl), 2.18-2.12 (m, 1H, CH_2, alkyl), 1.86-1.79 (m, 1H, *i*-Bu), 1.68-1.63 (m, 2H, CH_2, alkyl), 1.53-1.52 (m, 3H, *i*-Bu), 1.15-1.12 (m, 2H, CH_2, alkyl), 0.97-0.94 (m, 3H, CH_3, alkyl), 0.91-0.88 (m, 8H, CH_2, alkyl, Me, *i*-Bu), 0.78-0.75 (m, 3H, CH_3, alkyl); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 188.8, 160.6, 151.5, 148.3, 140.3, 131.8, 131.5, 129.6, 129.4, 128.4 (2C), 127.7 (2C), 126.6, 120.5, 118.5, 112.9, 110.0, 101.1, 91.8, 91.0, 72.9, 56.2, 31.0, 28.6 (2C), 24.7, 24.2, 22.5, 20.0, 19.5, 19.4, 14.2, 13.8; IR (film): 1656, 1598, 1582, 1551, 1509, 1465, 1424, 1387, 1362, 1266, 1233, 1153, 1100, 1034, 986, 855, 733, 700 cm^{-1}; Anal. Calcd for $C_{34}H_{43}NO_5$: C, 74.83; H, 7.94; N, 2.57%; Found: C, 75.11; H, 7.69; N, 2.29%; HRMS (ESI-TOF) calcd for $[C_{34}H_{43}NO_5+H]^+$ 546.321949; found 546.33515.



(*E*)-2-(3-(4-(1-(*iso*-Butoxy)ethoxy)-3,5-dimethoxyphenyl)-5-butyl-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (2p). Yield: 385 mg (67%), yellow crystals, mp 62-63 °C; ^{1}H NMR (400.13 MHz, $CDCl_3$): δ 7.99-7.96 (m, 2H, H_o, COPh), 7.67 (s, 1H, H-3, pyrrole), 7.49-7.43 (m, 3H, $H_{m,p}$, COPh), 6.69 (s, 1H, C(O)CH=), 6.49 (s, 1H, NC(H)O), 6.44 (s, 2H, CH, C_6H_2), 5.25 (q, *J* = 5.1 Hz, 1H, CH, acetal), 3.78 (s, 6H, OMe), 3.61-3.57 (m, 1H, *i*-Bu), 3.30-3.26 (m, 1H, *i*-Bu), 2.46-2.42 (m, 2H, CH_2, alkyl), 2.38-2.34 (m, 1H, CH_2, alkyl), 2.19-2.12 (m, 1H, CH_2, alkyl), 1.83-1.78 (m, 1H, *i*-Bu), 1.69-1.63 (m, 2H, CH_2, alkyl), 1.49-1.47 (m, 3H, *i*-Bu), 1.33-1.26 (m, 1H, CH_2, alkyl), 1.19-1.13 (m, 3H, CH_2, alkyl), 0.98-0.93 (m, 3H, CH_3, alkyl), 0.88-0.85 (m, 6H, CH_3, alkyl), 0.80-0.76 (m, 3H, CH_3, alkyl); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 188.8, 160.5, 154.1 (2C), 140.2, 137.2, 131.9, 131.6, 130.7, 129.7, 128.4 (2C), 127.7 (2C), 126.7, 113.0, 104.2 (2C), 104.0, 91.9, 91.1, 74.6, 56.2 (2C), 31.0, 28.6, 28.5, 24.7, 24.2, 22.5, 21.0, 19.5 (2C), 14.1, 13.8; IR (film): 2956, 2931, 2872, 1657, 1597, 1583, 1549, 1501, 1467, 1425, 1386, 1352, 1235, 1177, 1155, 1131, 1102, 1049, 1000, 960, 899, 855, 771, 699 cm^{-1}; Anal. Calcd for $C_{35}H_{45}NO_6$: C, 73.02; H, 7.88; N, 2.43%; Found: C, 73.29; H, 7.59; N, 2.64%; HRMS (ESI-TOF) calcd for $[C_{35}H_{45}NO_6+H]^+$ 576.332514; found 576.33281.

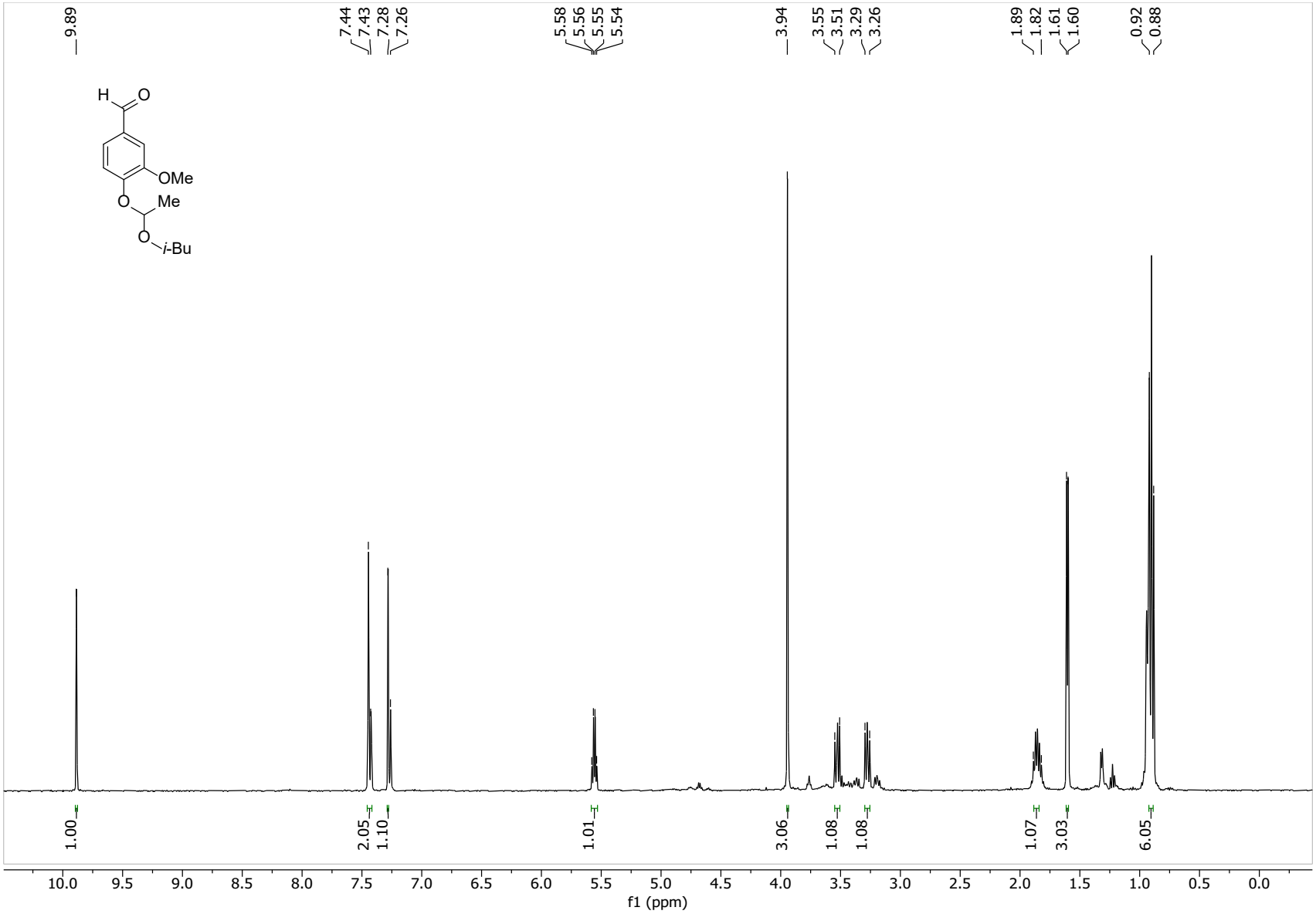
References

S1 B. A. Trofimov, Z. V. Stepanova, L. N. Sobenina, A. I. Mikhaleva and I. A. Ushakov, *Tetrahedron Lett.,* 2004, **45**, 6513; https://doi.org/10.1016/j.tetlet.2004.06.114.

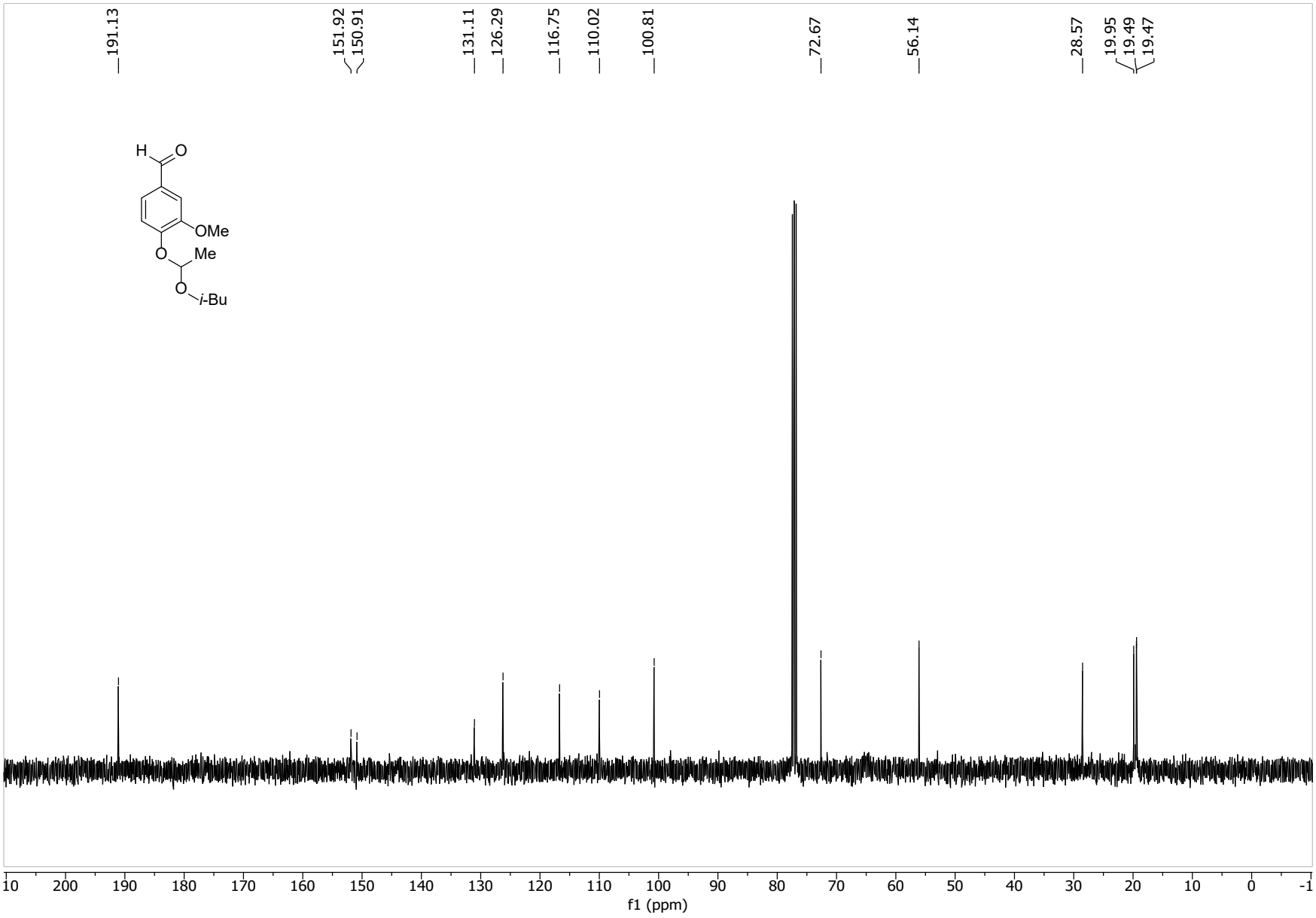
S2 L. Gavara, T. Boisse, J.-P. Hénichart, A. Daïch, B. Rigo and P. Gautret, *Tetrahedron,* 2010, **66**, 7544; https://doi.org/10.1016/j.tet.2010.07.048.

NMR Spectra of synthesized compounds

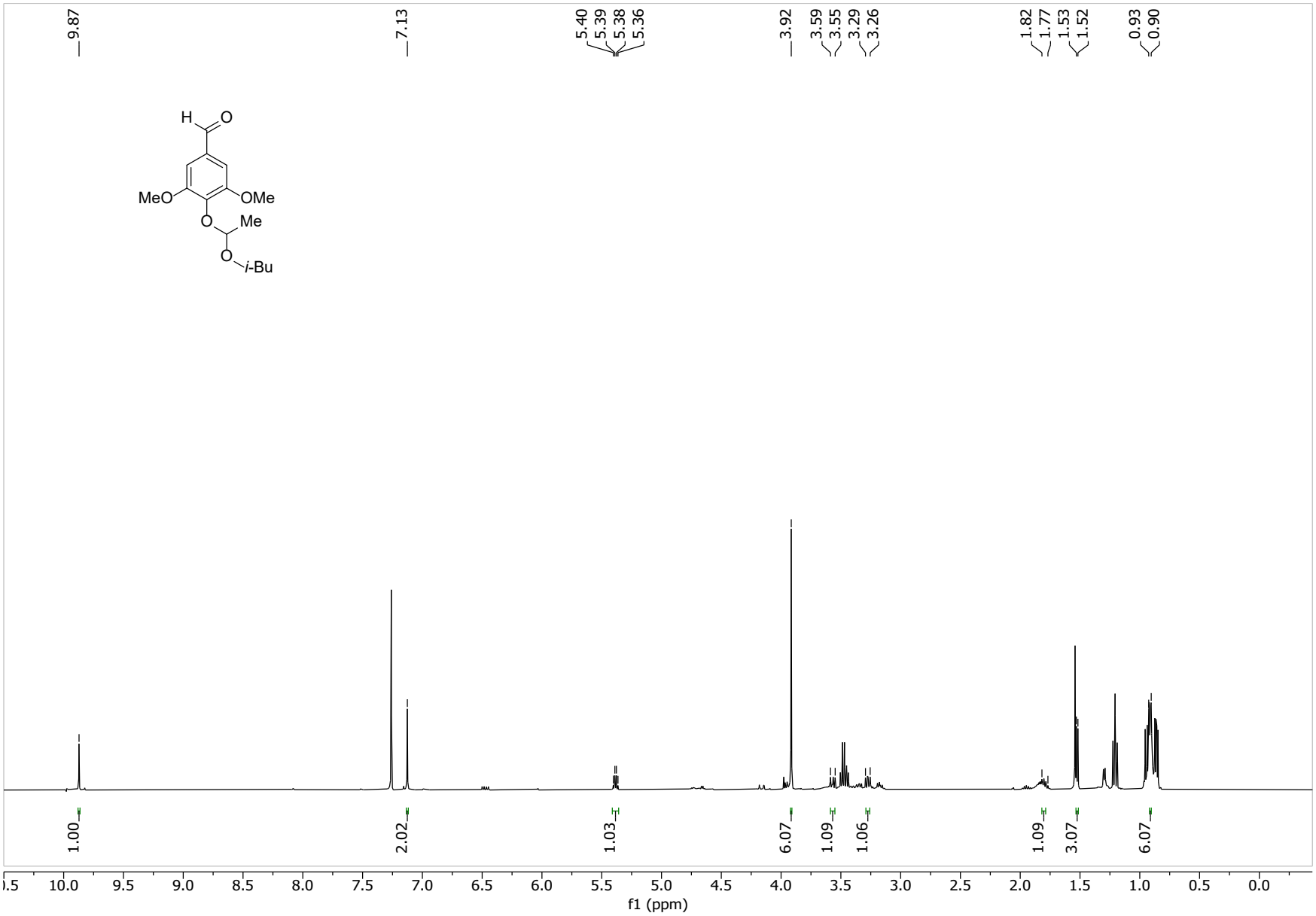
^{1}H NMR spectrum of 4-(1-*iso*butoxyethoxy)-3-methoxybenzaldehyde (**4c**)



