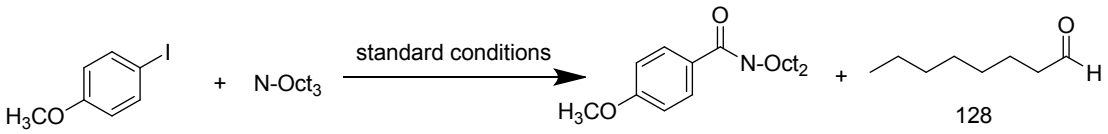
Electronic Supplementary Material (ESI) for ChemComm.

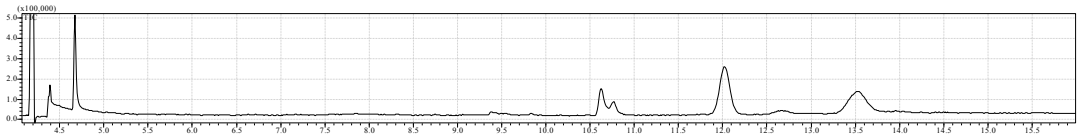
A Novel Pd-Catalyzed *N*-Dealkylative Carbonylation of Tertiary Amines for the Preparation of Amides

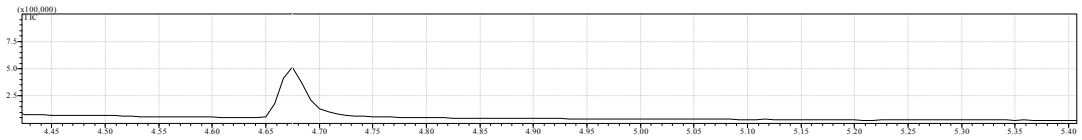
Contents

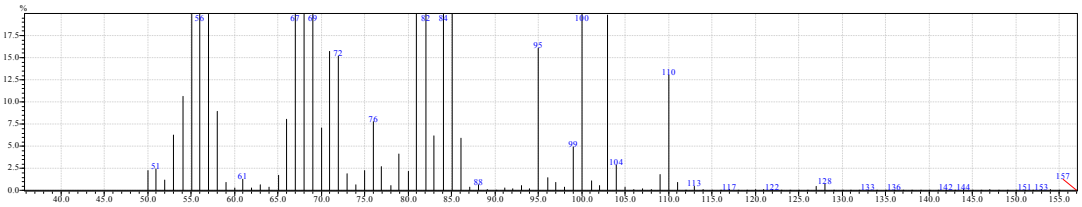
General procedures : A Tube was charged with 4-iodoanisole(0.3 mmol, 70.2 mg), $Pd(PhCN)_2Cl_2$ (5 mol%, 5.7 mg), tributylamine(2.0 equiv. 111 mg),copper oxide(3.0 equiv, 72 mg) together with1mL PhCN . Once sealed,the tube was purged several times with CO(1atm,25mL,no balloon), then pressurized to 1 atm at room temperature and heated in an oil bath at 100 °C for 16 h. The tube was then cooled to room temperature and vented to discharge the excess CO. The reaction mixture was concentrated in *vacuo*，The crude residue was purified by silica gel chromatography.

Control Experiment.







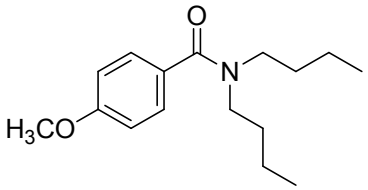


[MS Spectrum]
# of Peaks 547
Raw Spectrum 4.675 (scan : 82)
Background No Background Spectrum
Base Peak m/z 84.05 (Inten : 59,993)

m/z	Absolute Intensity	Relative Intensity	m/z	Absolute Intensity	Relative Intensity
50.00	1364	2.27	73.00	1146	1.91
51.00	1476	2.46	73.95	392	0.65
52.00	732	1.22	74.95	1345	2.24
53.00	3772	6.29	76.00	4655	7.76
54.05	6399	10.67	76.95	1628	2.71
55.05	43386	72.32	78.05	354	0.59
56.05	59555	99.27	78.95	2461	4.10
57.05	57408	95.69	80.05	1302	2.17
58.05	5377	8.96	81.00	26465	44.11
59.00	553	0.92	82.05	27777	46.30
60.00	210	0.35	83.00	3722	6.20

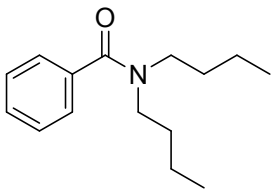
84.05	59993	100.00	105.00	230	0.38
85.05	21268	35.45	106.00	79	0.13
86.05	3549	5.92	107.00	142	0.24
87.10	257	0.43	108.00	65	0.11
88.10	404	0.67	109.05	1075	1.79
91.10	210	0.35	110.05	7808	13.01
92.10	116	0.19	111.05	562	0.94
93.10	335	0.56	112.00	49	0.08
94.00	159	0.27	113.00	294	0.49
95.00	9663	16.11	114.00	94	0.16
96.10	858	1.43	115.00	42	0.07
97.05	546	0.91	116.00	34	0.06
98.00	214	0.36	117.00	71	0.12
99.00	2985	4.98	122.00	74	0.12
100.05	12144	20.24	123.00	26	0.04
101.10	673	1.12	127.00	297	0.50
102.05	367	0.61	128.00	455	0.76
102.95	11866	19.78	129.00	52	0.09
104.00	1758	2.93	130.00	13	0.02

Characterization Data for Products



N,*N*-Dibutyl-4-methoxybenzamide[(1)] **3a**

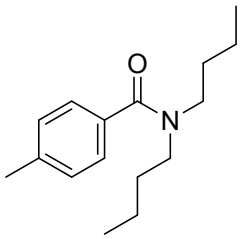
Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.15 (d, *J* =8.5 Hz, 2H), 6.70 (d, *J* =8.5 Hz,2H),3.60(s,3H),3.28(s,2H),3.09(s,2H),1.38(m ,4H),1.09(m,4H),0.77(s,3H),0.64(s, 3H);^{13}CNMR(125MHz,$CDCl_3$)δ: 171.0, 159.9, 129.3, 127.9, 112.9, 54.6, 48.4, 44.0, 30.2, 29.2, 19.3, 13.2; LRMS(EI70ev)*m*/z(%): 263(M^+,7), 220(6), 135(100), 107(7), 77(9).



N,N-dibutylbenzamide[(1)] **3b**

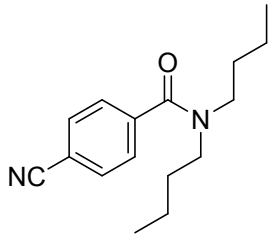
Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.33–7.24 (m, 5H), 3.41 (s, 2H), 3.11 (s, 2H), 1.57 (s, 2H), 1.46–1.27 (m, 4H), 1.02 (m, 5H), 0.70 (s, 3H);^{13}C NMR (125

MHz,$CDCl_3$) δ: 171.6, 137.3, 128.9, 128.2, 126.4, 8.7, 44.4, 30.7, 29.6, 20.2, 19.6, 13.8, 13.5; LRMS(EI70ev)*m*/z(%): 233 (M^+,7.6), 190 (12.8), 148 (5.2), 105 (100), 77 (24).



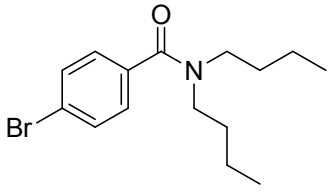
N,*N*-Dibutyl-4-methylbenzamide[(1)] **3c**

Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.21 (d, *J* = 7.5 Hz, 2H), 7.13 (d, *J* = 7.5 Hz, 2H), 3.43 (s, 2H), 3.16 (s, 2H), 2.34 (s, 3H), 1.59 (s, 2H), 1.44 (s, 2H), 1.35 (s, 2H), 1.10 (s,2H), 0.92 (s,3H), 0.75 (s,3H); ^{13}CNMR (125MHz,$CDCl_3$) δ: 171.7, 138.8, 134.3, 128.8, 126.4, 48.7, 44.3, 30.7, 29.6, 21.2, 20.7, 19.6, 14.0, 13.8; LRMS (EI70ev)*m*/z(%): 247 (M^+,9), 204 (9), 119 (100), 120 (9), 65 (7).



N,*N*-Dibutyl-4-cyanobenzamide[(2)] **3d**

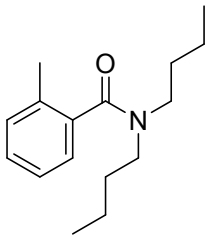
Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.63 (d, *J* =8.0 Hz, 2H), 7.39 (d, *J* = 8.0 Hz, 2H), 3.43-3.40(m, 2H), 3.10–3.00 (m, 2H), 1.63–1.50 (m, 2H), 1.43-1.31(m, 4H),1.08-.04(m, 2H),0.92-0.89(m,3H),0.73-0.70(m,3H);^{13}C NMR (125 MHz, $CDCl_3$) δ:169.6,142.0,132.3,127.1,118.3,112.9,48.7,44.5,30.7,29.5,20.2, 19.6, 13.8, 13.5; LRMS(EI70ev)*m*/z(%):258(M^+,3.4),215(14.5),173(9.4),130(100),102(24.2).



4-bromo-N,*N*-Dibutylbenzamide **3e**

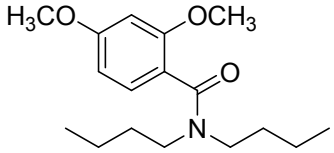
Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ :7.54 (d, *J* =8.0 Hz, 2H), 7.25 (d, *J* = 8.5 Hz, 2H), 3.48 (s, 2H), 3.18 (s, 2H), 1.64 (s, 2H), 1.49 (s, 2H), 1.41 (s, 2H), 1.19-1.15

(m,2H), 0.98 (s,3H), 0.82 (s,3H); ^{13}CNMR (125MHz,$CDCl_3$)δ: 170.7, 136.3, 131.3, 127.8, 122.7, 48.8, 44.7, 30.80, 29.6, 20.3, 19.7, 13.9, 13.6; LRMS (EI70ev)*m*/z(%): 311(M^+,8.7), 313 (8.9), 270 (18.8), 183 (100),155 (20),76 (20); IR(neat,cm^{-1}): 2954, 2868, 1633, 1421, 831, 572. HRMS m/z (ESI) for $C_{15}H_{23}BrNO$ $(M+H)^+$calcd : 312.0958, found: 312.0952.



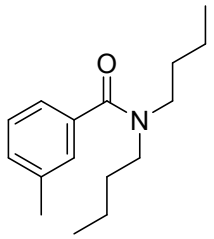
N,*N*-Dibutyl-2-methylbenzamide(1) **3f**

Yellowliquid;^{1}HNMR(500MHz,$CDCl_3$)δ: 7.27–7.22 (m,1H), 7.20-7.17 (m,2H), 7.16–7.13 (m,1H), 3.70 (s,1H), 3.32 (s,1H), 3.09–3.01 (m, 2H), 2.29 (s, 3H), 1.71–1.61 (m, 2H), 1.44-1.38 (m, 4H), 1.16–1.06 (m, 2H), 0.99 (t, *J* = 7.5 Hz, 3H), 0.76 (t, *J* = 7.5 Hz, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: 170.8, 137.2, 133.8, 130.2, 128.5, 125.8, 125.7, 48.0, 44.0, 30.6, 29.6, 20.4, 19.7, 18.9, 13.9, 13.5; LRMS (EI70ev) *m*/z(%): 247 (M^+,6.4), 202 (8.4), 145 (55.2), 119 (100),77 (30.3).



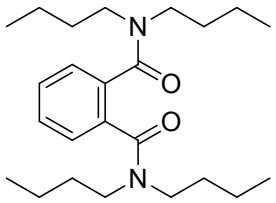
N,N-dibutyl-2,4-dimethoxybenzamide(3) **3g**

Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.11 (d, *J* = 8.0 Hz, 1H), 6.53–6.41 (m, 2H), 3.81 (s, 3H), 3.78 (s, 3H), 3.69–3.27 (m, 2H), 3.08 (t, *J* = 7.5 Hz,2H),1.67–1.58 (m, 2H), 1.39-1.36 (m, 4H), 1.14-1.09 (m, 2H), 0.97 (t, *J* = 7.5 Hz, 3H), 0.76 (t, *J* = 7.5Hz,3H); ^{13}CNMR (125MHz, $CDCl_3$) δ: 169.2, 161.2, 156.6, 128.5, 119.9, 104.6, 98.5, 55.6 (2C), 48.3, 44.0, 30.6, 29.3, 20.1, 19.7, 13.9, 13.6; LRMS (EI70ev) *m*/z(%): 293 (M^+,7.9), 250 (6.2),194 (6), 165(100), 122(5.7).



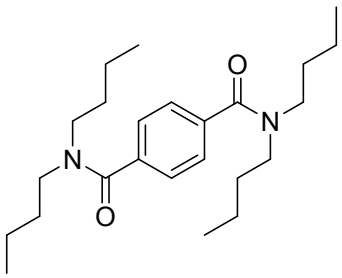
N,*N*-Dibutyl-3-methylbenzamide[4] **3h**

Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.25 (t, *J* = 7.5 Hz, 1H), 7.19–7.14 (m, 2H), 7.12 (d, *J* = 7.5 Hz, 1H), 3.48 (s, 2H), 3.18 (s, 2H), 2.36 (s, 3H), 1.64 (s, 2H), 1.48 (s, 2H), 1.40 (s, 2H), 1.14 (s, 2H), 0.97 (s, 3H), 0.78 (s, 3H);^{13}C NMR (125 MHz, $CDCl_3$)δ: 171.7, 137.9, 137.2, 129.6, 128.0, 126.9, 123.3, 48.7, 44.3, 30.7, 29.5, 21.2, 20.2, 19.6, 13.8, 13.5; LRMS (EI70ev) *m*/z(%): 247(M^+,11.3), 204(11.6), 162(4.7), 119(100), 91(22.7).



N^1,N^1,N^2,N^2-tetrabutylphthalamide[4] **3i**

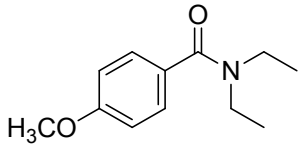
Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.38-7.31 (m, 2H), 7.26-7.20 (m,2H), 3.38 (s, 4H), 3.16–3.07 (m,4H), 1.56-1.62 (m, 4H), 1.44-1.47 (m, 4H), 1.33-1.37 (m, 4H), 1.10 (m, 4H), 0.93 (t, *J* = 7.5 Hz, 6H), 0.76 (t, *J* = 7.5 Hz, 6H);^{13}C NMR (125 MHz,$CDCl_3$)δ: 169.6,134.9,128.3,126.1,48.8 ,44.6,30.5,29.5,20.3,19.7,13.9,13.5; LRMS(EI70ev)*m*/z(%):388(M^+,7.2),260(17.3),204(18.3),128(100),105(12.5).



N^1,N^1,N^4,N^4-tetrabutylterephthalamide **3j**

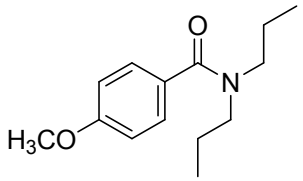
Yellow solid,mp 72.1~74.0^{o}C;^{1}H NMR (500 MHz, $CDCl_3$) δ 7.38 (s, 4H), 3.53–3.43 (m, 4H), 3.22–3.12 (m, 4H), 1.64 (d,*J* =7.0 Hz, 4H), 1.46 (d,J=6.5,4H), 1.43-1.39 (m,4H), 1.15-1.11 (m, 4H), 0.98 (t, *J* = 7.0 Hz, 6H), 0.80 (t, *J* = 7.0 Hz, 6H); ^{13}C

NMR (125 MHz,$CDCl_3$) δ171.0, 138.0, 126.5, 48.7, 44.4, 30.8, 29.6, 20.2, 19.7, 13.8, 13.6; IR(KBr,cm^{-1}): 2948, 2921, 2862, 1620, 1504, 1454, 1424 ,1106 ,736; LRMS(EI70ev) *m*/z(%): 388(M^+,6.5), 281(12.9), 260(100), 105(22.6), 73 (16); HRMS m/z (ESI) for $C_{24}H_{41}N_2O_2$ $(M+H)^+$calcd : 389.3163, found: 389.3150.



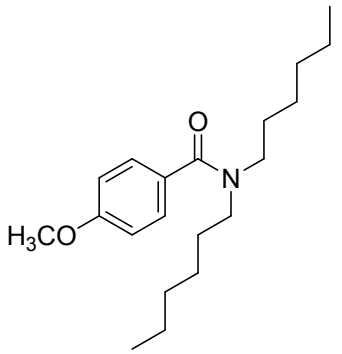
N,*N*-Diethyl-4-methoxybenzamide[5] **3k**

Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.27 (d, *J* =8.5 Hz, 2H), 6.82 (d, *J* =8.5Hz, 2H), 3.75 (s, 3H), 3.38 (m, 2H), 3.30 (m, 2H), 1.10 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ: 171.4, 160.1, 129.4, 128.0 , 113.7 , 55.3 , 43.4 , 39.5,14.0, 13.3; LRMS (EI 70 ev) *m*/z (%):207(M^+, 9.6) ,207(10.3),135(100),92(8.9),77(14.8).



N,*N*-Dipropyl-4-methoxybenzamide[6] **3l**

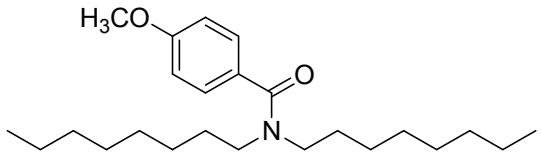
Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.23 (d, *J* = 8.5 Hz, 2H), 6.80 (d, *J* =8.5Hz, 2H), 3.73 (s, 3H), 3.31 (s, 2H), 3.14 (s, 2H), 1.53 (s, 4H), 0.85 (s, 3H), 0.69 (s,3H); ^{13}CNMR(125MHz,$CDCl_3$)δ: 171.7, 160.2, 129.6, 128.3, 113.6, 55.2, 51.3, 21.3, 11.2; LRMS(EI70ev)*m*/z(%):235(M^+,8.4),164(6.1),135(100),107(6.4),77(11.3).



N,N-dihexyl-4-methoxybenzamide **3m**

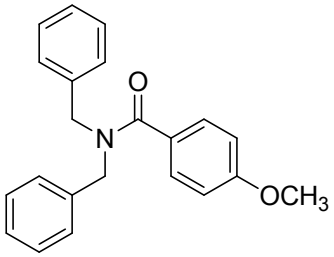
Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.32 (d, *J* = 8.5 Hz, 2H), 6.89 (d, *J* = 8.5 Hz, 2H), 3.82 (s, 3H), 3.44 (s, 2H), 3.23 (s, 2H), 1.61-1.52 (m, 4H), 1.29-1.16 (m,

12H),0.87(s,6H); ^{13}CNMR (125MHz,$CDCl_3$) δ: 171.5, 160.2, 129.7, 128.3, 113.6, 55.2, 49.1, 44.9, 31.3, 26.6, 22.5, 13.9; LRMS (EI70ev) *m*/z(%): 319 (M^+,5.0), 248(6.4), 192 (4.8), 135 (100), 77 (6.6); IR(neat,cm^{-1}): 2931, 2857, 1633, 1297, 1028, 843. HRMS m/z (ESI) for $C_{20}H_{34}NO_2$ $(M+H)^+$calcd : 320.2584, found: 320.2578.



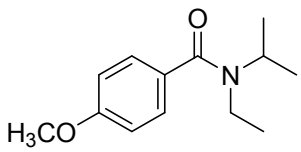
4-methoxy-N,N-dioctylbenzamide **3n**

Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.31 (d, *J* = 8.5 Hz, 2H), 6.89 (d, *J* = 9.0 Hz, 2H), 3.82 (s, 3H), 3.43 (s, 2H), 3.29 (s, 2H), 1.59 (s, 4H), 1.27 (s, 20H), 0.88 (t, *J* =10.0,6H); ^{13}CNMR(125MHz,$CDCl_3$) δ: 171.7, 160.4, 129.7, 128.3, 113.7, 55.2, 47.4, 42.1, 31.7, 29.1, 28.6, 26.9, 22.7, 14.3; LRMS (EI70ev) *m*/z(%): 375 (M^+,5.8), 276 (8.1), 220 (4.7),135 (100),156 (6.8);IR(neat,cm^{-1}): 2921, 2842, 1633,1461, 839, 765; HRMS m/z (ESI) for $C_{24}H_{42}NO_2$$(M+H)^+$calcd : 376.3210, found: 376.3205.



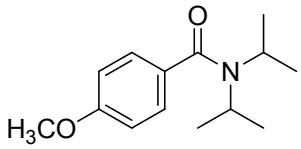
N,*N*-Dibenzyl-4-methoxybenzamide[7] **3o**

White solid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.47 (d,*J* = 8.0 Hz, 2H), 7.31-7.17 (m,10H), 6.84 (d,*J* = 8.0Hz,2H),4.66(s,2H), 4.48 (s, 2H), 3.71(s,3H);^{13}C NMR (125MHz, $CDCl_3$) δ: 172.0, 160.7, 136.6, 128.7, 127.7, 127.3, 127.1, 113.3, 54.9, 51.4, 47.0; Melting point : 114-116 ^{o}C ; LRMS (EI70ev) *m*/z(%): 331(M^+,2.3) , 240(28.9), 135(100), 107(8.8), 77(12.4).



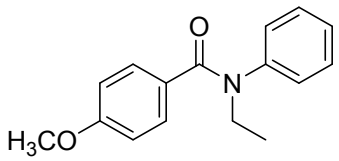
N-ethyl-N-isopropyl -4-methoxybenzamide **3p**

Yellow liquid; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.16 (d, *J* = 8.5 Hz, 2H), 6.75 (d, *J* = 8.5Hz, 2H), 3.66 (s, 4H), 3.21 (s, 2H), 1.03 (s, 12H);^{13}C NMR (125 MHz, $CDCl_3$) δ: 171.2, 159.9, 128.6, 127.7, 113.5, 54.8, 50.2, 41.5, 22.5, 20.8; IR(neat,cm^{-1}): 2973, 1609, 1250, 1024, 840, 591; LRMS (EI70ev) *m*/z(%): 221 (M^+,9.4), 192 (5.9), 135 (100), 107 (6.7), 77 (11.5). HRMS m/z (ESI) for $C_{13}H_{20}NO_2$ $(M+H)^+$calcd :222.1489 , found:222.1483



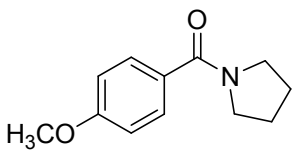
N,N-diisopropyl-4-methoxybenzamide[8] **3q**

Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.19 (d, *J* =8.5 Hz, 2H), 6.80 (d, *J* =8.5 Hz, 2H), 3.73 (s, 5H), 1.25 (s, 12H).^{13}C NMR (125 MHz, $CDCl_3$) δ: 170.9, 159.9, 128.6, 127.5, 113.5, 54.8, 20.8; LRMS (EI70ev) *m*/z(%): 235 (M^+,6.5), 192(18.1), 135 (100), 107 (5.7), 77(9.3).



