Supplementary Information for

Pt NPs@GO as Highly Efficient and Reusable Catalyst for One-Pot Synthesis of Acridinedione Derivatives

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Materials and Instrumentation

$PtCl_4$ (99 % Alfa Aesar), tetrahydrofuran (THF) (99.5 %, Merck) and ethanol (99.9 %) were purchased from Merck, octylamine (Sigma Aldrich) were used as received from suppliers. THF was distilled over sodium under argon atmosphere and stored under inert atmosphere. De-ionized water was filtered by Millipore water purification system (18 MΩ) analytical grade. All glassware and Teflon-coated magnetic stir bars were cleaned with aqua regia, followed by washing with distilled water before drying in an oven.

The chemicals used in the synthesis of acridinedione derivatives were obtained from Merck and Aldrich Chemical Company. All chemicals and solvents used for the synthesis were of spectroscopic reagent grade.

Transmission electron microscopy (TEM) images were obtained on a JEOL 200 kV TEM instrument. Sample preparation for TEM analysis involves placement of a drop of 0.5 mg/mL ethanol solution of the prepared catalysts with a carbon support on a carbon covered 400-mesh copper grid; the solvent is then allowed to evaporate. Excess solution was removed with an adsorbent paper and the sample was dried under vacuum at room temperature before analysis. More than 300 particles were calculated to get the integrated information about the overall distribution of Pt-based catalyst sample.

Thermo Scientific spectrometer was used for X-ray Photoelectron Spectroscopy (XPS) measurements and the X-ray source was Kα lines of Mg (1253.6 eV, 10 mA). Samples

were prepared by depositing the catalyst on Cu double-sided tape (3M Inc.). C 1s line at 284.6 eV was chosen as a reference point and all XPS peaks were fitted using a Gaussian function and the C 1s line at 284.6 eV was used as the reference line.

A Panalytical Emperian diffractometer with Ultima+theta–theta high resolution goniometer, having an X-ray generator (Cu Kα radiation, k = 1.54056 Å) and operating condition of 45 kV and 40 mA, were employed in XRD analysis.

An MFP-3D (Asylum Research) was used to carry out tapping-mode atomic force microscopy (AFM) imaging. Samples were directly deposited on a 75 mm 25 mm glass slide (VWR International) and imaged using rectangular silicon tips (Olympus AC240TS) with a nominal spring constant of 2 N m-1. Both topographic and height images were recorded during AFM analysis. Height analysis was performed using Igor Pro software.

Melting points were measured on a Bibby Scientific Stuart Digital, Advanced, and SMP30. Fourier Transform Infrared (FT–IR) spectra were recorded on Bruker Optics, ALPHA FT–IR spectrometer. The ^{1}H-NMR and ^{13}C-NMR spectra were obtained in DMSO-d_6 with Bruker DPX-300 as solvents with tetramethylsilane as the internal reference. The mass analyses were performed on an Agilent Technologies 6530 Accurate-Mass Q-TOF LC/HRMS at the advanced technology research centre of Dumlupınar University (ILTEM).

Characterization of Pt NPs@GO

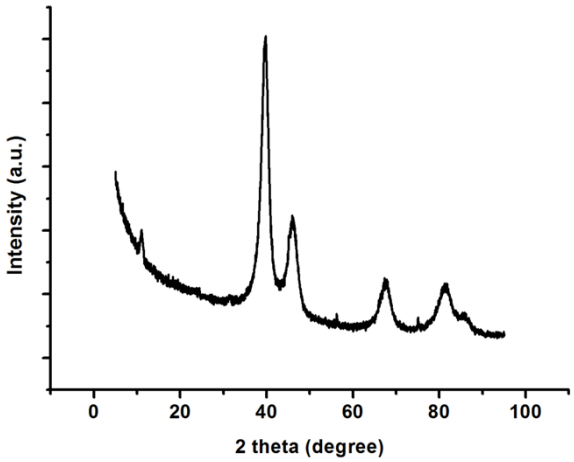


Fig. S1. XRD of catalyst Pt NPs@GO

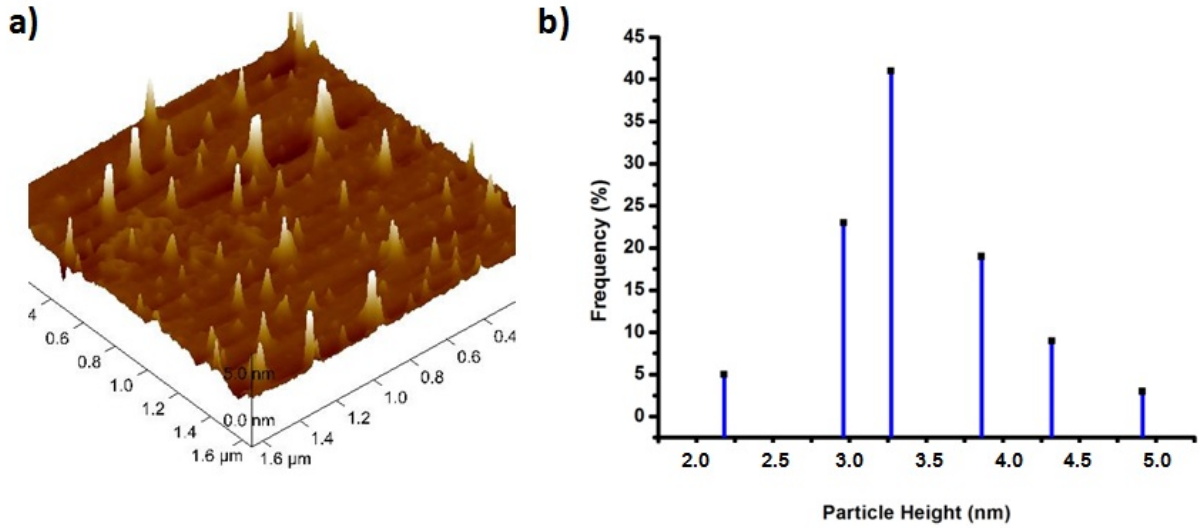


Fig. S2. AFM image of Pt NPs@GO catalyst (a). Histogram of height of particles obtained from AFM data (b).