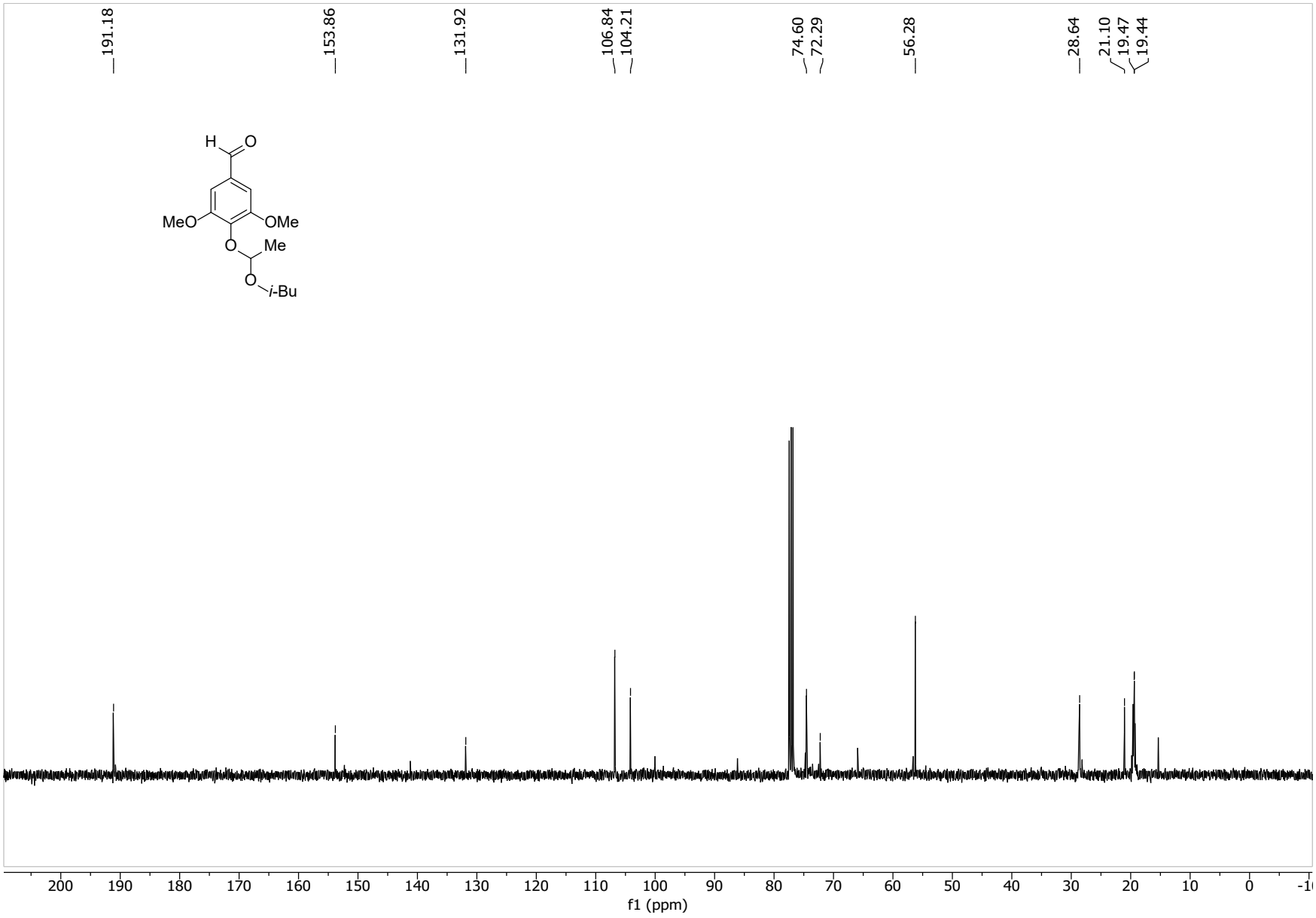
^{13}C NMR spectrum of 4-(1-*iso*butoxyethoxy)-3-methoxybenzaldehyde (**4c**)



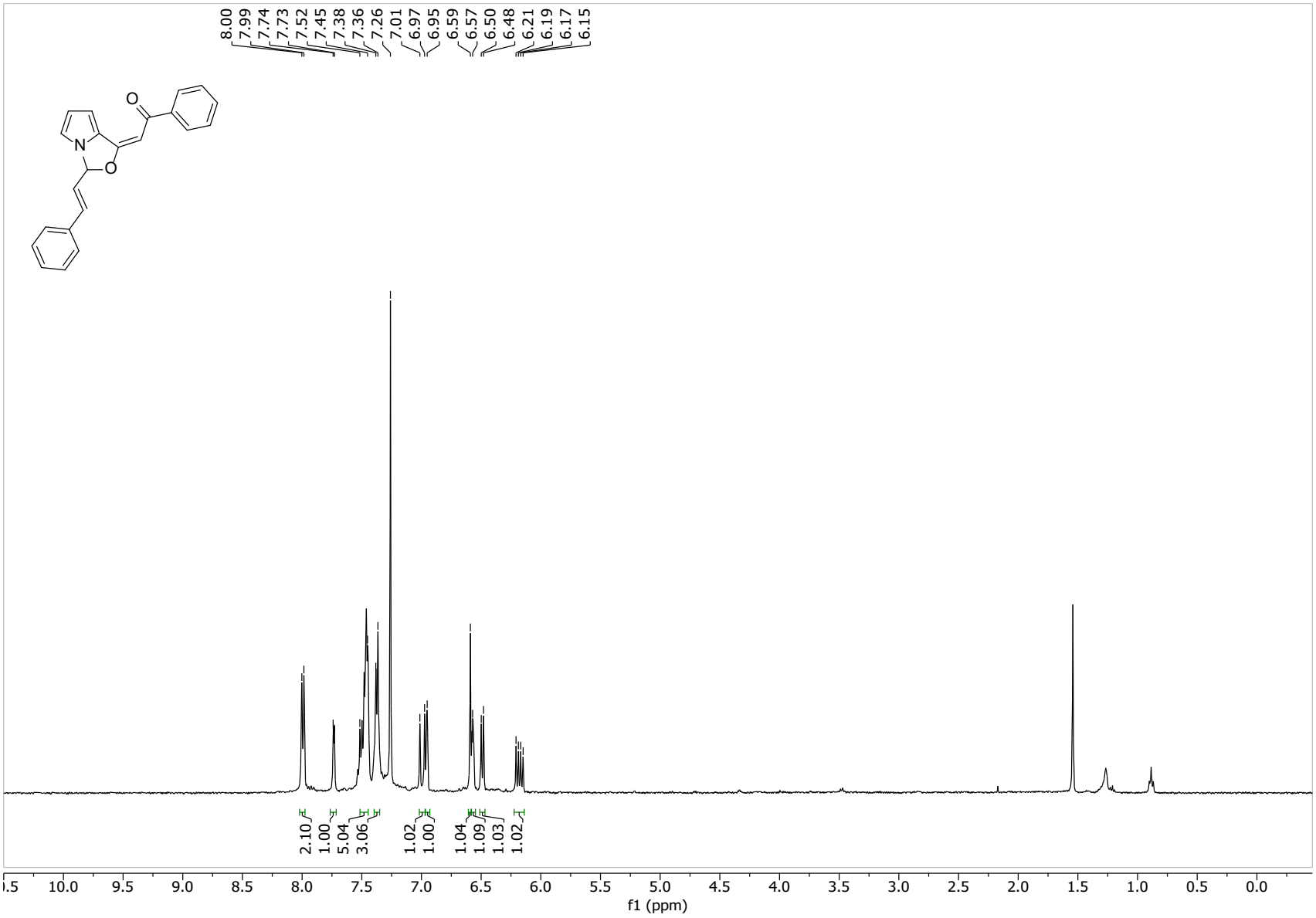
[1]H NMR spectrum of 4-(1-*iso*butoxyethoxy)-3,5-dimethoxybenzaldehyde (**4d**)



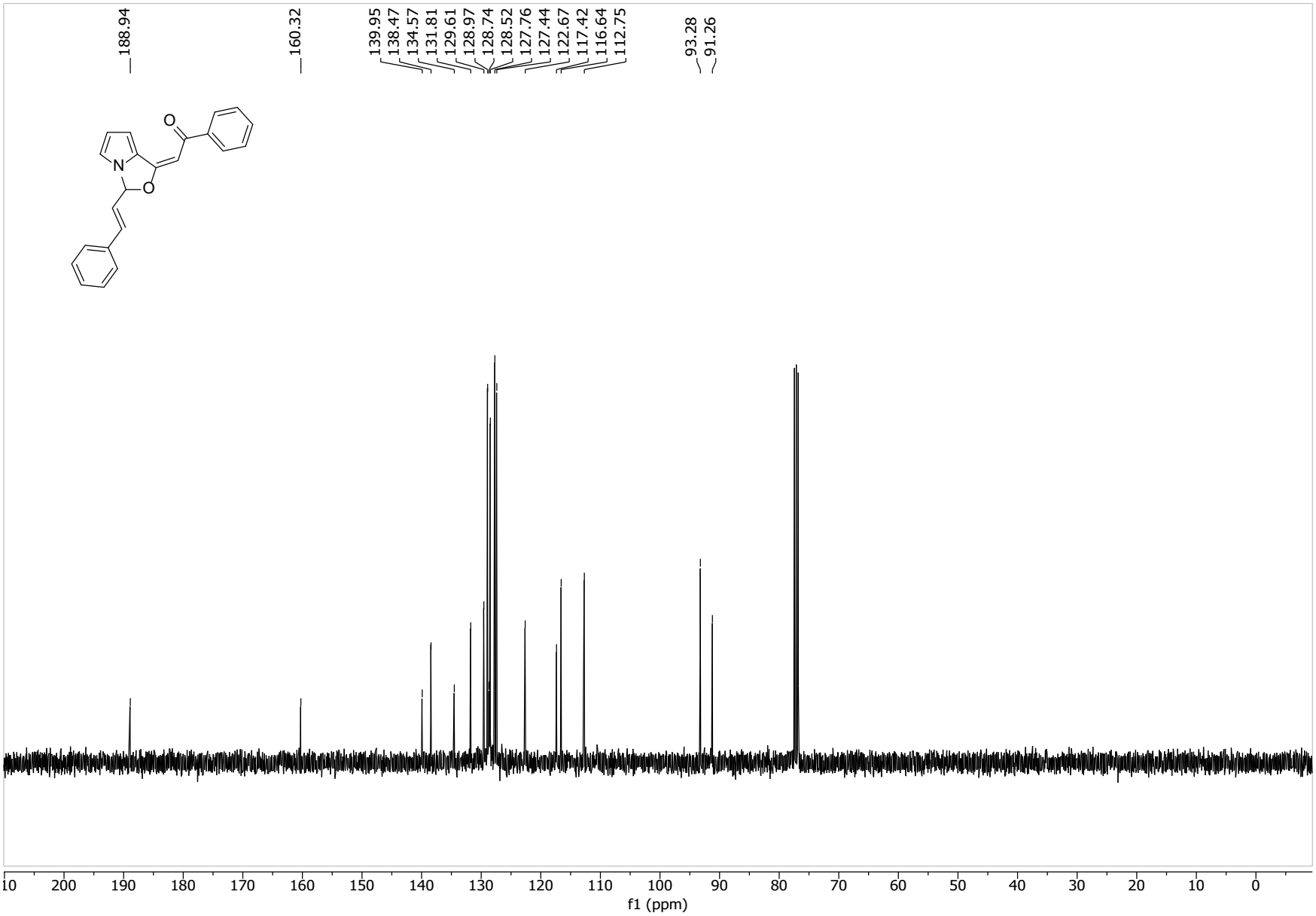
^{13}C NMR spectrum of 4-(1-*iso*butoxyethoxy)-3,5-dimethoxybenzaldehyde (**4d**)



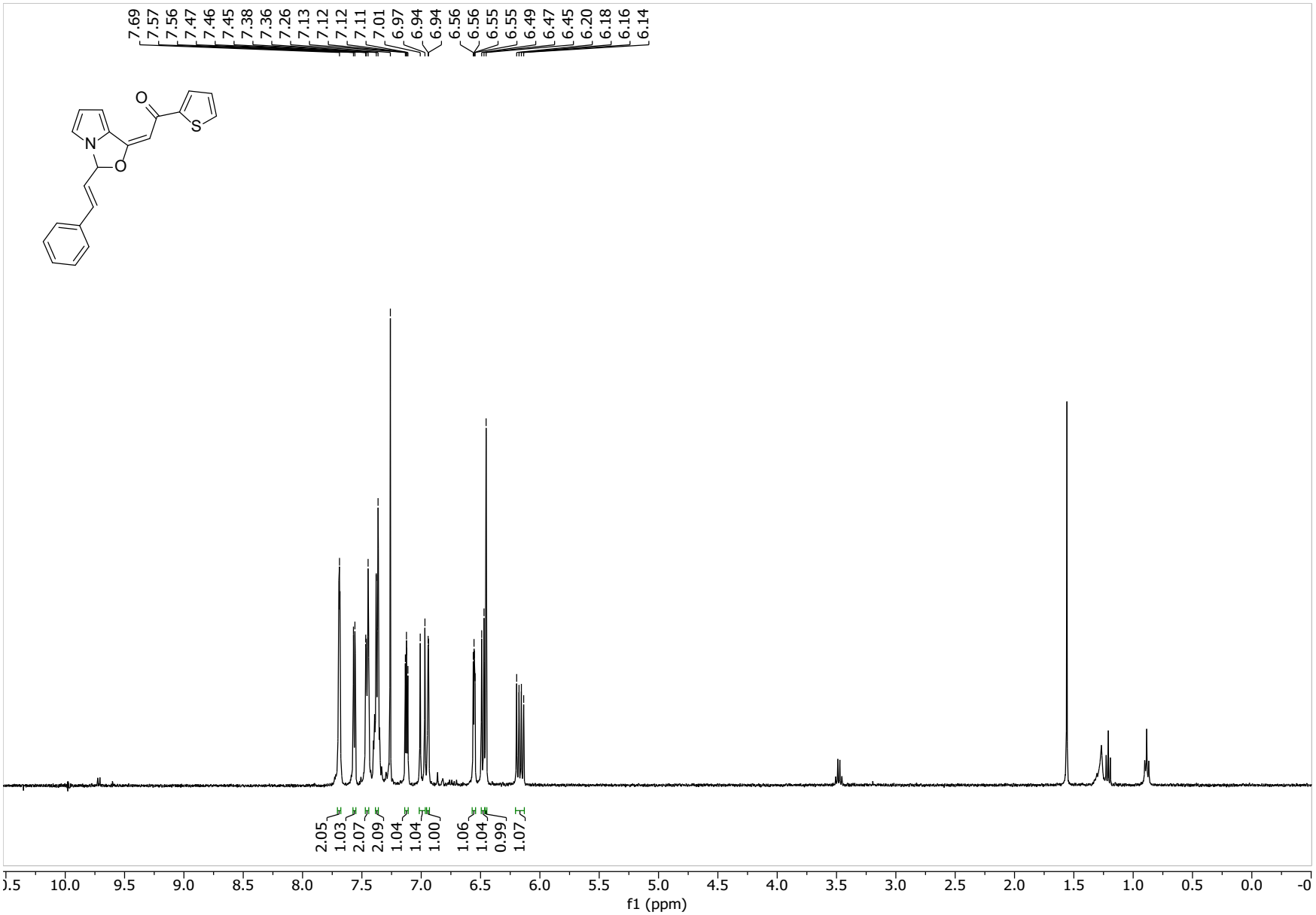
[1]H NMR spectrum of (*E*)-1-phenyl-2-(3-((*E*)-styryl)-1H,3H-pyrrolo[1,2-*c*]oxazol-1-ylidene)ethan-1-one (**2a**)



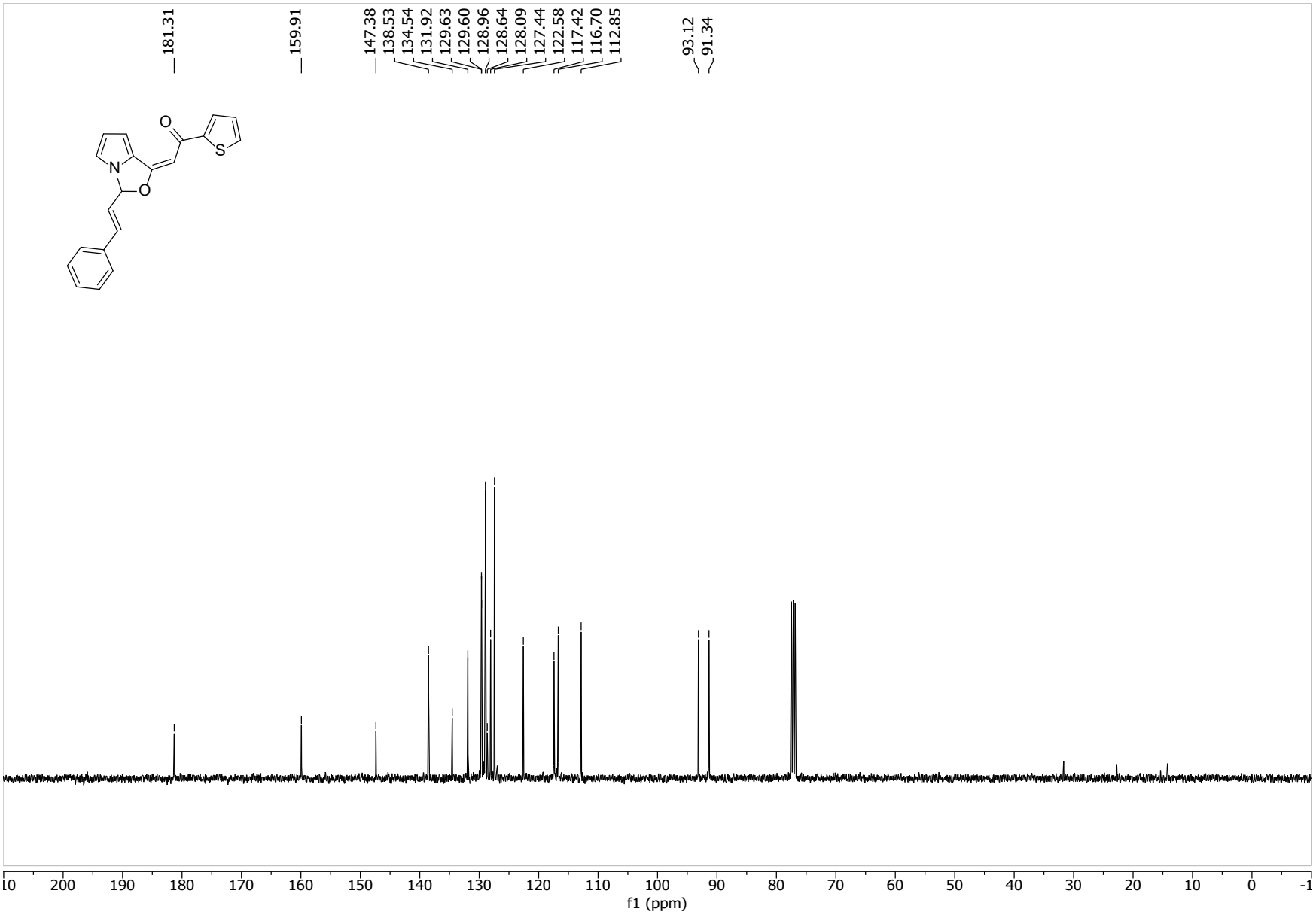
^{13}C NMR spectrum of (*E*)-1-phenyl-2-(3-((*E*)-styryl)-1H,3H-pyrrolo[1,2-*c*]oxazol-1-ylidene)ethan-1-one (**2a**)