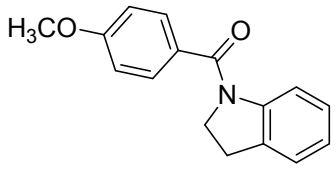
N-ethyl-N-phenyl -4-methoxybenzamide **3r**

Yellow liquid;^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.15 (dd, *J* = 9.0, 8.0 Hz, 4H), 7.05 (t, *J* = 7.5 Hz, 1H), 6.94 (d, *J* = 7.5Hz, 2H), 6.55 (d, *J* = 9.0 Hz, 2H), 3.88 (q, *J* = 7.0 Hz, 2H), 3.62(s,3H),1.12 (t,*J* =7.0Hz,3H);^{13}C NMR (125 MHz,$CDCl_3$)δ: 169.6 ,160.9 , 143.6 , 130.7 , 129.0 , 128.3 , 127.7 , 126.3 ,112.6, 55.3 , 45.3 , 12.6 .LRMS(EI70ev)*m*/z(%):255(M^+,14.2),135(100),107(9.4),92(8.7),77(17.7).IR(neat,cm^{-1}): 2970, 2935, 1633, 1299, 840, 697.HRMS m/z (ESI) for $C_{16}H_{18}NO_2$ $(M+H)^+$calcd : 256.1332, found: 256.1340.



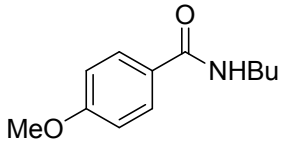
(4-methoxyphenyl)(pyrrolidin-1-yl)methanone[9] **3s**

White solid，mp 78-79 °C; ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.52 (d, *J* = 9.0 Hz, 2H), 6.90 (d, *J* = 8.5 Hz, 2H), 3.84 (s, 3H), 3.64 (t, *J* = 6.9 Hz, 2H), 3.48 (t, *J* = 6.6 Hz, 2H), 1.99 – 1.92 (m, 2H), 1.91 – 1.83 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 169.5, 160.8, 129.5, 129.2, 113.4, 55.3, 49.8, 46.3, 26.5, 24.5; LRMS (EI 70ev) *m*/z (%) : 205 (M^+, 23.5), 135 (100), 107(10.9), 92 (9.8), 77 (16.9).



indolin-1-yl(4-methoxyphenyl)methanone **3t**

White solid, mp 102-103°C; ^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.53 (d, *J* = 8.5 Hz, 2H), 7.19 (d, *J* = 7.5 Hz, 1H), 7.10 (s, 1H), 6.99 (t, *J* = 7.1 Hz, 1H), 6.93 (d, *J* = 8.5Hz, 2H), 4.10 (t, *J* = 8.0 Hz, 2H), 3.84 (s, 3H), 3.09 (t, *J* = 8.0 Hz, 2H);^{13}C NMR (125 MHz, $CDCl_3$) δ 168.9, 161.4, 142.9, 132.5, 129.4, 129.1, 127.2, 124.9, 123.7, 113.8, 55.4 , 50.7 , 28.2; IR(KBr,cm^{-1}): 2916, 1633, 1482, 1246, 1028, 845, 753; LRMS (EI 70ev) *m*/z (%) : 253(12.2), 135(100), 107(10.9), 92(11.5), 77(16.6); HRMS m/z (ESI) for $C_{16}H_{16}NO_2$ $(M+H)^+$calcd : 254.1176, found: 254.1174.



N-butyl-4-methoxybenzamide[10] **3u**

Yellow liquid:^{1}H NMR (500 MHz, $CDCl_3$) δ: 7.73 (d, *J* = 9.0 Hz, 2H), 6.91 (d, *J* = 9.0 Hz, 2H), 6.11 (s, 1H), 3.84 (s, 3H), 3.44 (dd, J_1 = 13.0, J_2 = 7.0 Hz, 2H), 1.64-1.54 (m, 2H), 1.41 (m, 2H), 0.95 (t, *J* = 7.5 Hz, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 167.0 , 162.1, 128.6, 127.2, 113.7, 55.4, 39.7, 31.8, 20.1, 13.7.； LRMS (EI70ev) *m*/z(%): 207 (M^+, 13.1), 164 (13.3), 135(100), 92 (9.3), 77 (11.0).

References

(1) Y, Z, Duan.;M, Z, Deng.*Synlett.***2005**(*2*), 355-357.

(2) Iida, Yusuke. *PCT Int. Appl*., **2012117965**, 07 Sep 2012.

(3) Castral, Thais C. *J. Agric. Food Chem*, **2011**, *59*, 4822.

(4) Wirth, Wolfgang .*Ger. Offen*.,**4331416**, 14 Jun 1995.。

(5) M, Z, Li.; C,Wang.; P, Fang.; H, B, Ge**.** *Chem. Commun*.**,2011**, *47*, 6587 .

(6) A,B.; R,E,P.;V, V.;S. Muramulla.; J, Wu .*Tetrahedron Letters*,**2006**,*47*, 505

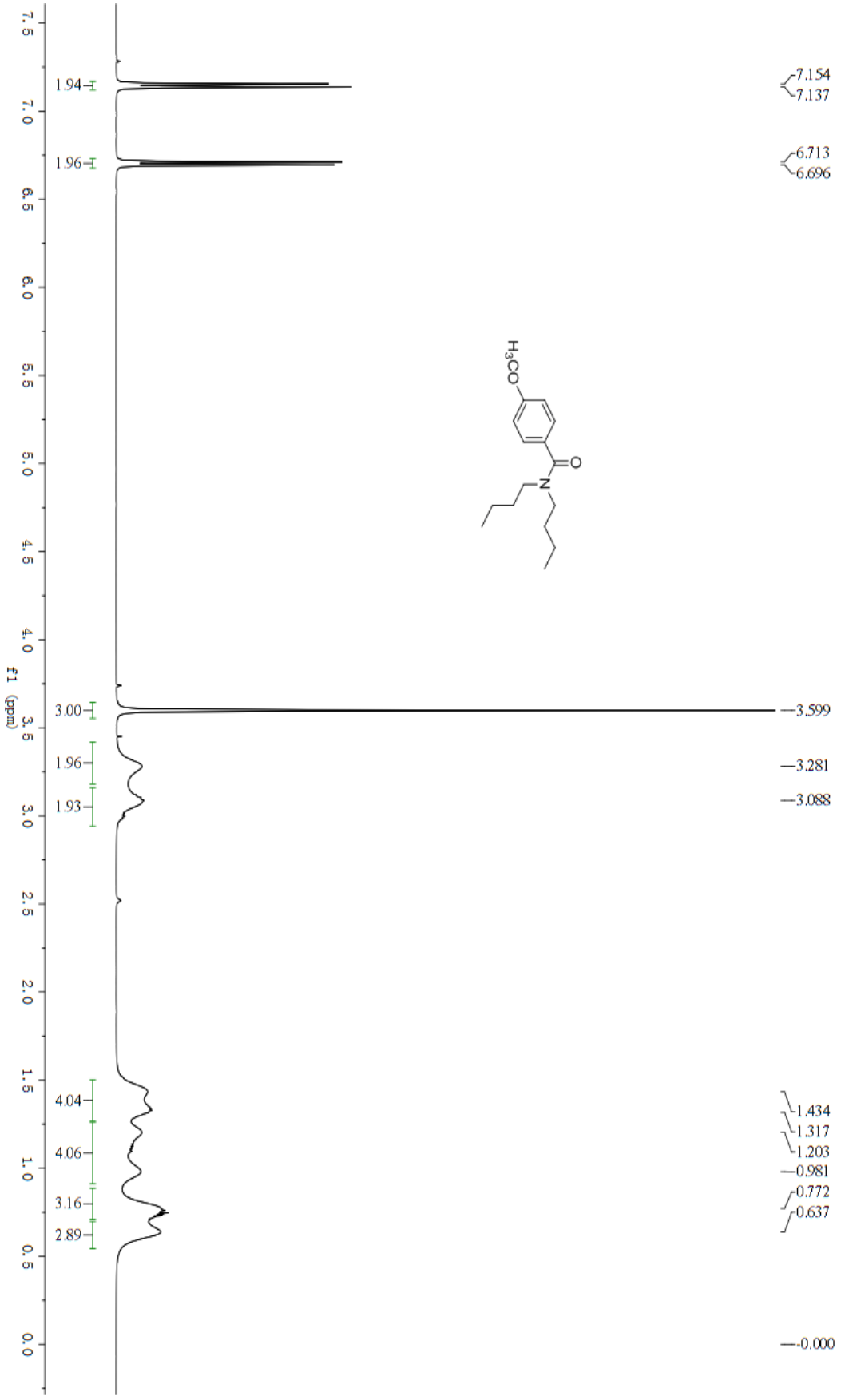
(7) Barbe,G.;Charette,A,B.*J.Am.Chem.Soc*.**2008**,*130*,18

(8) Joanna W·Corinna N, Frederic W. Patureau, Frank G*Angew Chem. Int. Ed*.**2012**, *51*, 2247.

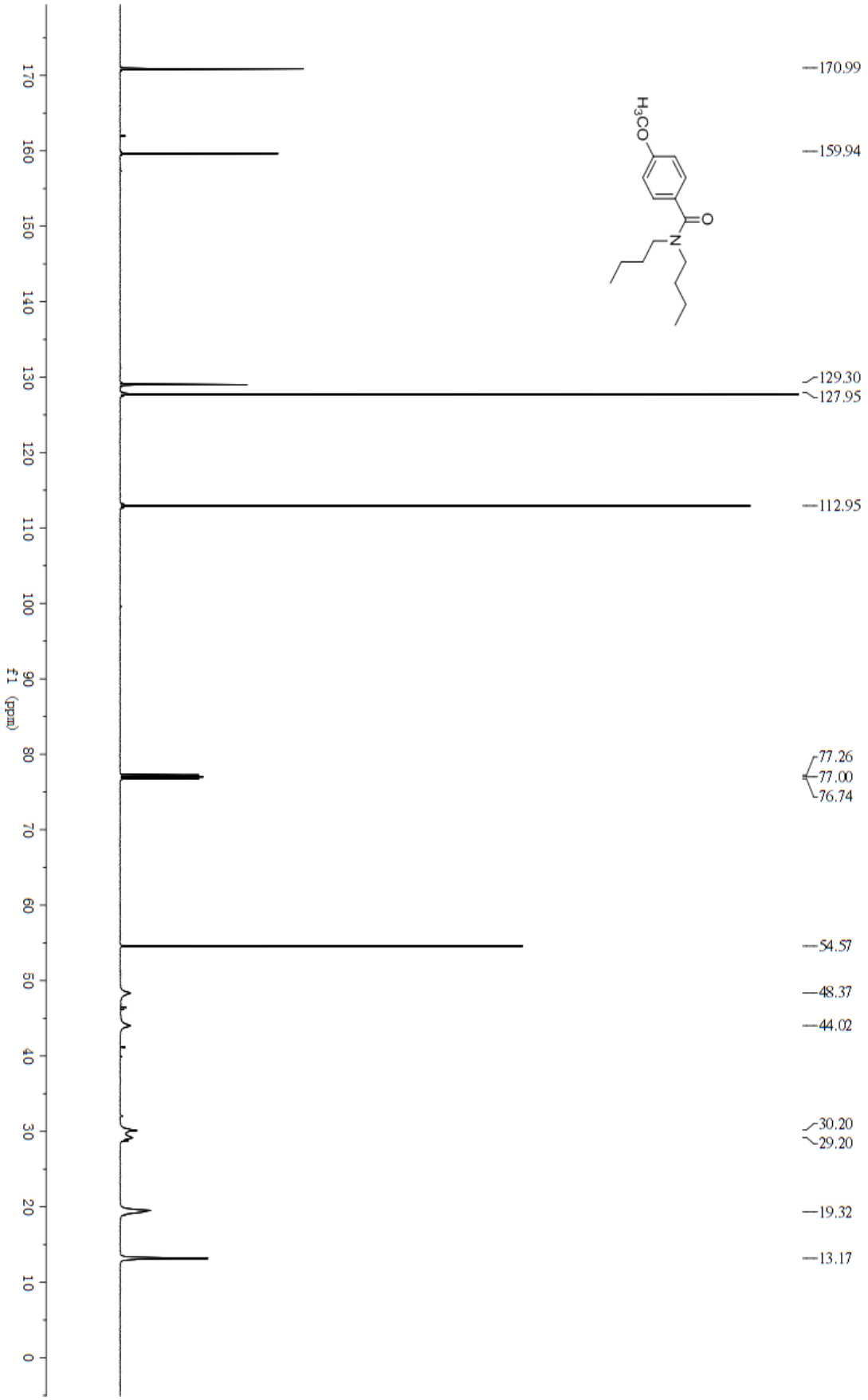
(9) Li, J.; Xu,F.; ZhangY.;ShenQ. *J. Org. Chem.*, **2009**, *74* , 2575

(10) P. Nordeman, L. R. Odell and M Larhed. *J. Org. Chem.*, **2012**, *77*, 11393.

