Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.
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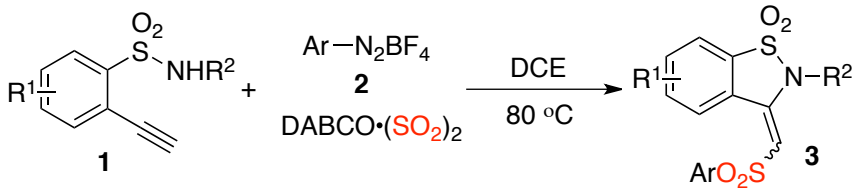
Supporting Information

1. General experimental methods (S2).
2. General experimental procedure and characterization data (S3-S12).
3. ^{1}H and ^{13}C NMR spectra of compounds **3** (S13–S64).

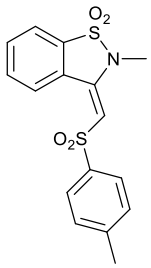
General experimental methods:

Unless otherwise stated, all commercial reagents were used as received. All solvents were dried and distilled according to standard procedures. Flash column chromatography was performed using silica gel (60-Å pore size, 32–63µm, standard grade). Analytical thin–layer chromatography was performed using glass plates pre-coated with 0.25 mm 230–400 mesh silica gel impregnated with a fluorescent indicator (254 nm). Thin layer chromatography plates were visualized by exposure to ultraviolet light. Organic solutions were concentrated on rotary evaporators at ~20 Torr at 25–35°C. Nuclear magnetic resonance (NMR) spectra are recorded in parts per million from internal tetramethylsilane on the δ scale. ^{1}H and ^{13}C NMR spectra were recorded in $CDCl_3$ on a Bruker DRX-400 spectrometer operating at 400 MHz and 100 MHz, respectively. All chemical shift values are quoted in ppm and coupling constants quoted in Hz. High resolution mass spectrometry (HRMS) spectra were obtained on a micrOTOF II Instrument.

General experimental procedure for the three-component reaction of 2-ethynylbenzenesulfonamide, DABCO·$(SO_2)_2$, and phenyldiazonium tetrafluoraborate

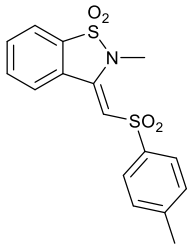


2-Ethynylbenzenesulfonamide (0.2 mmol), DABCO·$(SO_2)_2$ (0.16 mmol), and phenyldiazonium tetrafluoraborate (0.24 mmol) were combined in a tube. The tube was evacuated and backfilled with N_2 three times before DCE (2.0 mL) was added. The mixture was then placed in oil bath and stirred for 8 hours at 80 °C. After the conversion was completed as indicated by TLC, the solvent was evaporated under reduced pressure. The residue was purified directly by flash column chromatography (EtOAc/*n*-hexane, 1:3) to give the corresponding product **3**.



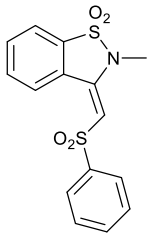
(*E*)-2-methyl-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3a**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.99 (d, *J*=7.9 Hz, 1H), 7.86 (d, *J*=8.3 Hz, 3H), 7.80 – 7.66 (m, 2H), 7.33 (d, *J*=8.1 Hz, 2H), 5.78 (s, 1H), 3.07 (s, 3H), 2.42 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 144.9, 142.2, 139.7, 134.1, 133.5, 132.8, 130.2, 129.7, 127.1, 126.0, 121.6, 106.0, 26.8, 21.8. HRMS (ESI) calcd for $C_{16}H_{15}N_1O_4S_2$: 350.0515(M + H^+), found: 350.0524.



(*Z*)-2-methyl-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*Z*)-**3a**]

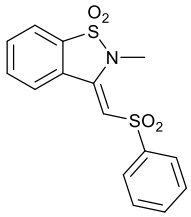
^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.85 (d, *J*=8.1 Hz, 3H), 7.72-7.60 (m, 3H), 7.36 (d, *J*=8.0 Hz, 2H), 6.15 (s, 1H), 3.63 (s, 3H), 2.44 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 144.6, 140.1, 138.6, 133.8, 132.4, 131.4, 130.0, 129.0, 127.0, 121.9, 121.6, 100.7, 30.5, 21.6. HRMS (ESI) calcd for $C_{16}H_{15}N_1O_4S_2$: 350.0515(M + H^+), found: 350.0525.



(*E*)-2-methyl-3-((phenylsulfonyl)methylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3b**]

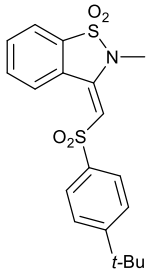
^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.97 (d, *J*=8.0 Hz, 1H), 8.04 – 7.93 (m, 2H), 7.91 – 7.81 (m, 1H), 7.80 – 7.67 (m, 2H), 7.62 (t, *J*=7.4 Hz, 1H), 7.54 (t, *J*=7.5 Hz, 2H), 5.79 (s, 1H), 3.08 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 142.6, 142.5, 134.1, 133.8, 133.5, 132.9,

129.6, 127.0, 125.9, 121.6, 105.4, 26.8. HRMS (ESI) calcd for $C_{15}H_{13}N_1O_4S_2$: 336.0359(M + H^+), found: 336.0363.



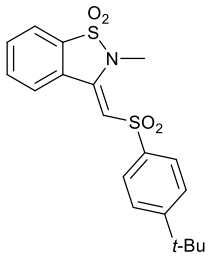
(*Z*)-2-methyl-3-((phenylsulfonyl)methylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*Z*)-**3b**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.98 (d, *J*=7.5 Hz, 2H), 7.90 – 7.81 (m, 1H), 7.74 – 7.60 (m, 4H), 7.57 (t, *J*=7.5 Hz, 2H), 6.15 (s, 1H), 3.63 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 139.2, 134.1, 133.8, 132.8, 129.7, 129.1, 127.2, 124.8, 122.2, 121.9, 30.8. HRMS (ESI) calcd for $C_{15}H_{13}N_1O_4S_2$: 336.0359(M + H^+), found: 336.0360.



(*E*)-3-(((4-(tert-butyl)phenyl)sulfonyl)methylene)-2-methyl-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3c**]

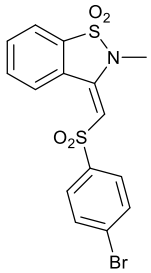
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.04 (d, *J*=8.0, 1H), 7.92-7.83 (m, 3H), 7.79-7.69 (m, 2H), 7.54 (d, *J* = 8.5 Hz, 2H), 5.79 (s, 1H), 3.08 (s, 3H), 1.32 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 157.9, 142.1, 139.6, 134.1, 133.5, 132.8, 129.7, 126.9, 126.7, 126.0, 121.6, 106.0, 35.5, 31.2, 26.8. HRMS (ESI) calcd for $C_{19}H_{21}N_1O_4S_2$: 392.0985(M + H^+), found: 392.0991.



(*Z*)-3-(((4-(tert-butyl)phenyl)sulfonyl)methylene)-2-methyl-2,3-dihydrobenzo[*d*]isothi

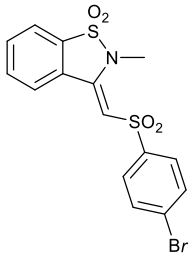
azole 1,1-dioxide [(*Z*)-**3c**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.92-7.83 (m, 3H), 7.72-7.62 (m, 3H), 7.57 (d, *J* = 8.5 Hz, 2H), 6.17 (s, 1H), 3.65 (s, 3H), 1.34 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 151.1, 140.0, 138.5, 133.8, 132.4, 131.4, 129.0, 126.9, 126.4, 122.0, 121.6, 100.7, 35.3, 31.0, 30.5. HRMS (ESI) calcd for $C_{19}H_{21}N_1O_4S_2$: 392.0985(M + H^+), found: 392.0994.



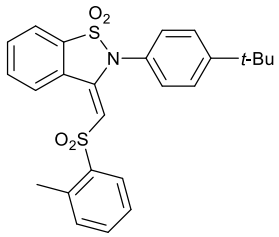
(*E*)-3-(((4-bromophenyl)sulfonyl)methylene)-2-methyl-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3d**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.94 (d, *J* = 7.6 Hz, 1H), 7.90 – 7.81 (m, 3H), 7.79-7.71 (m, 2H), 7.68 (d, *J*=8.5 Hz, 2H), 5.73 (s, 1H), 3.09 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 142.9, 141.7, 136.1, 134.2, 133.1, 133.0, 129.6, 129.1, 128.6, 125.8, 121.8, 104.7, 26.9. HRMS (ESI) calcd for $C_{15}H_{12}BrN_1O_4S_2$: 415.9443(M + H^+), found: 415.9443.



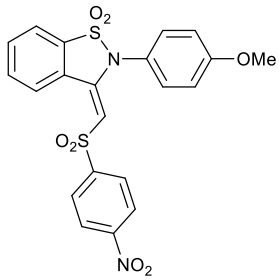
(*Z*)-3-(((4-bromophenyl)sulfonyl)methylene)-2-methyl-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*Z*)-**3d**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.89-7.82 (m, 3H), 7.74-7.66 (m, 4H), 7.63 (d, *J*=7.1 Hz, 1H), 6.09 (s, 1H), 3.62 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 142.2, 139.6, 134.2, 133.0, 132.9, 131.6, 129.0, 129.0, 128.8, 122.2, 122.0, 99.7, 30.9. HRMS (ESI) calcd for $C_{15}H_{12}BrN_1O_4S_2$: 415.9443(M + H^+), found: 415.9447.



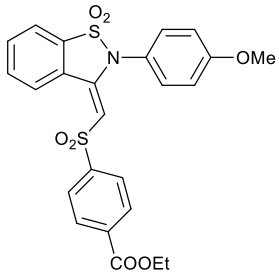
(*E*)-2-(4-(*tert*-butyl)phenyl)-3-((o-tolylsulfonyl)methylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3e**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.94 – 8.87 (m, 1H), 8.09 (d, *J*=7.8 Hz, 1H), 7.94 – 7.86 (m, 1H), 7.78 – 7.69 (m, 2H), 7.57 (d, *J*=8.4 Hz, 2H), 7.44 (t, *J*=7.3 Hz, 1H), 7.40 – 7.30 (m, 3H), 7.27 (d, *J*=7.5 Hz, 1H), 5.67 (s, 1H), 2.54 (s, 3H), 1.34 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 154.7, 144.1, 140.4, 137.4, 133.9, 133.6, 133.5, 133.1, 130.3, 129.7, 128.2, 128.0, 126.5, 126.3, 125.3, 121.7, 107.1, 35.2, 31.4, 20.5.



(*E*)-2-(4-methoxyphenyl)-3-(((4-nitrophenyl)sulfonyl)methylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3f**]

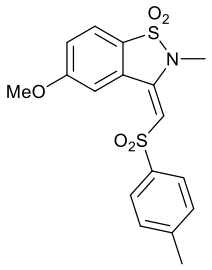
^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.98-8.95 (m, 1H), 8.33 (d, *J*=8.7 Hz, 2H), 8.07 (d, *J*=8.7 Hz, 2H), 7.96-7.92 (m, 1H), 7.84-7.79 (m, 2H), 7.45 (t, *J*=8.1 Hz, 1H), 7.11-7.06 (m, 1H), 6.98 (d, *J*=7.7 Hz, 1H), 6.93 (s, 1H), 5.59 (s, 1H), 3.81 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 161.5, 150.7, 148.1, 145.3, 134.3, 133.8, 131.7, 130.3, 129.6, 128.1, 125.1, 124.9, 122.5, 122.1, 117.3, 116.0, 104.8, 55.8. HRMS (ESI) calcd for $C_{21}H_{16}N_2O_7S_2$: 473.0472(M + H^+), found: 473.0448.



ethyl-(*E*)-4-(((2-(4-methoxyphenyl)-1,1-dioxidobenzo[*d*]isothiazol-3(2H)-ylidene)met

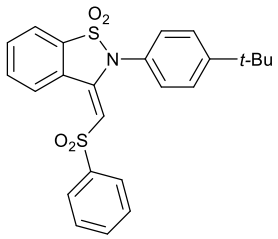
hyl)sulfonyl)benzoate [(*E*)-**3g**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.05 – 8.94 (m, 1H), 8.15 (d, *J*=8.3 Hz, 2H), 7.97-7.91 (m, 3H), 7.84 – 7.74 (m, 2H), 7.45 (t, *J*=8.1 Hz, 1H), 7.12 – 7.03 (m, 1H), 6.99 (d, *J*=7.8, 1H), 6.93 (s, 1H), 5.63 (s, 1H), 4.38 (q, *J*=7.1 Hz, 2H), 3.81 (s, 3H), 1.38 (t, *J*=7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 165.1, 161.4, 146.2, 144.6, 135.2, 134.2, 133.7, 133.5, 131.6, 130.7, 130.5, 129.8, 126.8, 125.3, 122.6, 122.0, 117.3, 116.0, 106.1, 62.0, 55.8, 14.4.



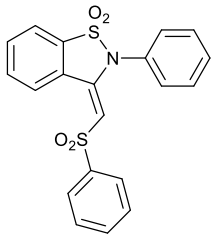
(*E*)-5-methoxy-2-methyl-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3h**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.51 (d, *J*=1.7 Hz, 1H), 7.85 (d, *J*=8.1 Hz, 2H), 7.72 (d, *J*=8.6 Hz, 1H), 7.33 (d, *J*=8.0 Hz, 2H), 7.19-7.15 (m, 1H), 5.75 (s, 1H), 3.90 (s, 3H), 3.05 (s, 3H), 2.41 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 164.0, 144.9, 142.4, 139.8, 130.2, 128.2, 126.9, 125.2, 122.8, 120.0, 113.5, 105.3, 56.4, 26.81 21.8. HRMS (ESI) calcd for $C_{22}H_{19}N_1O_5S_2$: 402.0440(M + Na^+), found: 402.0443.



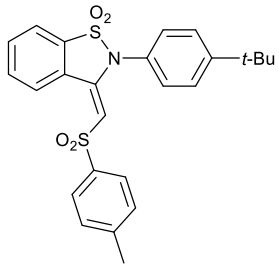
(*E*)-2-(4-(tert-butyl)phenyl)-3-((phenylsulfonyl)methylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3i**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 8.99-8.97 (m, 1H), 7.93-7.88 (m, 3H), 7.80 – 7.73 (m, 2H), 7.71-7.64 (m, 1H), 7.56 (d, *J*=8.4 Hz, 2H), 7.34 (d, *J*=8.5 Hz, 2H), 7.19-7.13 (m, 2H), 5.65 (s, 1H), 1.34 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 164.4, 154.8, 144.4, 134.1, 133.3, 130.3, 129.8, 129.6, 129.5, 128.1, 126.8, 126.4, 126.1, 125.5, 122.0, 117.0, 116.8, 106.5, 35.3, 31.4.



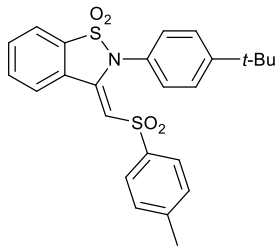
(*E*)-2-phenyl-3-((phenylsulfonyl)methylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3j**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.08 – 8.99 (m, 1H), 7.95 – 7.84 (m, 3H), 7.82 – 7.73 (m, 2H), 7.60 – 7.52 (m, 4H), 7.49 (t, *J*=7.6 Hz, 2H), 7.44-7.40 (m, 2H), 5.61 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 144.1, 142.5, 134.1, 133.7, 133.5, 133.3, 131.3, 130.9, 130.9, 129.8, 129.6, 126.7, 125.5, 121.8, 107.1.



(*E*)-2-(4-(tert-butyl)phenyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3k**]

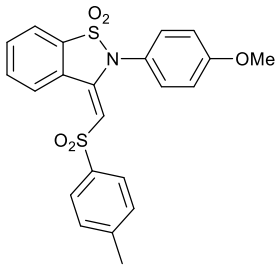
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.02-8.99 (m, 1H), 7.92-7.89 (m, 1H), 7.79-7.74 (m, 4H), 7.56 (d, *J*=8.5 Hz, 2H), 7.33 (d, *J*=8.5 Hz, 2H), 7.29 (d, *J*=8.1 Hz, 2H), 5.70 (s, 1H), 2.39 (s, 3H), 1.35 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 154.6, 144.6, 144.1, 139.9, 134.0, 133.6, 133.1, 130.3, 130.1, 129.9, 128.0, 126.7, 126.6, 125.6, 121.8, 107.2, 35.2, 31.4, 21.8. HRMS (ESI) calcd for $C_{25}H_{25}N_1O_4S_2$: 468.1298(M + H^+), found: 468.1303.



(*Z*)-2-(4-(tert-butyl)phenyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*Z*)-**3k**]

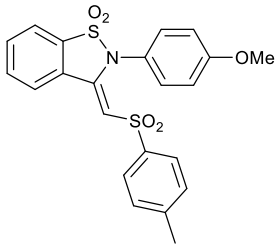
^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.93-7.89 (m, 1H), 7.83-7.79 (m, 1H), 7.78 – 7.73 (m,

2H), 7.29 (d, *J*=8.6 Hz, 2H), 7.26 (d, *J*=8.4 Hz, 2H), 7.17-7.13 (m, 4H), 6.30 (s, 1H), 2.40 (s, 3H), 1.35 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 153.0, 143.9, 139.5, 139.1, 134.2, 133.1, 132.0, 129.7, 129.6, 129.3, 126.8, 126.7, 126.5, 122.6, 122.3, 101.4, 35.1, 31.5, 21.8. HRMS (ESI) calcd for $C_{25}H_{25}N_1O_4S_2$: 468.1298(M + H^+), found: 468.1306.



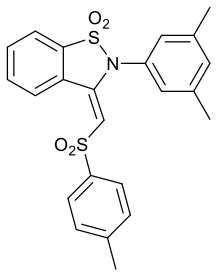
(*E*)-2-(4-methoxyphenyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3l**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.08 – 9.00 (m, 1H), 7.96 – 7.88 (m, 1H), 7.84 – 7.72 (m, 4H), 7.43 (t, *J*=8.1 Hz, 1H), 7.29 (d, *J*=8.1 Hz, 2H), 7.08-7.04 (m, 1H), 7.00 (d, *J*=7.8, 1H), 6.93 (t, *J*=2.0 Hz, 1H), 5.67 (s, 1H), 3.80 (s, 3H), 2.39 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 161.3, 144.8, 143.5, 139.6, 134.1, 133.5, 133.2, 131.5, 130.7, 130.2, 129.9, 126.8, 125.5, 122.7, 121.8, 117.3, 115.9, 107.7, 55.8, 21.8. HRMS (ESI) calcd for $C_{22}H_{19}N_1O_5S_2$: 442.0777(M + H^+), found: 442.0777.



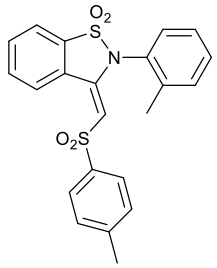
(*Z*)-2-(4-methoxyphenyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*Z*)-**3l**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.93 – 7.88 (m, 1H), 7.81-7.74 (m, 3H), 7.34 (d, *J*=8.2 Hz, 2H), 7.28 (d, *J*=8.2 Hz, 1H), 7.18 (d, *J*=8.2 Hz, 2H), 6.98-6.94 (m, 2H), 6.69 (t, *J*=2.1 Hz, 1H), 6.29 (s, 1H), 3.67 (s, 3H), 2.40 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 160.3, 144.2, 141.1, 139.2, 138.8, 134.2, 133.1, 130.2, 129.8, 126.9, 122.5, 122.3, 121.9, 116.5, 114.4, 102.5, 55.4, 21.8. HRMS (ESI) calcd for $C_{22}H_{19}N_1O_5S_2$: 442.0777(M + H^+), found: 442.0780.



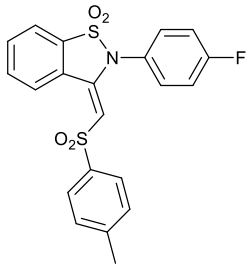
(*E*)-2-(3,5-dimethylphenyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3m**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.00 (d, *J*=6.9 Hz, 1H), 7.95 – 7.86 (m, 1H), 7.82 – 7.71 (m, 4H), 7.29 (d, *J*=8.0 Hz, 2H), 7.14 (s, 1H), 7.00 (s, 2H), 5.65 (s, 1H), 2.39 (s, 3H), 2.34 (s, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 149.0, 144.7, 140.8, 139.9, 134.0, 133.1, 133.0, 130.1, 130.0, 128.1, 126.8, 125.6, 121.8, 107.4, 21.8, 21.4.



(*E*)-2-(o-tolyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3n**]

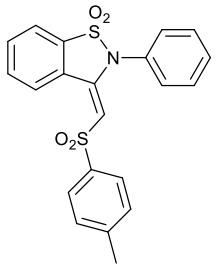
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.07 (d, *J*=7.8 Hz, 1H), 7.92 (d, *J*=6.9 Hz, 1H), 7.85 – 7.70 (m, 4H), 7.47 – 7.41 (m, 1H), 7.40-7.34 (m, 3H), 7.27 (d, *J*=8.0 Hz, 2H), 5.44 (s, 1H), 2.38 (s, 3H), 2.23 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 144.7, 142.5, 140.0, 139.8, 134.0, 133.1, 132.5, 131.6, 130.1, 130.0, 128.3, 127.9, 126.7, 125.4, 121.8, 106.8, 21.8, 17.9.



(*E*)-2-(4-fluorophenyl)-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3o**]

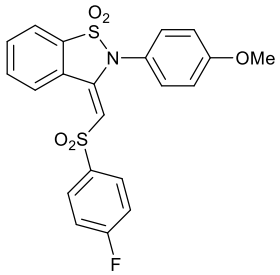
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.06 (d, *J* = 7.7 Hz, 1H), 7.92 (d, *J* = 7.0 Hz, 1H), 7.84 – 7.71 (m, 4H), 7.44-7.38 (m, 2H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.23 (t, *J* = 8.3 Hz, 2H), 5.55 (s,

1H), 2.40 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 164.2 (d, *J* = 251.3 Hz), 144.3 (d, *J* = 128.7 Hz), 134.2, 133.3, 133.2, 133.1, 130.2, 130.0, 126.9, 125.5 (d, *J* = 7.1 Hz) 121.8, 118.2(d, *J*= 22.9 Hz), 107.9, 29.9, 21.8.



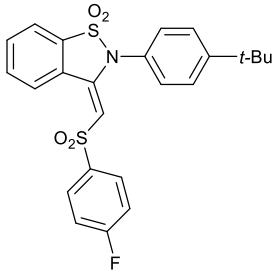
(*E*)-2-phenyl-3-(tosylmethylene)-2,3-dihydrobenzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3p**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.05 (d, *J*=7.3 Hz, 1H), 7.91 (d, *J*=7.6 Hz, 1H), 7.82 – 7.71 (m, 4H), 7.58 – 7.50 (m, 3H), 7.44-7.40 (m, 2H), 7.28 (d, *J*=8.0 Hz, 2H), 5.61 (s, 1H), 2.39 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ = 144.8, 143.7, 139.7, 134.1, 133.5, 133.2, 131.2, 130.9, 130.2, 129.9, 129.7, 126.8, 125.6, 121.8, 107.6, 21.8.



(*E*)-3-(((4-fluorophenyl)sulfonyl)methylene)-2-(4-methoxyphenyl)-2,3-dihydrobenzo [*d*]isothiazole 1,1-dioxide [(*E*)-**3q**]

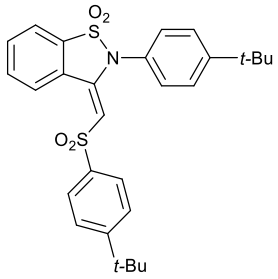
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.07 – 8.99 (m, 1H), 7.95-7.88 (m, 3H), 7.85 – 7.75 (m, 2H), 7.44 (t, *J*=8.1 Hz, 1H), 7.17 (t, *J*=8.5 Hz, 2H), 7.09-7.05 (m, 1H), 6.99 (d, *J*=7.8 Hz, 1H), 6.93 (s, 1H), 5.62 (s, 1H), 3.80 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 165.3 (d, *J*=166.6 Hz), 161.4, 143.9, 134.2, 133.6, 133.4, 131.5, 130.6, 129.8, 129.7 (d, *J*=9.7 Hz), 122.6, 121.9, 117.2 (d, *J*=22.6 Hz), 116.8, 116.0, 106.9, 55.8.



(*E*)-2-(4-(tert-butyl)phenyl)-3-(((4-fluorophenyl)sulfonyl)methylene)-2,3-dihydrobenz

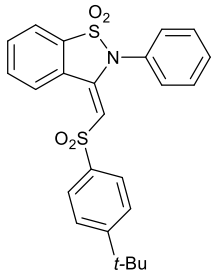
o[*d*]isothiazole 1,1-dioxide [(*E*)-**3r**]

^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.01-8.97 (m, 1H), 7.93-7.87 (m, 3H), 7.81 – 7.71 (m, 2H), 7.57 (t, *J*=8.7 Hz, 3H), 7.50 (t, *J*=7.5 Hz, 2H), 7.34 (d, *J*=8.5 Hz, 2H), 5.69 (s, 1H), 1.35 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 154.7, 143.6 (d, *J*=163.5 Hz), 134.0, 133.6, 133.2, 130.3 , 129.8, 129.5, 128.0, 126.6, 126.5, 125.5, 121.9, 106.7, 35.2, 31.4.