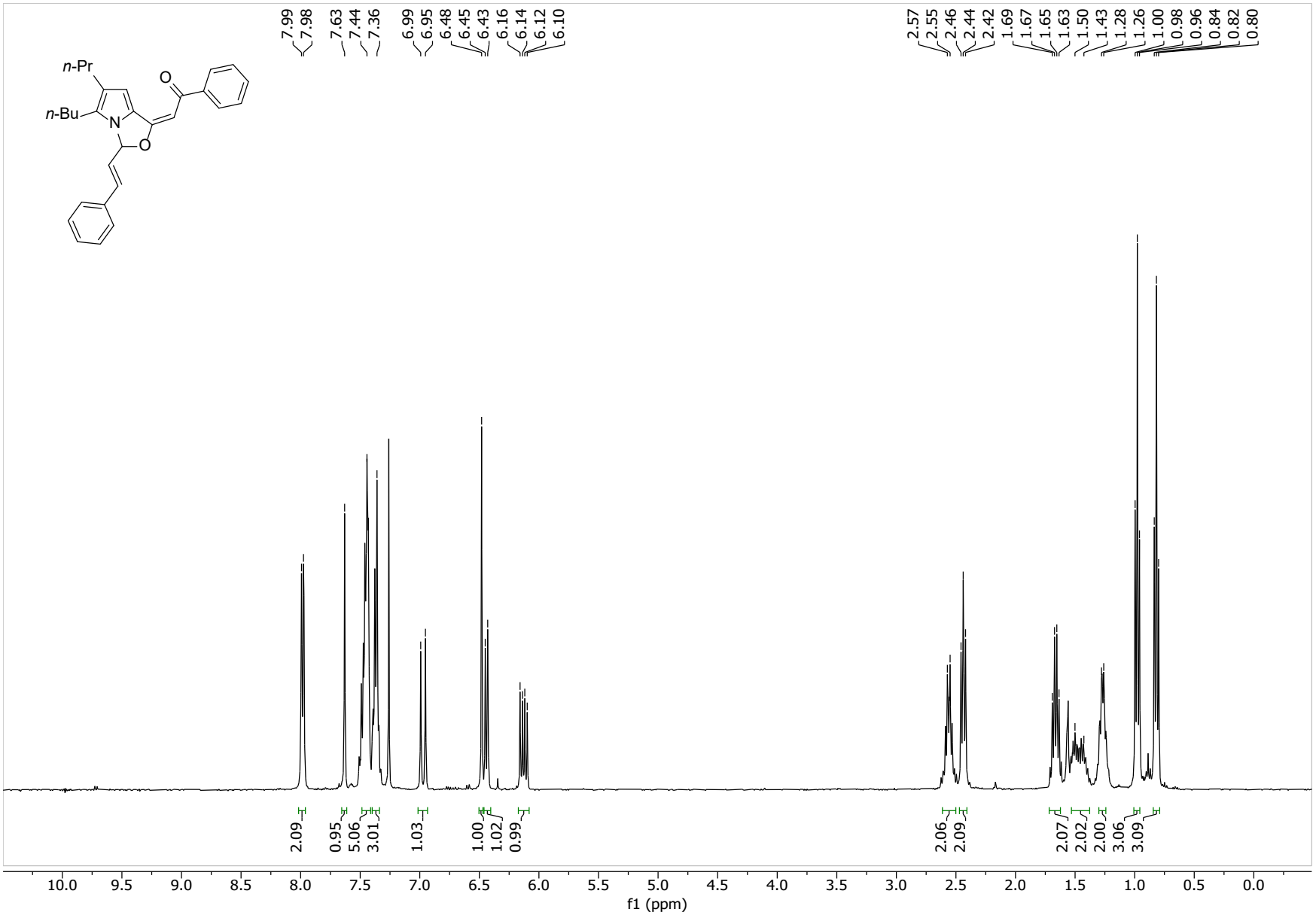
^{1}H NMR spectrum of (*E*)-2-(3-((*E*)-styryl)-1H,3H-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-(thiophen-2-yl)ethan-1-one (**2b**)



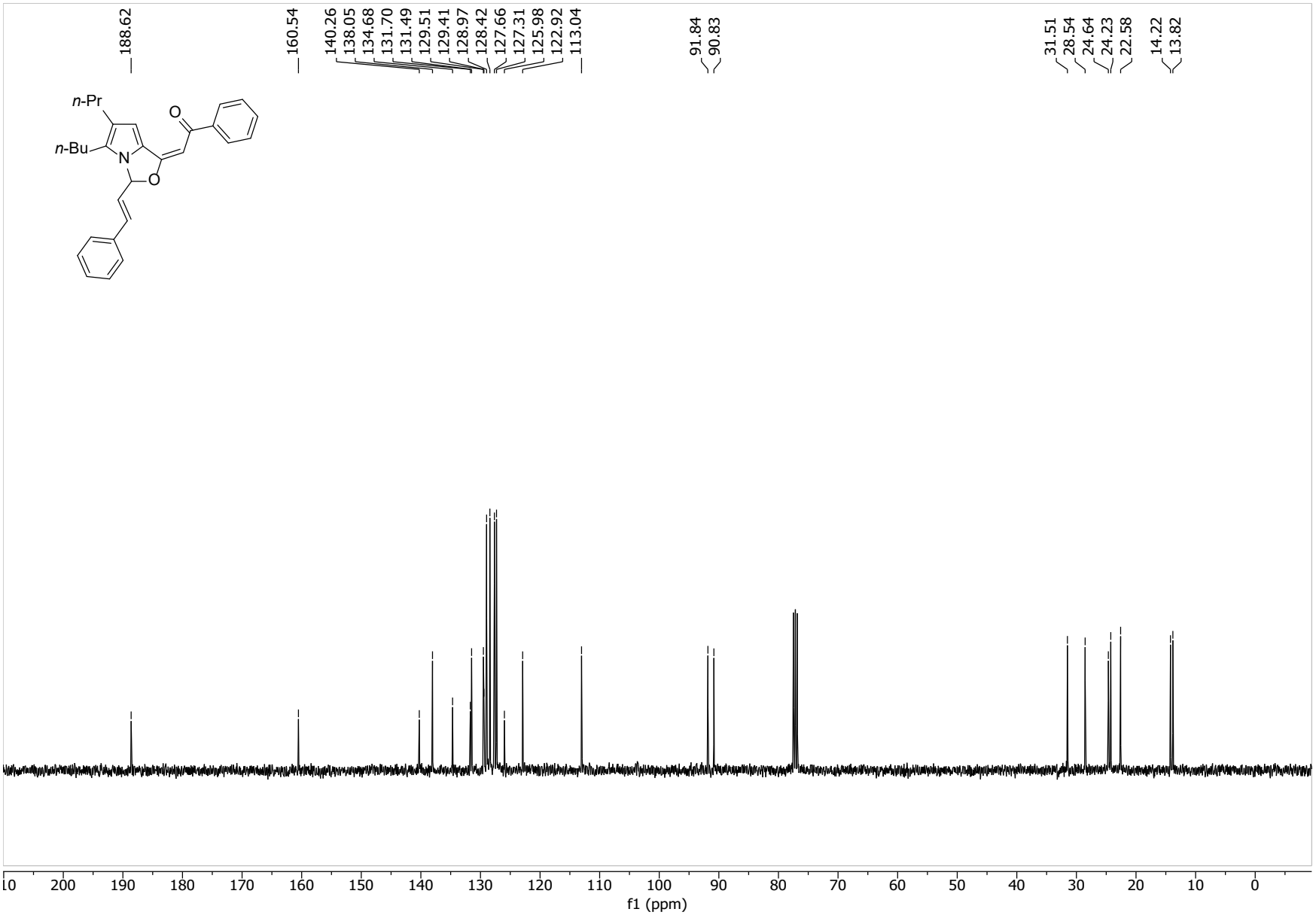
^{13}C NMR spectrum of (*E*)-2-(3-((*E*)-styryl)-1H,3H-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-(thiophen-2-yl)ethan-1-one (**2b**)



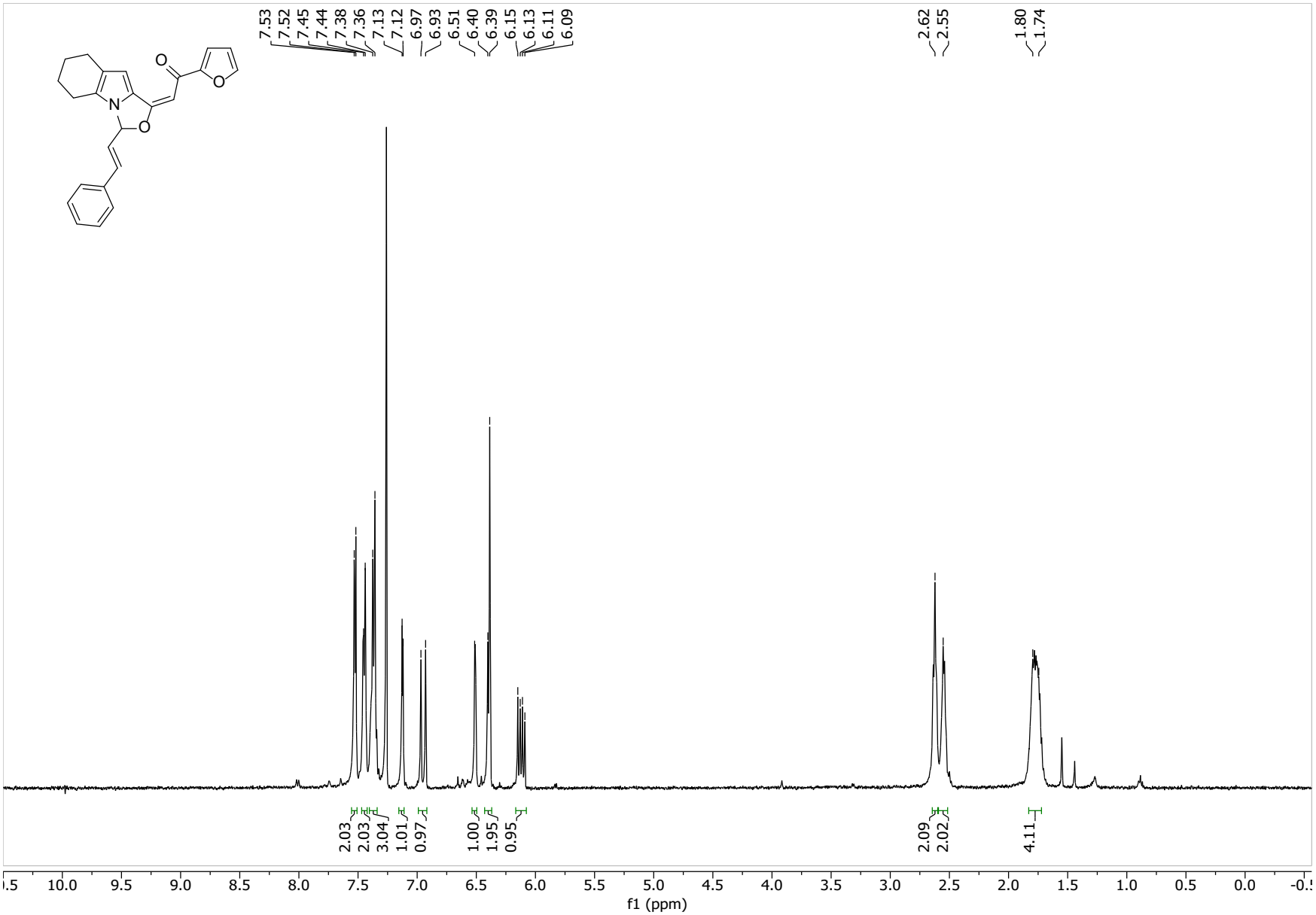
^{1}H NMR spectrum of (*E*)-2-(5-butyl-6-propyl-3-((*E*)-styryl)-1H,3H-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2c**)



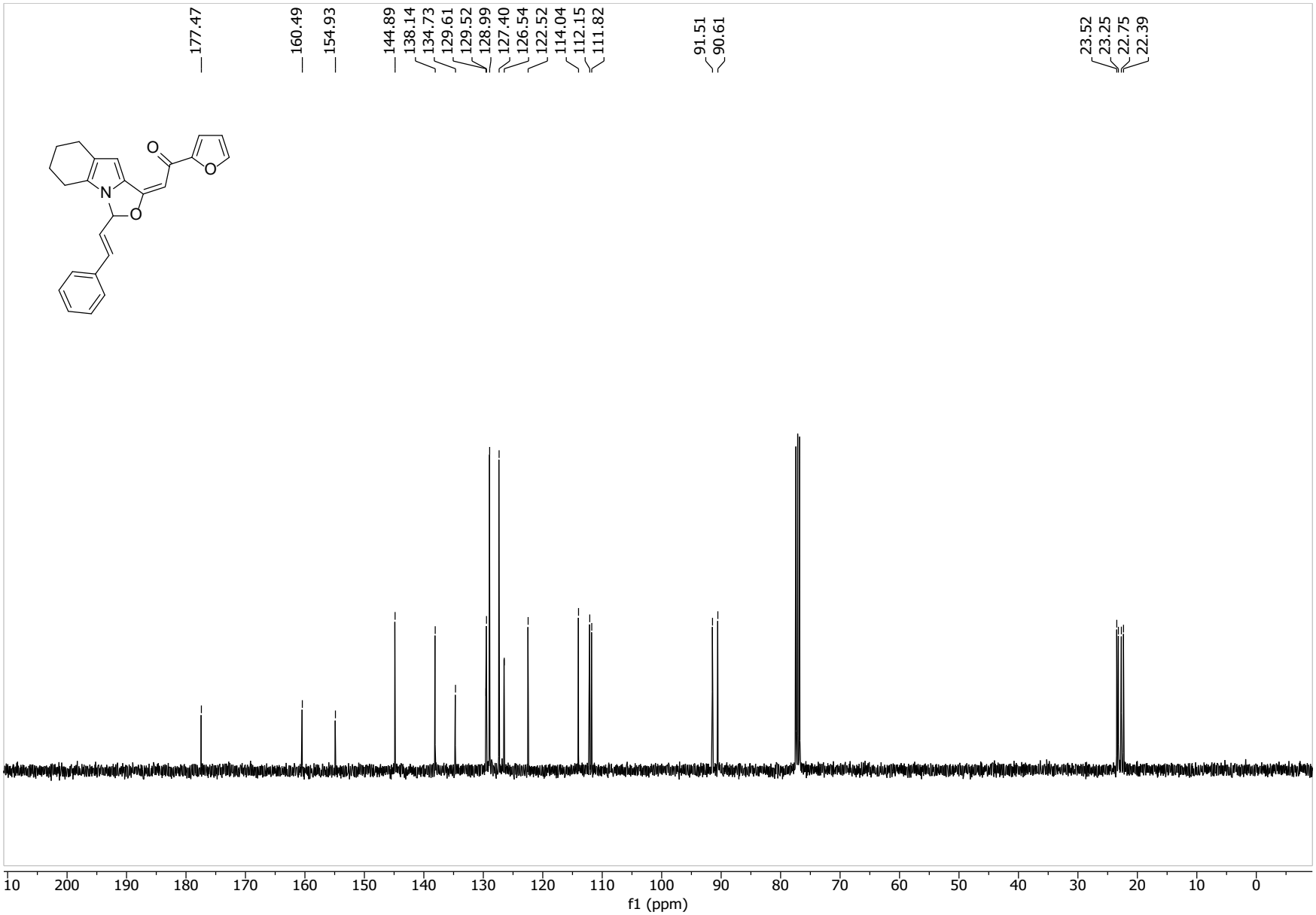
^{13}C NMR spectrum of (*E*)-2-(5-butyl-6-propyl-3-((*E*)-styryl)-1H,3H-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2c**)



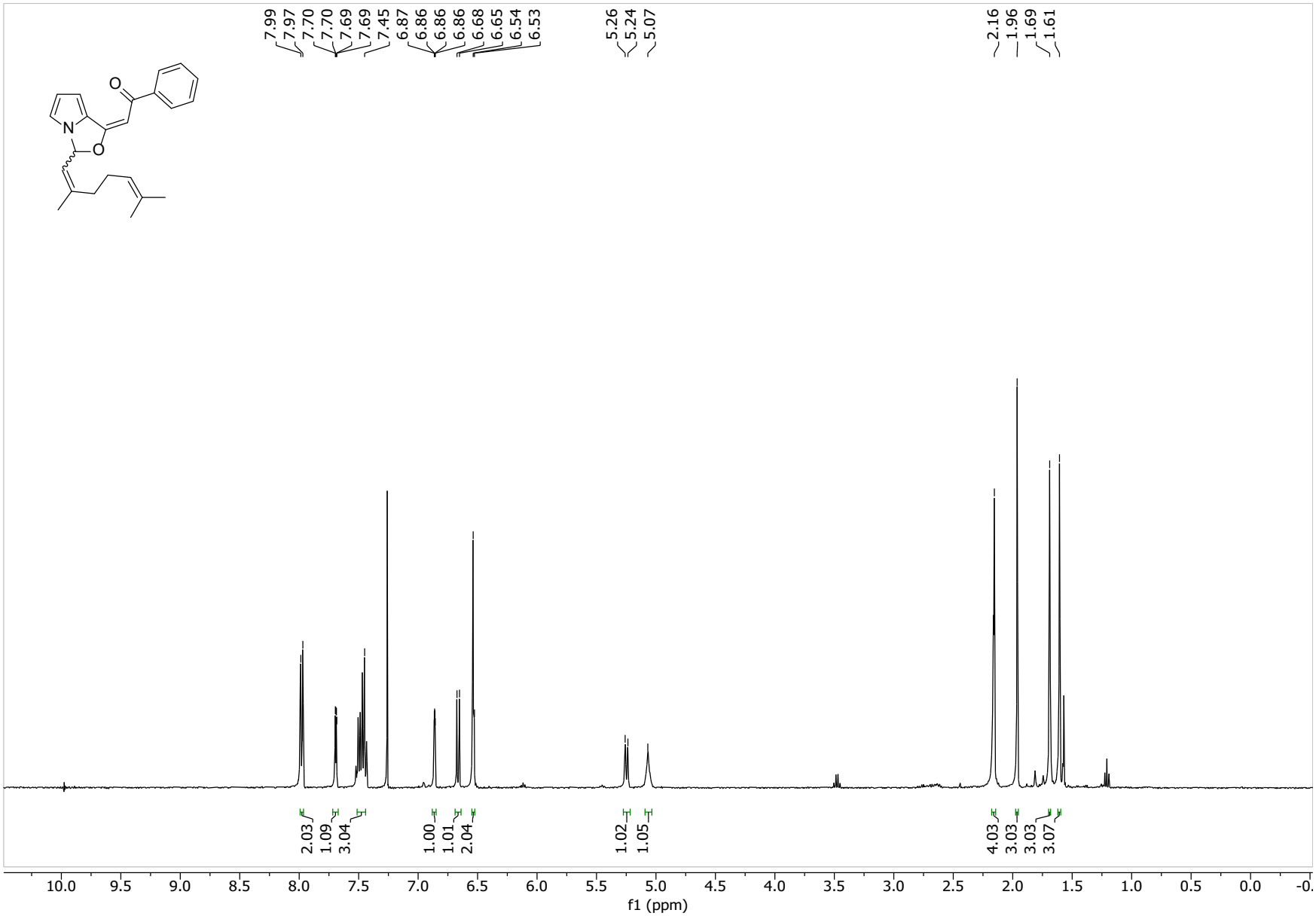
^{1}H NMR spectrum of (*E*)-1-(furan-2-yl)-2-(3-((*E*)-styryl)-5,6,7,8-tetrahydro-1*H*,3*H*-oxazolo[3,4-*a*]indol-1-ylidene)ethan-1-one (**2d**)