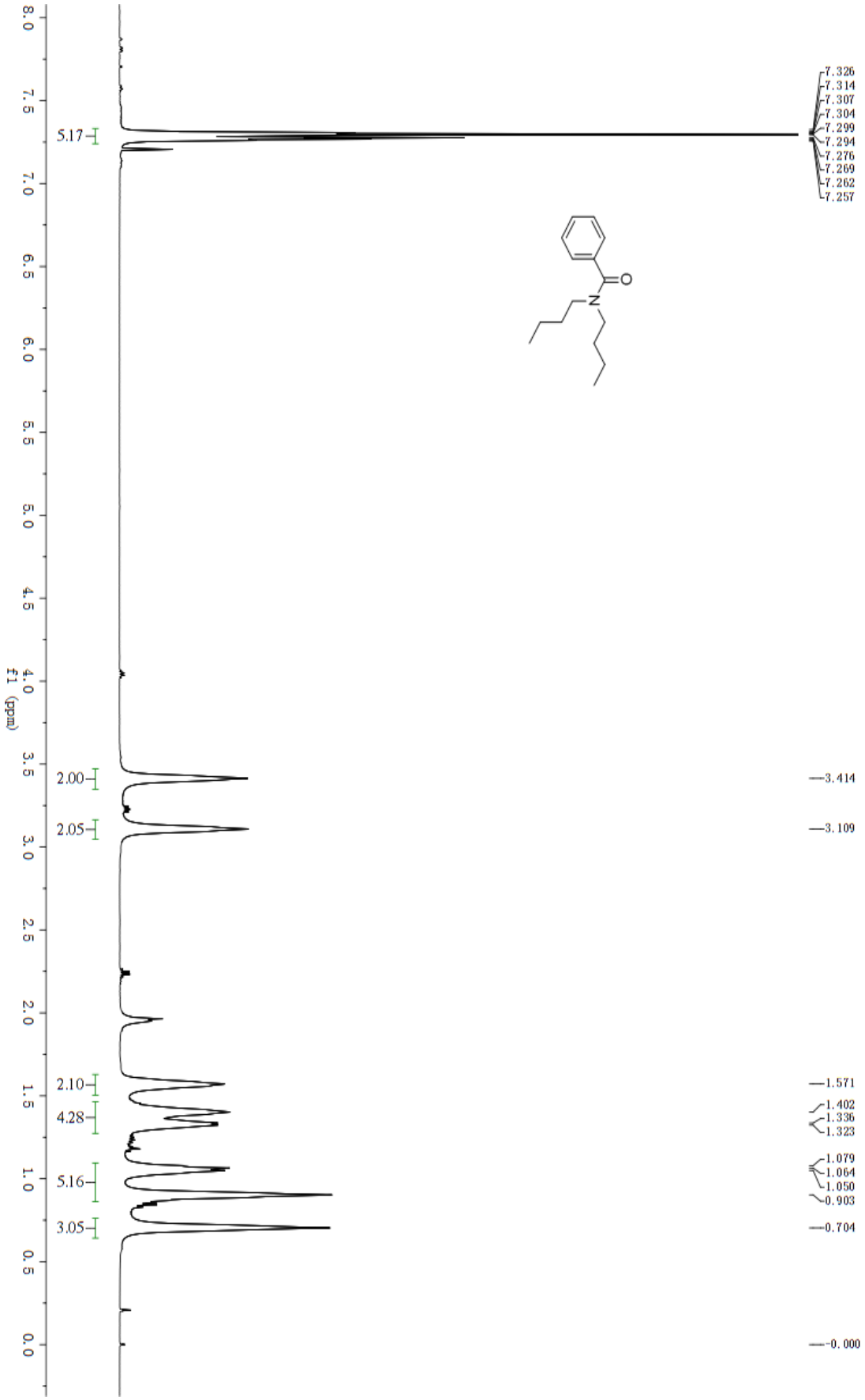
N,*N*-Dibutyl-4-methoxybenzamide **3a**



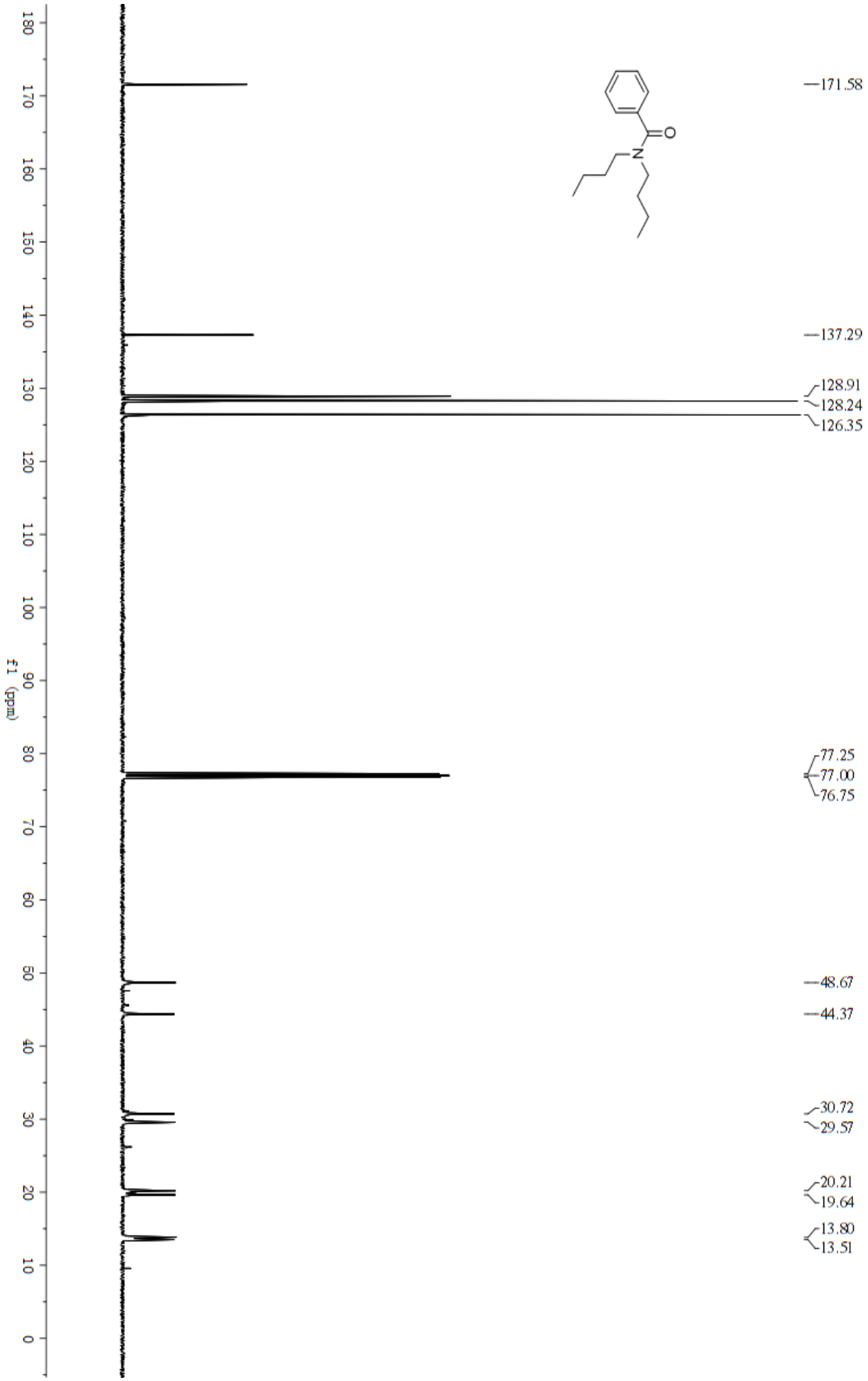
N,*N*-Dibutyl-4-methoxybenzamide **3a**



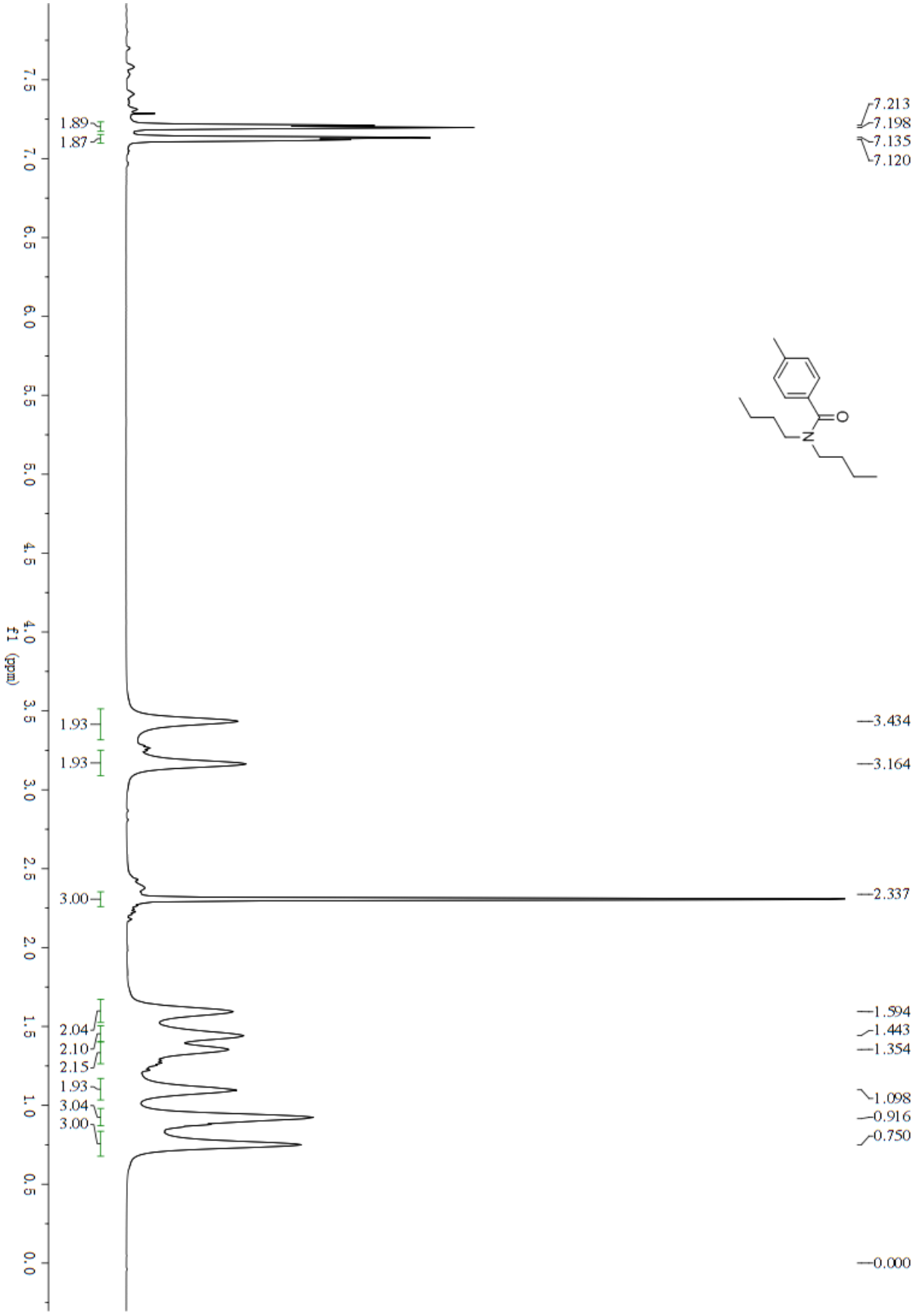
N,N-dibutylbenzamide **3b**



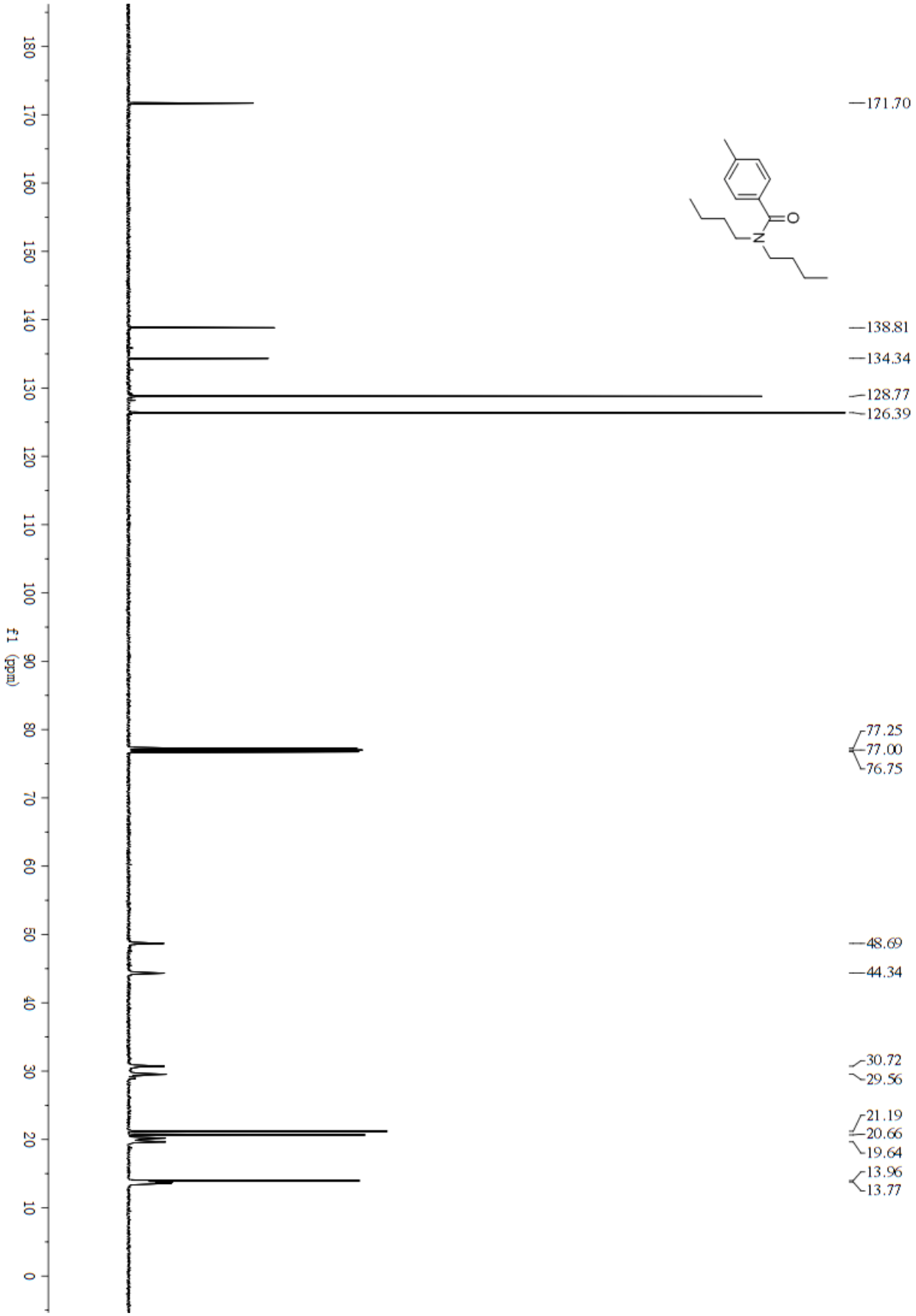
N,N-dibutylbenzamide **3b**



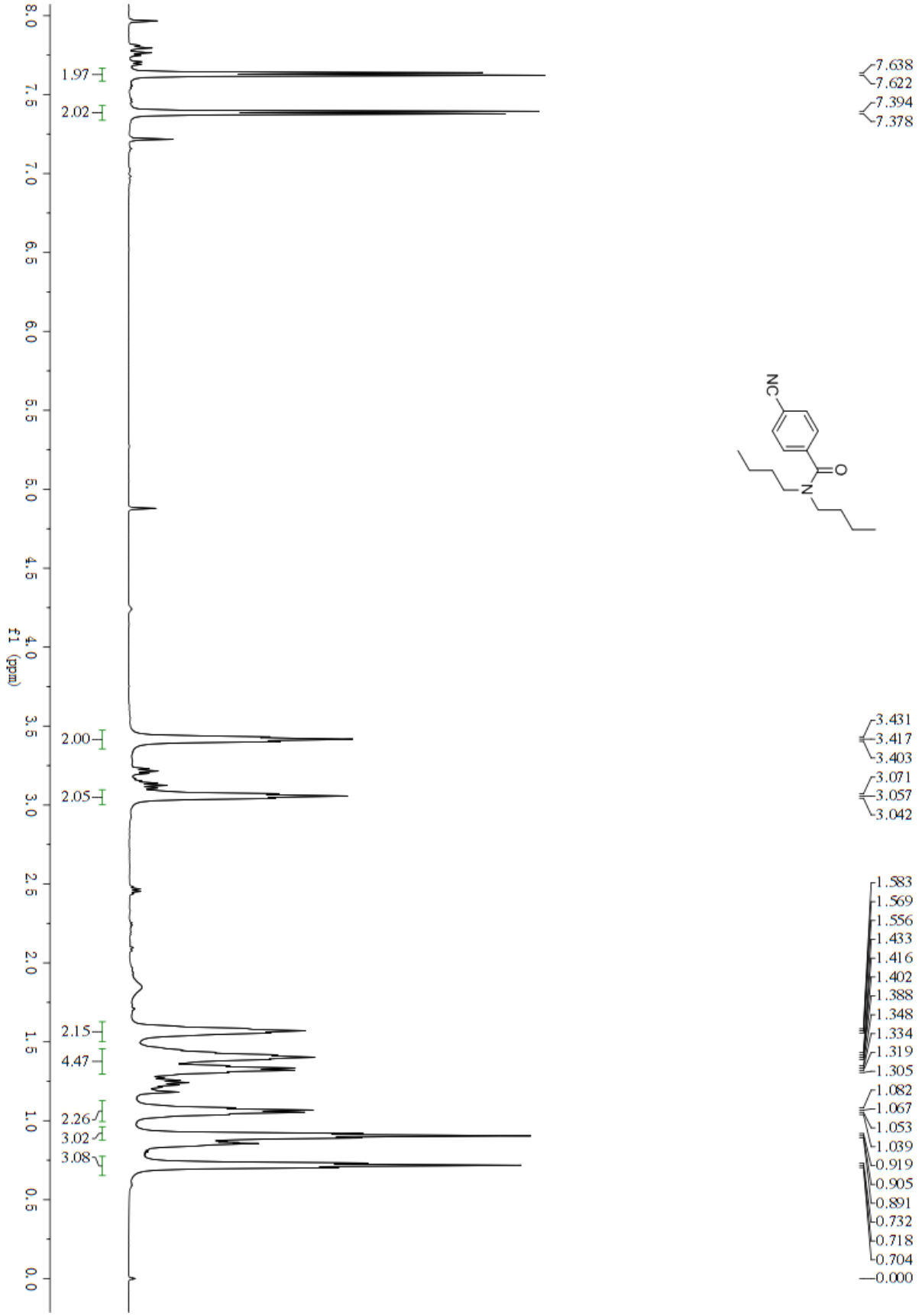
N,*N*-Dibutyl-4-methylbenzamide **3c**



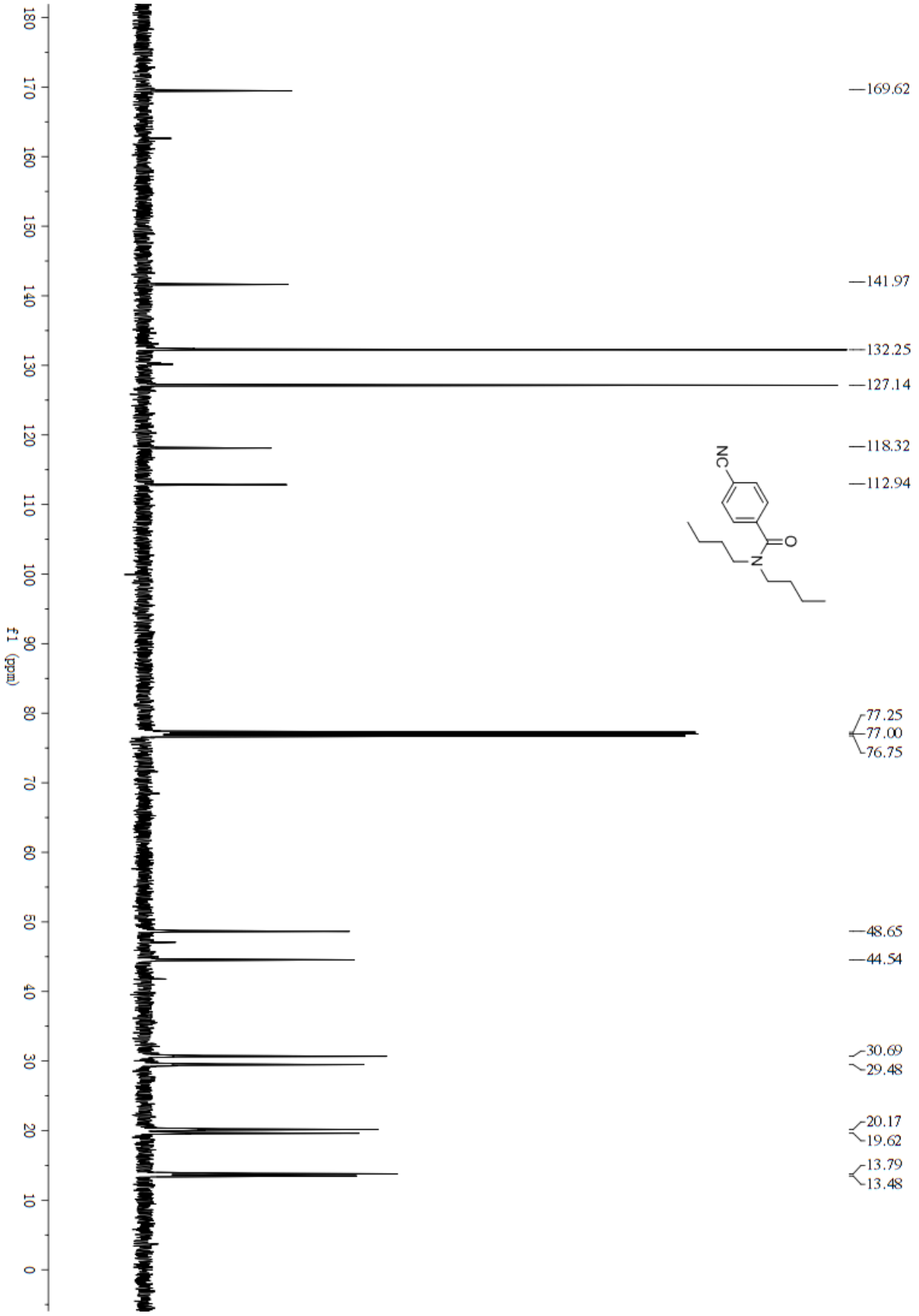
N,*N*-Dibutyl-4-methylbenzamide **3c**



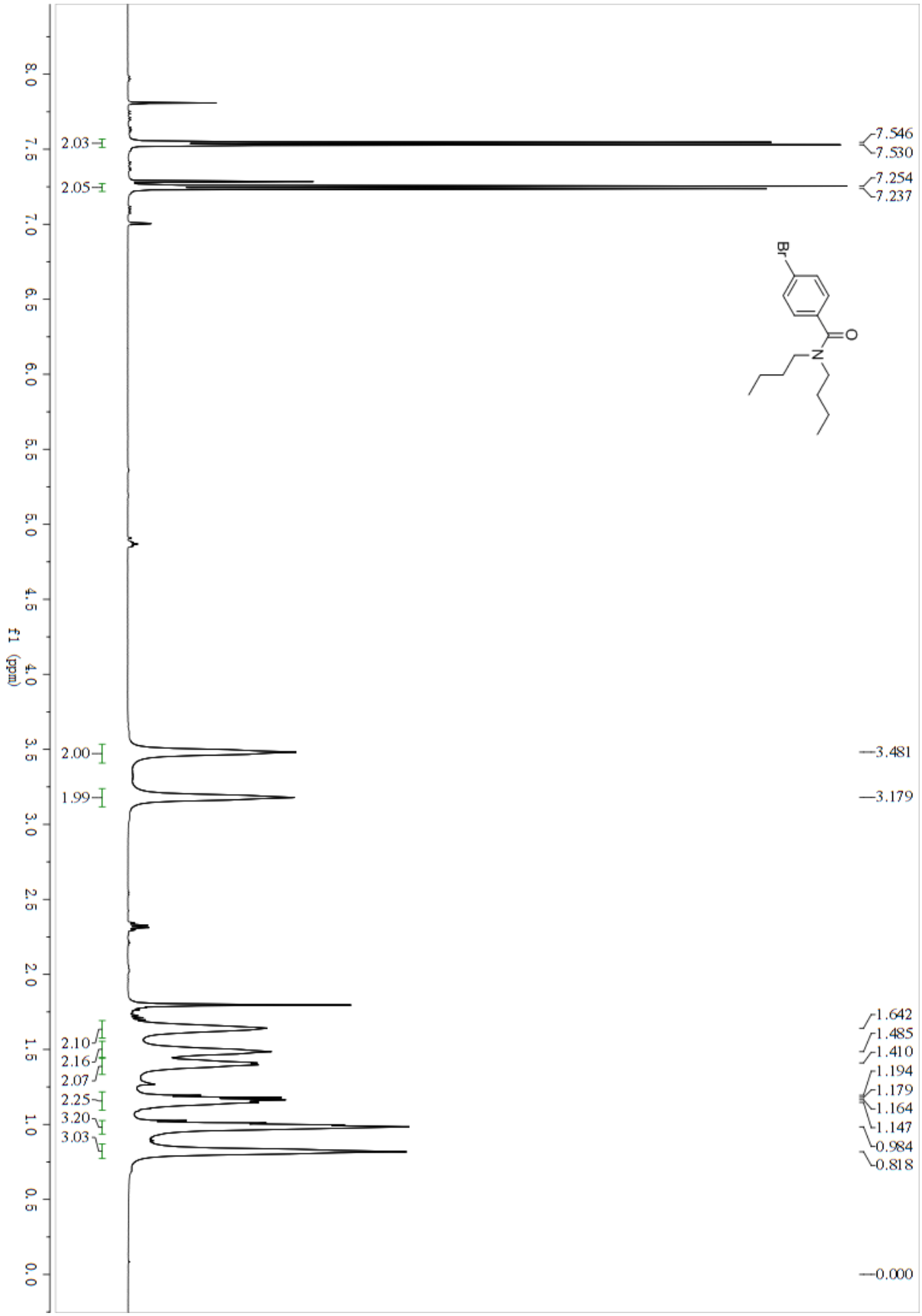
N,*N*-Dibutyl-4-cyanobenzamide **3d**