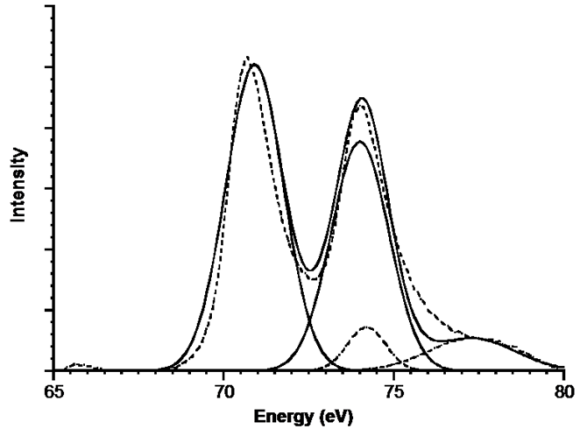


Fig. S3. Pt 4f electron spectra of Pt NPs@GO

The preparation of Graphene Oxide

Graphene oxide (GO) was synthesized from graphite powder using modified Hummer's method. In brief, 1 g of graphite and 0.5 g of sodium nitrate were mixed together followed by the addition of 23 ml of conc. sulphuric acid under constant stirring. After 1 h, 3 g of KMnO4 was added gradually to the above solution while keeping the temperature less than 20°C to prevent overheating and explosion. The mixture was stirred at 35 °C for 12 h and the resulting solution was diluted by adding 500 ml of water under vigorous stirring. To ensure the completion of reaction with $KMnO_4$, the suspension was further treated with 30% H_2O_2 solution (5 ml). The resulting mixture was washed with HCl and H_2O respectively, followed by filtration and drying, graphene oxide sheets were thus obtained.

Characterization of acridinedione derivatives

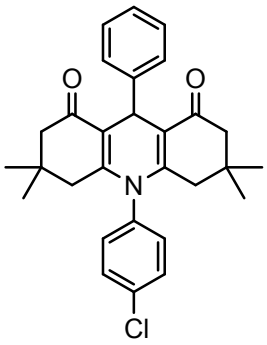
Whereas the infrared (IR) spectra of all the 1,8-dioxoacridine **4a-j** aromatic C–H stretching bands are observed between 3061-3006 cm^{-1}, the aliphatic C–H stretching bands were observed between 2959-2952 cm^{-1}. Besides, in the IR spectra of all **4a-j** compounds, the carbonyl groups showed sharp peaks in the region between 1653 and 1632 cm^{-1}.

The ^{1}H-NMR spectra of the compounds **4a-j** belonging to protons of the methyl groups showed singlet peaks in position 3 and 6 approximate between 0.70-0.90 ppm. The methoxy protons of compound **4g** were observed 3.70 ppm. The signals for the -CH protons were observed at 4.95–5.15 ppm and the signals for the aromatic protons were observed in the range between 6.61-8.14 ppm.

The signals observed in ^{13}C-NMR (APT) spectrums of all the acridinedione **4a-j** molecules are determined to be in line with the recommended molecule structures.

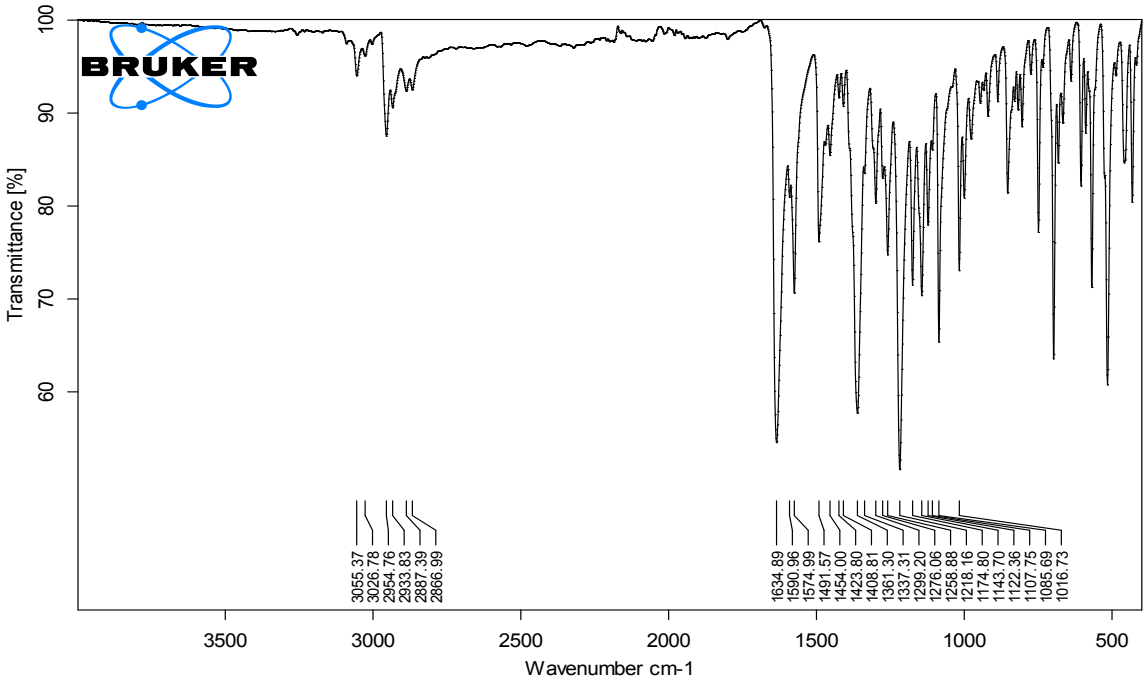
Further, when their high resolution mass spectra (HRMS) are examined, the observed molecule ion peaks are in compliance with the recommended structures.