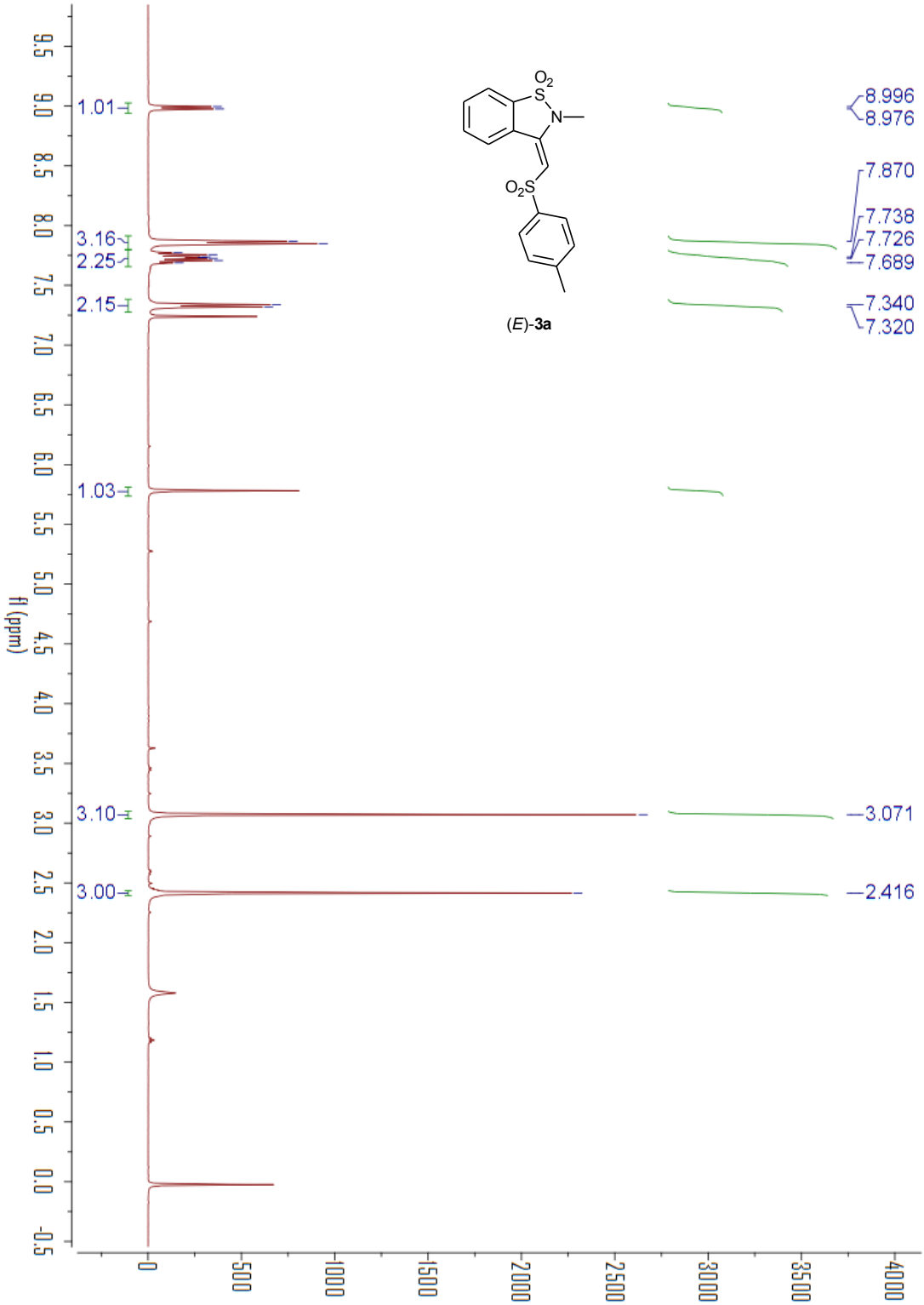
(*E*)-2-(4-(tert-butyl)phenyl)-3-(((4-(tert-butyl)phenyl)sulfonyl)methylene)-2,3-dihydro benzo[*d*]isothiazole 1,1-dioxide [(*E*)-**3s**]

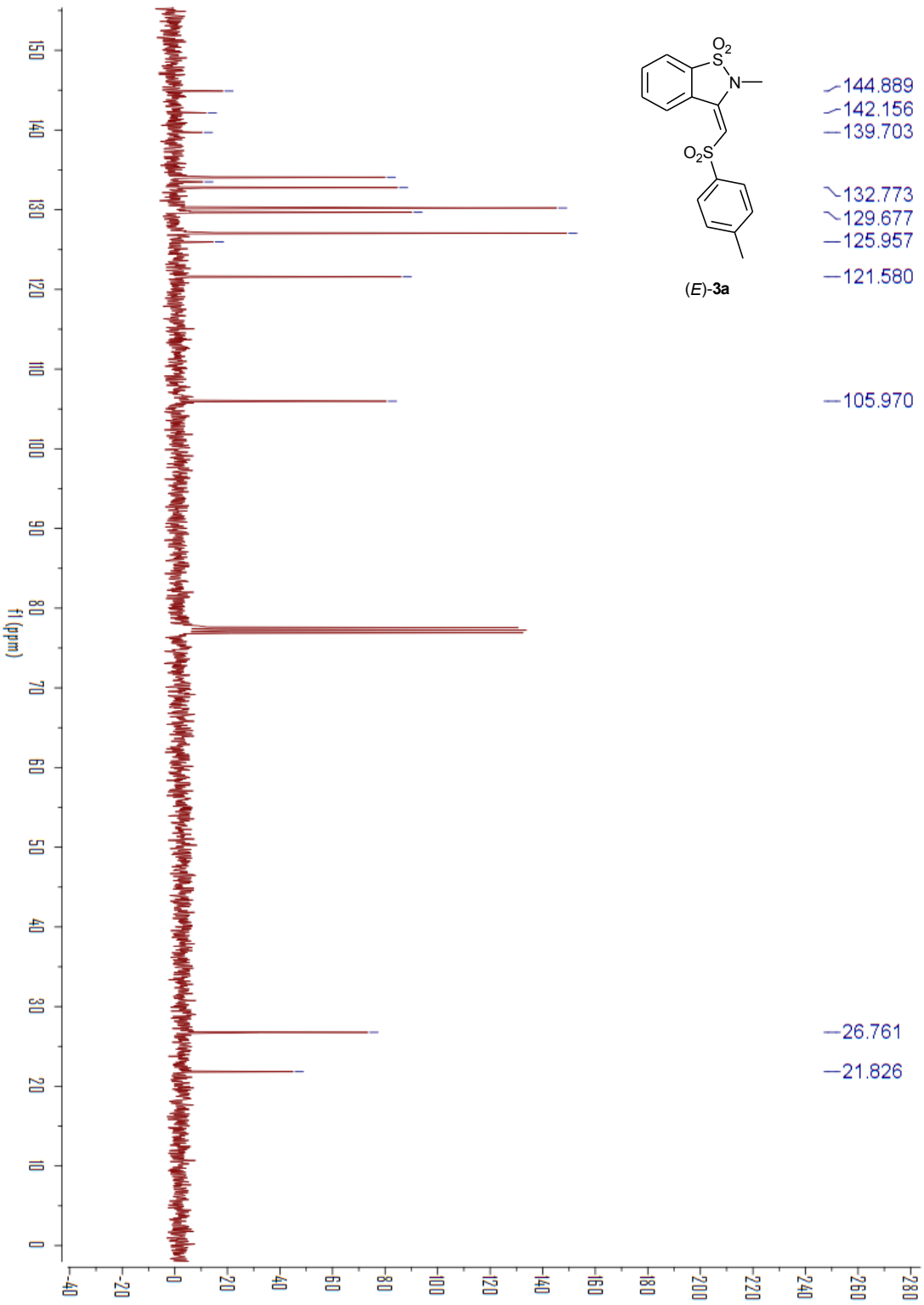
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.05 (d, *J*=7.5 Hz, 1H), 7.91 (d, *J*=6.9 Hz, 1H), 7.84 – 7.71 (m, 4H), 7.56 (d, *J*=8.2 Hz, 2H), 7.50 (d, *J*=8.3 Hz, 2H), 7.34 (d, *J*=8.2 Hz, 2H), 5.71 (s, 1H), 1.35 (s, 9H), 1.30 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 157.6, 154.6, 144.1, 139.7, 134.0, 133.6, 133.1, 130.3, 129.9, 128.0, 126.6, 125.7, 121.8, 107.3, 35.4, 35.2, 31.4, 31.2.

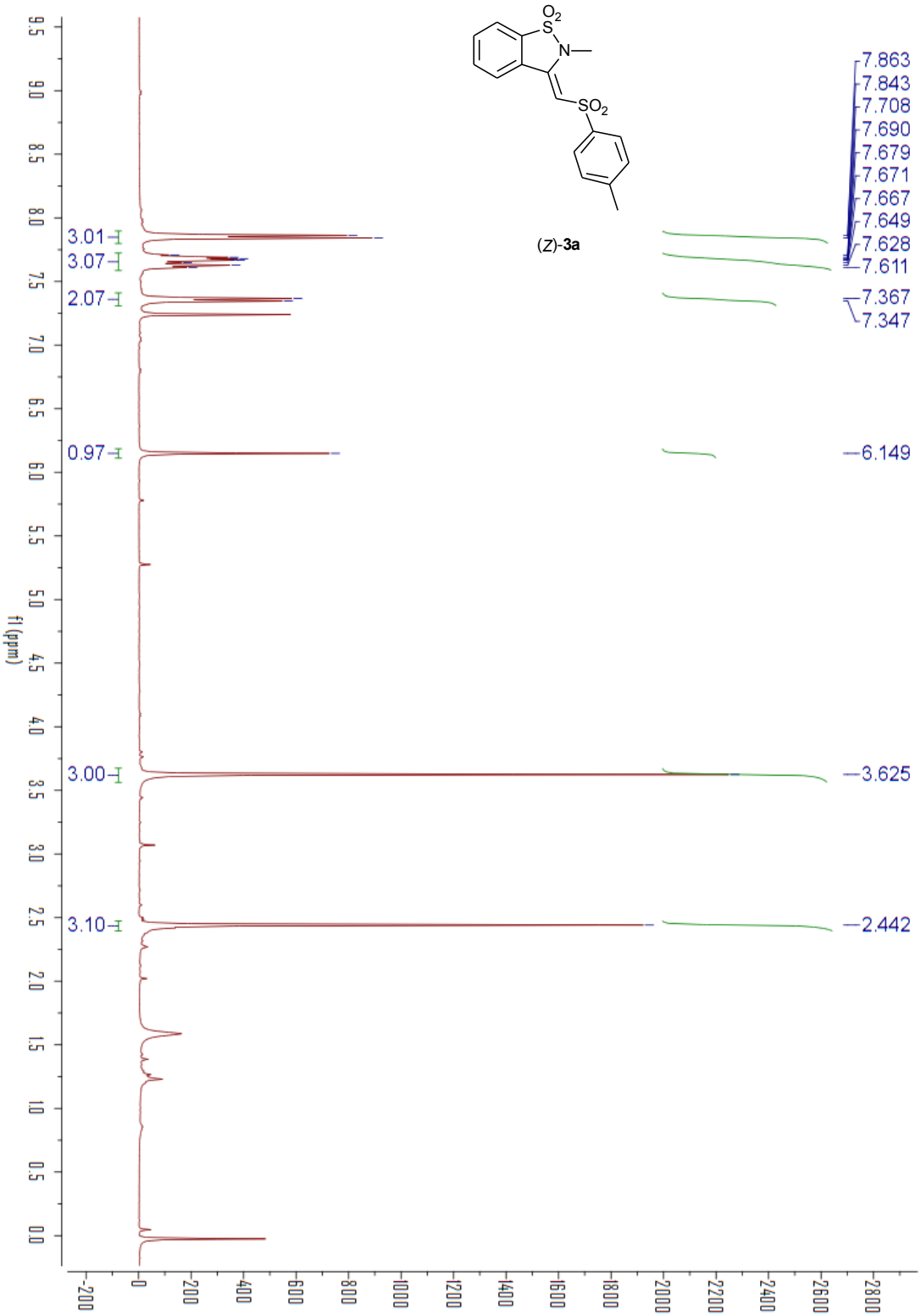


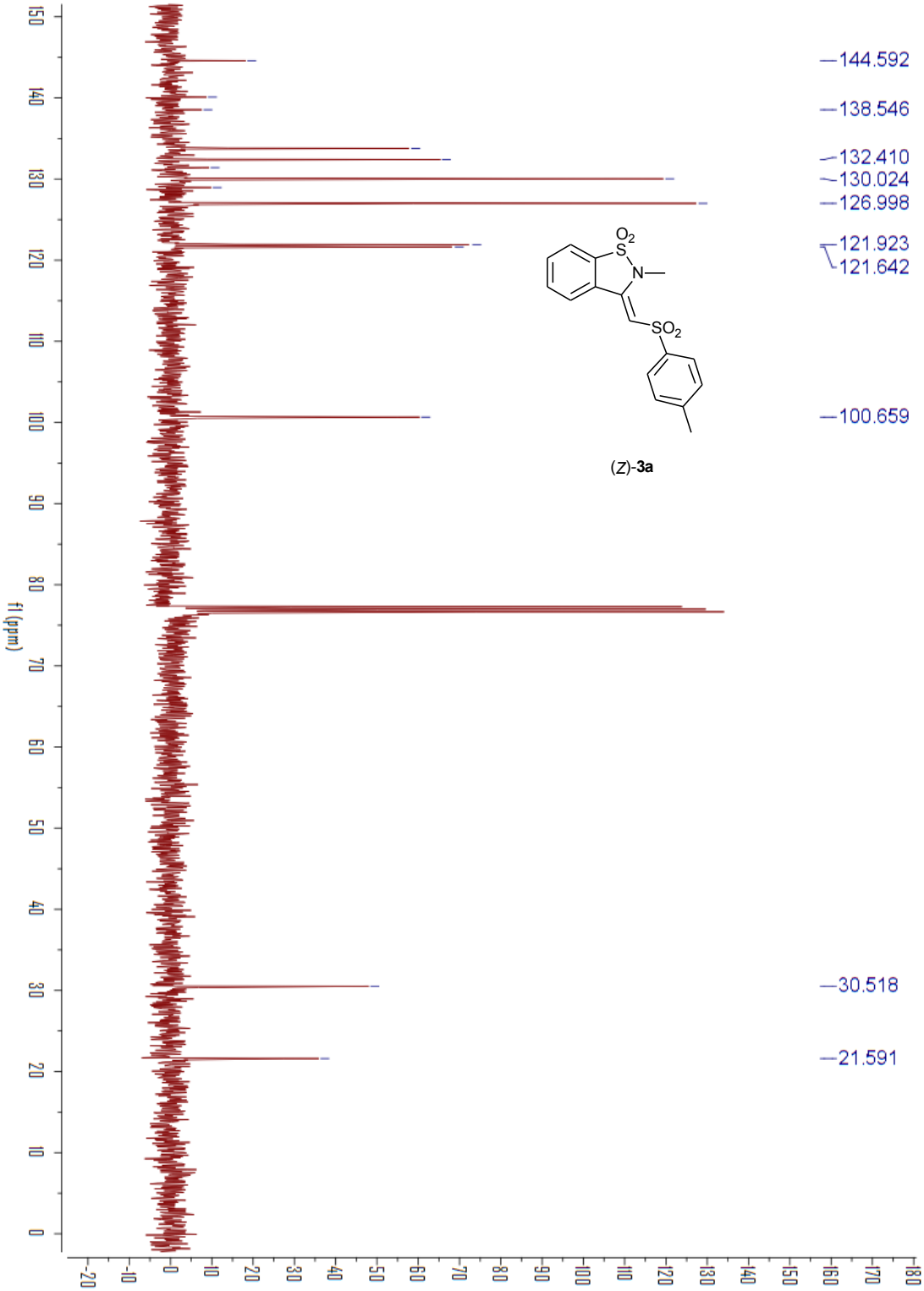
(*E*)-3-(((4-(tert-butyl)phenyl)sulfonyl)methylene)-2-phenyl-2,3-dihydrobenzo[*d*]isothi azole 1,1-dioxide [(*E*)-**3t**]

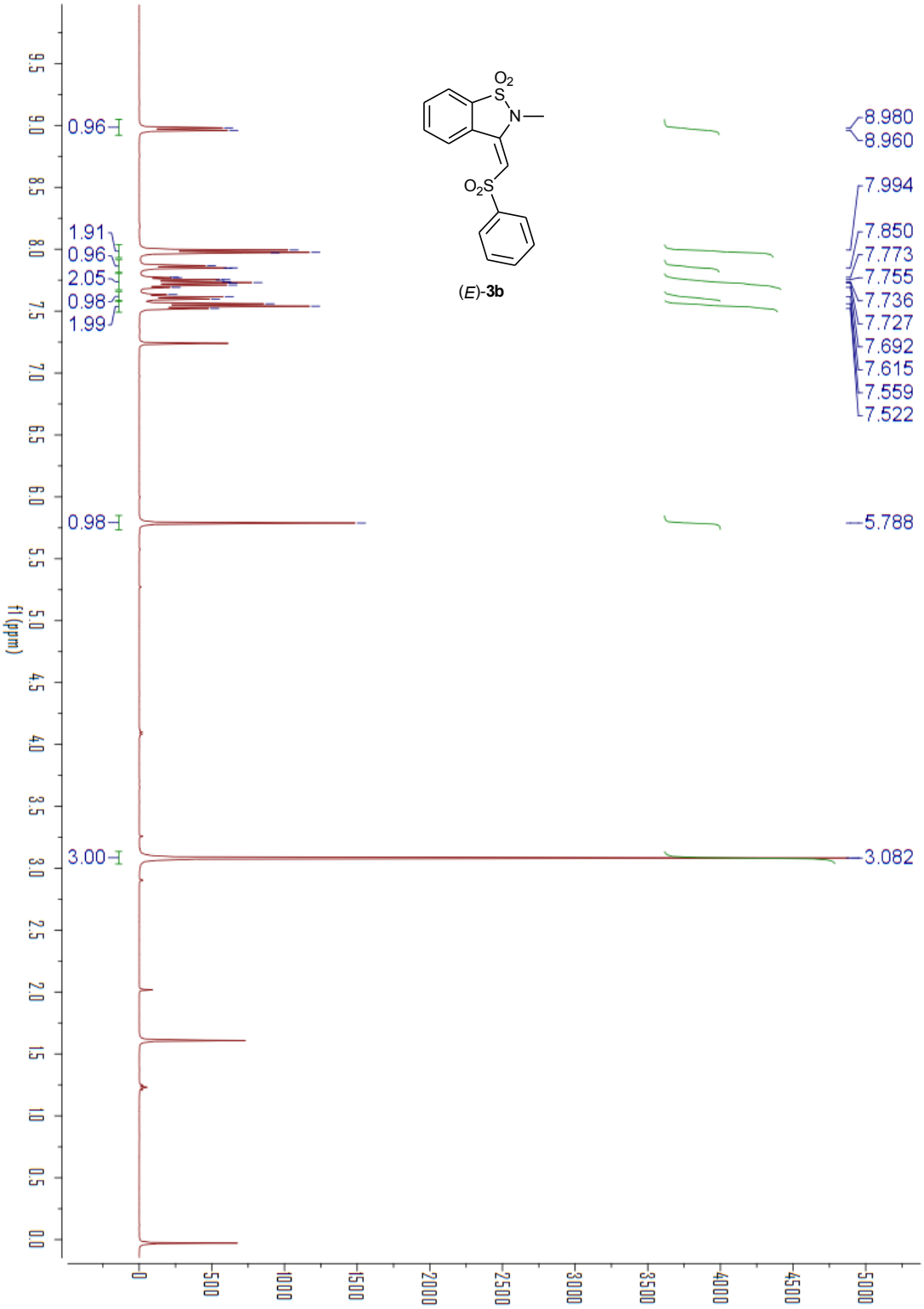
^{1}H NMR (400 MHz, $CDCl_3$) δ = 9.08 (d, *J*=7.5 Hz, 1H), 7.96 – 7.87 (m, 1H), 7.85 – 7.73 (m, 4H), 7.62 – 7.52 (m, 3H), 7.50 (d, *J*=8.5 Hz, 2H), 7.45-7.41 (m, 2H), 5.65 (s, 1H), 1.30 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ = 157.7, 143.8, 139.5, 134.1, 133.5, 133.2, 131.2, 130.9, 129.9, 129.7, 126.6, 126.6, 125.6, 121.8, 107.6, 35.5, 31.2.

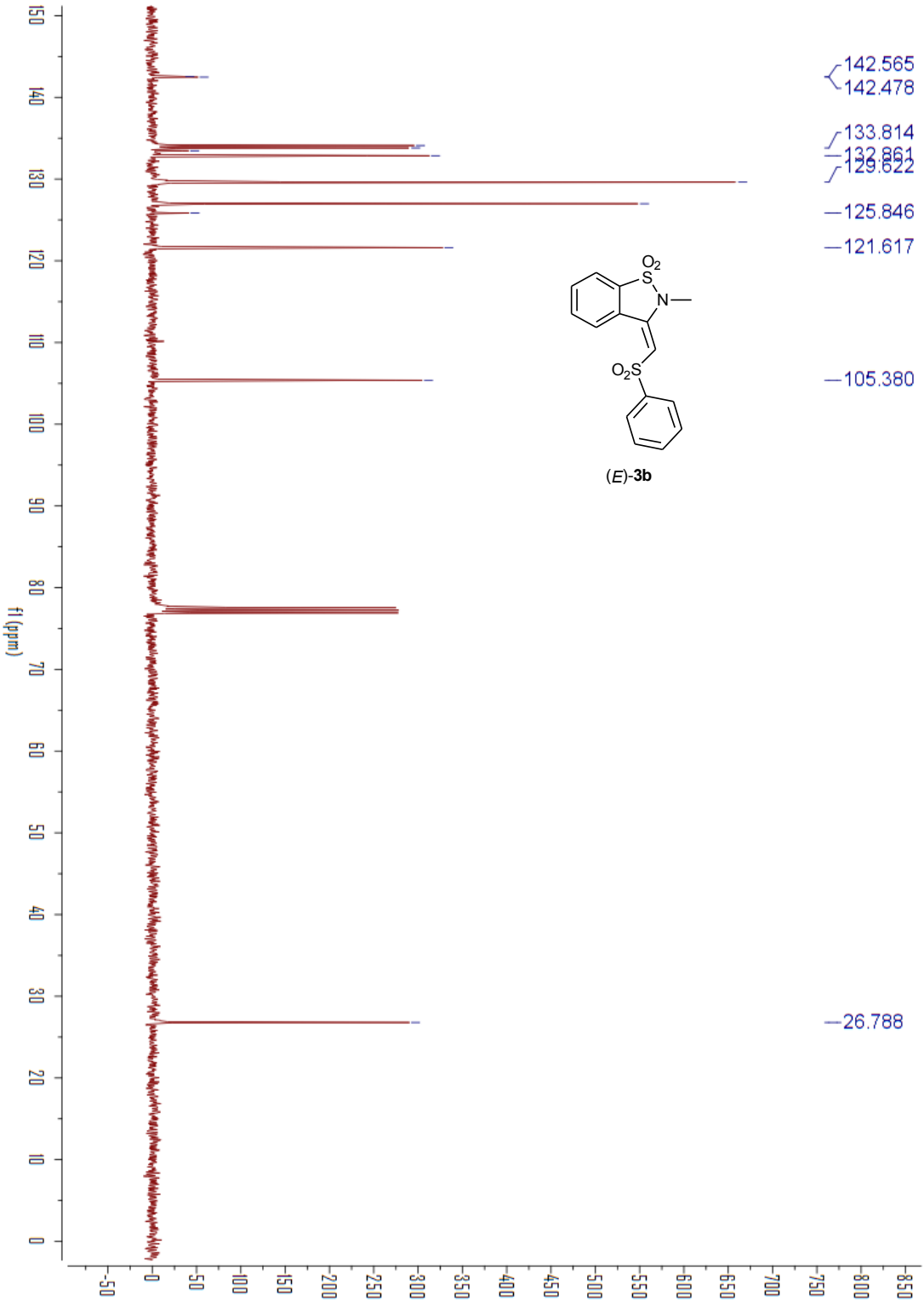

(E)-3a
8.996
8.976
7.870
7.738
7.726
7.689
7.340
7.320
3.071
2.416
1.01
3.16
2.25
2.15
1.03
3.10
3.00
f1 (ppm)

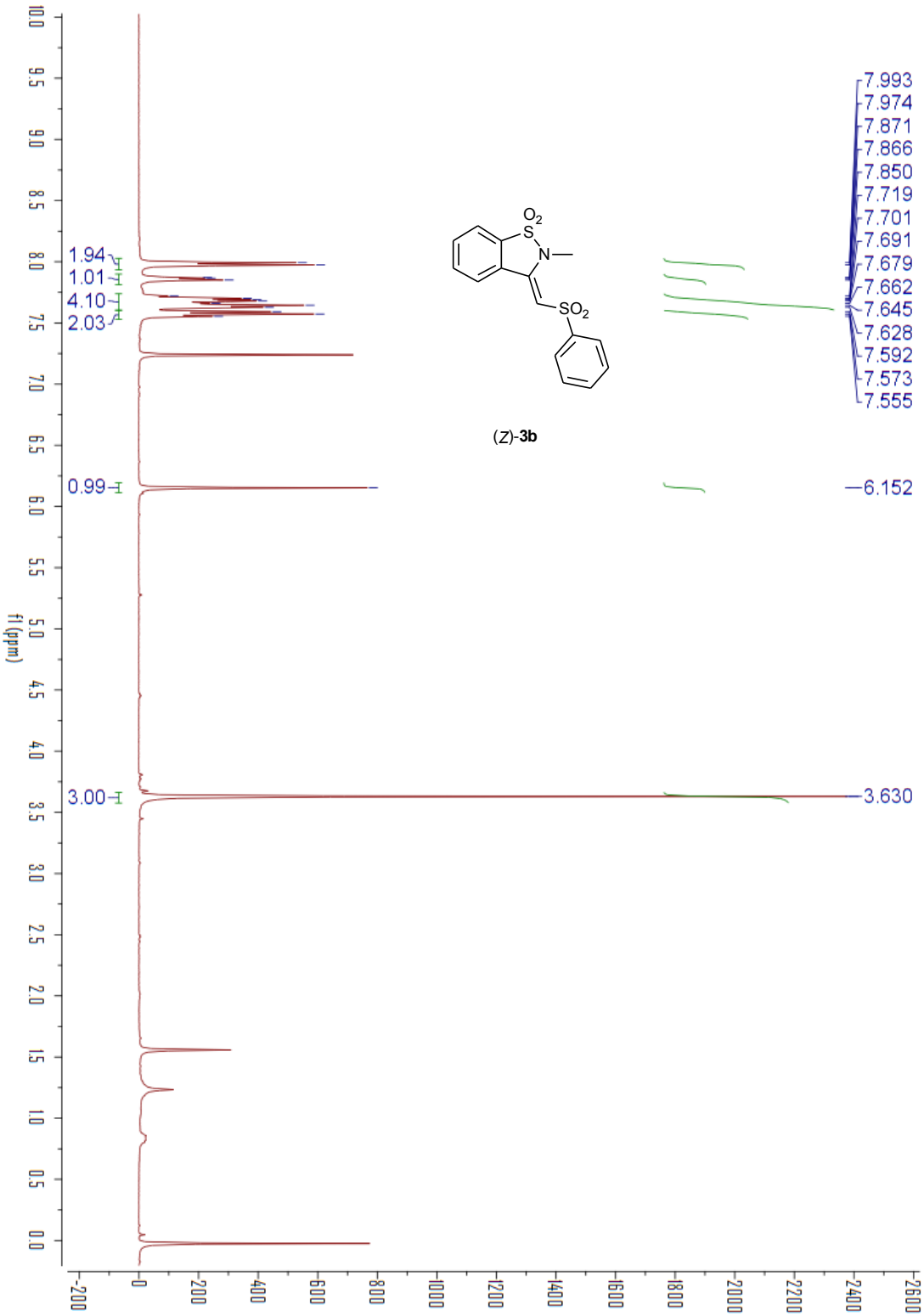

144.889
142.156
139.703
132.773
129.677
125.957
121.580
105.970
26.761
21.826
(E)-3a
f1 (ppm)


(Z)-3a
7.863
7.843
7.708
7.690
7.679
7.671
7.667
7.649
7.628
7.611
7.367
7.347
6.149
3.625
2.442
3.01
3.07
2.07
0.97
3.00
3.10
f1 (ppm)

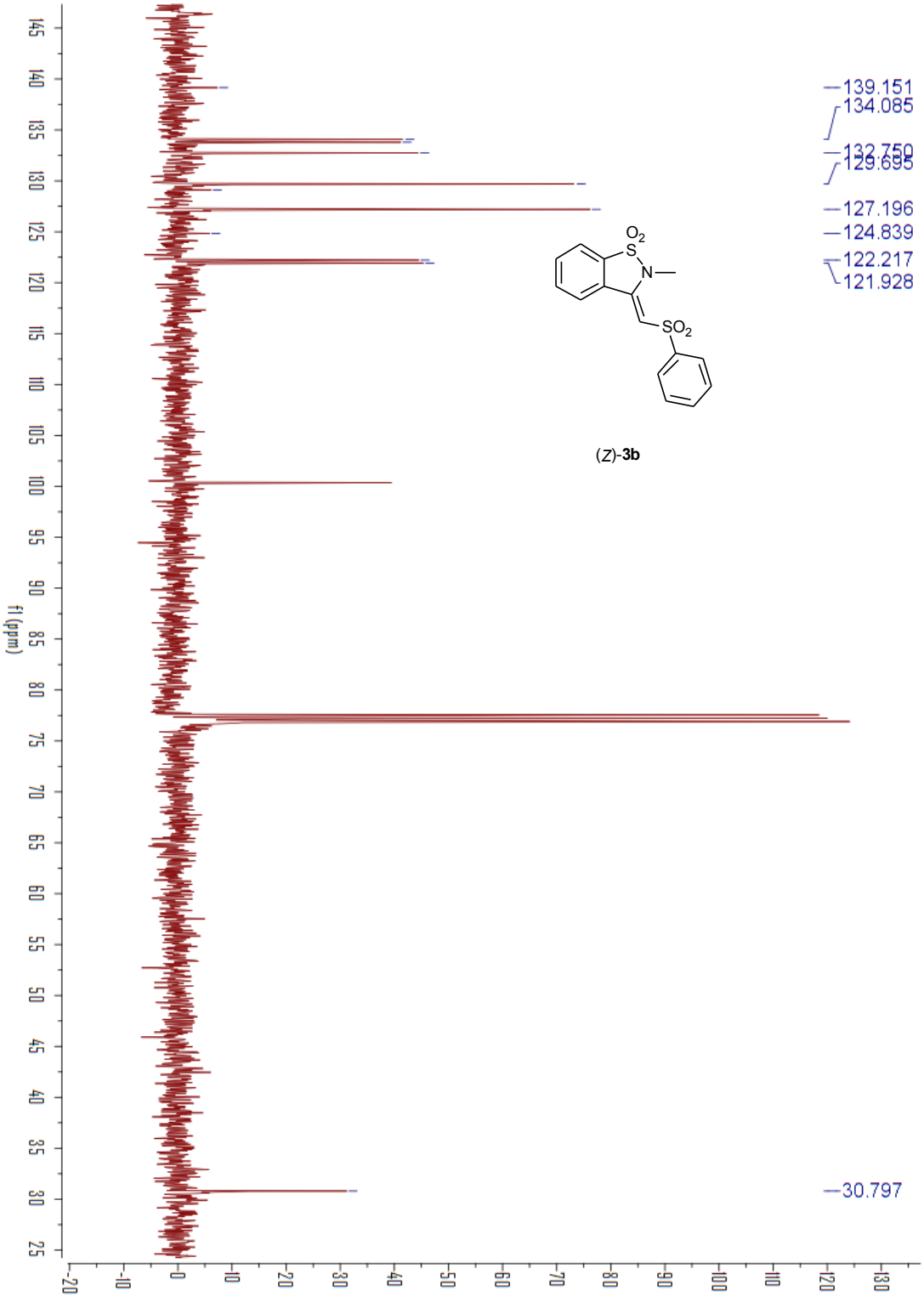

144.592
138.546
132.410
130.024
126.998
121.923
121.642
100.659
30.518
21.591
f1 (ppm)
(Z)-3a