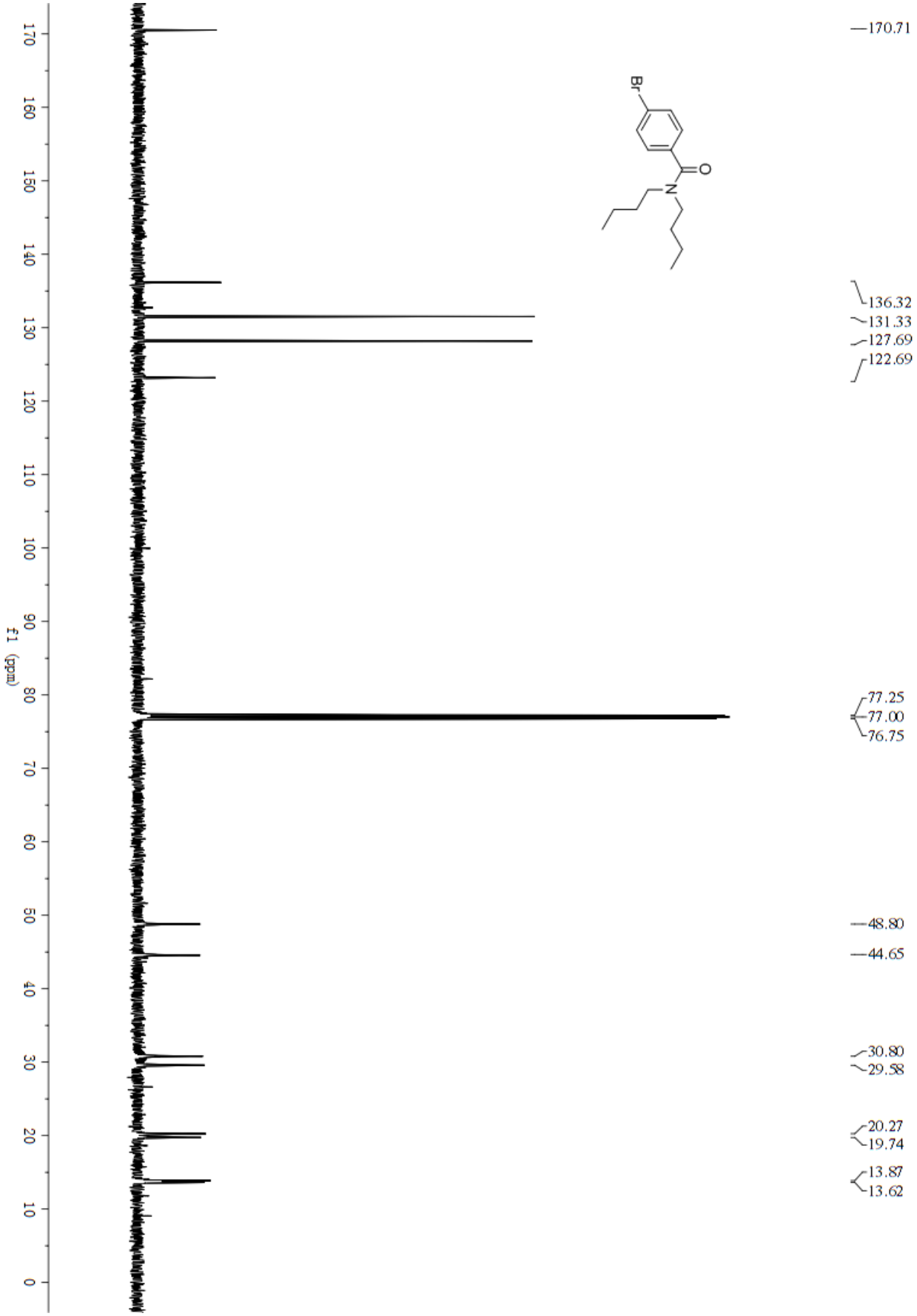
N,*N*-Dibutyl-4-cyanobenzamide **3d**



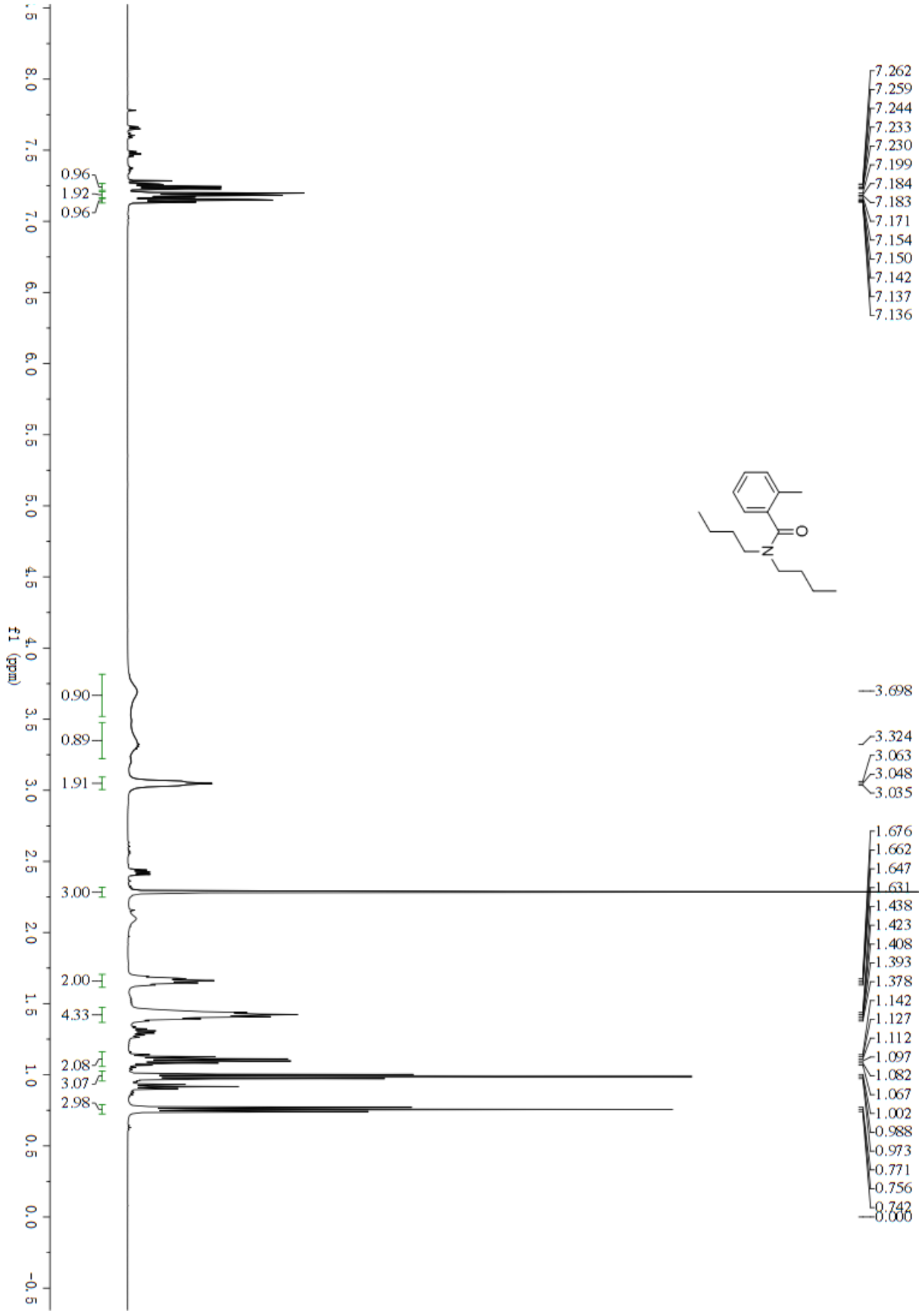
4-bromo-N,N-Dibutylbenzamide **3e**



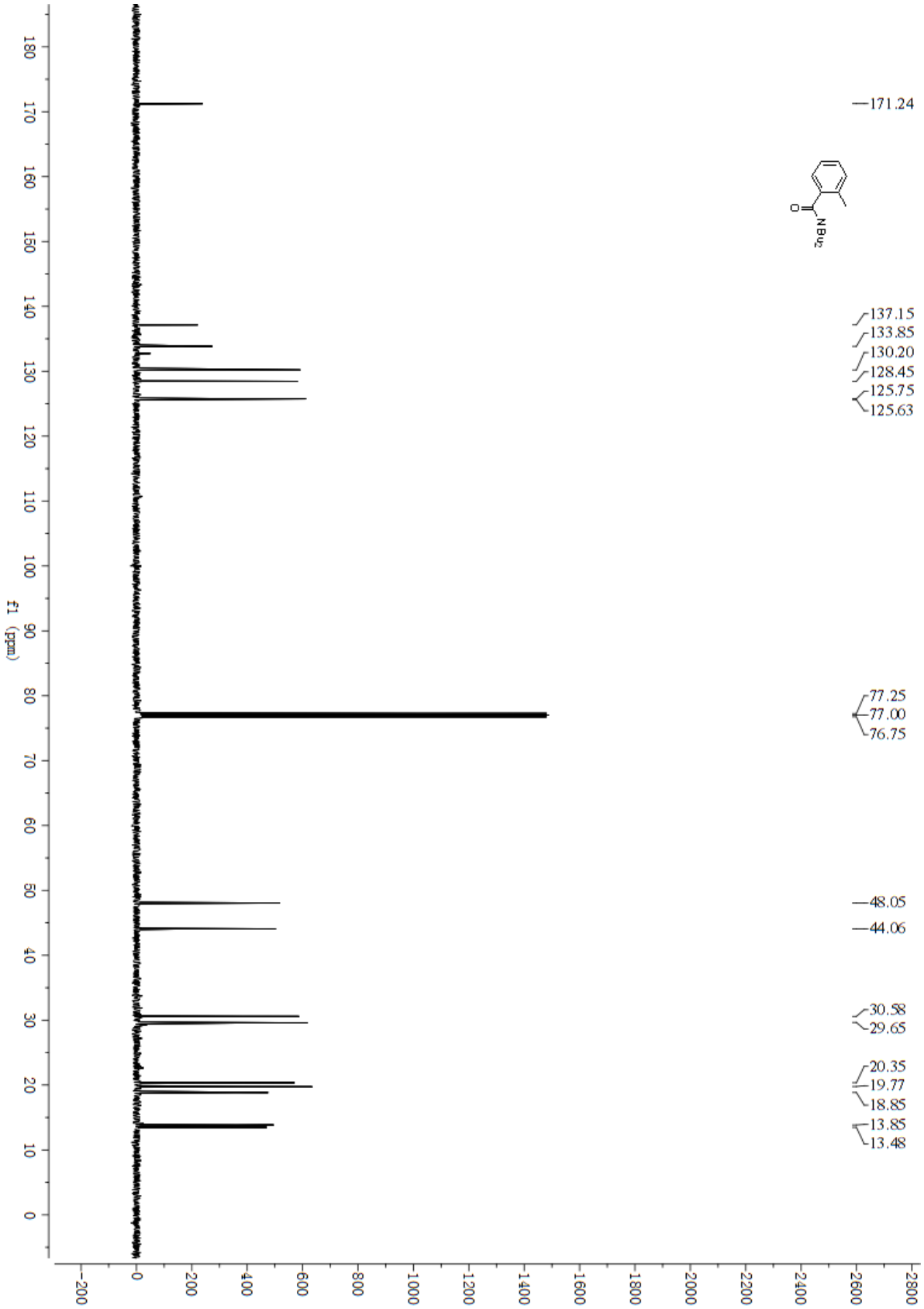
4-bromo-N,N-Dibutylbenzamide **3e**



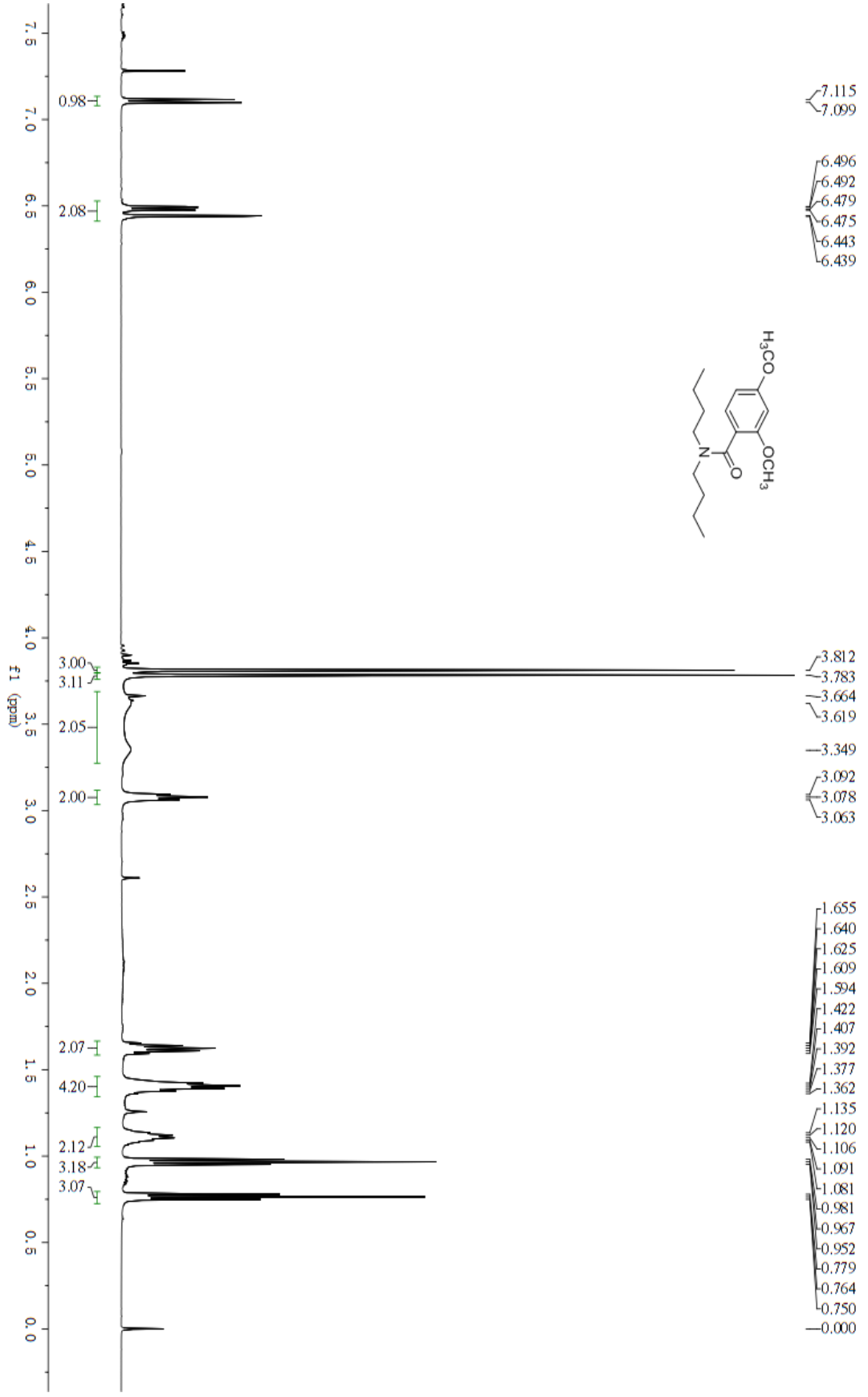
N,*N*-Dibutyl-2-methylbenzamide **3f**



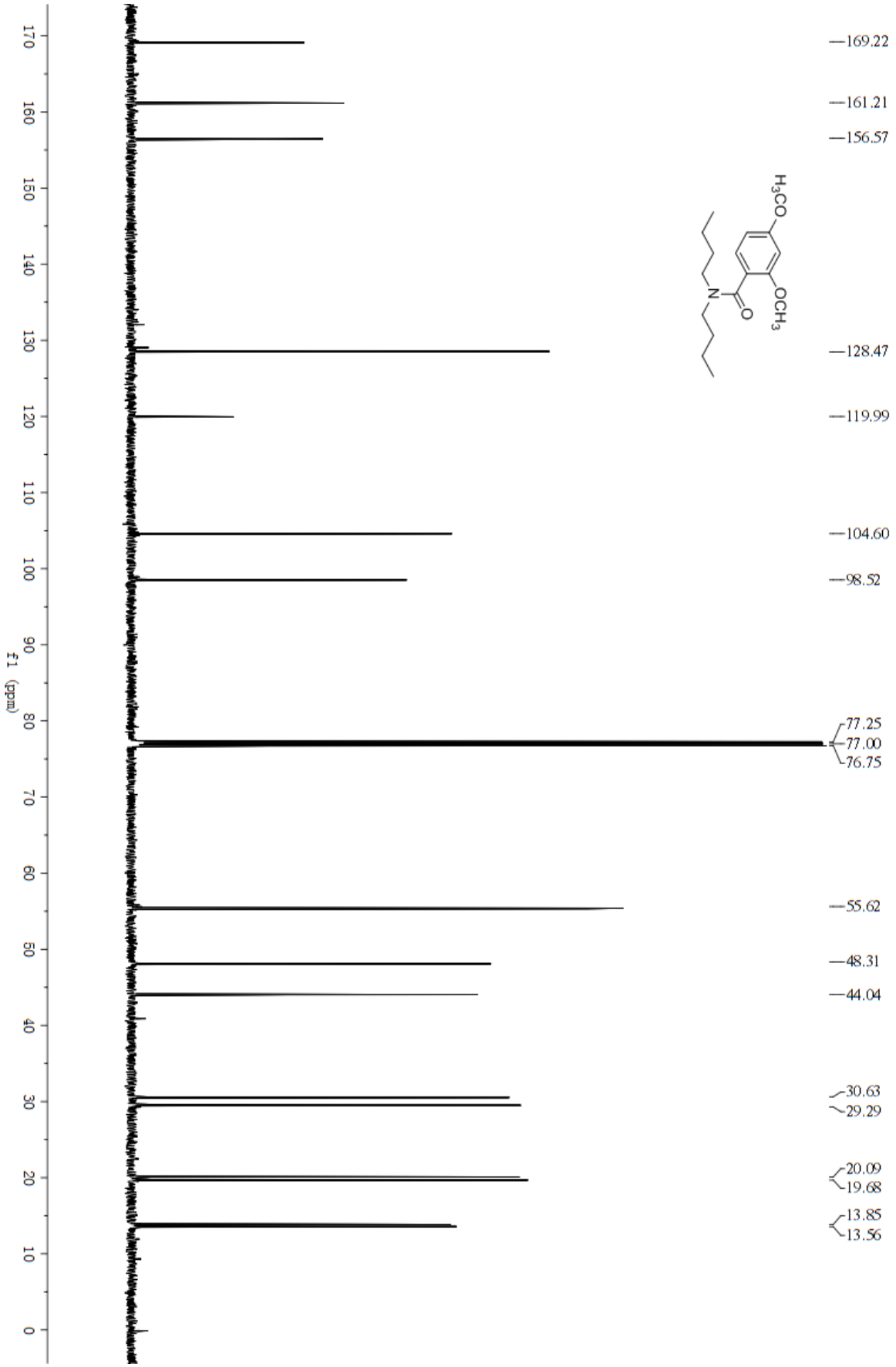
N,*N*-Dibutyl-2-methylbenzamide **3f**



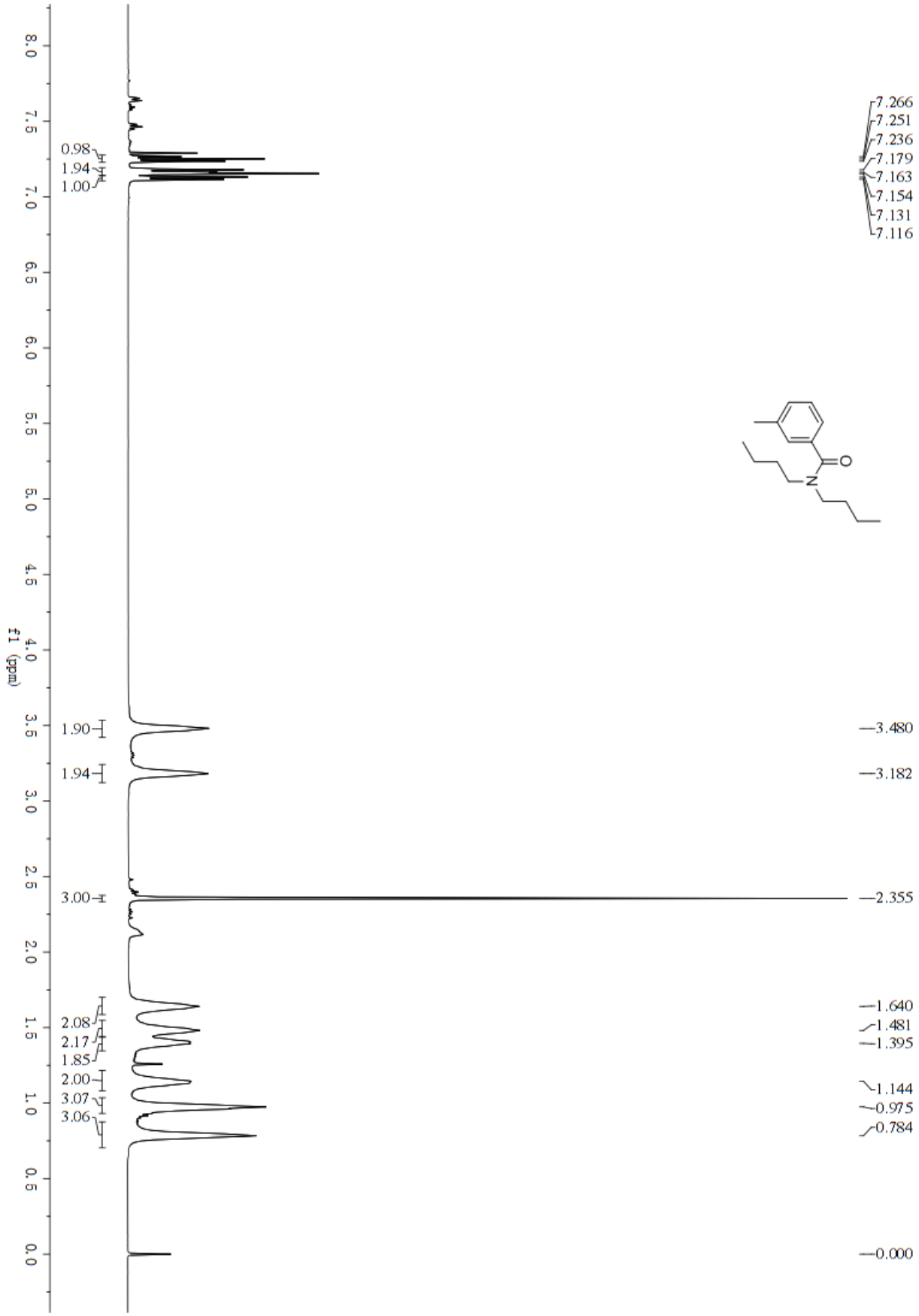
N,N-dibutyl-2,4-dimethoxybenzamide **3g**



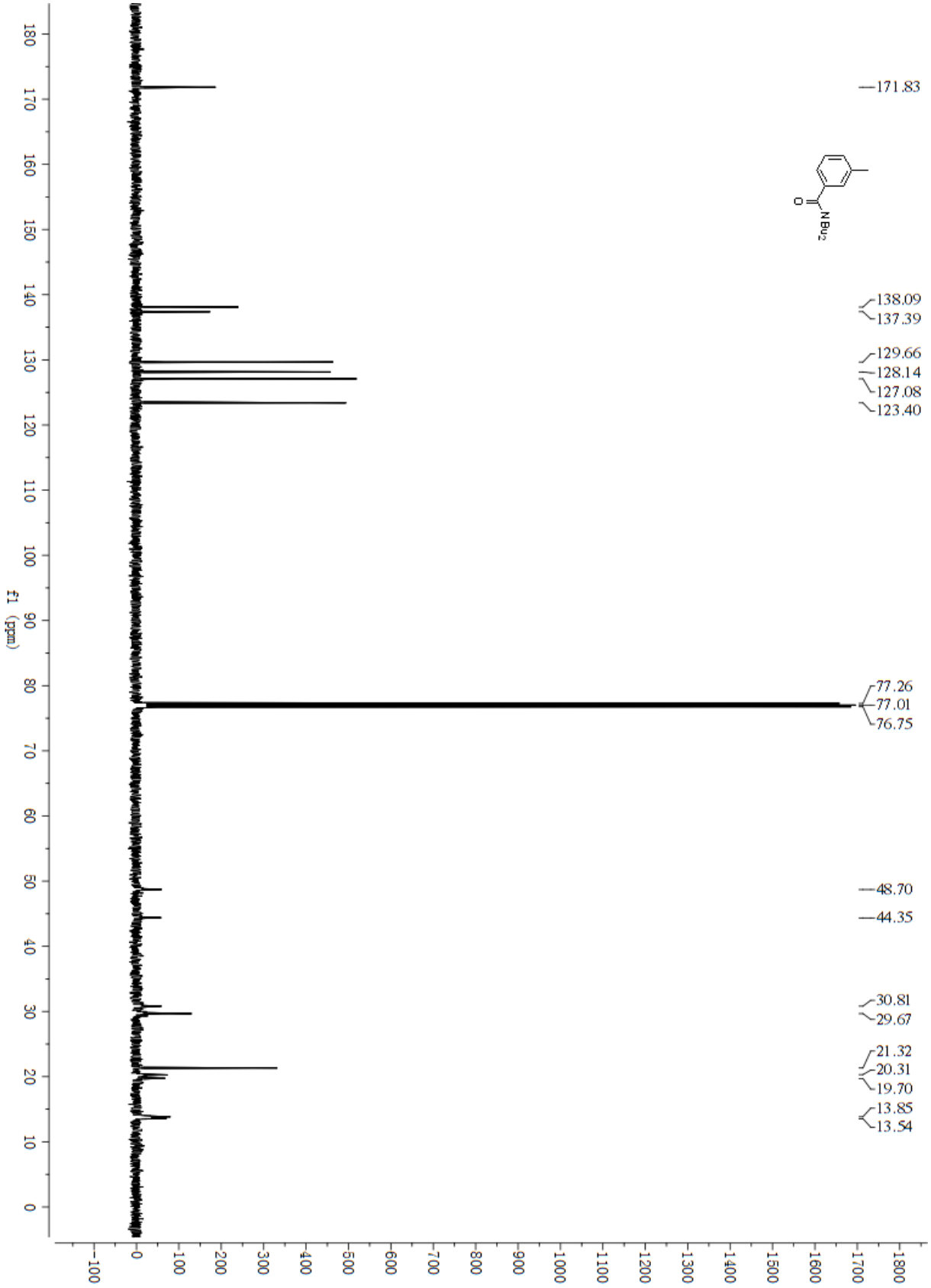
N,N-dibutyl-2,4-dimethoxybenzamide **3g**