10-(4-Chlorophenyl)-3,3,6,6-tetramethyl-9-phenyl-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4a)



As yellow crystals, (0.422 g, 92 %), mp. (300-302 ^{o}C) [49] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.72 (s, 6H, 2x-CH_3), 0.88 (s, 6H, 2x-CH_3), 1.78 (d, 2H, J= 17.43 Hz, -CH_2), 2.00 (d, 2H, J= 16.00 Hz, -CH_2), 2.16-2.22 (m, 4H, -CH_2), 5.05 (s, 1H, -CH), 7.07-7.12 (m, 1H, Ar-H), 7.21-7.32 (m, 4H, Ar-H), 7.48 (d, 2H, J= 5.44 Hz, 10.58, Ar-H), 7.68 (d, 2H, J= 8.84 Hz, Ar-H); ^{13}C-NMR (75 MHz, DMSO–d_6) δ (ppm): 26.50, 29.72, 32.33, 32.44, 41.35, 50.03, 113.55, 126.26, 127.97, 128.38, 130.56, 134.37, 137.79, 146.57, 150.58, 195.54; IR (cm^{-1}): 3026 w (Ar-H), 2954 s (-CH), 1634 s (C=O), 1590 s (C=C); HRMS (QTOF-ESI): m/z $C_{29}H_{30}ClNO_2$: 459.1965; found: 460.2061 ($[M+H]^{+}$).

a)


BRUKER
Transmittance [%]
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80
70
60
3055.37
3026.78
2954.76
2933.83
2887.39
2866.99
1634.89
1590.96
1574.99
1491.57
1454.00
1423.80
1408.81
1361.30
1337.31
1299.20
1276.06
1258.88
1218.16
1174.80
1143.70
1122.36
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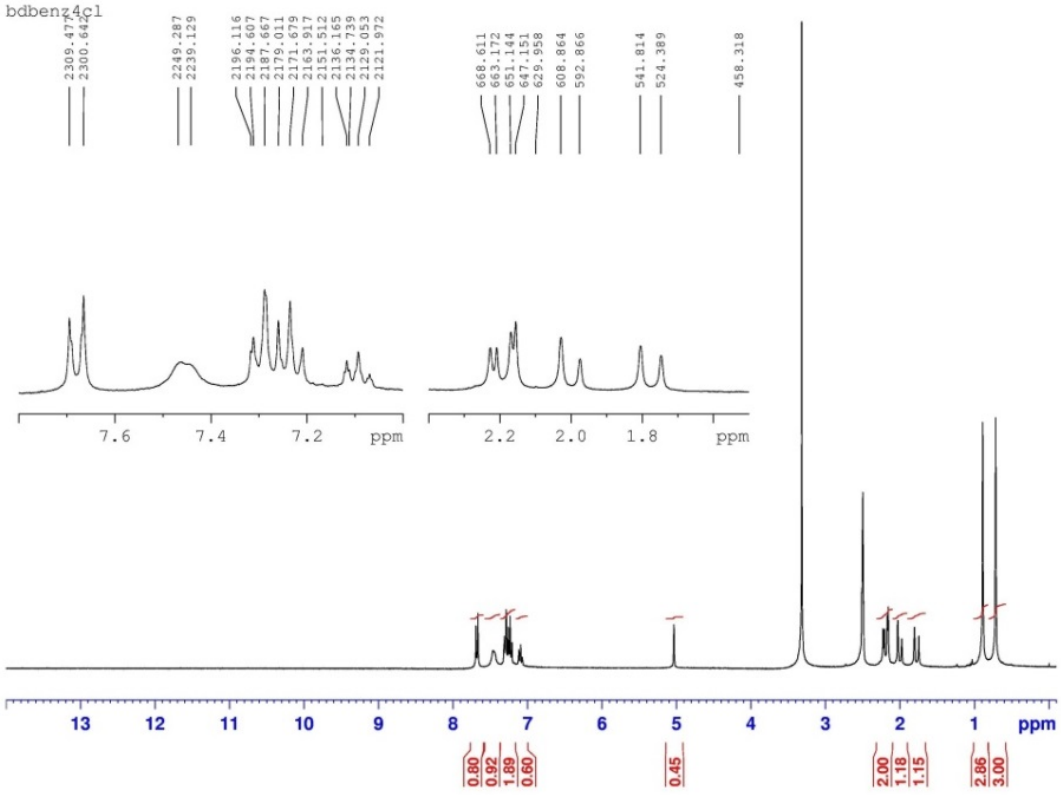
1085.69
1016.73
3500
3000
2500
2000
1500
1000
500
Wavenumber cm-1

