Support information

Alternative reaction pathway triggered by oxygen vacancies for boosting selective hydrodeoxygenation reactions

Anqiu Liu,†[a] Xixi Liu,†[b] Yaping She,[a] Xiaoqiang Hu,[b] Miao Hu,[a] Zehui Zhang,*[b] Xiaochen Wang*[a] and Bing Liu*[b]

[a] School of Energy Materials and Chemical Engineering, Hefei University, Hefei 230601, China
[b]Key Laboratory of Catalysis and Materials Sciences of the Ministry of Education, South-Central Minzu University, Wuhan 430074, PR China.

***Corresponding Authors**
* Tel: +86-027-67842752
mail:zehuizh@mail.ustc.edu.cn(Z. Zhang), wxc@hfuu.edu.cn(X. Wang), liubing@mail.scuec.edu.cn (B. Liu).

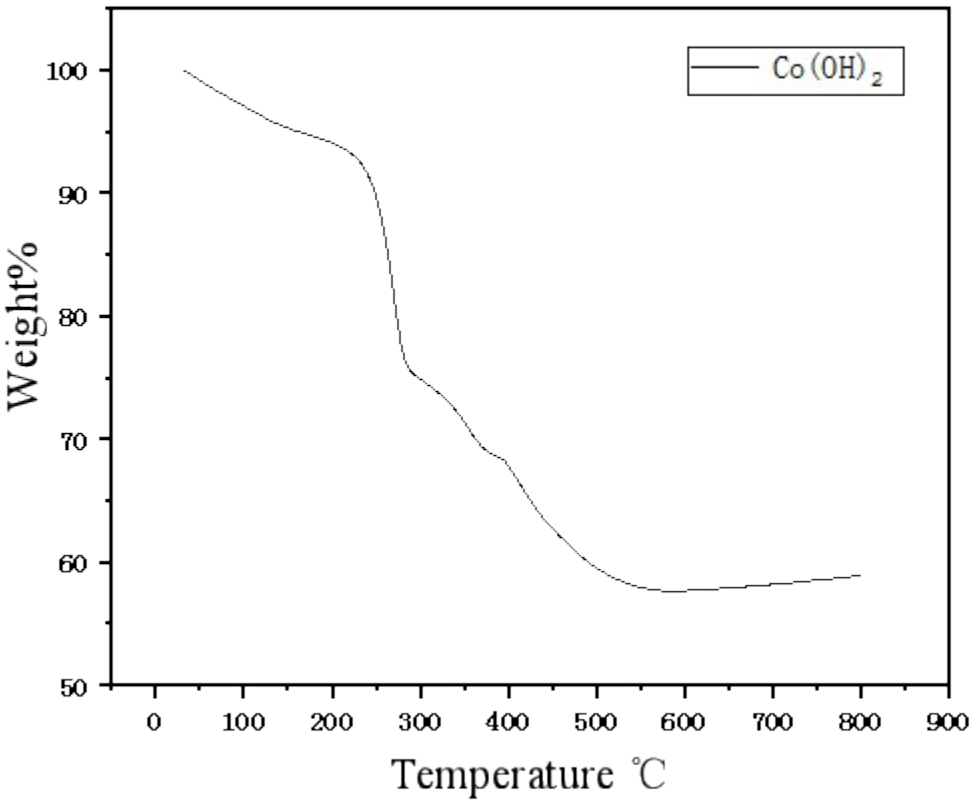


Fig.S1. TG curves of $Co(OH)_2$ precursor in the flowing N_2, 5 ℃ min^{-1}.

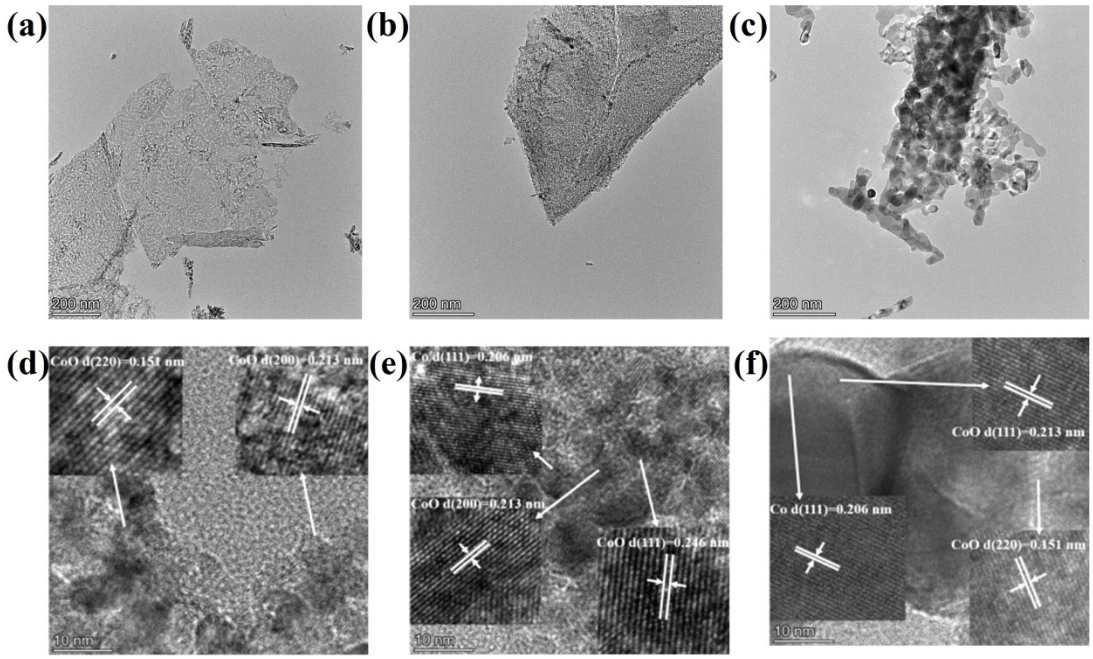


Fig. S2. Electron micrograph of *as*-prepared Co/CoO_x-V-T catalysts. (a-c) TEM images of CoO_x-V-300, Co/CoO_x-V-400 and Co/CoO_x-V-500, respectively; (d-f) HR-TEM images of CoO_x-V-300, Co/CoO_x-V-400 and Co/CoO_x-V-500, respectively.

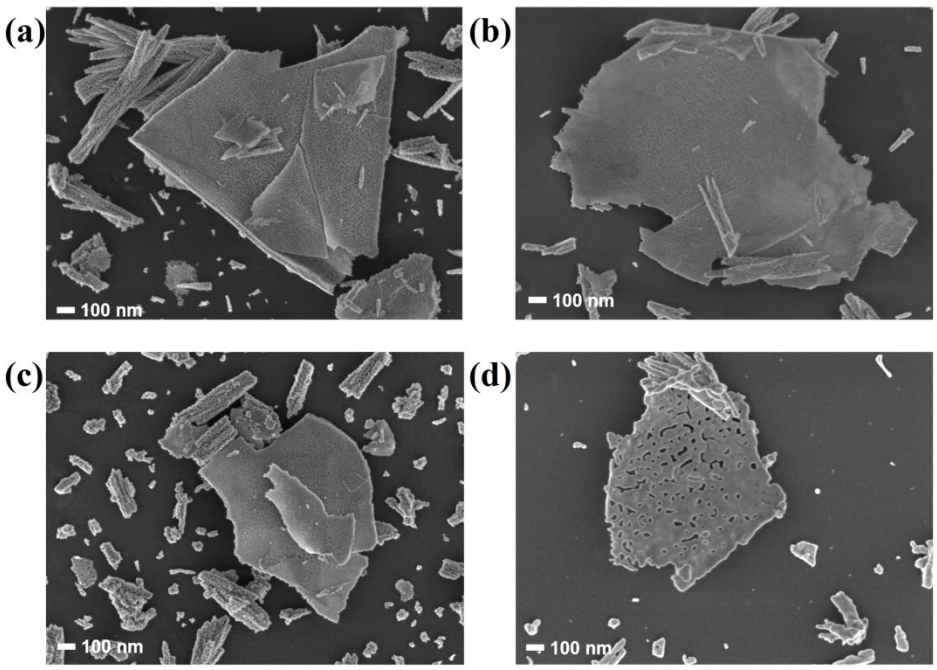


Fig. S3. SEM images of *as*-prepared Co/CoO_x-V-T catalysts. (a) CoO_x-V-300; (b) Co/CoO_x-V-350; (c) Co/CoO_x-V-400; and (d) Co/CoO_x-V-500.

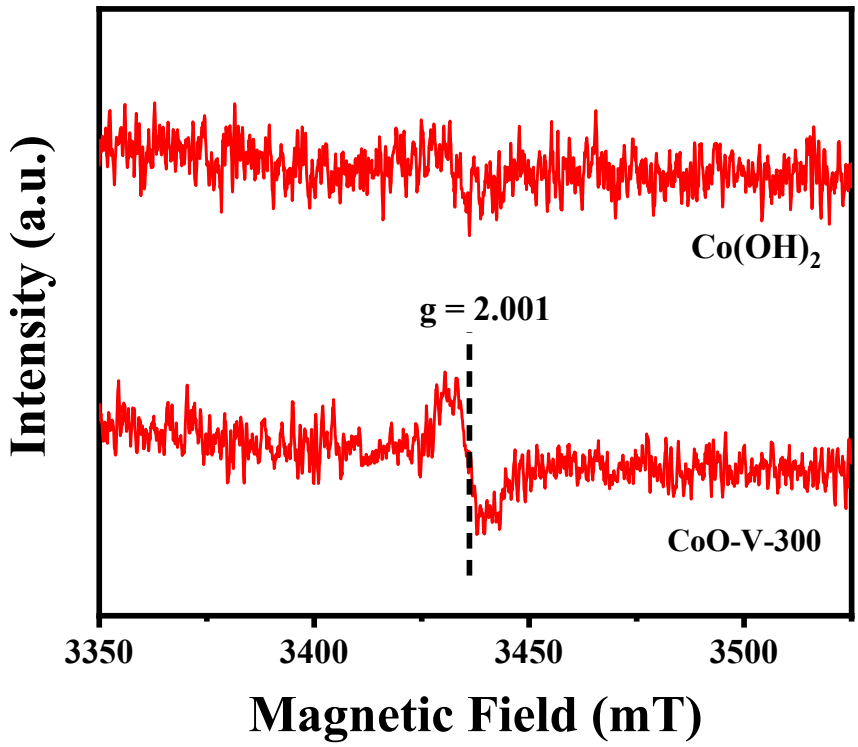


Fig. S4. EPR spectra of $Co(OH)_2$ and CoO_x-V-300.

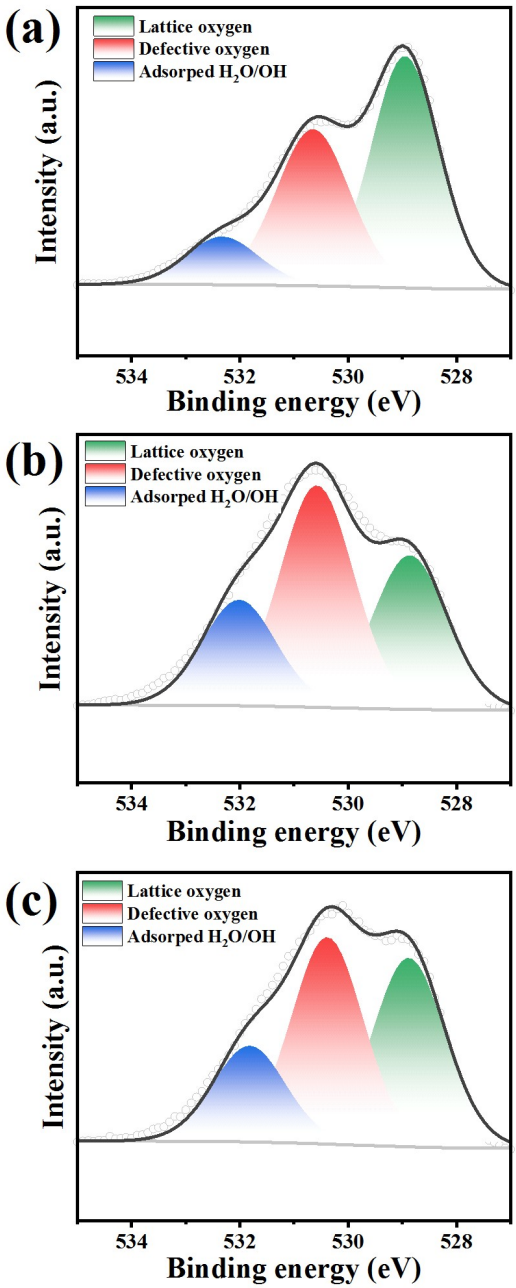


Fig. S5. O 1s XPS spectra of the *as*-prepared catalysts. (a) CoO_x-V-300; (b) Co/CoO_x-V-400; (c) Co/CoO_x-V-500.

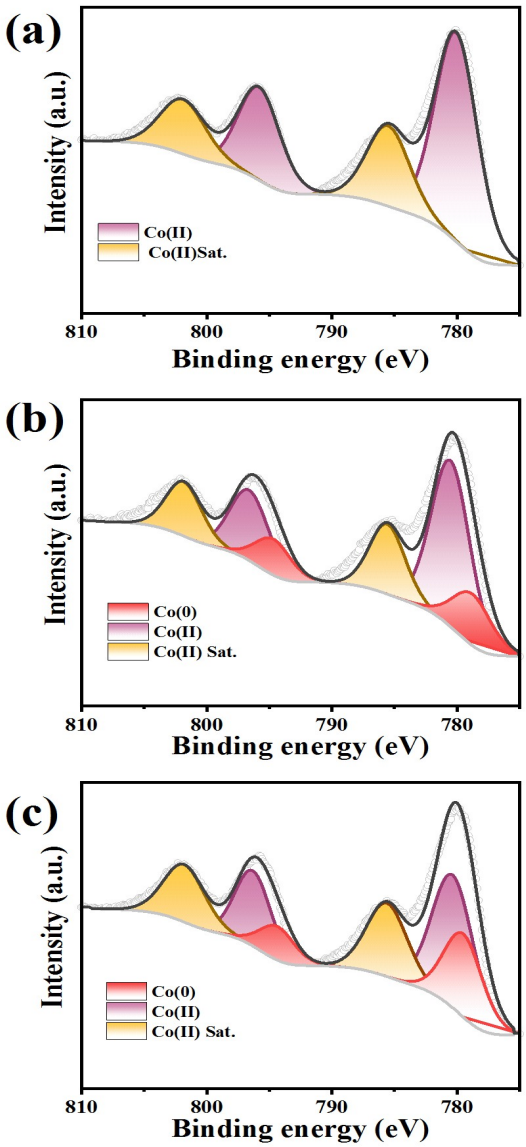


Fig. S6. Co 2p XPS spectra of the as-prepared samples. (a) CoO_x-V-300; (b) Co/CoO_x-V-400; (c) Co/CoO_x-V-500.

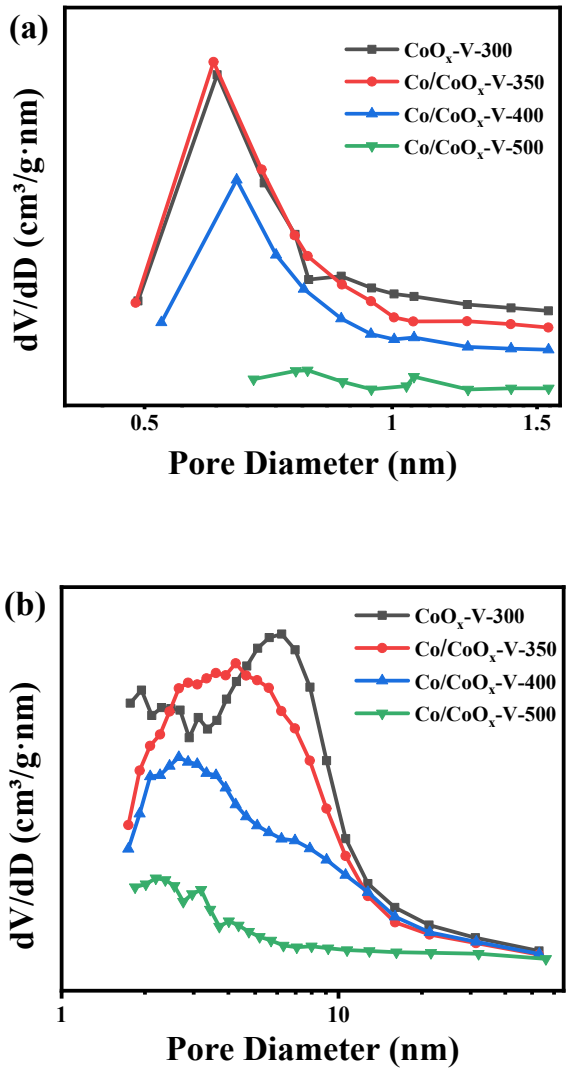


Fig. S7. (a) micropore and (b) mesoporous pore size distribution of the *as*-prepared catalysts.

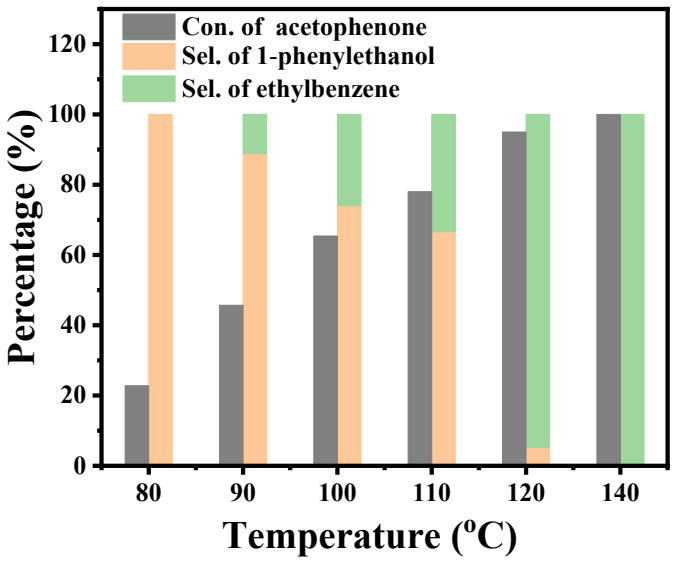


Fig. S8. The effect of reaction temperature on the hydrodeoxygenation of acetophenone. Reaction conditions: acetophenone (0.5 mmol), toluene (5 mL), Co/CoO-V-350 (20 mg), H_2 (10 bar), 4 h.

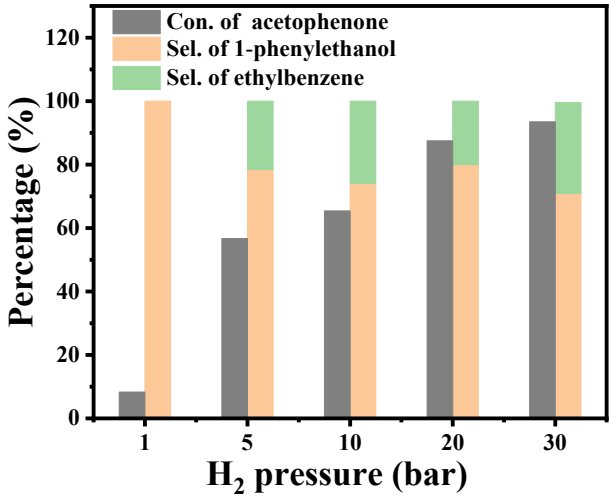


Fig. S9. The effect of H_2 pressure on the hydrodeoxygenation of acetophenone. Reaction conditions: acetophenone (0.5 mmol), toluene (5 mL), Co/CoO-V-350 (20 mg), 100 ^{o}C and 4 h.

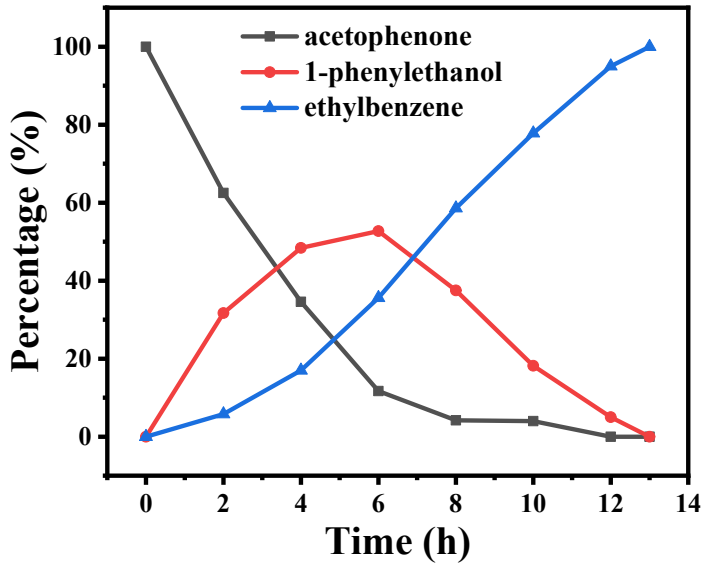


Fig. S10. Time distribution curve of the hydrodeoxygenation of acetophenone. Reaction conditions:acetophenone (0.5 mmol), 5 mL toluene, 20 mg catalyst, 10 bar H_2, 100°C.

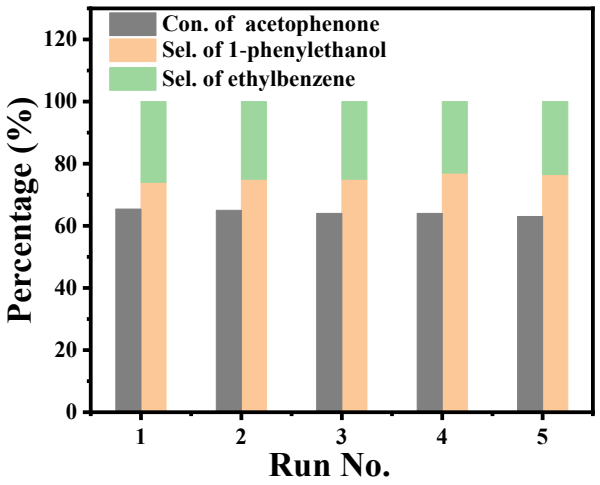


Fig. S11. Catalyst recycling experiments of the Co/CoO-V-350 catalyst. Reaction conditions:acetophenone (0.5 mmol), 5 mL toluene, 20 mg catalyst, 10 bar H_2, 100^{o}C and 4 h.

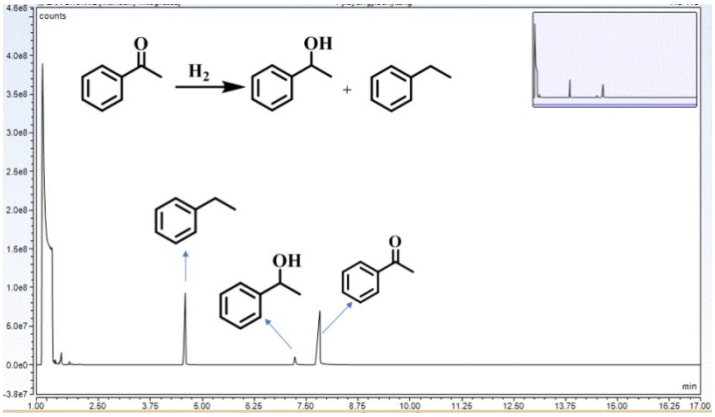


Fig. S12. GC-Mass spectra of the result of hydrodeoxygenation of acetophenone**.** Reaction conditions: acetophenone (0.5 mmol), 5 mL toluene, 20 mg catalyst, 10 bar H_2, 100 ^oC and 4 h.

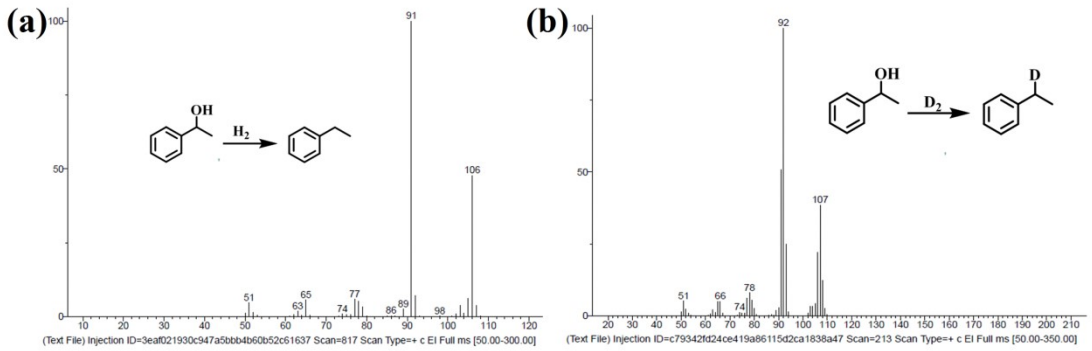


Fig. S13. Mass spectra of the product fromisotope labeling experiments. Reaction conditions: 1-phenylethanol (0.5 mmol), 5 mL toluene, 20 mg catalyst, 120 ^{o}C and 12 h. (a) 10 bar H_2; (b) 3 bar D_2.

Table S1. The Co particles size calculated by Scherrer equation

Catalyst	Co particles size(nm)
Co/CoO-V-350	15.6
Co/CoO-V-400	22.0
Co/CoO-V-500	26.2
CoO-V-300-H_2	28.9

Table S2. The binding energy and relative peak area percentage of different types of oxygen.

Catalyst	**Lattice oxygen**		**Defective oxygen**		**Adsorbed H_2O/OH**	
	B.E. (eV)	Percentage (%)	B.E. (eV)	Percentage (%)	B.E. (eV)	Percentage (%)
CoO-V-300	529.8	46.4	531.4	30.7	532.4	22.9
Co/CoO-V-350	529.7	24.6	531.6	56.7	532.4	18.7
Co/CoO-V-400	529.7	17.5	531.6	44.4	532.4	38.1
Co/CoO-V-500	529.8	18.9	531.2	42.9	532.4	38.2

Table S3. The peak area ratio of metallic Co and Co^{2+} in the catalysts

Catalyst	Co^0 (%)	Co^{2+} (%)	Peak area ratio of Co^0 to Co^{2+}
CoO-V-300	0	100	0
Co/CoO-V-350	6.7	93.3	0.07
Co/CoO-V-400	13.5	86.5	0.16
Co/CoO-V-500	15.5	84.5	0.18

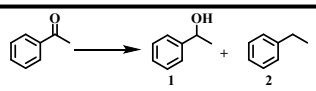
Table S4. The textural parameters of the cobalt catalysts.

Catalyst	Surface Area (m^2/g)			Pore Volume (mL/g)		
	Meso	Micro	Total surface area	Meso	Micro	Total pore volume
CoO-V-300	81.0	13.2	94.2	0.18	0.03	0.21
Co/CoO-V-350	72.1	6.2	78.3	0.15	0.001	0.15
Co/CoO-V-400	50.5	5.1	55.6	0.13	0.001	0.13
Co/CoO-V-500	13.7	4.6	18.3	0.04	0.003	0.04

Table S5. The binding energy and relative peak area percentage of different types of oxygen in the treated catalysts.

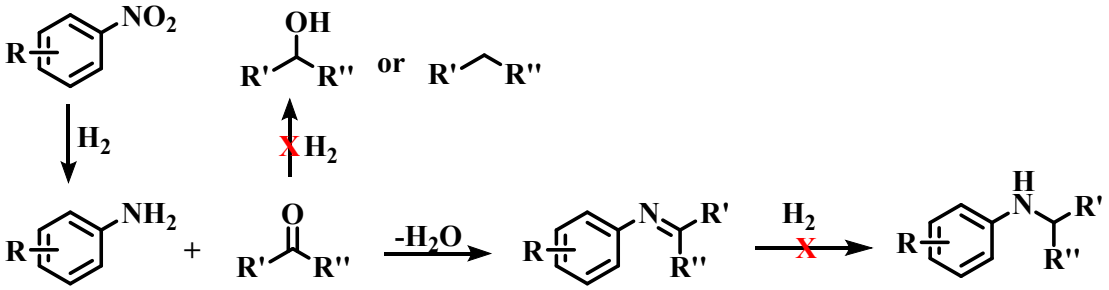
Sample	Lattice oxygen		Defective oxygen		Adsorbed H_2O/OH	
	B.E. (eV)	Percentage (%)	B.E. (eV)	Percentage (%)	B.E. (eV)	Percentage (%)
Co/CoO-V-350	529.7	24.6	531.6	56.7	532.4	18.7
Treated by acetophenone	529.8	28.9	531.4	46.8	532.4	24.1
Treated by 1-phenylethanol	529.8	31.2	531.3	34.5	529.8	34.2

Table S6. The effect of the reaction solvents on the hydrodeoxygenation of acetophenone.

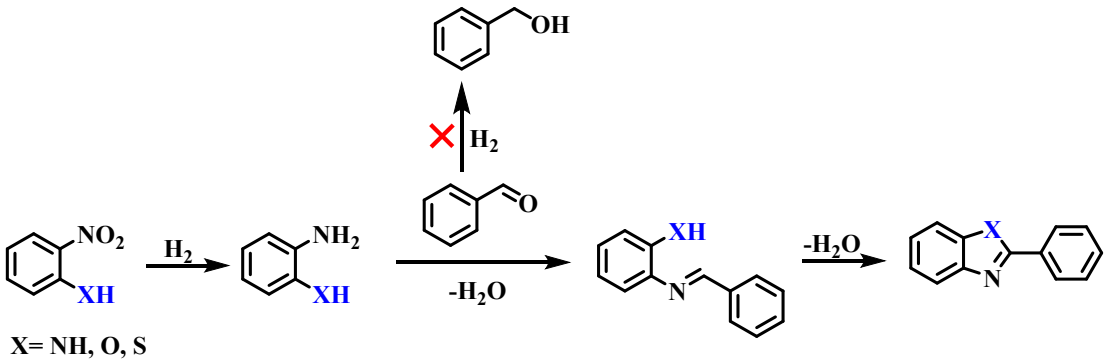


Solvents	Con. (%)	Sel. of 1 (%)	Sel. of 2 (%)
Toluene	95.0	5.3	94.7
n-Hexane	94.6	61.8	38.2
Acetonitrile	10.3	100	-
Tetrahydrofuran	45.2	93.4	6.6
MeOH	5.5	100	-
1,4-Dioxane	3.2	100	-
Ethyl acetate	2.3	100	-

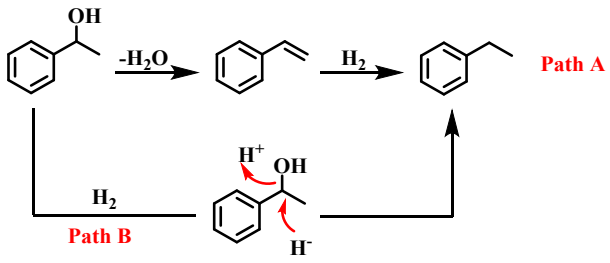
Reaction conditions: acetophenone (0.5 mmol), solvent (5 mL), Co/CoO-V-350 (20 mg), H_2 (10 bar), 4 h.



Scheme S1. Reaction pathways of the reductive coupling of nitro compounds with carbonyl compounds.



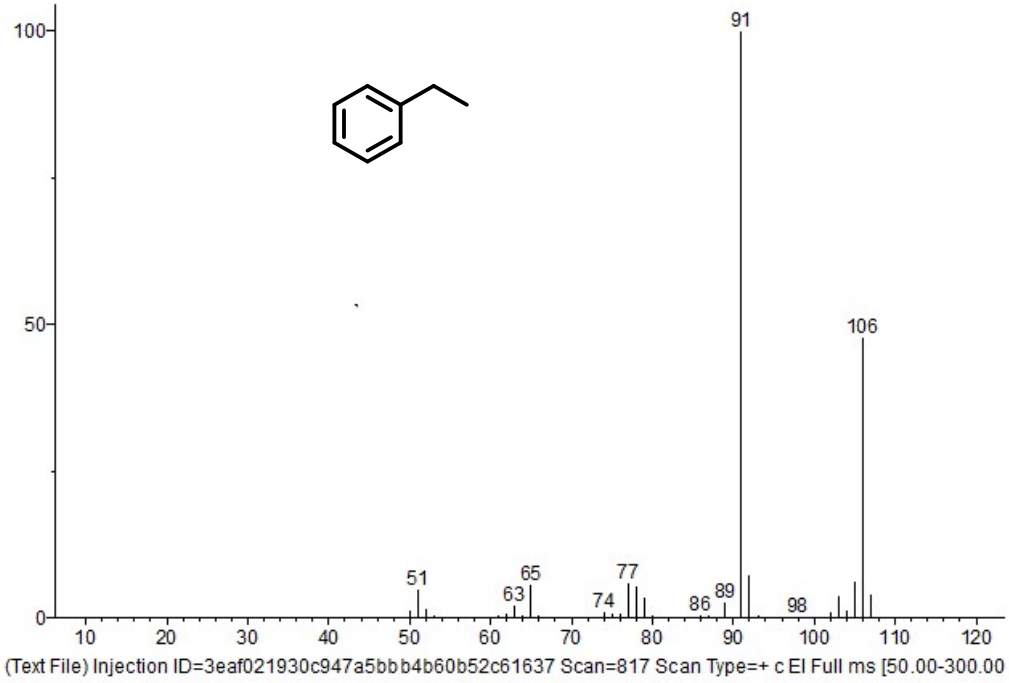
Scheme S2. Reaction pathways of the synthesis of benzazoles.