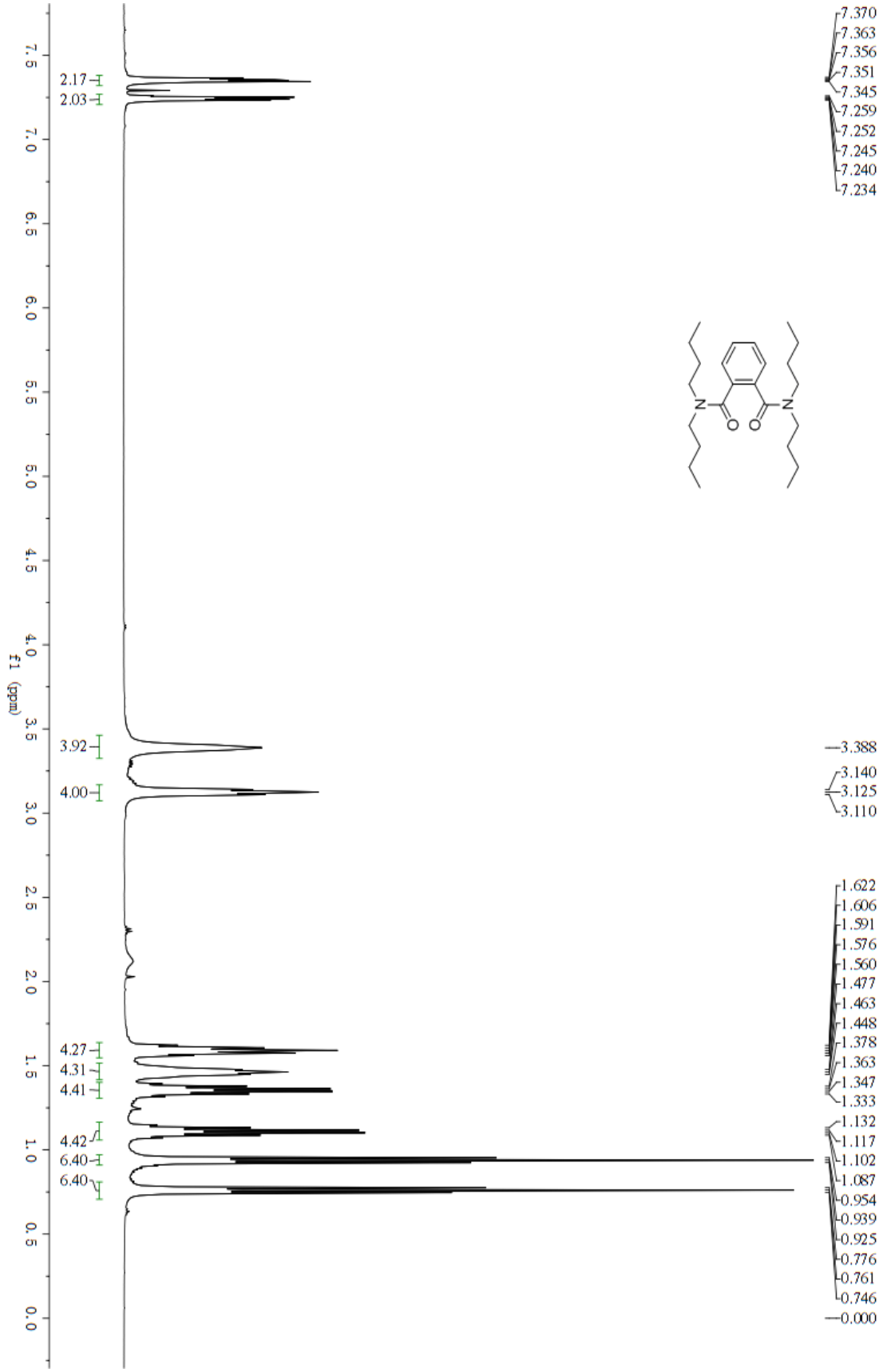
N,*N*-Dibutyl-3-methylbenzamide **3h**



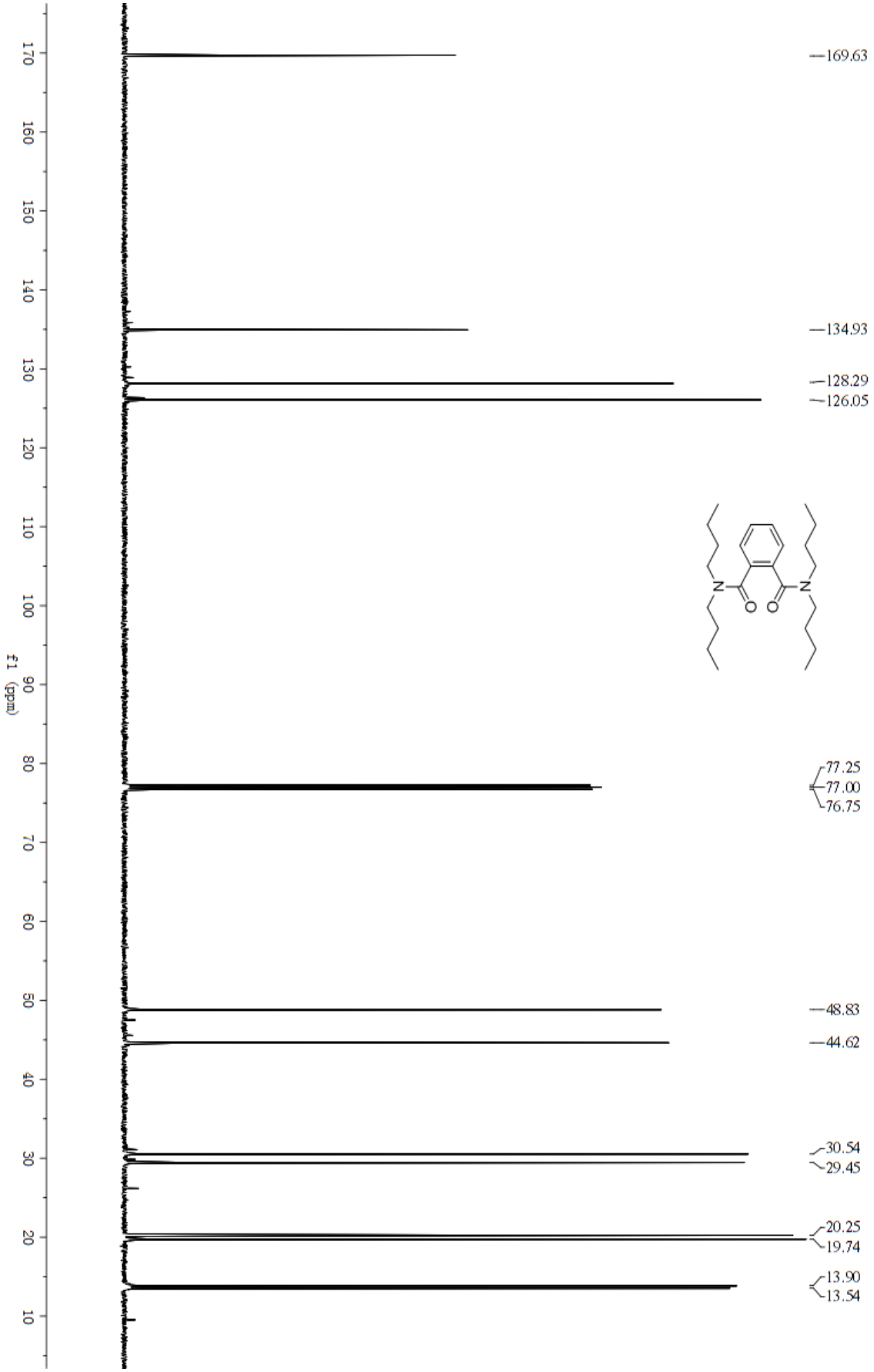
N,*N*-Dibutyl-3-methylbenzamide **3h**



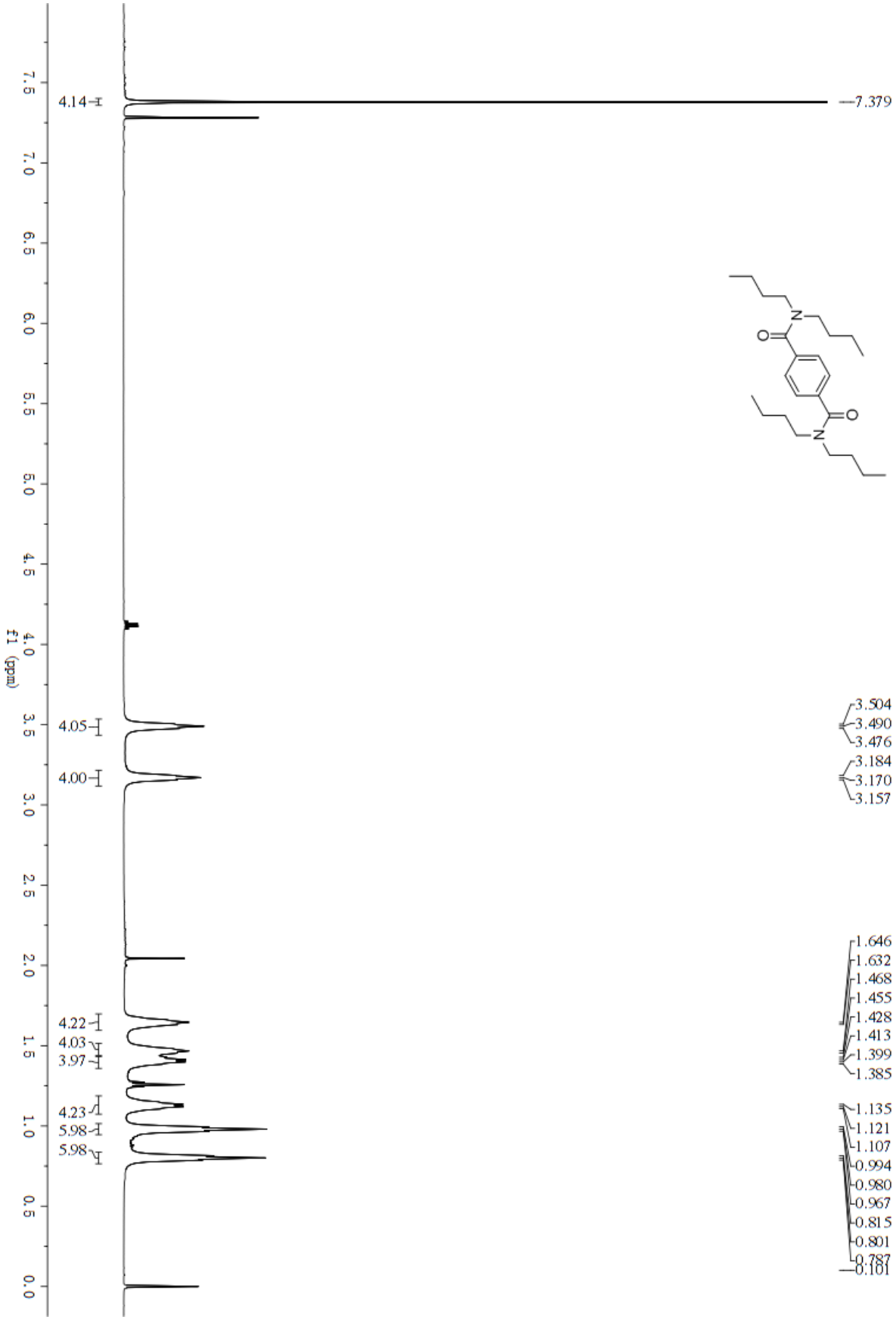
N^1,N^1,N^2,N^2-tetrabutylphthalamide **3i**



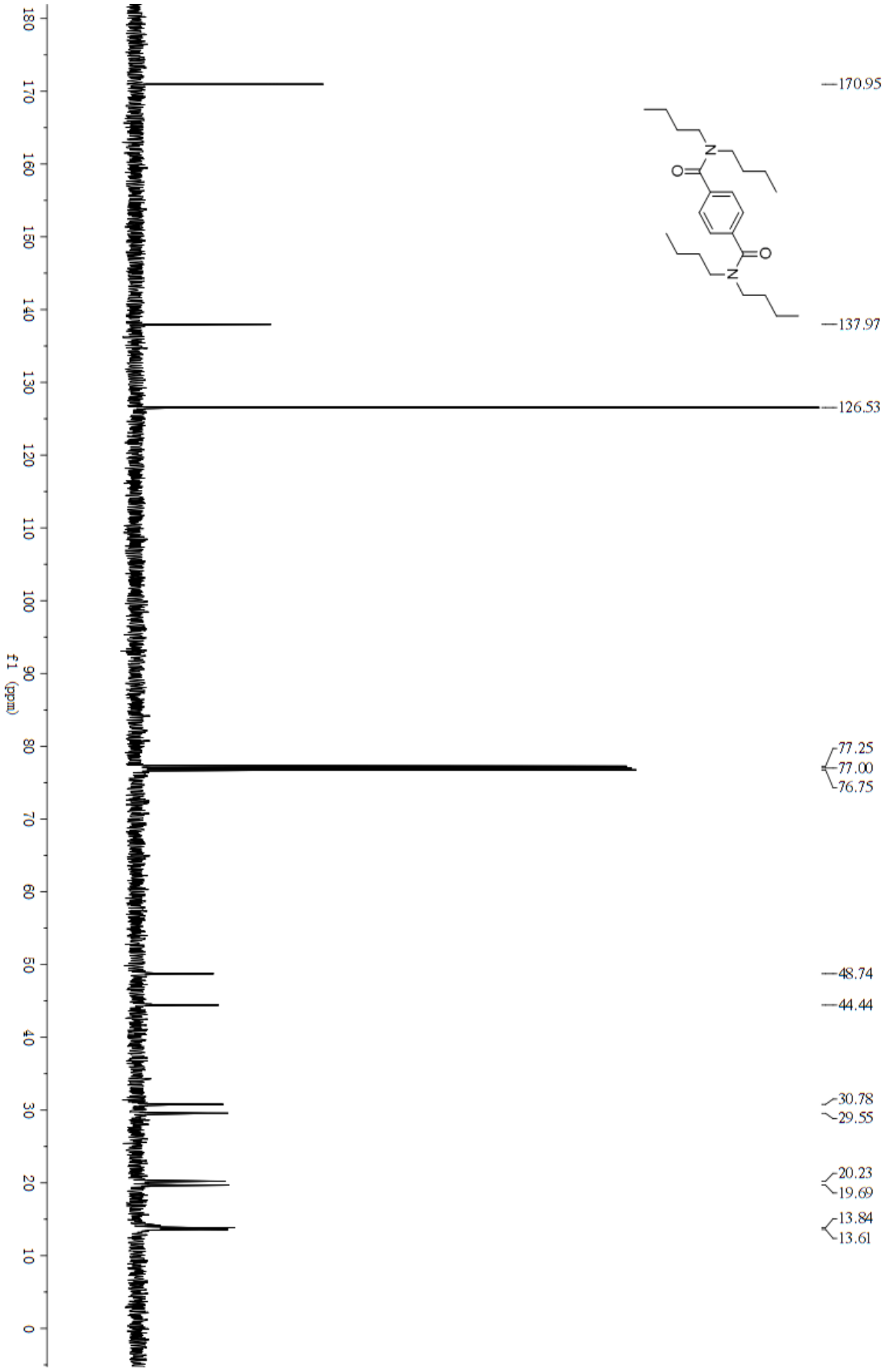
N^1,N^1,N^2,N^2-tetrabutylphthalamide **3i**



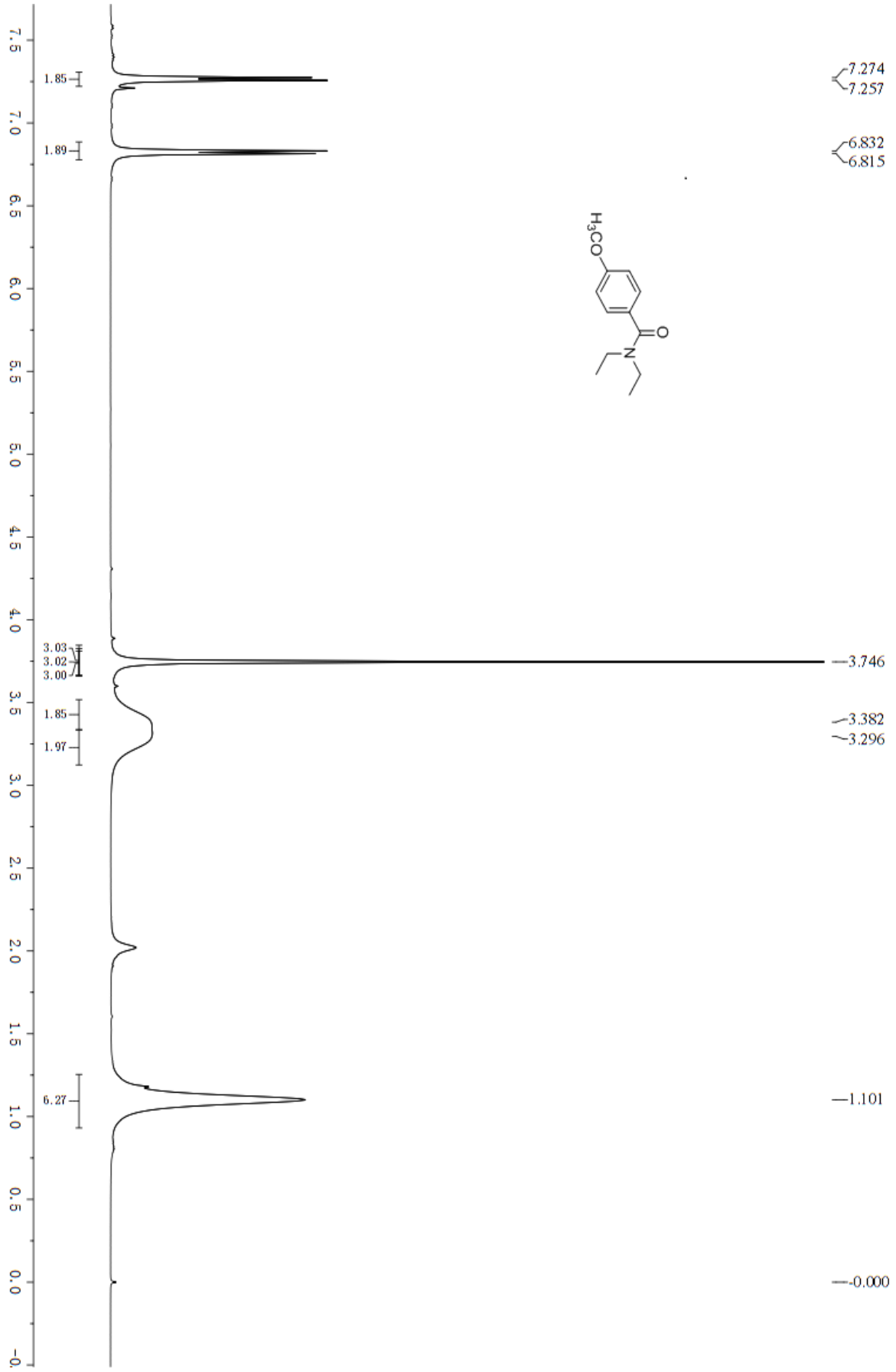
N^1,N^1,N^4,N^4-tetrabutylterephthalamide **3j**



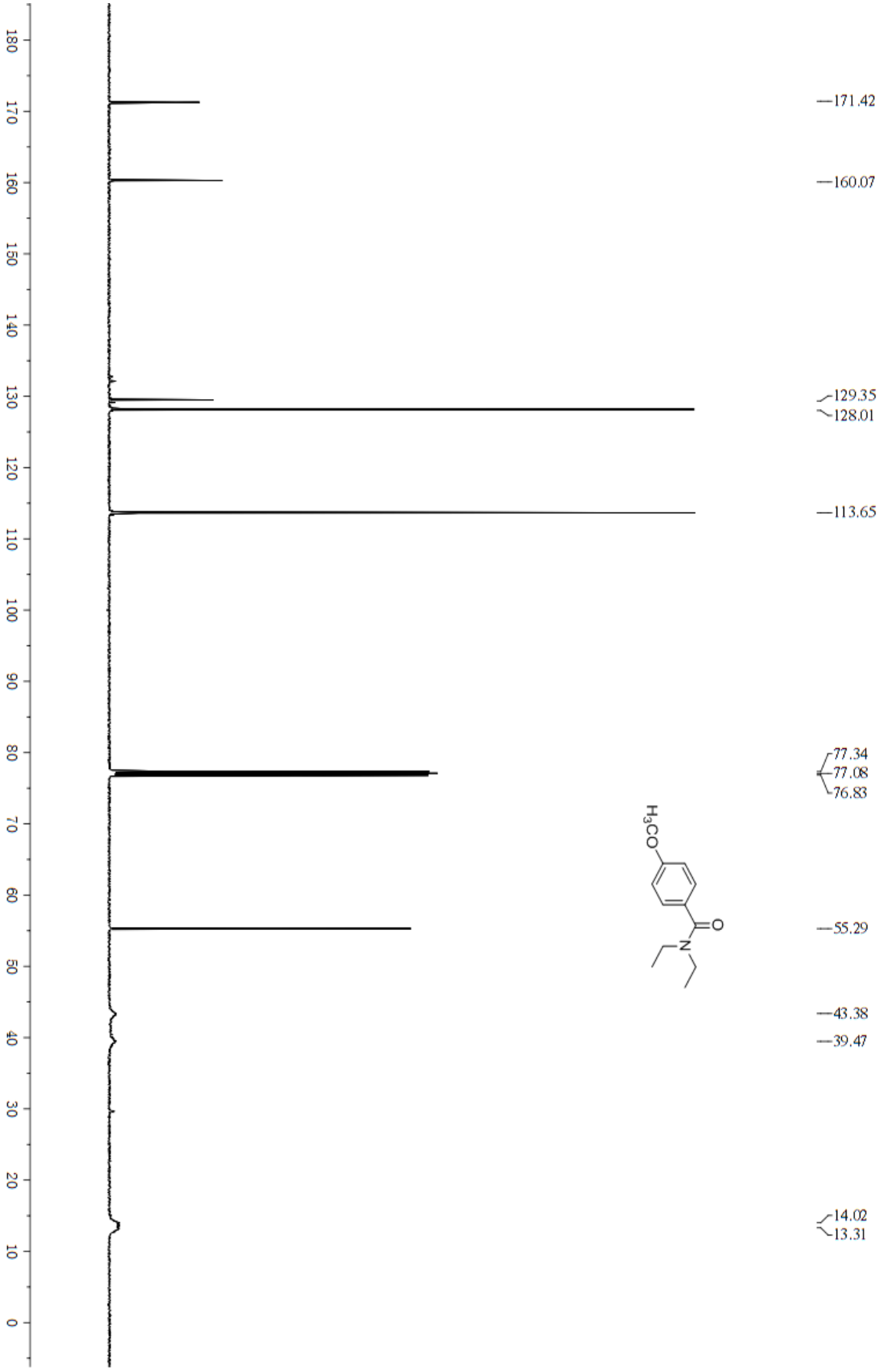
N^1,N^1,N^4,N^4-tetrabutylterephthalamide **3j**