b)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2300.642
2249.287
2239.129
2196.116
2194.607
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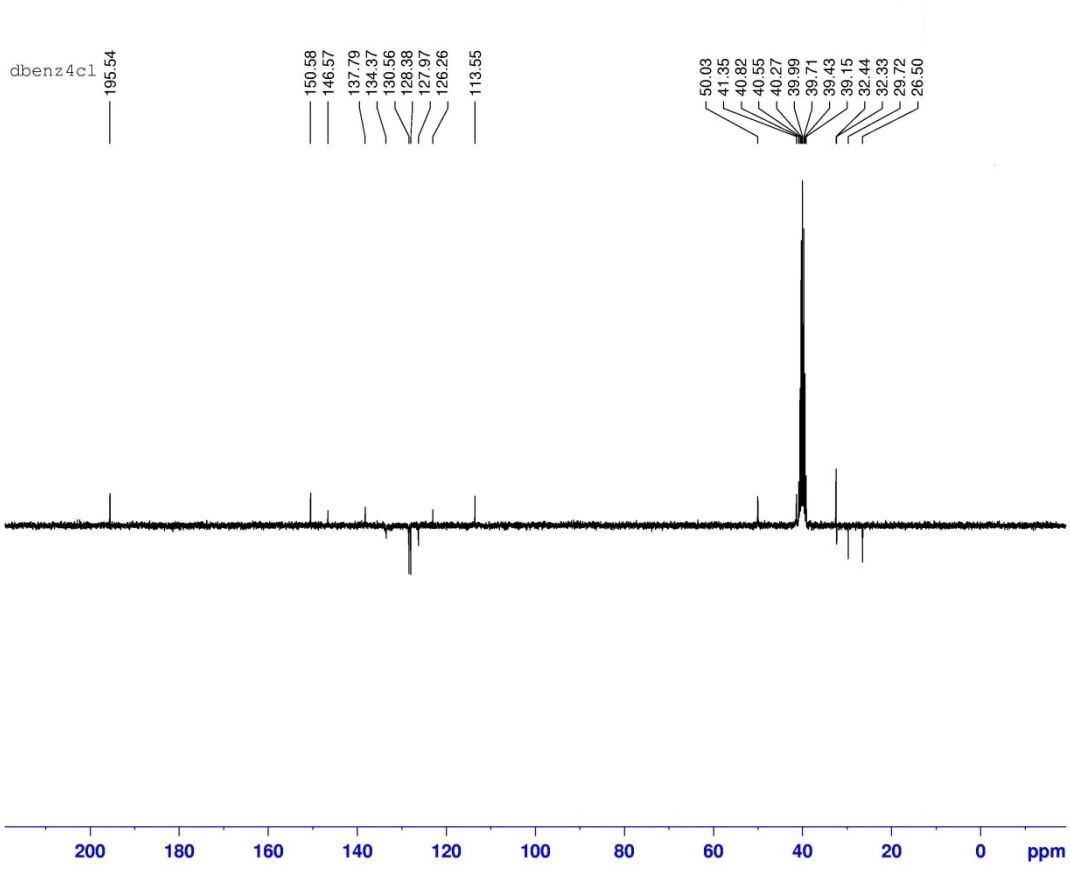
2171.679
2163.917
2151.512
2136.165
2134.739
2129.053
2121.972
668.611
663.172
651.144
647.151
629.958
608.864
592.866
541.814
524.389
458.318
7.6
7.4
7.2
ppm
2.2
2.0
1.8
ppm
13
12
11
10
9
8
7
6
5
4
3
2
1
ppm
0.80
0.92
1.89
0.60
0.45
2.00
1.18
1.15
2.86
3.00

c)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150.58
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130.56
128.38
127.97
126.26
113.55
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41.35
40.82
40.55
40.27
39.99
39.71
39.43
39.15
32.44
32.33
29.72
26.50
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

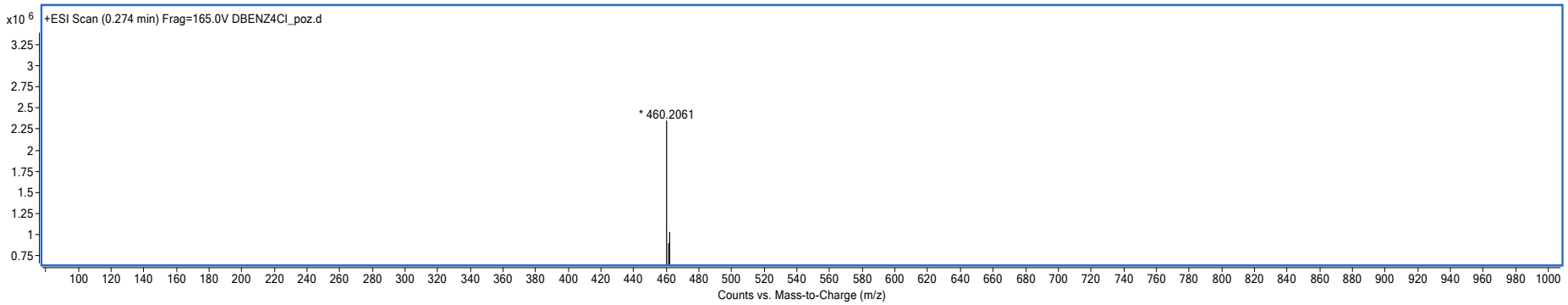
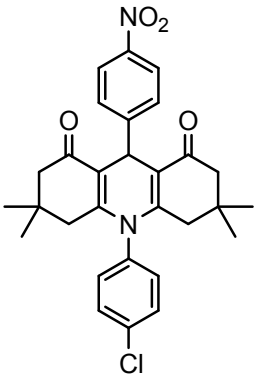