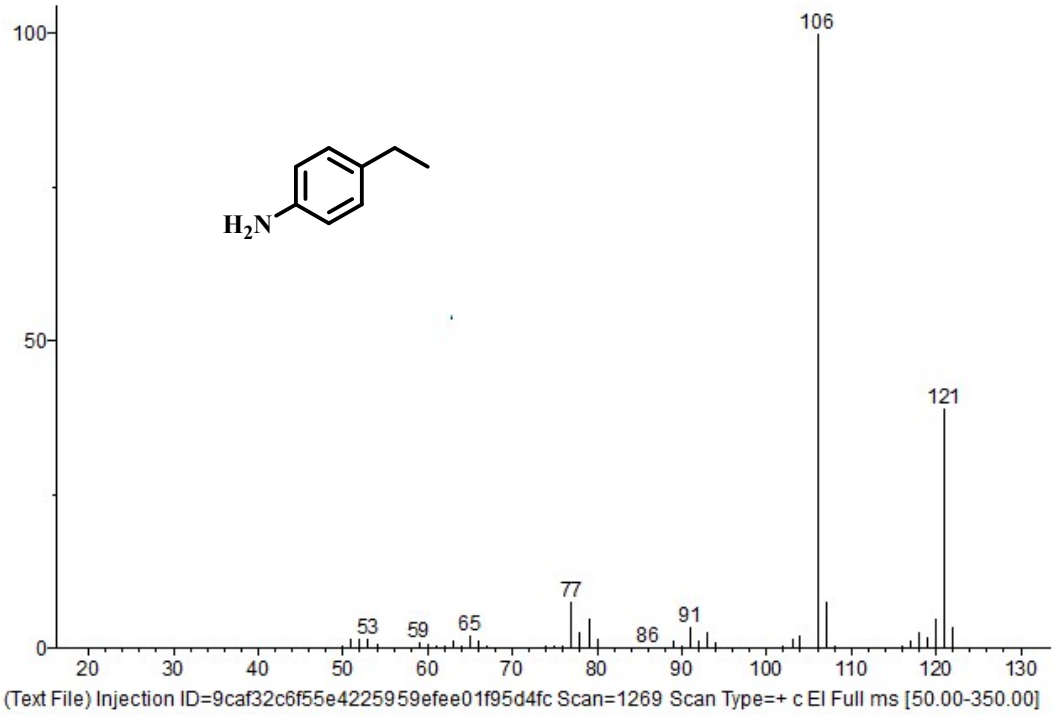
Scheme S3. The possible pathways the hydrodeoxygenation of 1-phenylethanol into ethylbenzene.

GC-MS date

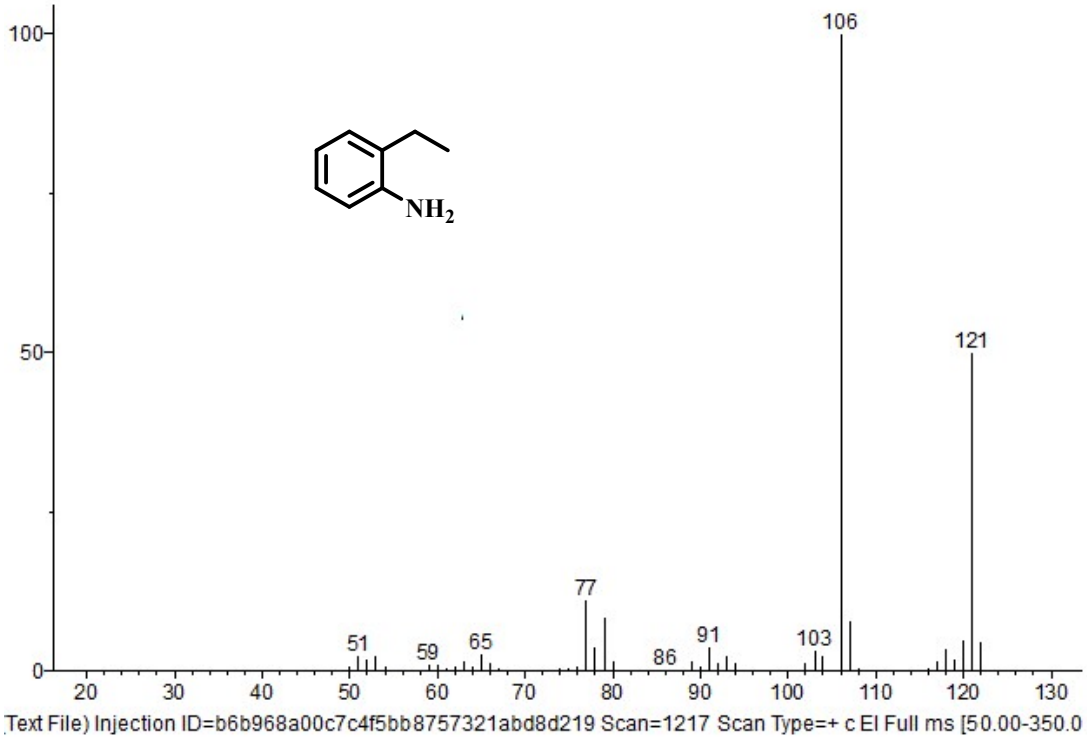
(a1)


100
50
0
91
106
51
63
65
74
77
86
89
98
10
20
30
40
50
60
70
80
90
100
110
120
(Text File) Injection ID=3eaf021930c947a5bbb4b60b52c61637 Scan=817 Scan Type=+ c EI Full ms [50.00-300.00

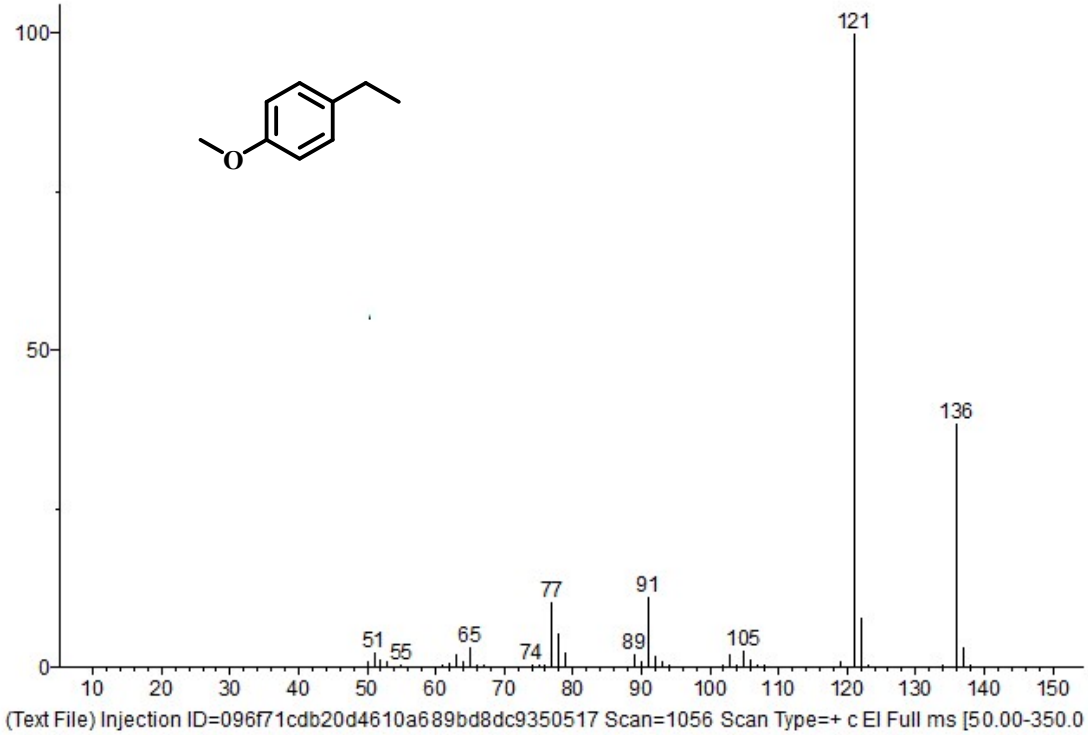
(a2)


100
50
0
106
121
77
91
53
59
65
86
H_2N
20
30
40
50
60
70
80
90
100
110
120
130
(Text File) Injection ID=9caf32c6f55e4225959efee01f95d4fc Scan=1269 Scan Type=+ c EI Full ms [50.00-350.00]

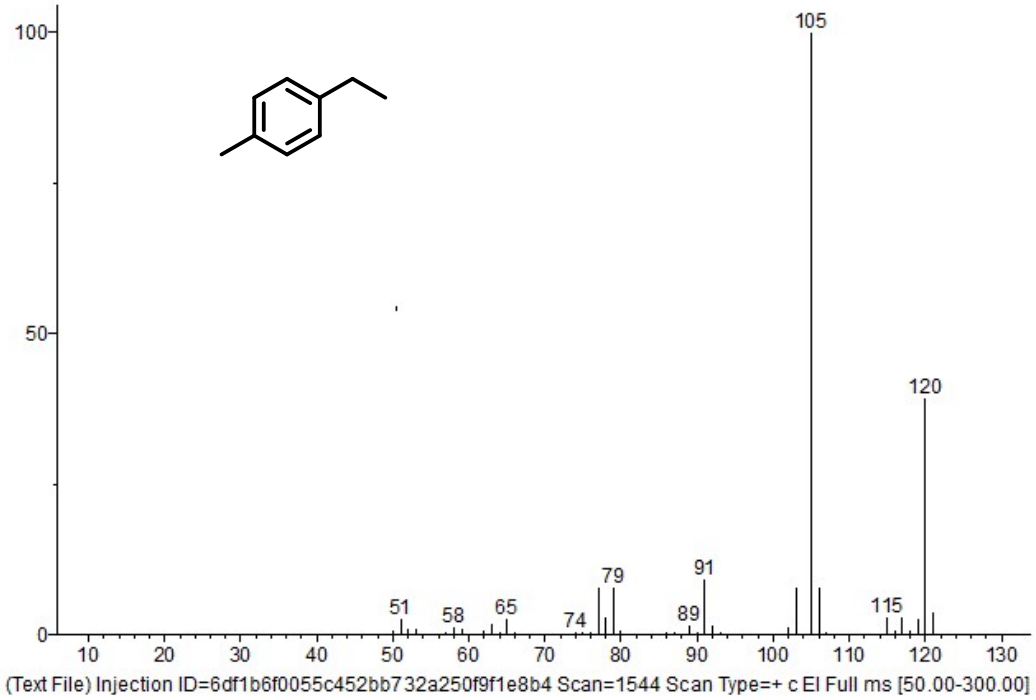
(a3)


100
50
0
106
121
77
51
59
65
86
91
103
NH2
20
30
40
50
60
70
80
90
100
110
120
130
Text File) Injection ID=b6b968a00c7c4f5bb8757321abd8d219 Scan=1217 Scan Type=+ c EI Full ms [50.00-350.0

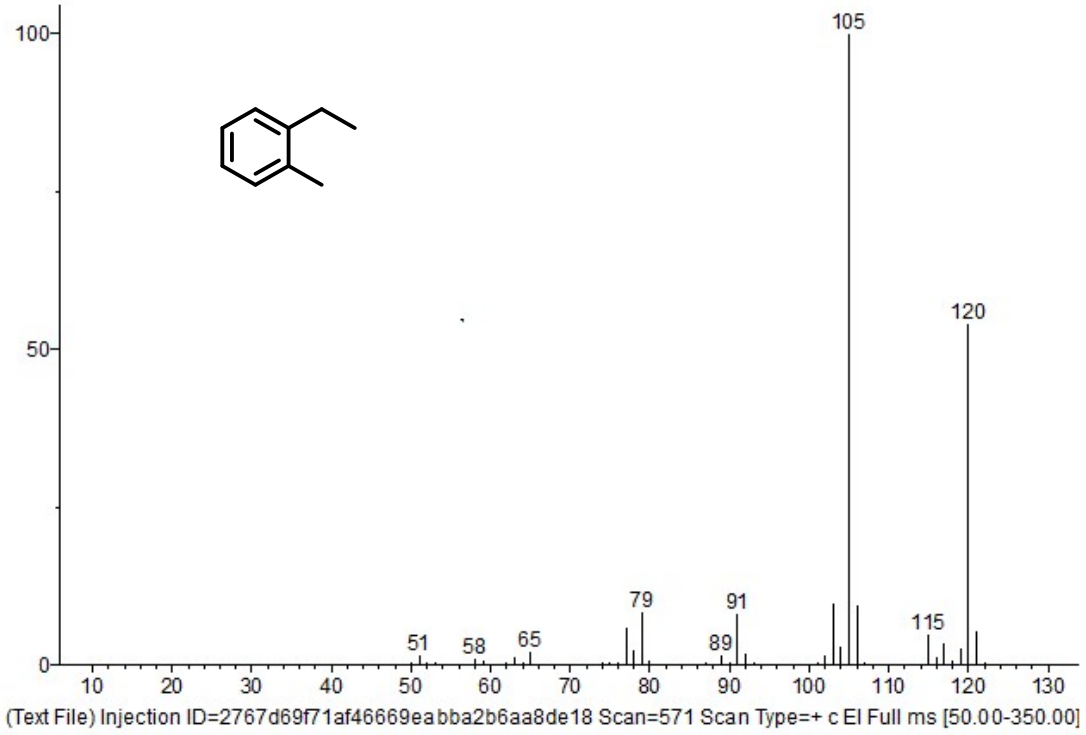
(a4)


100
50
0
O
121
136
91
77
65
51
55
74
89
105
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
(Text File) Injection ID=096f71cdb20d4610a689bd8dc9350517 Scan=1056 Scan Type=+ c EI Full ms [50.00-350.0

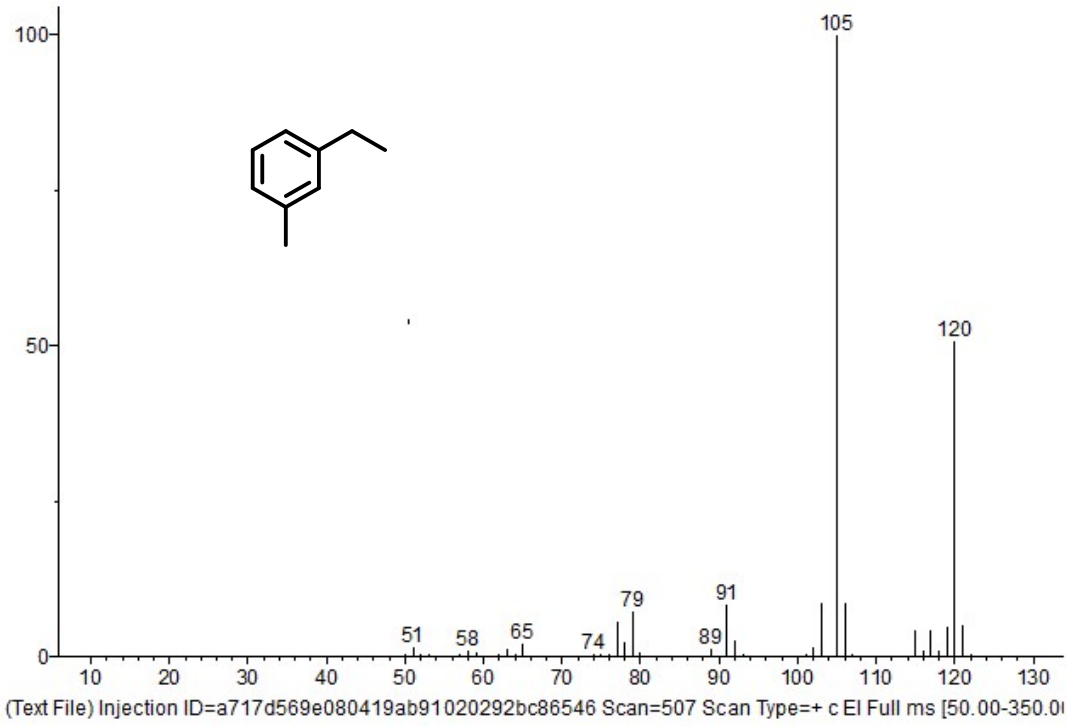
(a5)


100
50
0
105
120
91
79
51
58
65
74
89
115
10
20
30
40
50
60
70
80
90
100
110
120
130
(Text File) Injection ID=6df1b6f0055c452bb732a250f9f1e8b4 Scan=1544 Scan Type=+ c EI Full ms [50.00-300.00]

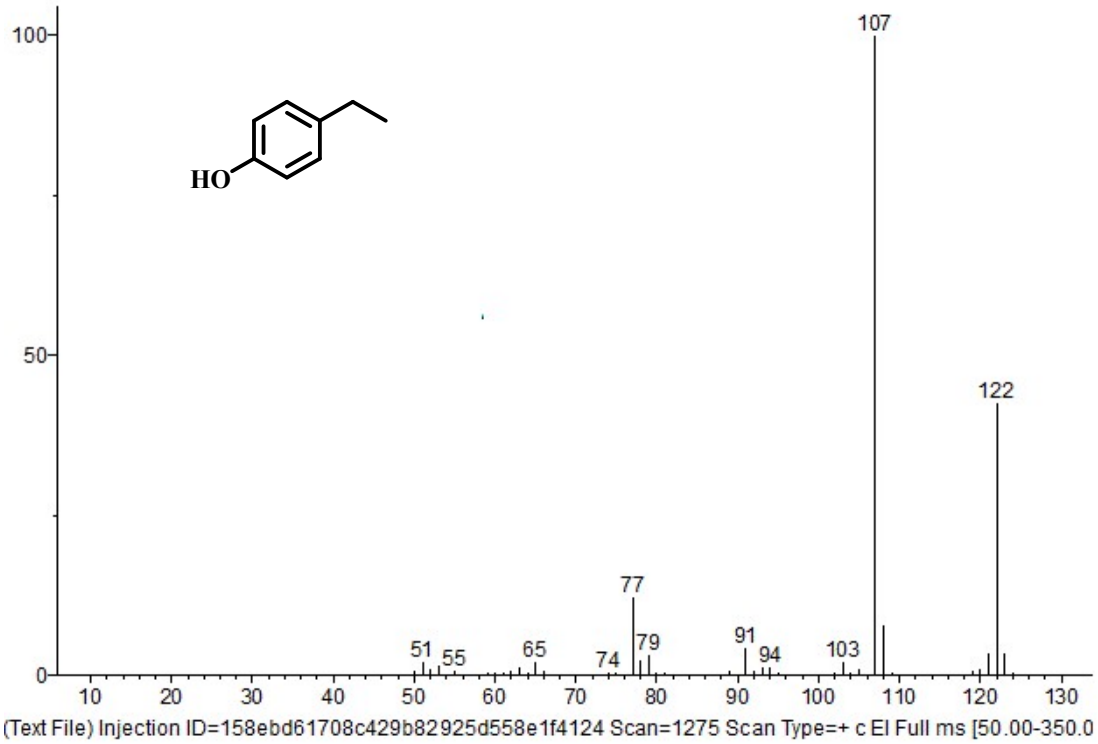
(а6)


100
50
0
105
120
79
91
115
51
58
65
89
10
20
30
40
50
60
70
80
90
100
110
120
130
(Text File) Injection ID=2767d69f71af46669eabba2b6aa8de18 Scan=571 Scan Type=+ c EI Full ms [50.00-350.00]

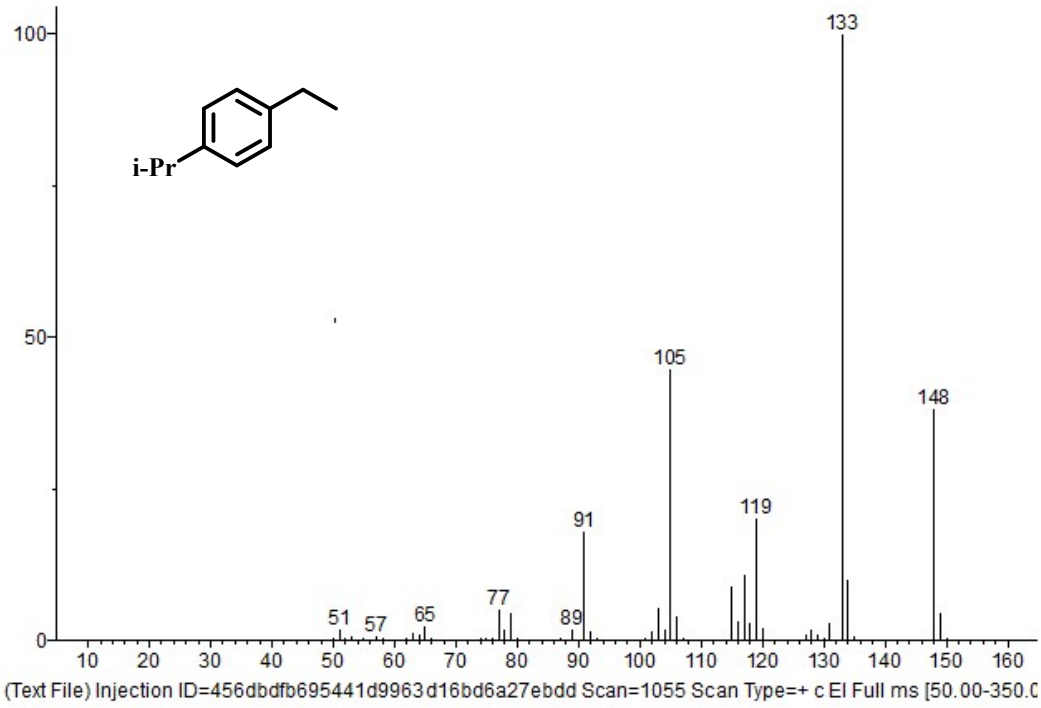
(a7)


100
50
0
105
120
79
91
51
58
65
74
89
10
20
30
40
50
60
70
80
90
100
110
120
130
(Text File) Injection ID=a717d569e080419ab91020292bc86546 Scan=507 Scan Type=+ c EI Full ms [50.00-350.0

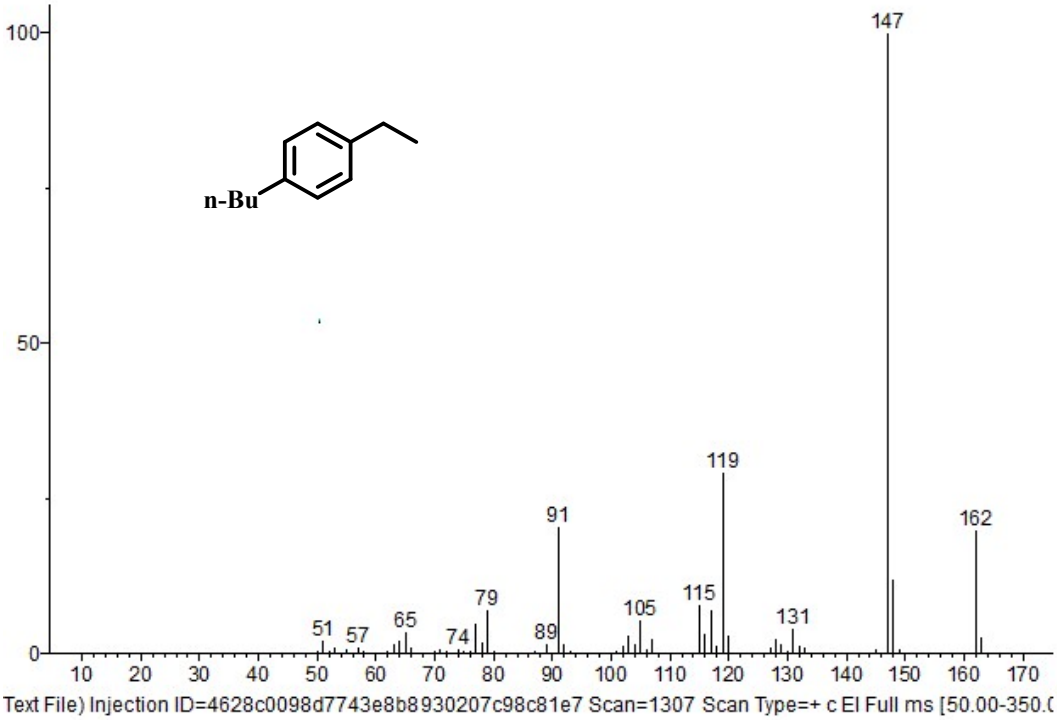
(a8)


100
50
0
HO
107
122
77
79
51
55
65
74
91
94
103
10
20
30
40
50
60
70
80
90
100
110
120
130
(Text File) Injection ID=158ebd61708c429b82925d558e1f4124 Scan=1275 Scan Type=+ c EI Full ms [50.00-350.0

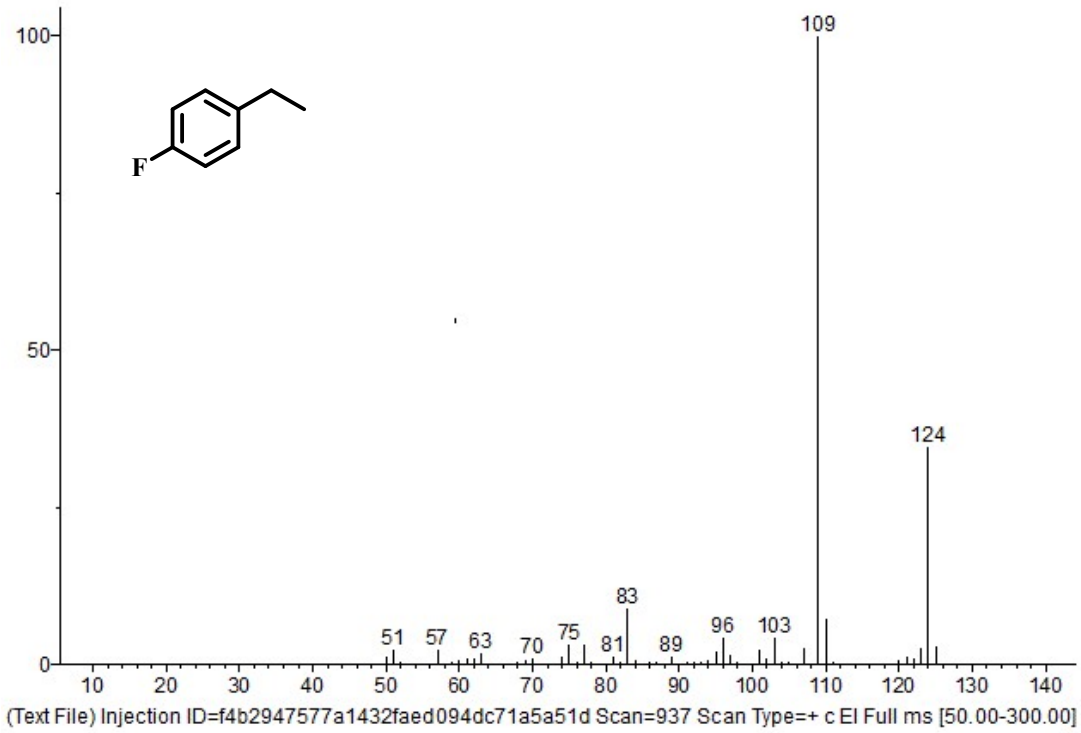
(a9)


100
50
0
i-Pr
133
105
148
119
91
77
51
57
65
89
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
(Text File) Injection ID=456dbdfb695441d9963d16bd6a27ebdd Scan=1055 Scan Type=+ c EI Full ms [50.00-350.0

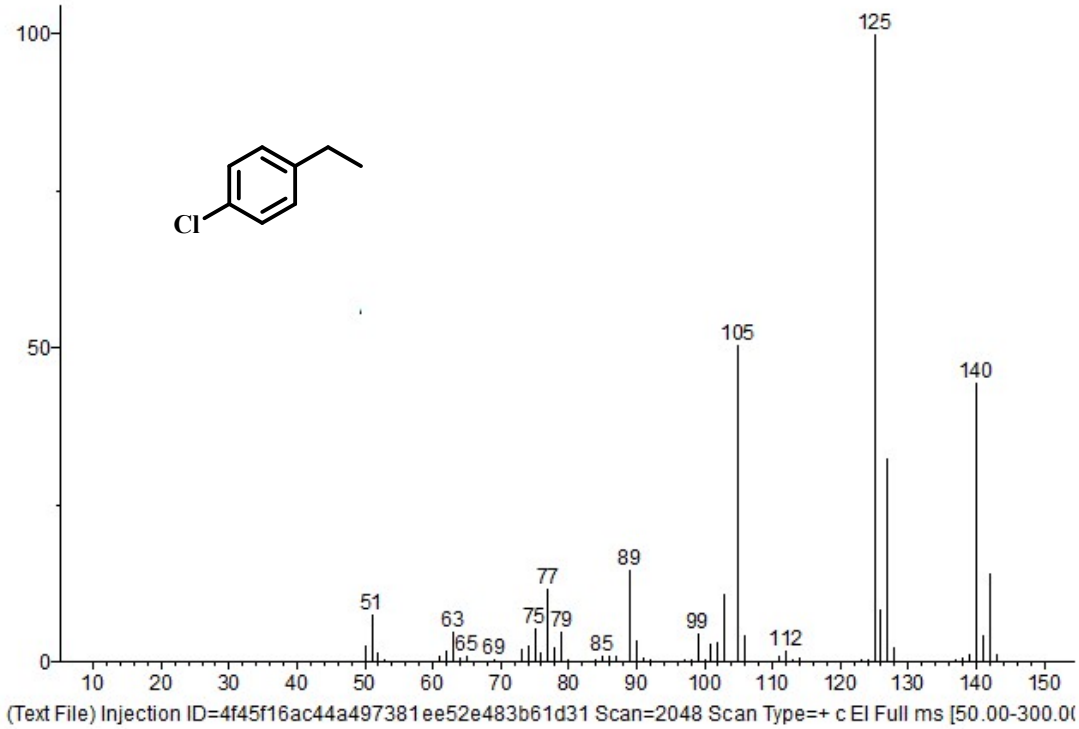
(a10)


n-Bu
147
119
91
162
79
105
115
131
51
57
65
74
89
100
50
0
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170
Text File) Injection ID=4628c0098d7743e8b8930207c98c81e7 Scan=1307 Scan Type=+ c EI Full ms [50.00-350.(

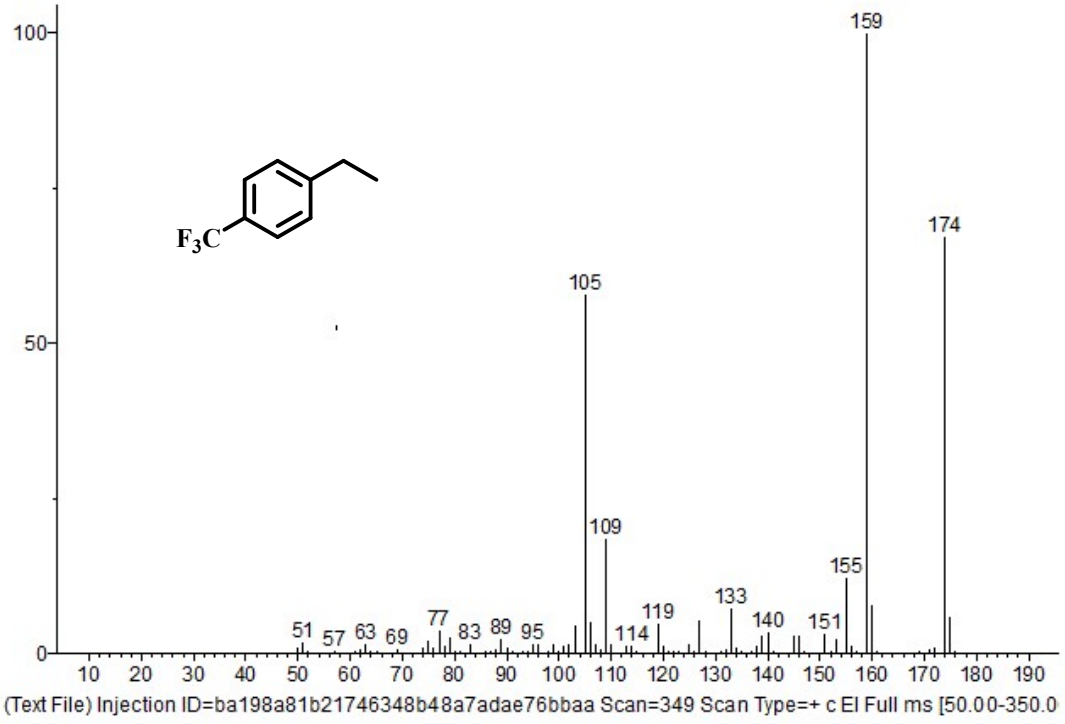
(a11)


100
50
0
F
109
124
83
51
57
63
70
75
81
89
96
103
10
20
30
40
50
60
70
80
90
100
110
120
130
140
(Text File) Injection ID=f4b2947577a1432faed094dc71a5a51d Scan=937 Scan Type=+ c EI Full ms [50.00-300.00]