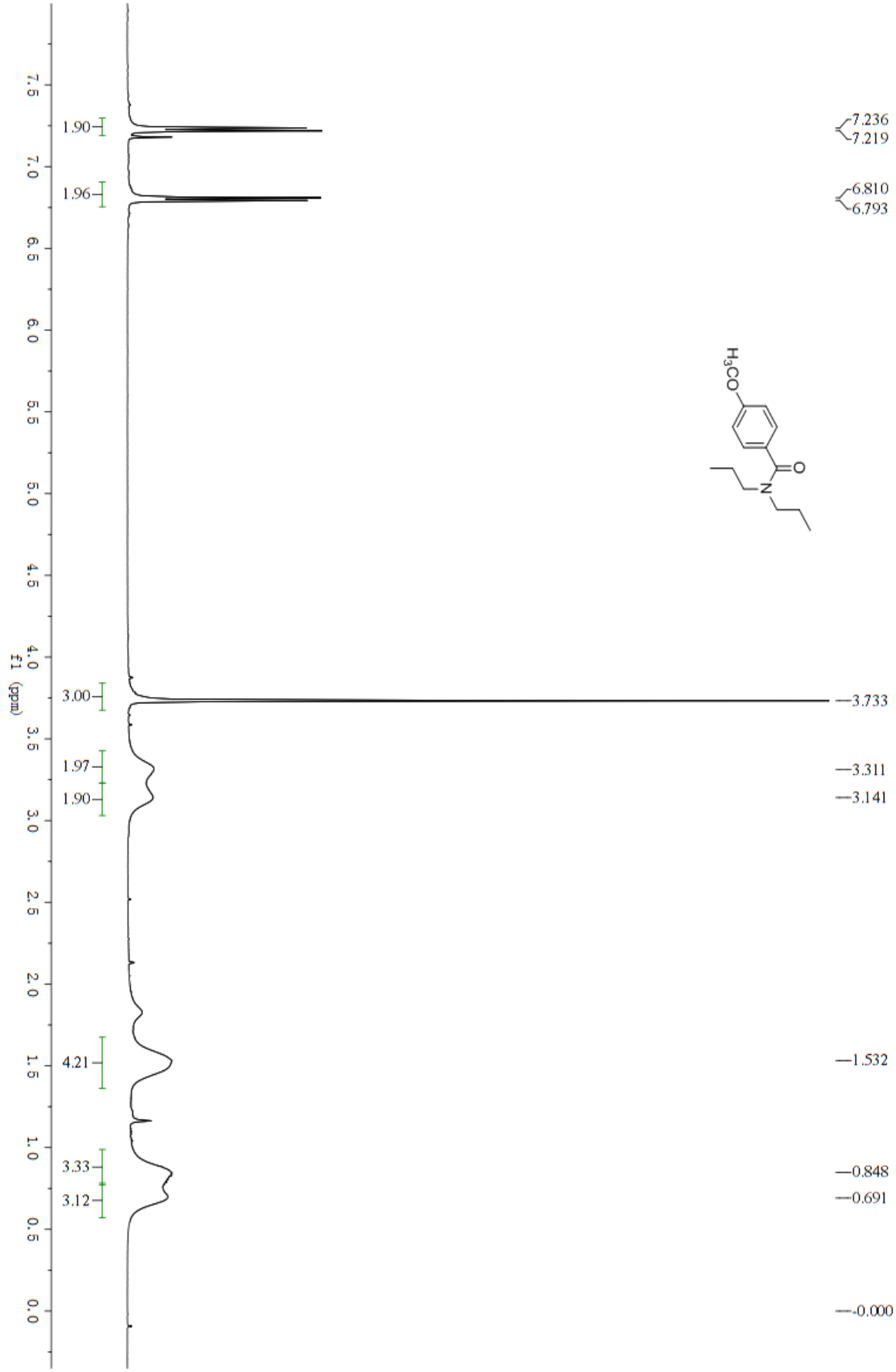
N,*N*-Diethyl-4-methoxybenzamide **3k**



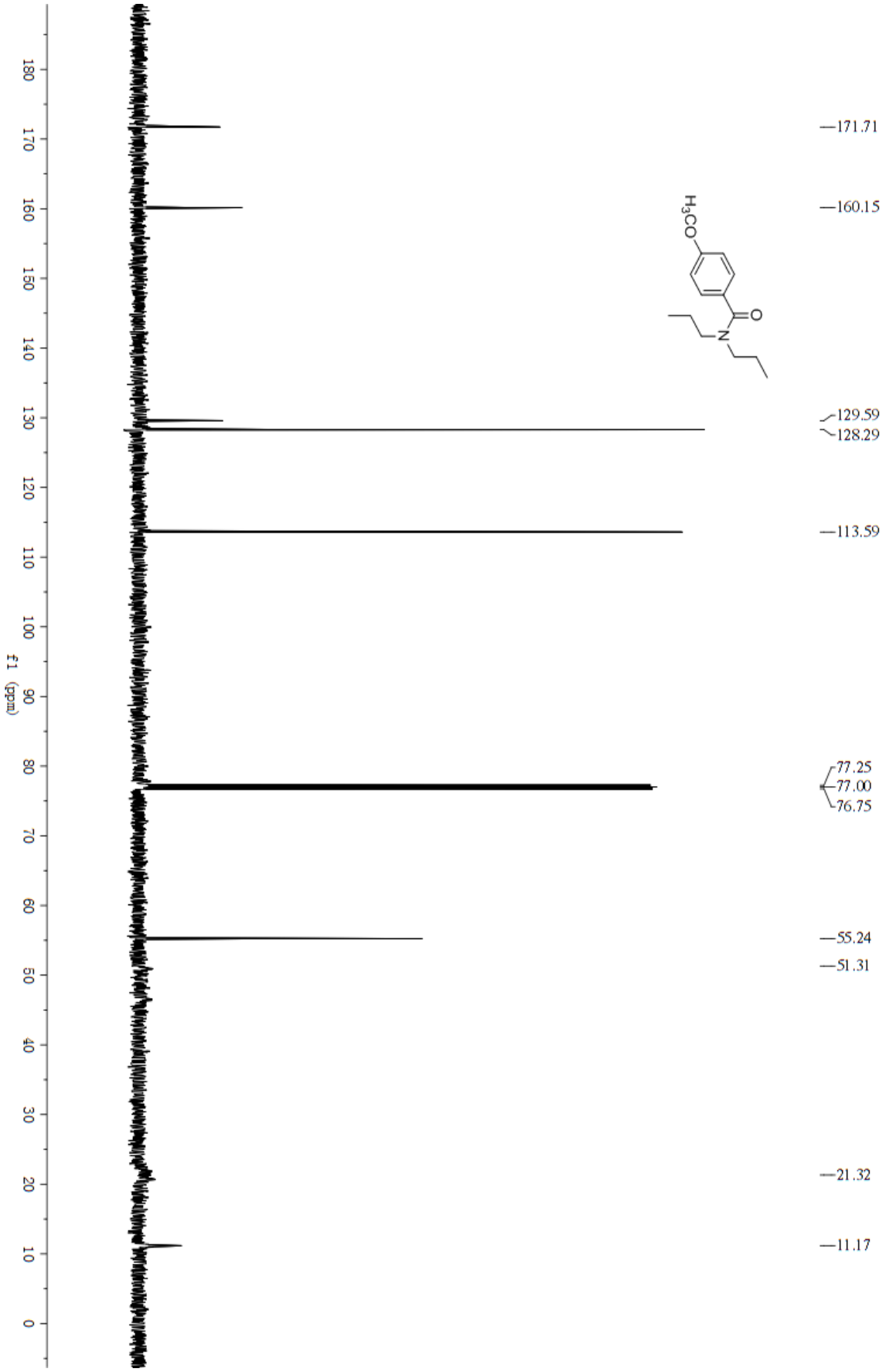
N,*N*-Diethyl-4-methoxybenzamide **3k**



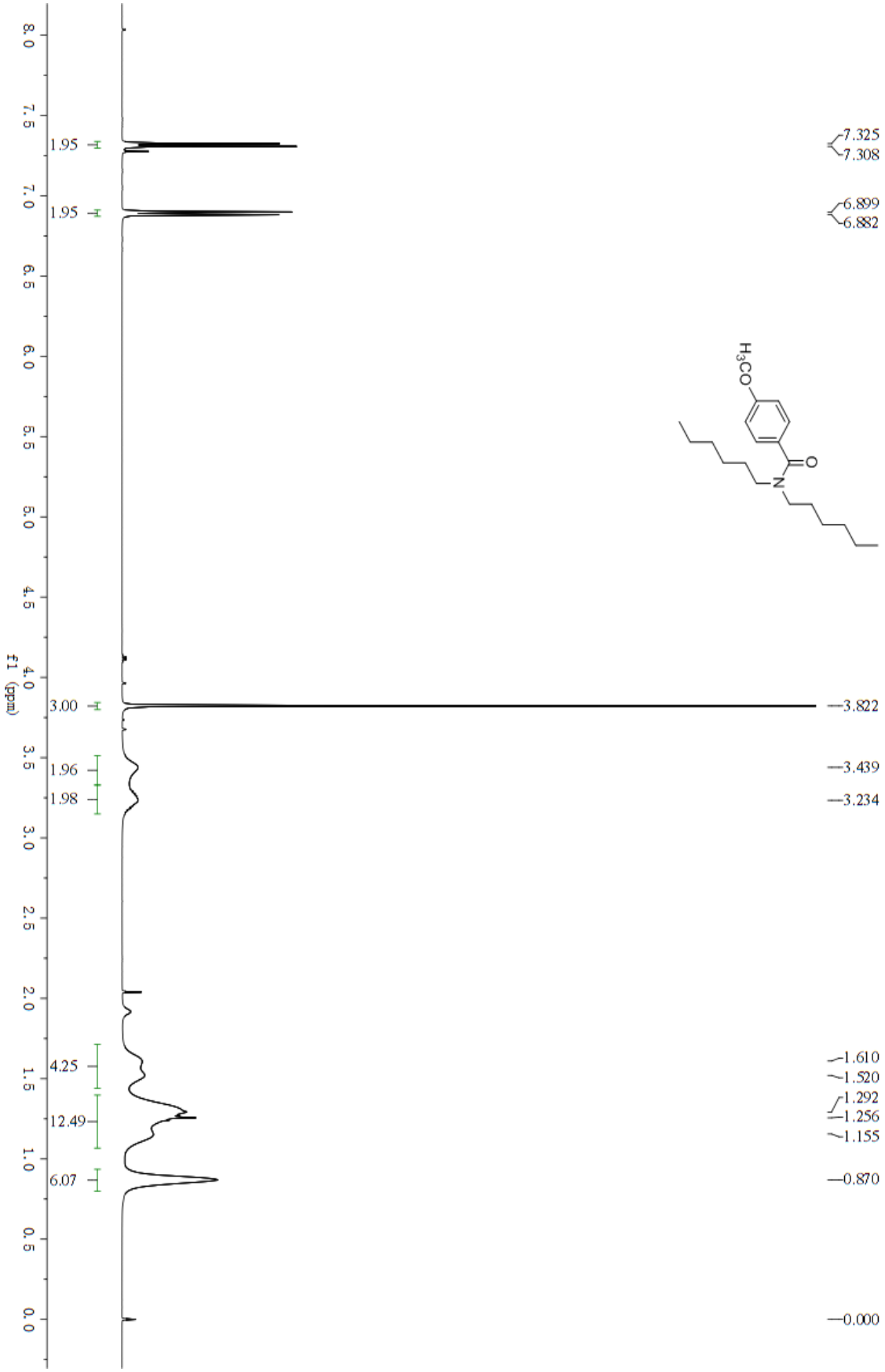
N,*N*-Dipropyl-4-methoxybenzamide **3l**



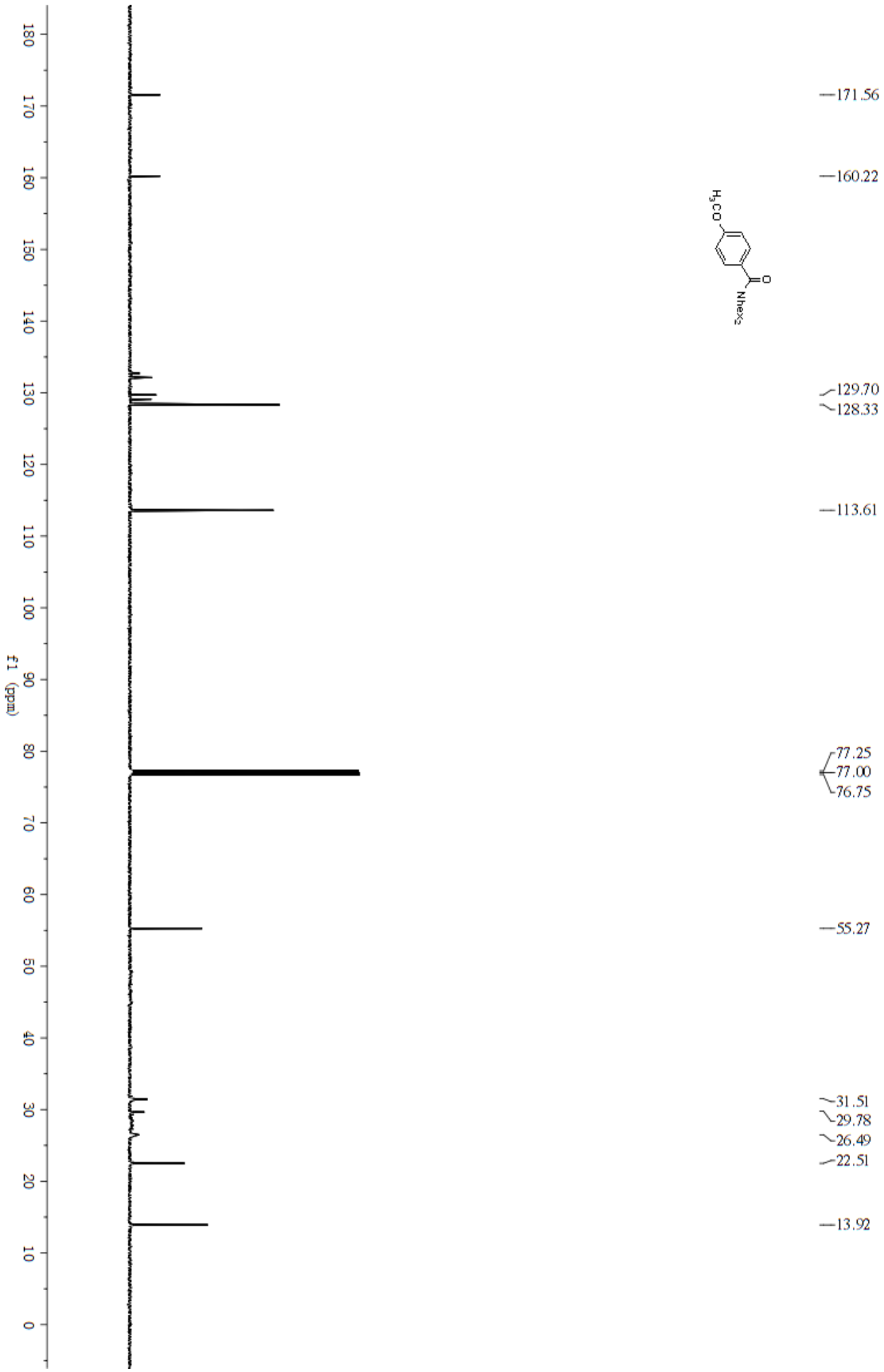
N,*N*-Dipropyl-4-methoxybenzamide **3l**