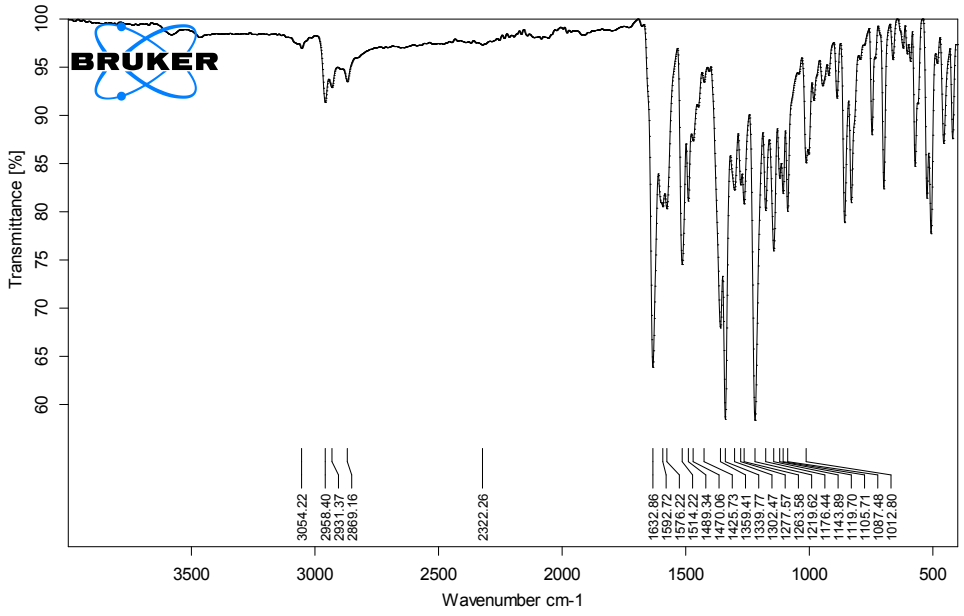
Fig. S4. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4a**

10-(4-Chlorophenyl)-3,3,6,6-tetramethyl-9-(4-nitrophenyl)-3,4,6,7,9,10 hexahydroacridine-1,8(2H,5H)-dione (4b)

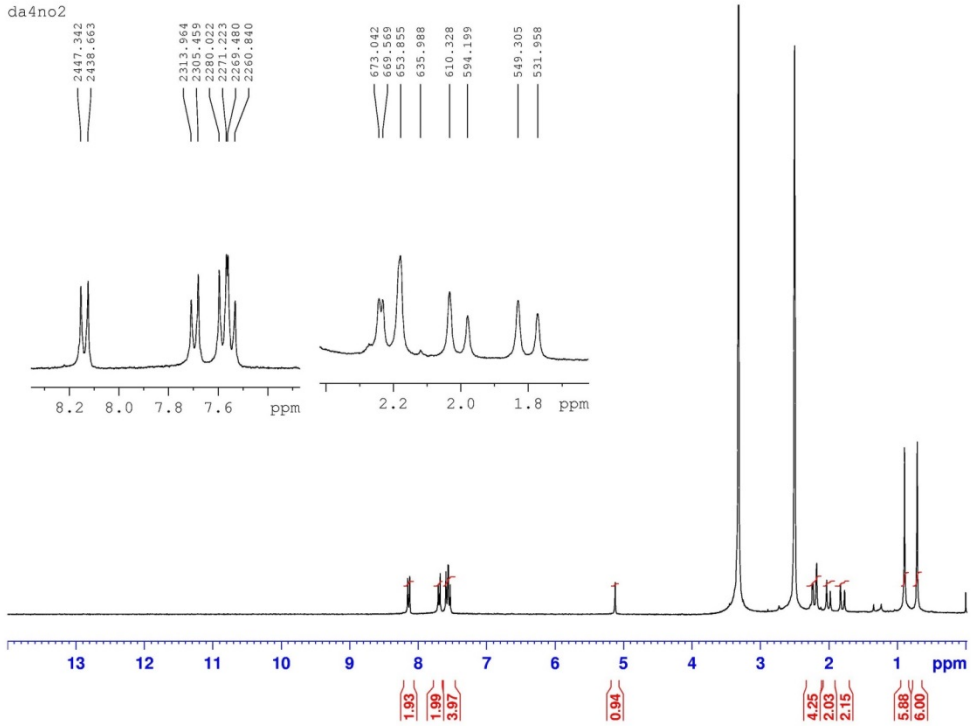


As yellow crystals, (0.478 g, 91 %), mp. (315-317 ^{o}C) [50] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.80 (d, 2H, *J*= 17.35 Hz, -CH_2), 2.01 (d, 2H, *J*= 16.13 Hz, -CH_2), 2.18-2.24 (m, 4H, -CH_2), 5.10 (s, 1H, -CH), 7.54-7.60 (m, 4H, Ar-H), 7.70 (d, 2H, *J*= 8.51 Hz, Ar-H), 8.14 (d, 2H, *J*= 8.68 Hz, Ar-H); ^{13}C-NMR (75 MHz, DMSO–d_6) δ (ppm): 26.57, 29.61, 32.47, 33.35, 41.39, 49.86, 112.51, 119.43, 123.76, 129.43, 134.55, 137.55, 146.16, 151.32, 154.01, 195.53; IR (cm^{-1}): 3054 w (Ar-H), 2958 w (-CH), 1632 s (C=O), 1592 w (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{29}H_{29}ClN_2O_4$: 504.1816; found: 527.1729 ([M+Na]$^{+}$).