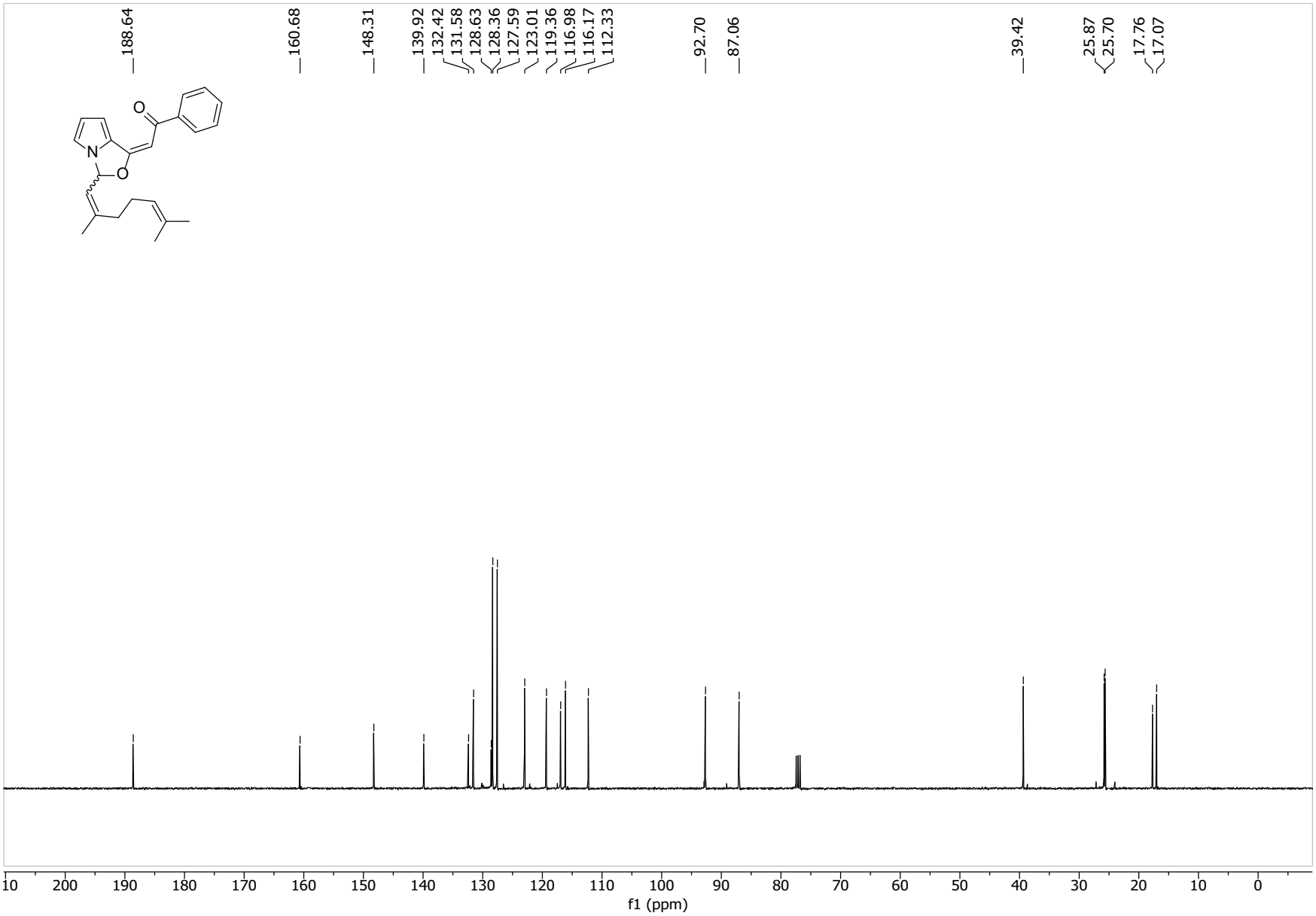
^{13}C NMR spectrum of (*E*)-1-(furan-2-yl)-2-(3-((*E*)-styryl)-5,6,7,8-tetrahydro-1*H*,3*H*-oxazolo[3,4-*a*]indol-1-ylidene)ethan-1-one (**2d**)



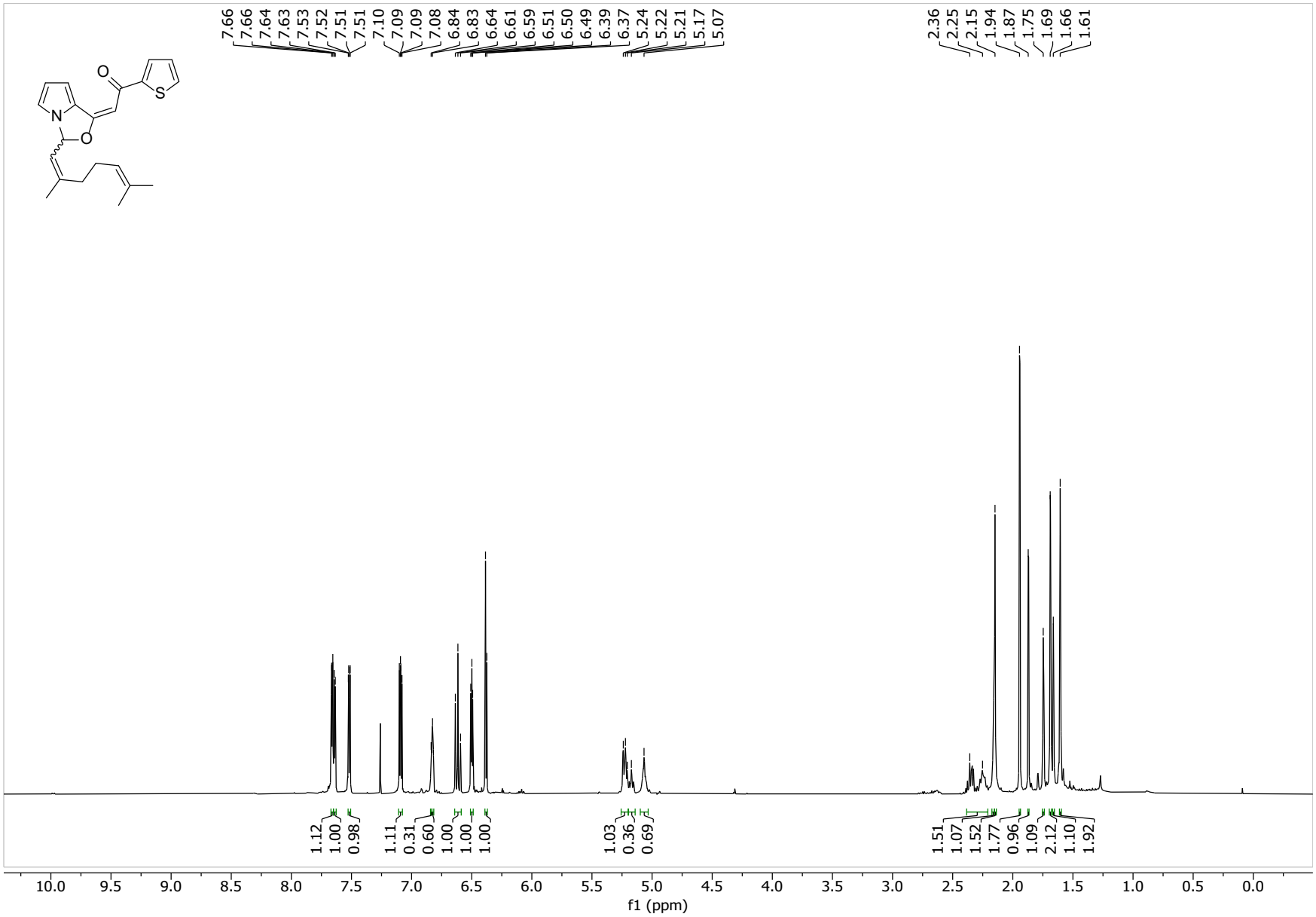
[1]H NMR spectrum of (*E*)-2-(3-(2,6-dimethylhepta-1,5-dien-1-yl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2e**)



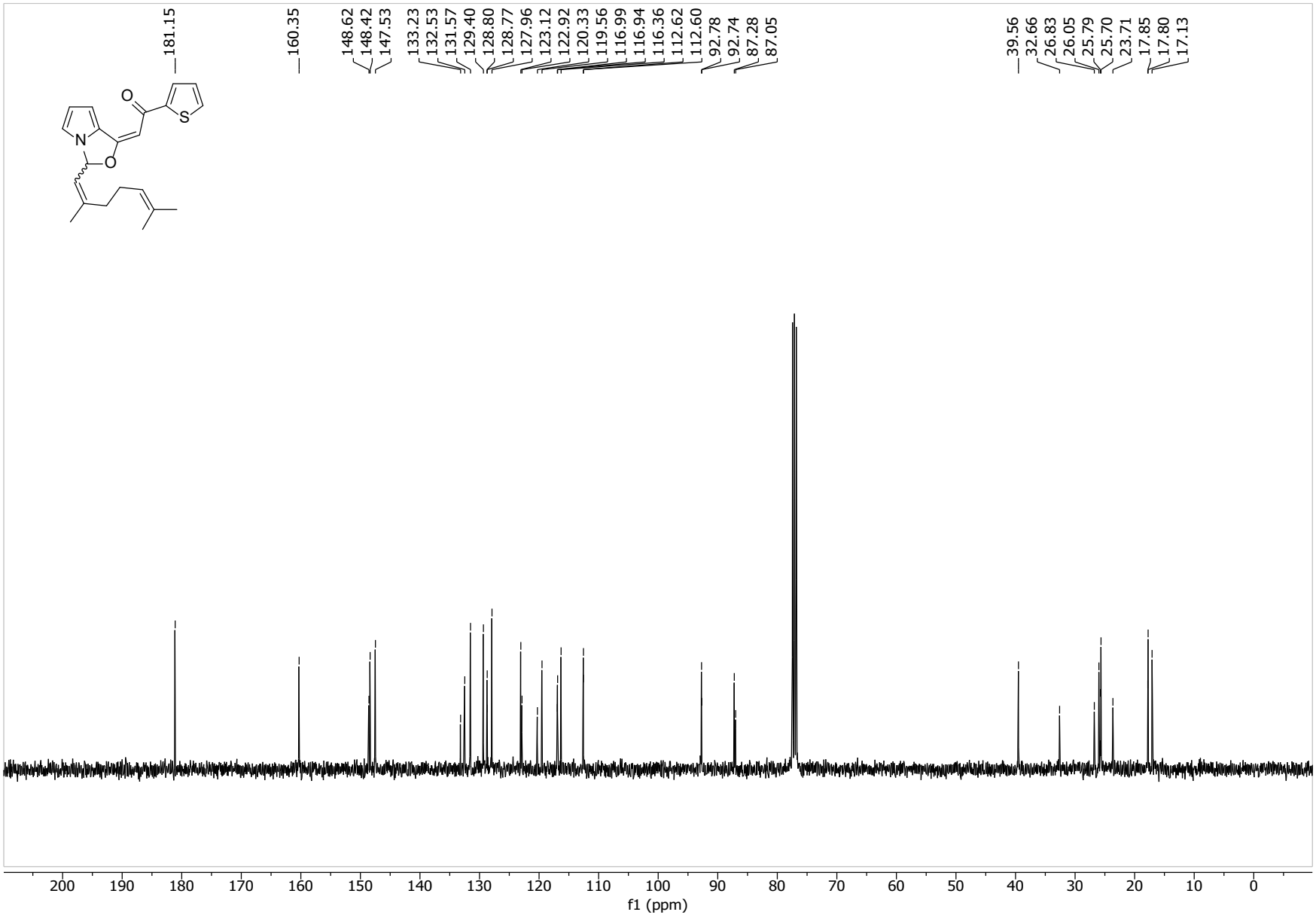
^{13}C NMR spectrum of (*E*)-2-(3-(2,6-dimethylhepta-1,5-dien-1-yl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2e**)



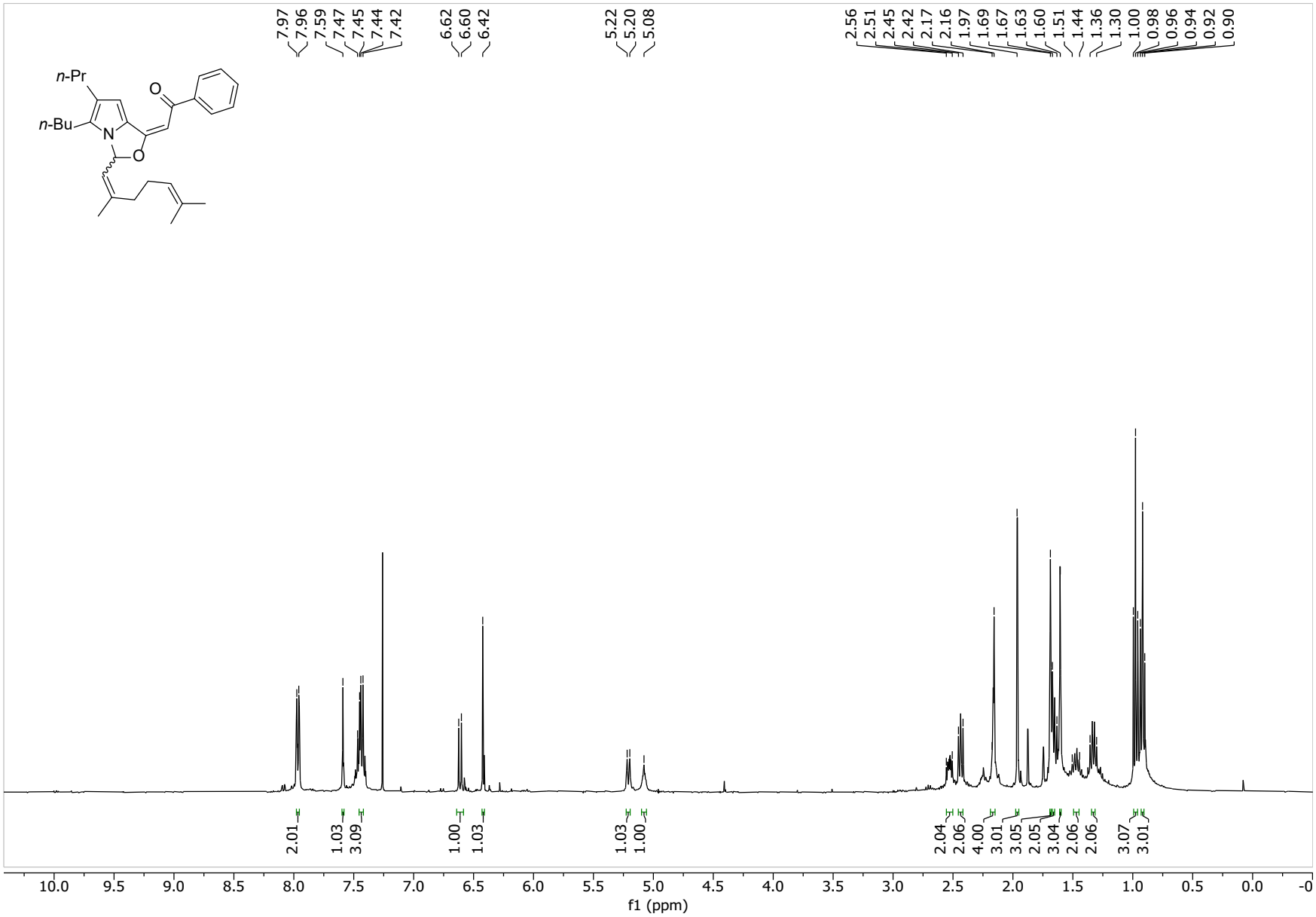
[1]H NMR spectrum of (*E*)-2-(3-(2,6-dimethylhepta-1,5-dien-1-yl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-(thiophen-2-yl)ethan-1-one (**2f**)