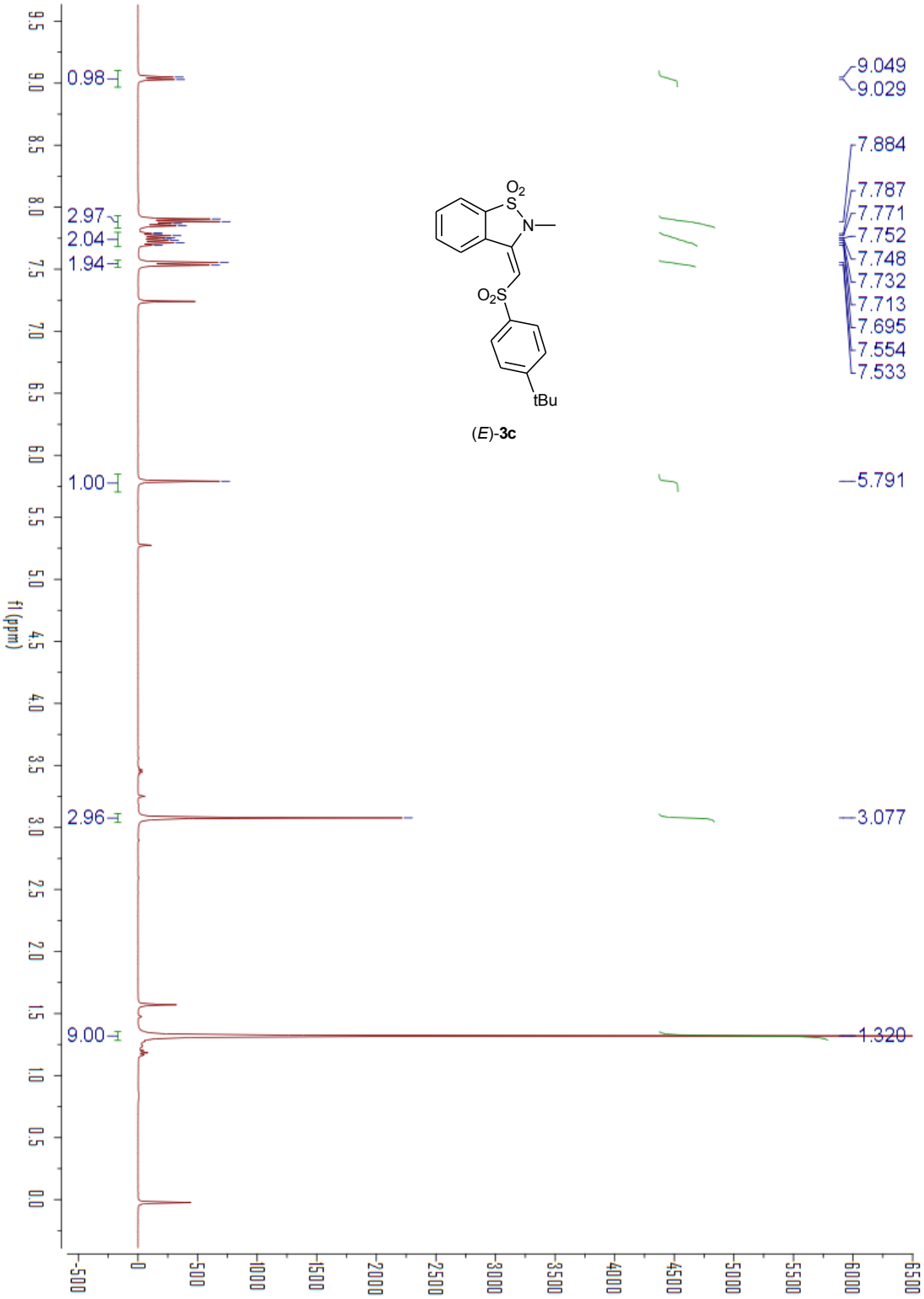

(E)-3b
0.96
1.91
0.96
2.05
0.98
1.99
0.98
3.00
8.980
8.960
7.994
7.850
7.773
7.755
7.736
7.727
7.692
7.615
7.559
7.522
5.788
3.082
f1 (ppm)

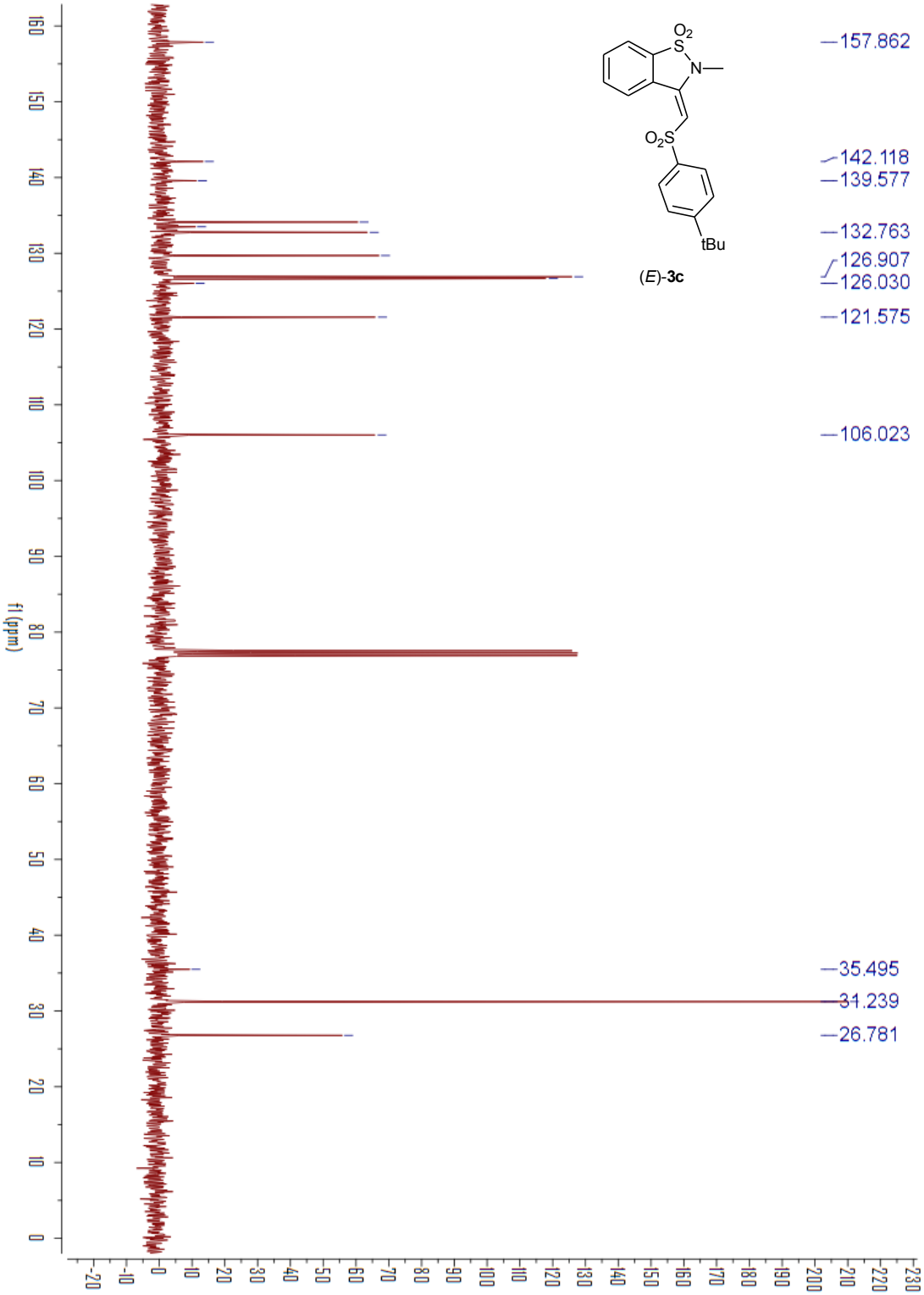

142.565
142.478
133.814
132.861
129.622
125.846
121.617
105.380
26.788
f1 (ppm)
(E)-3b

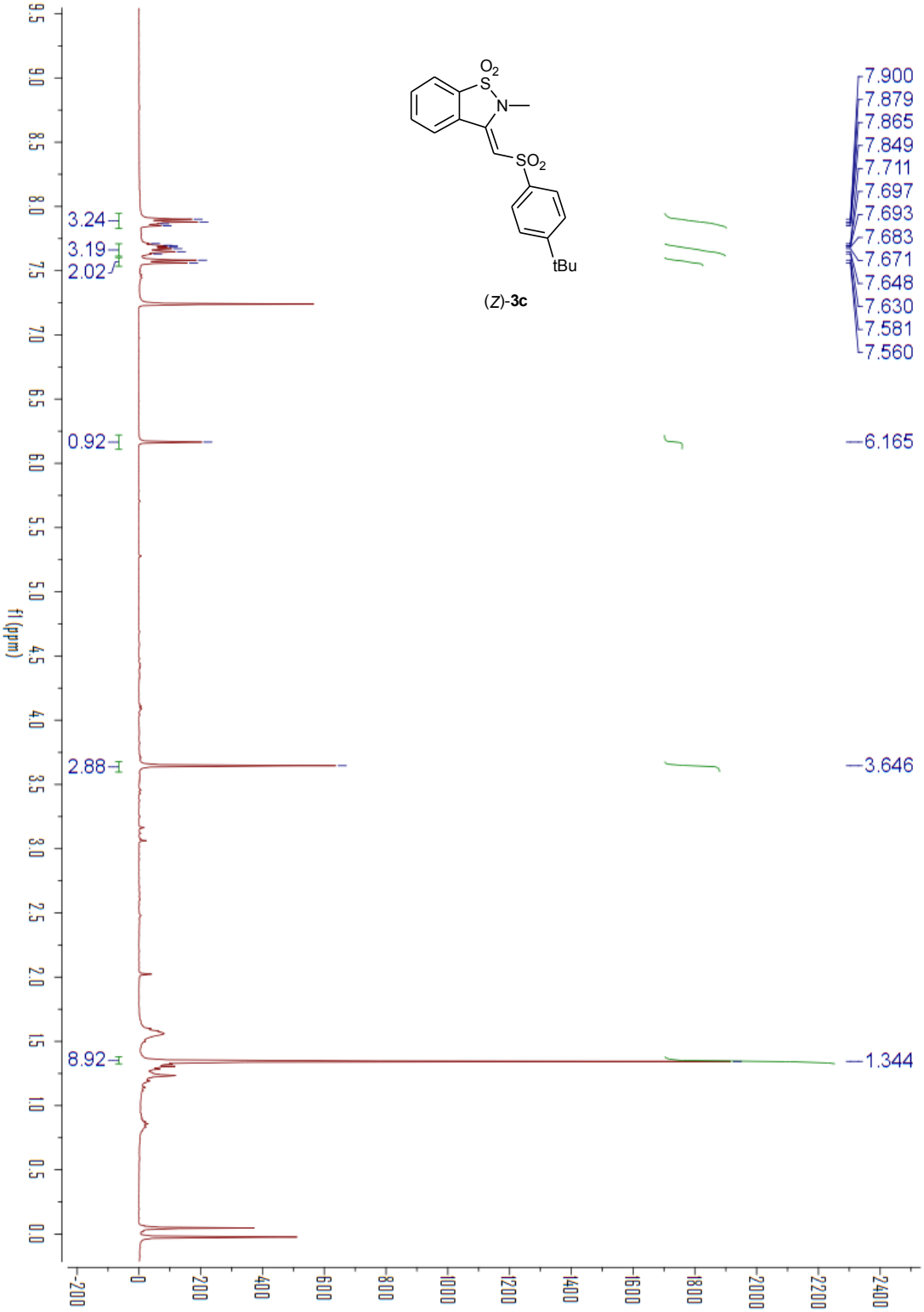

1.94
1.01
4.10
2.03
0.99
3.00
7.993
7.974
7.871
7.866
7.850
7.719
7.701
7.691
7.679
7.662
7.645
7.628
7.592
7.573
7.555
6.152
3.630
f1 (ppm)

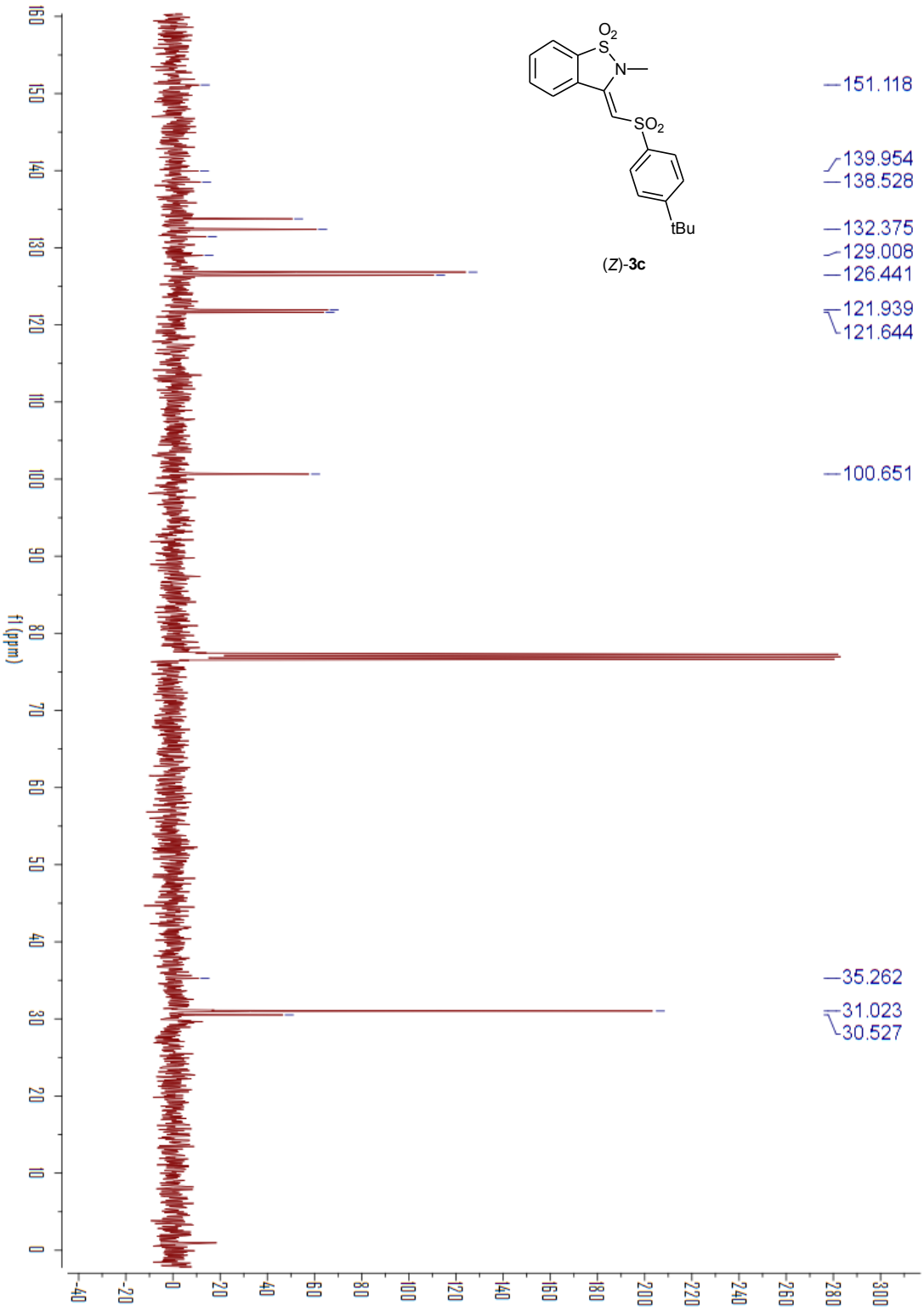
(*Z*)-**3b**

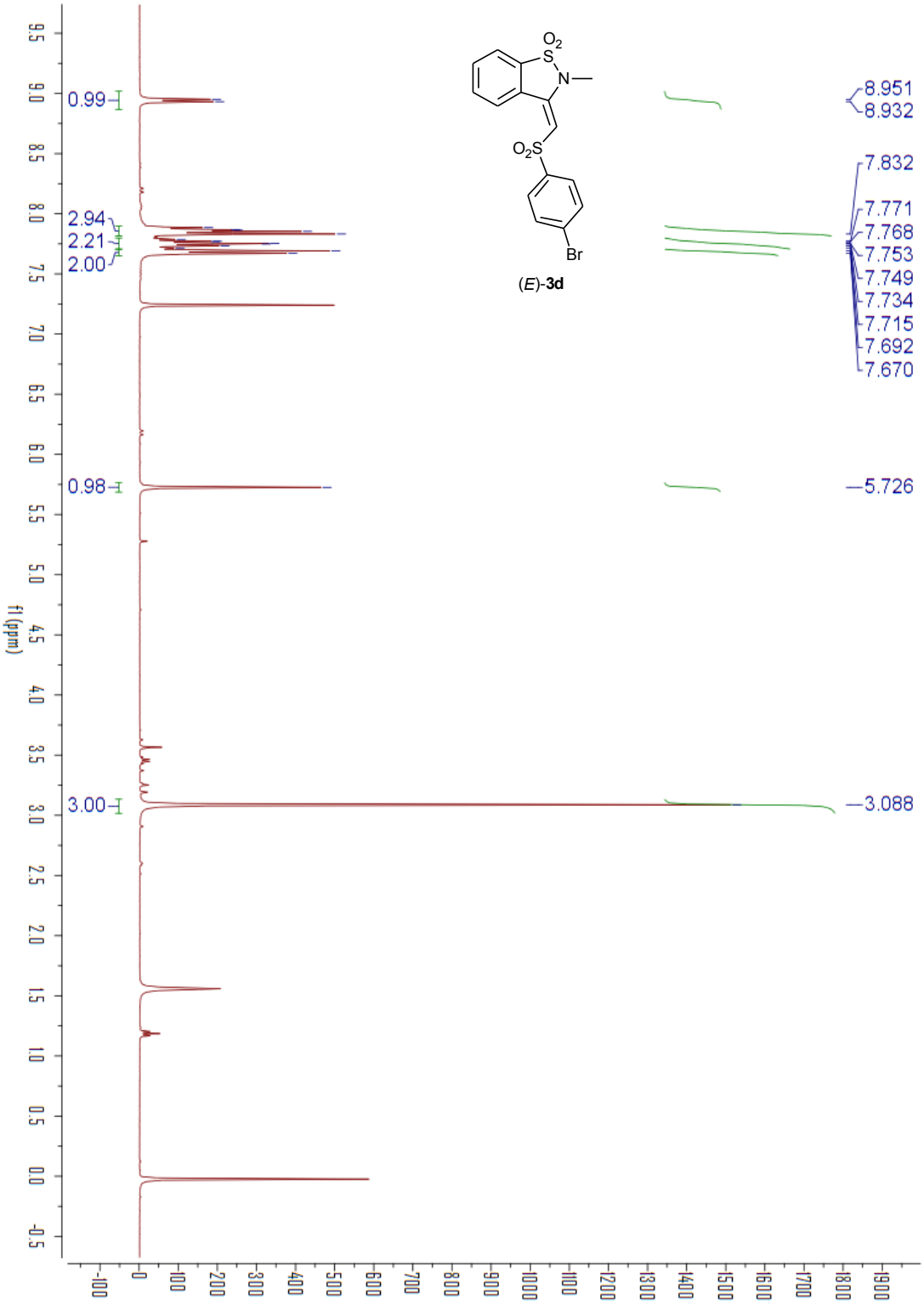

139.151
134.085
132.750
129.695
127.196
124.839
122.217
121.928
30.797
f1 (ppm)
(Z)-3b

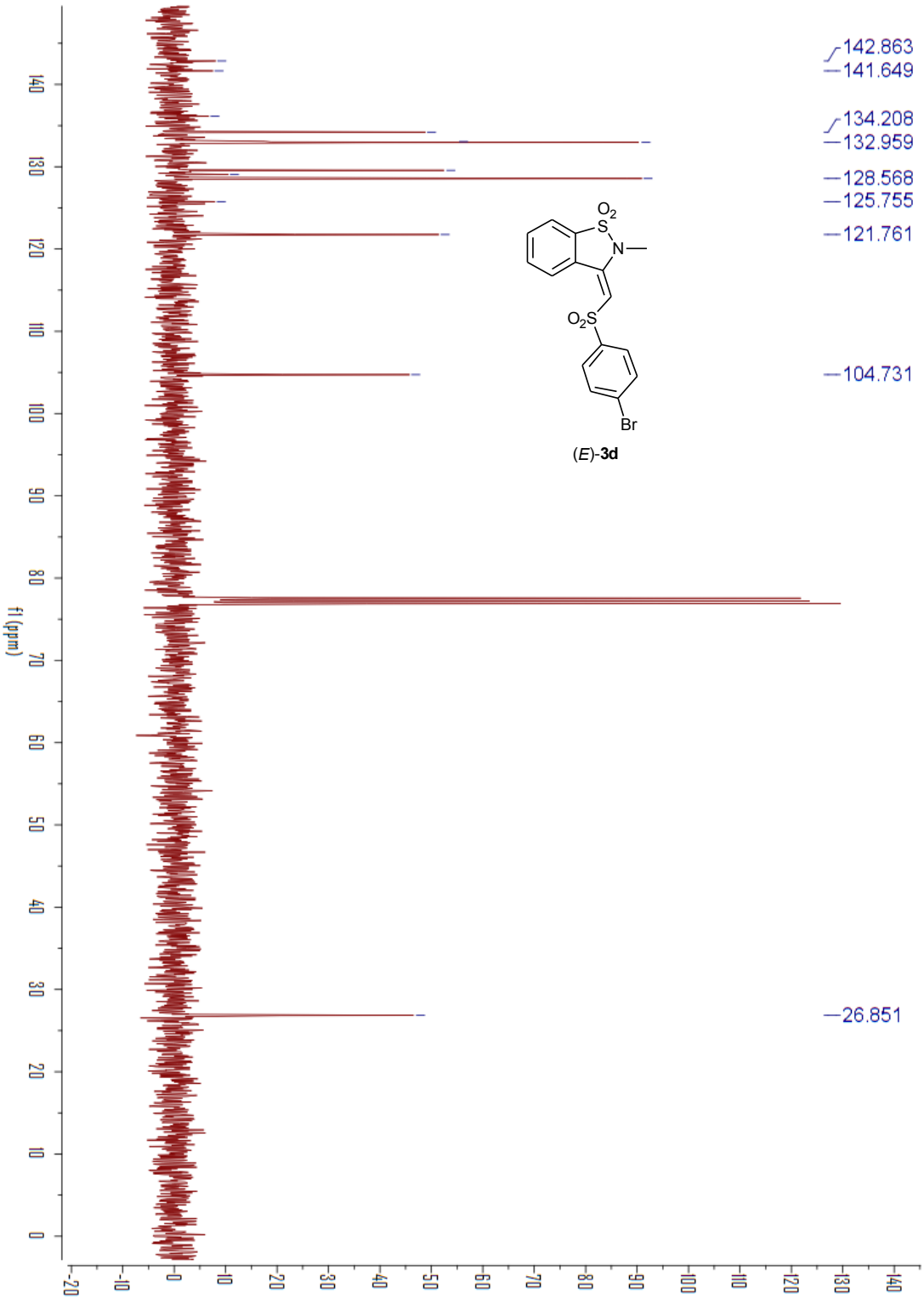

9.049
9.029
7.884
7.787
7.771
7.752
7.748
7.732
7.713
7.695
7.554
7.533
5.791
3.077
1.320
0.98
2.97
2.04
1.94
1.00
2.96
9.00
O2
S
N
O2S
tBu
(E)-3c
f1 (ppm)

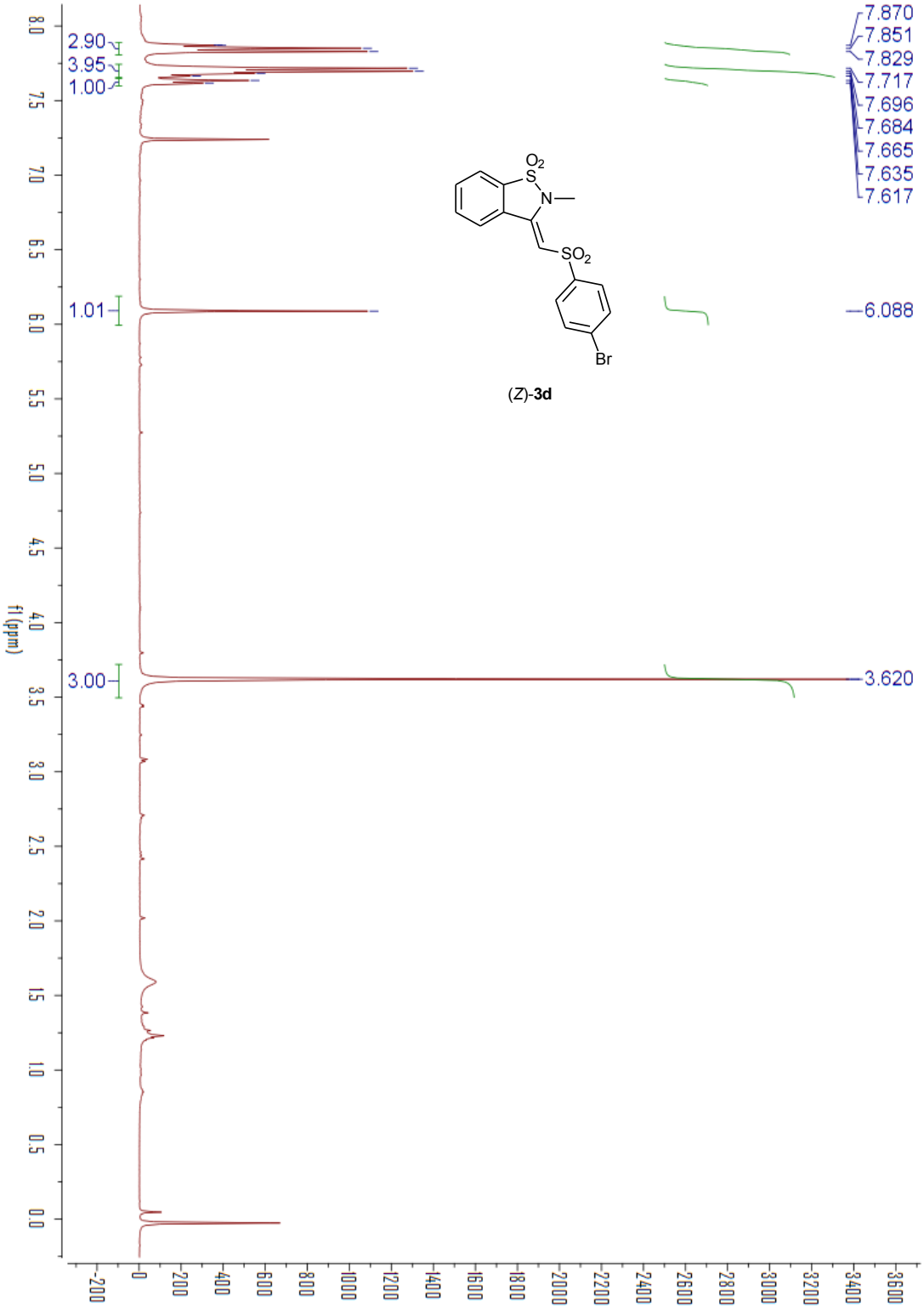

(E)-3c
157.862
142.118
139.577
132.763
126.907
126.030
121.575
106.023
35.495
31.239
26.781
f1 (ppm)


O2
S
N
SO2
tBu
(Z)-3c
7.900
7.879
7.865
7.849
7.711
7.697
7.693
7.683
7.671
7.648
7.630
7.581
7.560
6.165
3.646
1.344
3.24
3.19
2.02
0.92
2.88
8.92
f1 (ppm)

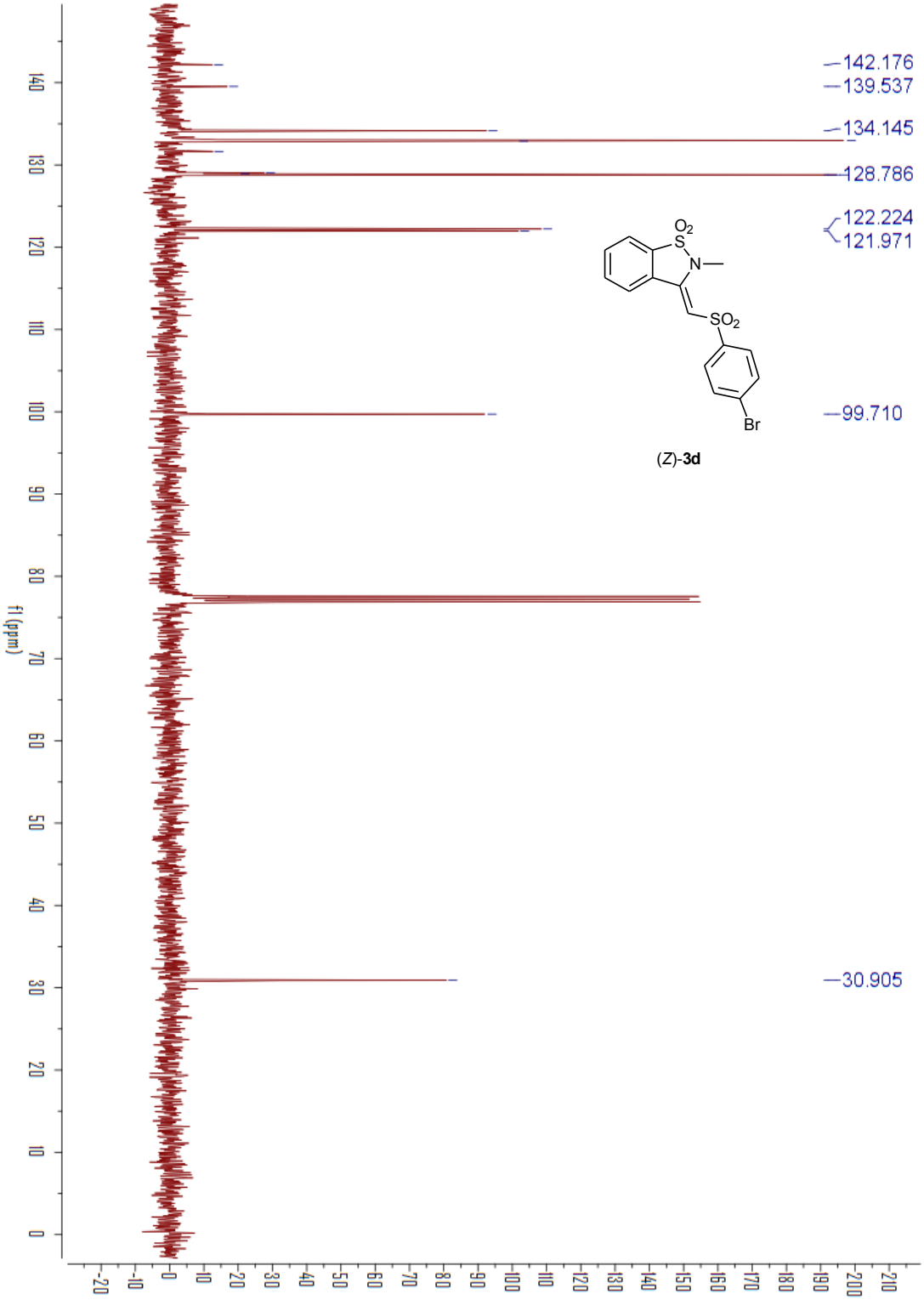

O2
S
N
SO2
tBu
(Z)-3c
151.118
139.954
138.528
132.375
129.008
126.441
121.939
121.644
100.651
35.262
31.023
30.527
f1 (ppm)