a)



b)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2305.459
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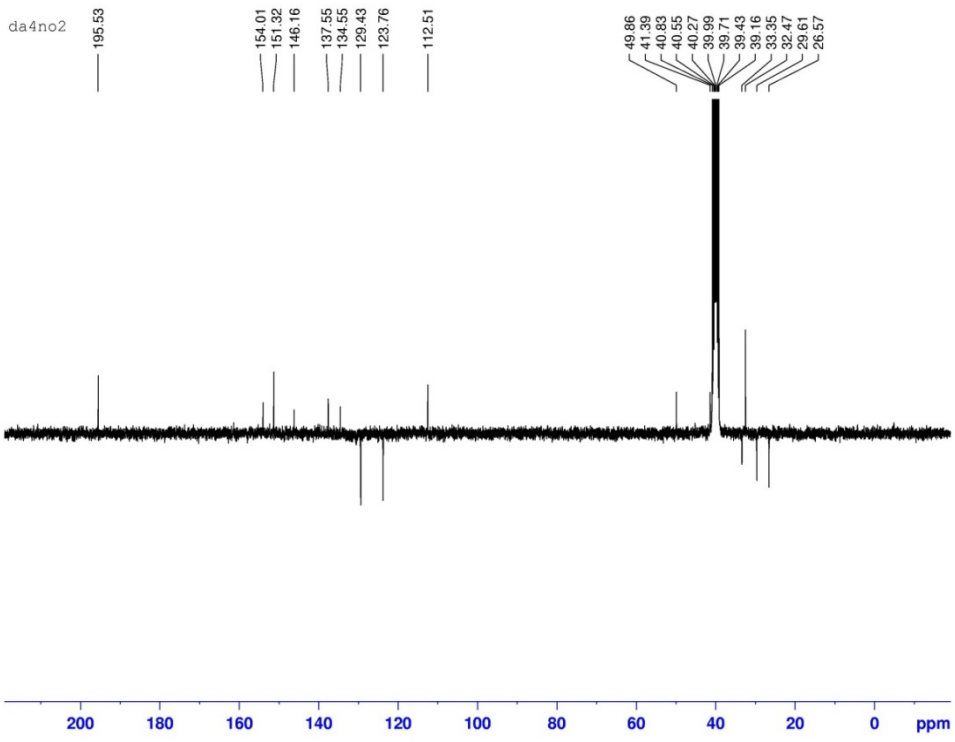
2271.223
2269.480
2260.840
673.042
669.569
653.855
635.988
610.328
594.199
549.305
531.958
8.2 8.0 7.8 7.6 ppm
2.2 2.0 1.8 ppm
13 12 11 10 9 8 7 6 5 4 3 2 1 ppm
1.93
1.99
3.97
0.94
4.25
2.03
2.15
5.88
6.00

c)


da4no2
195.53
154.01
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146.16
137.55
134.55
129.43
123.76
112.51
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40.55
40.27
39.99
39.71
39.43
39.16
33.35
32.47
29.61
26.57
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180
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140
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100
80
60
40
20
0
ppm

d)

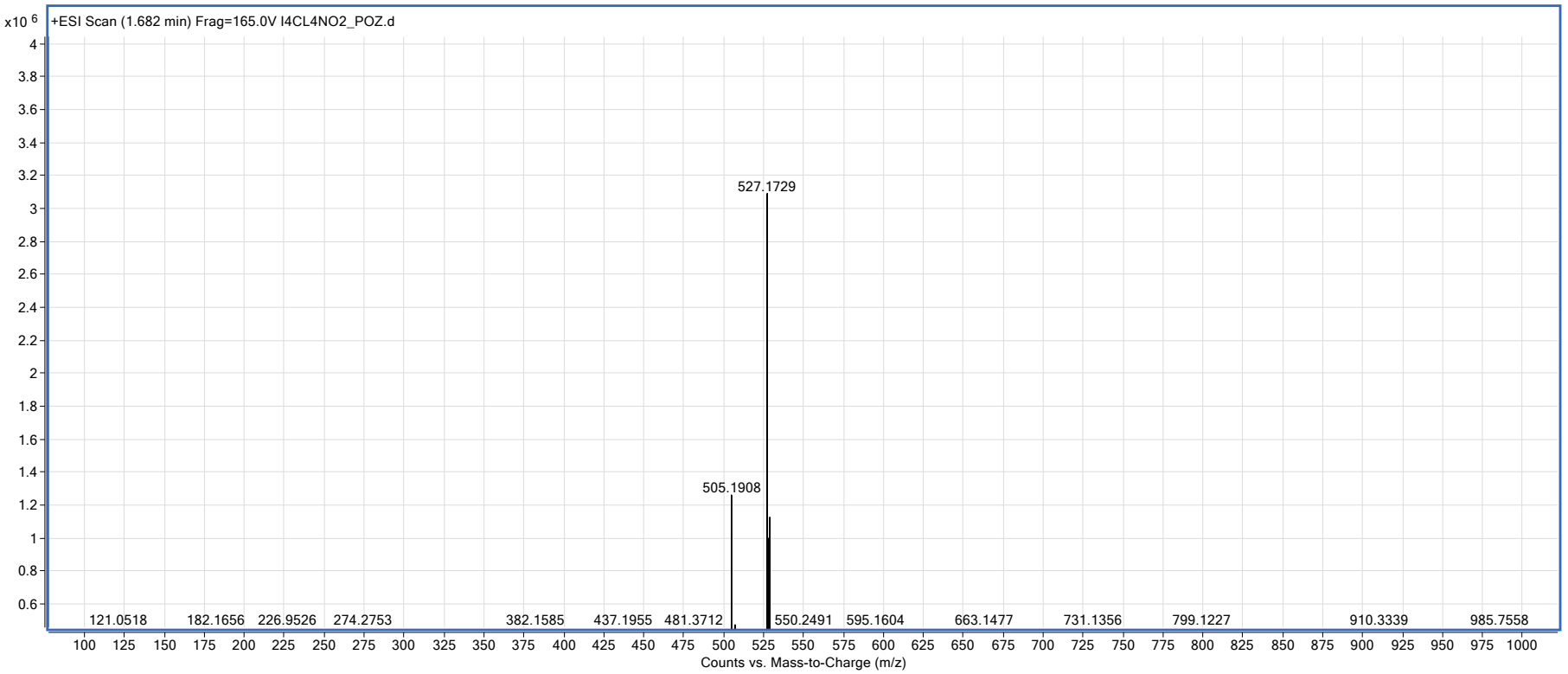
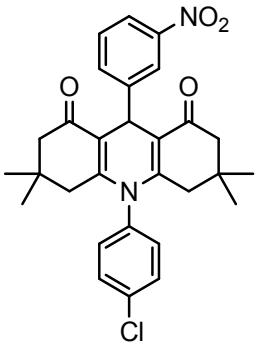