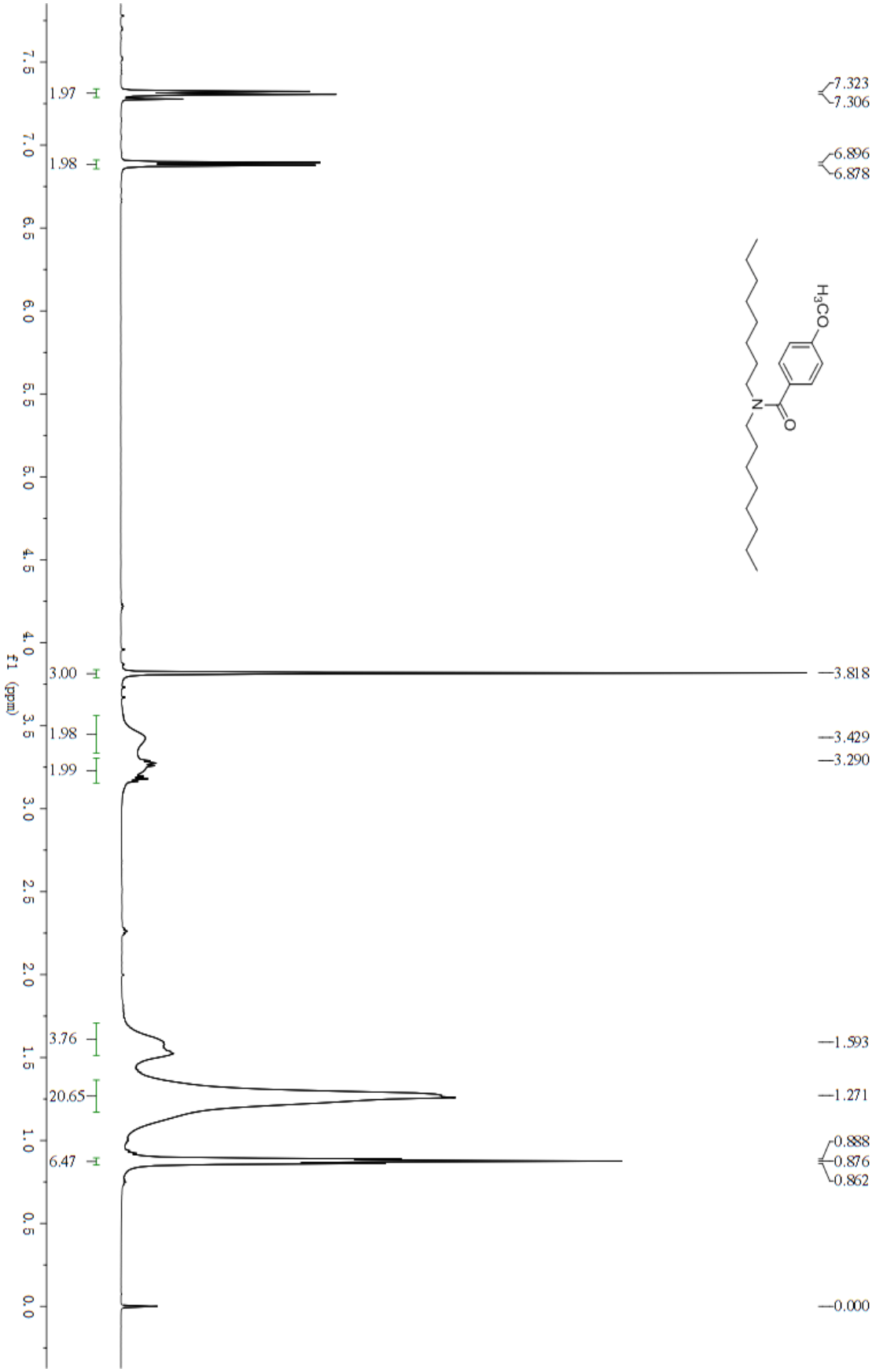
N,N-dihexyl-4-methoxybenzamide **3m**



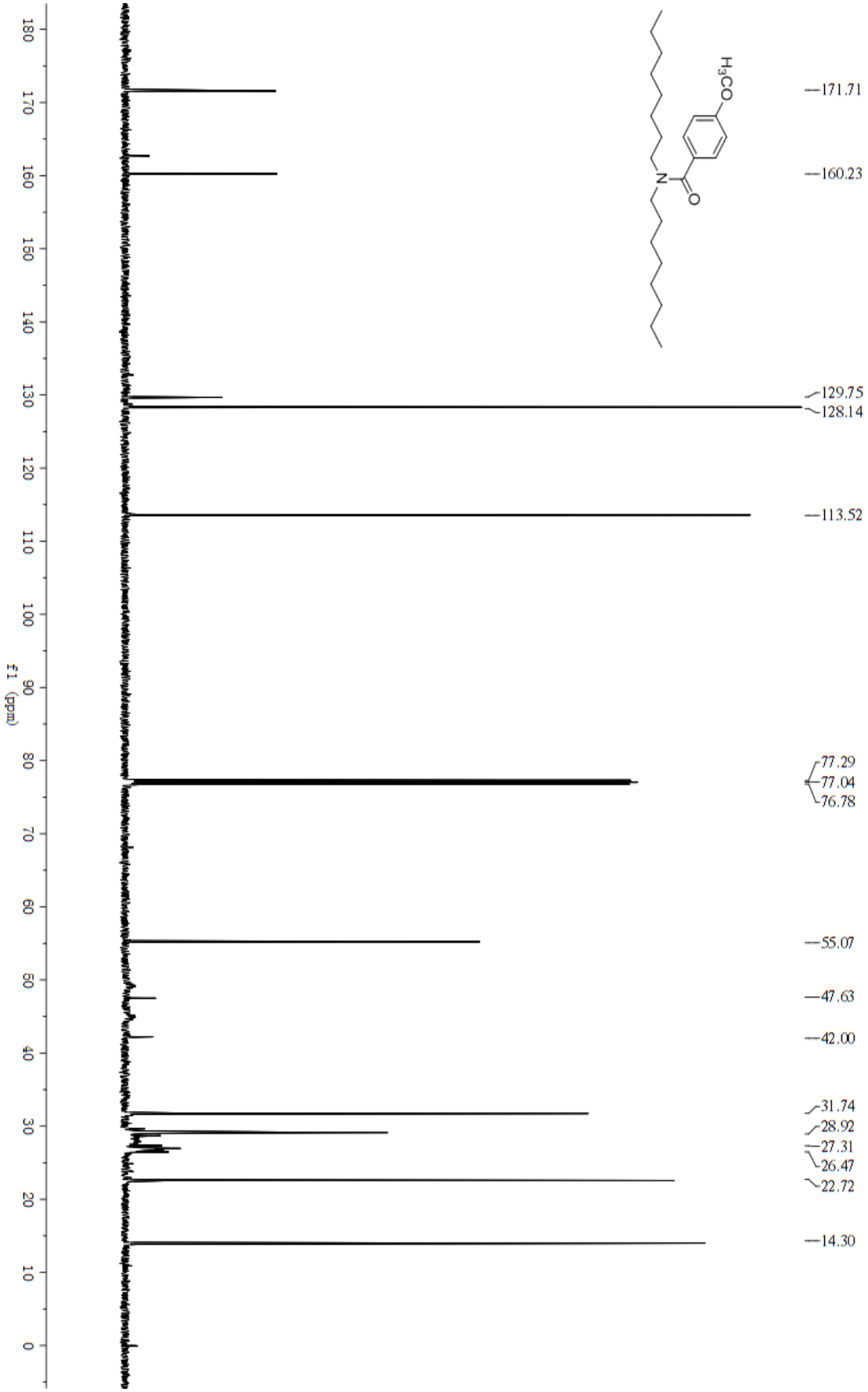
N,N-dihexyl-4-methoxybenzamide **3m**



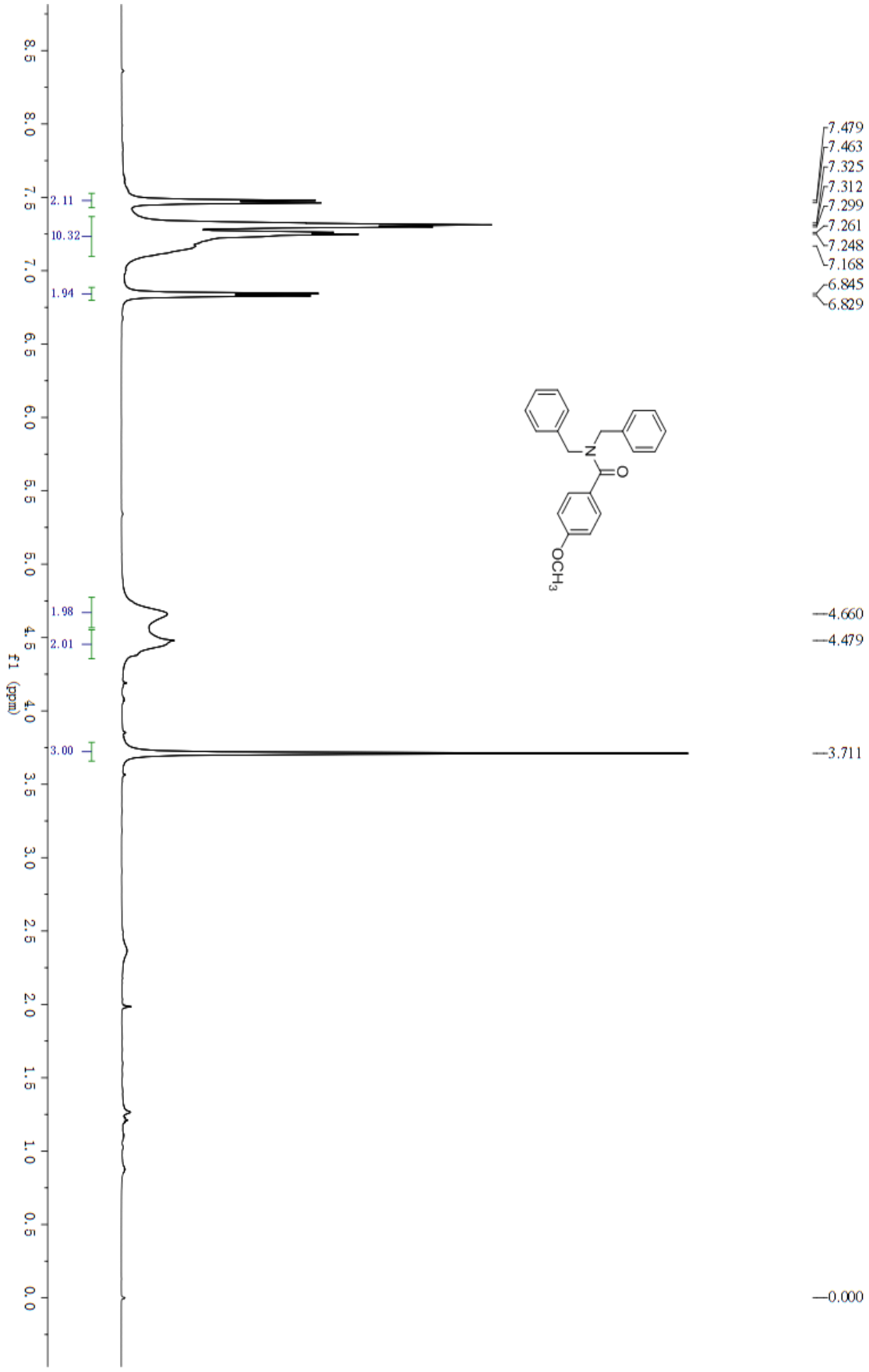
4-methoxy-N,N-dioctylbenzamide **3n**



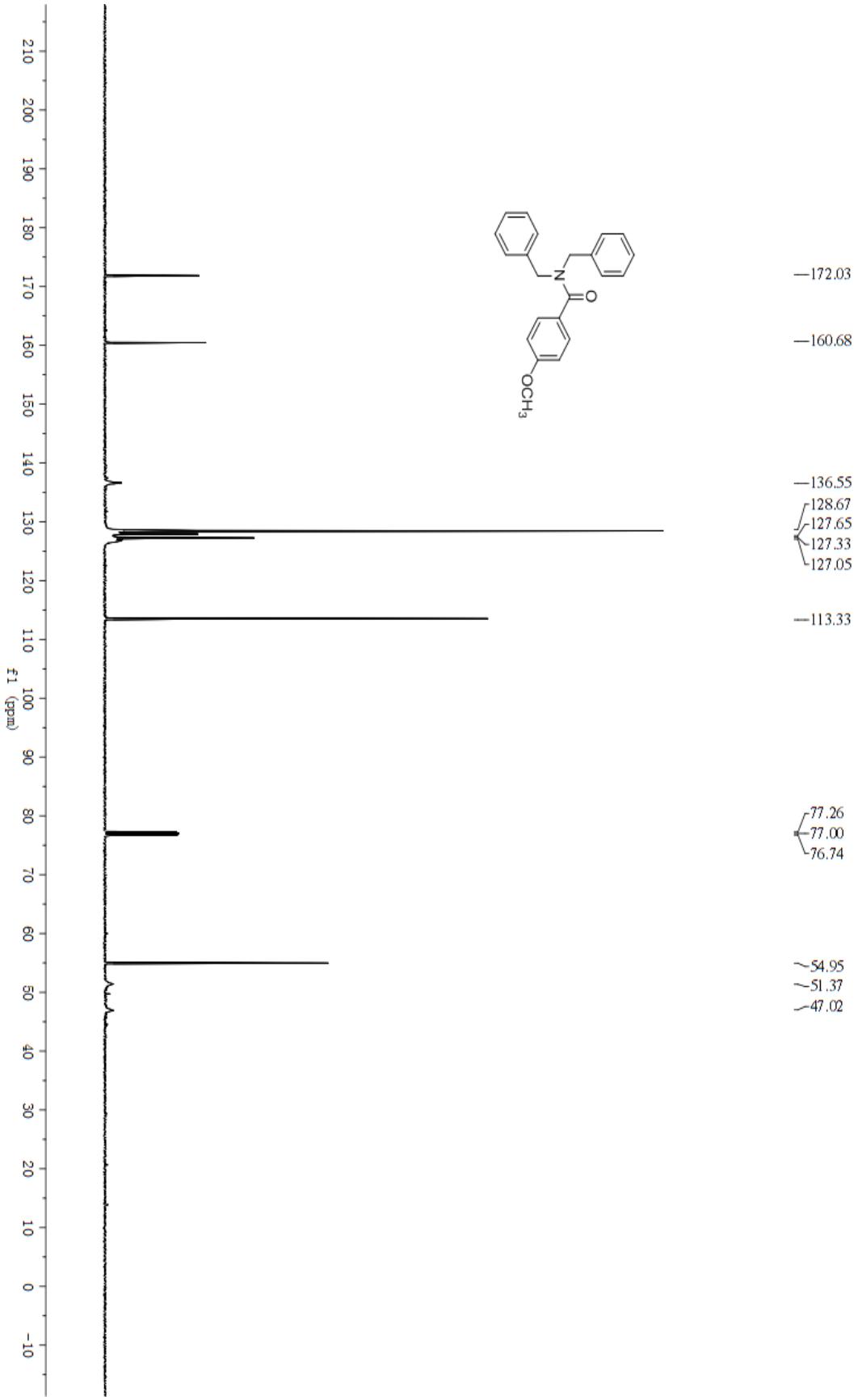
4-methoxy-N,N-dioctylbenzamide **3n**



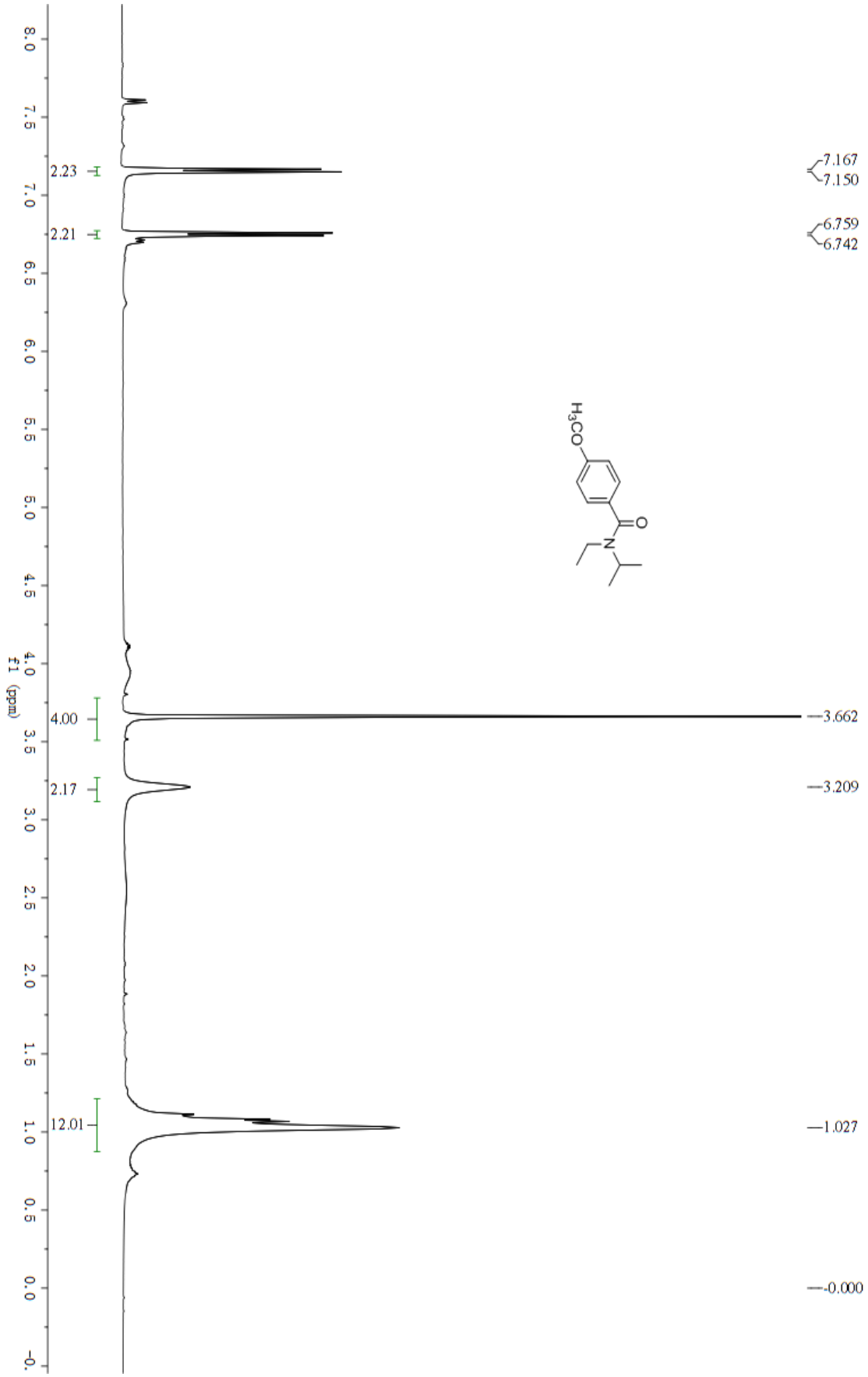
N,*N*-Dibenzyl-4-methoxybenzamide **3o**



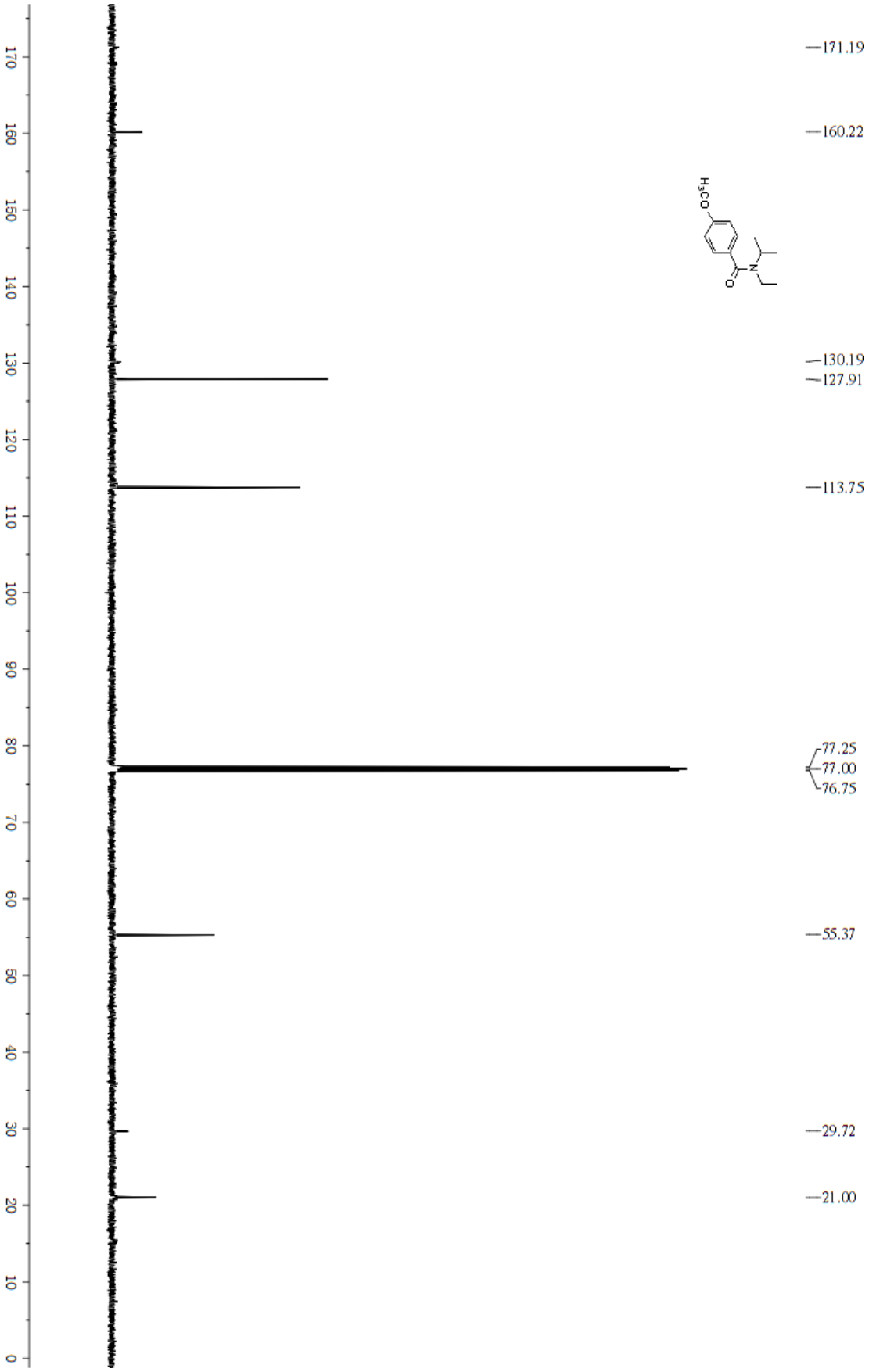
N,*N*-Dibenzyl-4-methoxybenzamide **3o**



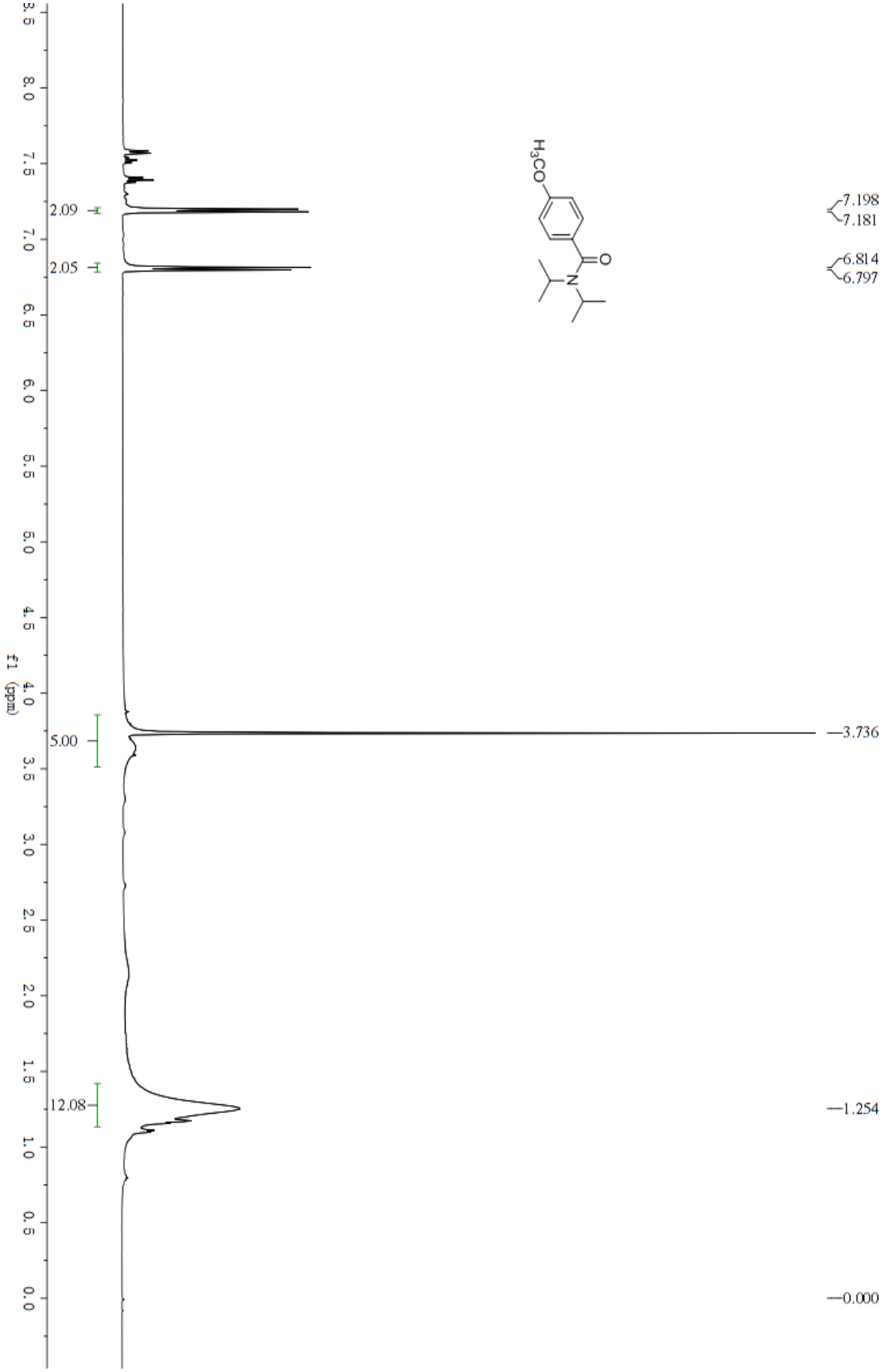
N-ethyl-N-isopropyl -4-methoxybenzamide **3p**



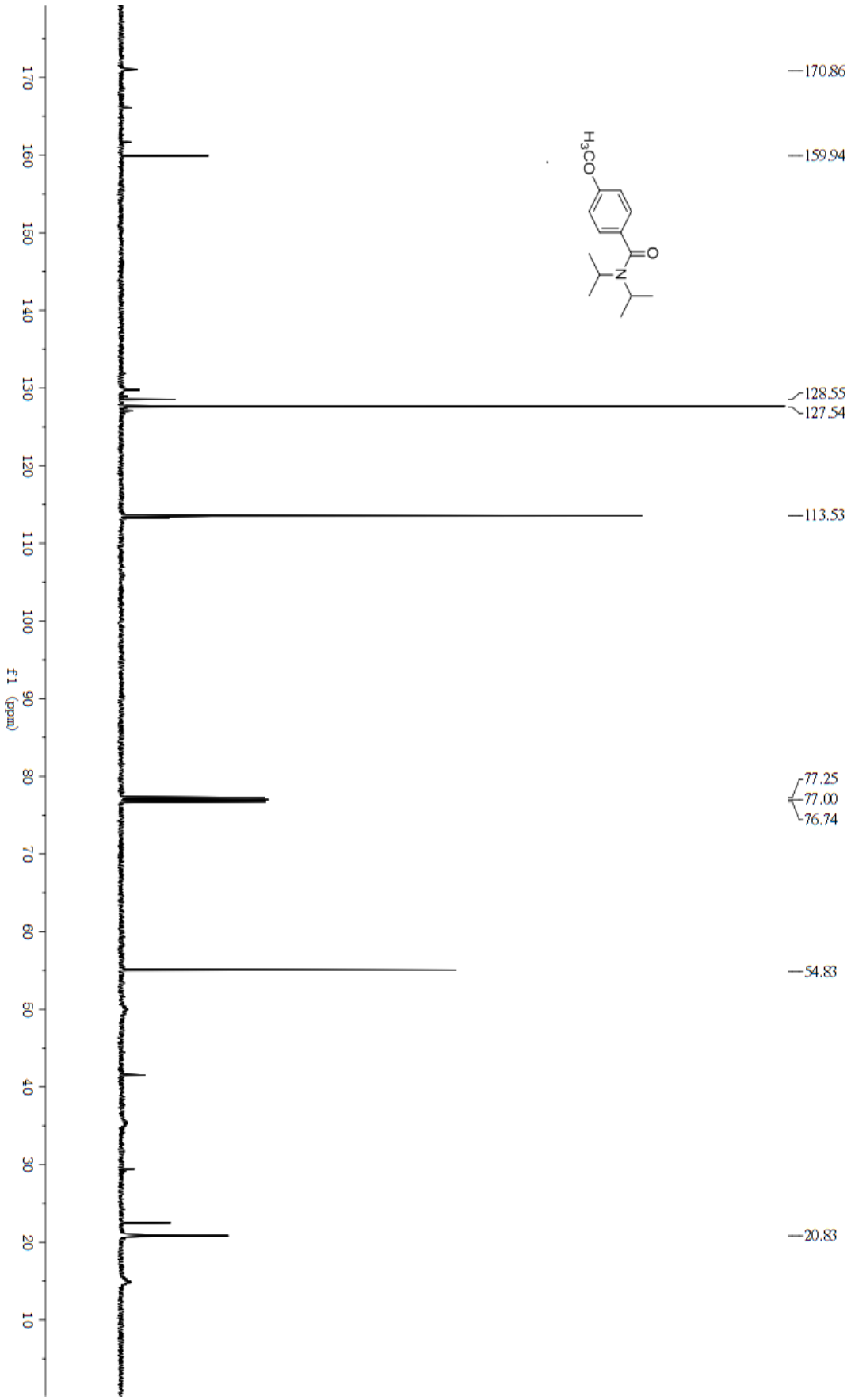
N-ethyl-N-isopropyl -4-methoxybenzamide **3p**



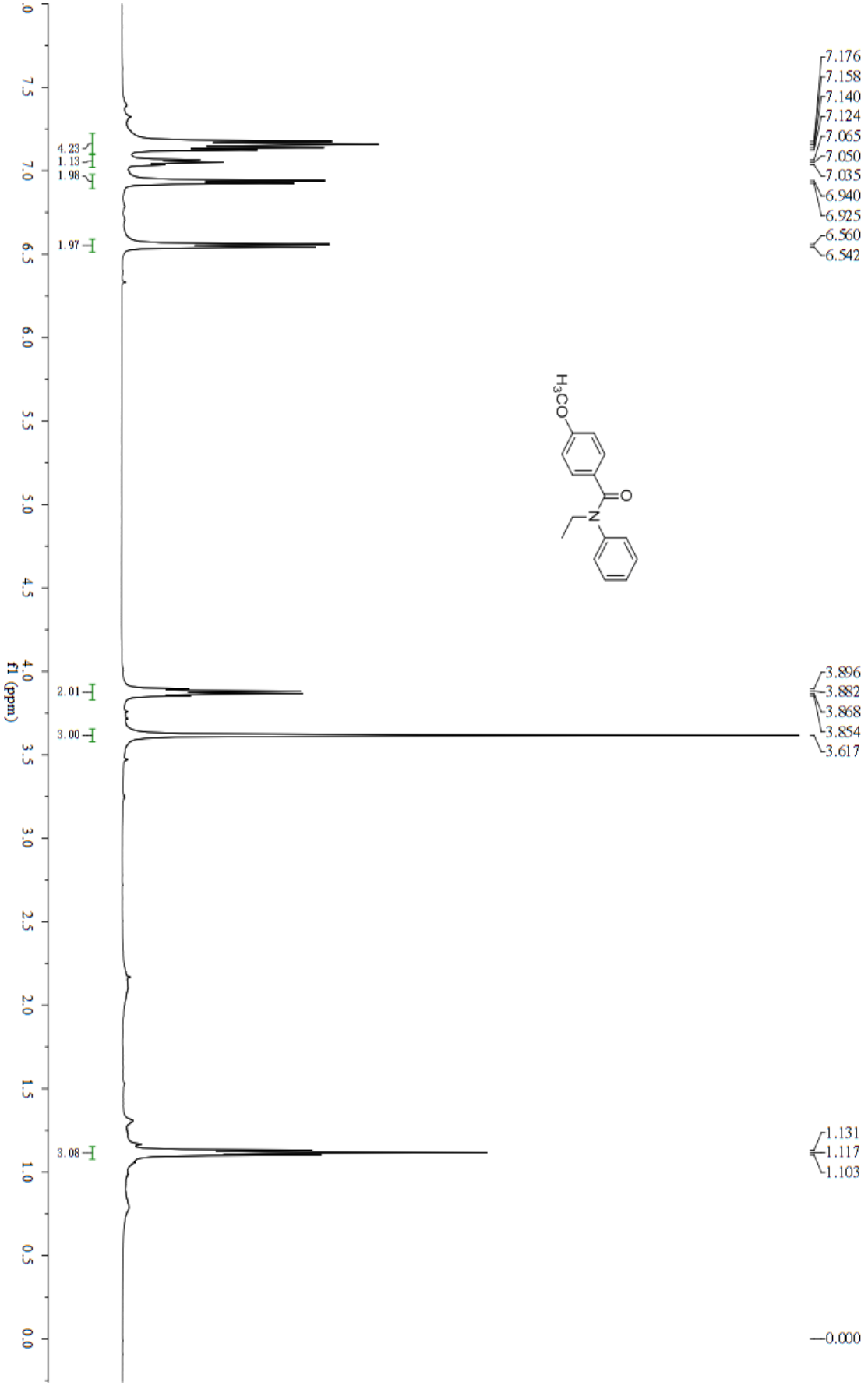
N,N-diisopropyl-4-methoxybenzamide **3q**