(E)-3d
8.951
8.932
7.832
7.771
7.768
7.753
7.749
7.734
7.715
7.692
7.670
5.726
3.088
0.99
2.94
2.21
2.00
0.98
3.00
f1 (ppm)

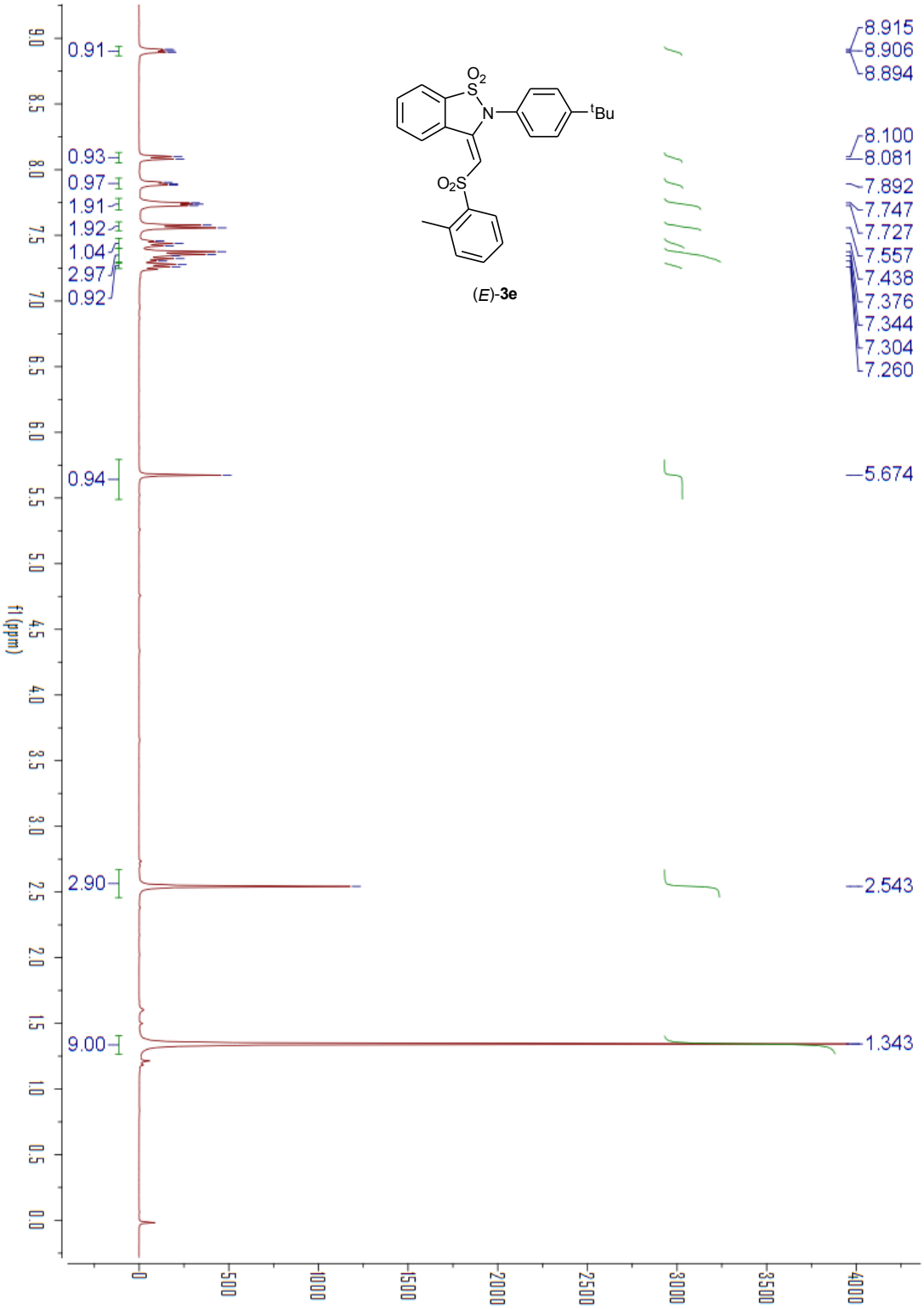

142.863
141.649
134.208
132.959
128.568
125.755
121.761
104.731
26.851
f1 (ppm)
(E)-3d

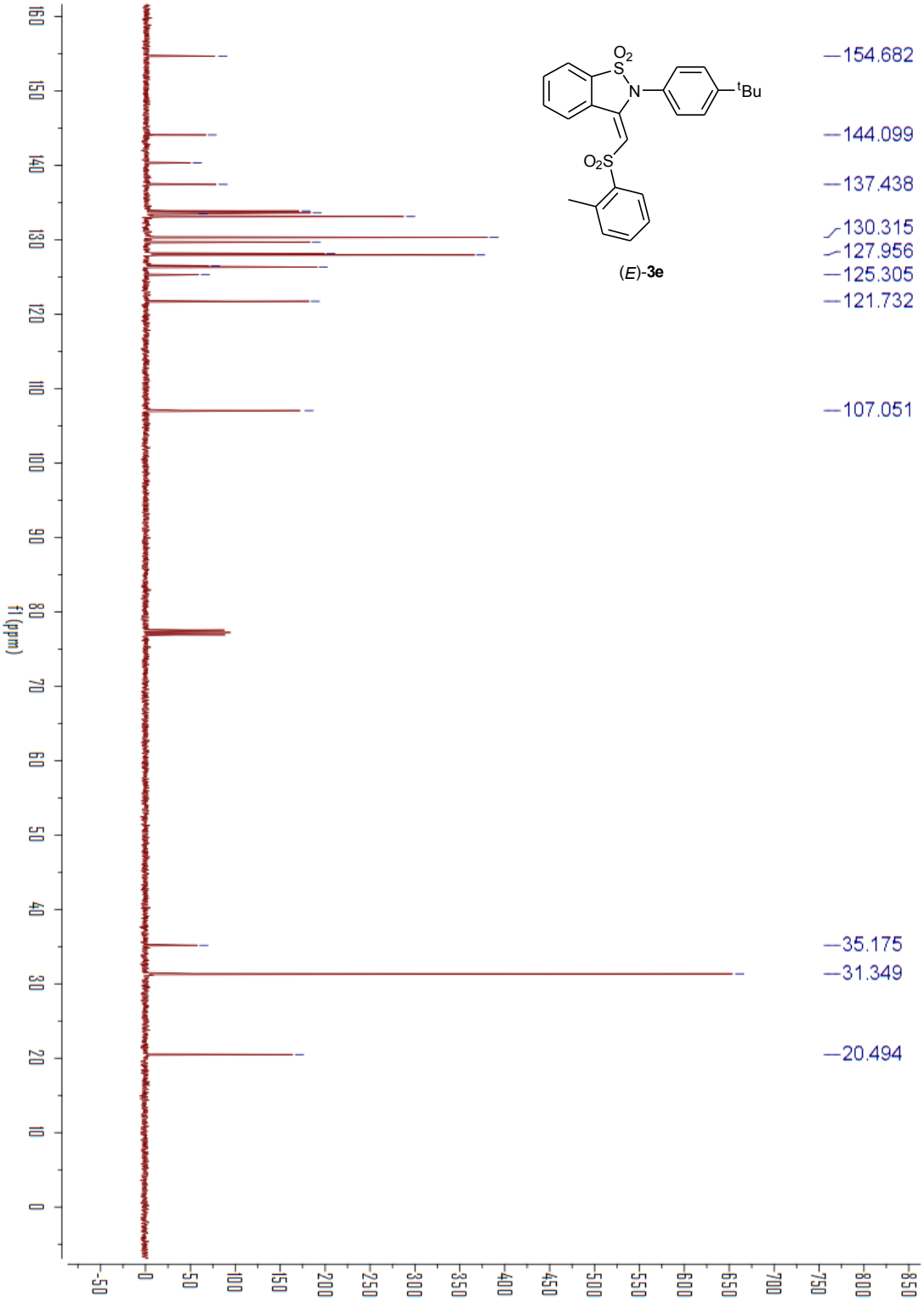

7.870
7.851
7.829
7.717
7.696
7.684
7.665
7.635
7.617
6.088
3.620
2.90
3.95
1.00
1.01
3.00
f1 (ppm)
O2
S
N
SO2
Br

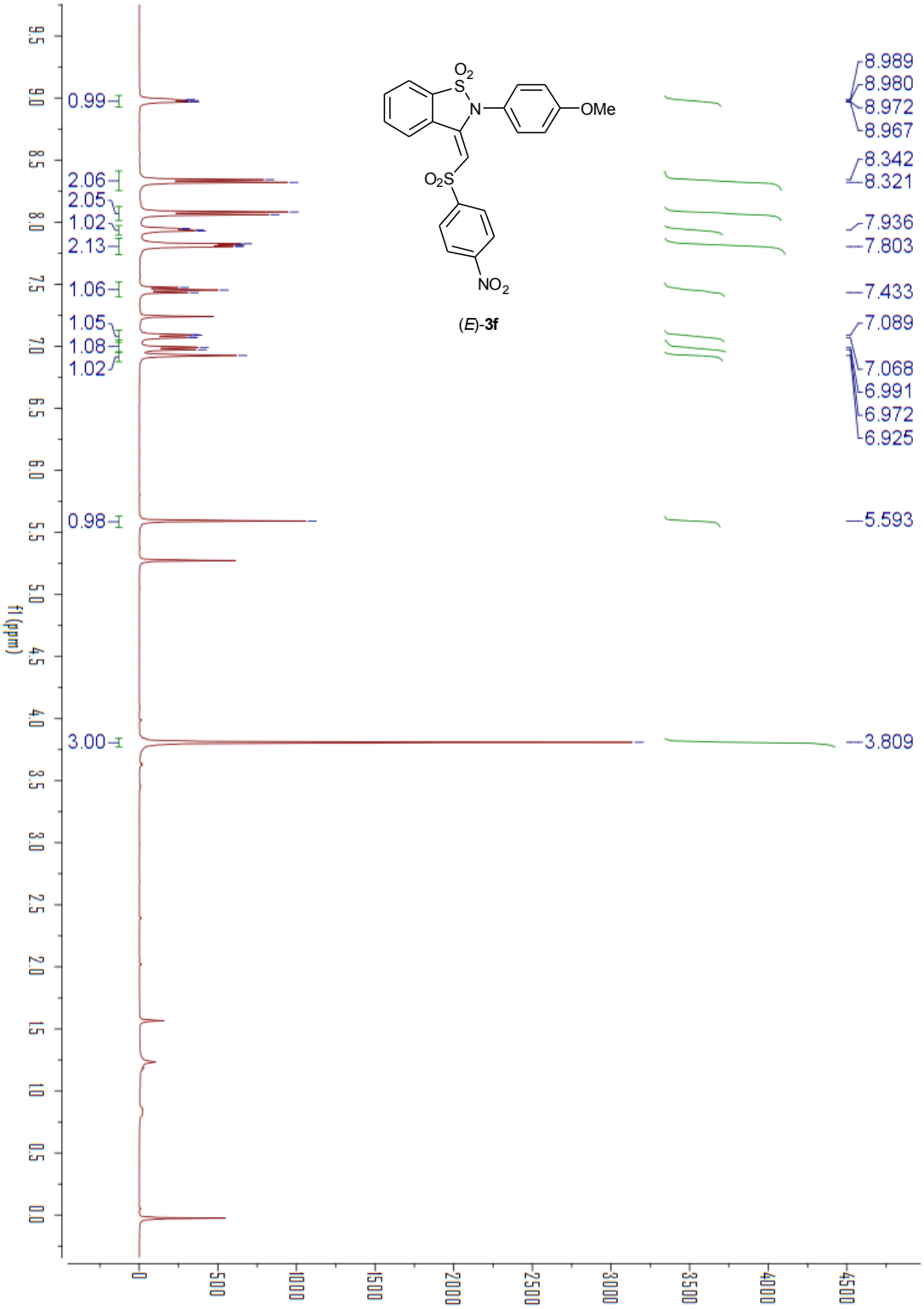
(*Z*)-**3d**


142.176
139.537
134.145
128.786
122.224
121.971
99.710
30.905
f1 (ppm)
O2
S
N
SO2
Br

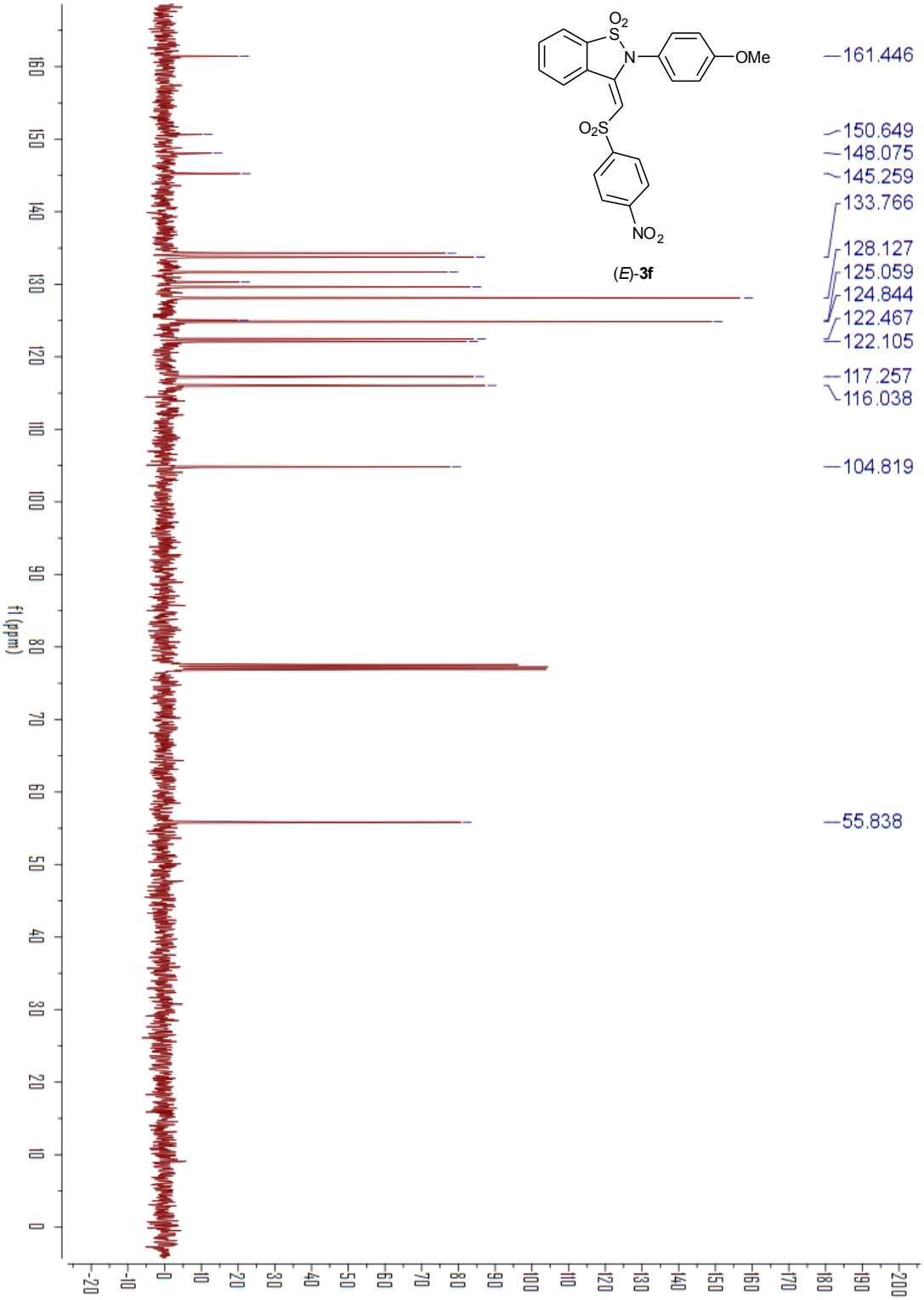
(*Z*)-**3d**

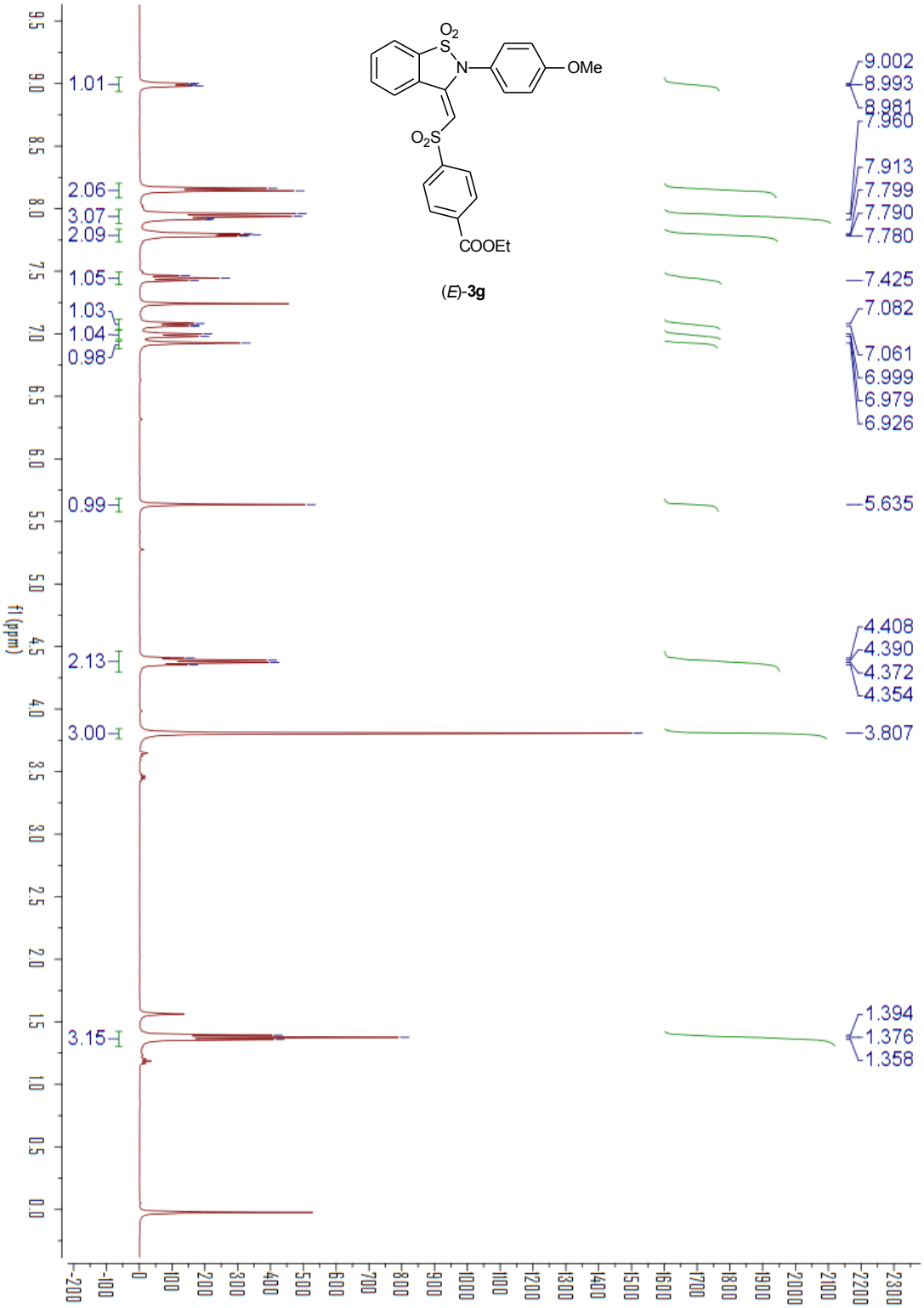

(E)-3e
0.91
0.93
0.97
1.91
1.92
1.04
2.97
0.92
0.94
2.90
9.00
8.915
8.906
8.894
8.100
8.081
7.892
7.747
7.727
7.557
7.438
7.376
7.344
7.304
7.260
5.674
2.543
1.343
f1 (ppm)

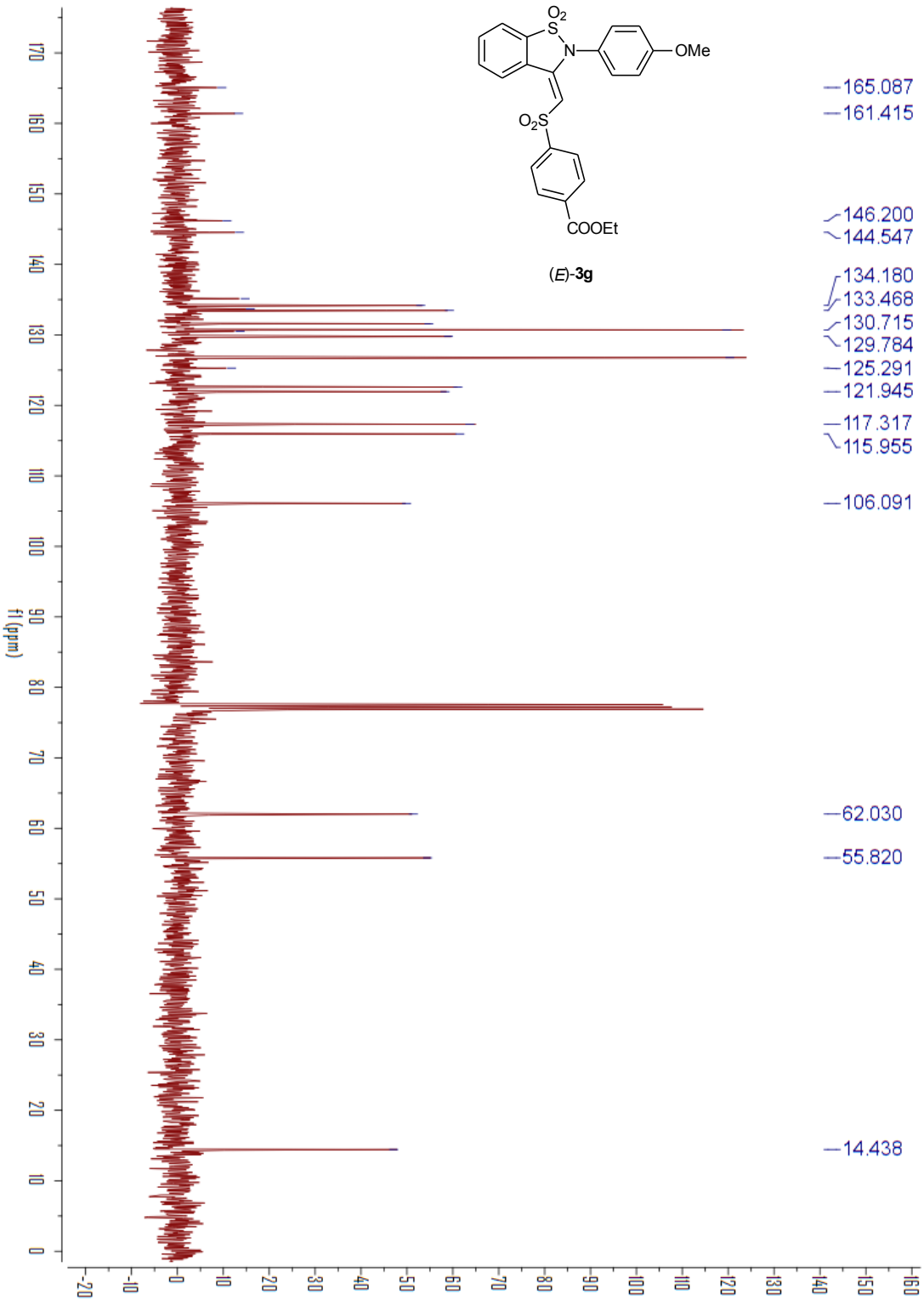

154.682
144.099
137.438
130.315
127.956
125.305
121.732
107.051
35.175
31.349
20.494
f1 (ppm)
(E)-3e