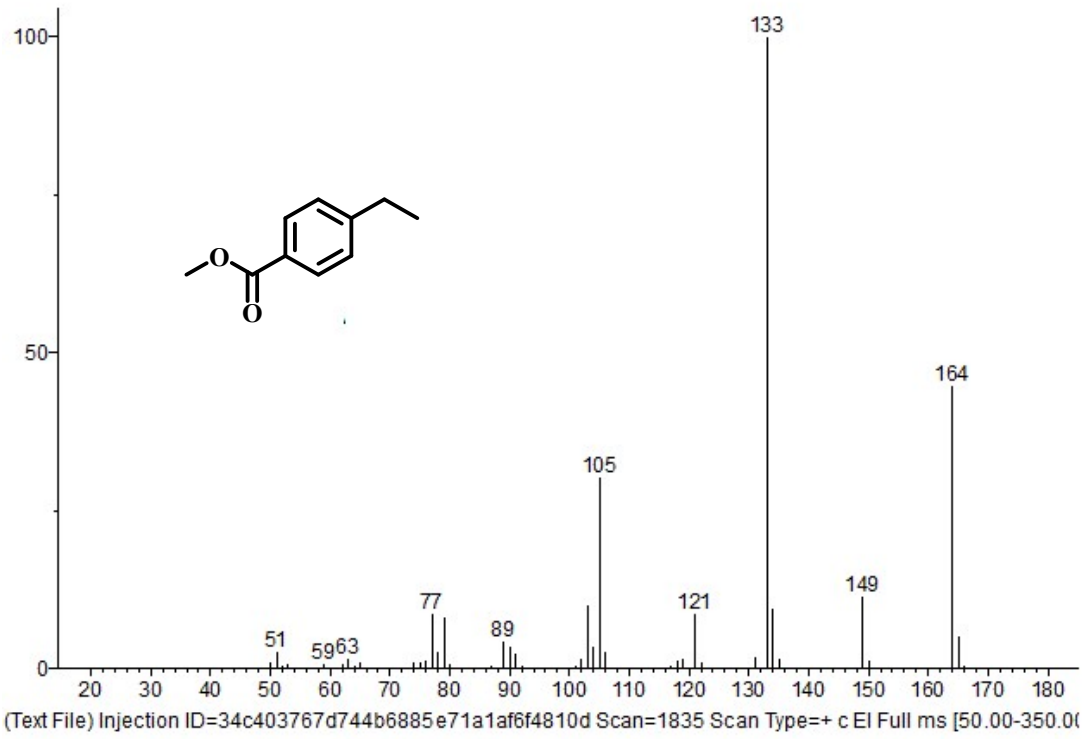
(a12)


100
50
0
Cl
125
105
140
89
77
51
63
75
79
65
69
85
99
112
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
(Text File) Injection ID=4f45f16ac44a497381ee52e483b61d31 Scan=2048 Scan Type=+ c EI Full ms [50.00-300.0(

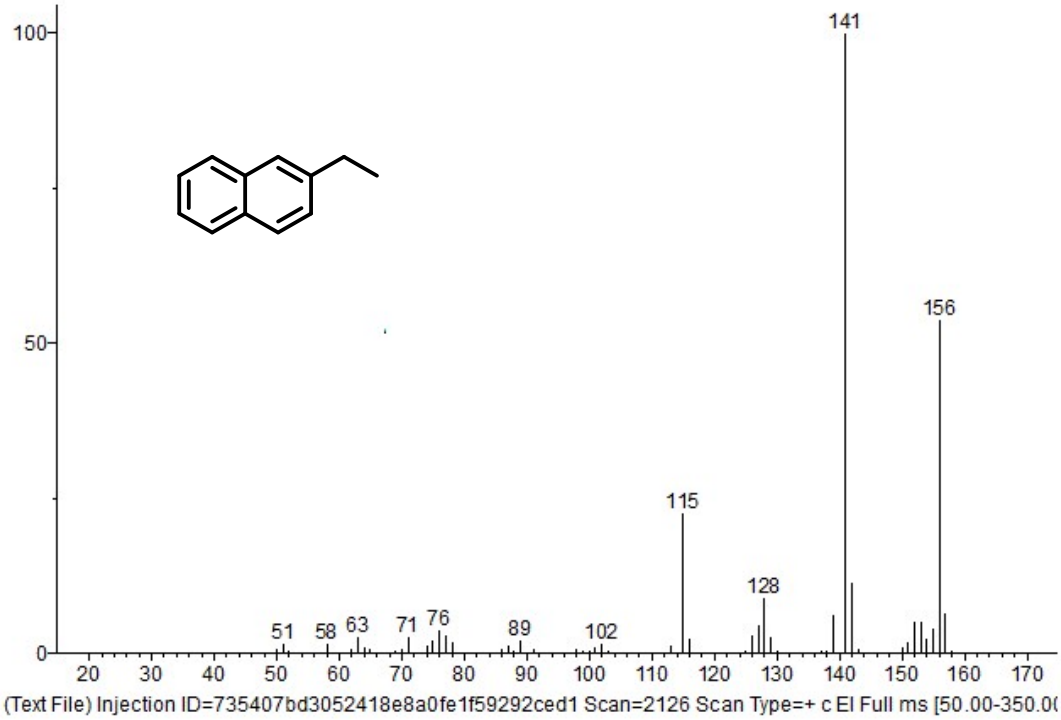
(a13)


100
50
0
159
174
105
109
155
133
119
140
151
114
51
57
63
69
77
83
89
95
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
(Text File) Injection ID=ba198a81b21746348b48a7adae76bbaa Scan=349 Scan Type=+ c EI Full ms [50.00-350.0

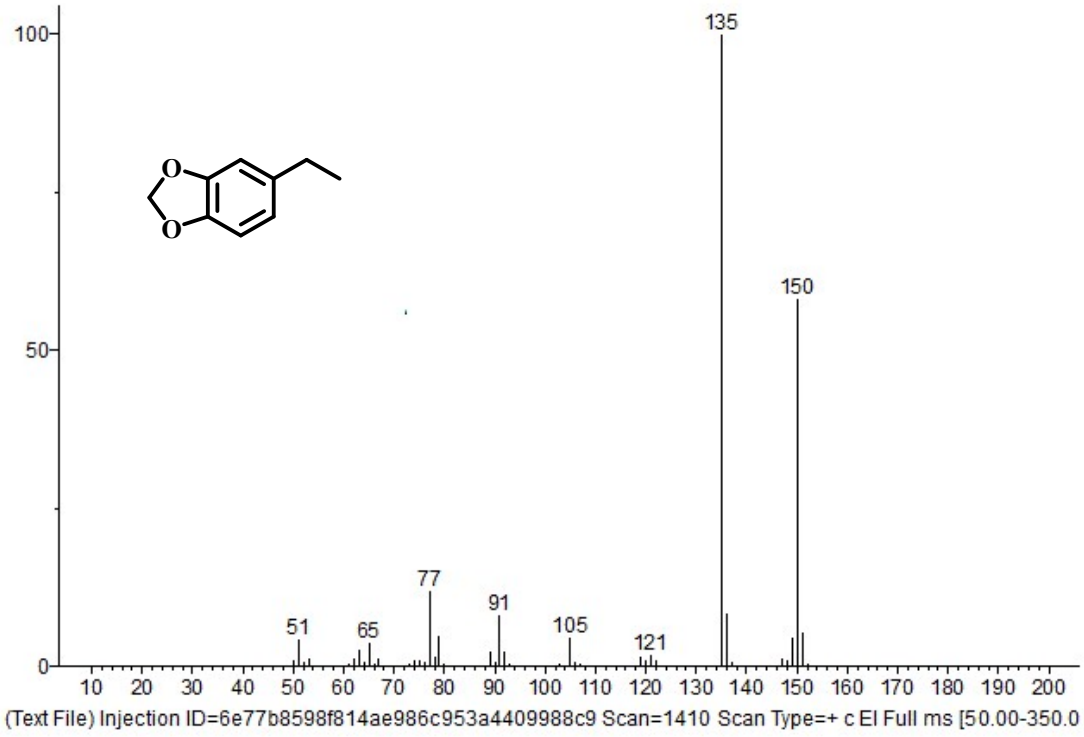
(a14)


100
50
0
133
164
105
149
121
77
89
51
59
63
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
(Text File) Injection ID=34c403767d744b6885e71a1af6f4810d Scan=1835 Scan Type=+ c EI Full ms [50.00-350.0(

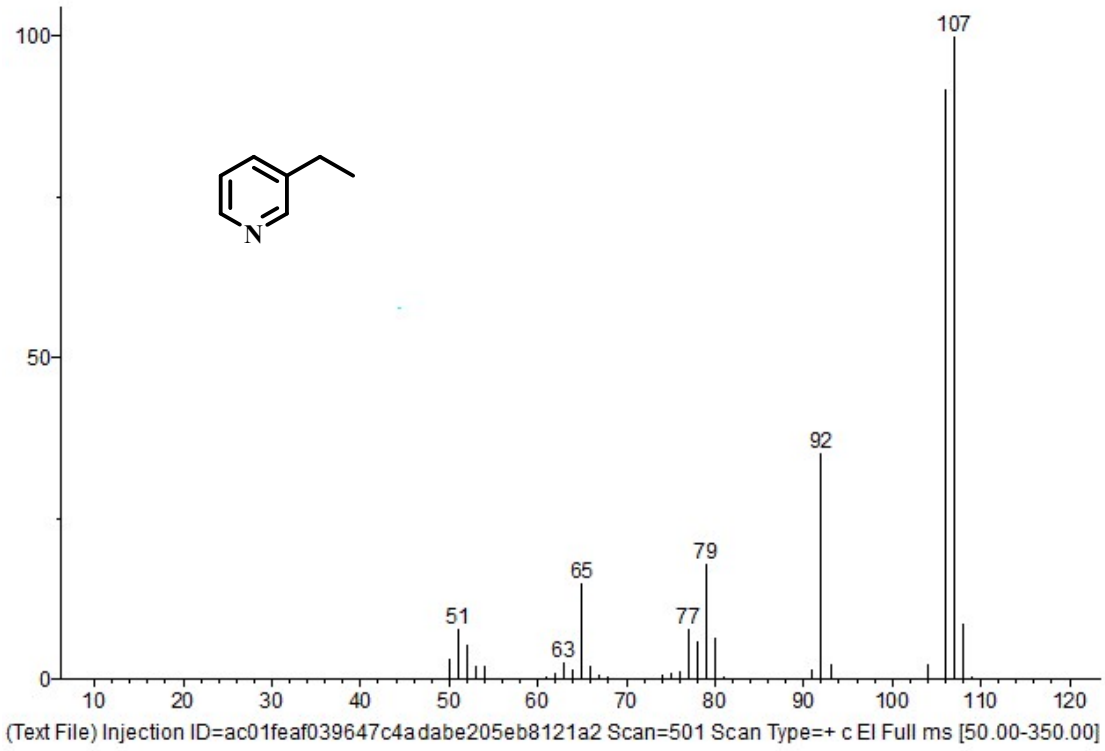
(a15)


100
50
0
141
156
115
128
51
58
63
71
76
89
102
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
(Text File) Injection ID=735407bd3052418e8a0fe1f59292ced1 Scan=2126 Scan Type=+ c EI Full ms [50.00-350.0(

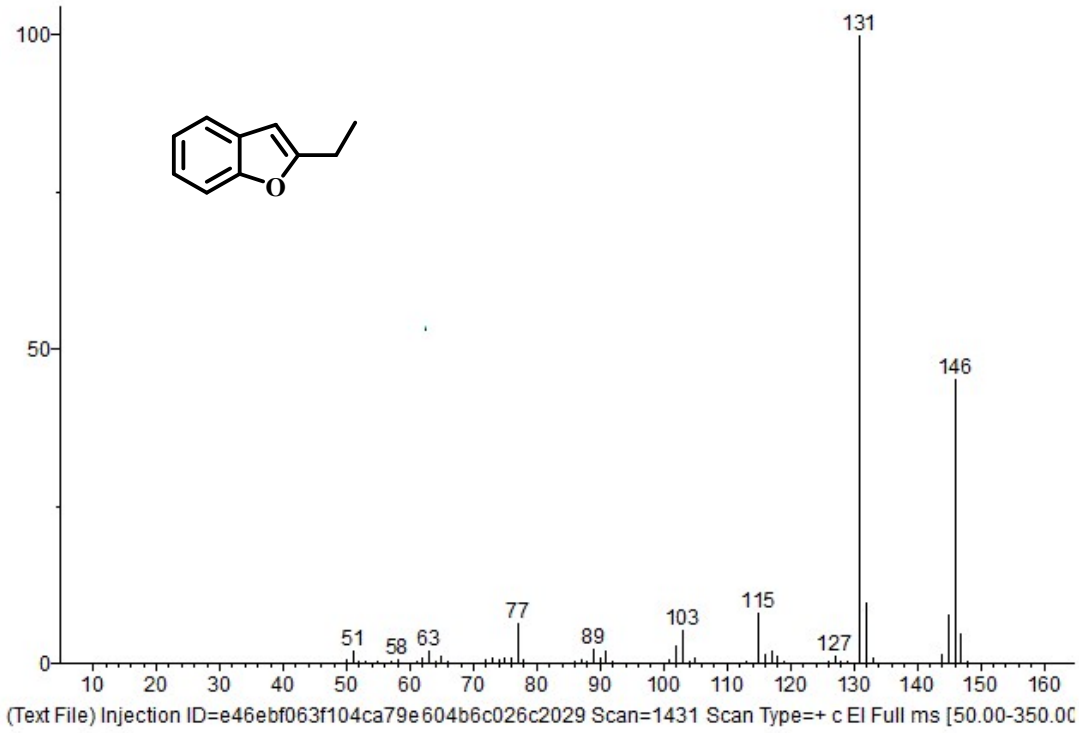
(a16)


100
50
0
135
150
77
91
51
65
105
121
O
O
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
(Text File) Injection ID=6e77b8598f814ae986c953a4409988c9 Scan=1410 Scan Type=+ c EI Full ms [50.00-350.0

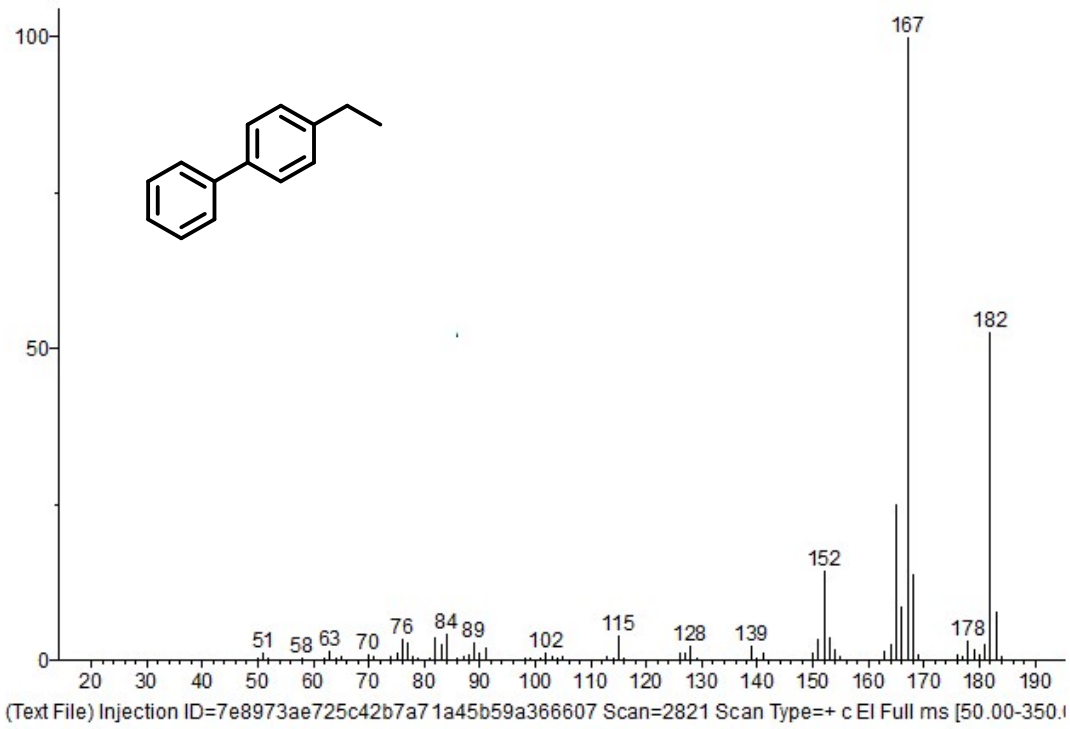
(a17)


100
50
0
N
107
92
79
65
51
77
63
10
20
30
40
50
60
70
80
90
100
110
120
(Text File) Injection ID=ac01feaf039647c4adabe205eb8121a2 Scan=501 Scan Type=+ c EI Full ms [50.00-350.00]

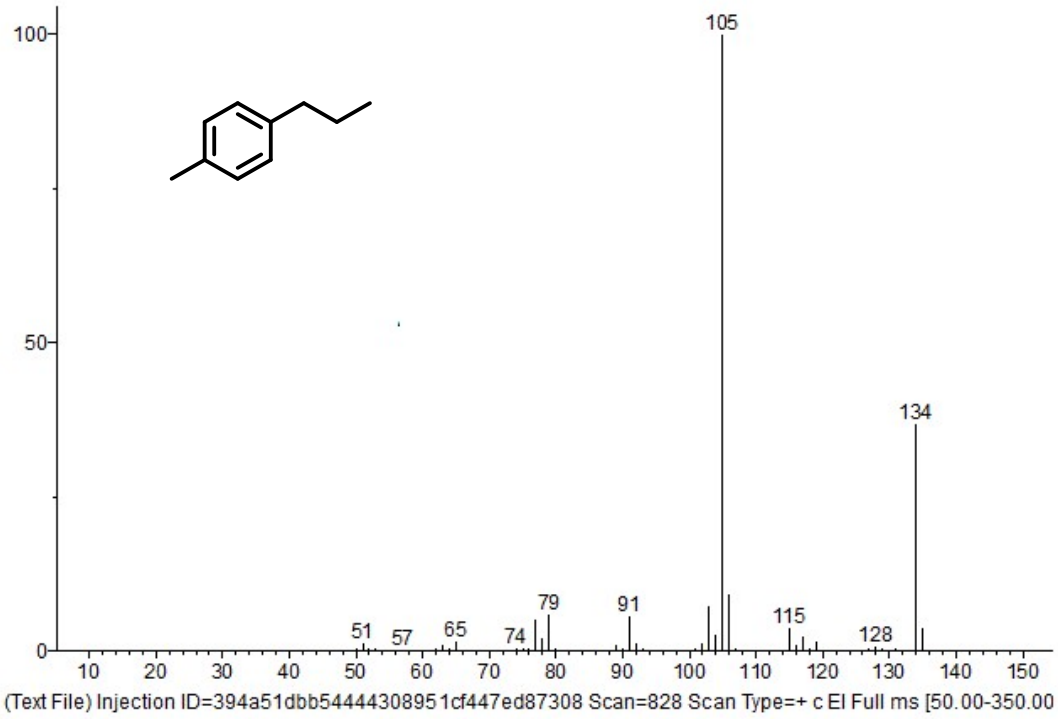
(a18)


100
50
0
131
146
77
103
115
51
58
63
89
127
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
(Text File) Injection ID=e46ebf063f104ca79e604b6c026c2029 Scan=1431 Scan Type=+ c EI Full ms [50.00-350.00

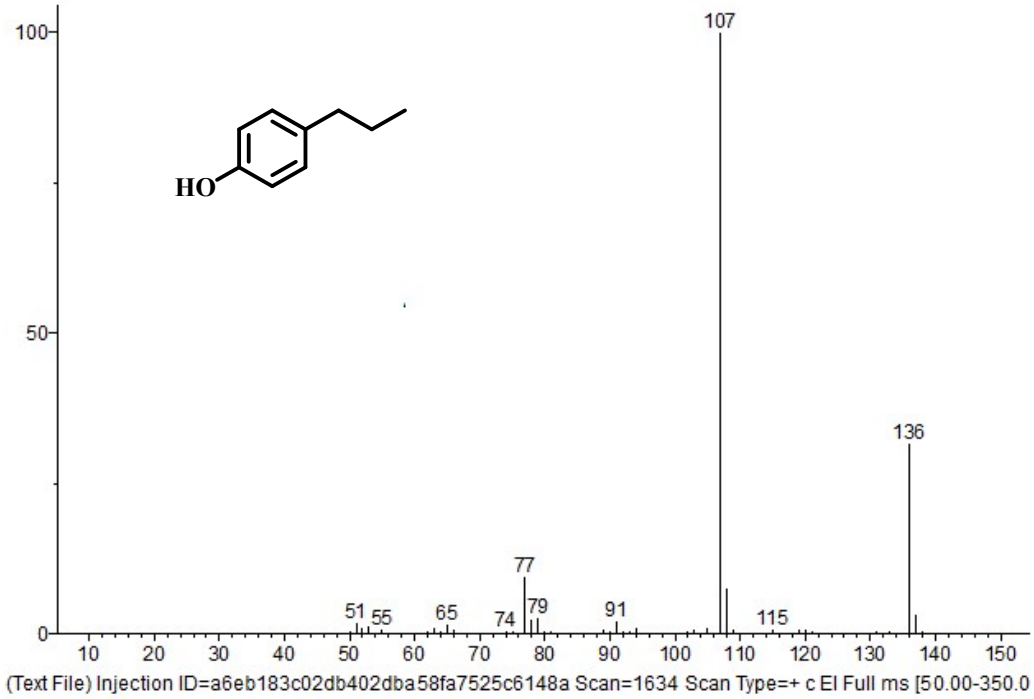
(a19)


100
50
0
167
182
152
51
58
63
70
76
84
89
102
115
128
139
178
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
(Text File) Injection ID=7e8973ae725c42b7a71a45b59a366607 Scan=2821 Scan Type=+ c EI Full ms [50.00-350.

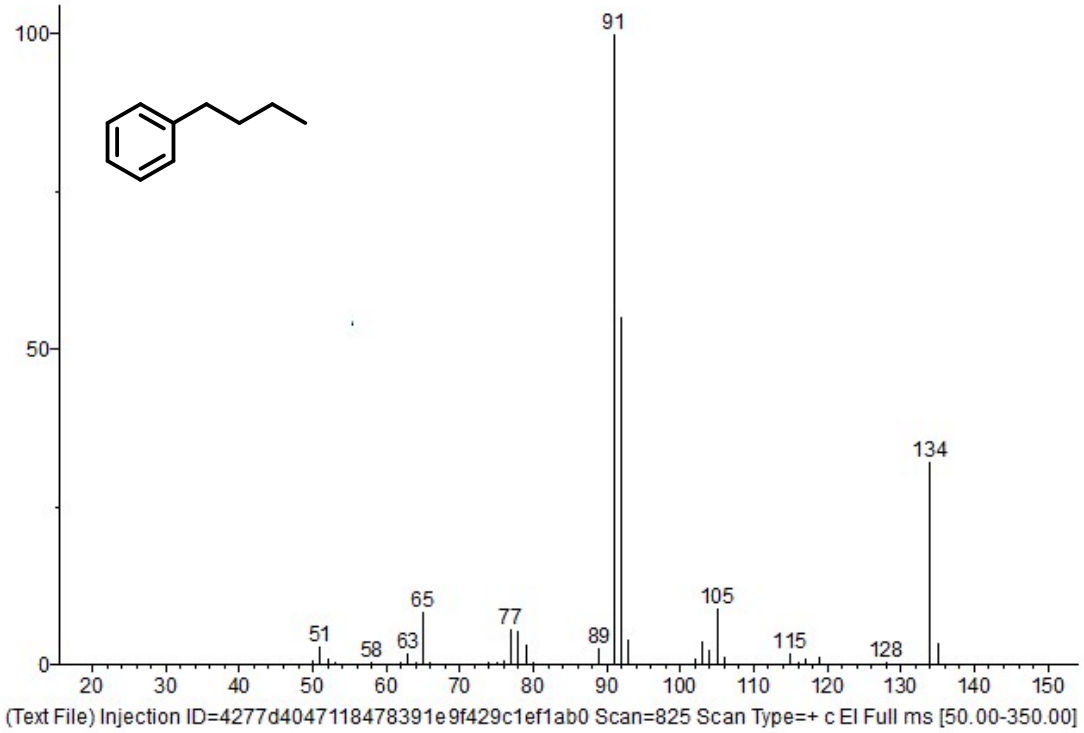
(a20)


100
50
0
105
134
79
91
115
51
57
65
74
128
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
(Text File) Injection ID=394a51dbb54444308951cf447ed87308 Scan=828 Scan Type=+ c EI Full ms [50.00-350.00

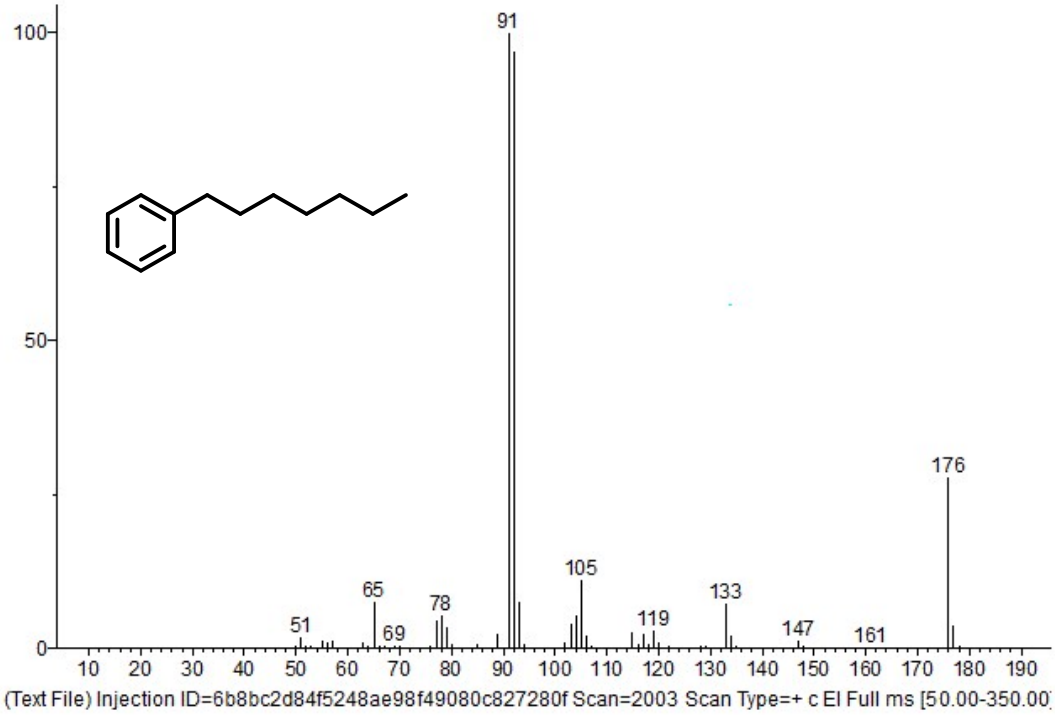
(a21)


100
50
0
HO
107
136
77
51
55
65
74
79
91
115
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
(Text File) Injection ID=a6eb183c02db402dba58fa7525c6148a Scan=1634 Scan Type=+ c EI Full ms [50.00-350.0

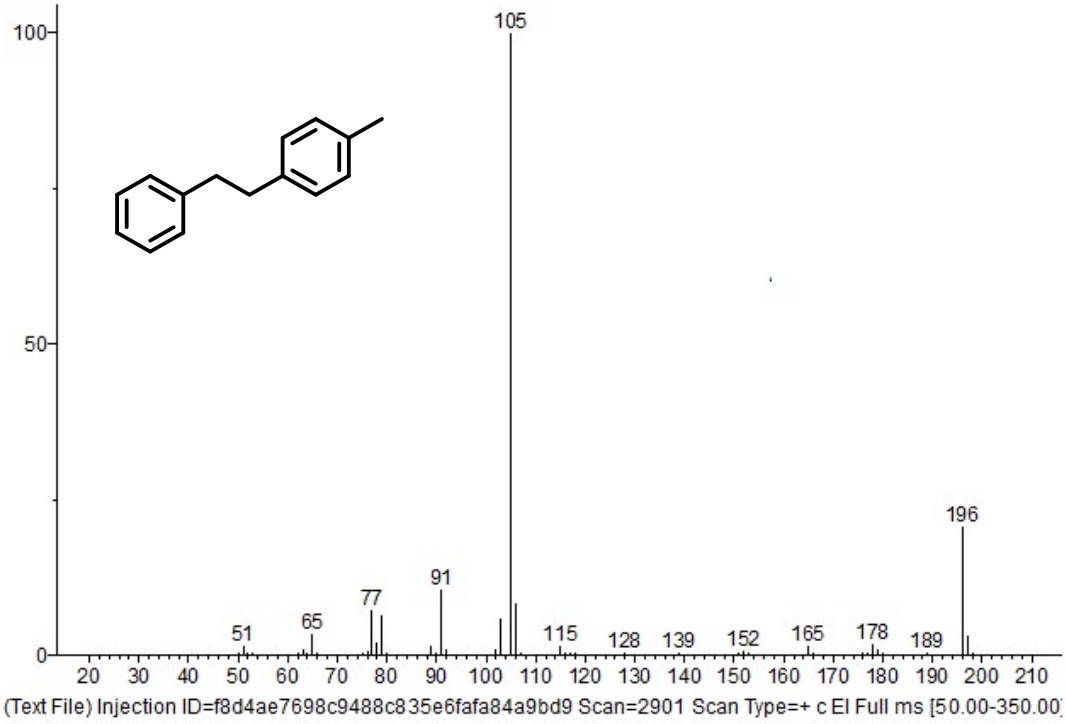
(a22)


100
50
0
91
134
65
77
105
51
58
63
89
115
128
20
30
40
50
60
70
80
90
100
110
120
130
140
150
(Text File) Injection ID=4277d4047118478391e9f429c1ef1ab0 Scan=825 Scan Type=+ c EI Full ms [50.00-350.00]

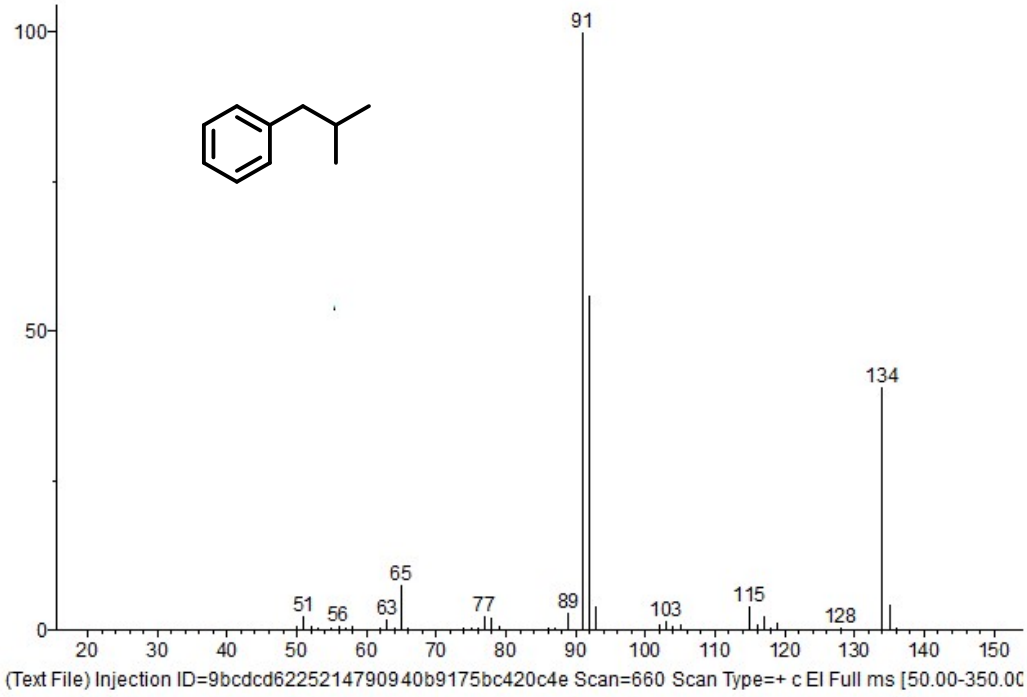
(a23)


100
50
0
91
176
105
65
78
133
51
69
119
147
161
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
(Text File) Injection ID=6b8bc2d84f5248ae98f49080c827280f Scan=2003 Scan Type=+ c EI Full ms [50.00-350.00]

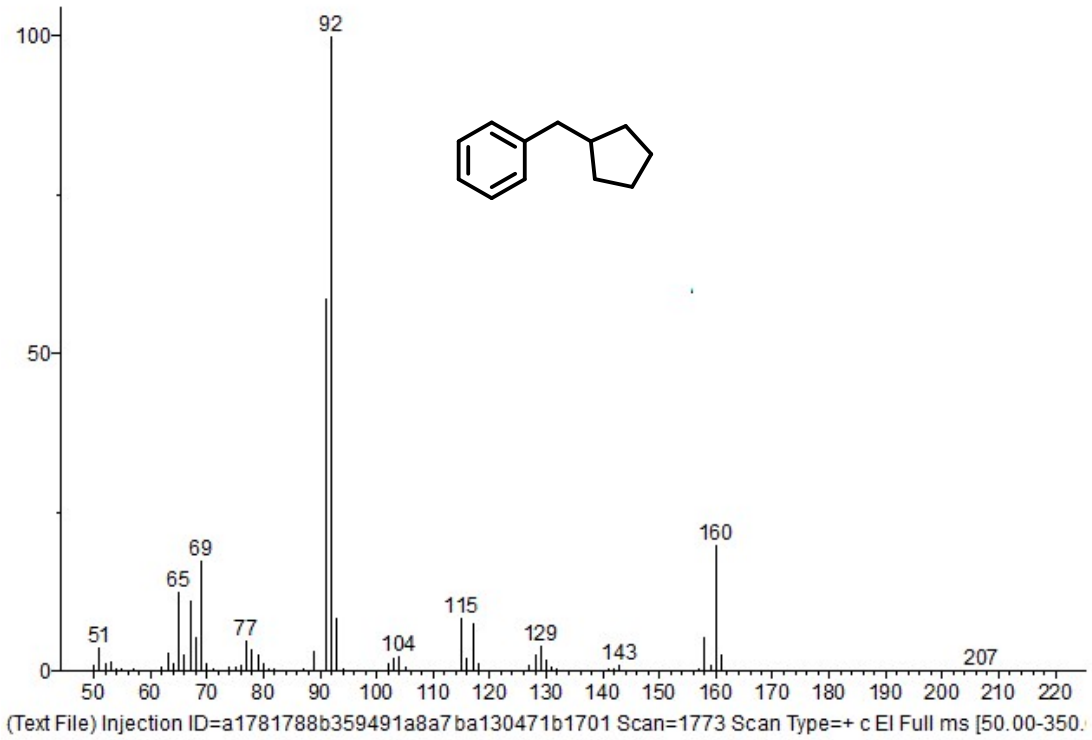
(a24)