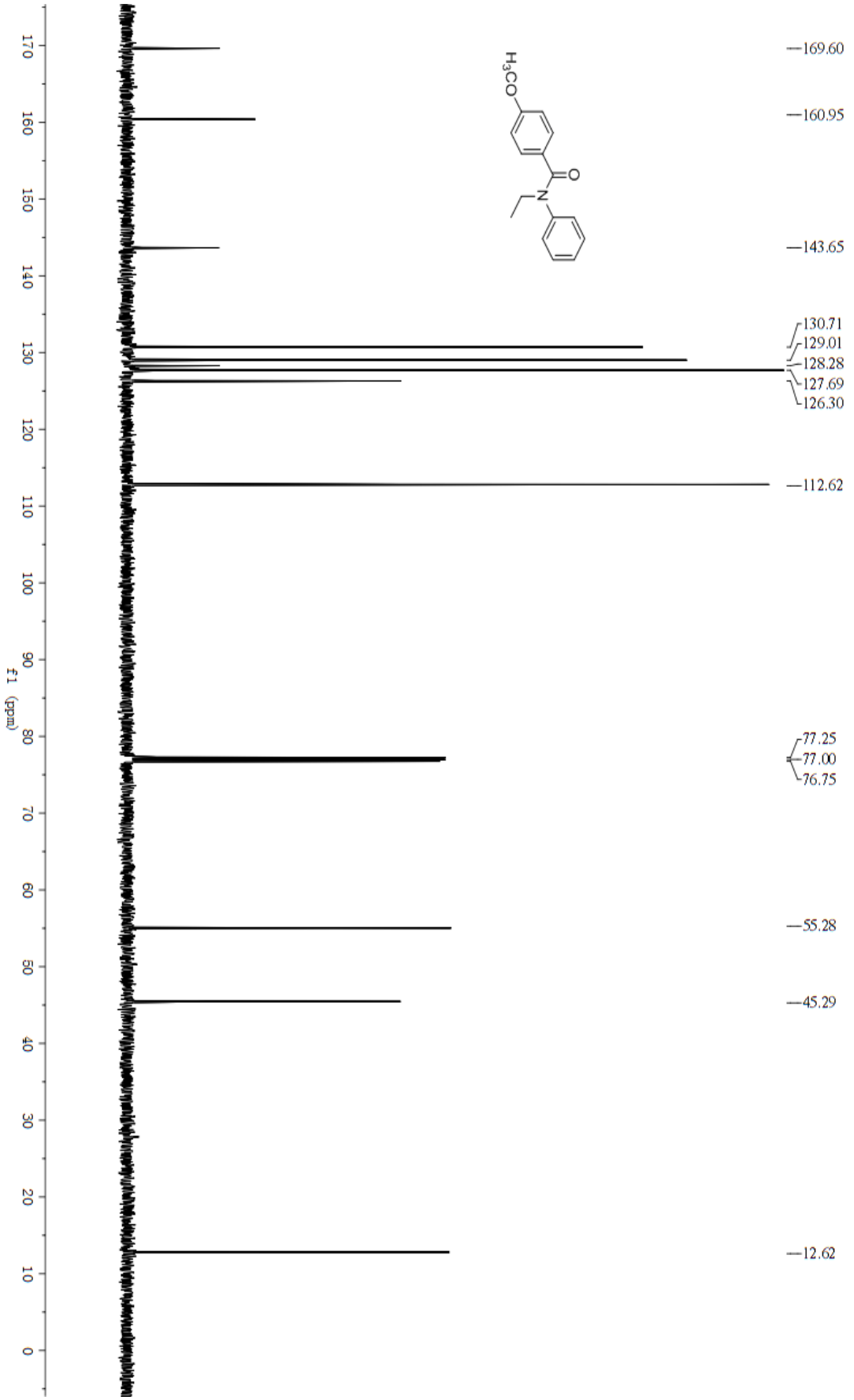
N,N-diisopropyl-4-methoxybenzamide **3q**



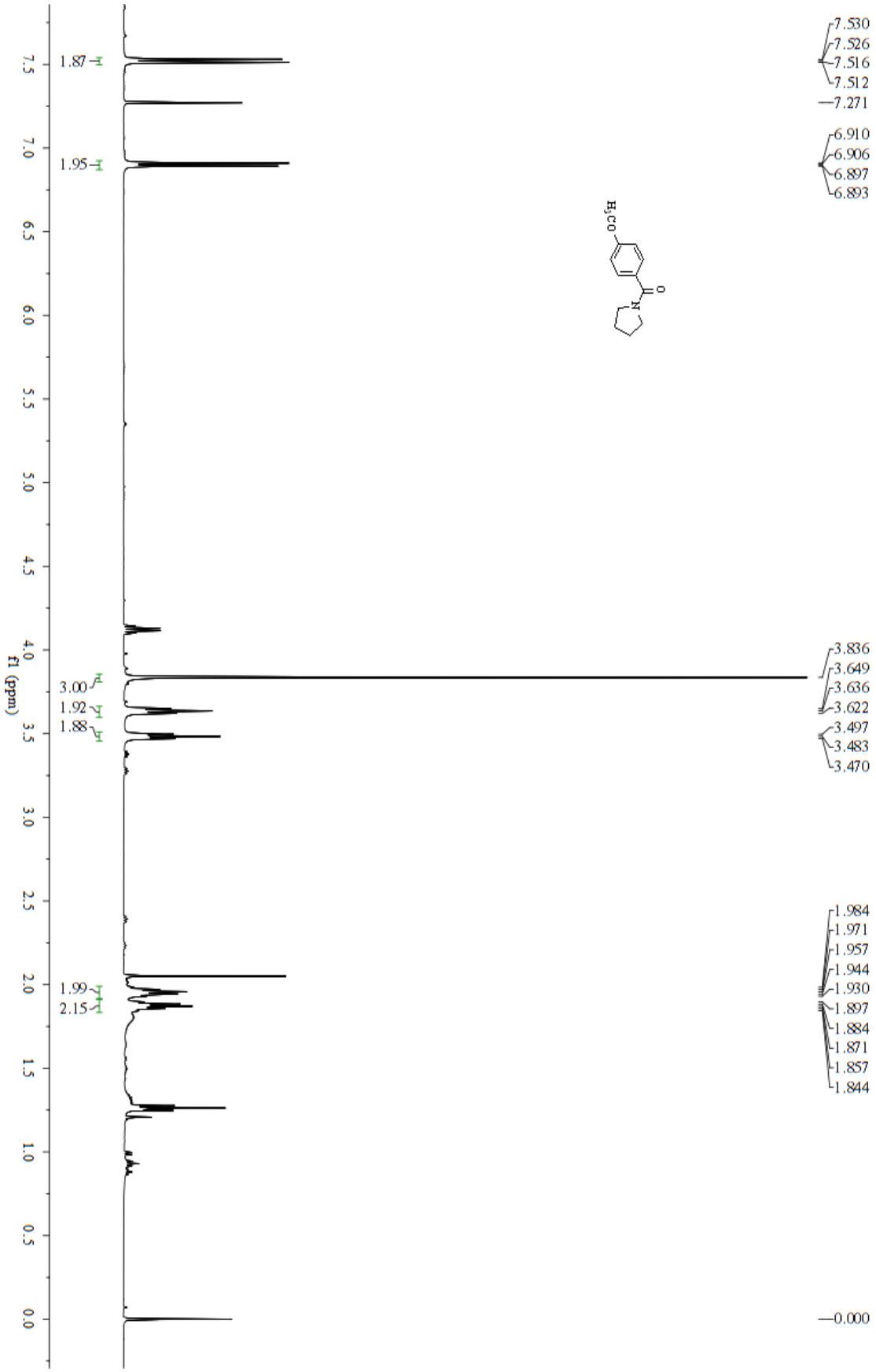
N-ethyl-N-phenyl -4-methoxybenzamide **3r**



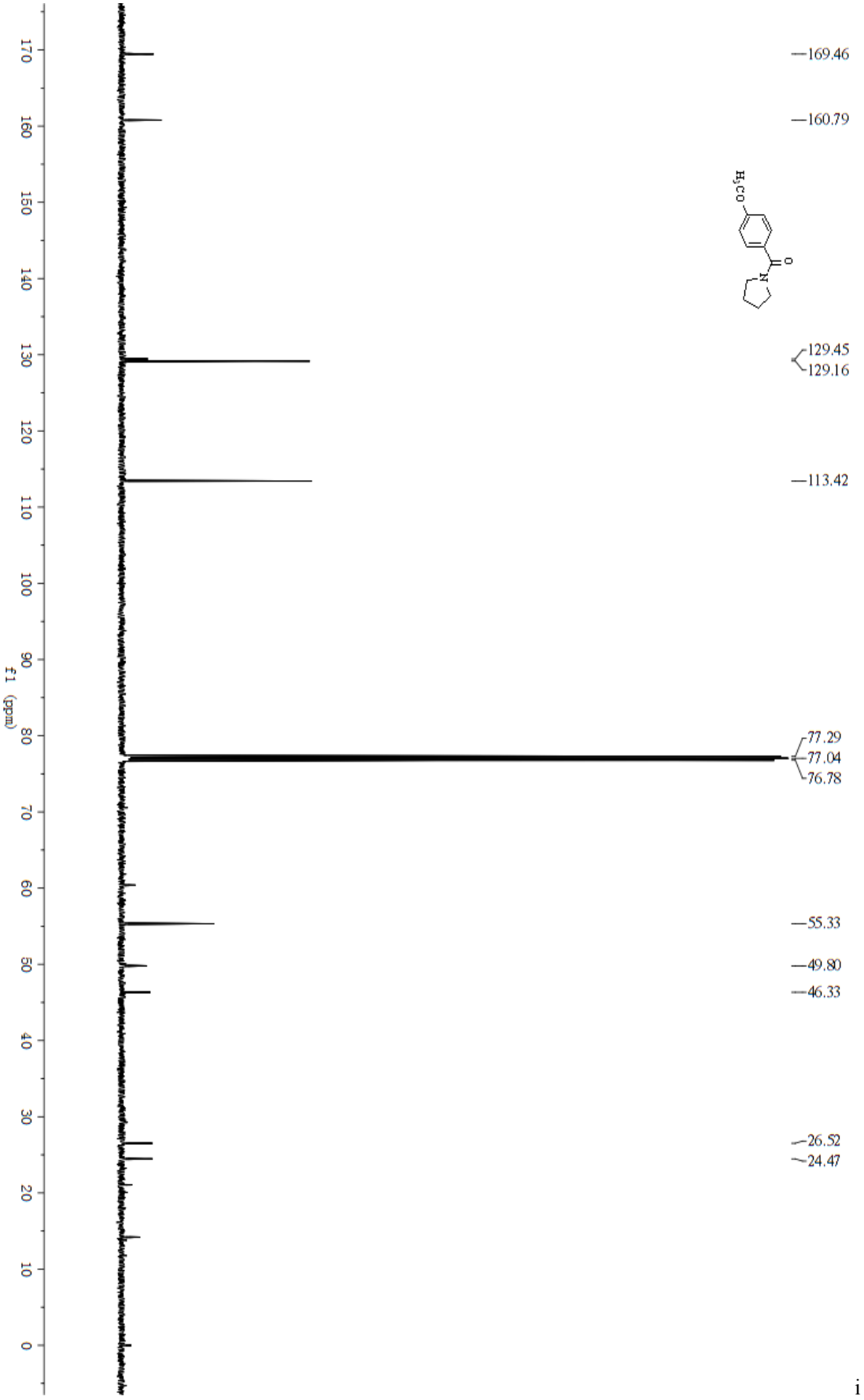
N-ethyl-N-phenyl -4-methoxybenzamide **3r**



(4-methoxyphenyl)(pyrrolidin-1-yl)methanone **3s**

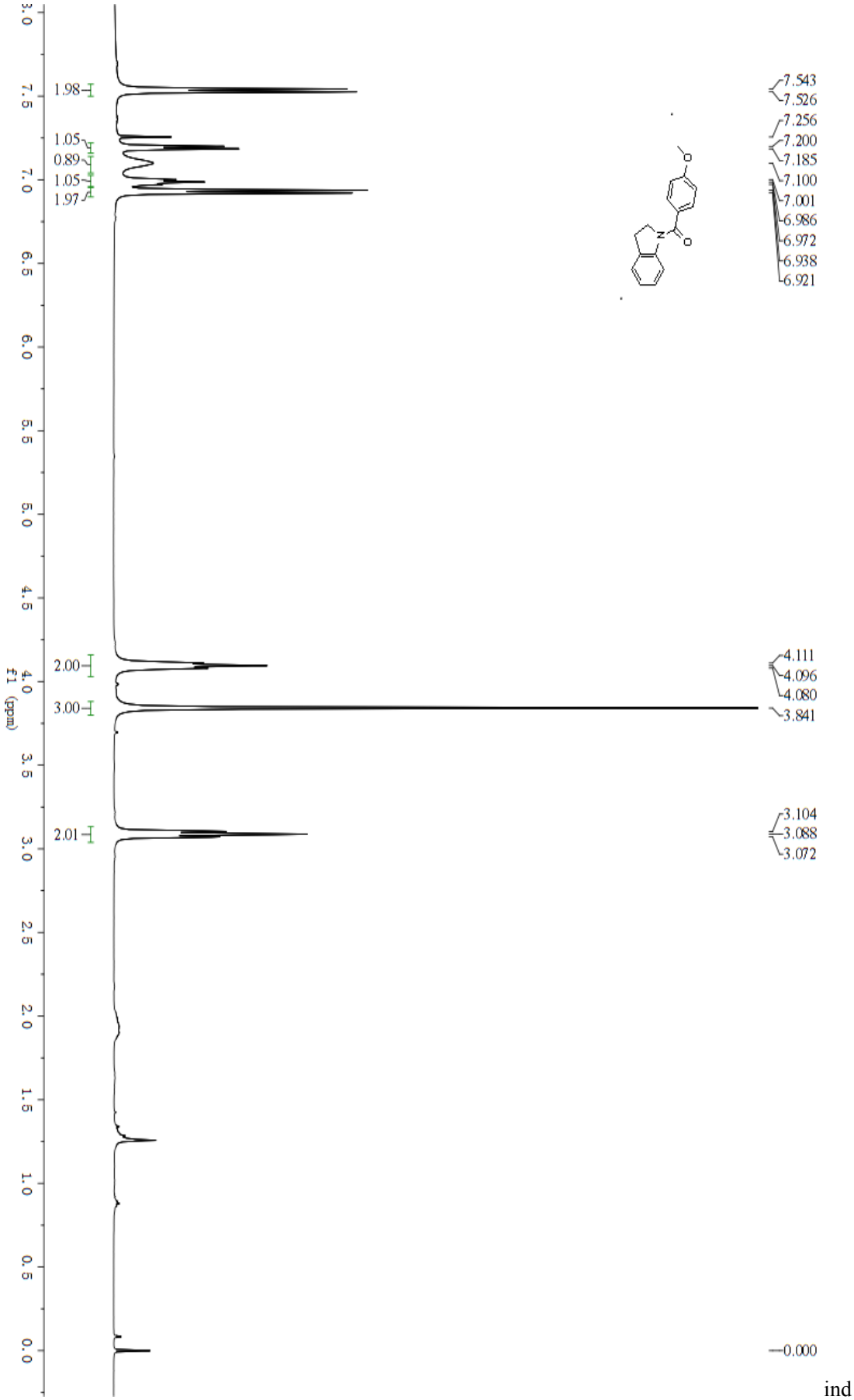


(4-methoxyphenyl)(pyrrolidin-1-yl)methanone **3s**



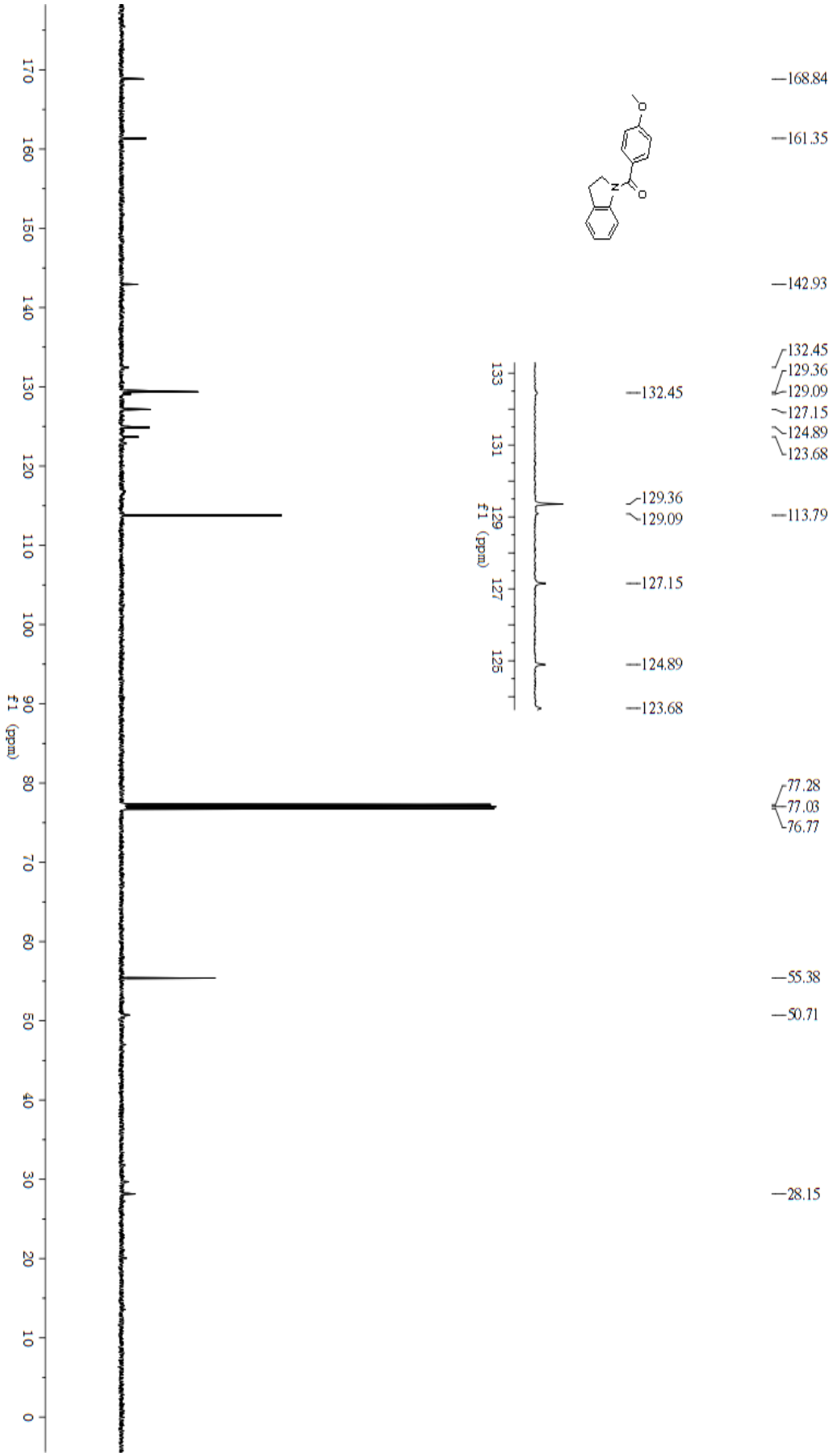
i

ndolin-1-yl(4-methoxyphenyl)methanone **3t**

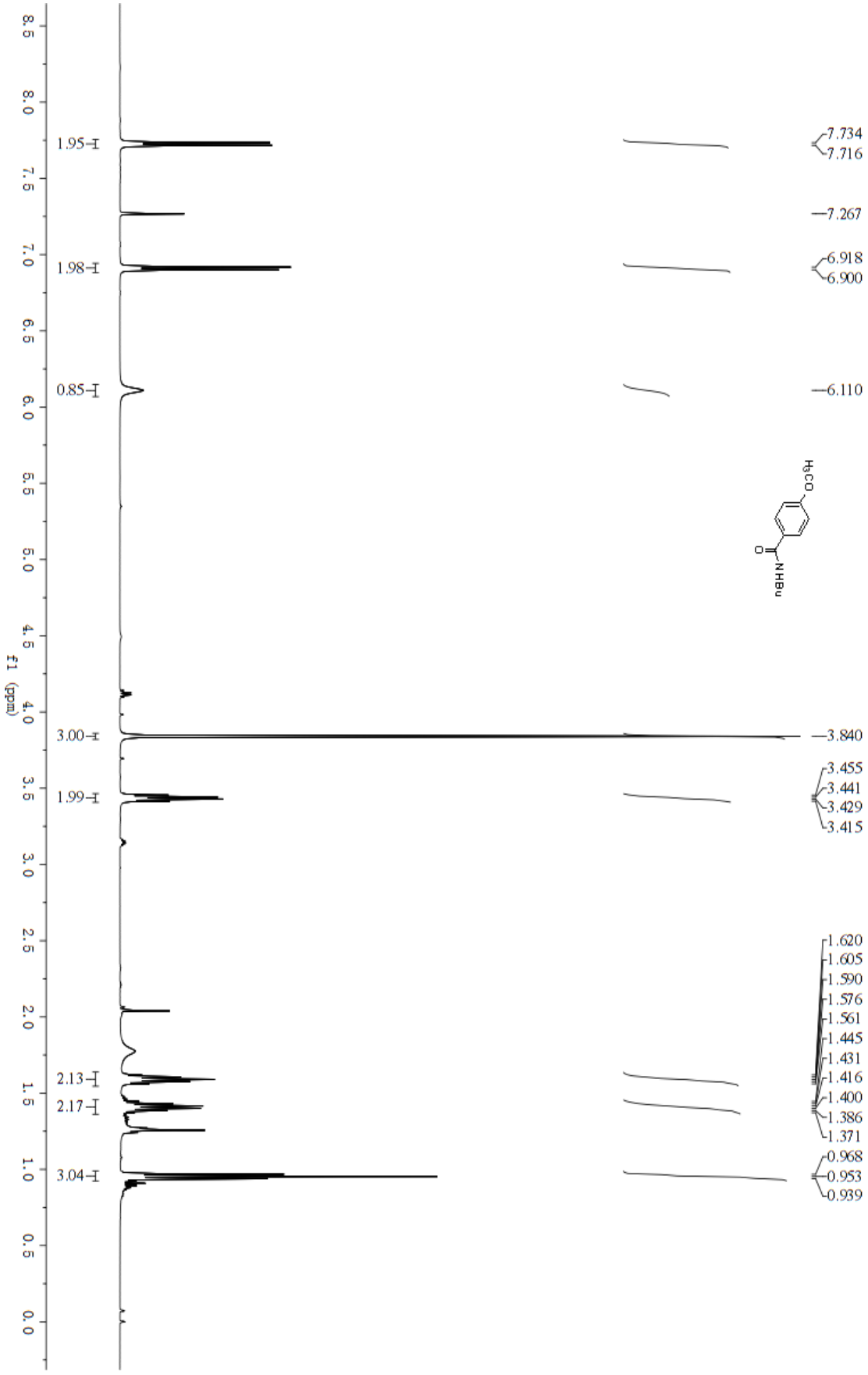

1.98
1.05
0.89
1.05
1.97
2.00
3.00
2.01
f1 (ppm)
7.543
7.526
7.256
7.200
7.185
7.100
7.001
6.986
6.972
6.938
6.921
4.111
4.096
4.080
3.841
3.104
3.088
3.072
0.000

ind

olin-1-yl(4-methoxyphenyl)methanone **3t**



N-butyl-4-methoxybenzamide **3u**



N-butyl-4-methoxybenzamide **3u**