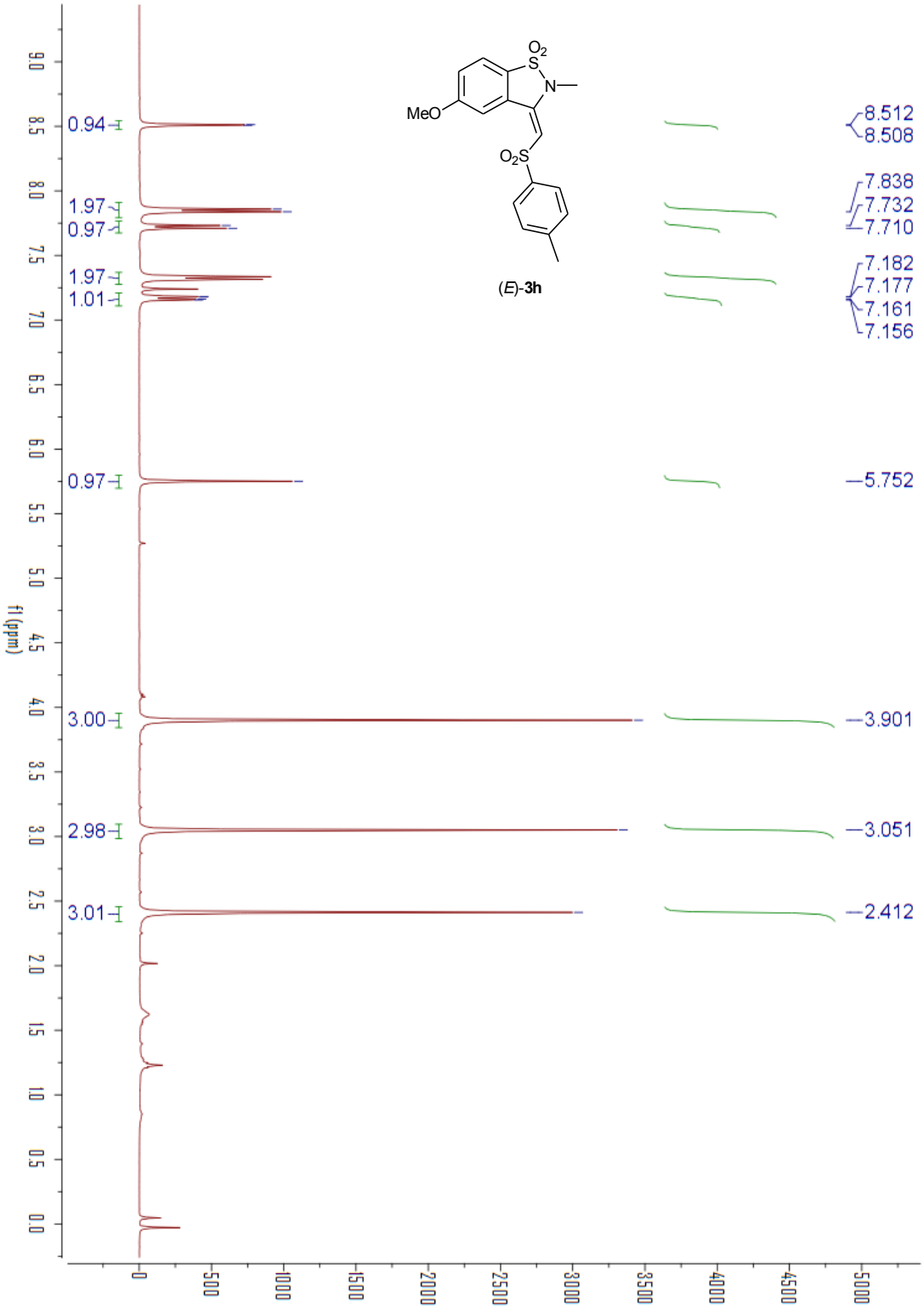


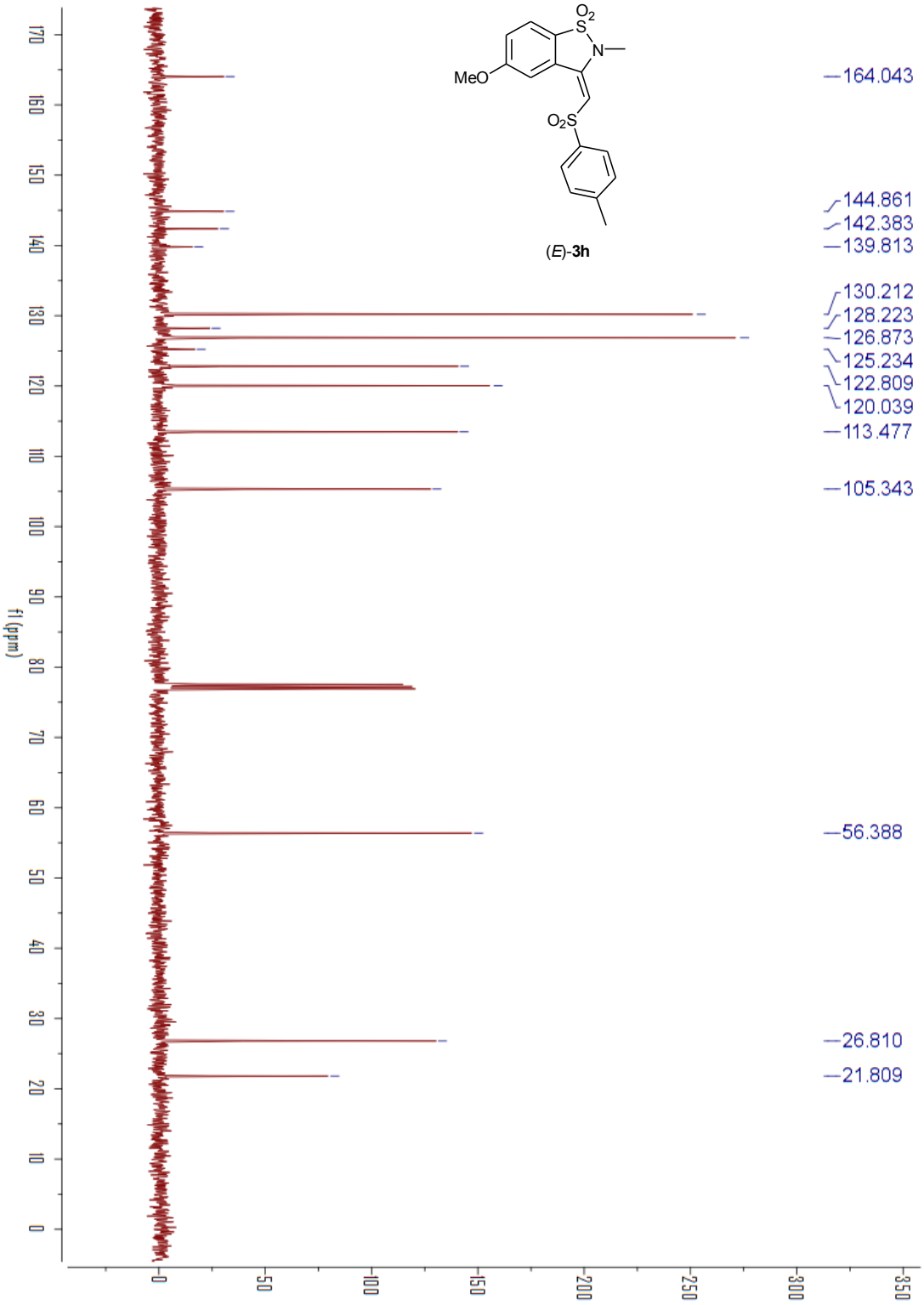
O2
S
N
OMe
O2S
NO2
(E)-3f
0.99
2.06
2.05
1.02
2.13
1.06
1.05
1.08
1.02
0.98
3.00
8.989
8.980
8.972
8.967
8.342
8.321
7.936
7.803
7.433
7.089
7.068
6.991
6.972
6.925
5.593
3.809
f1 (ppm)

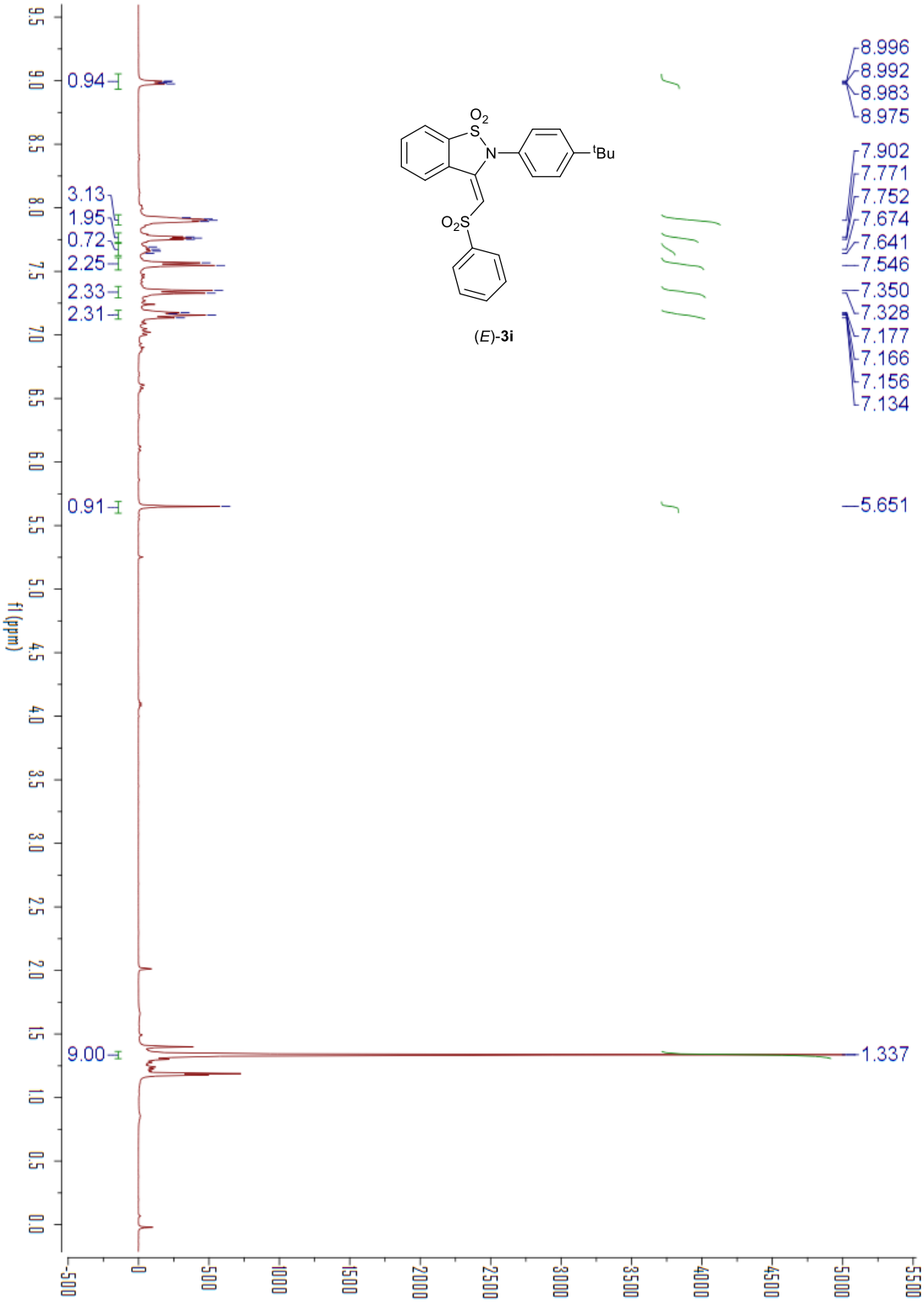

O2
S
N
OMe
O2S
NO2
(E)-3f
161.446
150.649
148.075
145.259
133.766
128.127
125.059
124.844
122.467
122.105
117.257
116.038
104.819
55.838
f1 (ppm)

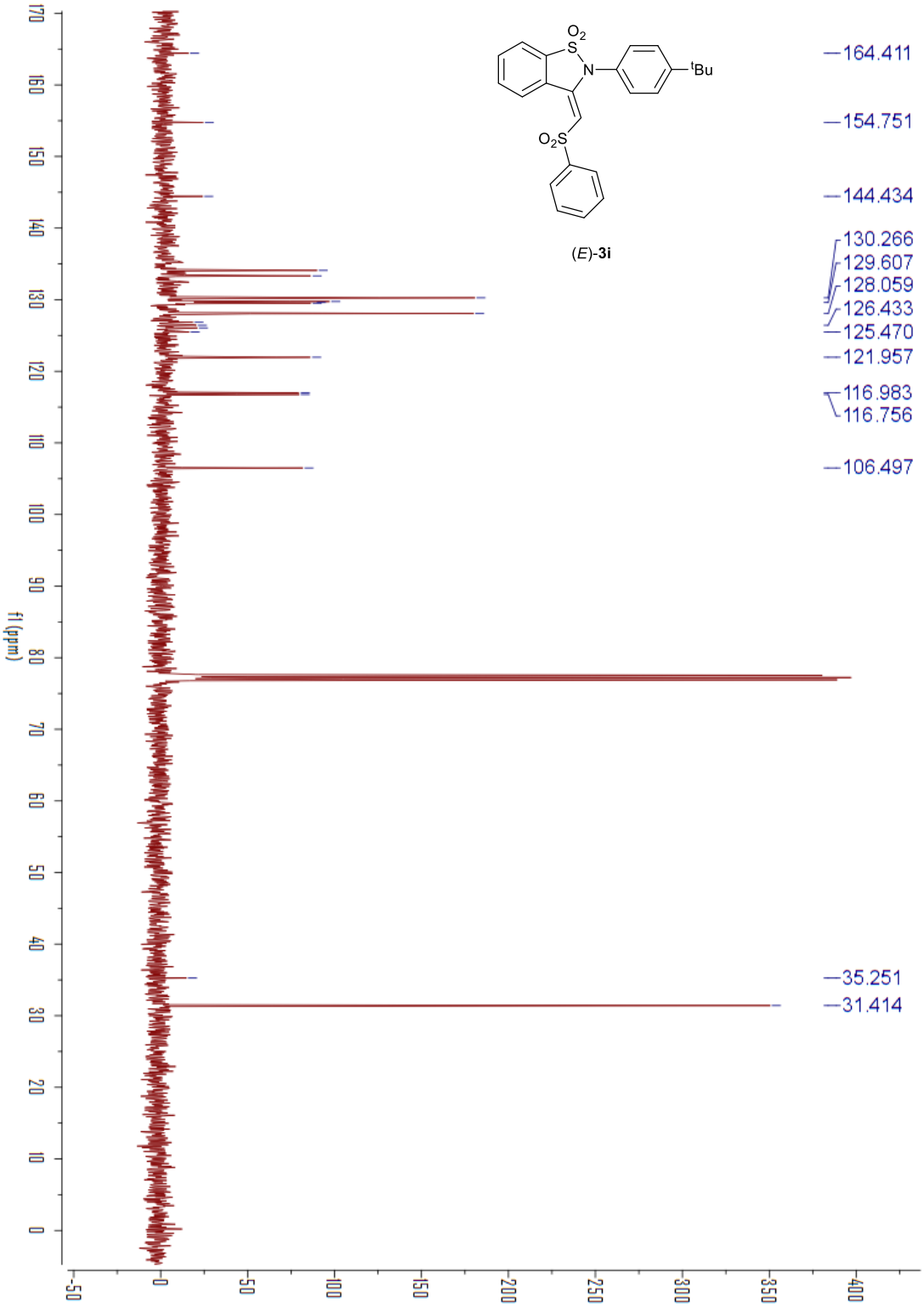

O2
S
N
OMe
O2S
COOEt
(E)-3g
9.002
8.993
8.981
7.960
7.913
7.799
7.790
7.780
7.425
7.082
7.061
6.999
6.979
6.926
5.635
4.408
4.390
4.372
4.354
3.807
1.394
1.376
1.358
1.01
2.06
3.07
2.09
1.05
1.03
1.04
0.98
0.99
2.13
3.00
3.15
f1 (ppm)

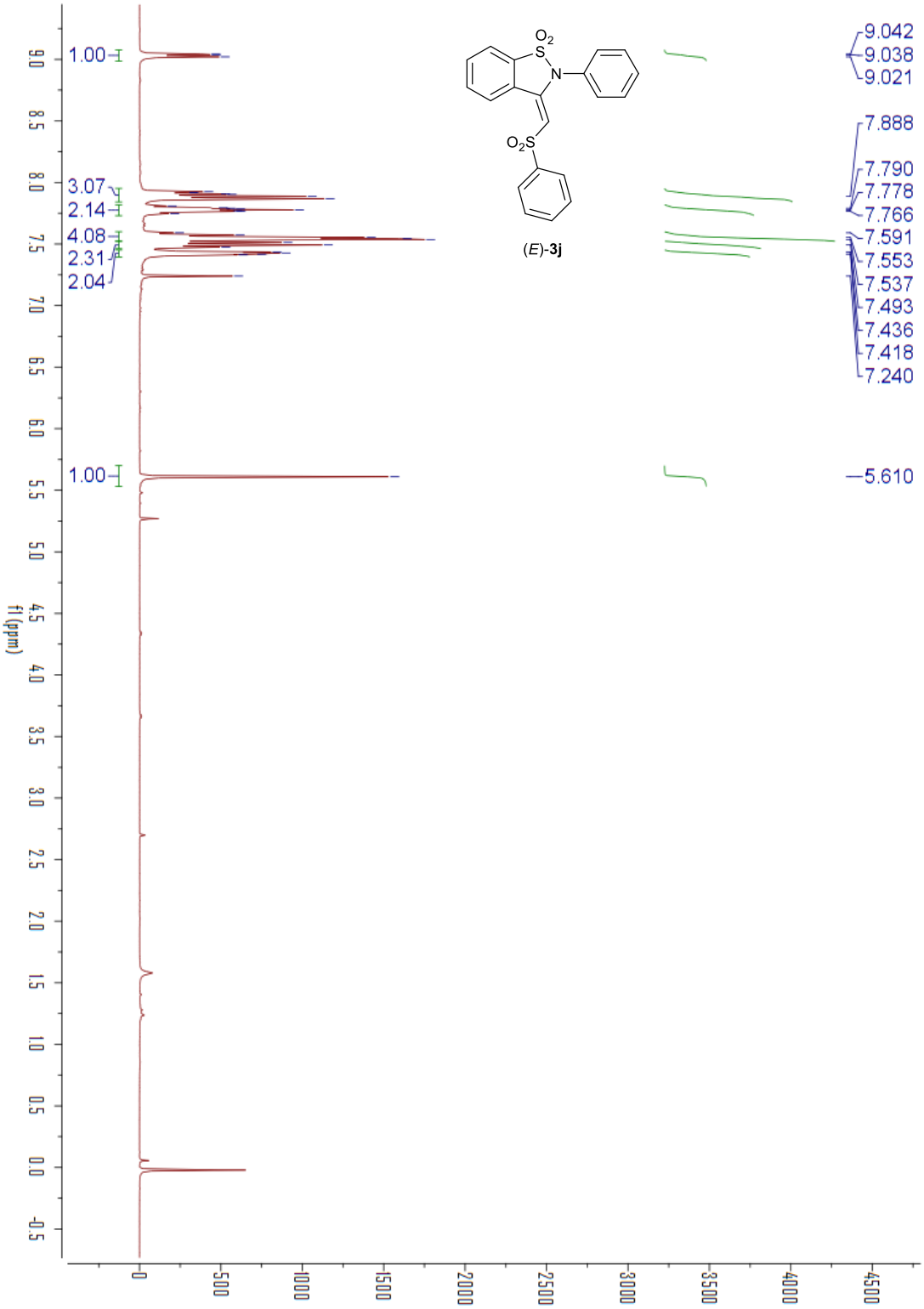

O2
S
N
OMe
O2S
COOEt
(E)-3g
165.087
161.415
146.200
144.547
134.180
133.468
130.715
129.784
125.291
121.945
117.317
115.955
106.091
62.030
55.820
14.438
f1 (ppm)

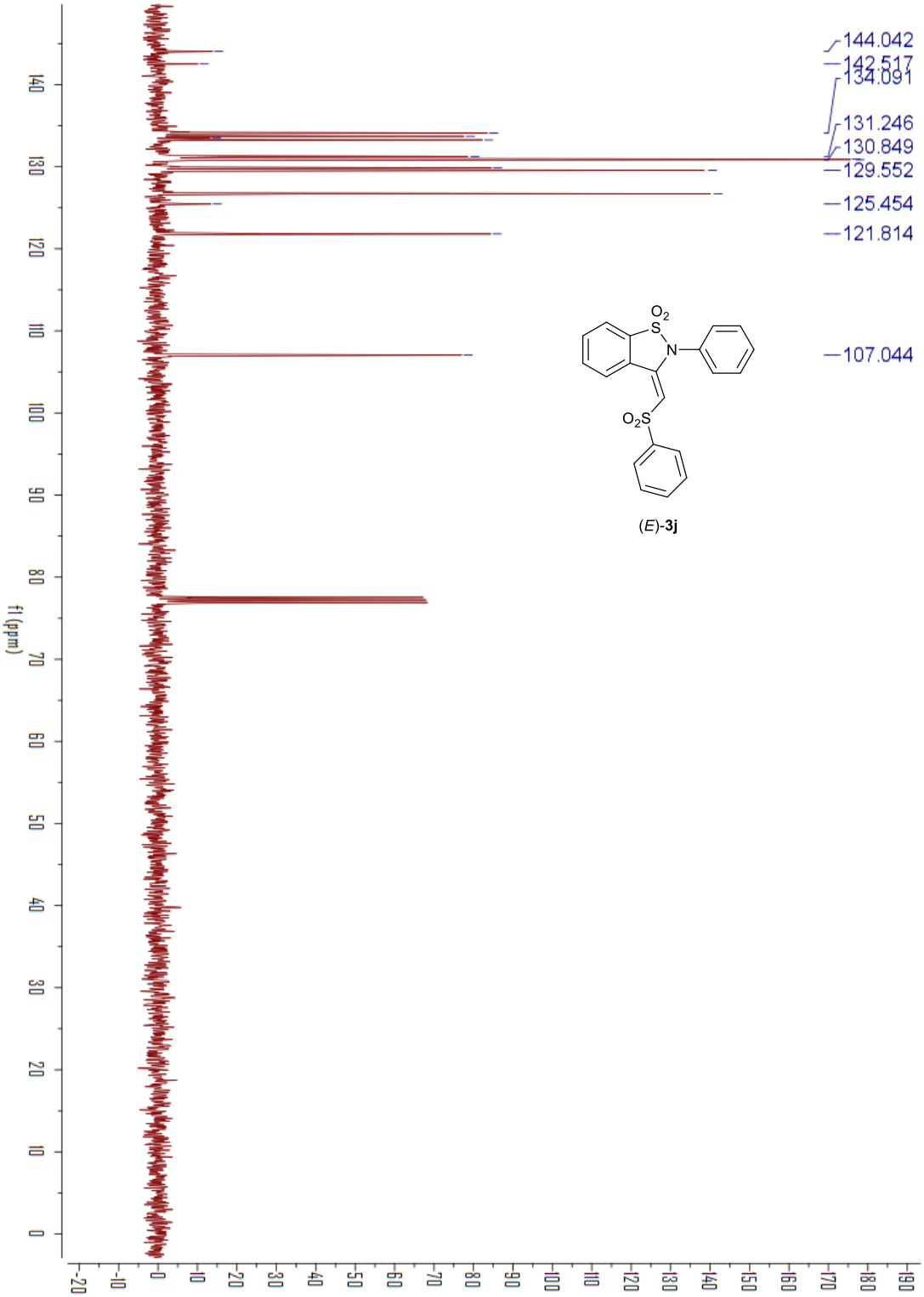

MeO
O2
S
N
O2S
(E)-3h
0.94
1.97
0.97
1.97
1.01
0.97
3.00
2.98
3.01
8.512
8.508
7.838
7.732
7.710
7.182
7.177
7.161
7.156
5.752
3.901
3.051
2.412
f1 (ppm)

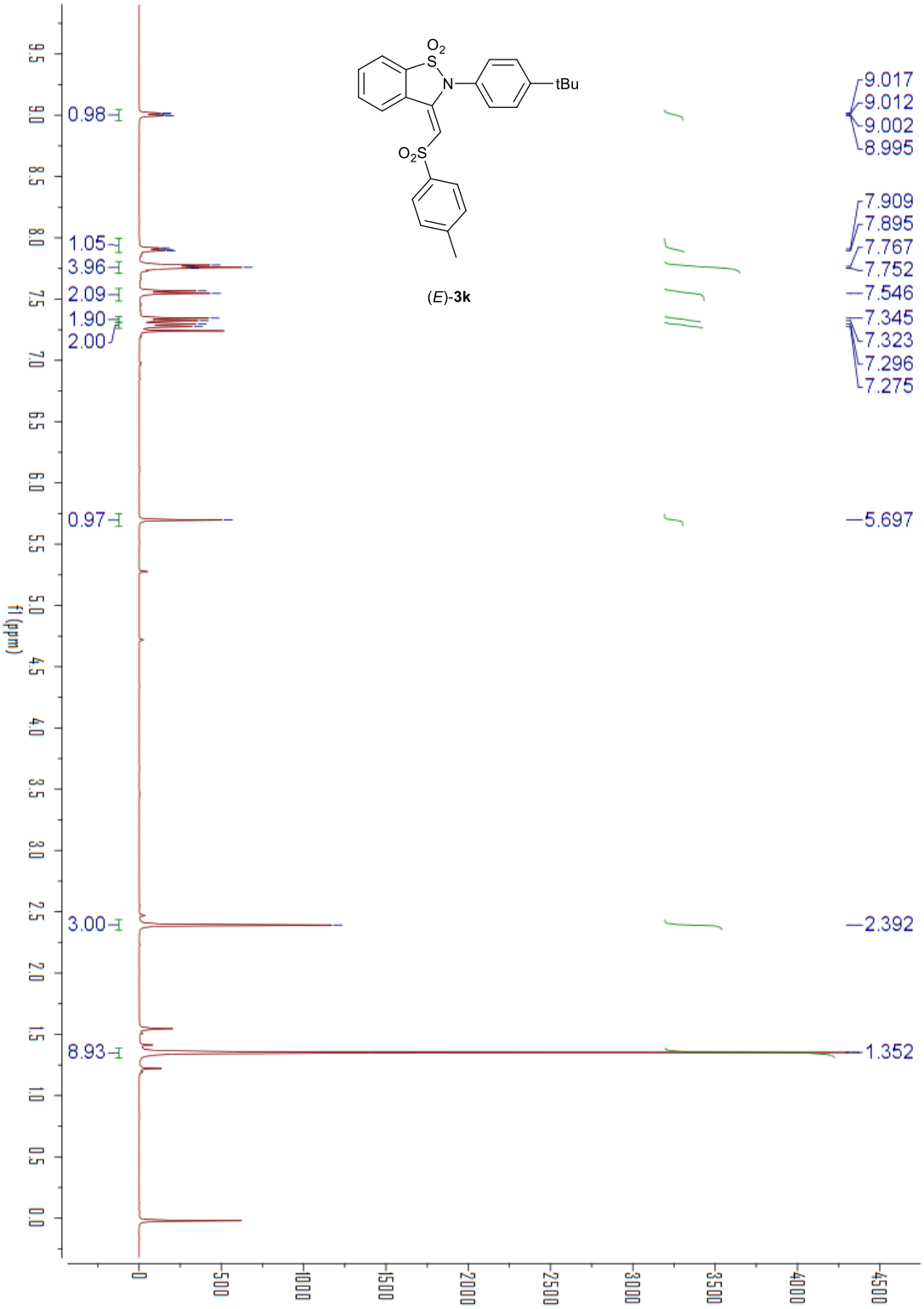

MeO
O2
S
N
O2S
(E)-3h
164.043
144.861
142.383
139.813
130.212
128.223
126.873
125.234
122.809
120.039
113.477
105.343
56.388
26.810
21.809
f1 (ppm)

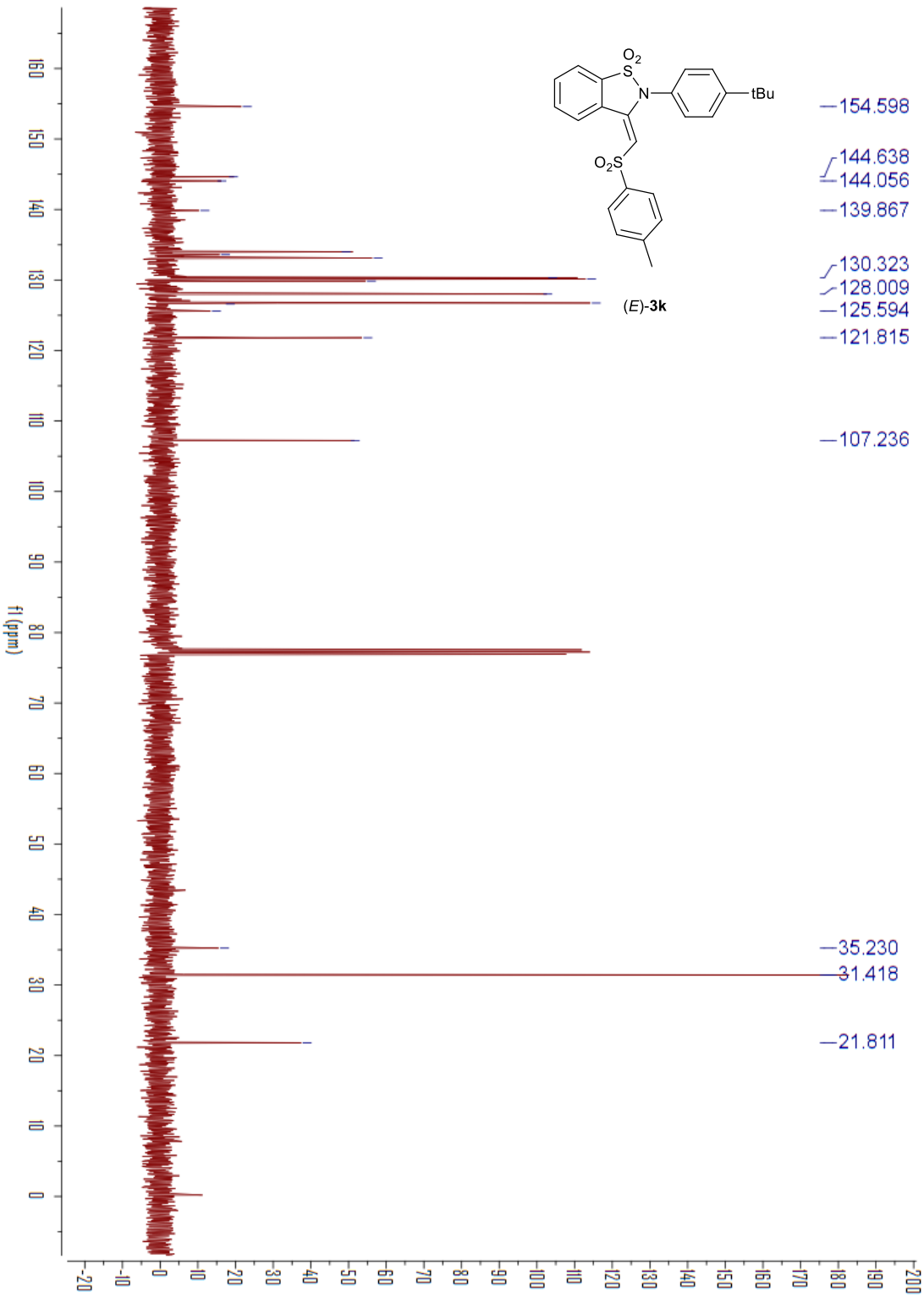

0.94
3.13
1.95
0.72
2.25
2.33
2.31
0.91
9.00
8.996
8.992
8.983
8.975
7.902
7.771
7.752
7.674
7.641
7.546
7.350
7.328
7.177
7.166
7.156
7.134
5.651
1.337
f1 (ppm)
(E)-3i