100
50
0
105
196
91
77
65
51
115
128
139
152
165
178
189
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=f8d4ae7698c9488c835e6fafa84a9bd9 Scan=2901 Scan Type=+ c EI Full ms [50.00-350.00]

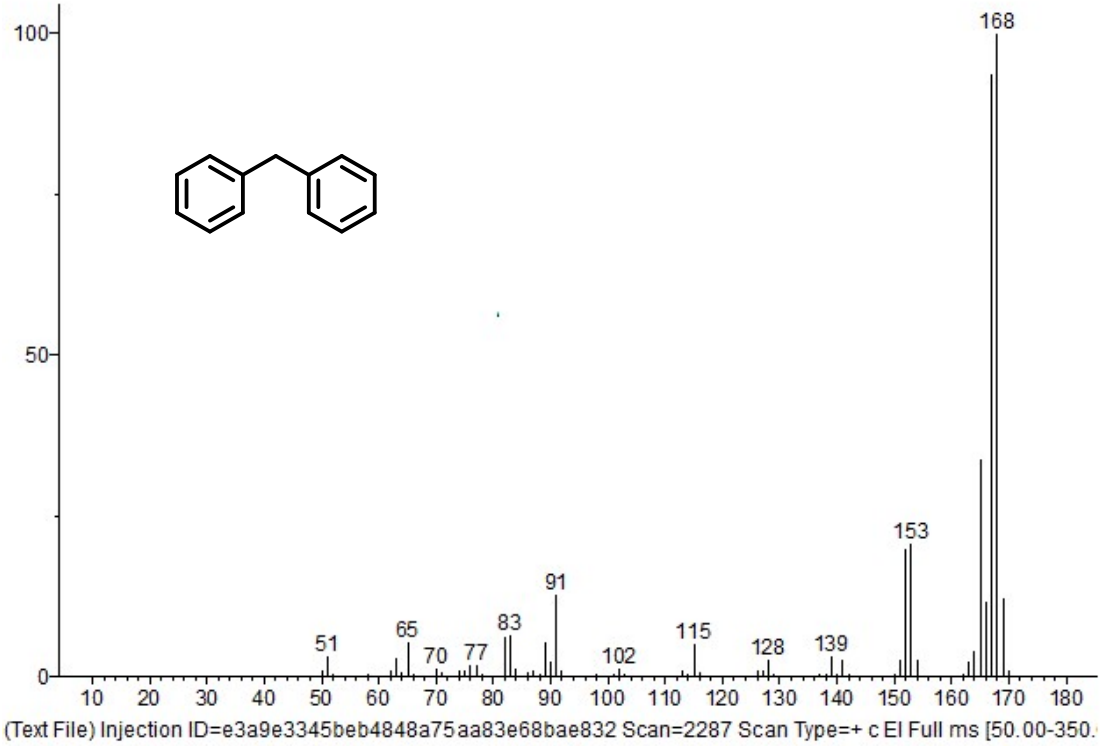
(a25)


100
50
0
91
134
65
51
56
63
77
89
103
115
128
20
30
40
50
60
70
80
90
100
110
120
130
140
150
(Text File) Injection ID=9bcdcd6225214790940b9175bc420c4e Scan=660 Scan Type=+ c EI Full ms [50.00-350.00

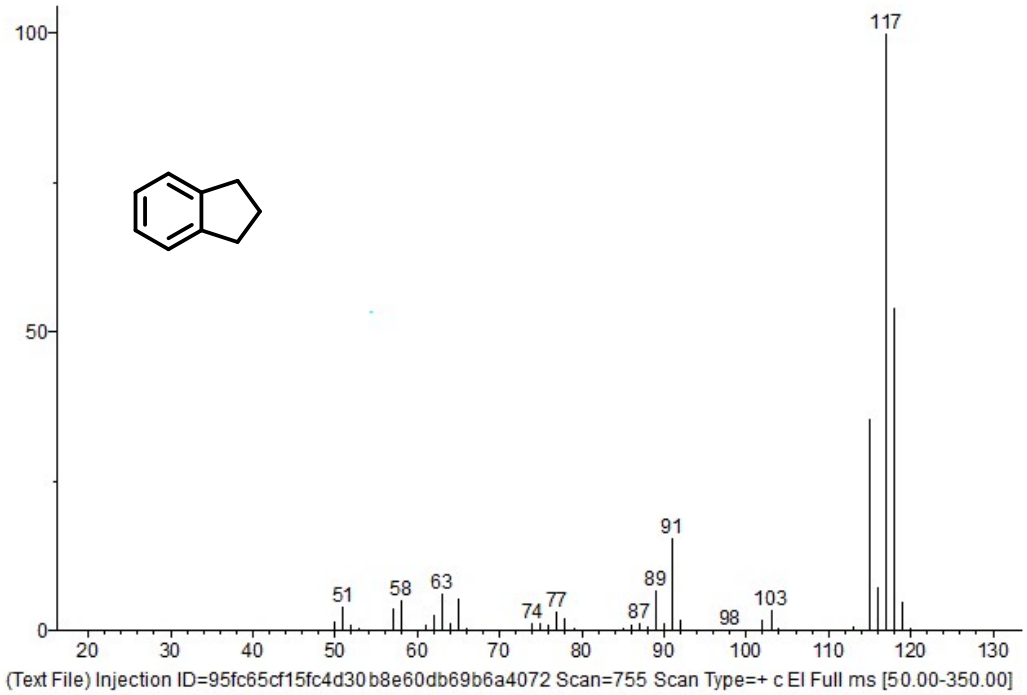
(a26)


100
50
0
92
69
65
51
77
104
115
129
143
160
207
50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=a1781788b359491a8a7ba130471b1701 Scan=1773 Scan Type=+ c EI Full ms [50.00-350.

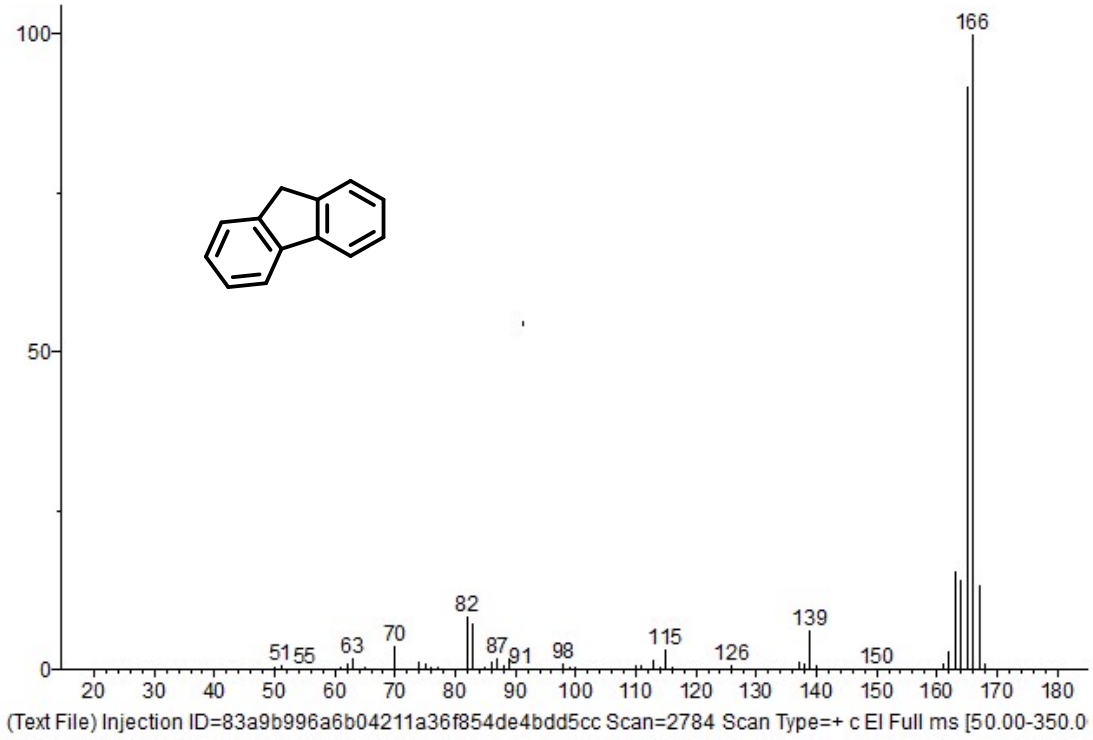
(a27)


100
50
0
168
153
91
83
65
51
70
77
102
115
128
139
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
(Text File) Injection ID=e3a9e3345beb4848a75aa83e68bae832 Scan=2287 Scan Type=+ c EI Full ms [50.00-350.

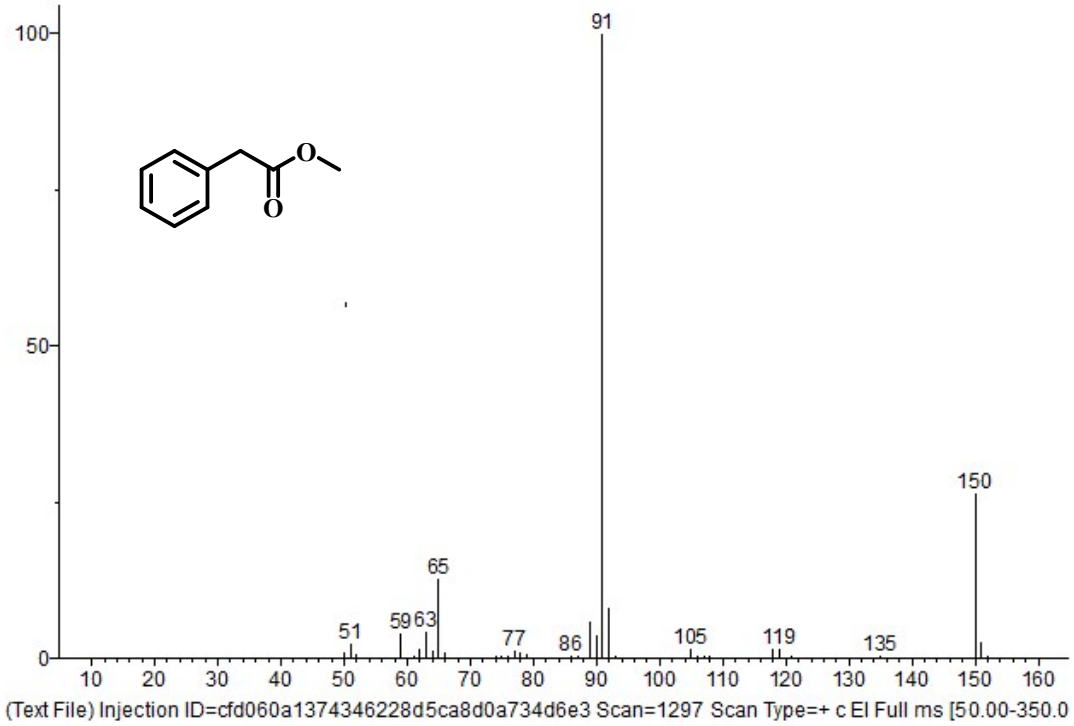
(a28)


100
50
0
117
91
89
51
58
63
74
77
87
98
103
20
30
40
50
60
70
80
90
100
110
120
130
(Text File) Injection ID=95fc65cf15fc4d30b8e60db69b6a4072 Scan=755 Scan Type=+ c EI Full ms [50.00-350.00]

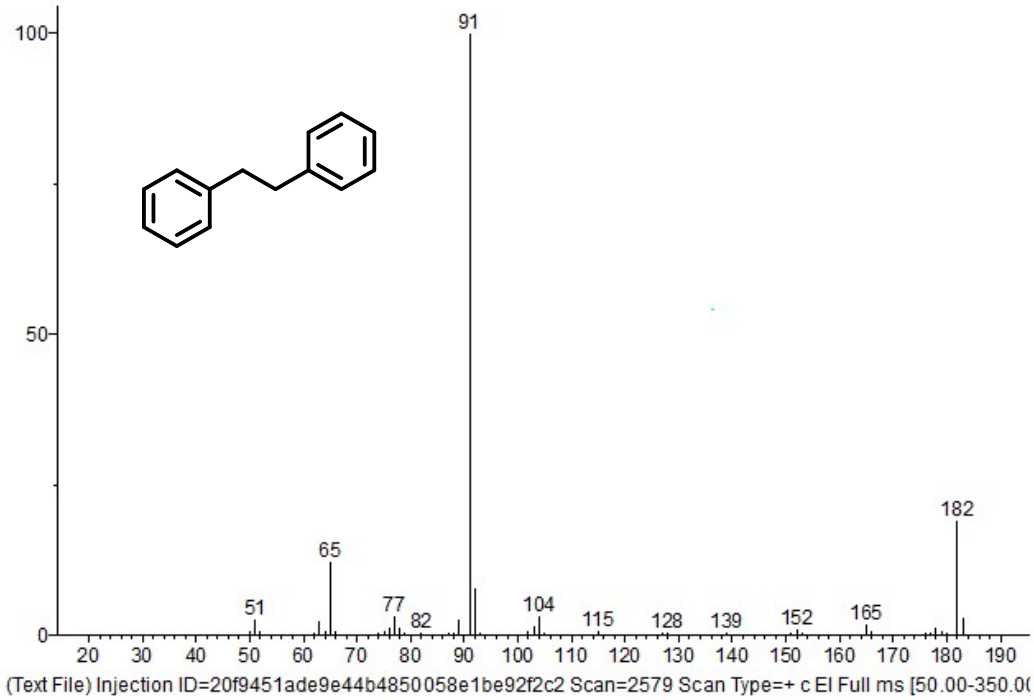
(a29)


100
50
0
166
82
70
63
51
55
87
91
98
115
126
139
150
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
(Text File) Injection ID=83a9b996a6b04211a36f854de4bdd5cc Scan=2784 Scan Type=+ c EI Full ms [50.00-350.0

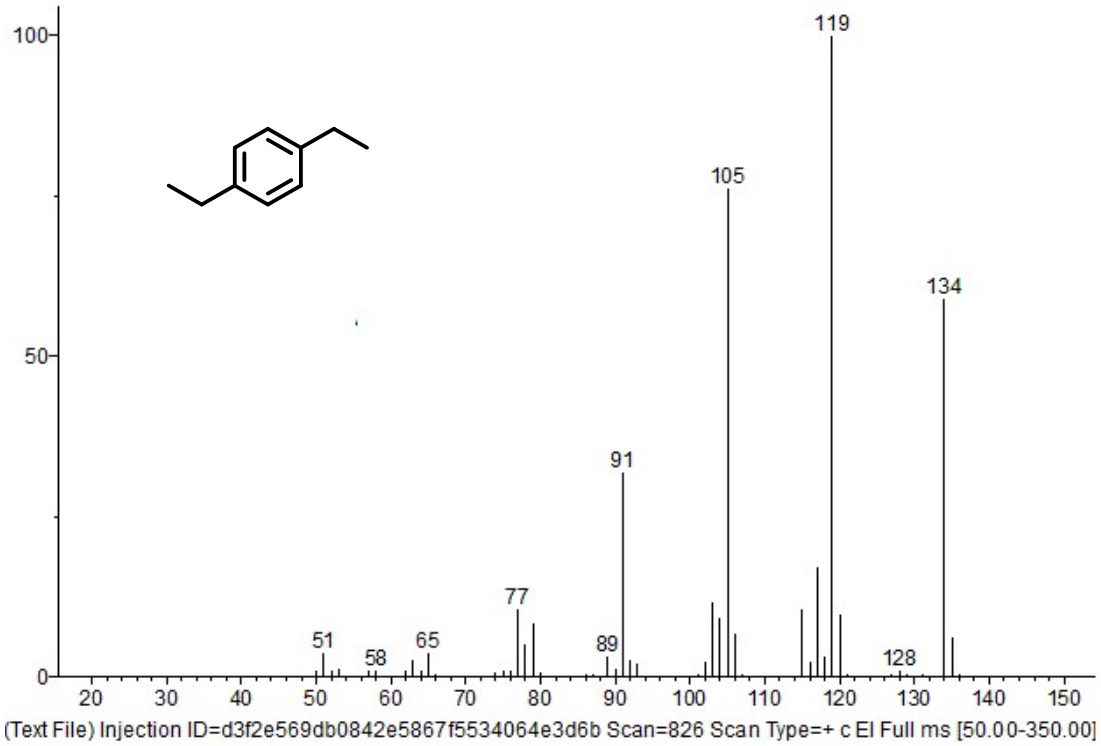
(a30)


100
50
0
91
150
65
51
59
63
77
86
105
119
135
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
O
O
(Text File) Injection ID=cfd060a1374346228d5ca8d0a734d6e3 Scan=1297 Scan Type=+ c EI Full ms [50.00-350.0

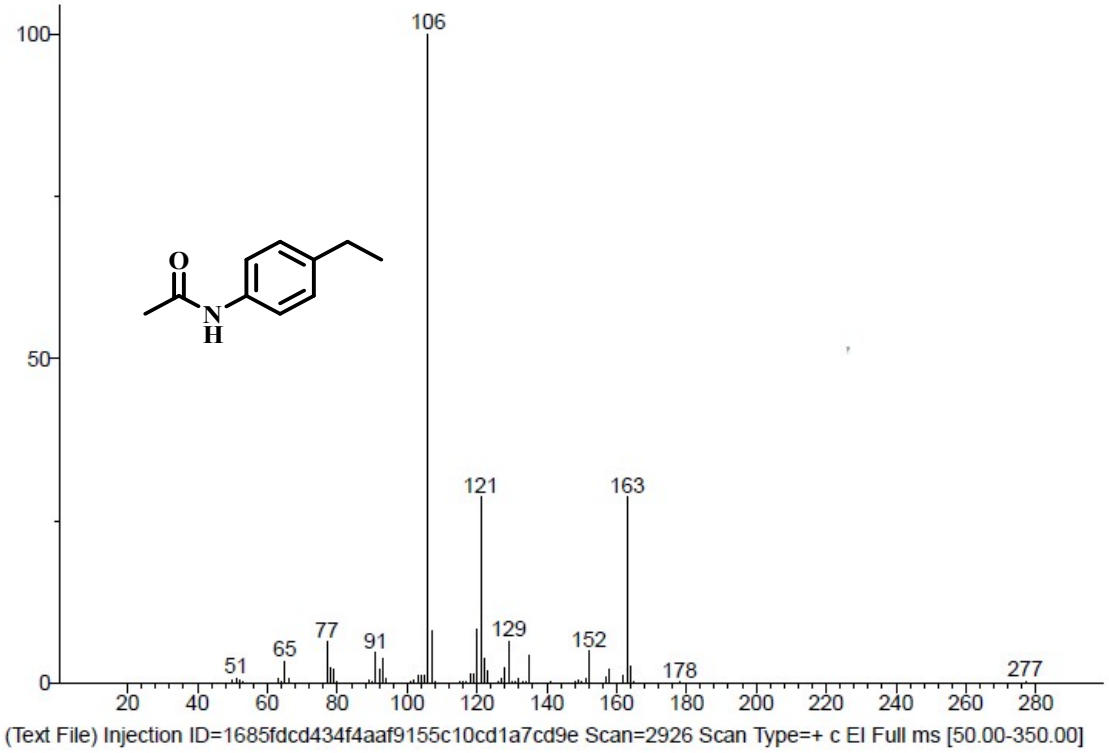
(a31)


100
50
0
91
182
65
51
77
82
104
115
128
139
152
165
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
(Text File) Injection ID=20f9451ade9e44b4850058e1be92f2c2 Scan=2579 Scan Type=+ c EI Full ms [50.00-350.0(

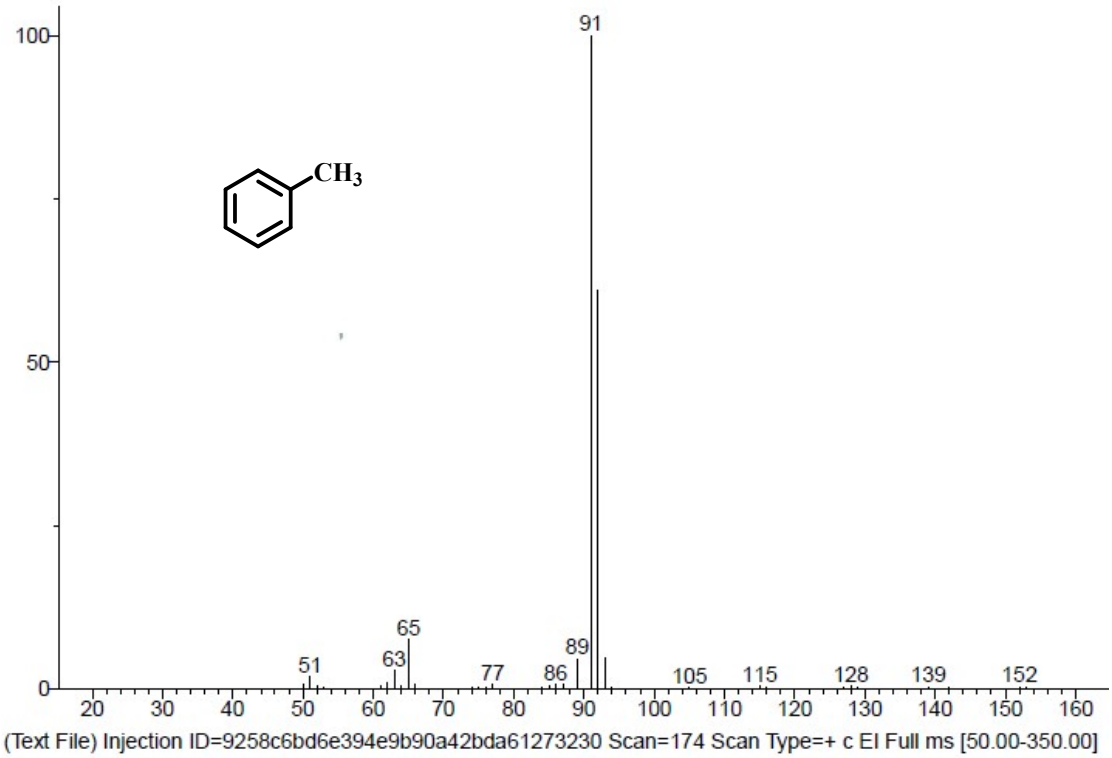
(a32)


100
50
0
119
105
134
91
77
51
58
65
89
128
20
30
40
50
60
70
80
90
100
110
120
130
140
150
(Text File) Injection ID=d3f2e569db0842e5867f5534064e3d6b Scan=826 Scan Type=+ c EI Full ms [50.00-350.00]

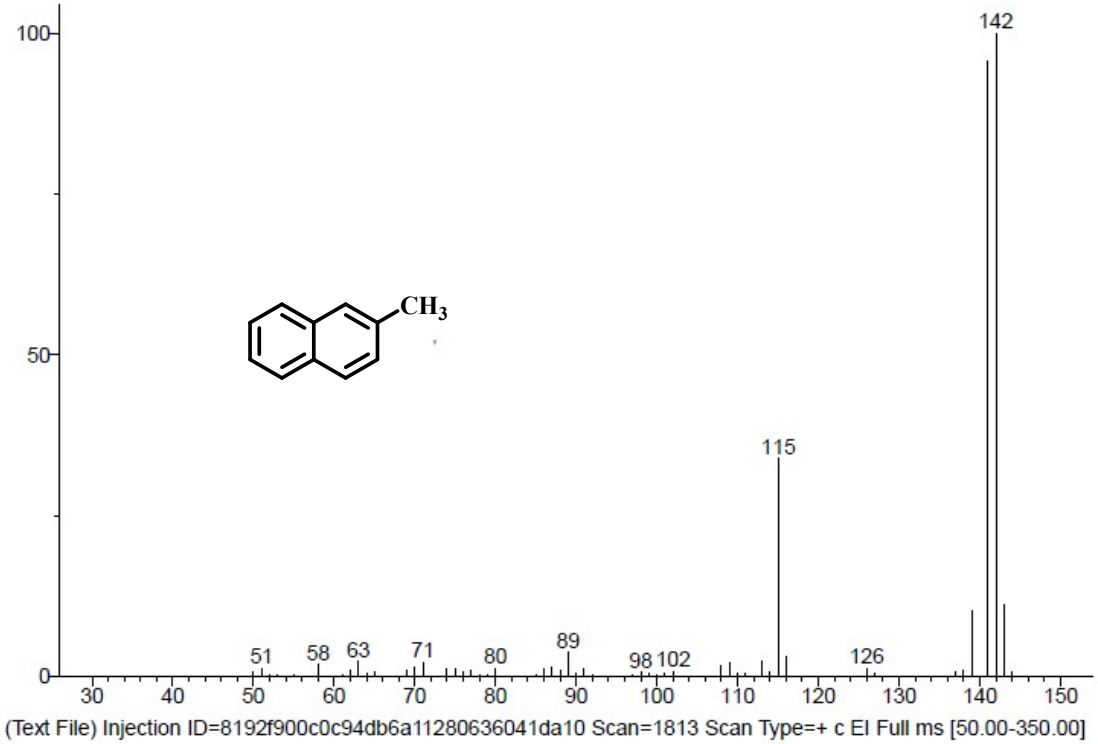
(a33)


100
50
0
106
121
163
77
91
65
51
129
152
178
277
20
40
60
80
100
120
140
160
180
200
220
240
260
280
O
N
H
(Text File) Injection ID=1685fdcd434f4aaf9155c10cd1a7cd9e Scan=2926 Scan Type=+ c EI Full ms [50.00-350.00]

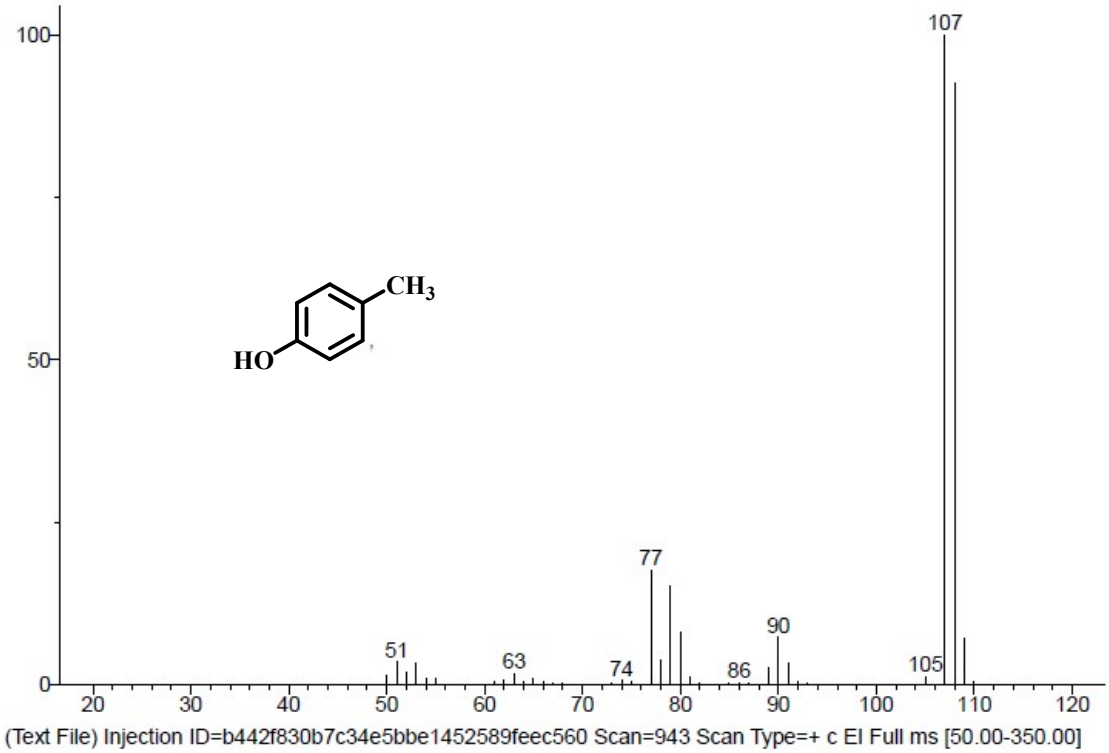
(a34)


100
50
0
91
CH3
65
63
51
89
77
86
105
115
128
139
152
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
(Text File) Injection ID=9258c6bd6e394e9b90a42bda61273230 Scan=174 Scan Type=+ c EI Full ms [50.00-350.00]

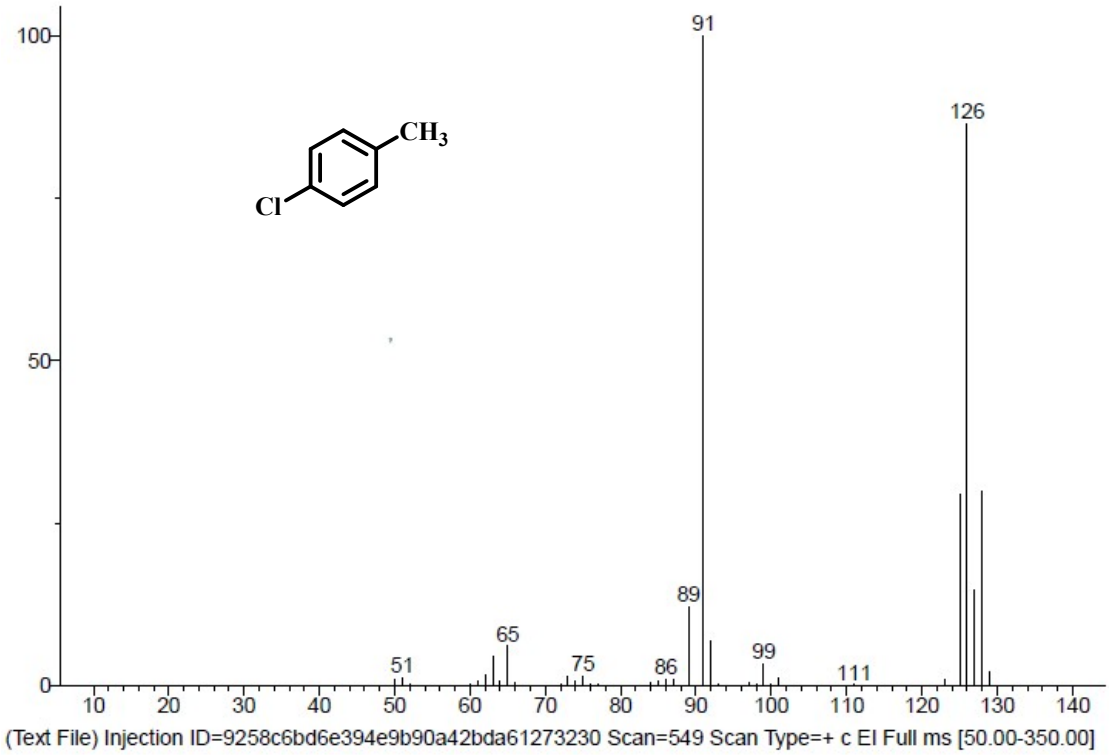
(a35)


100
50
0
142
115
89
51
58
63
71
80
98
102
126
30
40
50
60
70
80
90
100
110
120
130
140
150
CH3
(Text File) Injection ID=8192f900c0c94db6a11280636041da10 Scan=1813 Scan Type=+ c EI Full ms [50.00-350.00]

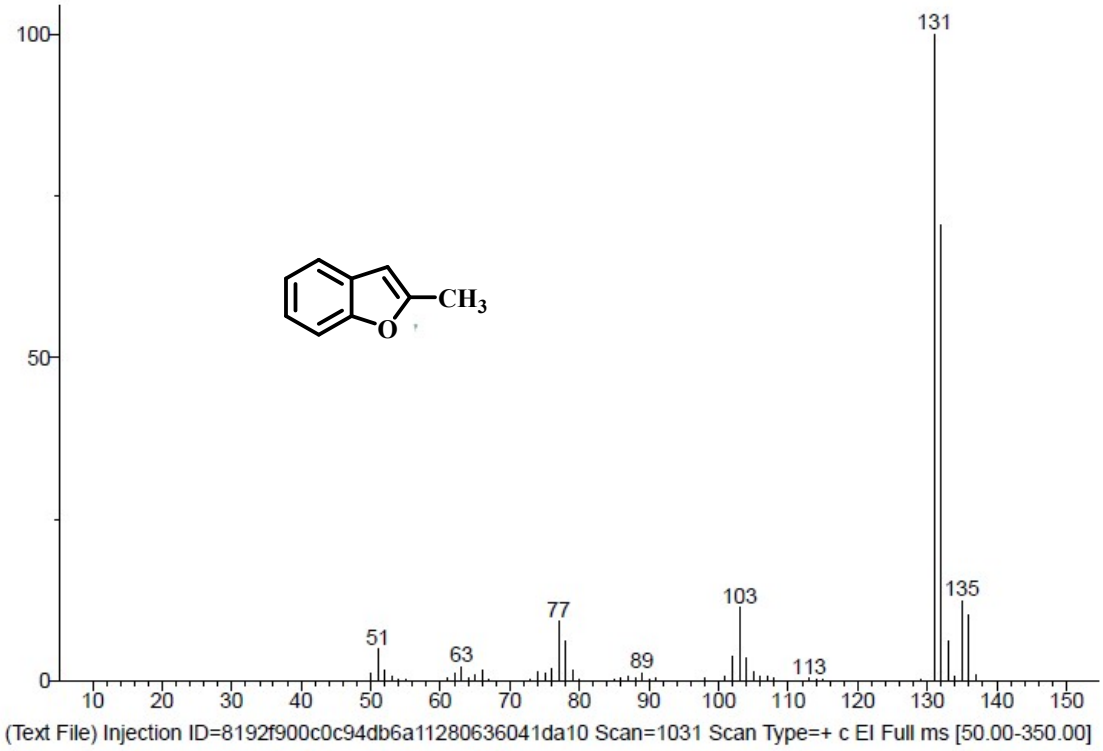
(a36)