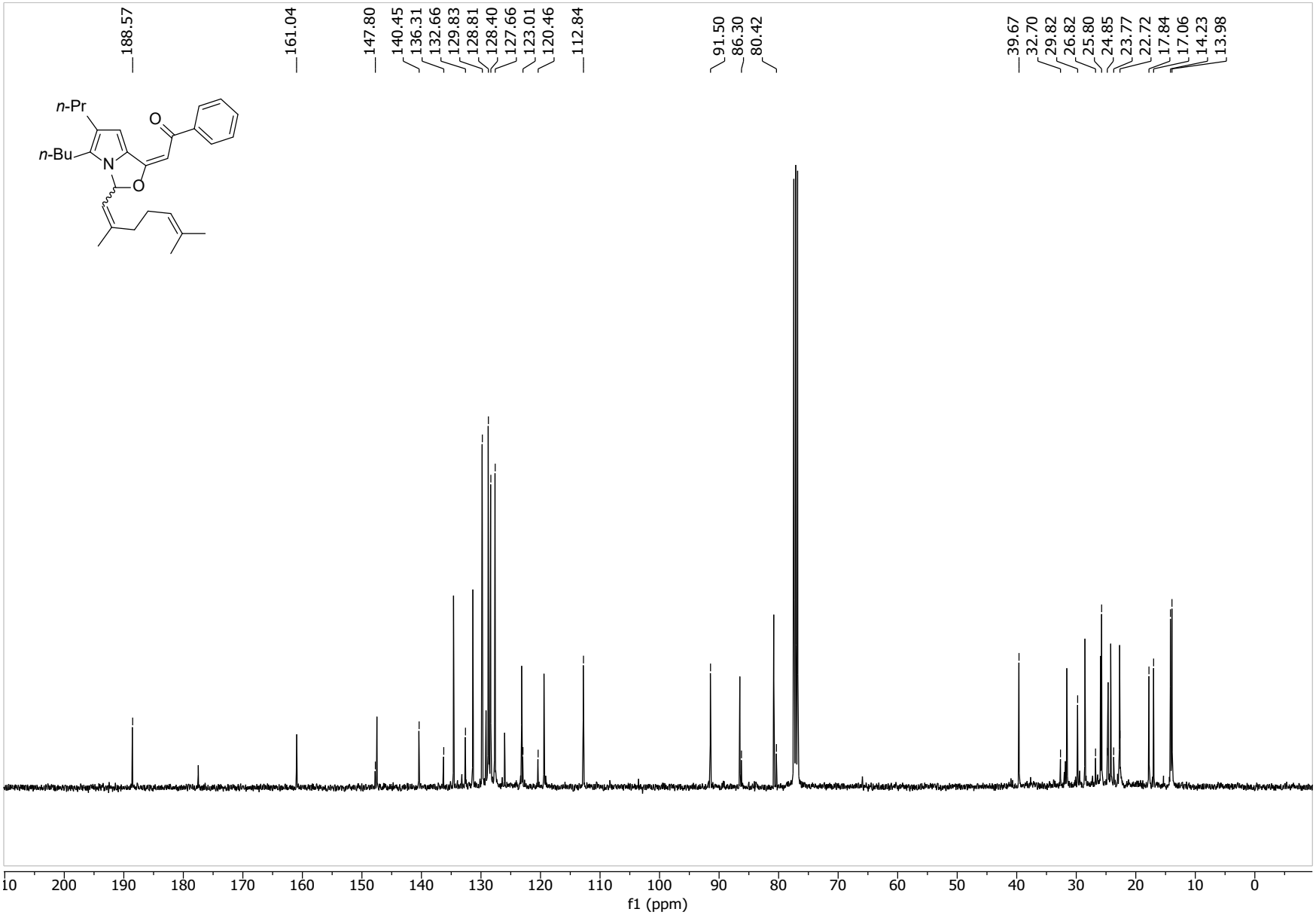
^{13}C NMR spectrum of (*E*)-2-(3-(2,6-dimethylhepta-1,5-dien-1-yl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-(thiophen-2-yl)ethan-1-one (**2f**)



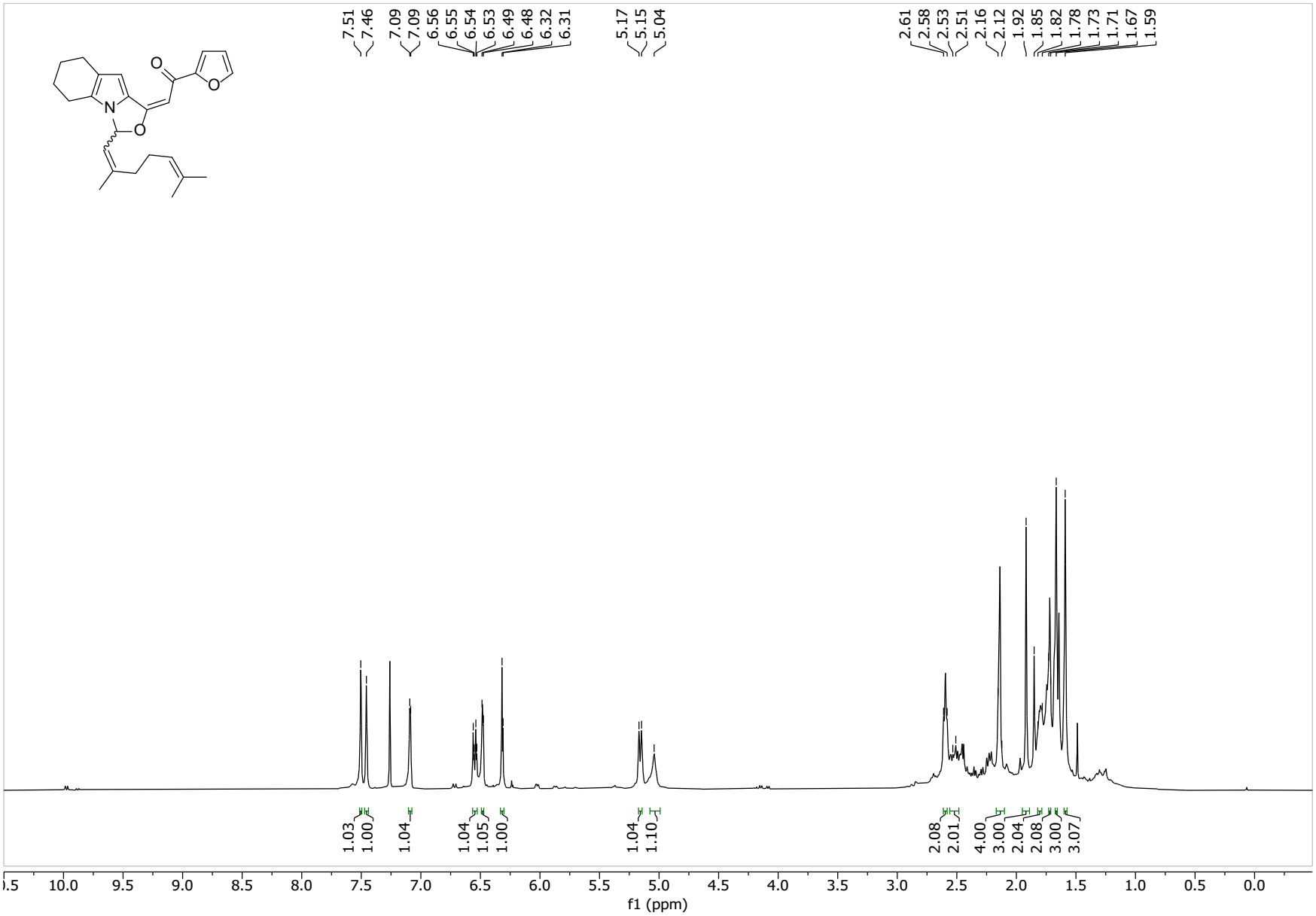
[1]H NMR spectrum of (*E*)-2-(5-butyl-3-(2,6-dimethylhepta-1,5-dien-1-yl)-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2g**)



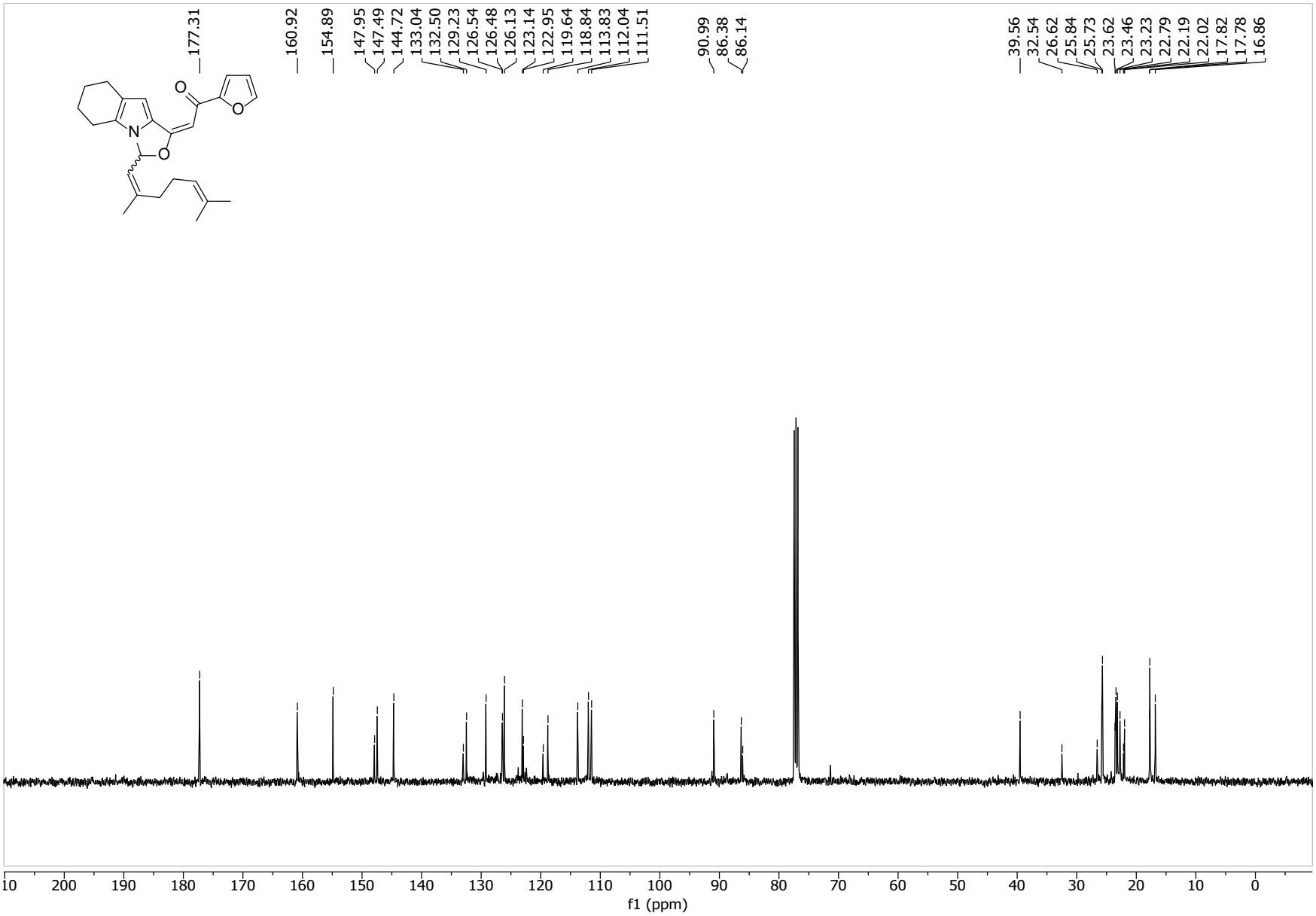
^{13}C NMR spectrum of (*E*)-2-(5-butyl-3-(2,6-dimethylhepta-1,5-dien-1-yl)-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2g**)



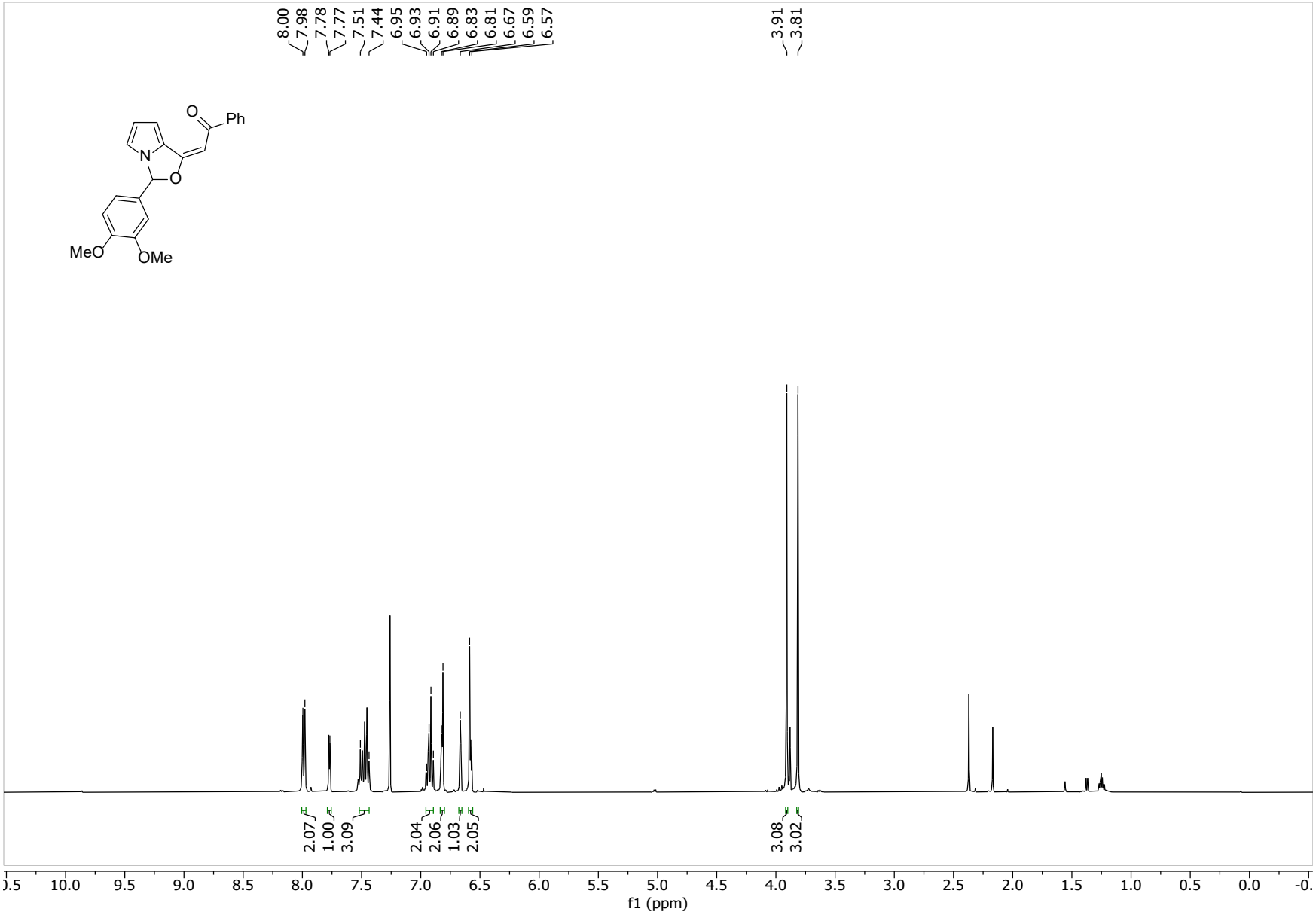
[1]H NMR spectrum of (*E*)-2-(3-(2,6-dimethylhepta-1,5-dien-1-yl)-5,6,7,8-tetrahydro-1*H*,3*H*-oxazolo[3,4-*a*]indol-1-ylidene)-1-(furan-2-yl)ethan-1-one (**2h**)



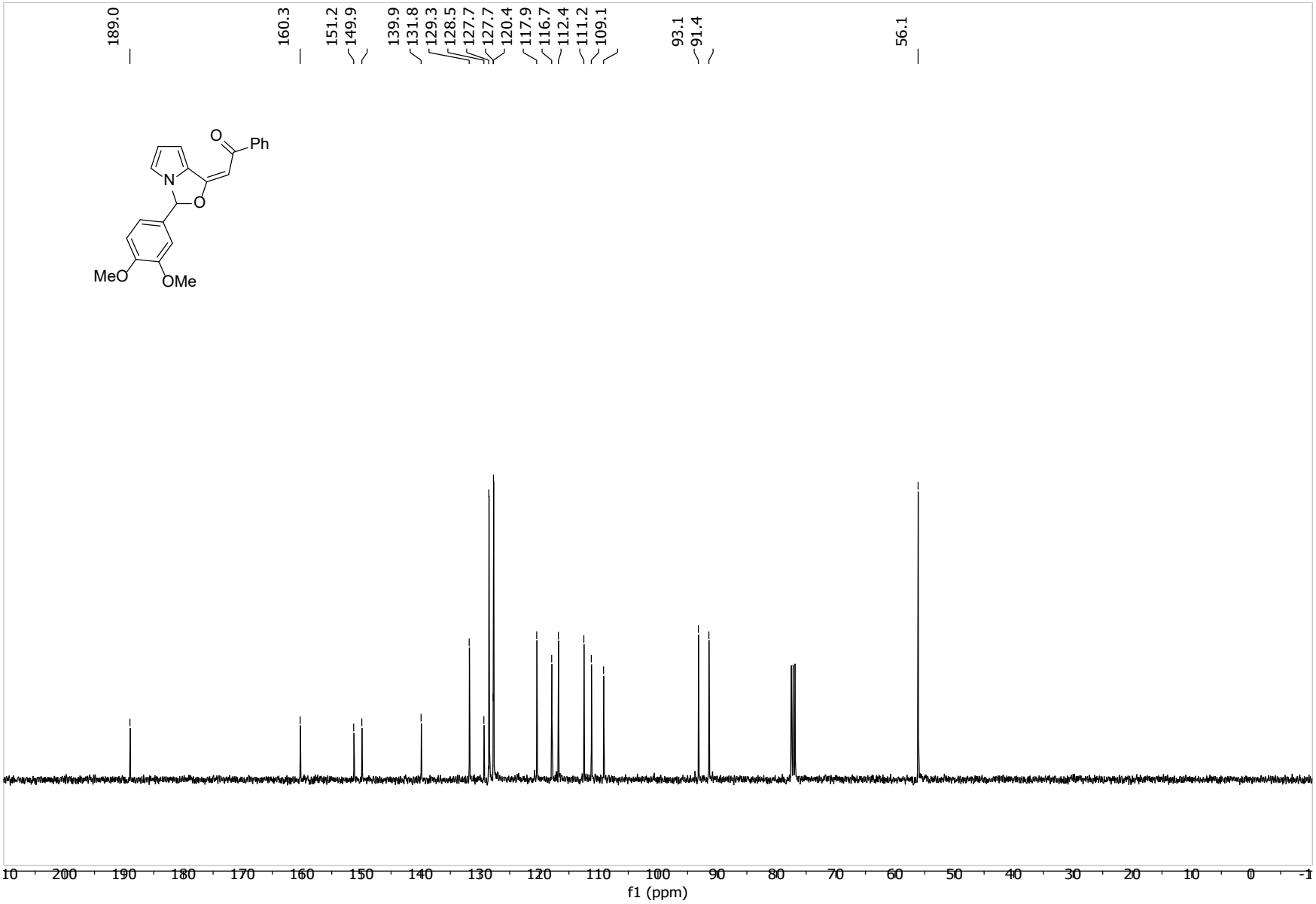
^{13}C NMR spectrum of (*E*)-2-(3-(2,6-dimethylhepta-1,5-dien-1-yl)-5,6,7,8-tetrahydro-1*H*,3*H*-oxazolo[3,4-*a*]indol-1-ylidene)-1-(furan-2-yl)ethan-1-one (**2h**)