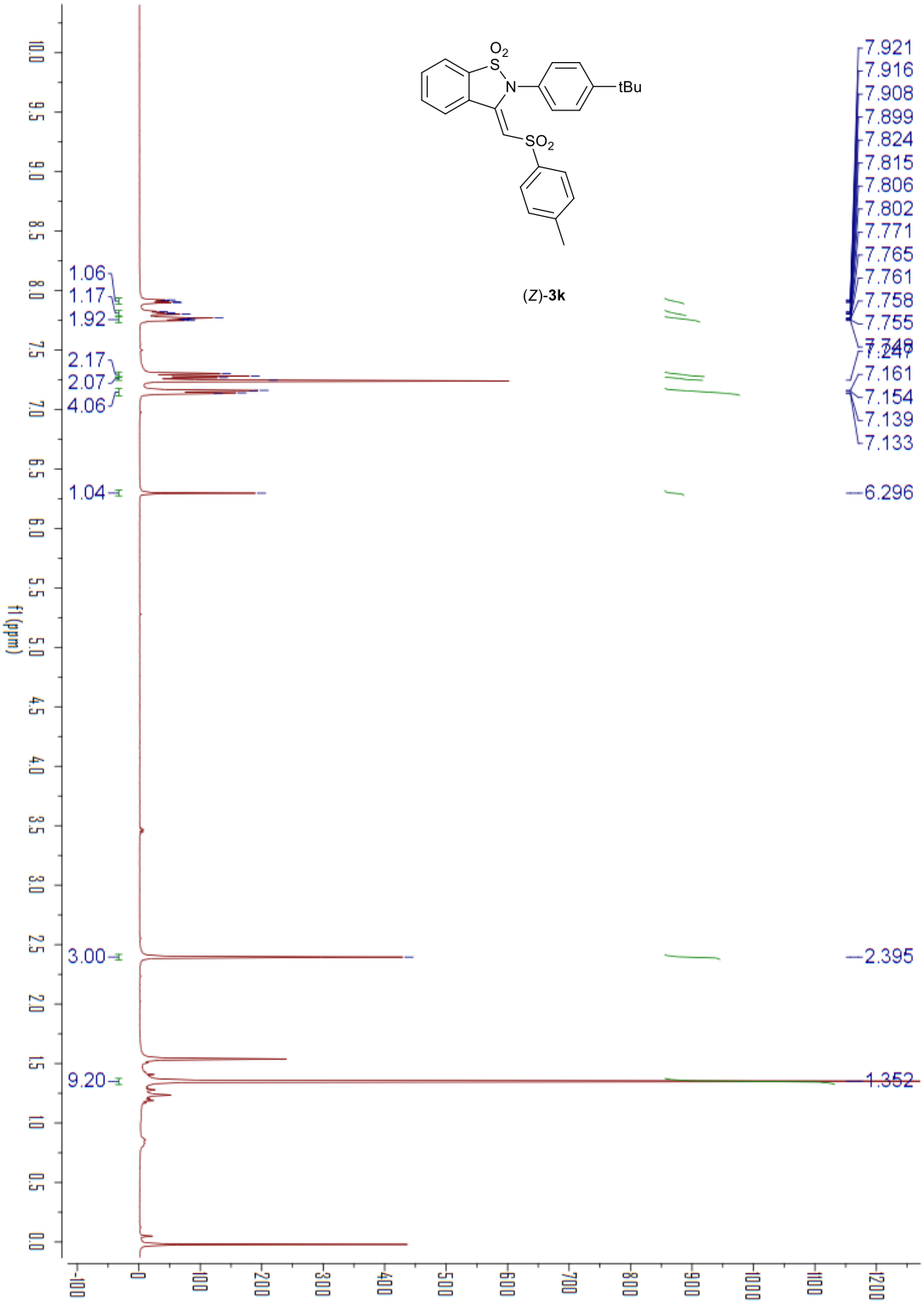

O2
S
N
tBu
O2S
(E)-3i
164.411
154.751
144.434
130.266
129.607
128.059
126.433
125.470
121.957
116.983
116.756
106.497
35.251
31.414
f1 (ppm)

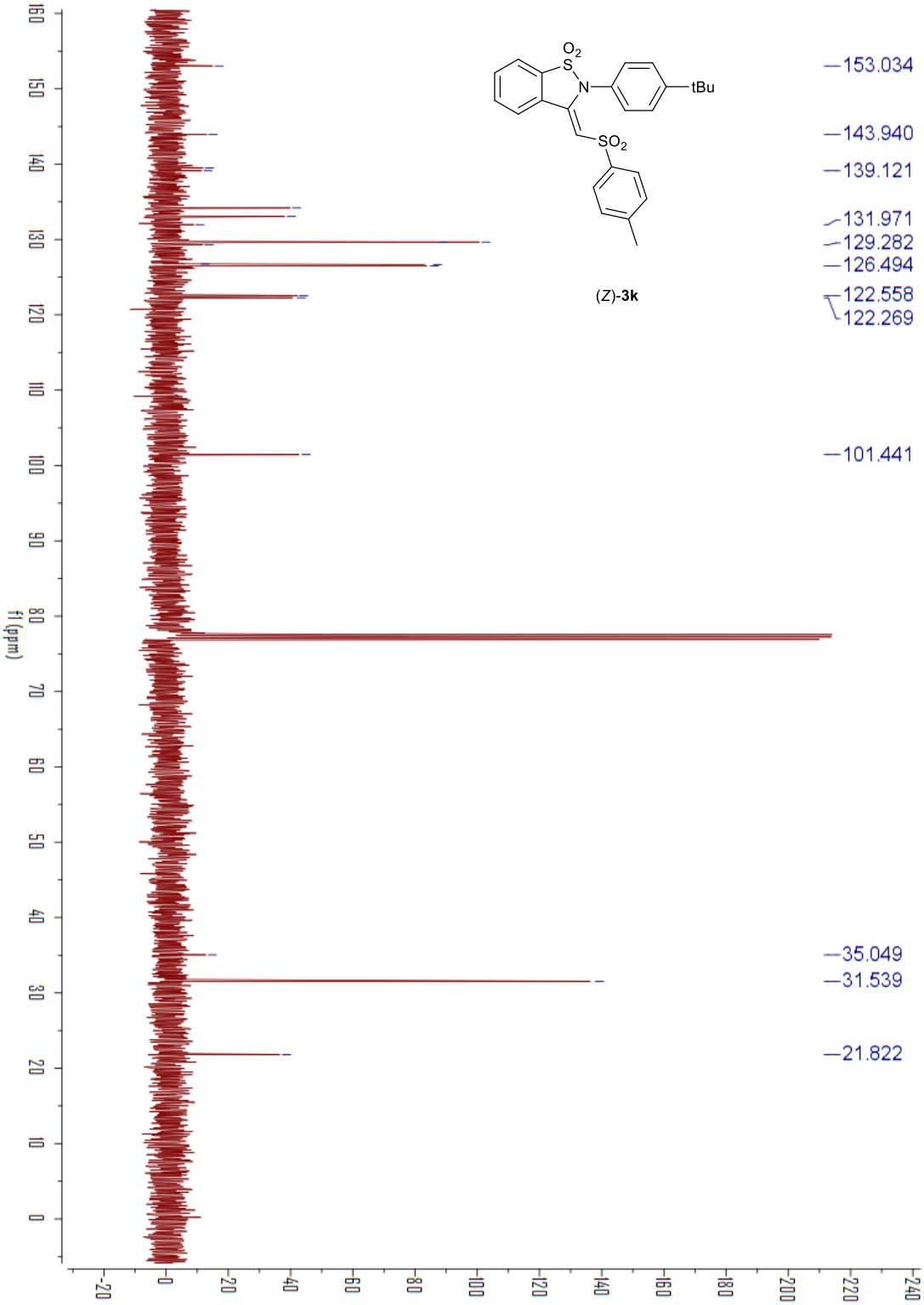

(E)-3j
9.042
9.038
9.021
7.888
7.790
7.778
7.766
7.591
7.553
7.537
7.493
7.436
7.418
7.240
5.610
1.00
3.07
2.14
4.08
2.31
2.04
1.00
f1 (ppm)

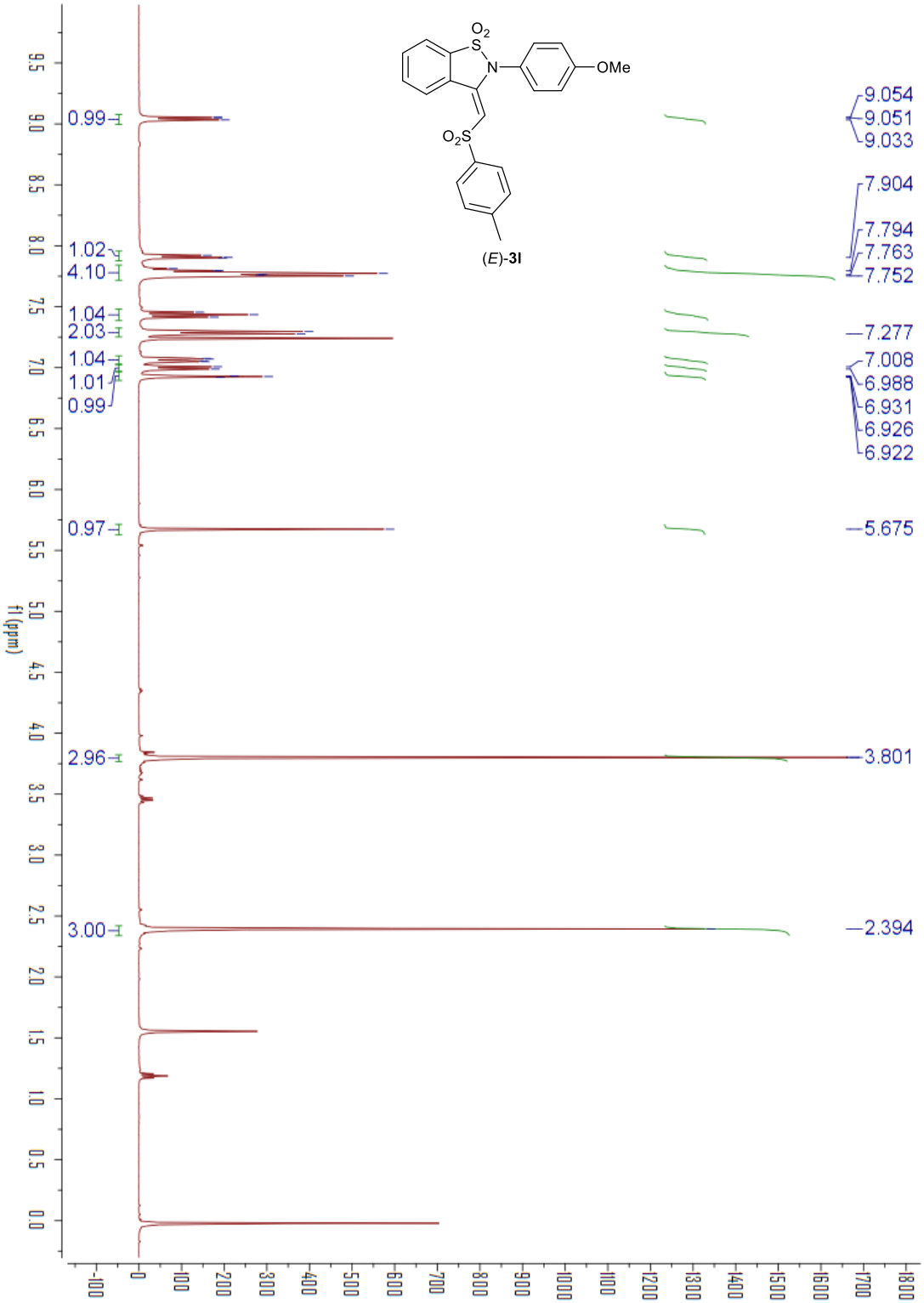

144.042
142.517
134.091
131.246
130.849
129.552
125.454
121.814
107.044
f1 (ppm)
(E)-3j

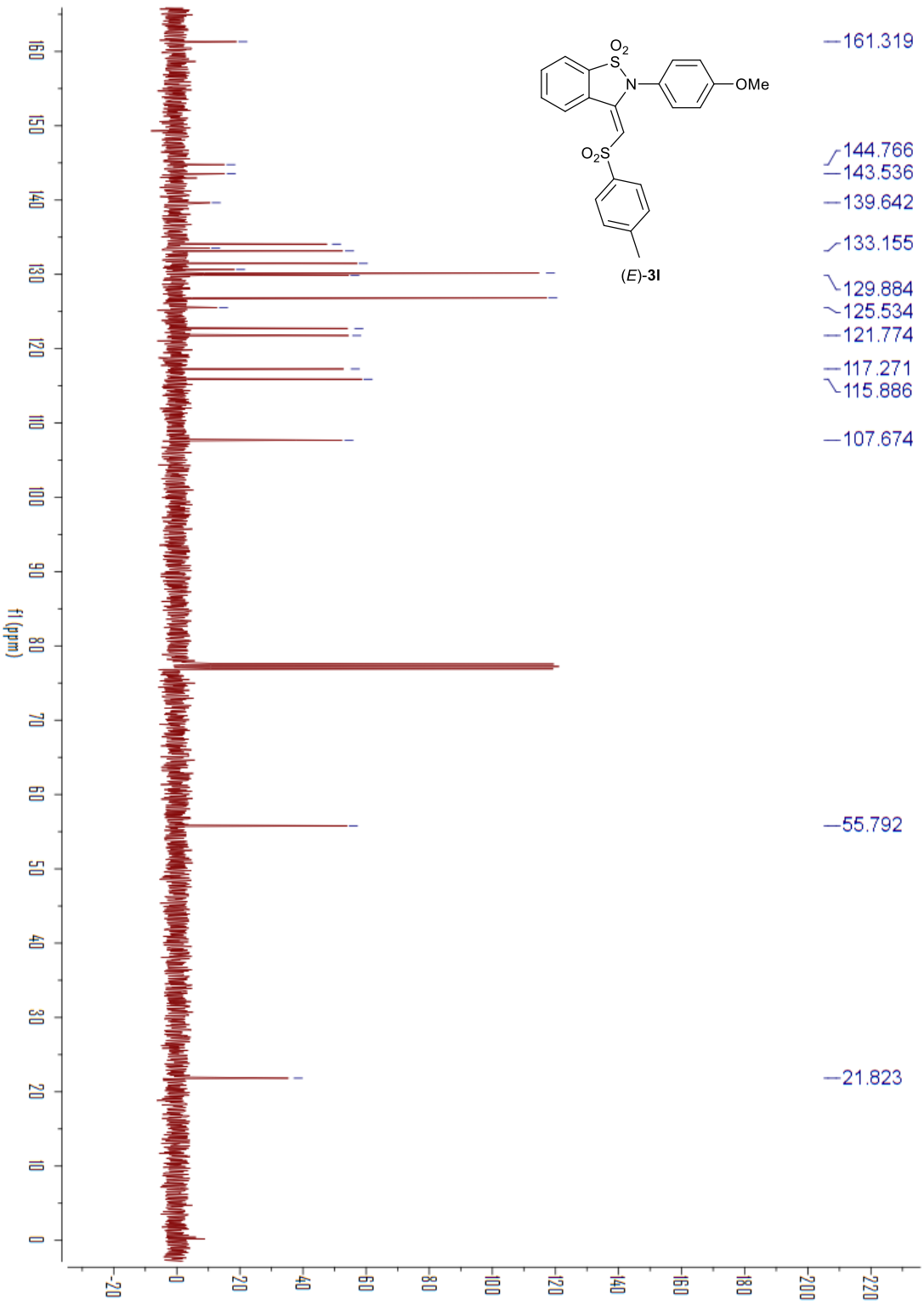

(E)-3k
tBu
9.017
9.012
9.002
8.995
7.909
7.895
7.767
7.752
7.546
7.345
7.323
7.296
7.275
5.697
2.392
1.352
0.98
1.05
3.96
2.09
1.90
2.00
0.97
3.00
8.93
f1 (ppm)

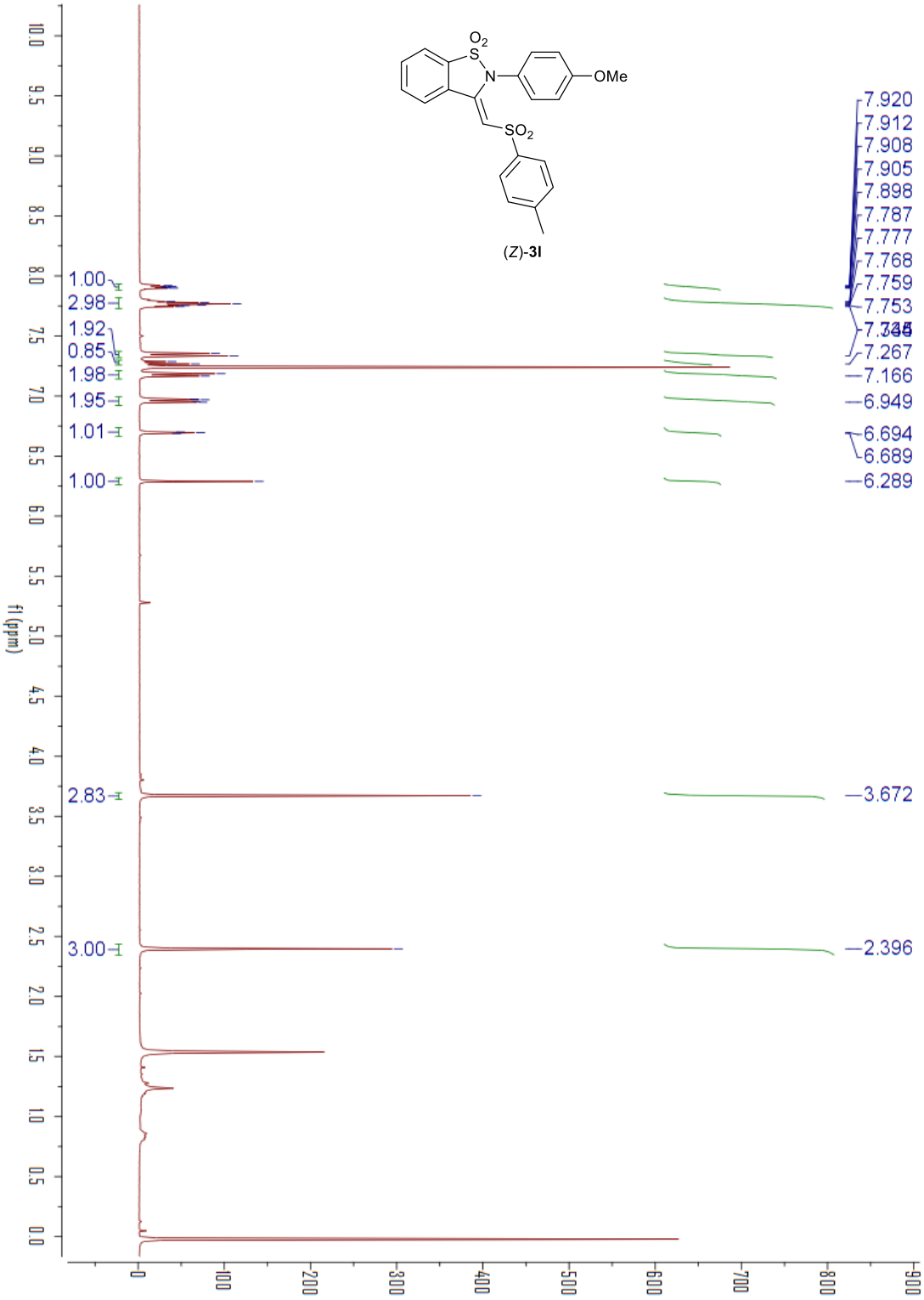

O2
S
N
tBu
O2S
(E)-3k
154.598
144.638
144.056
139.867
130.323
128.009
125.594
121.815
107.236
35.230
31.418
21.811
f1 (ppm)

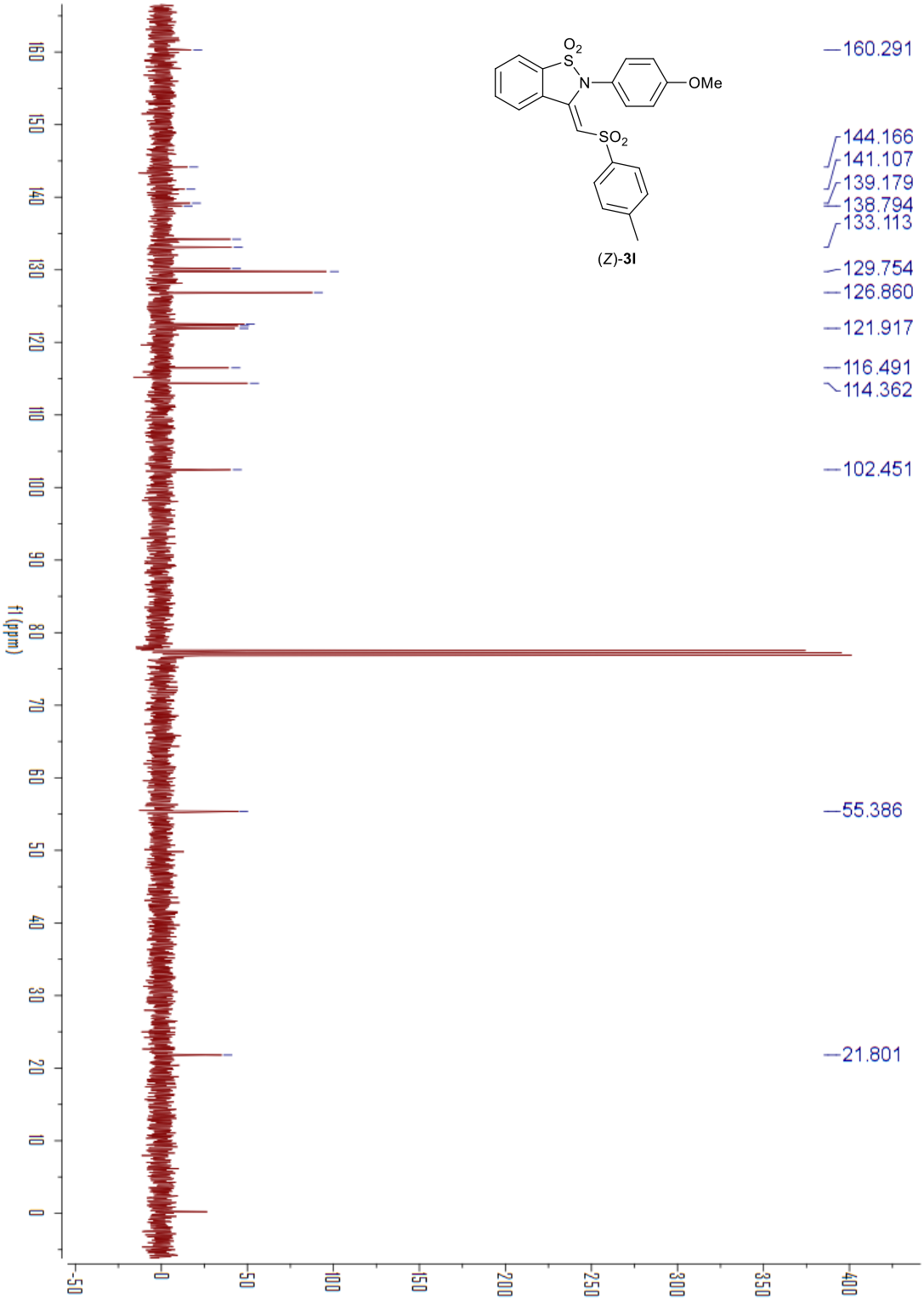

(Z)-3k
tBu
SO2
7.921
7.916
7.908
7.899
7.824
7.815
7.806
7.802
7.771
7.765
7.761
7.758
7.755
7.247
7.161
7.154
7.139
7.133
6.296
2.395
1.352
1.06
1.17
1.92
2.17
2.07
4.06
1.04
3.00
9.20
f1 (ppm)

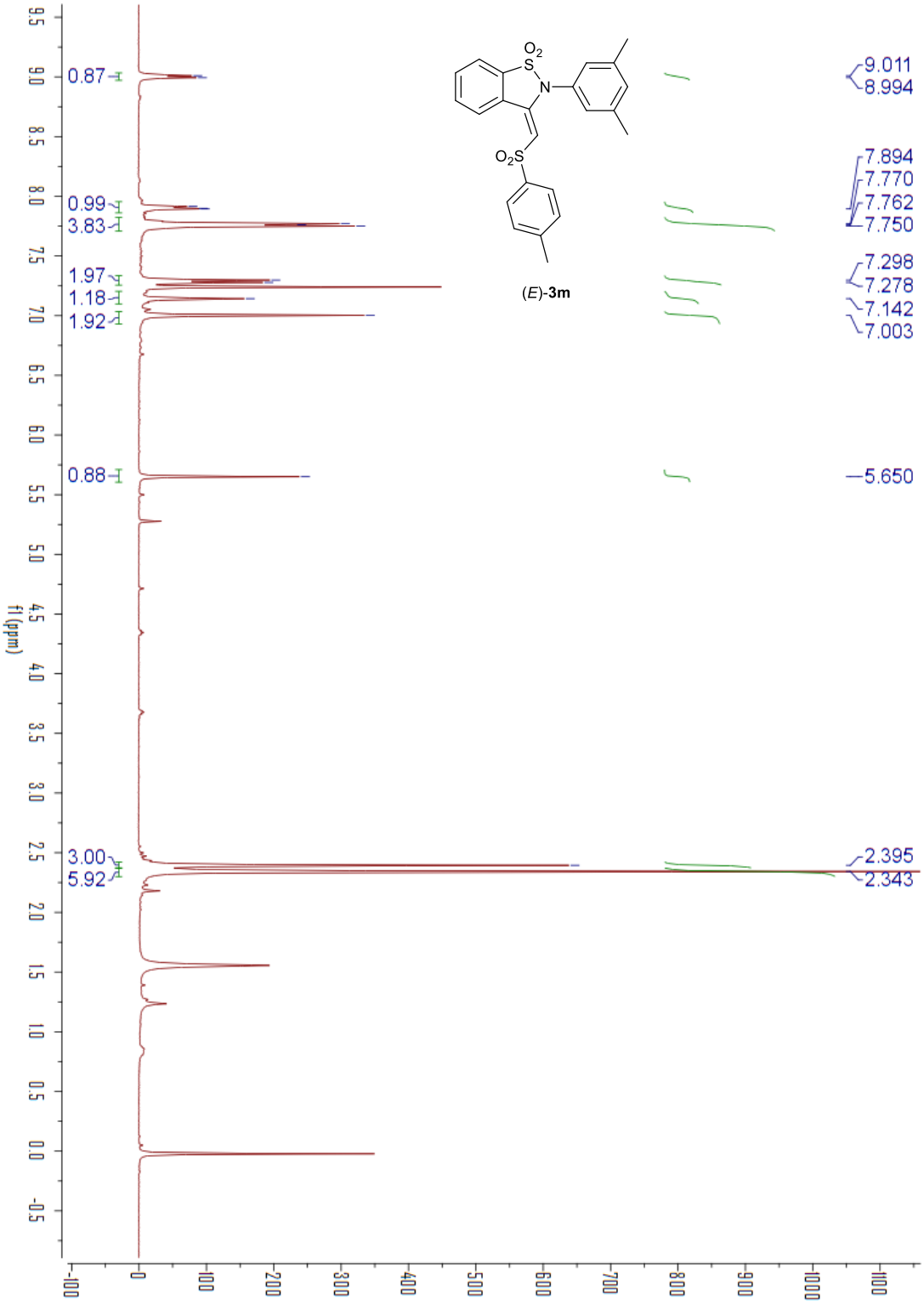

153.034
143.940
139.121
131.971
129.282
126.494
122.558
122.269
101.441
35.049
31.539
21.822
(Z)-3k
tBu
f1 (ppm)

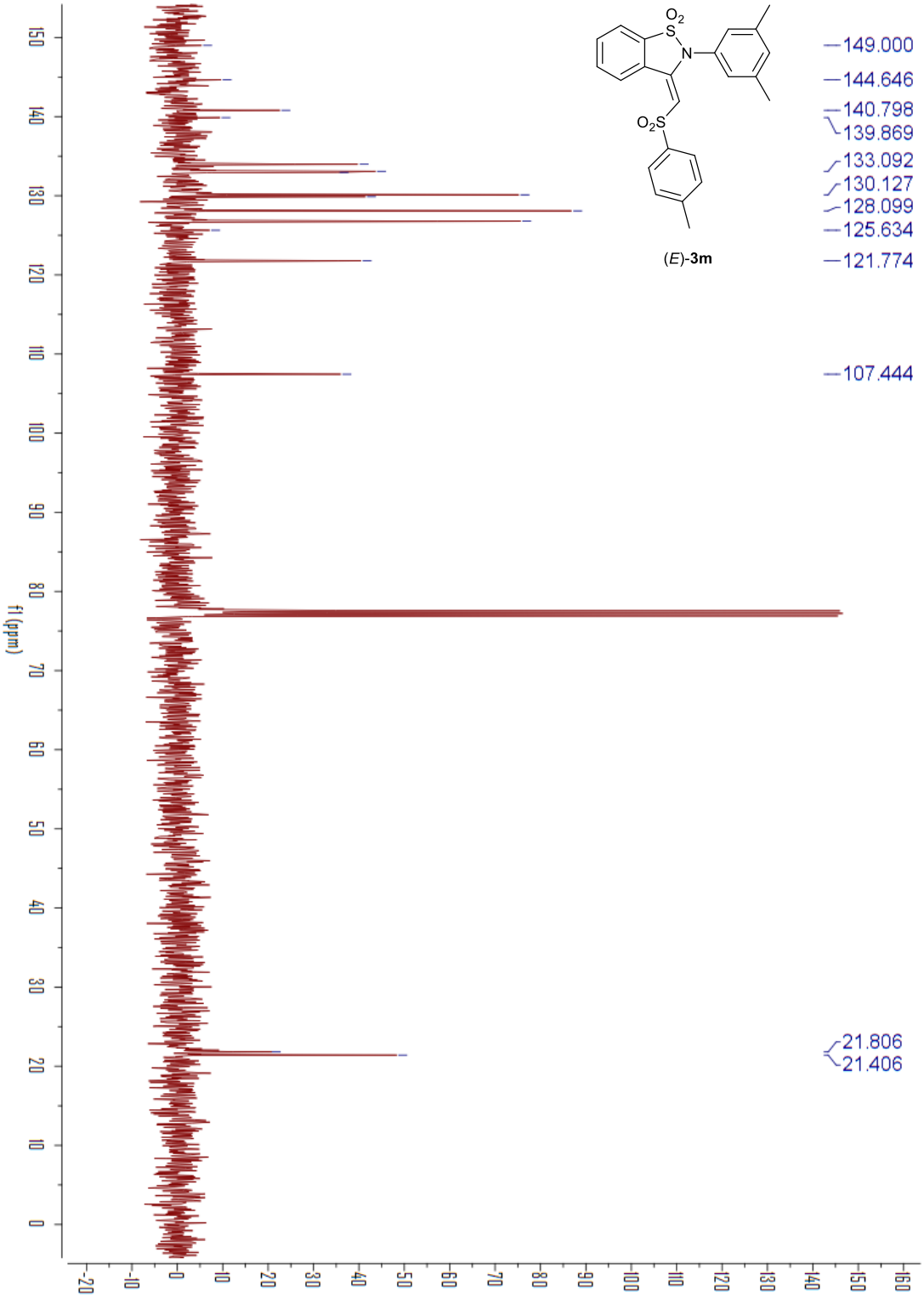

O2
S
N
OMe
O2S
(E)-3l
9.054
9.051
9.033
7.904
7.794
7.763
7.752
7.277
7.008
6.988
6.931
6.926
6.922
5.675
3.801
2.394
0.99
1.02
4.10
1.04
2.03
1.04
1.01
0.99
0.97
2.96
3.00
f1 (ppm)