100
50
0
107
77
90
51
63
74
86
105
20
30
40
50
60
70
80
90
100
110
120
CH3
HO
(Text File) Injection ID=b442f830b7c34e5bbe1452589feec560 Scan=943 Scan Type=+ c EI Full ms [50.00-350.00]

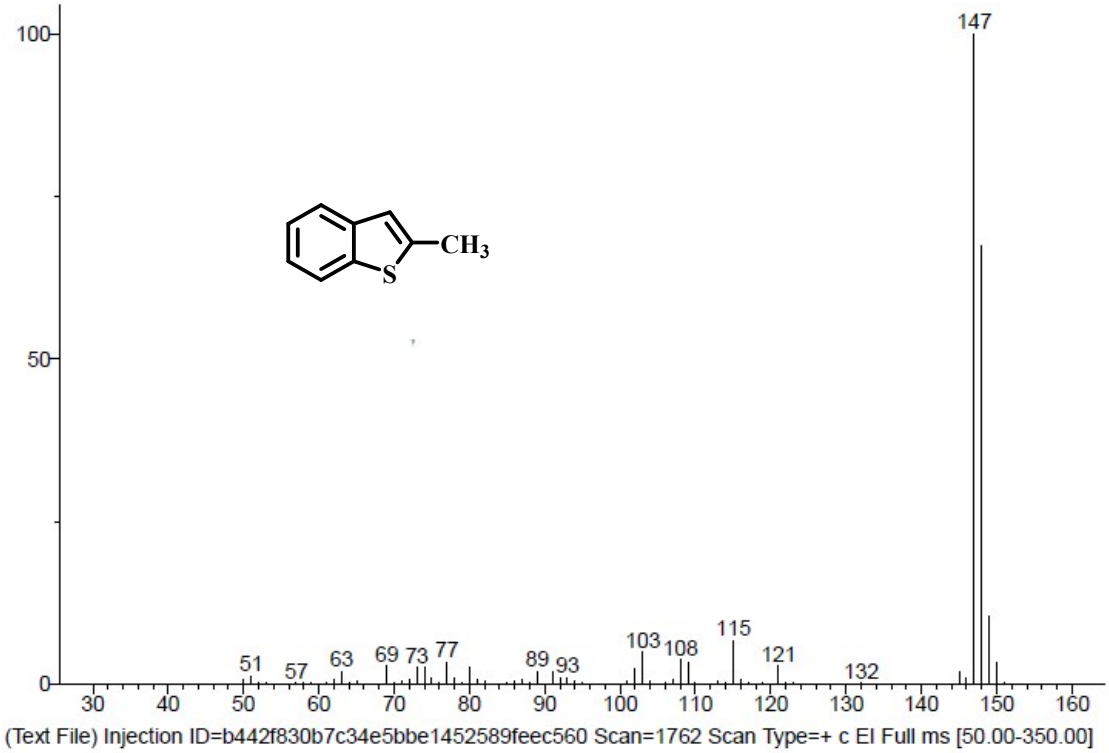
(a37)


100
50
0
91
126
89
65
51
75
86
99
111
10 20 30 40 50 60 70 80 90 100 110 120 130 140
CH3
Cl
(Text File) Injection ID=9258c6bd6e394e9b90a42bda61273230 Scan=549 Scan Type=+ c EI Full ms [50.00-350.00]

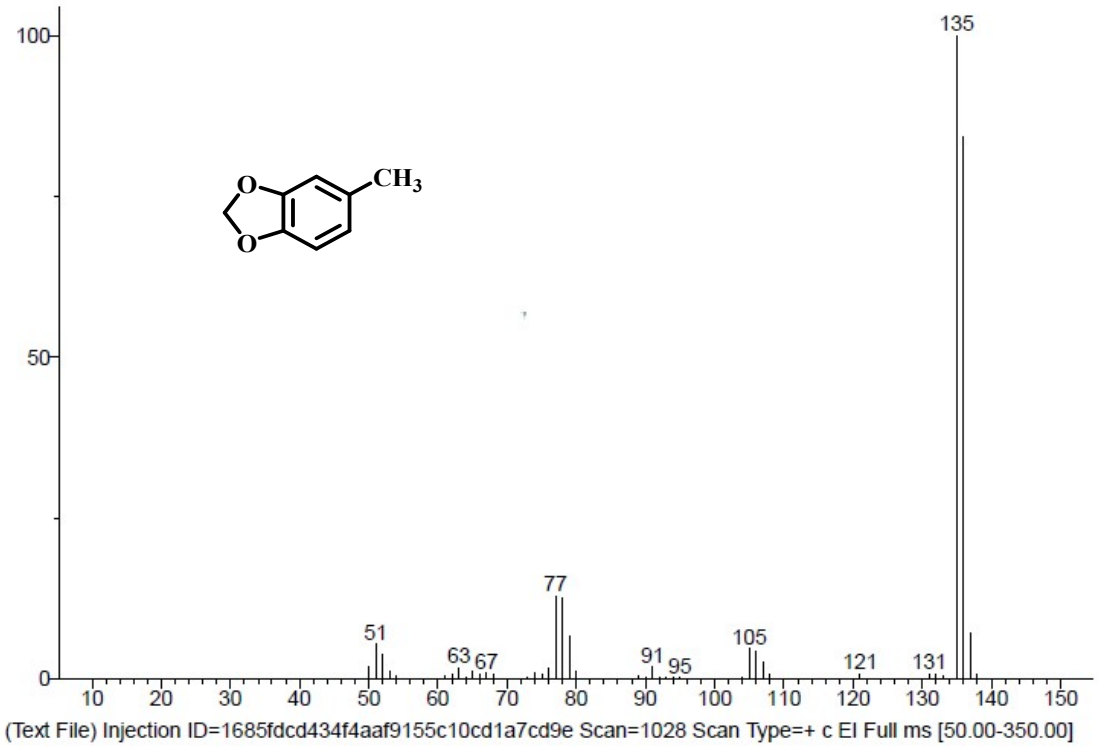
(a38)


100
50
0
131
135
103
77
51
63
89
113
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
CH3
O
(Text File) Injection ID=8192f900c0c94db6a11280636041da10 Scan=1031 Scan Type=+ c EI Full ms [50.00-350.00]

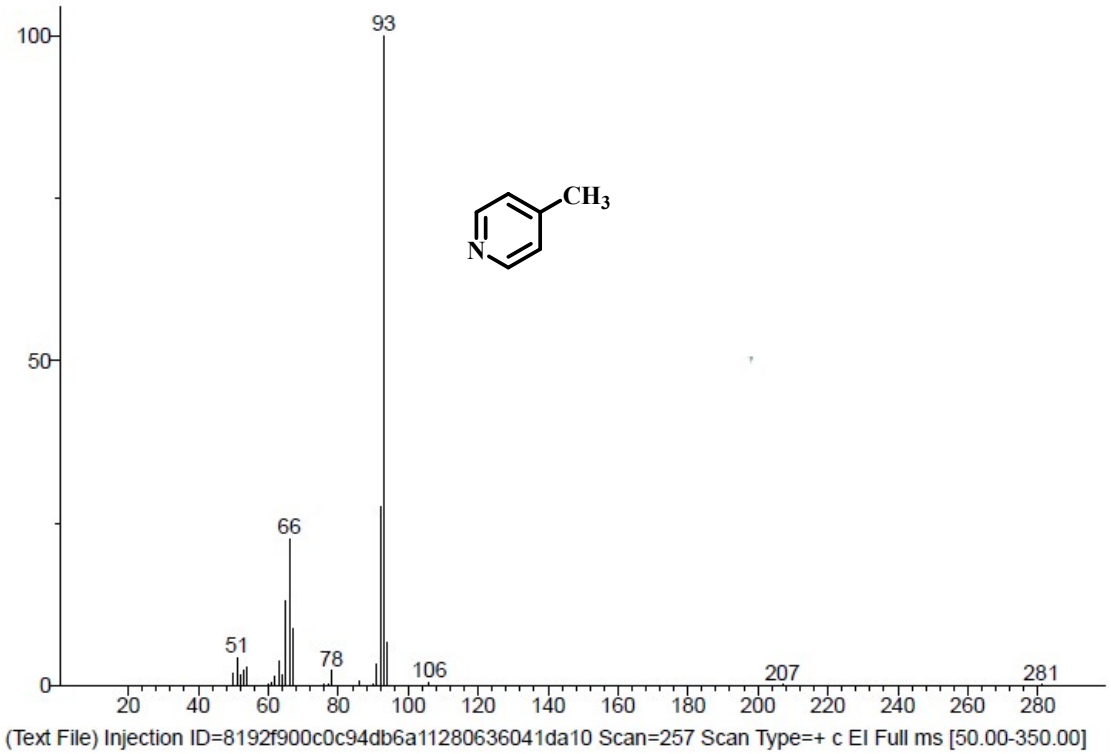
(a39)


100
50
0
147
115
103
108
121
132
89
93
51
57
63
69
73
77
30
40
50
60
70
80
90
100
110
120
130
140
150
160
CH3
S
(Text File) Injection ID=b442f830b7c34e5bbe1452589feec560 Scan=1762 Scan Type=+ c EI Full ms [50.00-350.00]

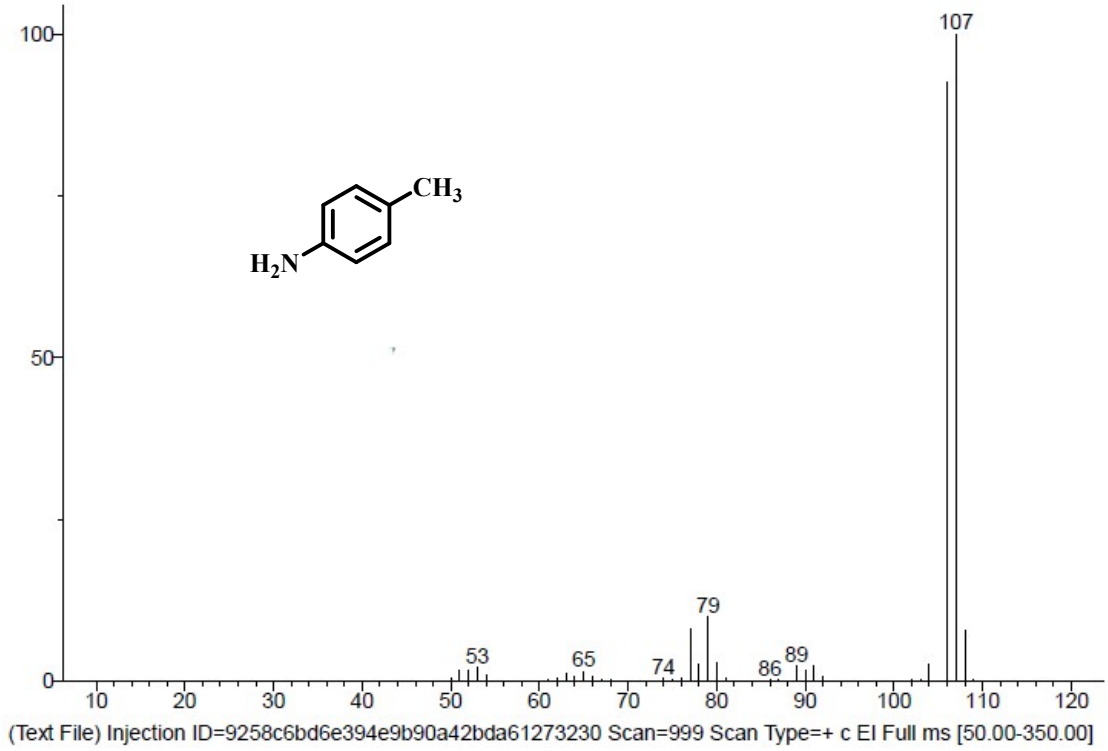
(a40)


100
50
0
O
O
CH3
135
77
51
63
67
91
95
105
121
131
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
(Text File) Injection ID=1685fdcd434f4aaf9155c10cd1a7cd9e Scan=1028 Scan Type=+ c EI Full ms [50.00-350.00]

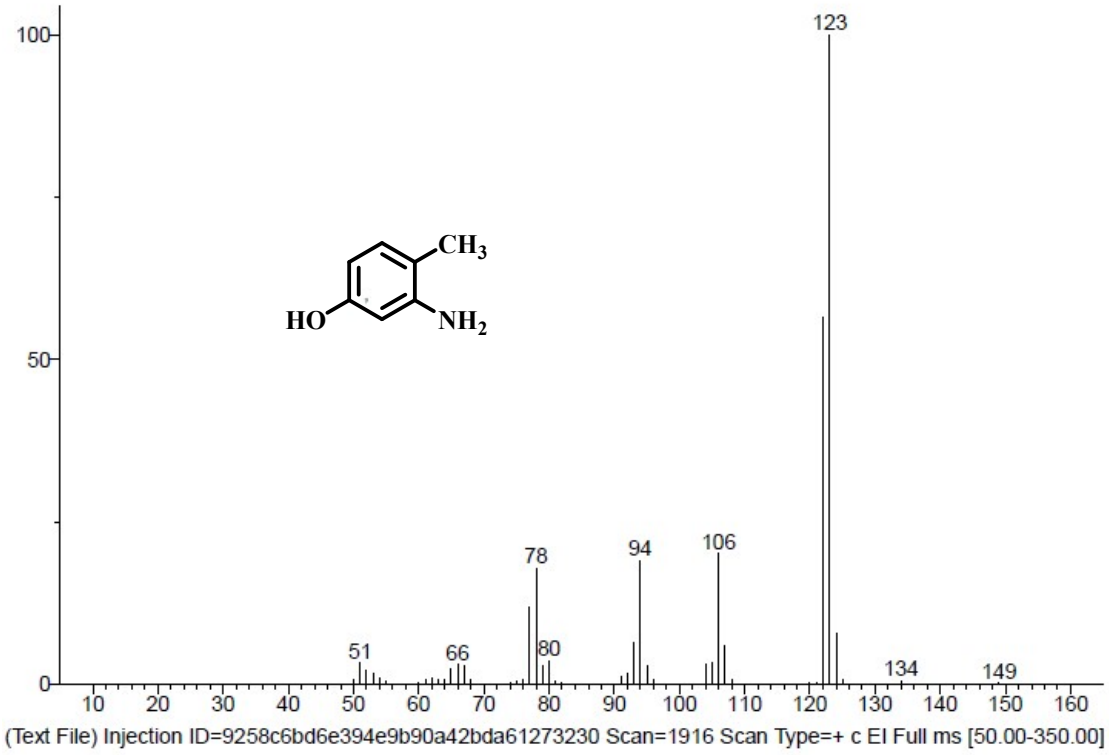
(a41)


100
50
0
93
66
51
78
106
207
281
20
40
60
80
100
120
140
160
180
200
220
240
260
280
CH3
N
(Text File) Injection ID=8192f900c0c94db6a11280636041da10 Scan=257 Scan Type=+ c EI Full ms [50.00-350.00]

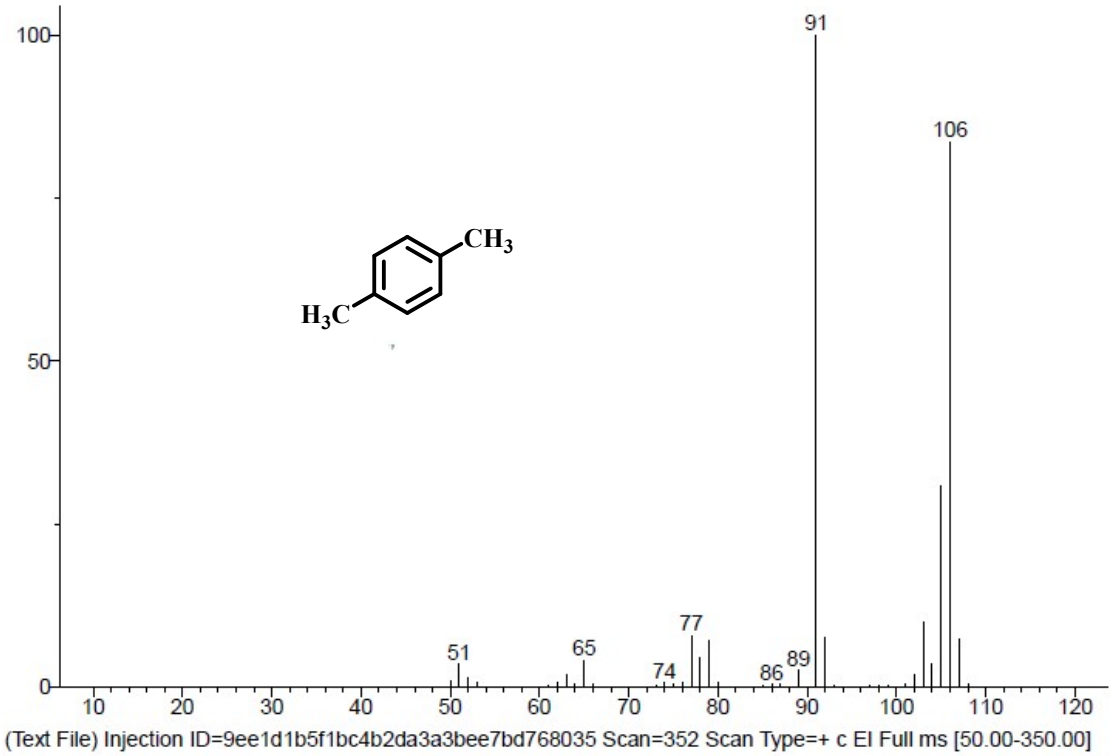
(a42)


100
50
0
107
79
53
65
74
86
89
10
20
30
40
50
60
70
80
90
100
110
120
CH3
H2N
(Text File) Injection ID=9258c6bd6e394e9b90a42bda61273230 Scan=999 Scan Type=+ c EI Full ms [50.00-350.00]

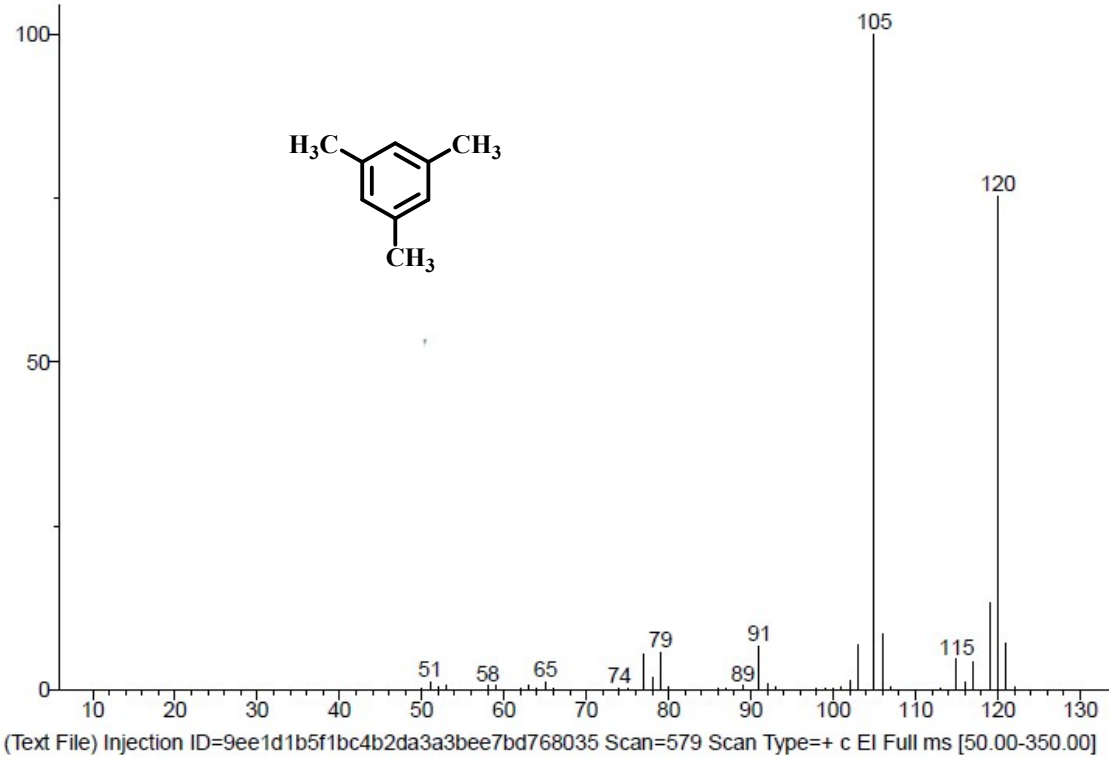
(a43)


100
50
0
123
94
106
78
80
51
66
134
149
CH3
HO
NH2
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
(Text File) Injection ID=9258c6bd6e394e9b90a42bda61273230 Scan=1916 Scan Type=+ c EI Full ms [50.00-350.00]

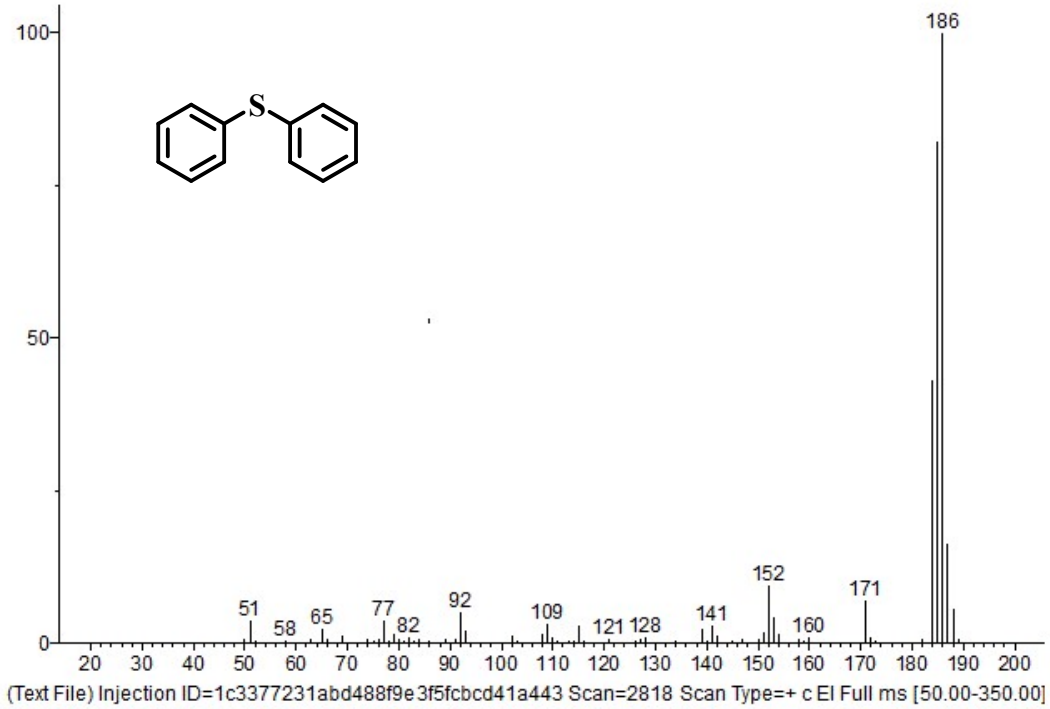
(a44)


100
50
0
91
106
77
51
65
74
86
89
10
20
30
40
50
60
70
80
90
100
110
120
CH3
H3C
(Text File) Injection ID=9ee1d1b5f1bc4b2da3a3bee7bd768035 Scan=352 Scan Type=+ c EI Full ms [50.00-350.00]

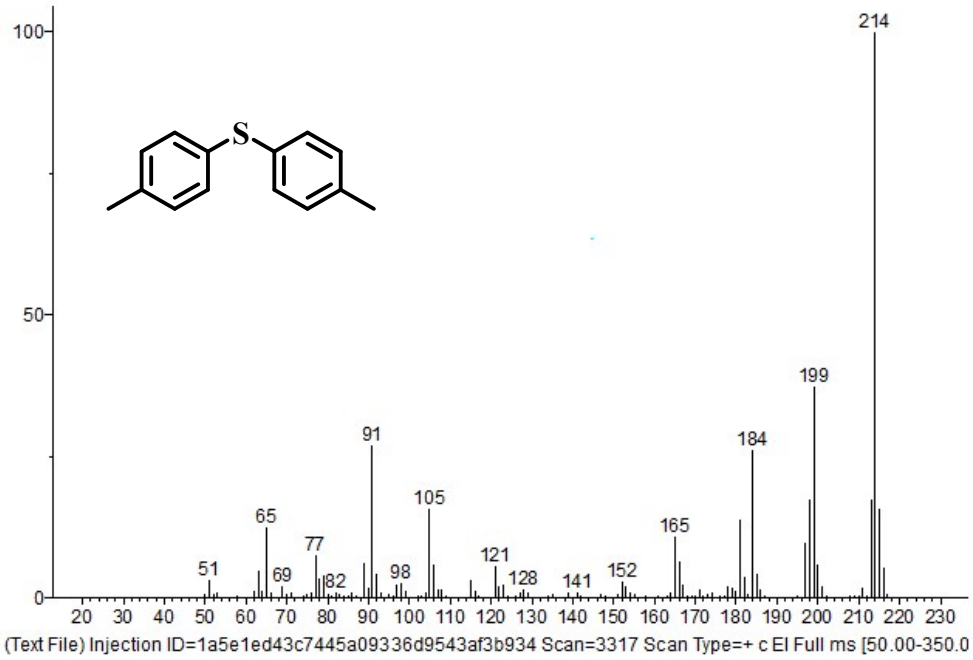
(a45)


100
50
0
105
120
79
91
51
58
65
74
89
115
10
20
30
40
50
60
70
80
90
100
110
120
130
H_3C
CH_3
CH_3
(Text File) Injection ID=9ee1d1b5f1bc4b2da3a3bee7bd768035 Scan=579 Scan Type=+ c EI Full ms [50.00-350.00]

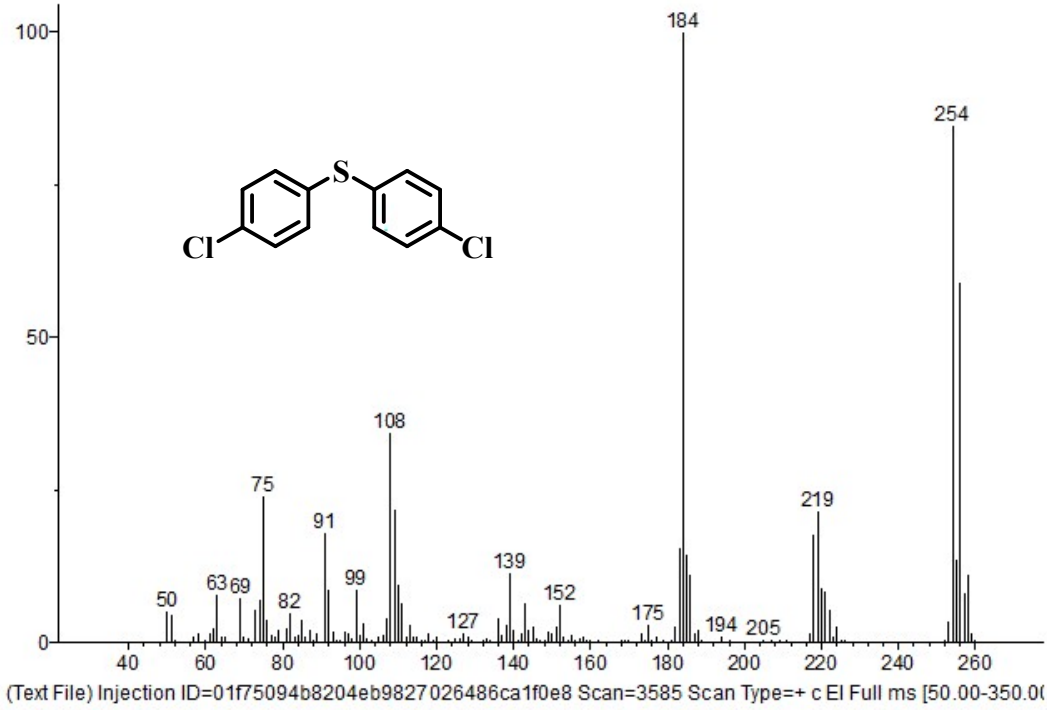
(b1)


100
50
0
S
186
152
171
51
58
65
77
82
92
109
121
128
141
160
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
(Text File) Injection ID=1c3377231abd488f9e3f5fcbcd41a443 Scan=2818 Scan Type=+ c EI Full ms [50.00-350.00]

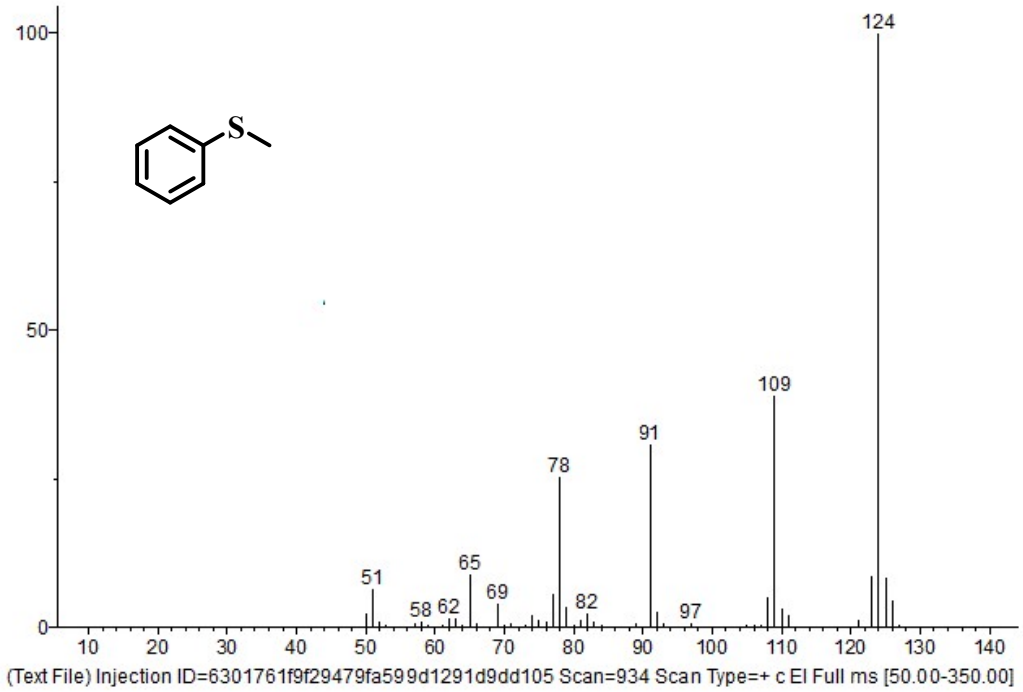
(b2)


100
50
0
S
214
199
184
91
105
65
77
165
121
51
69
82
98
128
141
152
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230
(Text File) Injection ID=1a5e1ed43c7445a09336d9543af3b934 Scan=3317 Scan Type=+ c EI Full ms [50.00-350.0

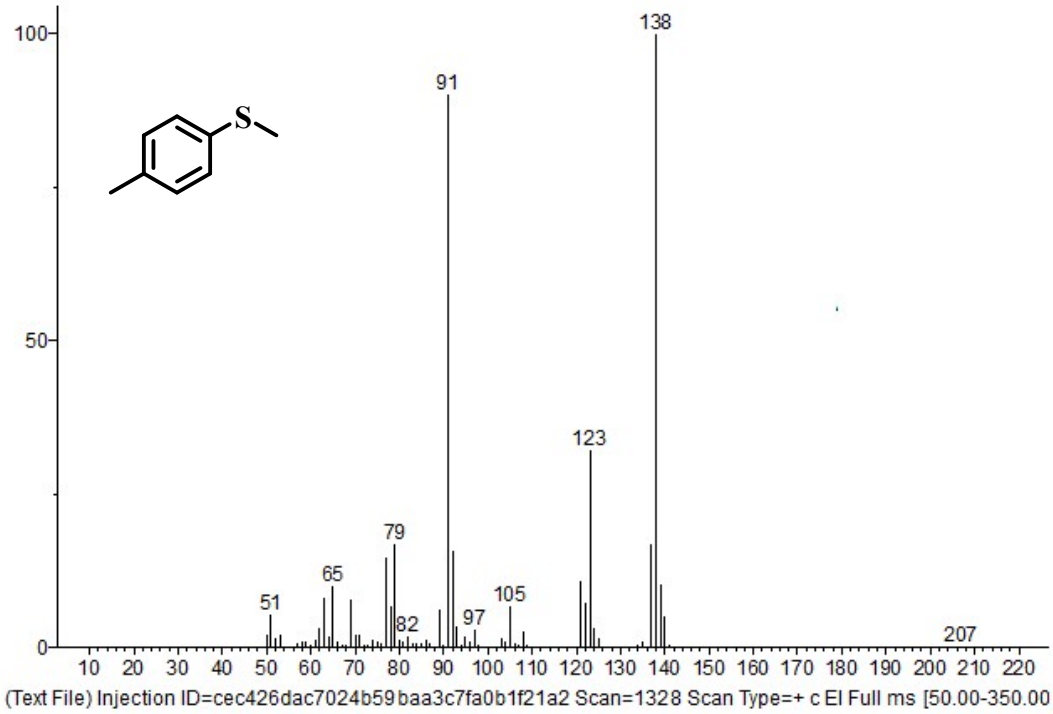
(b3)


100
50
0
184
254
108
75
91
219
139
63
69
99
50
82
152
127
175
194
205
40
60
80
100
120
140
160
180
200
220
240
260
S
Cl
Cl
(Text File) Injection ID=01f75094b8204eb9827026486ca1f0e8 Scan=3585 Scan Type=+ c EI Full ms [50.00-350.0(