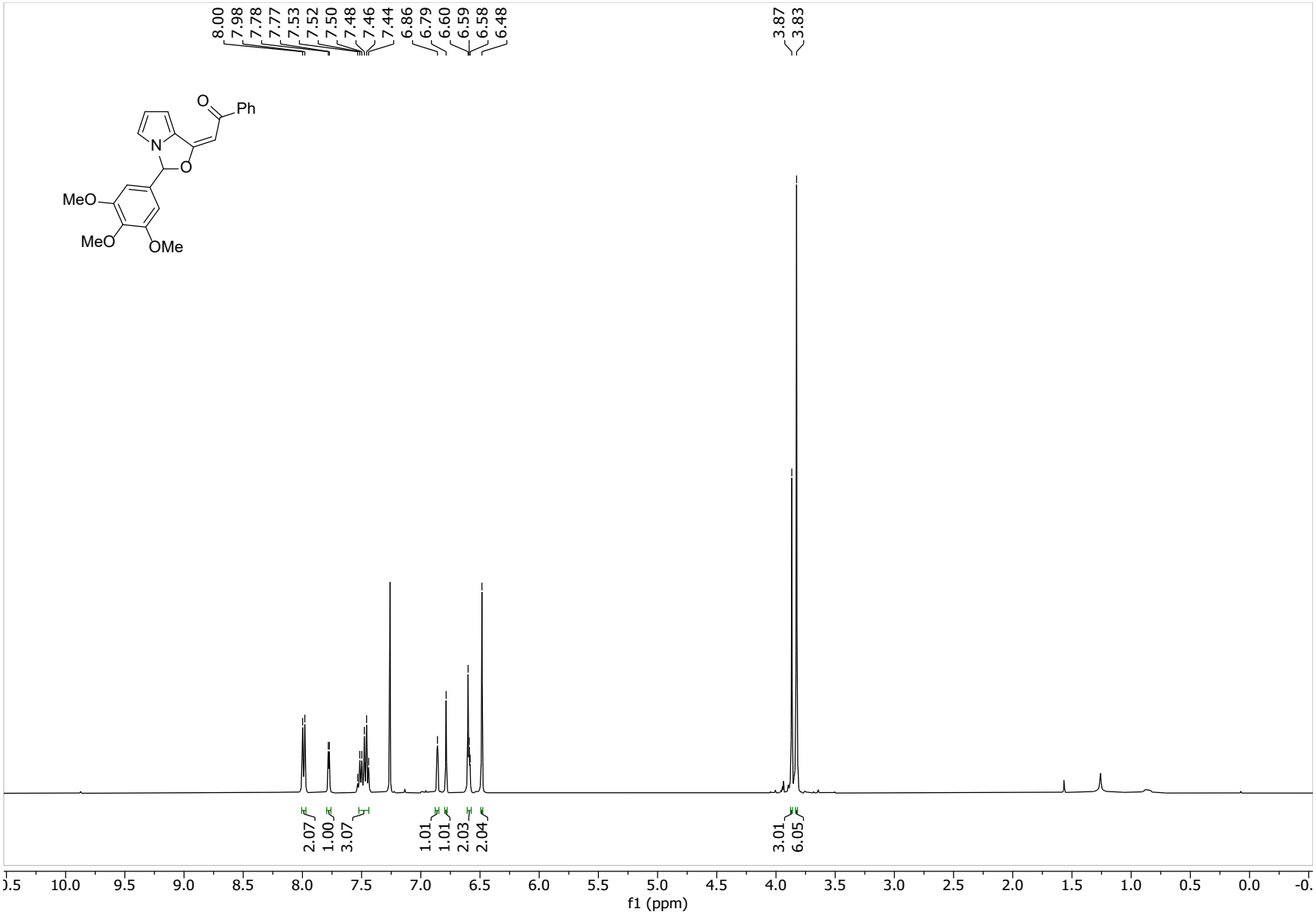
^{1}H NMR spectrum of (*E*)-2-(3-(3,4-dimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2i**)



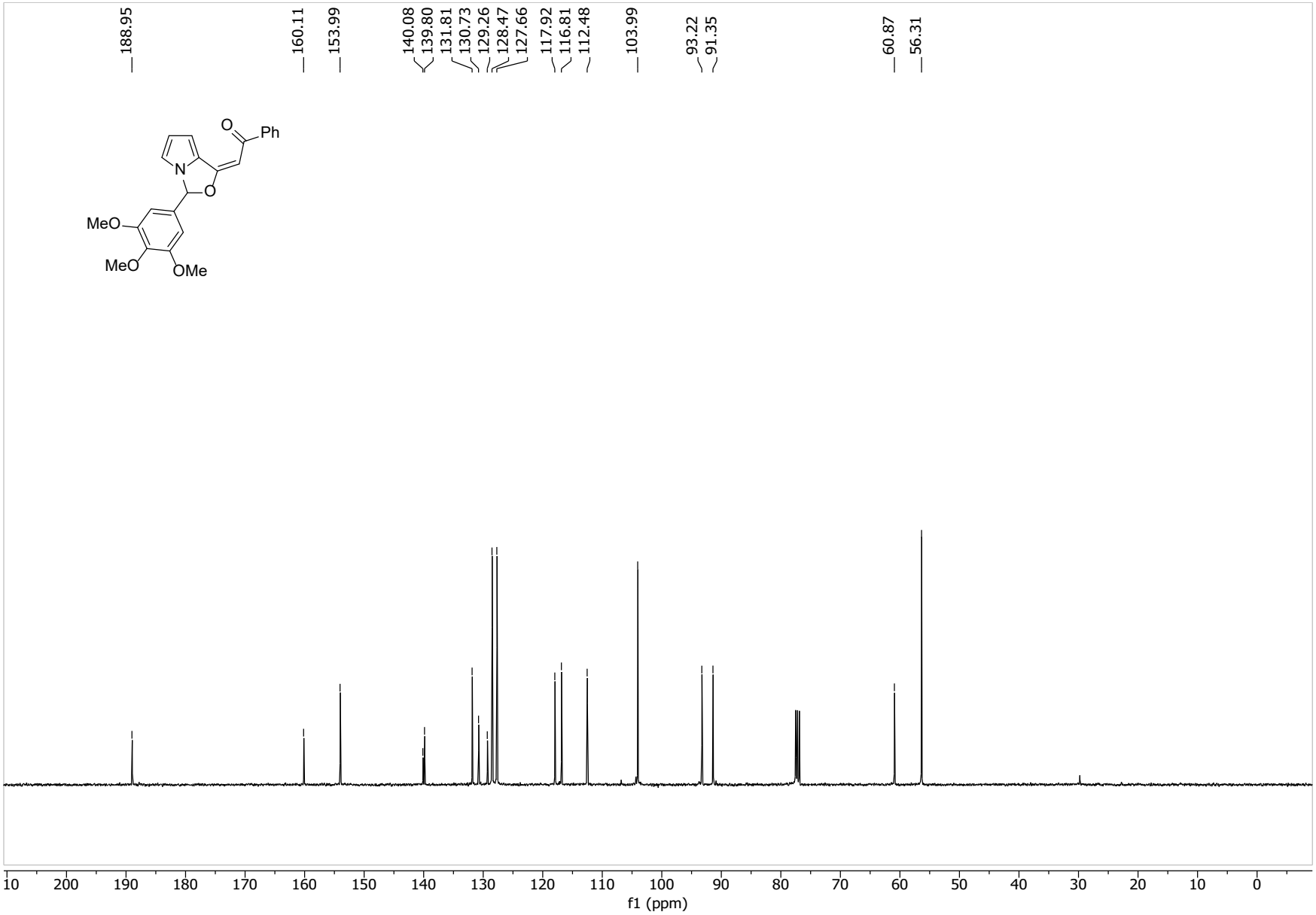
^{13}C NMR spectrum of (*E*)-2-(3-(3,4-dimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2i**)



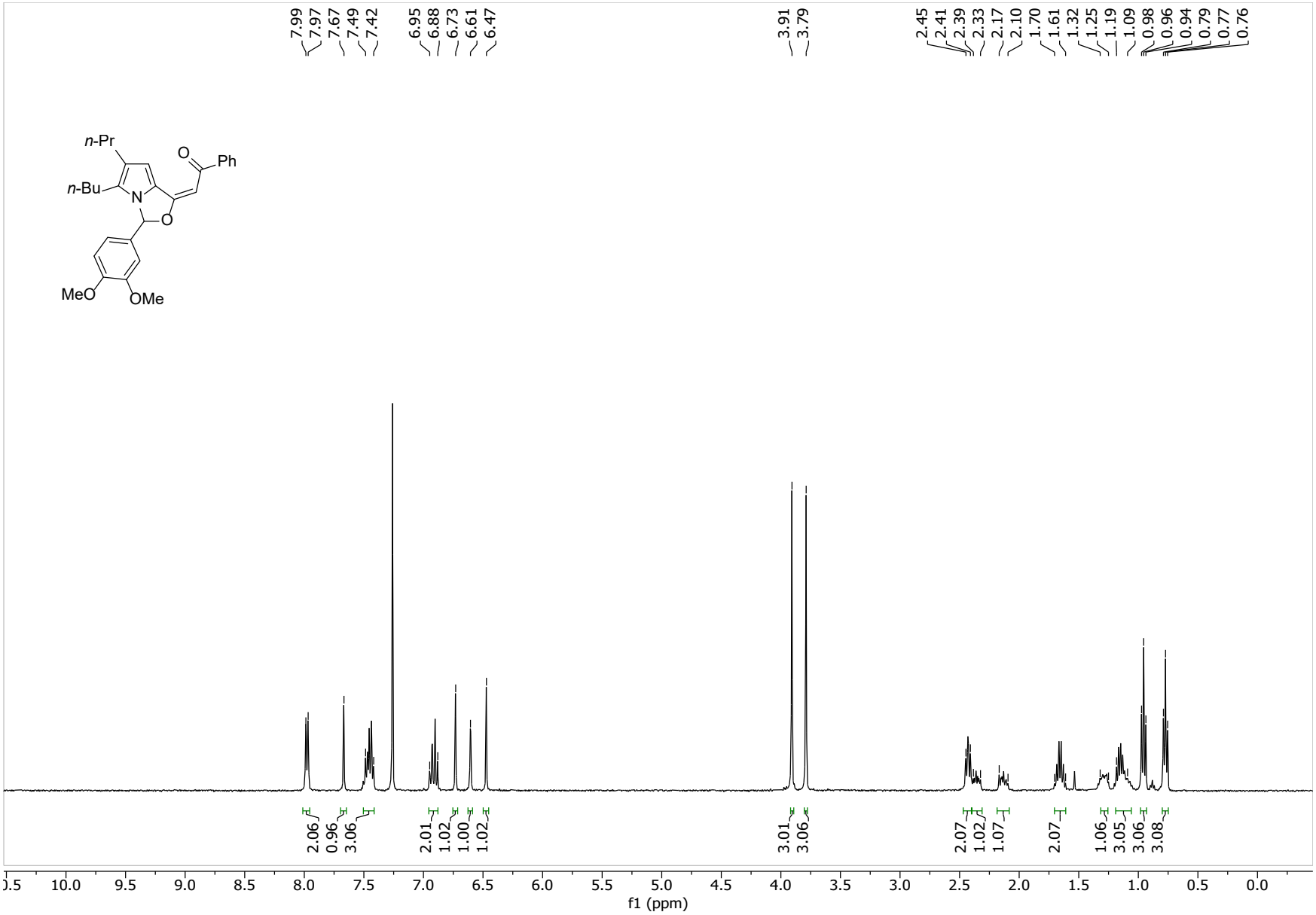
[1]H NMR spectrum of (*E*)-1-phenyl-2-(3-(3,4,5-trimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)ethan-1-one (**2j**)



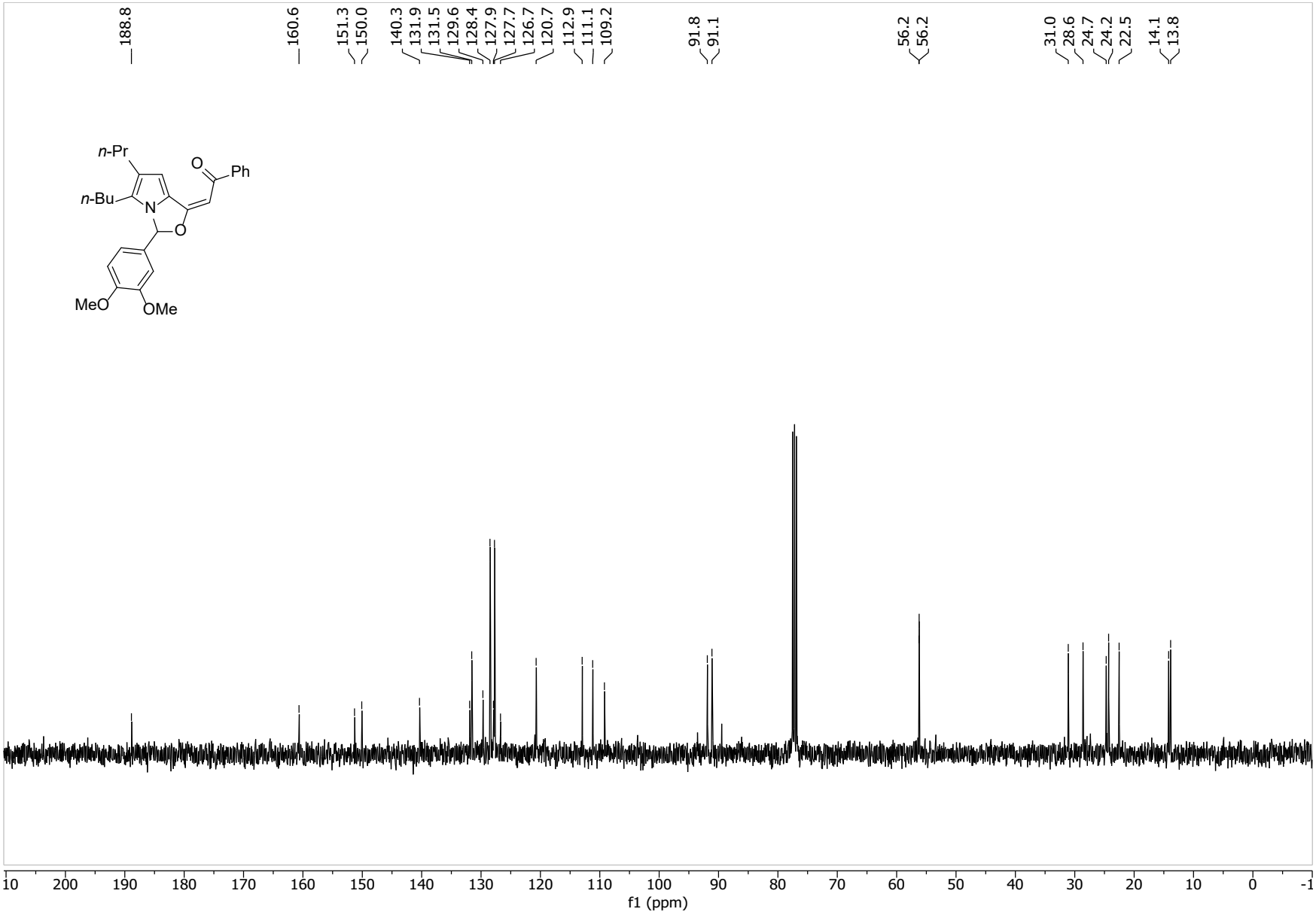
^{13}C NMR spectrum of (*E*)-1-phenyl-2-(3-(3,4,5-trimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)ethan-1-one (**2j**)