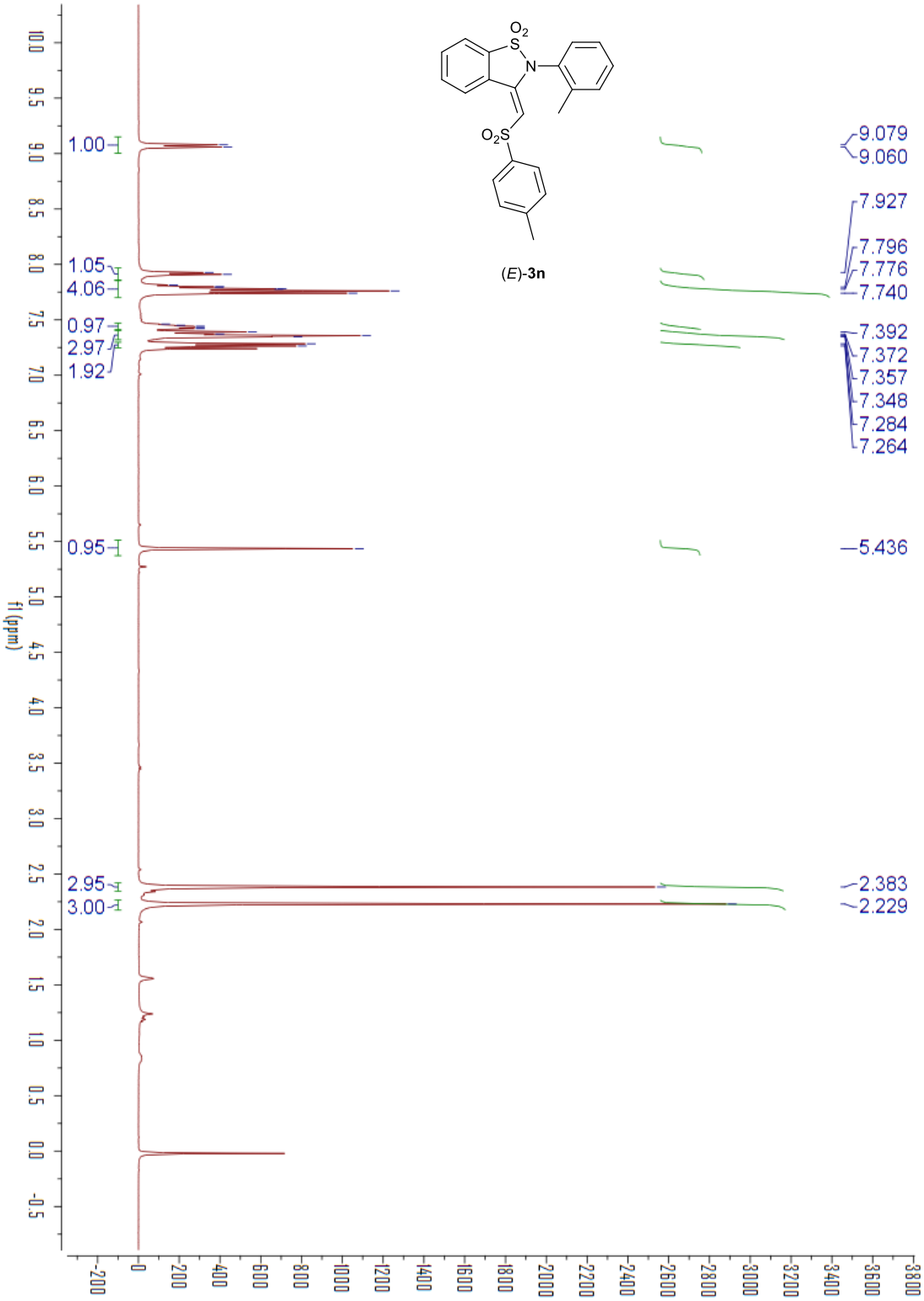

161.319
144.766
143.536
139.642
133.155
129.884
125.534
121.774
117.271
115.886
107.674
55.792
21.823
(E)-3l
OMe
f1 (ppm)

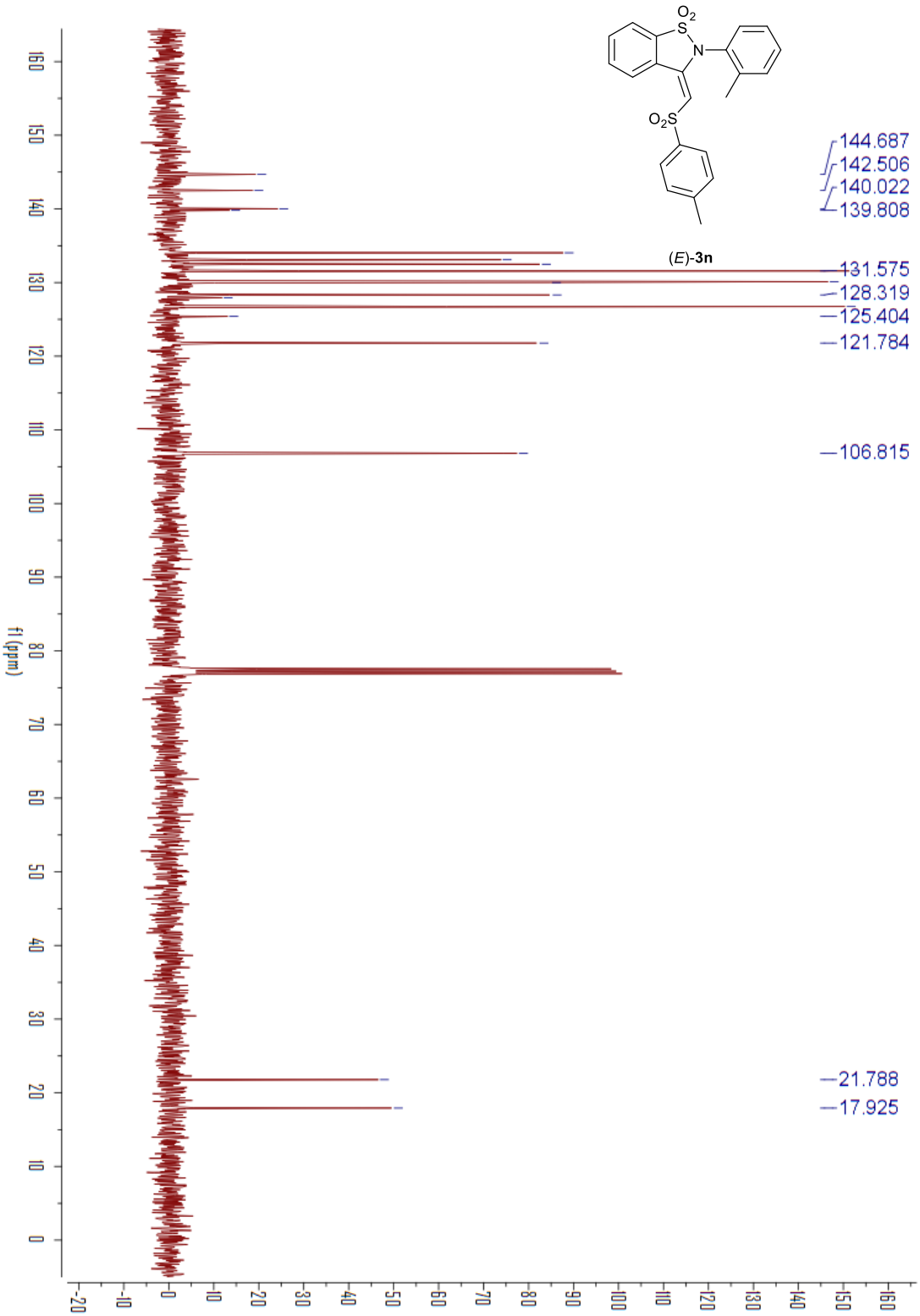

O2
S
N
OMe
SO2
(Z)-3l
7.920
7.912
7.908
7.905
7.898
7.787
7.777
7.768
7.759
7.753
7.267
7.166
6.949
6.694
6.689
6.289
3.672
2.396
1.00
2.98
1.92
0.85
1.98
1.95
1.01
1.00
2.83
3.00
f1 (ppm)

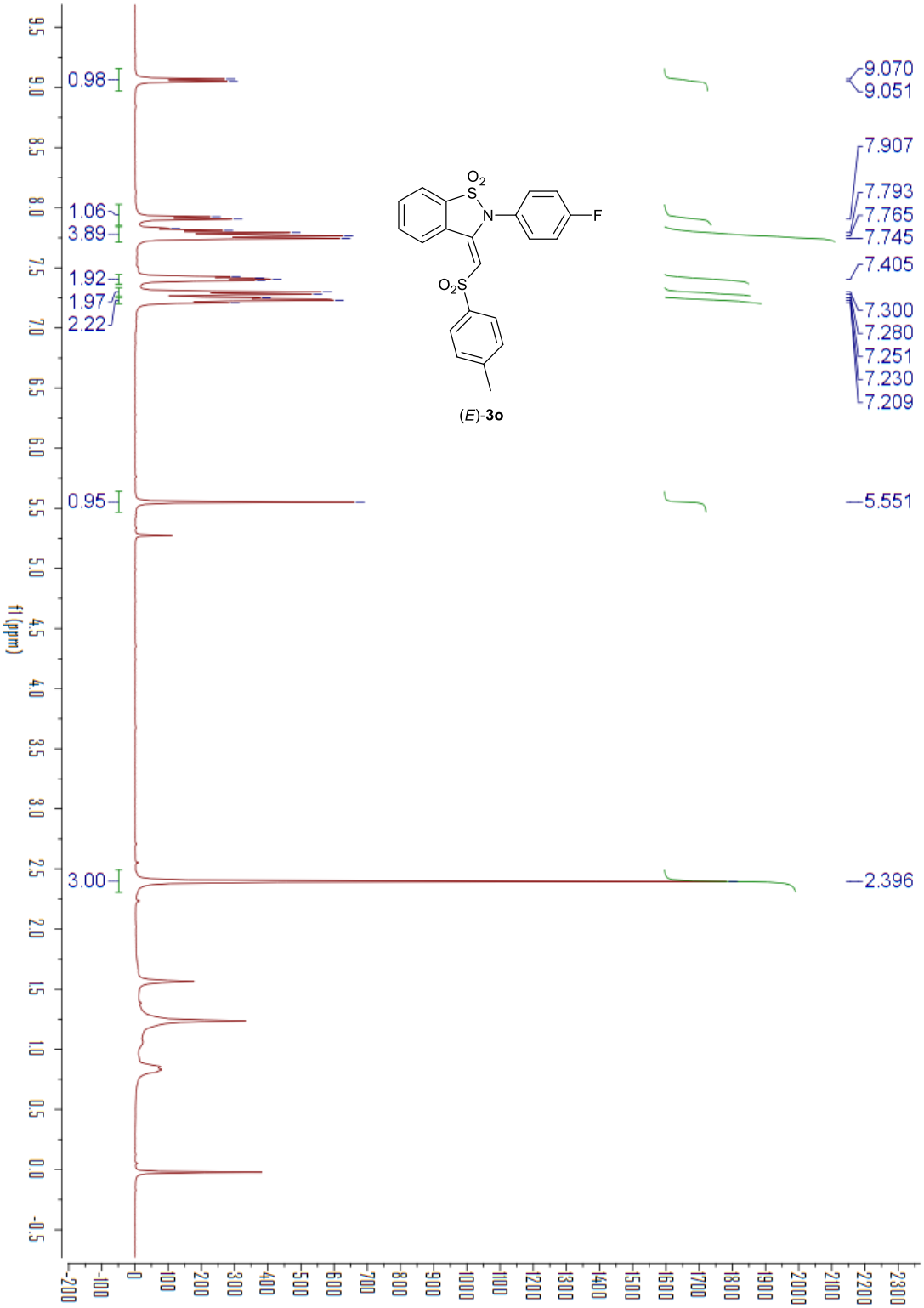

(Z)-3l
160.291
144.166
141.107
139.179
138.794
133.113
129.754
126.860
121.917
116.491
114.362
102.451
55.386
21.801
f1 (ppm)

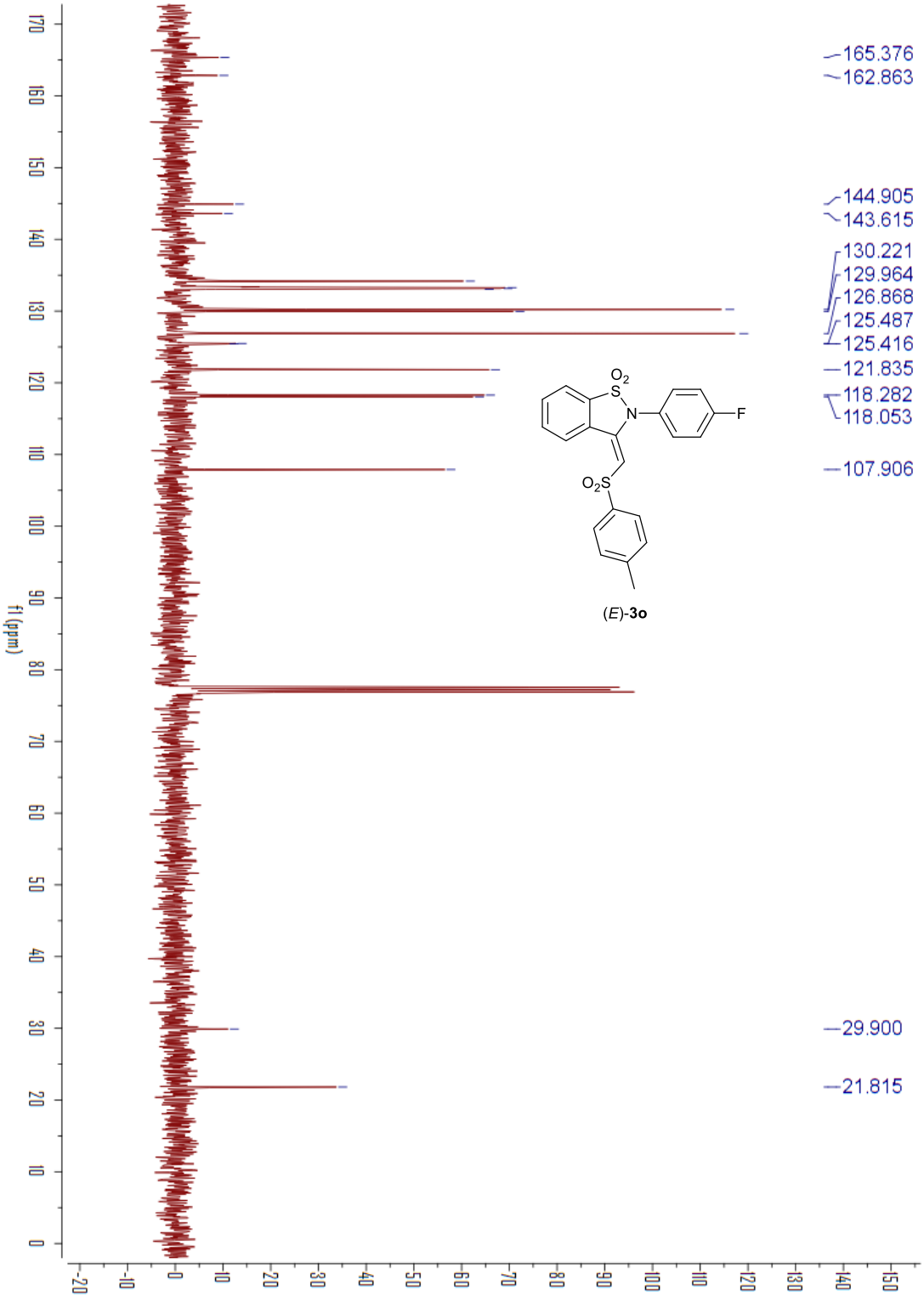

(E)-3m
9.011
8.994
7.894
7.770
7.762
7.750
7.298
7.278
7.142
7.003
5.650
2.395
2.343
0.87
0.99
3.83
1.97
1.18
1.92
0.88
3.00
5.92
f1 (ppm)

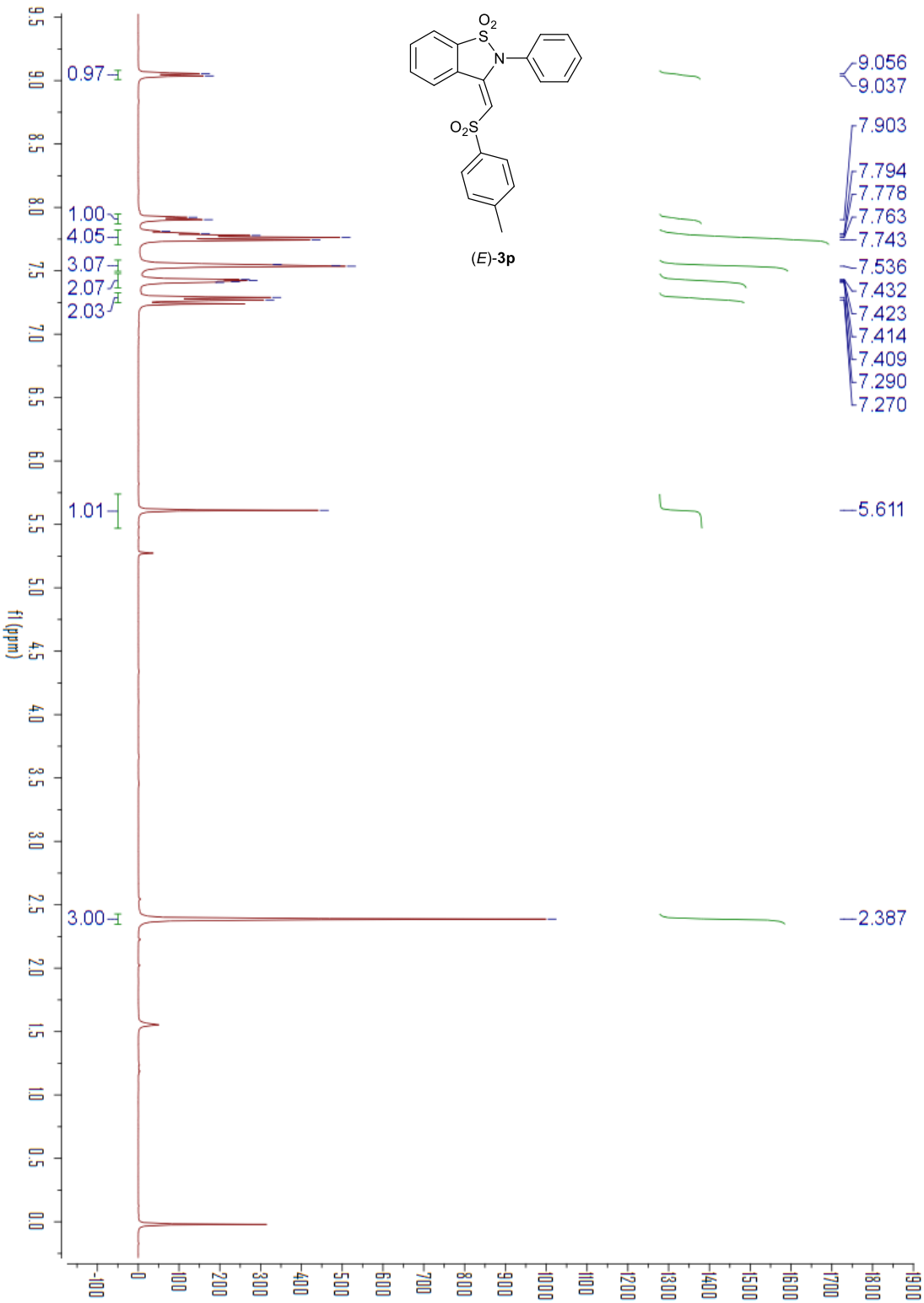

149.000
144.646
140.798
139.869
133.092
130.127
128.099
125.634
121.774
107.444
21.806
21.406
(E)-3m
f1 (ppm)

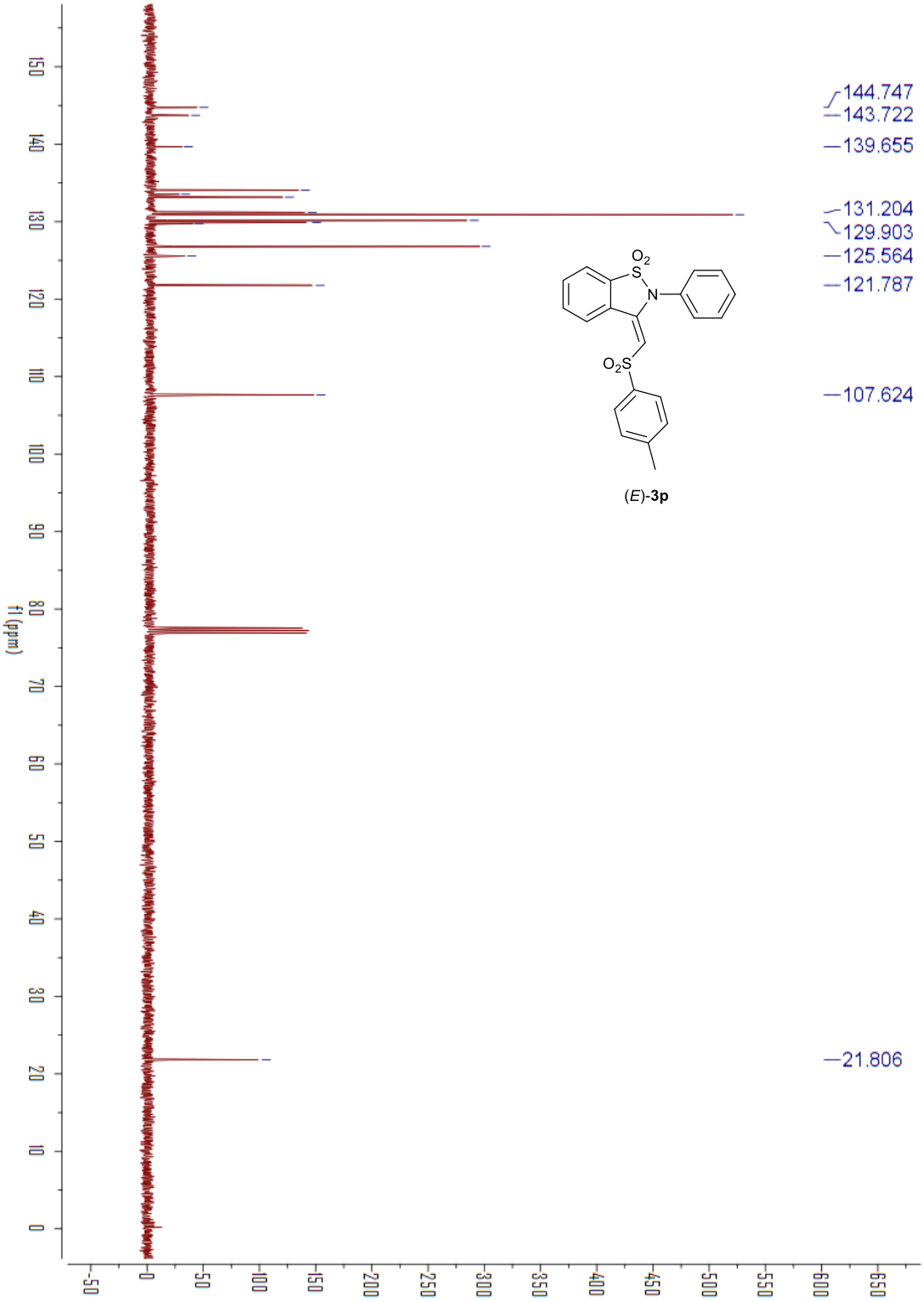

(E)-3n
1.00
1.05
4.06
0.97
2.97
1.92
0.95
2.95
3.00
9.079
9.060
7.927
7.796
7.776
7.740
7.392
7.372
7.357
7.348
7.284
7.264
5.436
2.383
2.229
f1 (ppm)

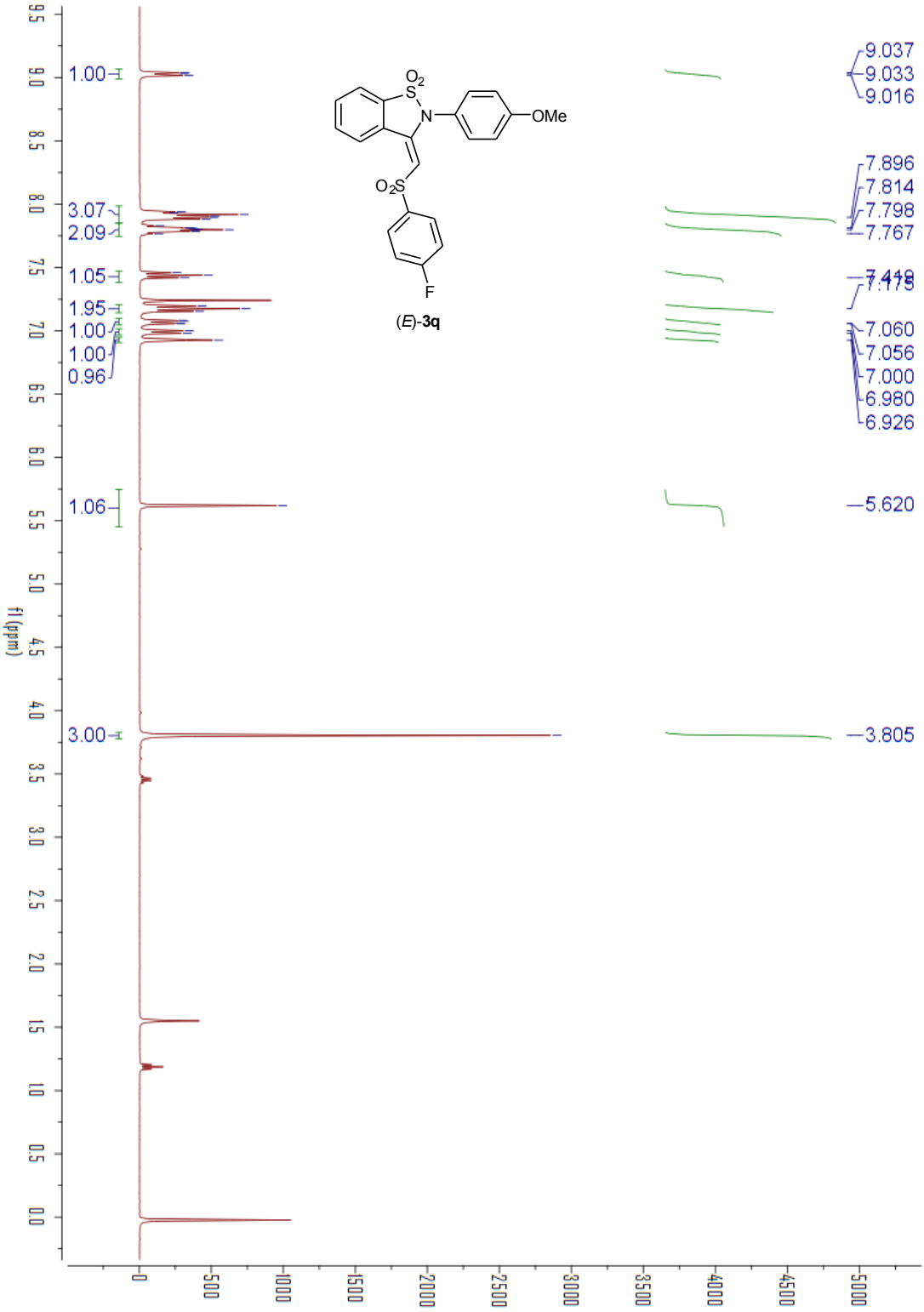

(E)-3n
144.687
142.506
140.022
139.808
131.575
128.319
125.404
121.784
106.815
21.788
17.925
f1 (ppm)