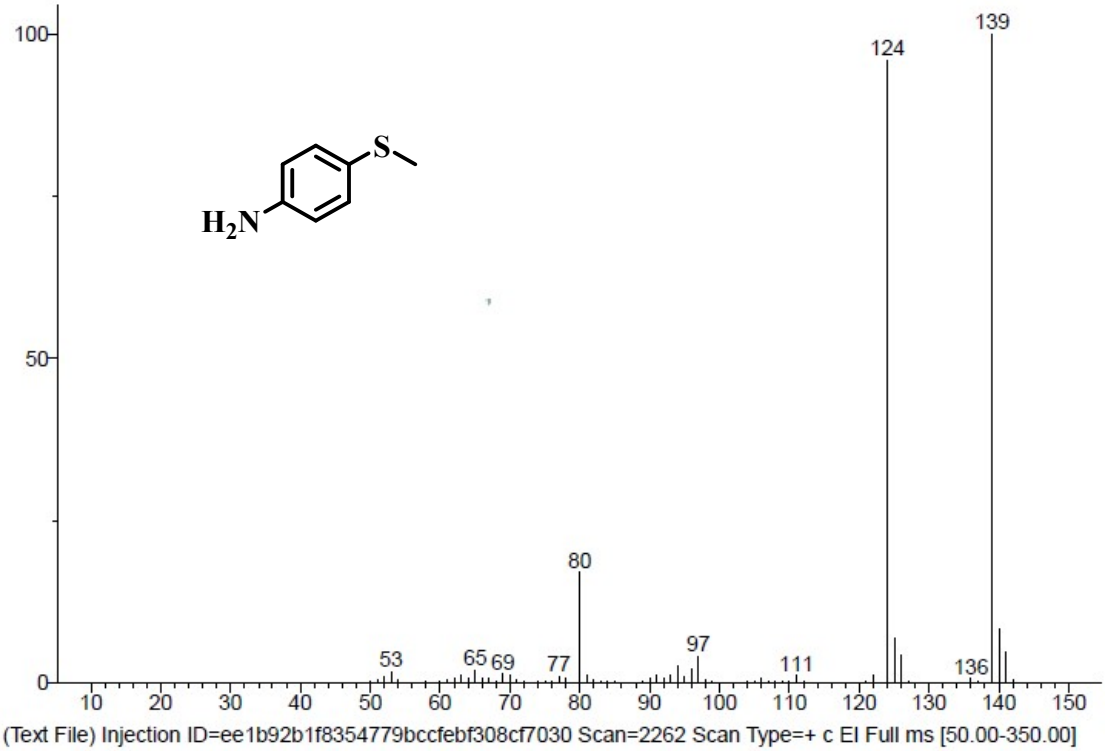
(b4)


100
50
0
S
124
109
91
78
65
69
51
58
62
82
97
10
20
30
40
50
60
70
80
90
100
110
120
130
140
(Text File) Injection ID=6301761f9f29479fa599d1291d9dd105 Scan=934 Scan Type=+ c EI Full ms [50.00-350.00]

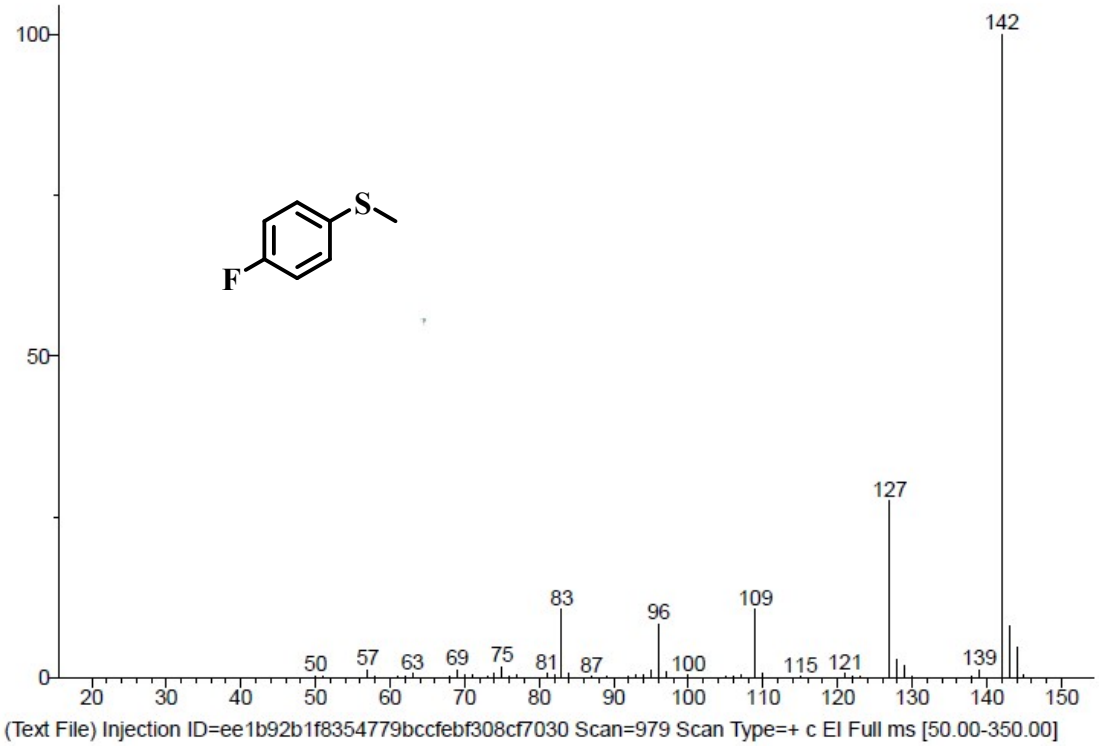
(b5)


100
50
0
138
91
123
79
65
51
105
97
82
207
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=cec426dac7024b59baa3c7fa0b1f21a2 Scan=1328 Scan Type=+ c EI Full ms [50.00-350.00

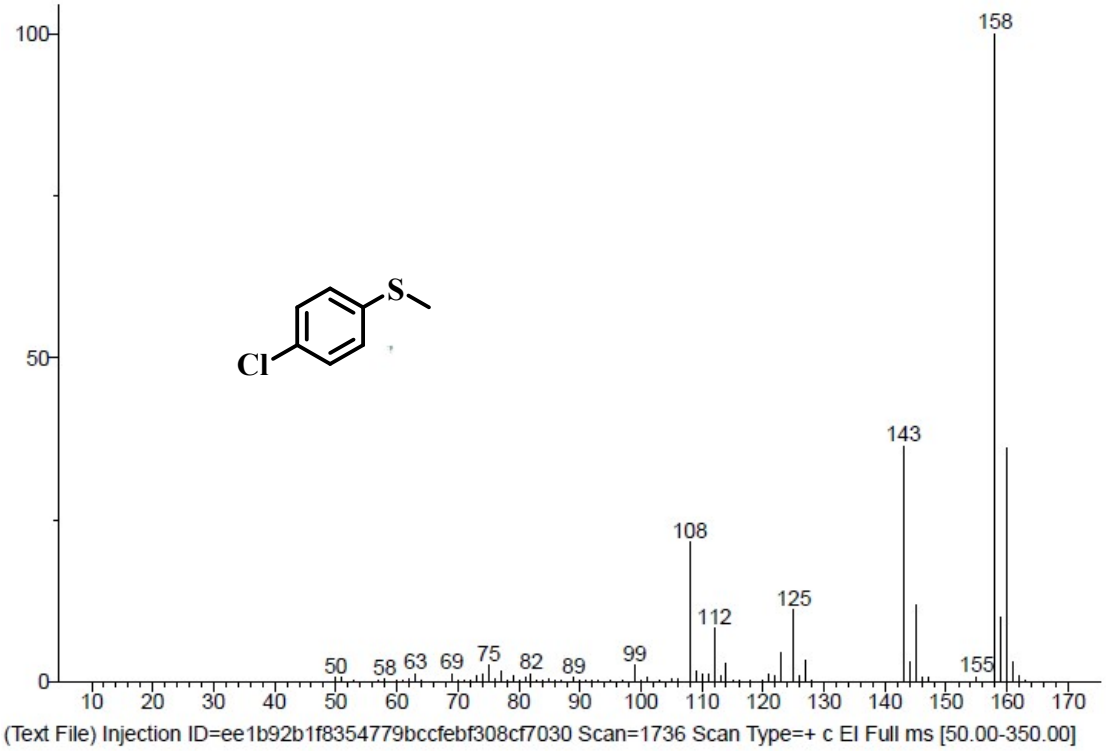
(b6)


100
50
0
139
124
80
97
53
65
69
77
111
136
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
S
H2N
(Text File) Injection ID=ee1b92b1f8354779bccfebf308cf7030 Scan=2262 Scan Type=+ c EI Full ms [50.00-350.00]

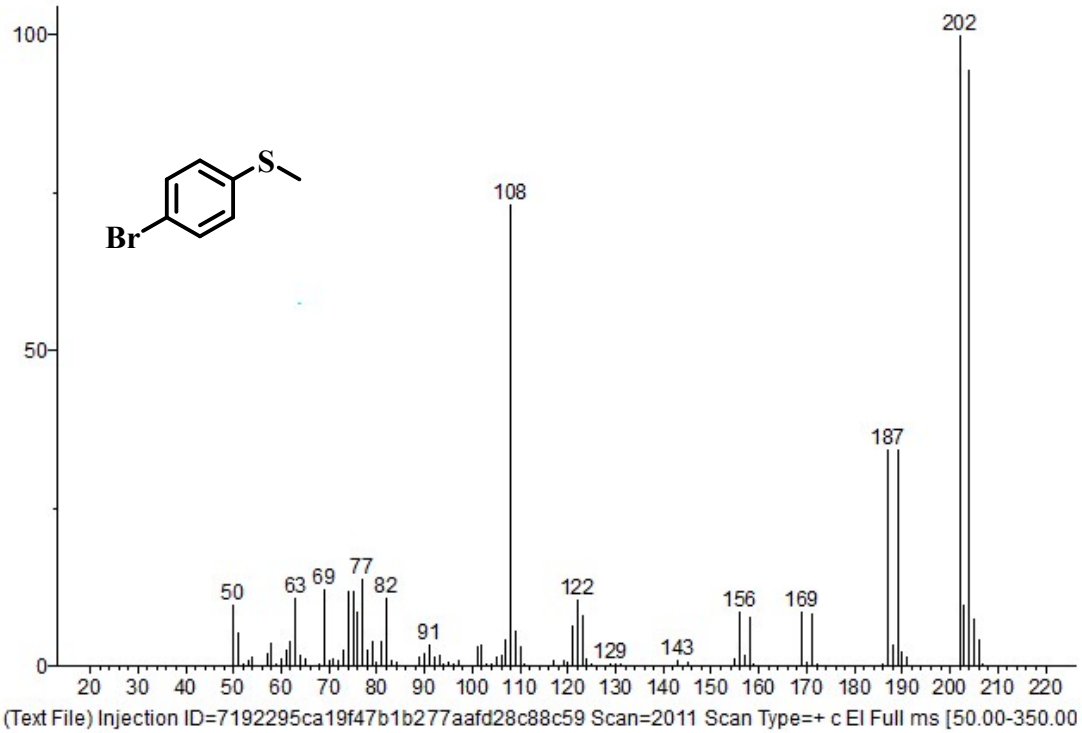
(b7)


100
50
0
142
127
83
96
109
50 57 63 69 75 81 87 100 115 121 139
20 30 40 50 60 70 80 90 100 110 120 130 140 150
S
F
(Text File) Injection ID=ee1b92b1f8354779bccfebf308cf7030 Scan=979 Scan Type=+ c EI Full ms [50.00-350.00]

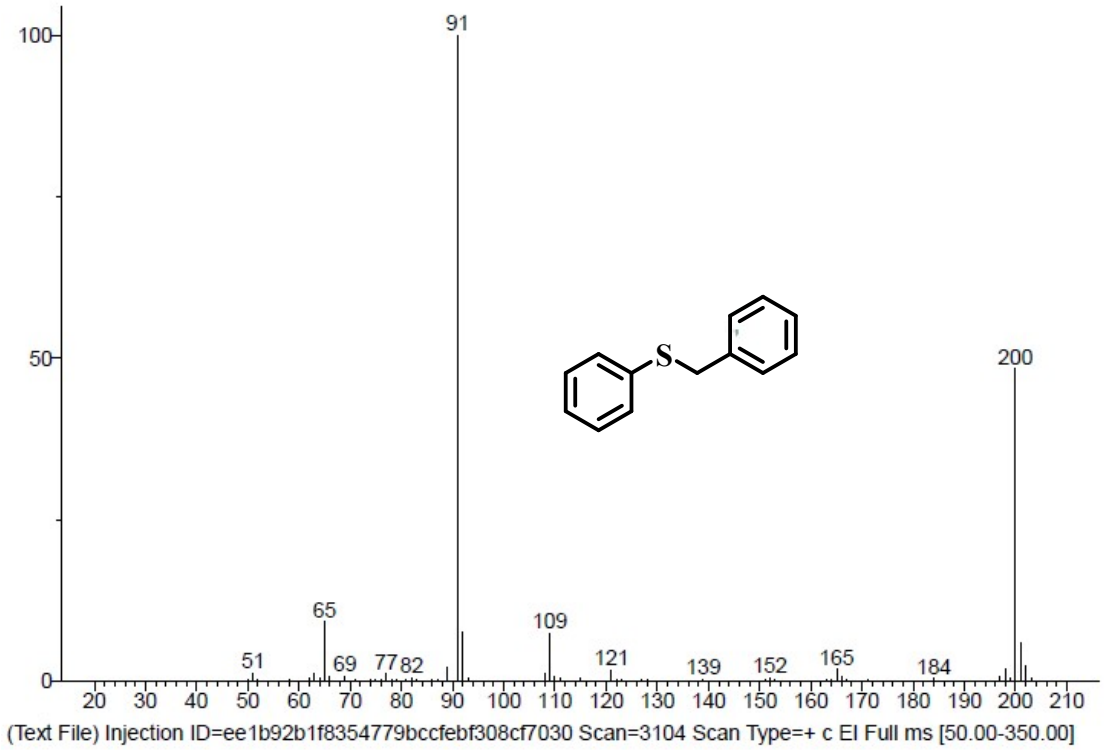
(b8)


100
50
0
158
143
108
125
112
50 58 63 69 75 82 89 99
155
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170
S
Cl
(Text File) Injection ID=ee1b92b1f8354779bccfebf308cf7030 Scan=1736 Scan Type=+ c EI Full ms [50.00-350.00]

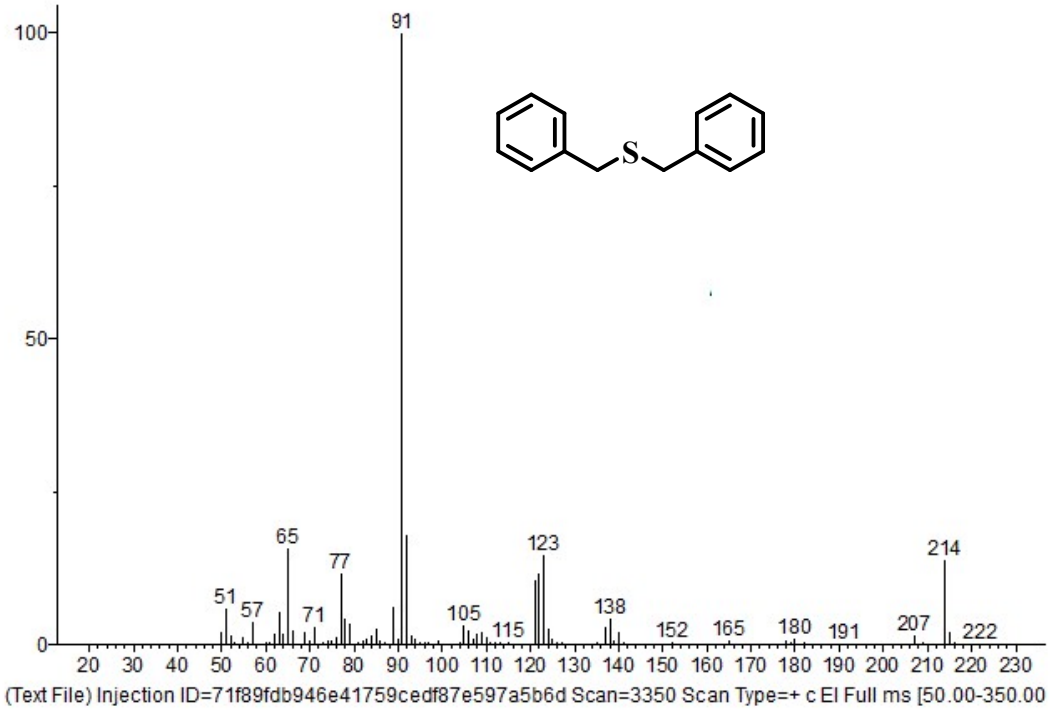
(b9)


100
50
0
Br
S
202
108
187
77
69
63
82
50
122
156
169
91
129
143
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=7192295ca19f47b1b277aafd28c88c59 Scan=2011 Scan Type=+ c EI Full ms [50.00-350.00

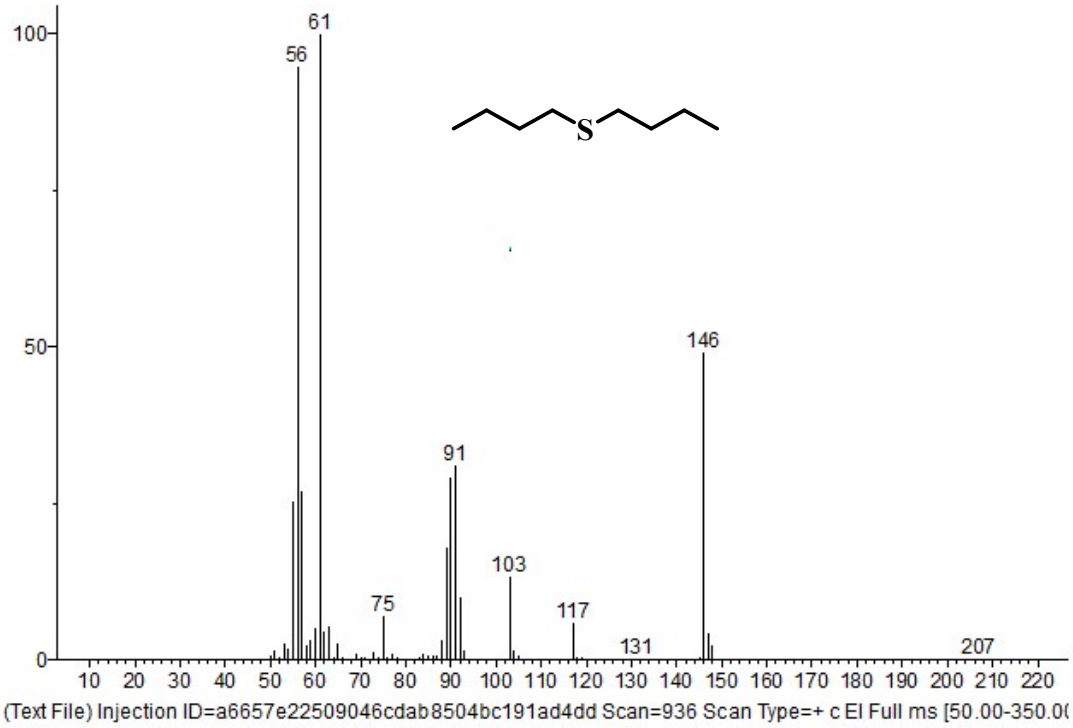
(b10)


100
50
0
91
200
65
109
51
69
77
82
121
139
152
165
184
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
S
(Text File) Injection ID=ee1b92b1f8354779bccfebf308cf7030 Scan=3104 Scan Type=+ c EI Full ms [50.00-350.00]

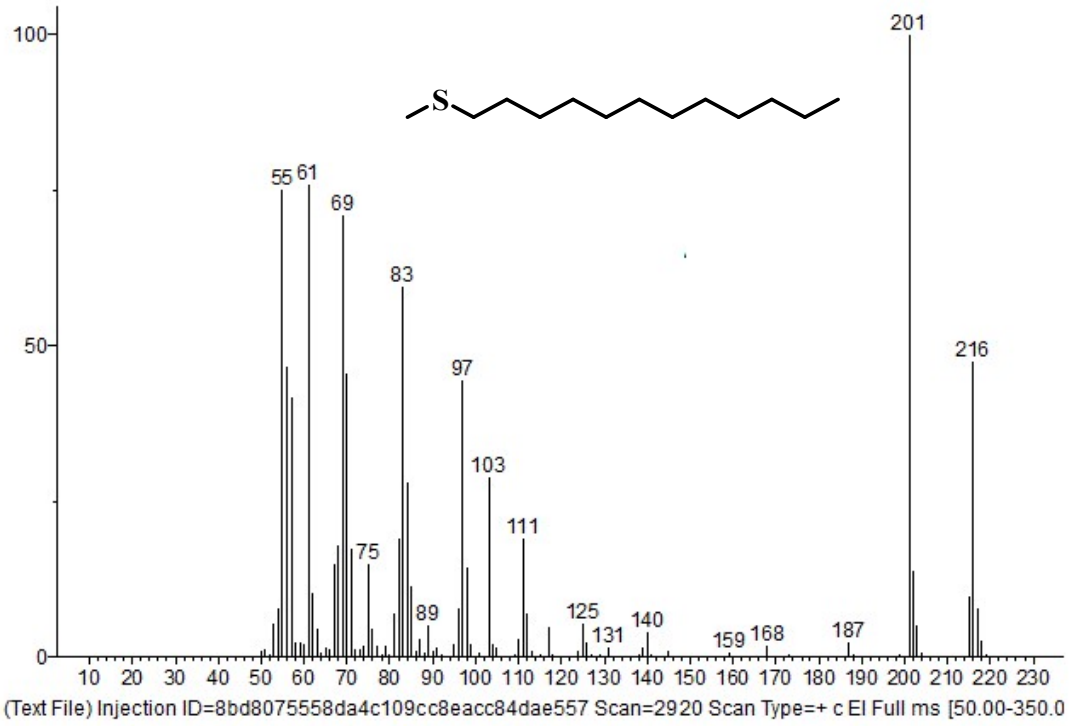
(b12)


100
50
0
91
65
77
51
57
71
105
115
123
138
152
165
180
191
207
214
222
S
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230
(Text File) Injection ID=71f89fdb946e41759cedf87e597a5b6d Scan=3350 Scan Type=+ c EI Full ms [50.00-350.00

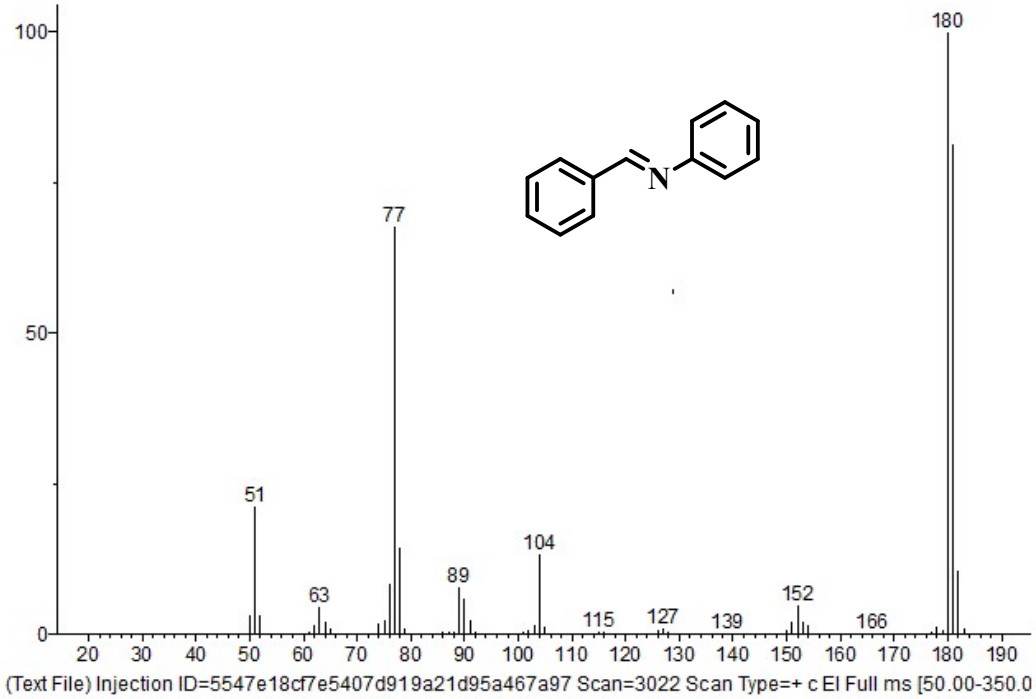
(b13)


100
50
0
61
56
91
146
103
75
117
131
207
S
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=a6657e22509046cdab8504bc191ad4dd Scan=936 Scan Type=+ c EI Full ms [50.00-350.0

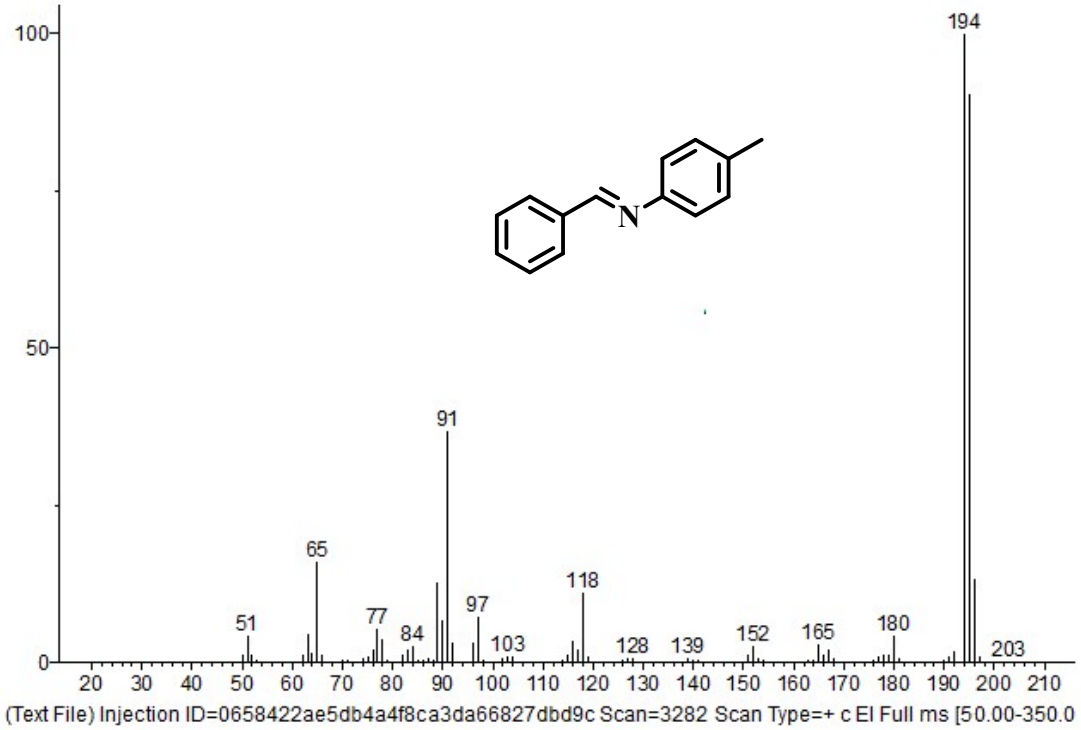
(b14)


100
50
0
S
201
55
61
69
83
97
216
103
111
75
89
125
131
140
159
168
187
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230
(Text File) Injection ID=8bd8075558da4c109cc8eacc84dae557 Scan=2920 Scan Type=+ c EI Full ms [50.00-350.0

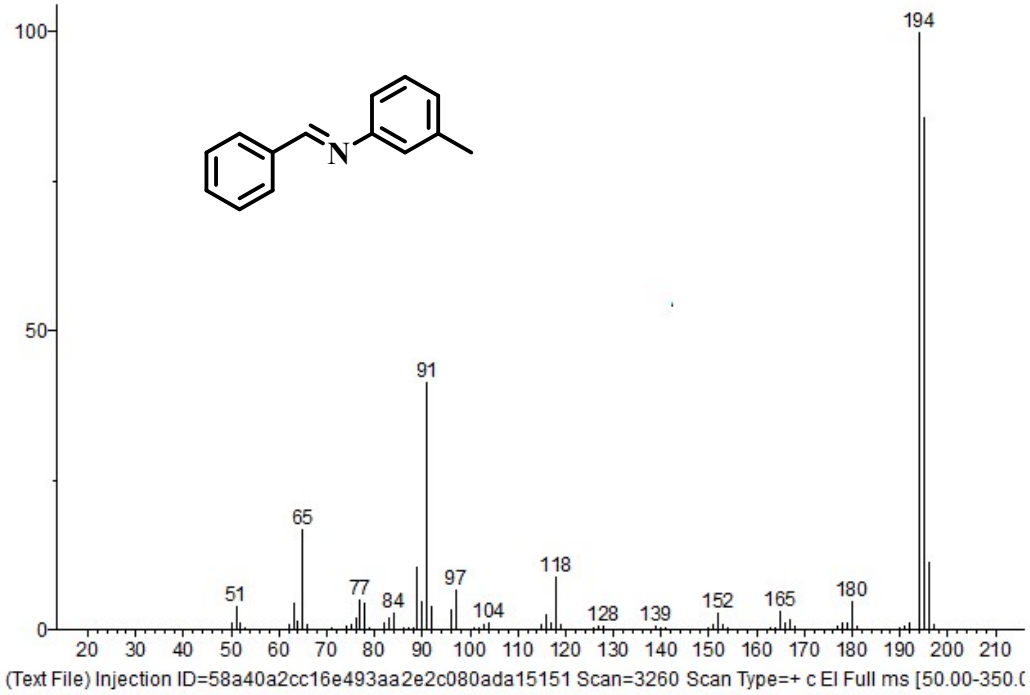
(c1)


100
50
0
180
77
51
104
89
63
152
115
127
139
166
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
N
(Text File) Injection ID=5547e18cf7e5407d919a21d95a467a97 Scan=3022 Scan Type=+ c EI Full ms [50.00-350.0

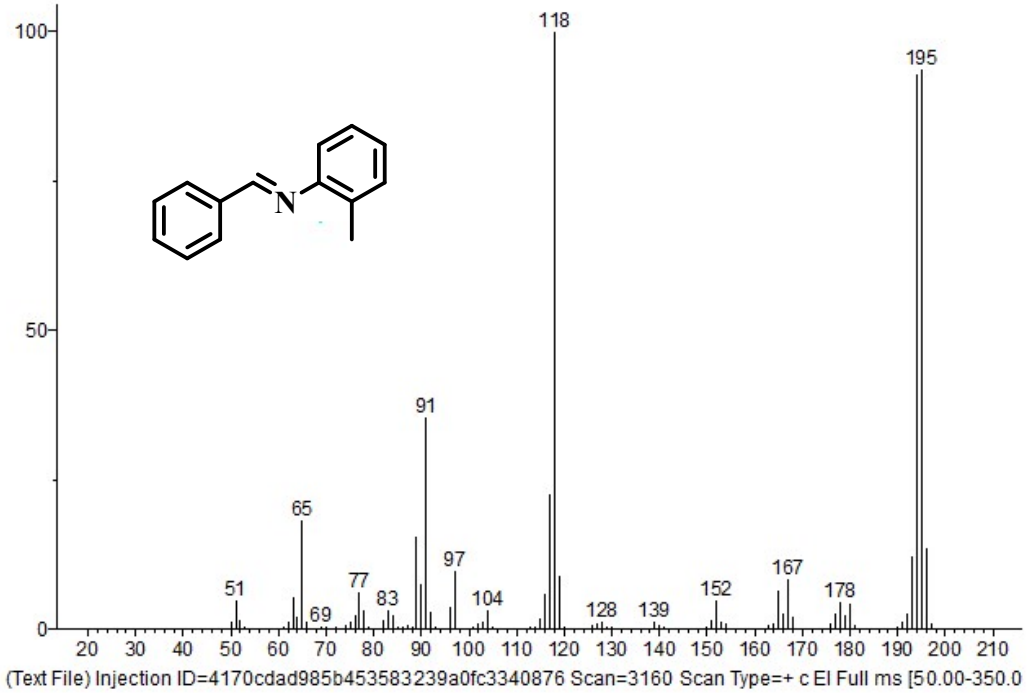
(c2)


100
50
0
194
91
65
118
97
51
77
84
103
128
139
152
165
180
203
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
N
(Text File) Injection ID=0658422ae5db4a4f8ca3da66827dbd9c Scan=3282 Scan Type=+ c EI Full ms [50.00-350.0