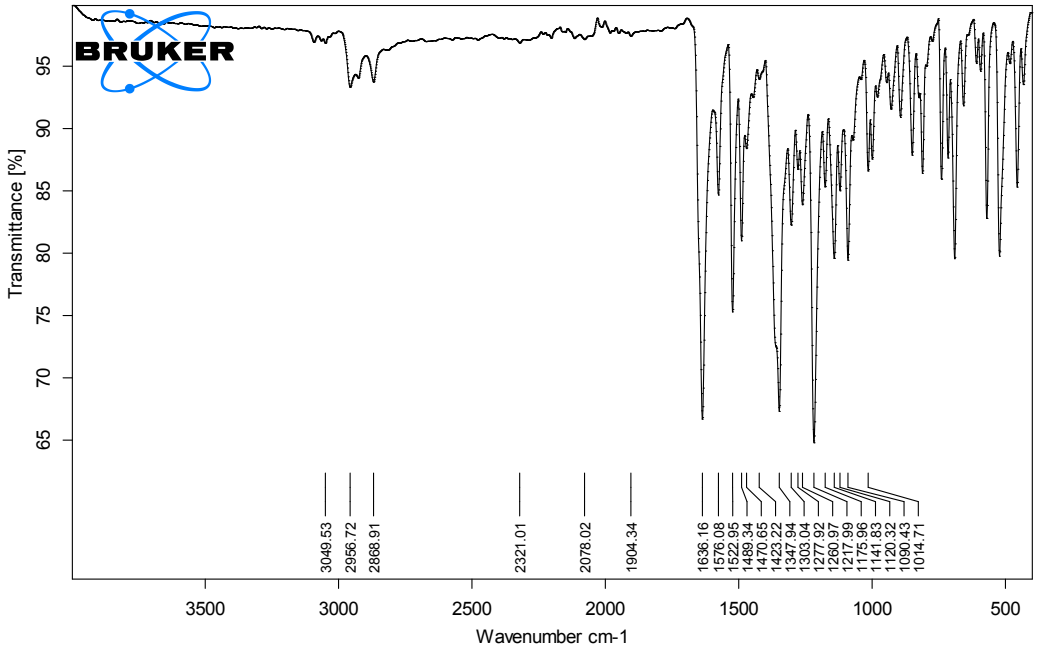
Fig. S5. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4b**

10-(4-Chlorophenyl)-3,3,6,6-tetramethyl-9-(3-nitrophenyl)-3,4,6,7,9,10 hexahydroacridine-1,8(2H,5H)-dione (4c)