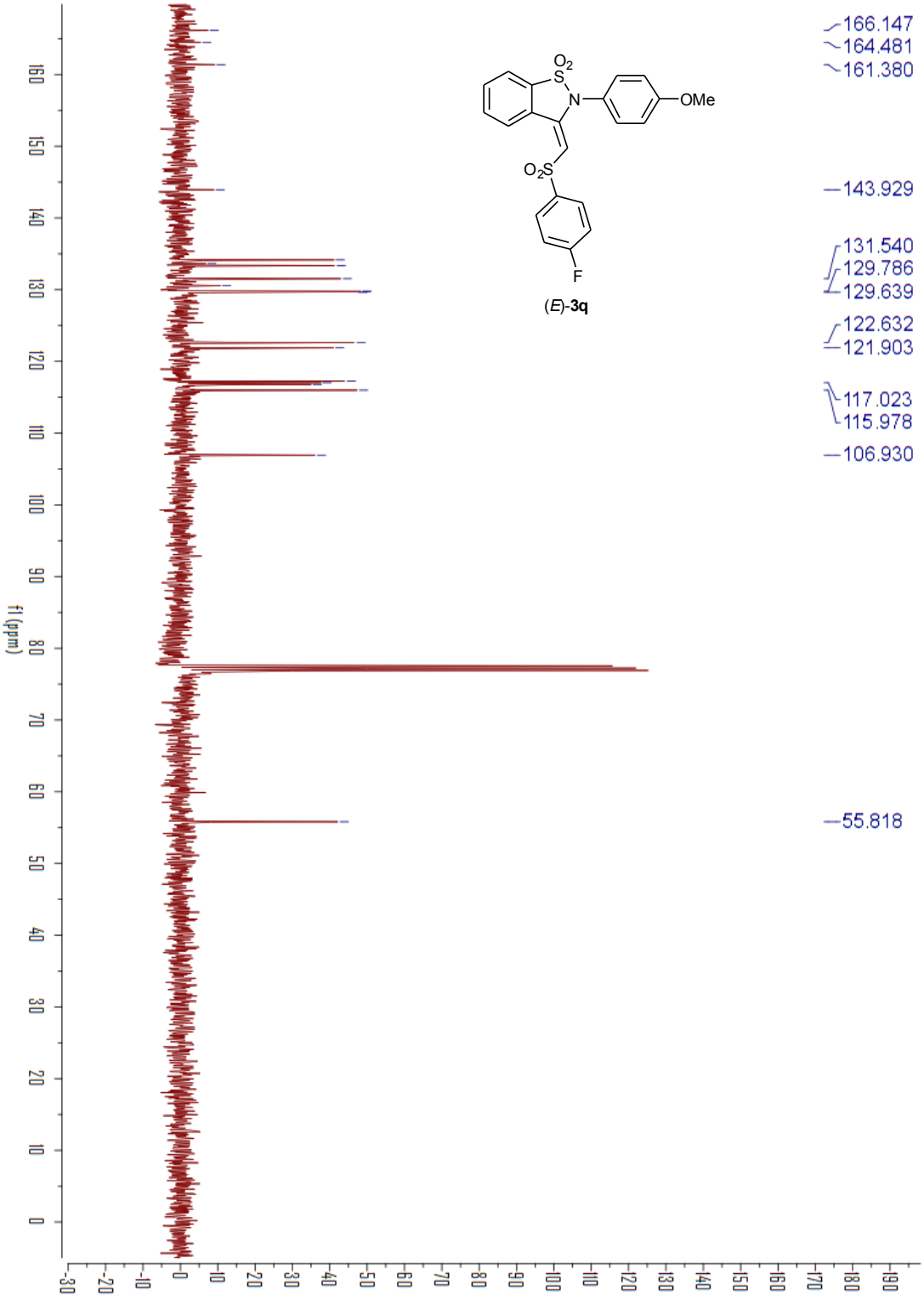

0.98
1.06
3.89
1.92
1.97
2.22
0.95
3.00
9.070
9.051
7.907
7.793
7.765
7.745
7.405
7.300
7.280
7.251
7.230
7.209
5.551
2.396
f1 (ppm)
(E)-3o

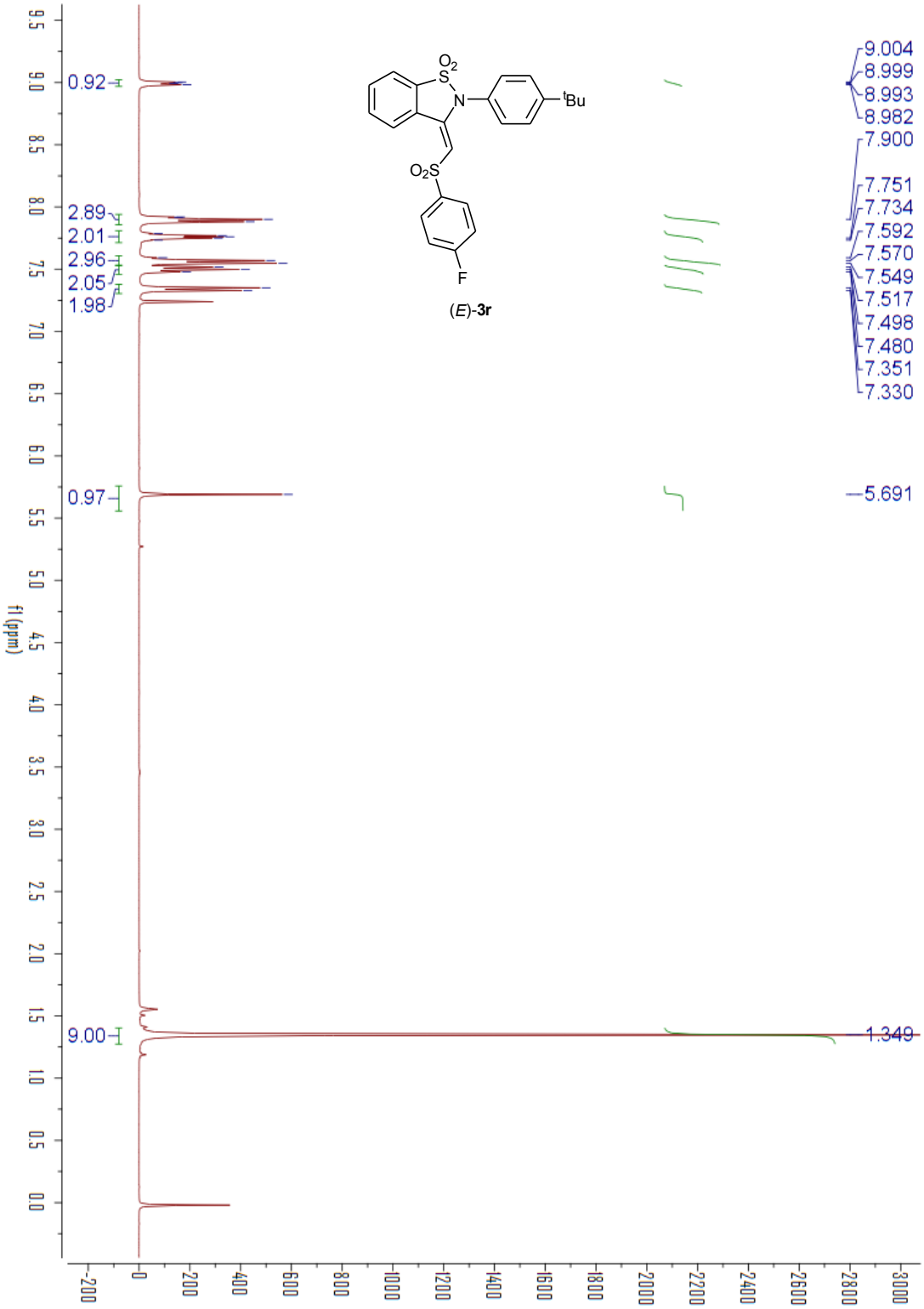

165.376
162.863
144.905
143.615
130.221
129.964
126.868
125.487
125.416
121.835
118.282
118.053
107.906
29.900
21.815
f1 (ppm)
(E)-3o

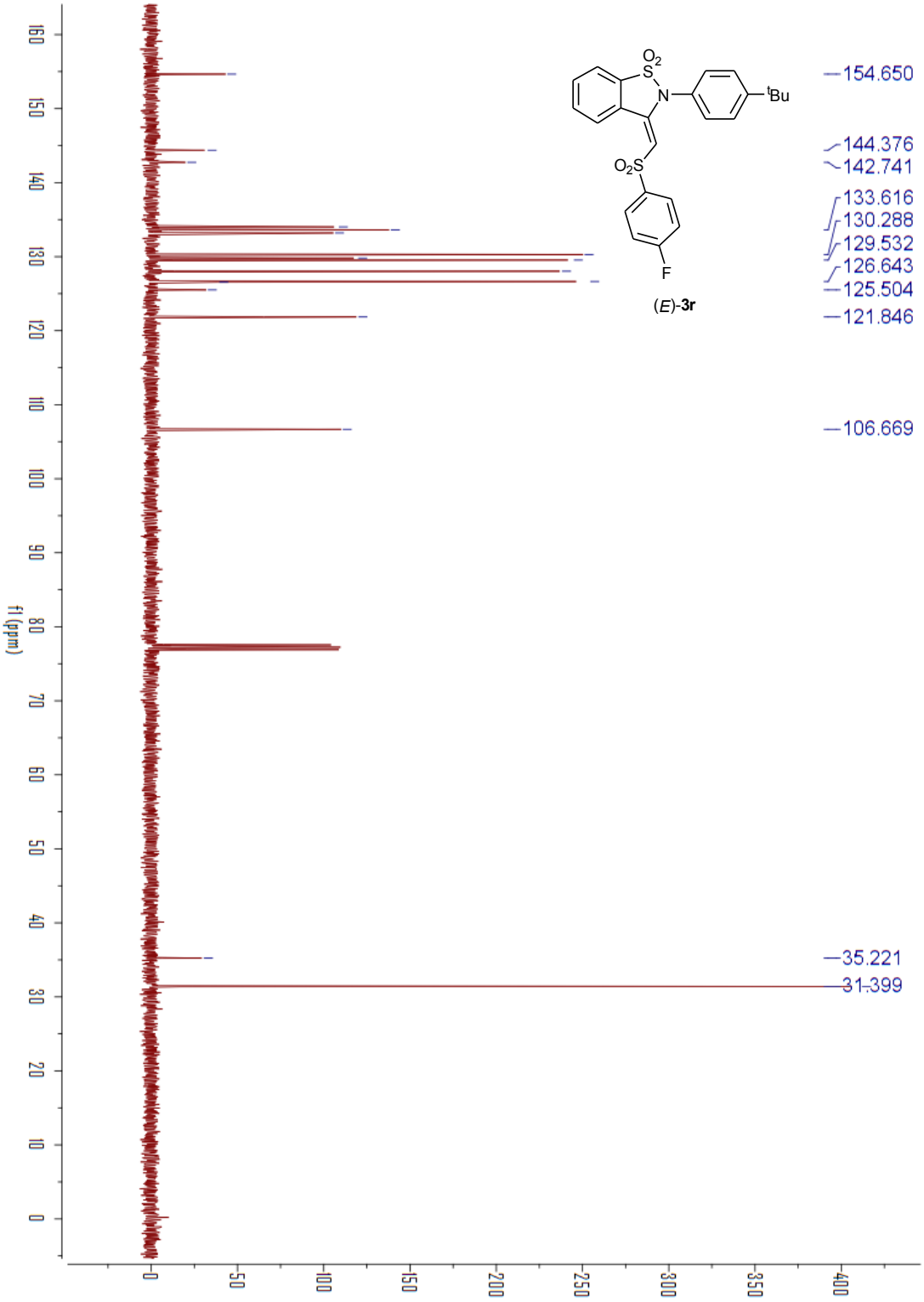

(E)-3p
9.056
9.037
7.903
7.794
7.778
7.763
7.743
7.536
7.432
7.423
7.414
7.409
7.290
7.270
5.611
2.387
0.97
1.00
4.05
3.07
2.07
2.03
1.01
3.00
f1 (ppm)

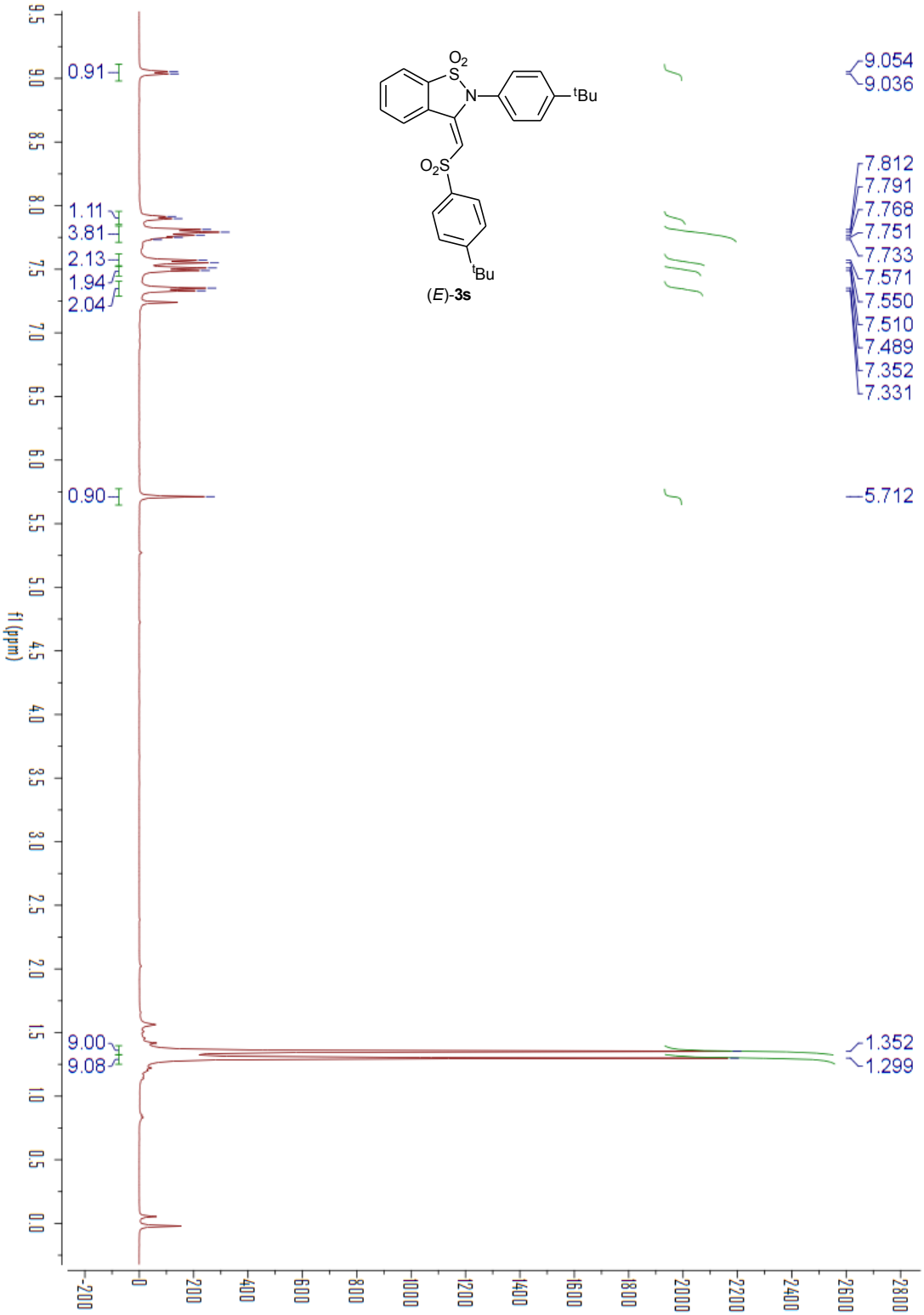

144.747
143.722
139.655
131.204
129.903
125.564
121.787
107.624
21.806
f1 (ppm)
(E)-3p

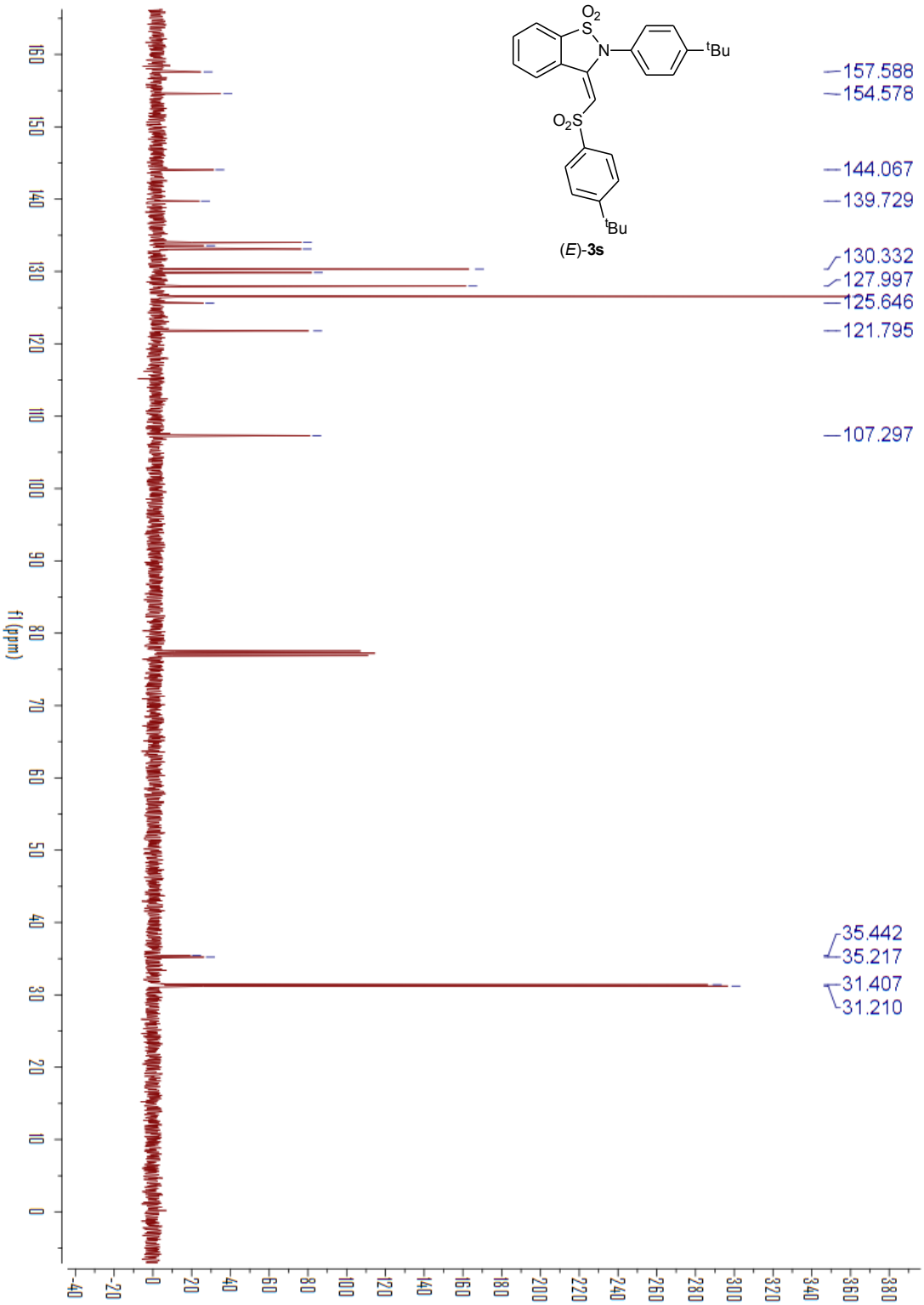

(E)-3q
OMe
F
9.037
9.033
9.016
7.896
7.814
7.798
7.767
7.419
7.173
7.060
7.056
7.000
6.980
6.926
5.620
3.805
1.00
3.07
2.09
1.05
1.95
1.00
1.00
0.96
1.06
3.00
f1 (ppm)

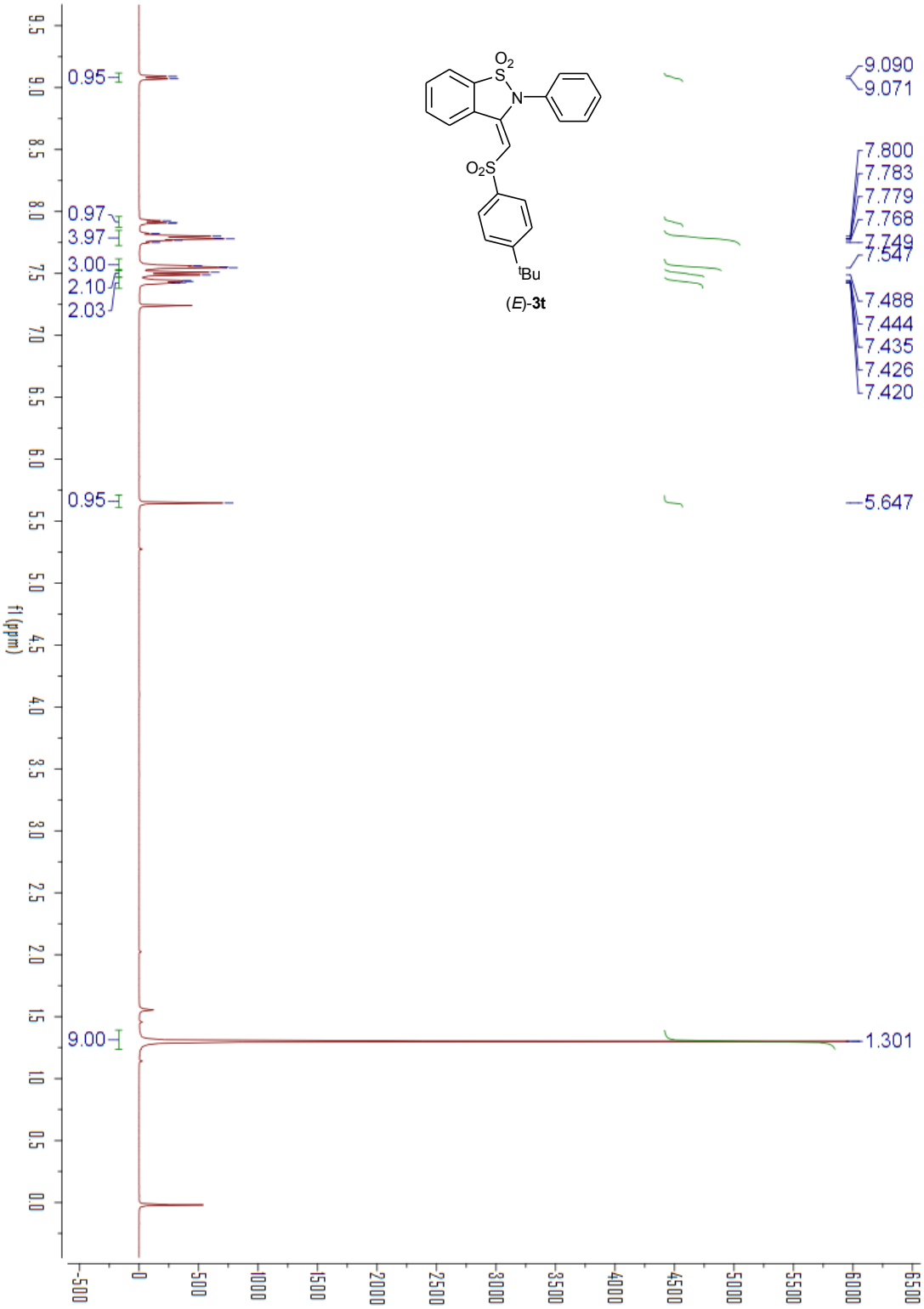

166.147
164.481
161.380
143.929
131.540
129.786
129.639
122.632
121.903
117.023
115.978
106.930
55.818
f1 (ppm)
(E)-3q

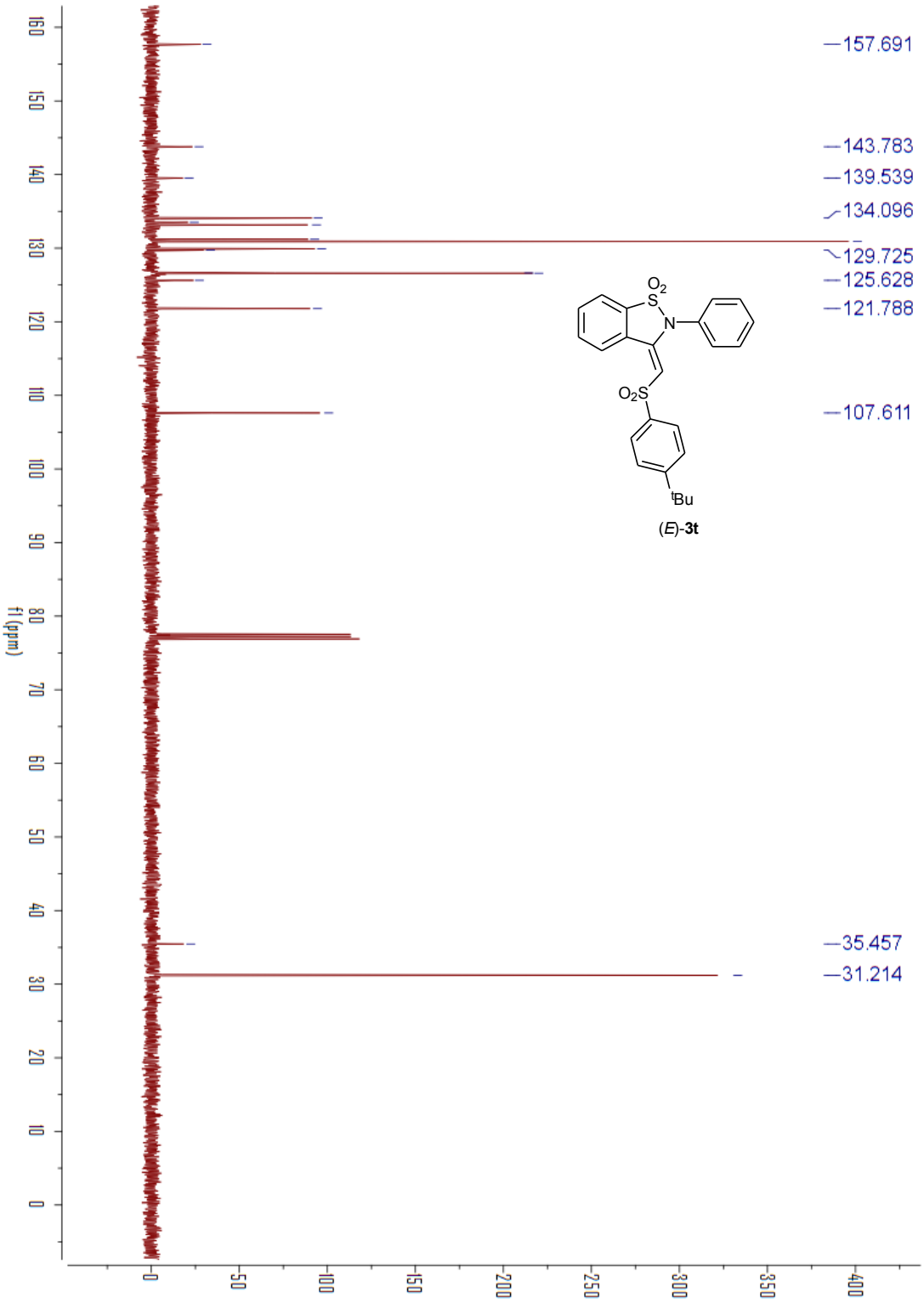

(E)-3r
0.92
2.89
2.01
2.96
2.05
1.98
0.97
9.00
9.004
8.999
8.993
8.982
7.900
7.751
7.734
7.592
7.570
7.549
7.517
7.498
7.480
7.351
7.330
5.691
1.349
f1 (ppm)


154.650
144.376
142.741
133.616
130.288
129.532
126.643
125.504
121.846
106.669
35.221
31.399
(E)-3r
f1 (ppm)


O2
S
N
tBu
O2S
tBu
(E)-3s
9.054
9.036
7.812
7.791
7.768
7.751
7.733
7.571
7.550
7.510
7.489
7.352
7.331
5.712
1.352
1.299
0.91
1.11
3.81
2.13
1.94
2.04
0.90
9.00
9.08
f1 (ppm)


(E)-3s
157.588
154.578
144.067
139.729
130.332
127.997
125.646
121.795
107.297
35.442
35.217
31.407
31.210
f1 (ppm)


O2
S
N
O2S
tBu
(E)-3t
9.090
9.071
7.800
7.783
7.779
7.768
7.749
7.547
7.488
7.444
7.435
7.426
7.420
5.647
1.301
0.95
0.97
3.97
3.00
2.10
2.03
0.95
9.00
f1 (ppm)


157.691
143.783
139.539
134.096
129.725
125.628
121.788
107.611
35.457
31.214
f1 (ppm)
(E)-3t