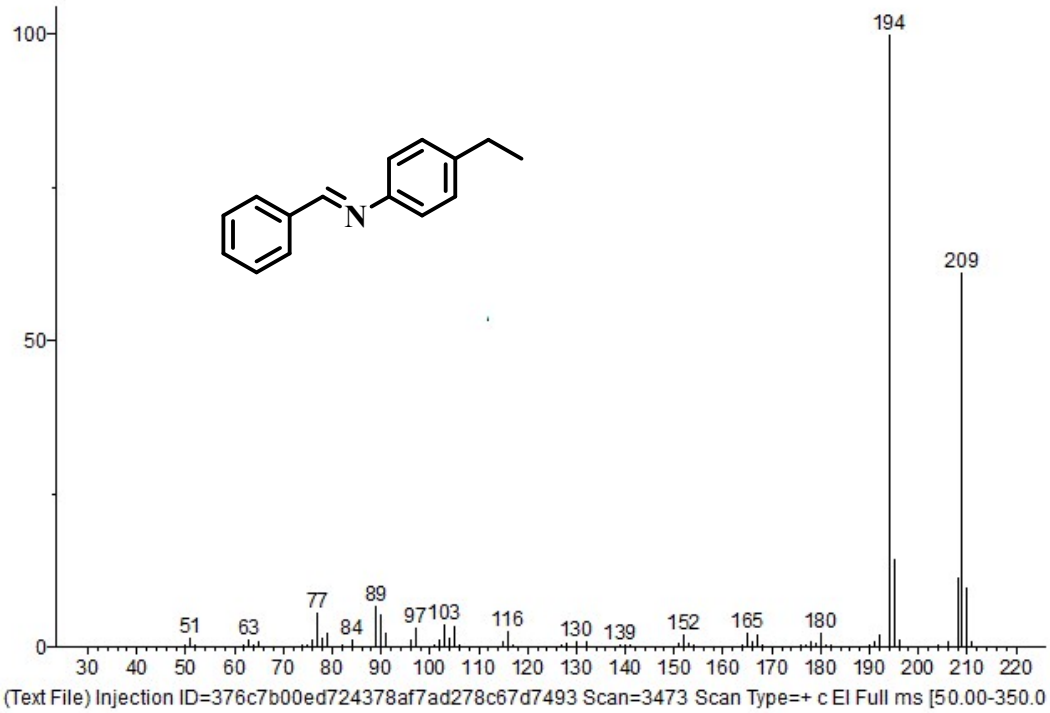
(c3)


100
50
0
194
91
65
118
97
77
84
51
104
128
139
152
165
180
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=58a40a2cc16e493aa2e2c080ada15151 Scan=3260 Scan Type=+ c EI Full ms [50.00-350.(

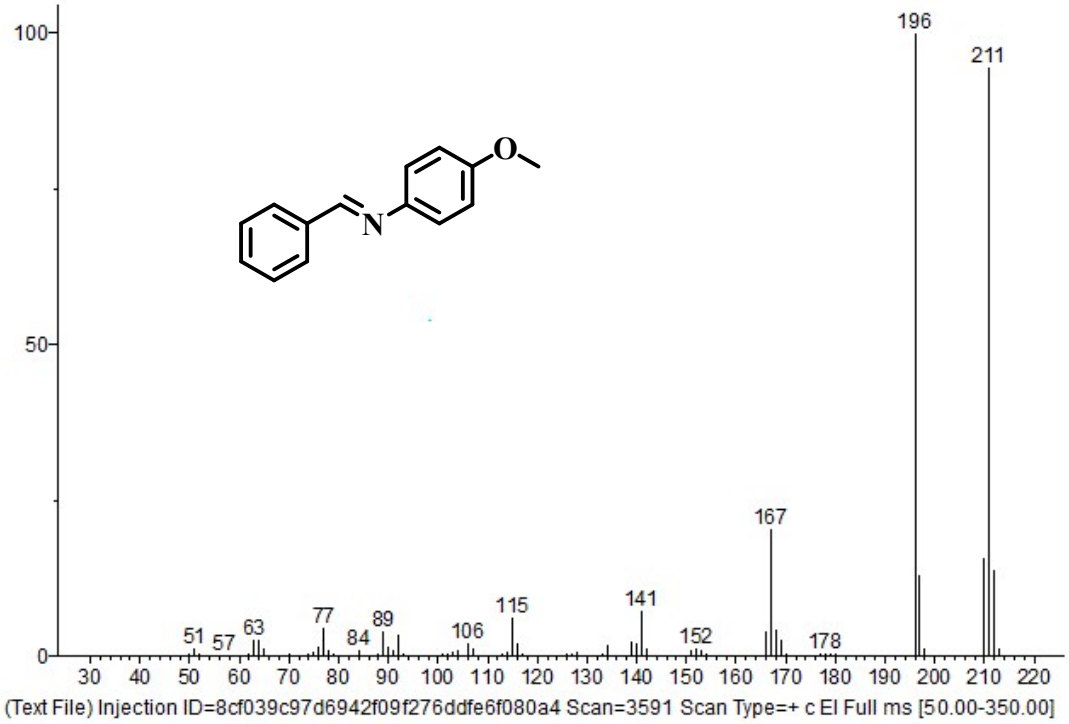
(c4)


100
50
0
118
195
91
65
97
51
77
83
104
69
128
139
152
167
178
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=4170cdad985b453583239a0fc3340876 Scan=3160 Scan Type=+ c EI Full ms [50.00-350.0

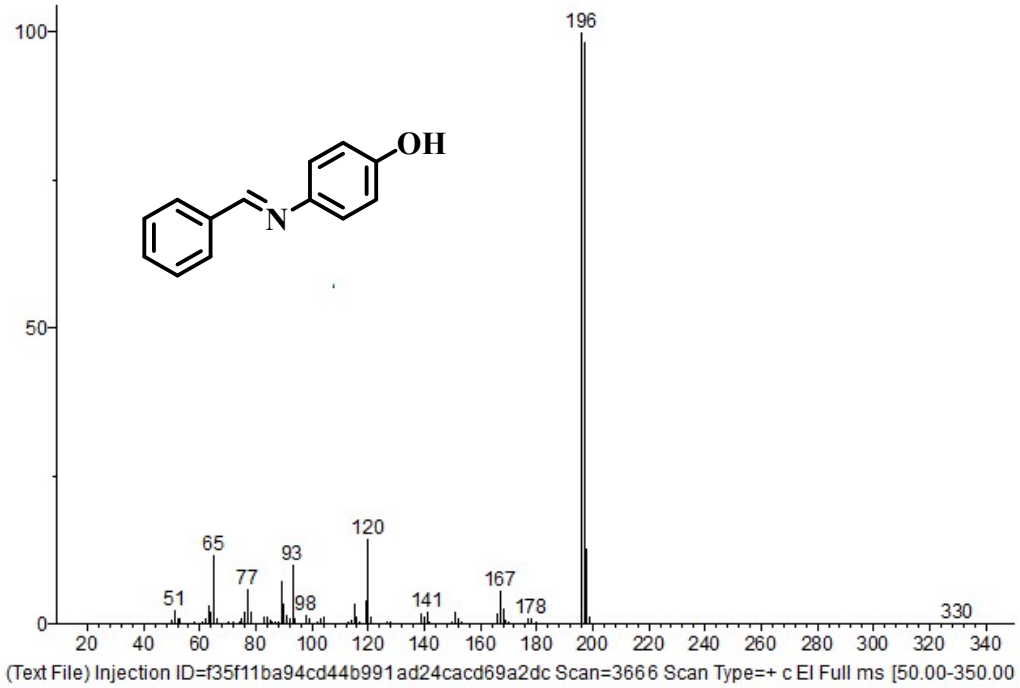
(c5)


100
50
0
194
209
77
89
97
103
116
51
63
84
130
139
152
165
180
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=376c7b00ed724378af7ad278c67d7493 Scan=3473 Scan Type=+ c EI Full ms [50.00-350.0

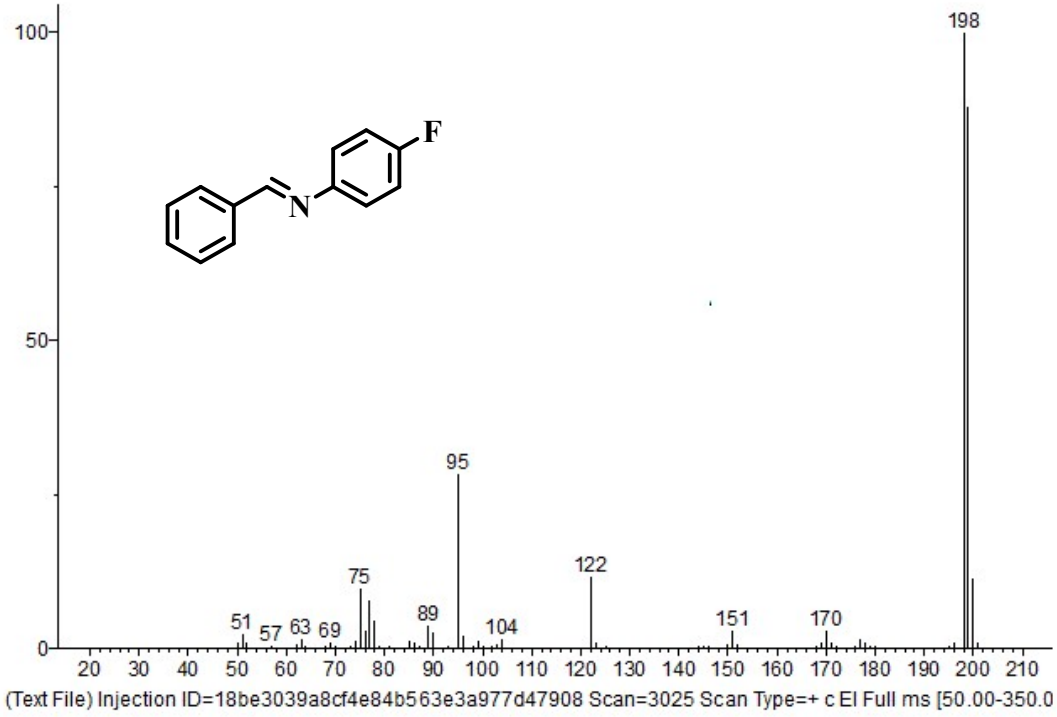
(b6)


100
50
0
196
211
167
115
141
77
89
63
51
57
84
106
152
178
O
N
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=8cf039c97d6942f09f276ddfe6f080a4 Scan=3591 Scan Type=+ c EI Full ms [50.00-350.00]

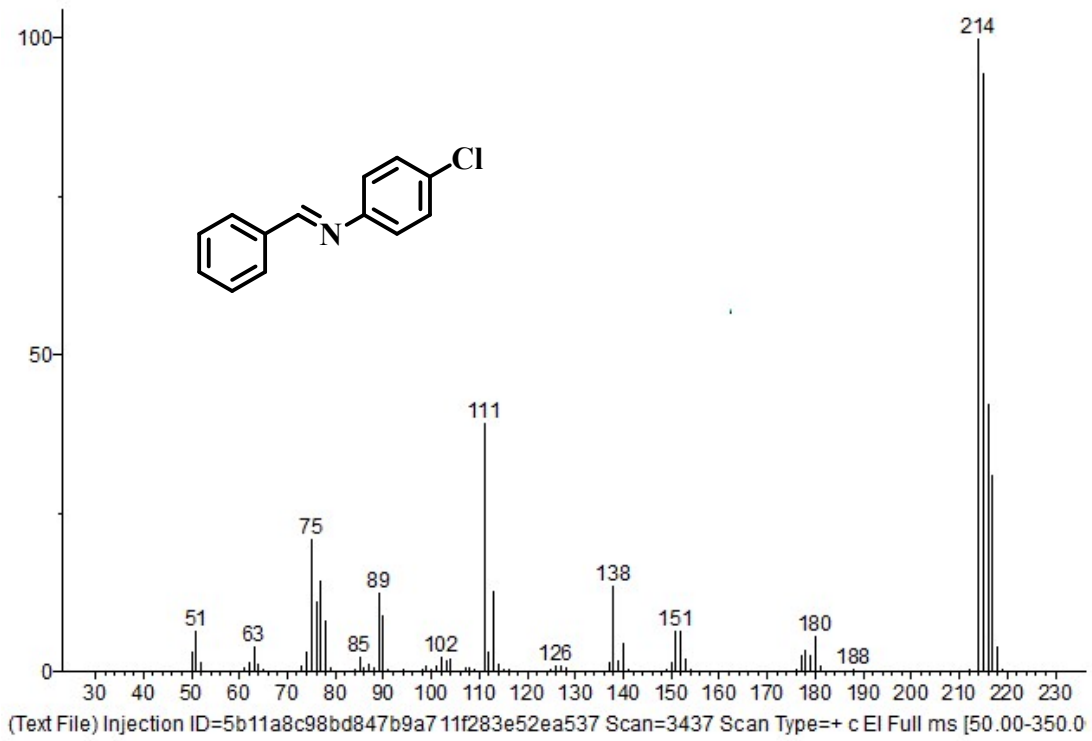
(b7)


100
50
0
OH
N
196
120
65
93
77
167
51
98
141
178
330
20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340
(Text File) Injection ID=f35f11ba94cd44b991ad24cacd69a2dc Scan=3666 Scan Type=+ c EI Full ms [50.00-350.00

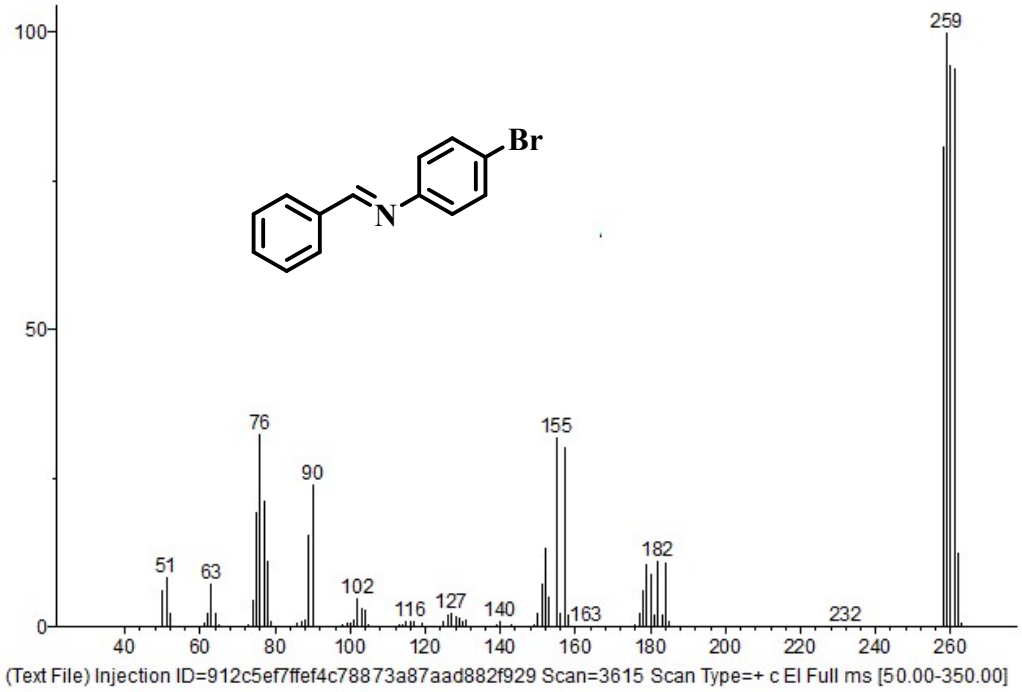
(b8)


100
50
0
F
N
198
95
122
75
89
51
57
63
69
104
151
170
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=18be3039a8cf4e84b563e3a977d47908 Scan=3025 Scan Type=+ c EI Full ms [50.00-350.0

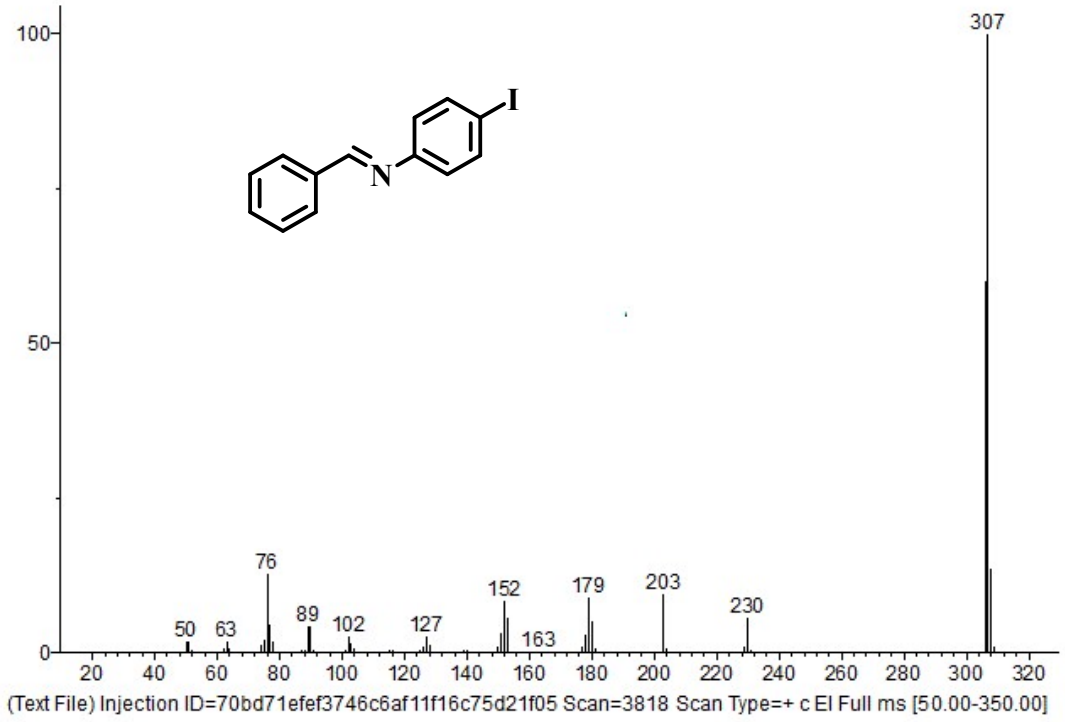
(c9)


100
50
0
214
111
75
89
138
51
63
85
102
126
151
180
188
Cl
N
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230
(Text File) Injection ID=5b11a8c98bd847b9a711f283e52ea537 Scan=3437 Scan Type=+ c EI Full ms [50.00-350.0

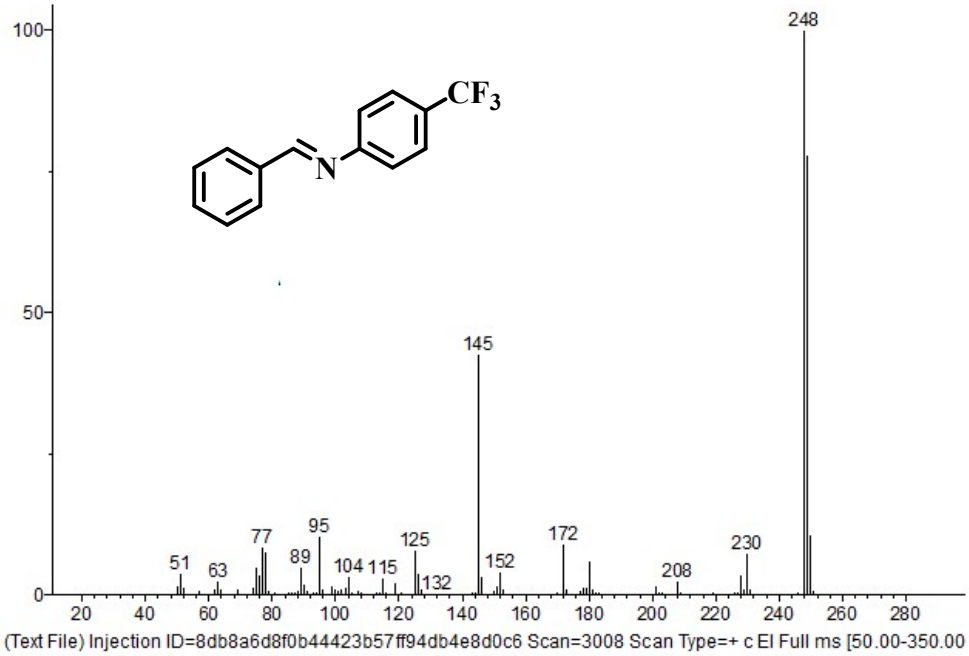
(c10)


100
50
0
Br
N
259
76
155
90
182
51
63
102
116
127
140
163
232
40
60
80
100
120
140
160
180
200
220
240
260
(Text File) Injection ID=912c5ef7ffef4c78873a87aad882f929 Scan=3615 Scan Type=+ c EI Full ms [50.00-350.00]

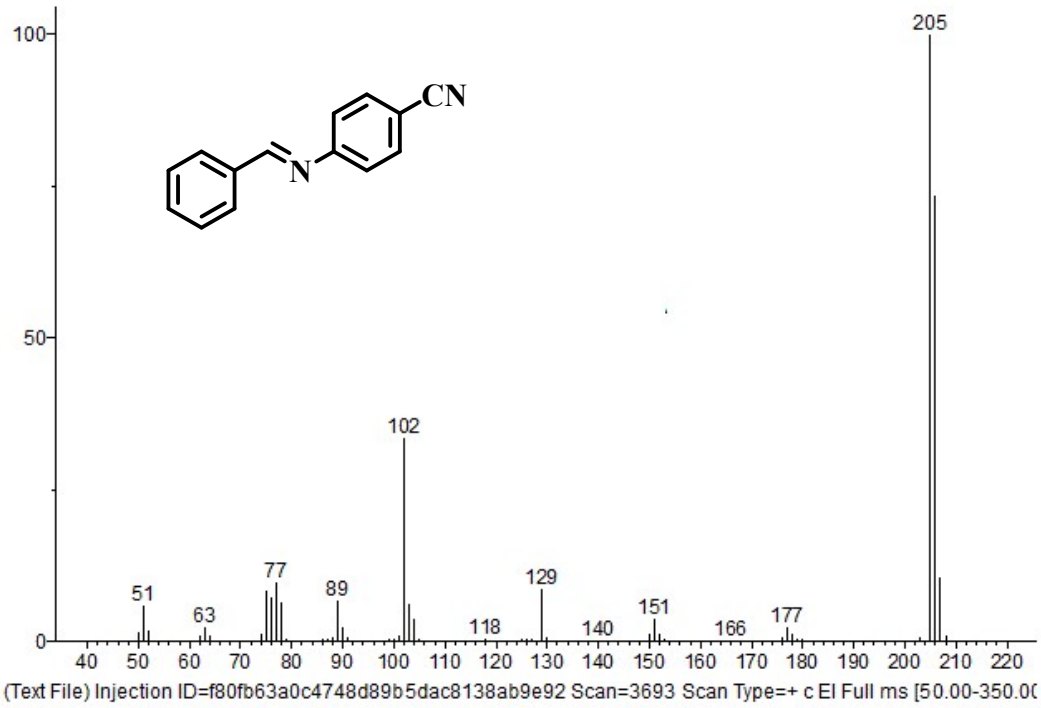
(c11)


100
50
0
307
76
89
102
127
152
163
179
203
230
50
63
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
I
N
(Text File) Injection ID=70bd71efef3746c6af11f16c75d21f05 Scan=3818 Scan Type=+ c EI Full ms [50.00-350.00]

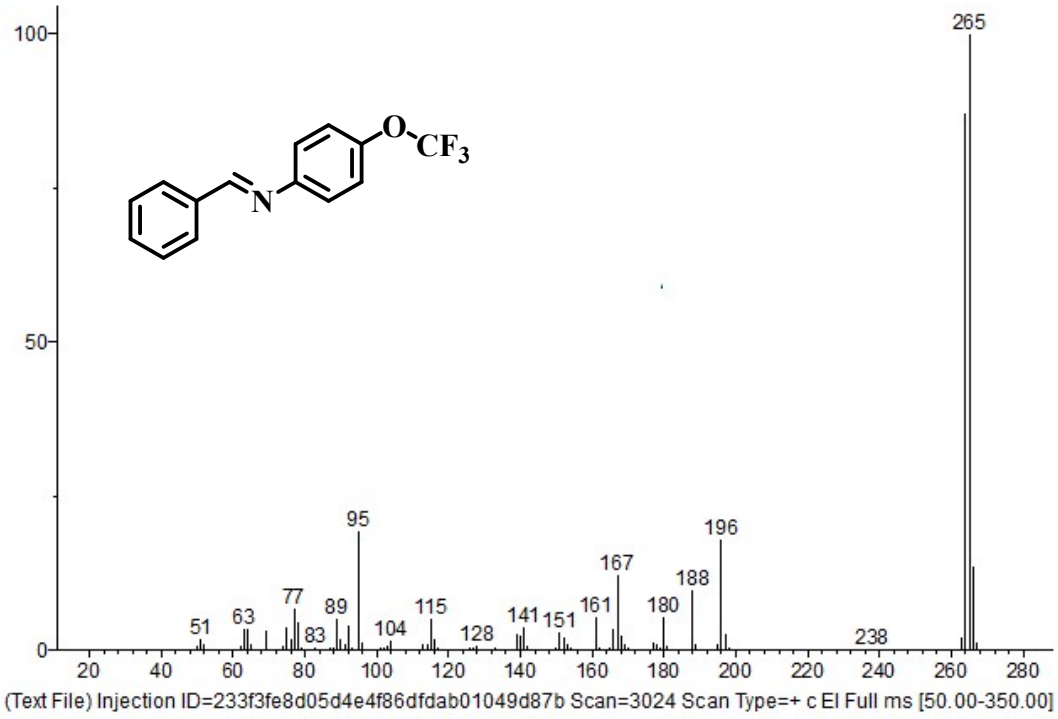
(c12)


100
50
0
248
145
95
77
89
125
172
230
51
63
104
115
132
152
208
20
40
60
80
100
120
140
160
180
200
220
240
260
280
CF3
N
(Text File) Injection ID=8db8a6d8f0b44423b57ff94db4e8d0c6 Scan=3008 Scan Type=+ c EI Full ms [50.00-350.00

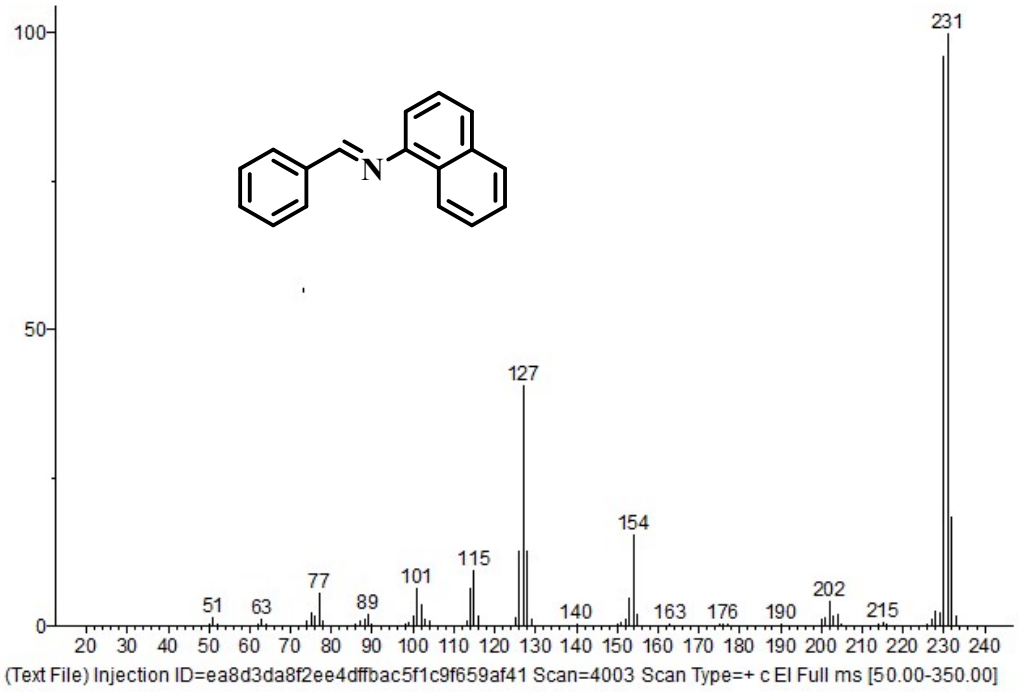
(c13)


100
50
0
CN
N
205
102
77
89
51
63
129
151
118
140
166
177
40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=f80fb63a0c4748d89b5dac8138ab9e92 Scan=3693 Scan Type=+ c EI Full ms [50.00-350.0(

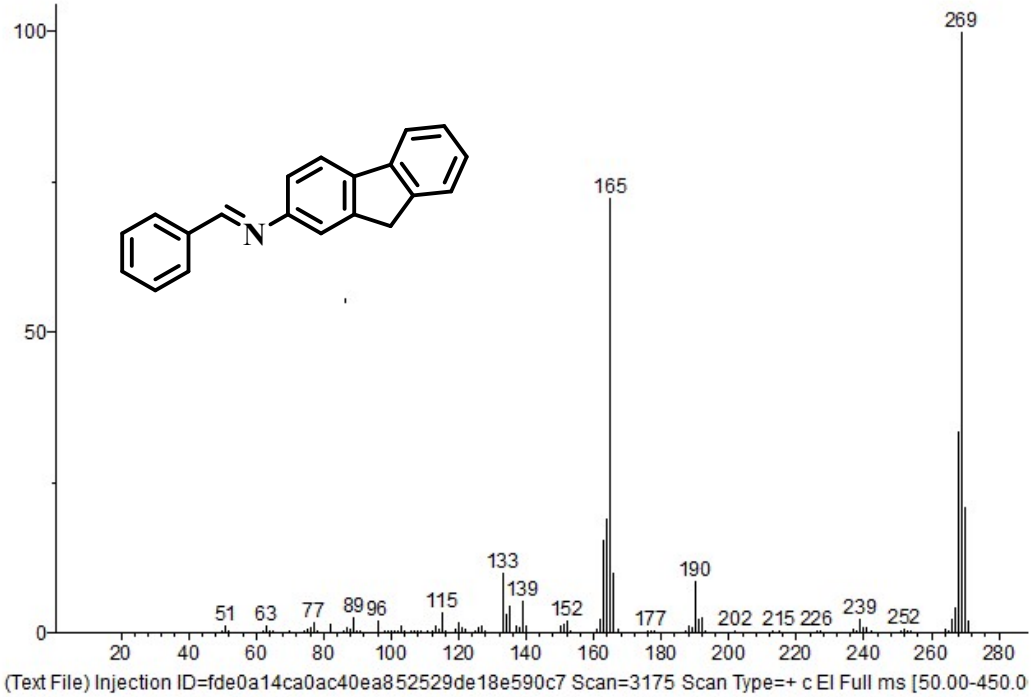
(c14)


100
50
0
265
196
167
188
95
77
89
115
180
161
141
151
104
128
63
51
83
238
20
40
60
80
100
120
140
160
180
200
220
240
260
280
O
CF3
N
(Text File) Injection ID=233f3fe8d05d4e4f86dfdab01049d87b Scan=3024 Scan Type=+ c EI Full ms [50.00-350.00]

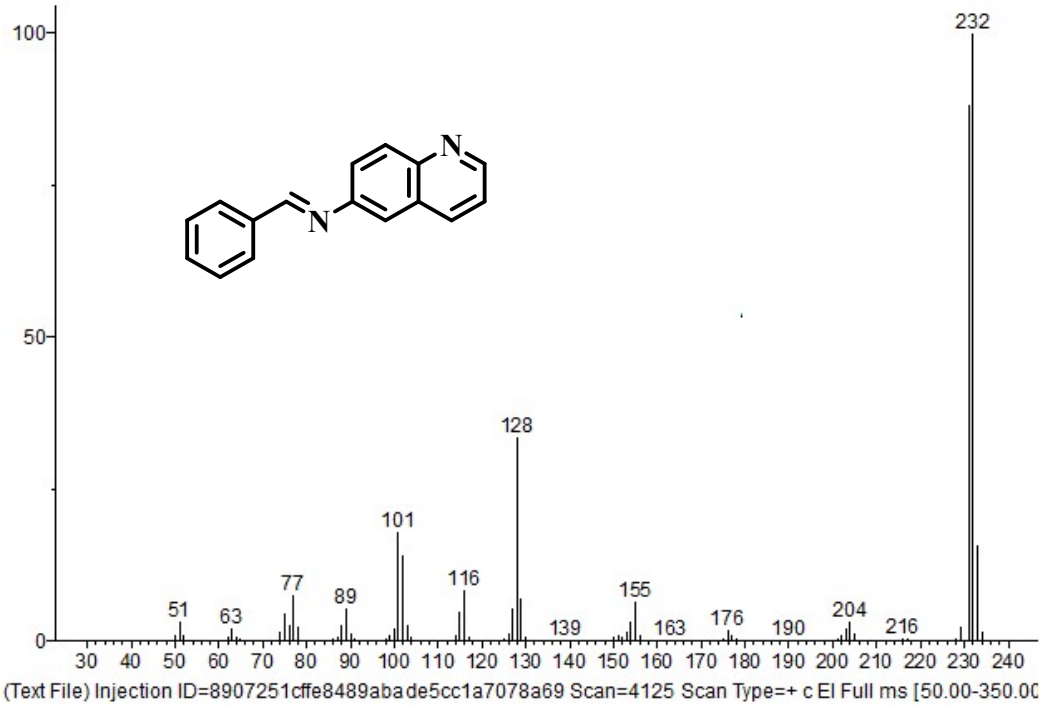
(c15)


100
50
0
231
127
154
115
77
101
89
51
63
140
163
176
190
202
215
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240
N
(Text File) Injection ID=ea8d3da8f2ee4dffbac5f1c9f659af41 Scan=4003 Scan Type=+ c EI Full ms [50.00-350.00]

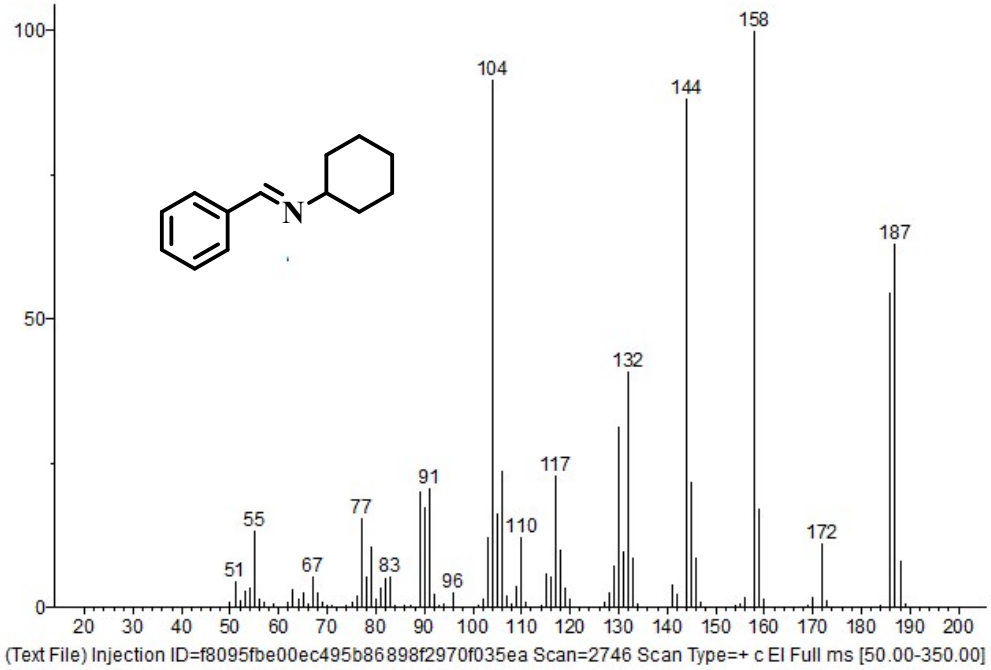
(c16)