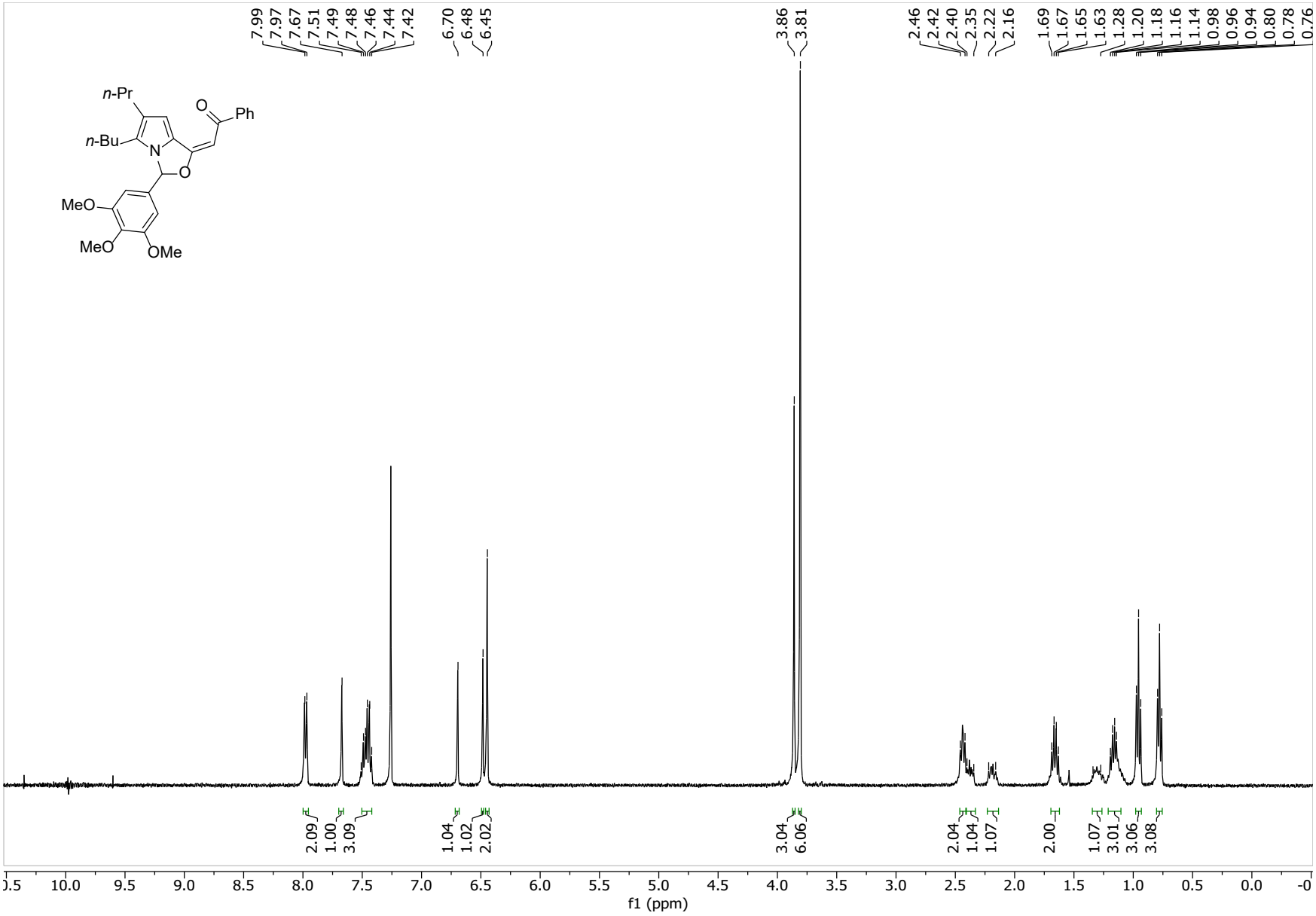
^{1}H NMR spectrum of (*E*)-2-(5-butyl-3-(3,4-dimethoxyphenyl)-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2k**)



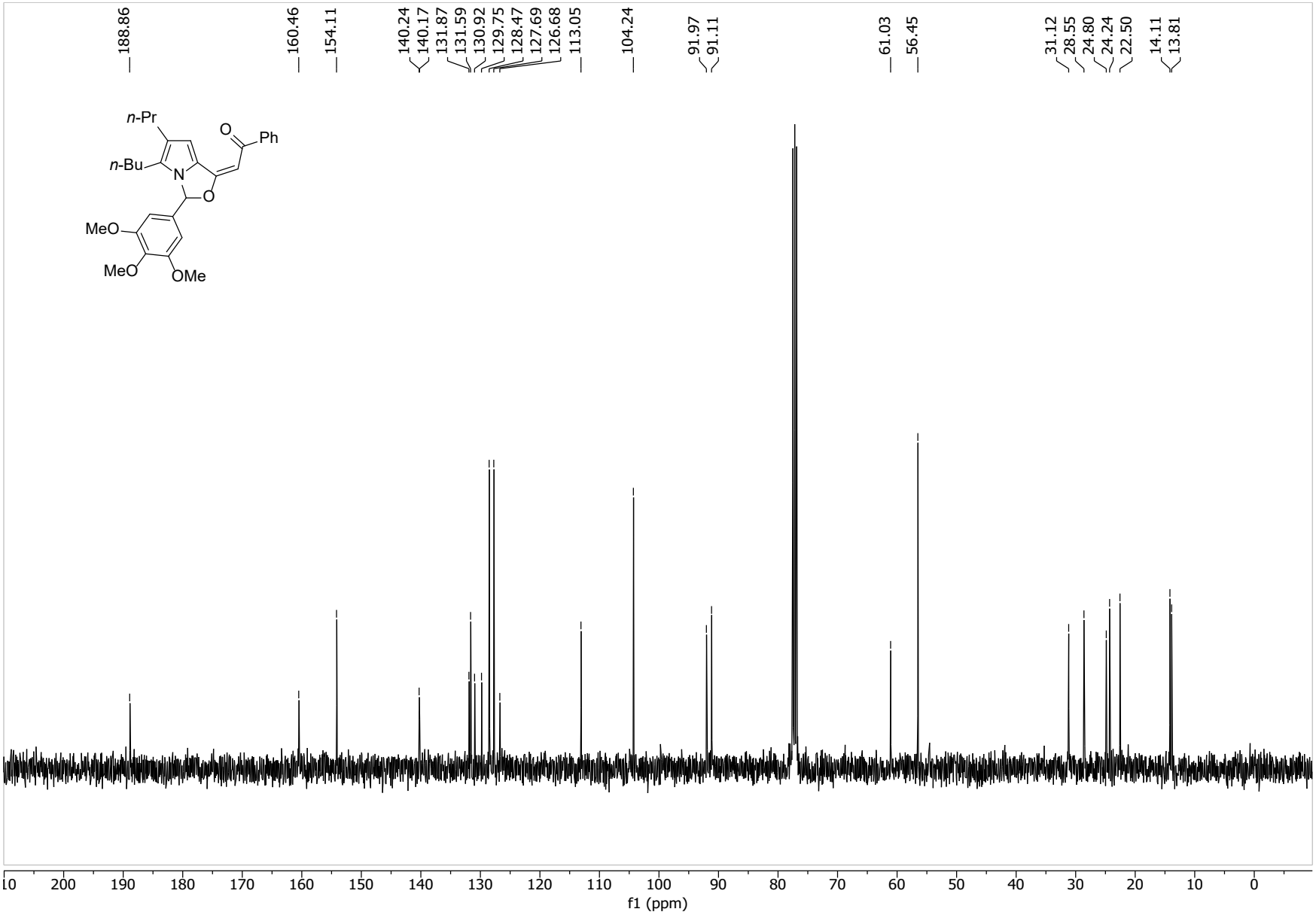
^{13}C NMR spectrum of (*E*)-2-(5-butyl-3-(3,4-dimethoxyphenyl)-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2k**)



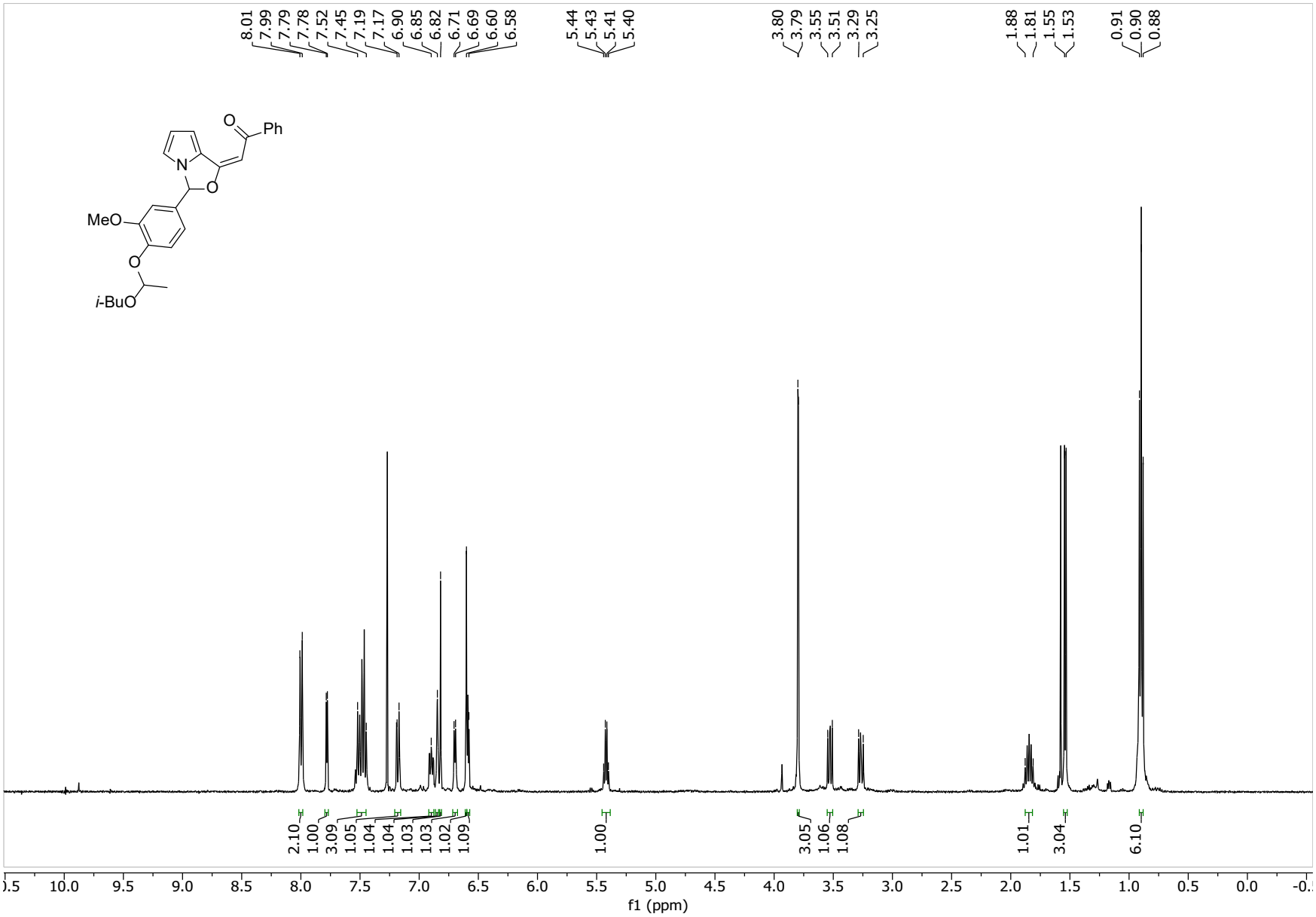
[1]H NMR spectrum of (*E*)-2-(5-butyl-6-propyl-3-(3,4,5-trimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2l**)



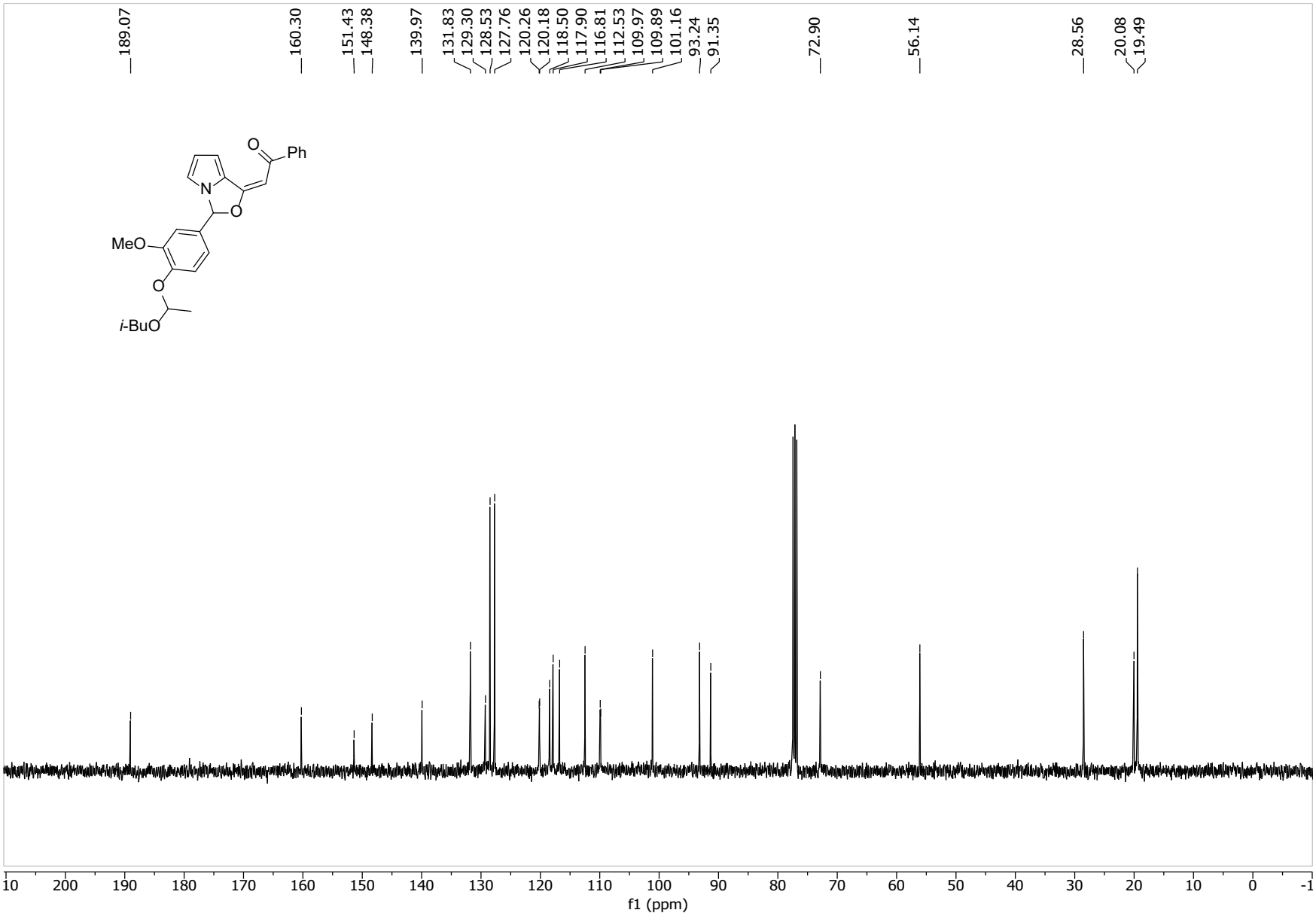
^{13}C NMR spectrum of (*E*)-2-(5-butyl-6-propyl-3-(3,4,5-trimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2l**)



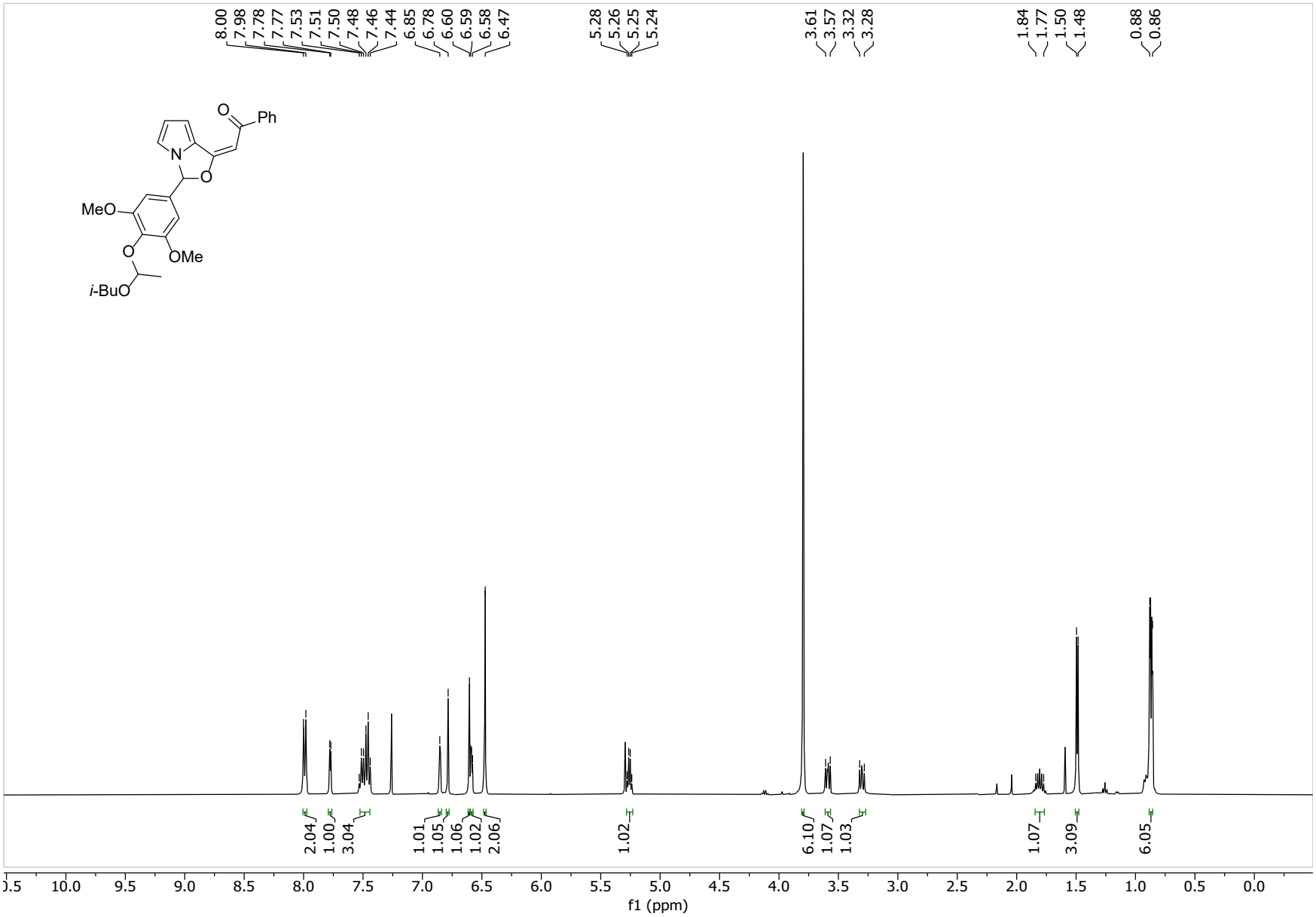
^{1}H NMR spectrum of (*E*)-2-(3-(4-(1-(*iso*-butoxy)ethoxy)-3-methoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2m**)