100
50
0
269
165
133
139
190
51
63
77
89
96
115
152
177
202
215
226
239
252
20
40
60
80
100
120
140
160
180
200
220
240
260
280
N
(Text File) Injection ID=fde0a14ca0ac40ea852529de18e590c7 Scan=3175 Scan Type=+ c EI Full ms [50.00-450.0

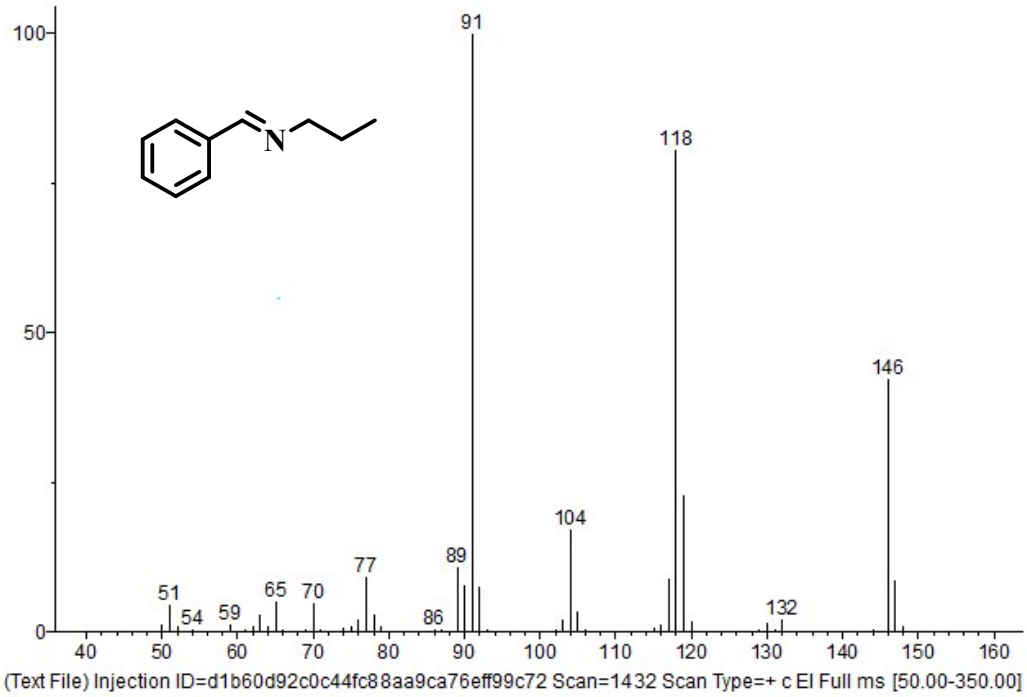
(c17)


100
50
0
232
128
101
116
77
89
51
63
155
139
163
176
190
204
216
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240
(Text File) Injection ID=8907251cffe8489abade5cc1a7078a69 Scan=4125 Scan Type=+ c EI Full ms [50.00-350.00

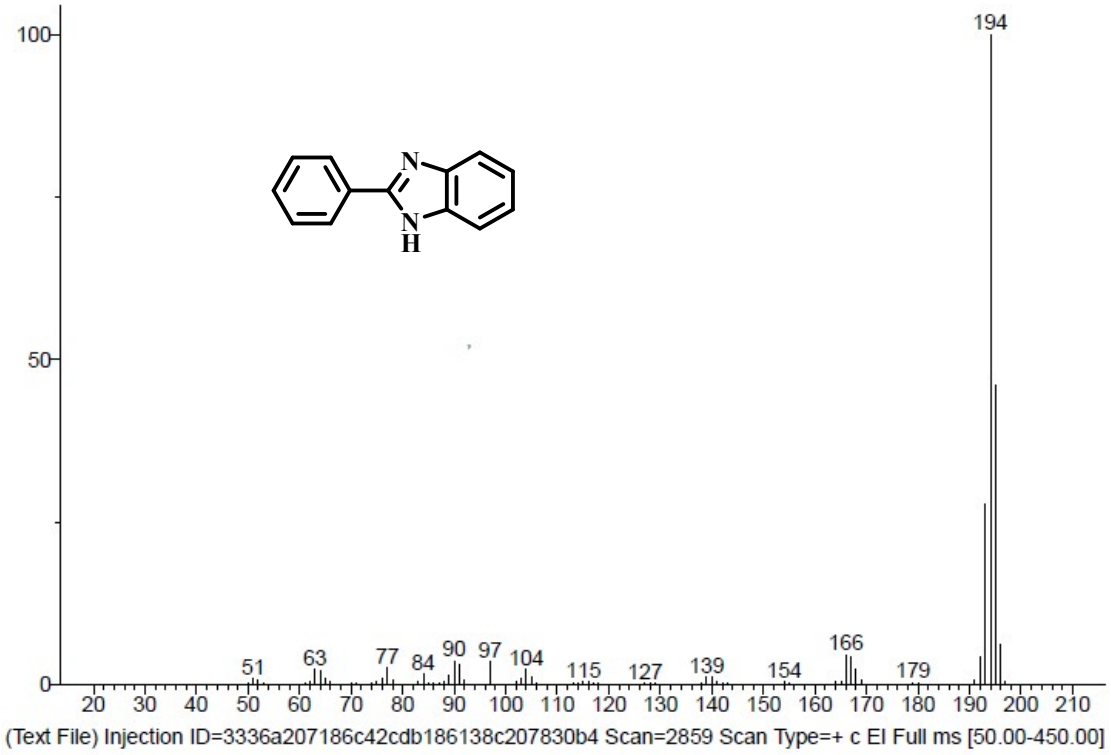
(c18)


100
50
0
158
104
144
187
132
117
91
77
55
110
172
51
67
83
96
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
(Text File) Injection ID=f8095fbe00ec495b86898f2970f035ea Scan=2746 Scan Type=+ c EI Full ms [50.00-350.00]

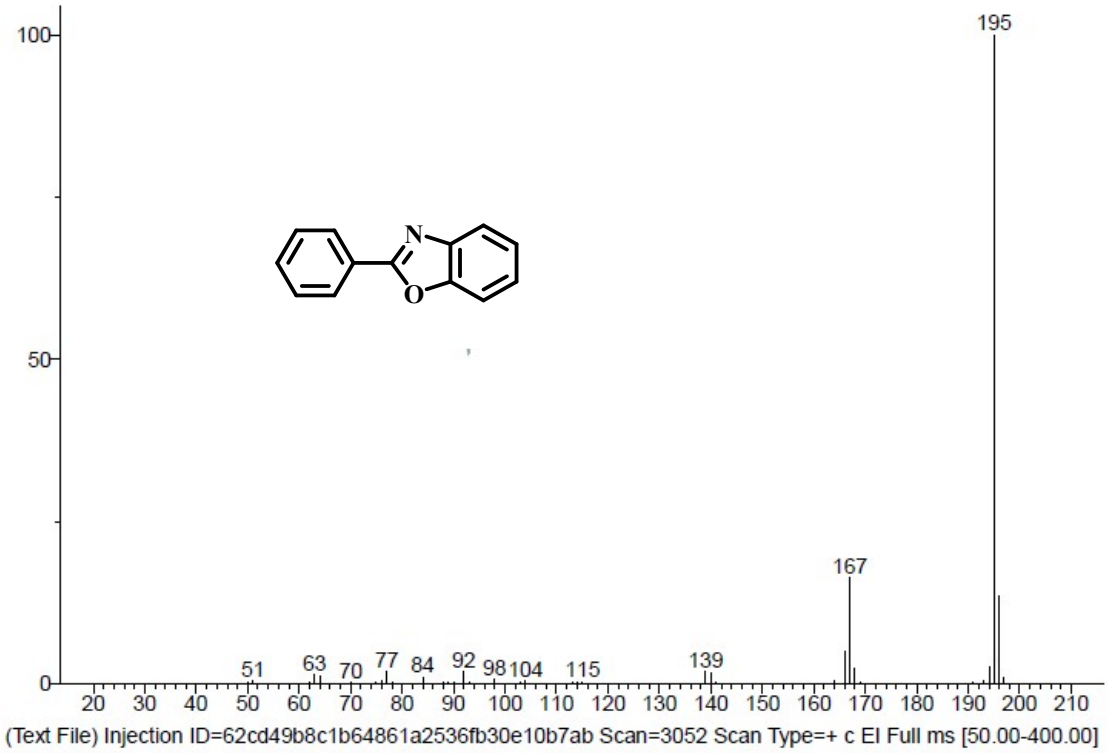
(c19)


100
50
0
91
118
146
104
89
77
51
54
59
65
70
86
132
40
50
60
70
80
90
100
110
120
130
140
150
160
(Text File) Injection ID=d1b60d92c0c44fc88aa9ca76eff99c72 Scan=1432 Scan Type=+ c EI Full ms [50.00-350.00]

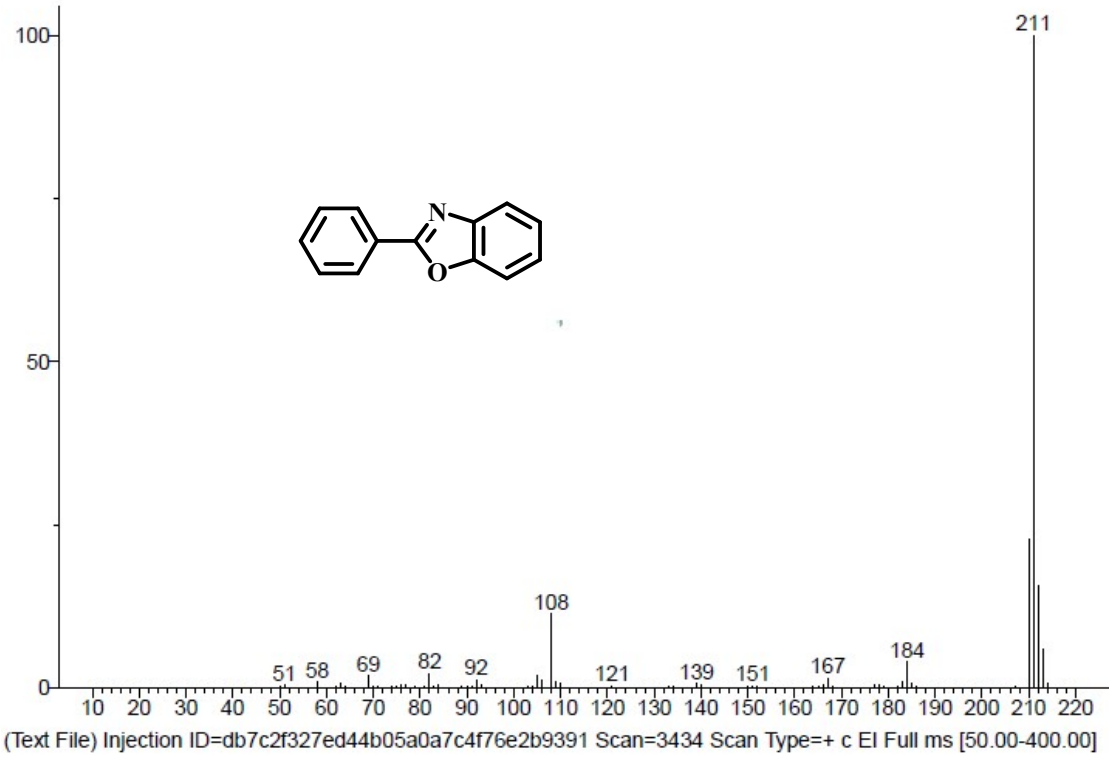
(c20)


100
50
0
194
166
51
63
77
84
90
97
104
115
127
139
154
179
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
N
N
H
(Text File) Injection ID=3336a207186c42cdb186138c207830b4 Scan=2859 Scan Type=+ c EI Full ms [50.00-450.00]

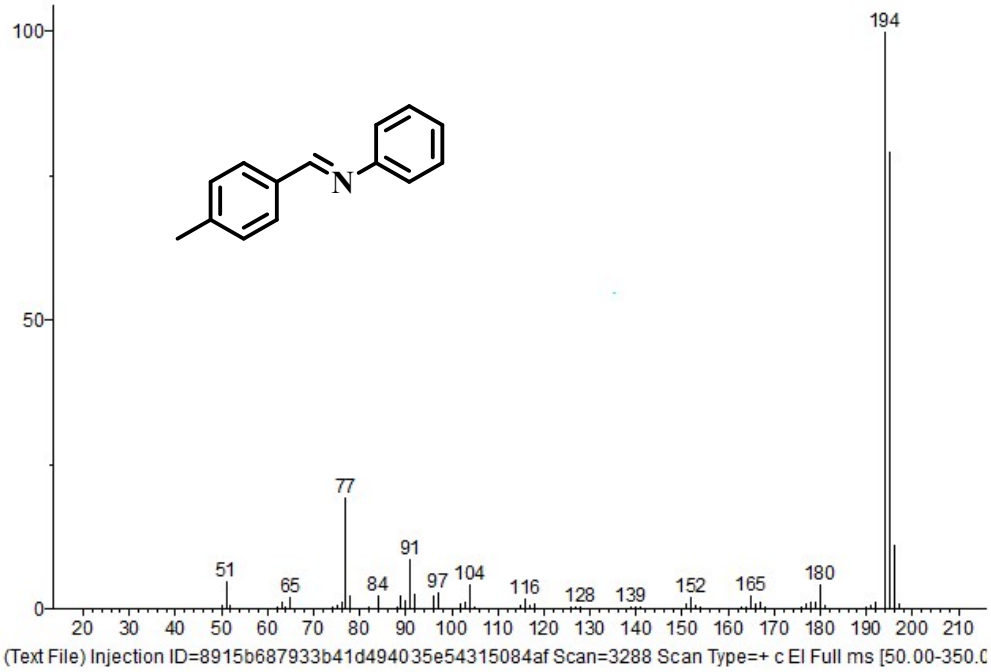
(c21)


100
50
0
195
167
51
63
70
77
84
92
98
104
115
139
N
O
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=62cd49b8c1b64861a2536fb30e10b7ab Scan=3052 Scan Type=+ c EI Full ms [50.00-400.00]

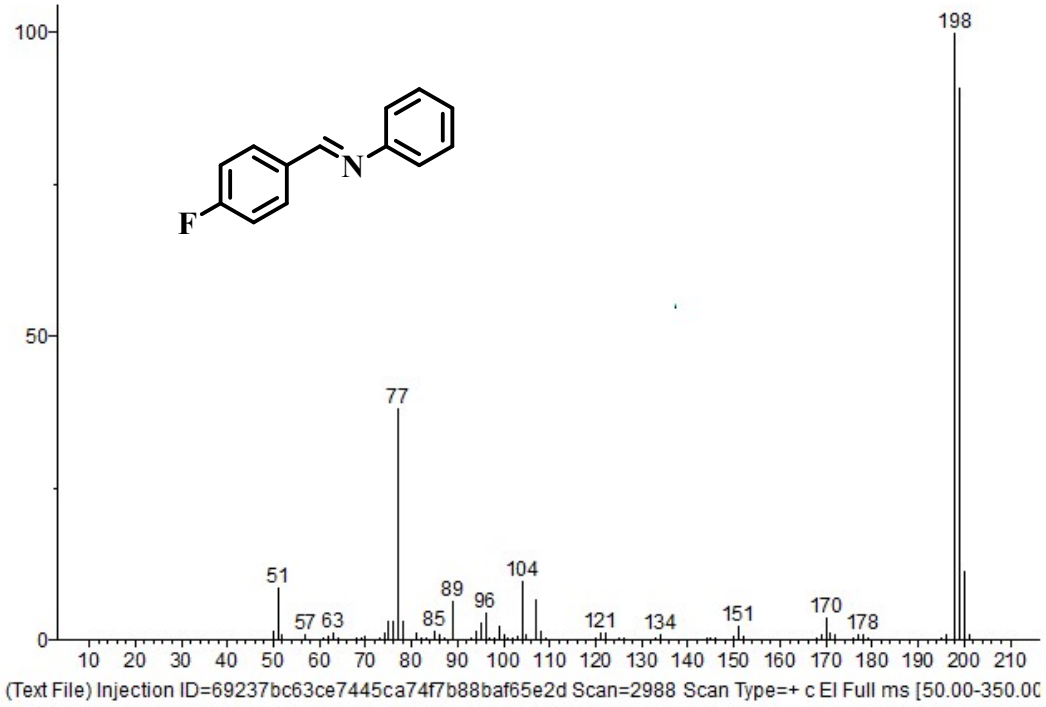
(c22)


100
50
0
211
108
51 58 69 82 92 121 139 151 167 184
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
N
O
(Text File) Injection ID=db7c2f327ed44b05a0a7c4f76e2b9391 Scan=3434 Scan Type=+ c EI Full ms [50.00-400.00]

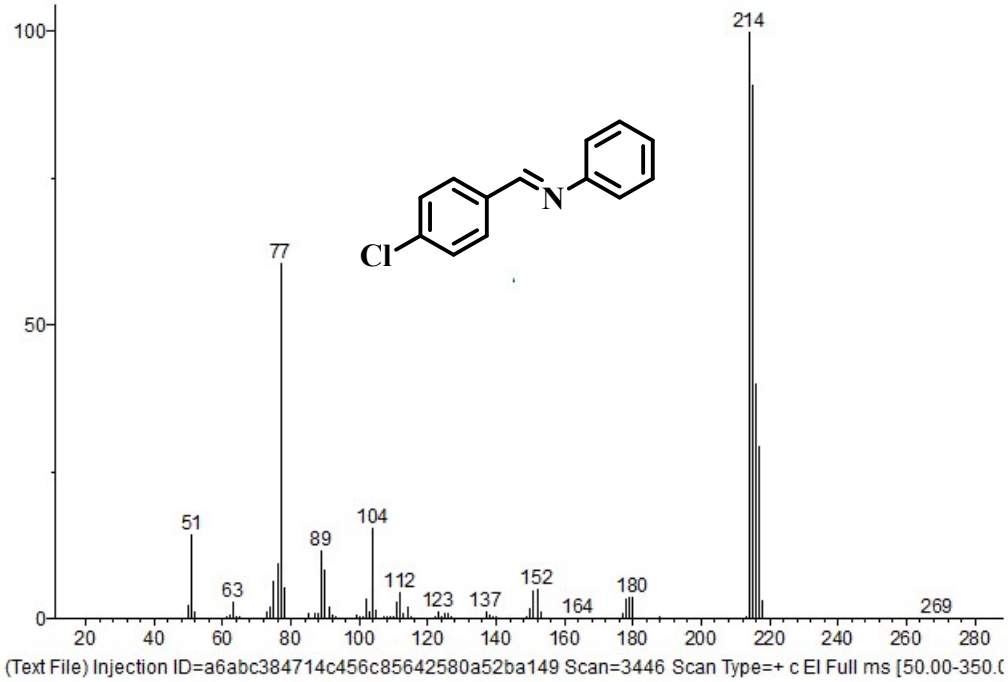
(c23)


100
50
0
194
77
91
51
65
84
97
104
116
128
139
152
165
180
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=8915b687933b41d494035e54315084af Scan=3288 Scan Type=+ c EI Full ms [50.00-350.0

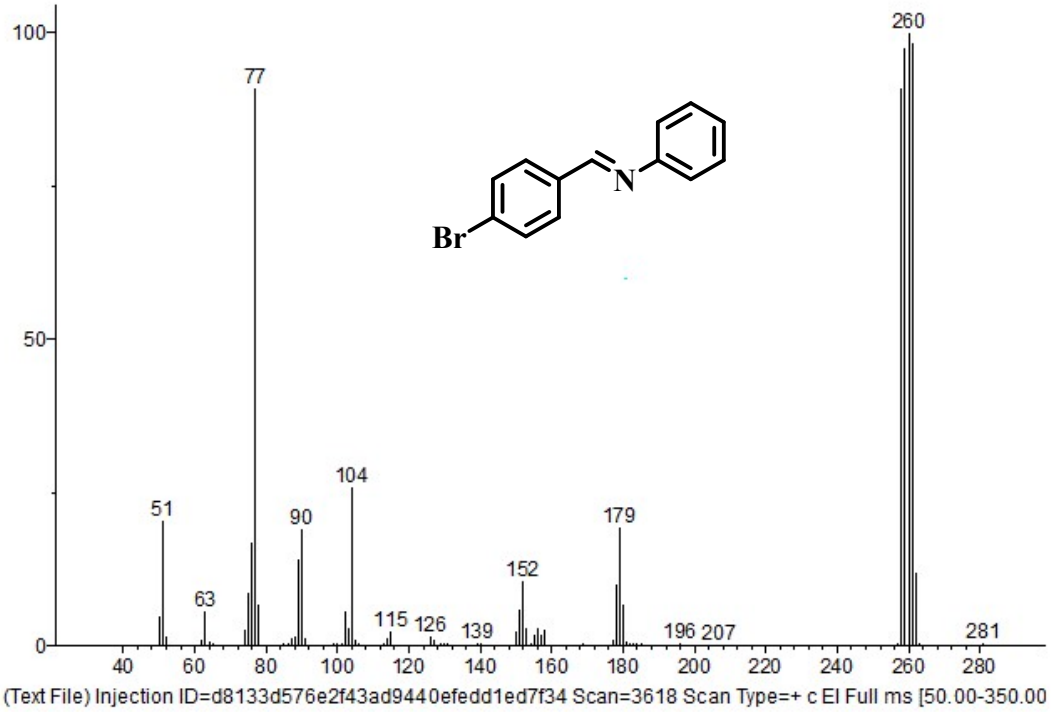
(c24)


100
50
0
198
77
51
57 63
89
85
96
104
121
134
151
170
178
F
N
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210
(Text File) Injection ID=69237bc63ce7445ca74f7b88baf65e2d Scan=2988 Scan Type=+ c EI Full ms [50.00-350.00

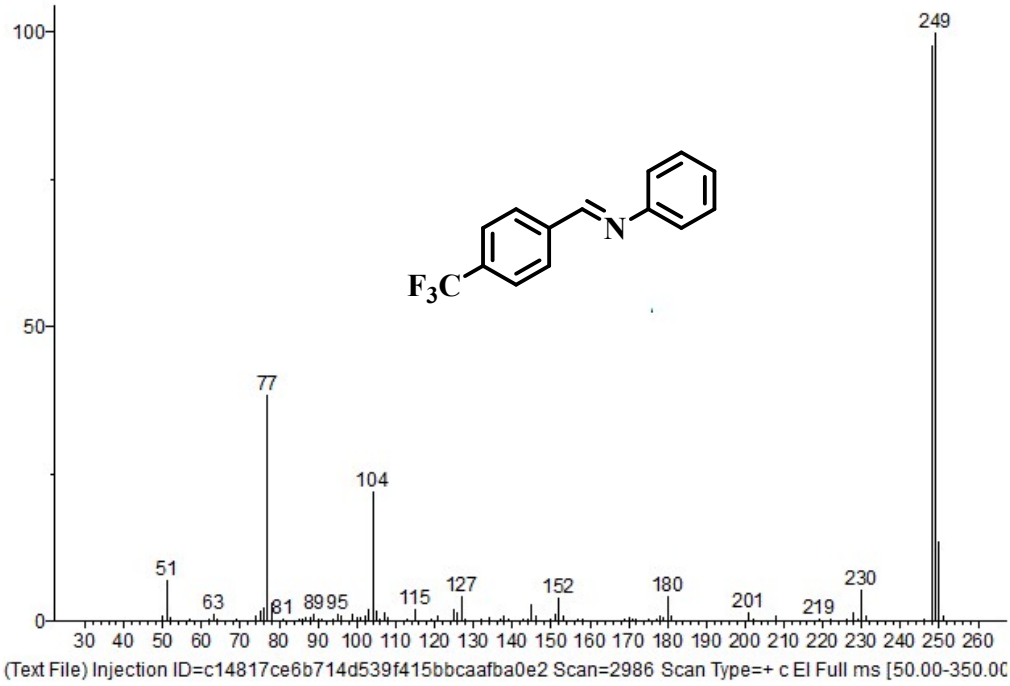
(c25)


100
50
0
214
77
Cl
N
51
63
89
104
112
123
137
152
164
180
269
20
40
60
80
100
120
140
160
180
200
220
240
260
280
(Text File) Injection ID=a6abc384714c456c85642580a52ba149 Scan=3446 Scan Type=+ c EI Full ms [50.00-350.(

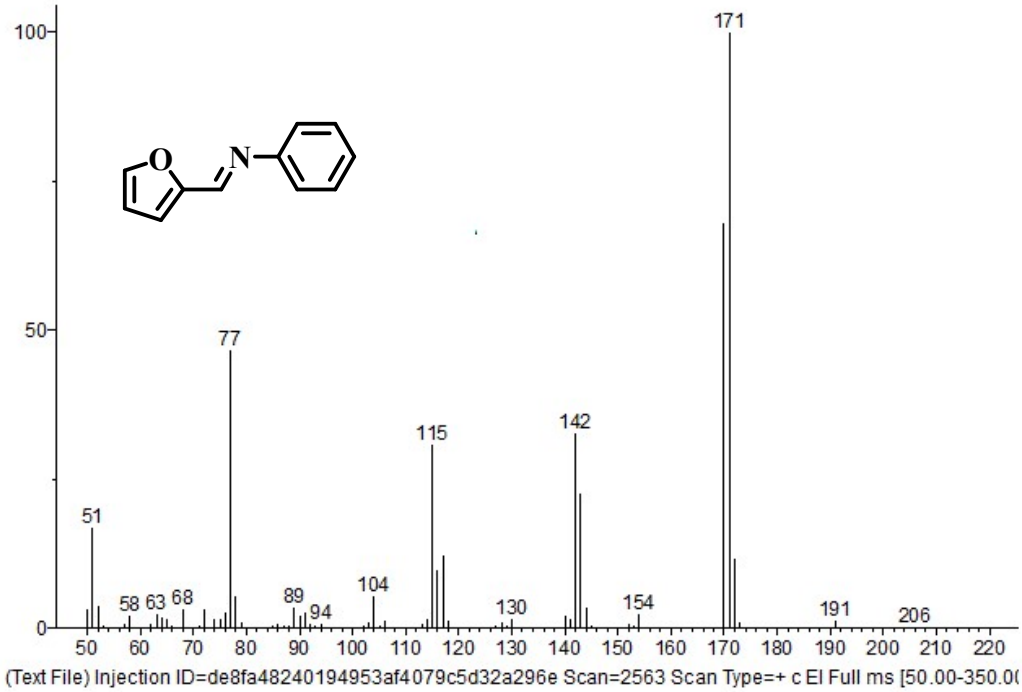
(c26)


100
50
0
77
260
104
51
90
179
152
63
115
126
139
196
207
281
40
60
80
100
120
140
160
180
200
220
240
260
280
Br
N
(Text File) Injection ID=d8133d576e2f43ad9440efedd1ed7f34 Scan=3618 Scan Type=+ c EI Full ms [50.00-350.00

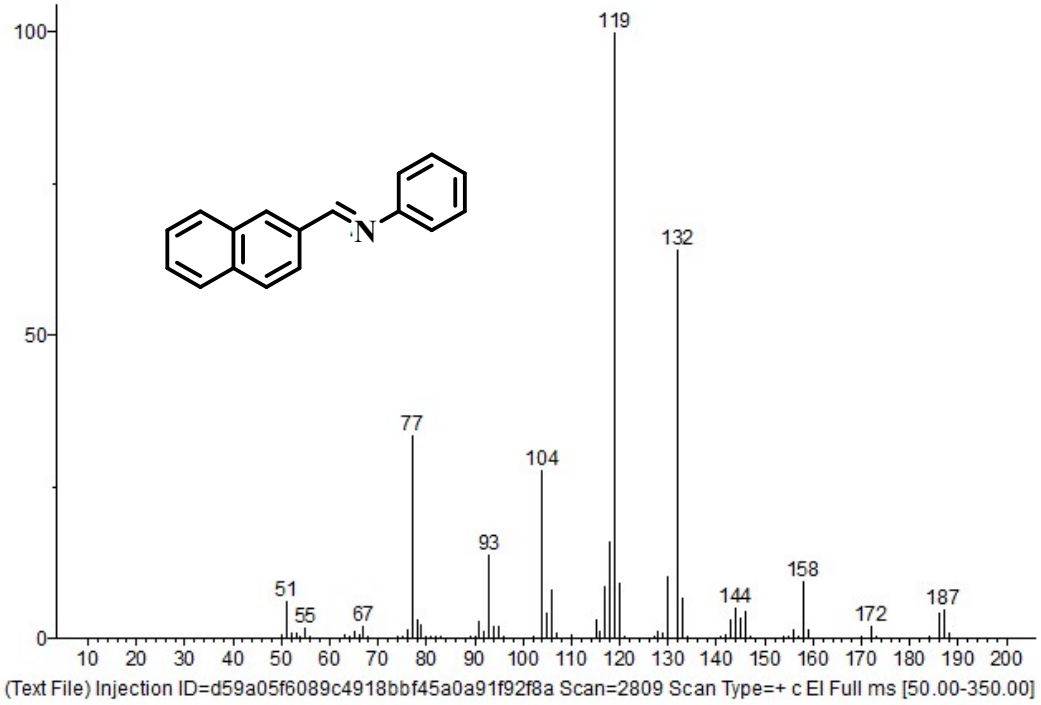
(c27)


100
50
0
249
77
104
51
63
81
89
95
115
127
152
180
201
219
230
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260
N
F3C
(Text File) Injection ID=c14817ce6b714d539f415bbcaafba0e2 Scan=2986 Scan Type=+ c EI Full ms [50.00-350.0

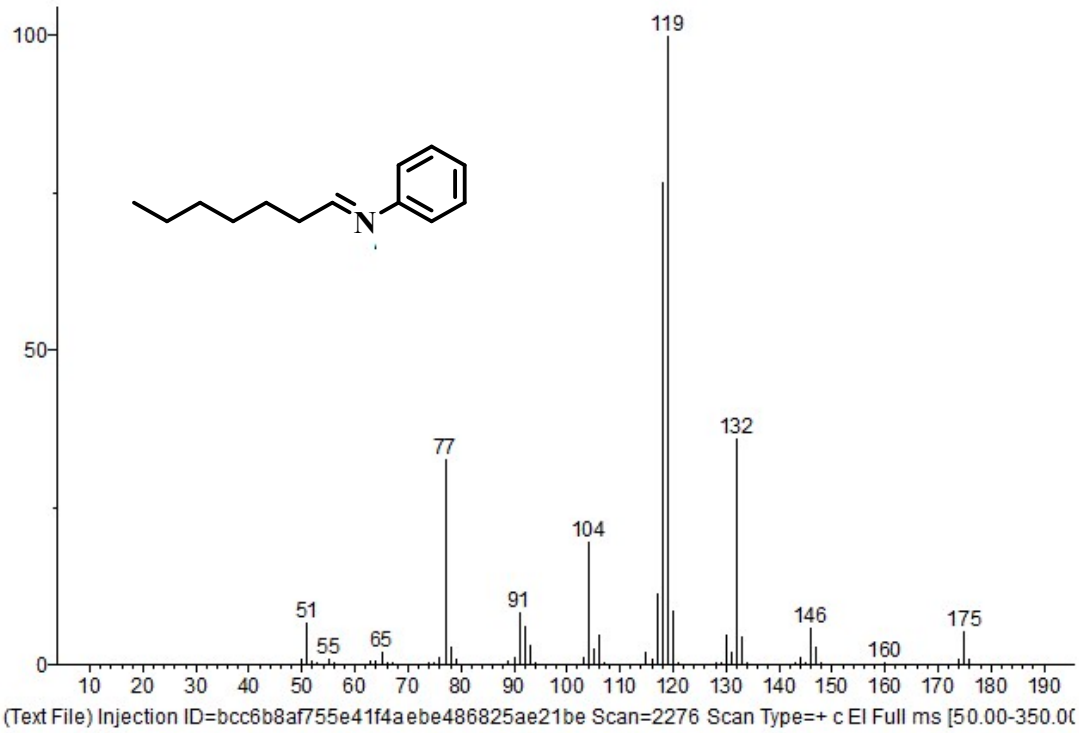
(c28)


100
50
0
O
N
171
77
115
142
51
58
63
68
89
94
104
130
154
191
206
50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
(Text File) Injection ID=de8fa48240194953af4079c5d32a296e Scan=2563 Scan Type=+ c EI Full ms [50.00-350.0(

(c29)


100
50
0
119
132
77
104
93
158
144
187
172
51
55
67
N
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
(Text File) Injection ID=d59a05f6089c4918bbf45a0a91f92f8a Scan=2809 Scan Type=+ c EI Full ms [50.00-350.00]

(c30)


100
50
0
119
132
77
104
91
51
55
65
146
160
175
N
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
(Text File) Injection ID=bcc6b8af755e41f4aebe486825ae21be Scan=2276 Scan Type=+ c EI Full ms [50.00-350.0(