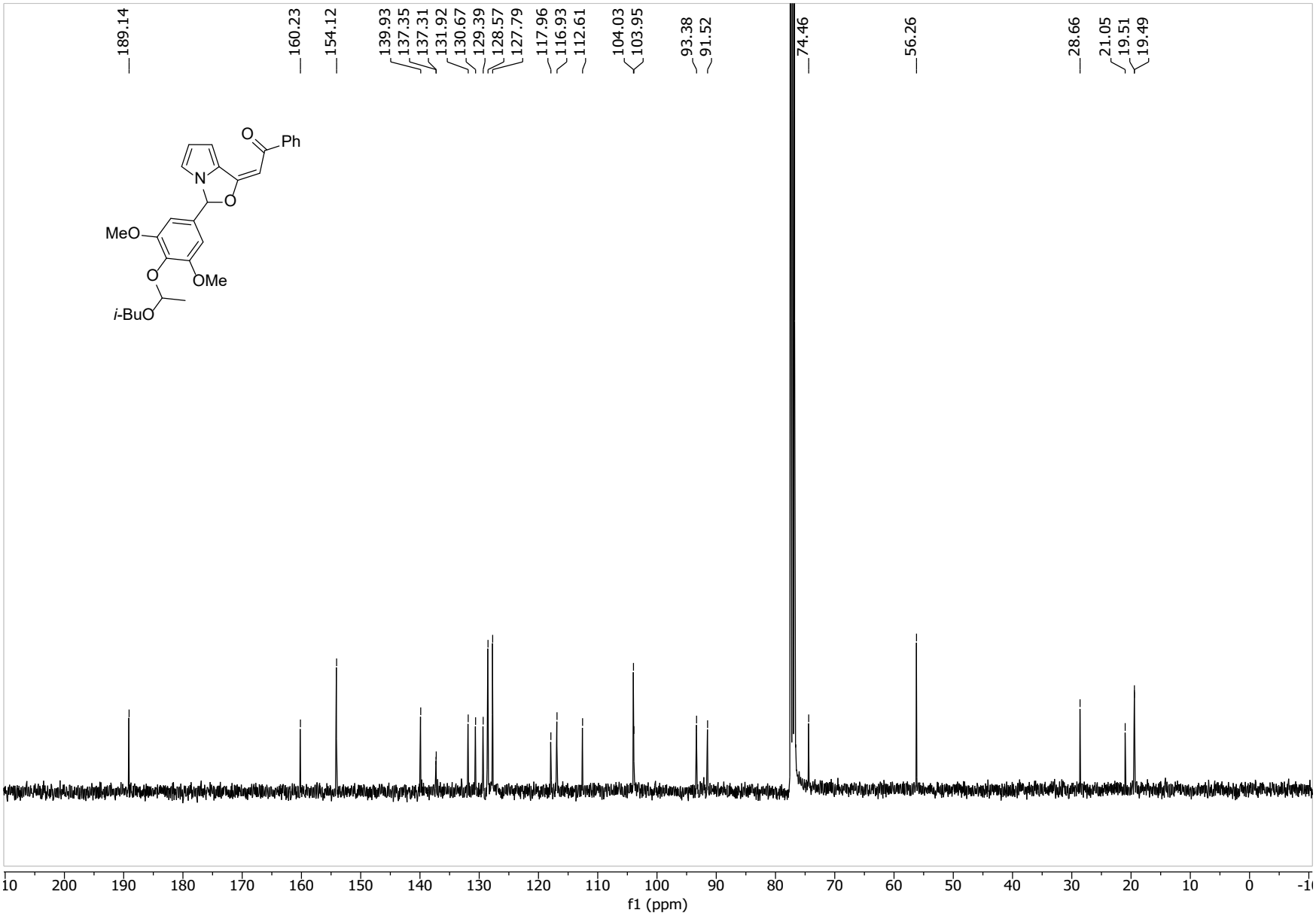
^{13}C NMR spectrum of (*E*)-2-(3-(4-(1-(*iso*-butoxy)ethoxy)-3-methoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2m**)



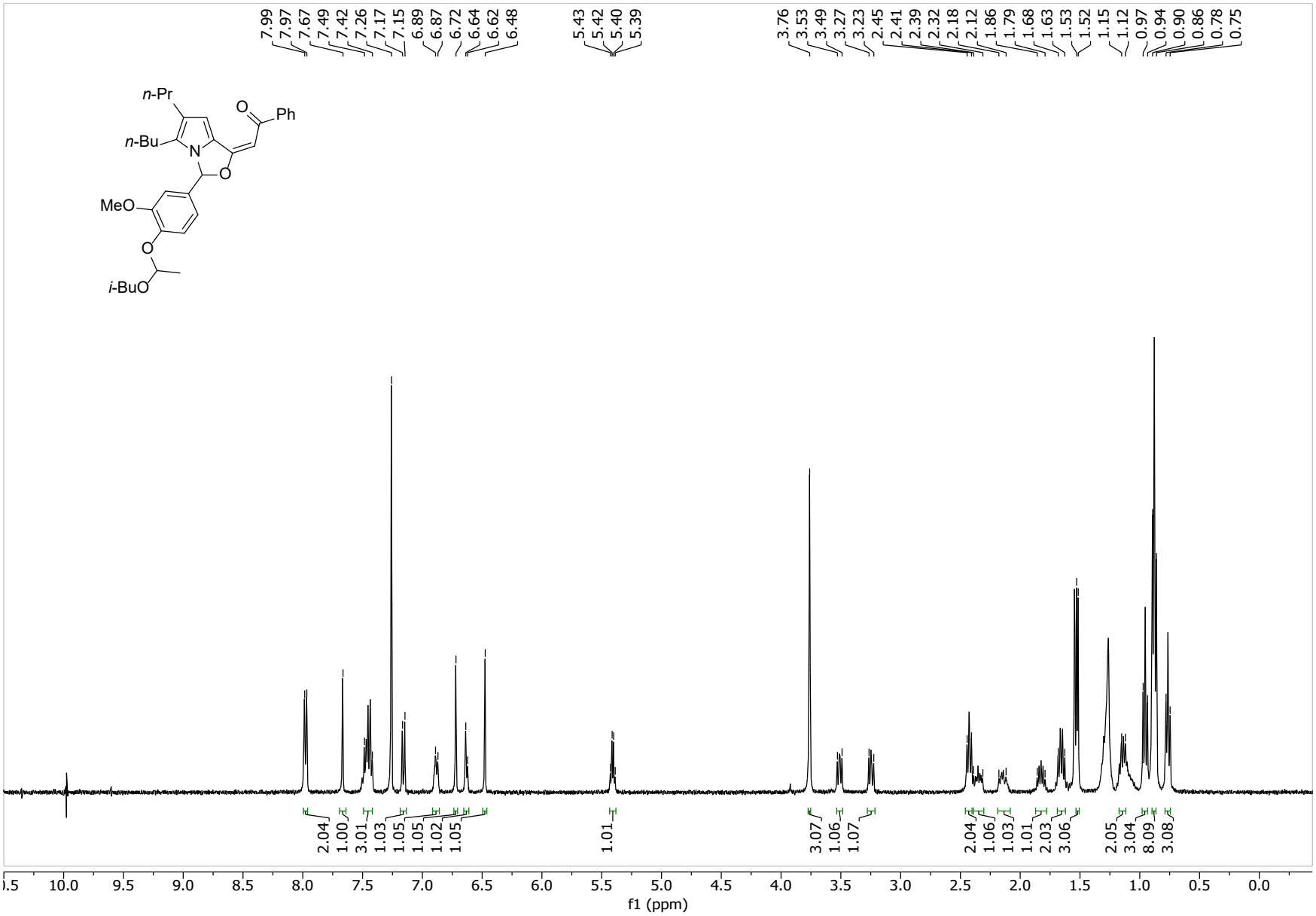
[1]H NMR spectrum of (*E*)-3-(3-(4-(1-(*iso*-butoxy)ethoxy)-3,5-dimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-yl)-1-phenylprop-2-en-1-one (**2n**)



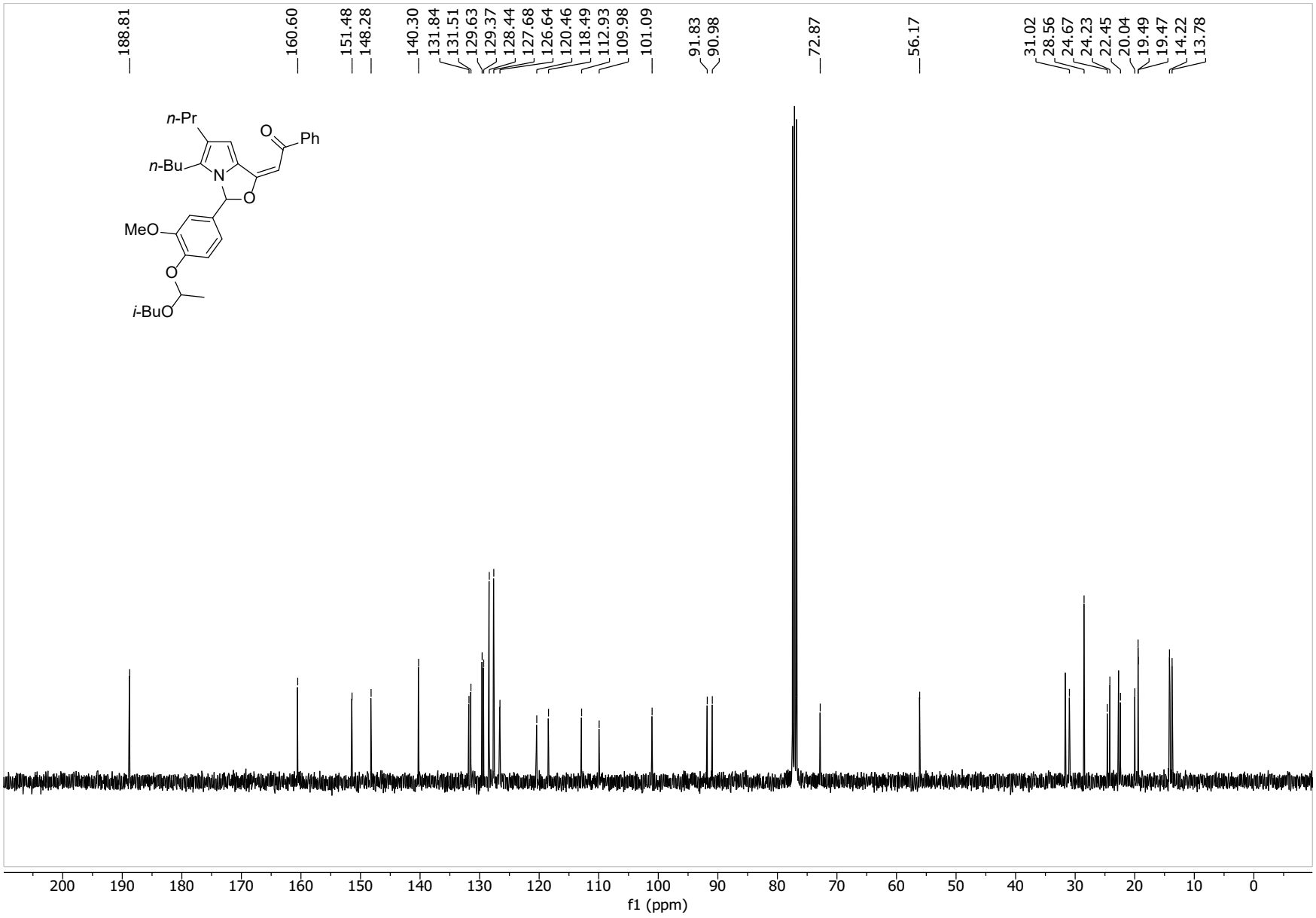
^{13}C NMR spectrum of (*E*)-3-(3-(4-(1-(*iso*-butoxy)ethoxy)-3,5-dimethoxyphenyl)-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-yl)-1-phenylprop-2-en-1-one (**2n**)



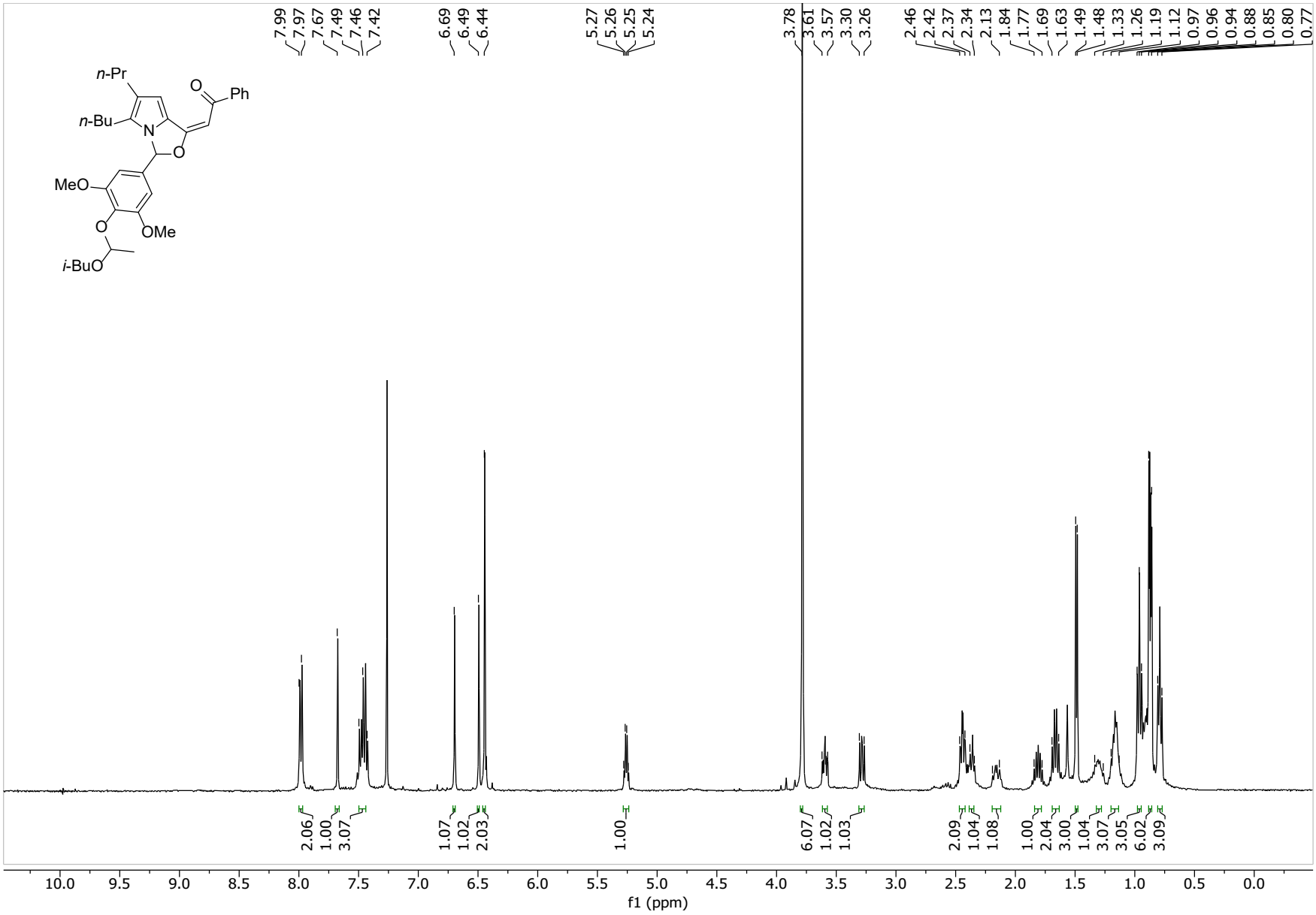
^{1}H NMR spectrum of (*E*)-2-(3-(4-(1-(*iso*-butoxy)ethoxy)-3-methoxyphenyl)-5-butyl-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2o**)



^{13}C NMR spectrum of (*E*)-2-(3-(4-(1-(*iso*-butoxy)ethoxy)-3-methoxyphenyl)-5-butyl-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one(**2o**)



^{1}H NMR spectrum of (*E*)-2-(3-(4-(1-(*iso*-butoxy)ethoxy)-3,5-dimethoxyphenyl)-5-butyl-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2p**)



^{13}C NMR spectrum of (*E*)-2-(3-(4-(1-(*iso*-butoxy)ethoxy)-3,5-dimethoxyphenyl)-5-butyl-6-propyl-1*H*,3*H*-pyrrolo[1,2-*c*]oxazol-1-ylidene)-1-phenylethan-1-one (**2p**)