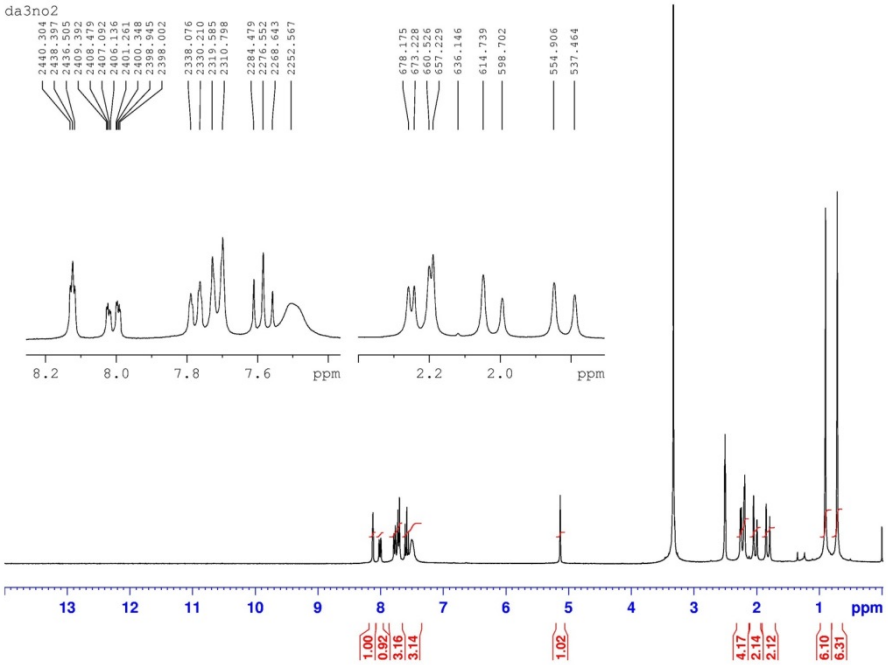


As yellow crystals, (0.464 g, 92 %), mp. (285-287 ^{o}C) [51] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.72 (s, 6H, 2x-CH_3), 0.88 (s, 6H, 2x-CH_3), 1.82 (d, 2H, J= 17.44 Hz, -CH_2), 2.02 (d, 2H, J= 16.04 Hz, -CH_2), 2.20 (d, 2H, J= 3.30 Hz, -CH_2), 2.25 (d, 2H, J= 4.95 Hz, -CH_2), 5.15 (s, 1H, -CH), 7.51-7.61 (m, 3H, Ar-H), 7.72 (d, 2H, J= 8.79 Hz, Ar-H), 7.78 (d, 1H, J= 7.87 Hz, Ar-H), 7.99-8.03 (m, 1H, Ar-H), 8.12-8.13 (m, 1H, Ar-H)); ^{13}C-NMR (75 MHz, DMSO–d_6) δ (ppm): 26.47, 29.62, 32.52, 32.92, 41.34, 49.84, 112.72, 121.50, 122.56, 130.21, 130.65, 134.58, 134.75, 137.52, 147.88, 148.60, 151.39, 195.63; IR (cm^{-1}): 3049 w (Ar-H), 2956 w (-CH), 1636 s (C=O), 1576 s (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{29}H_{29}ClN_2O_4$: 504.1816; found: 527.1655 ([M+Na]$^{+}$).

a)



b)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2398.002
2338.076
2330.210
2319.585
2310.798
2284.479
2276.552
2268.643
2252.567
678.175
673.228
660.526
657.229
636.146
614.739
598.702
554.906
537.464
8.2
8.0
7.8
7.6
ppm
2.2
2.0
ppm
13
12
11
10
9
8
7
6
5
4
3
2
1
ppm
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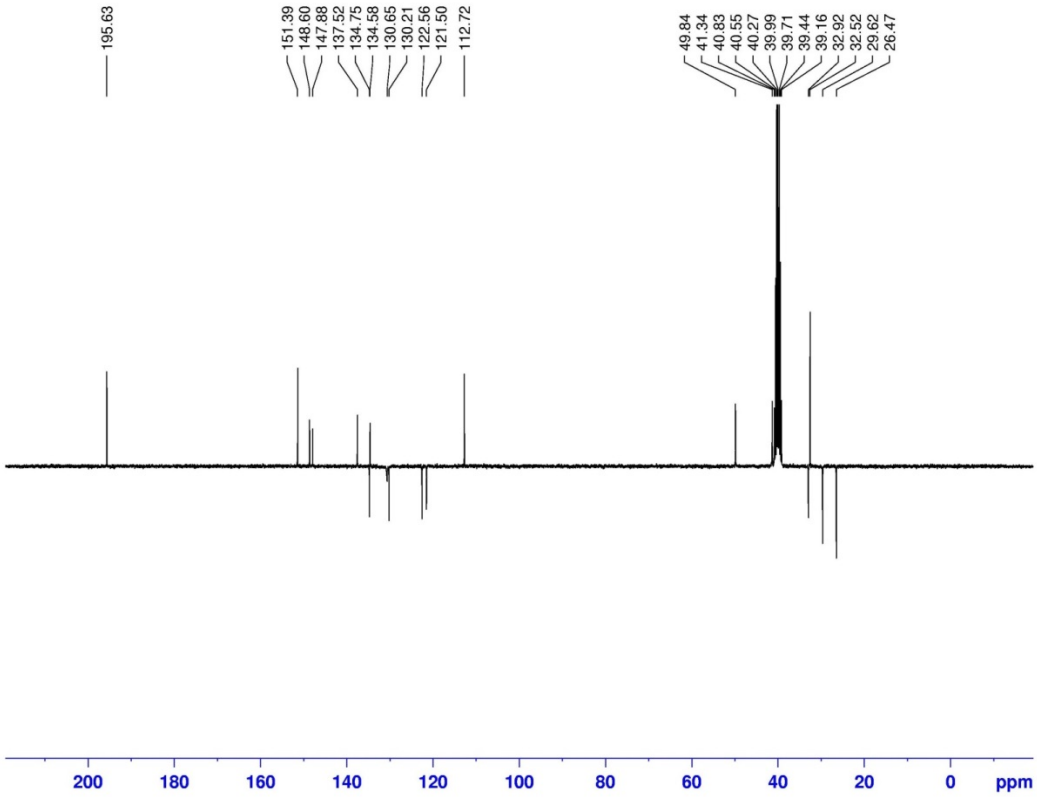
3.16
3.14
1.02
4.17
2.14
2.12
6.10
6.31

c)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147.88
137.52
134.75
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130.65
130.21
122.56
121.50
112.72
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41.34
40.83
40.55
40.27
39.99
39.71
39.44
39.16
32.92
32.52
29.62
26.47
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

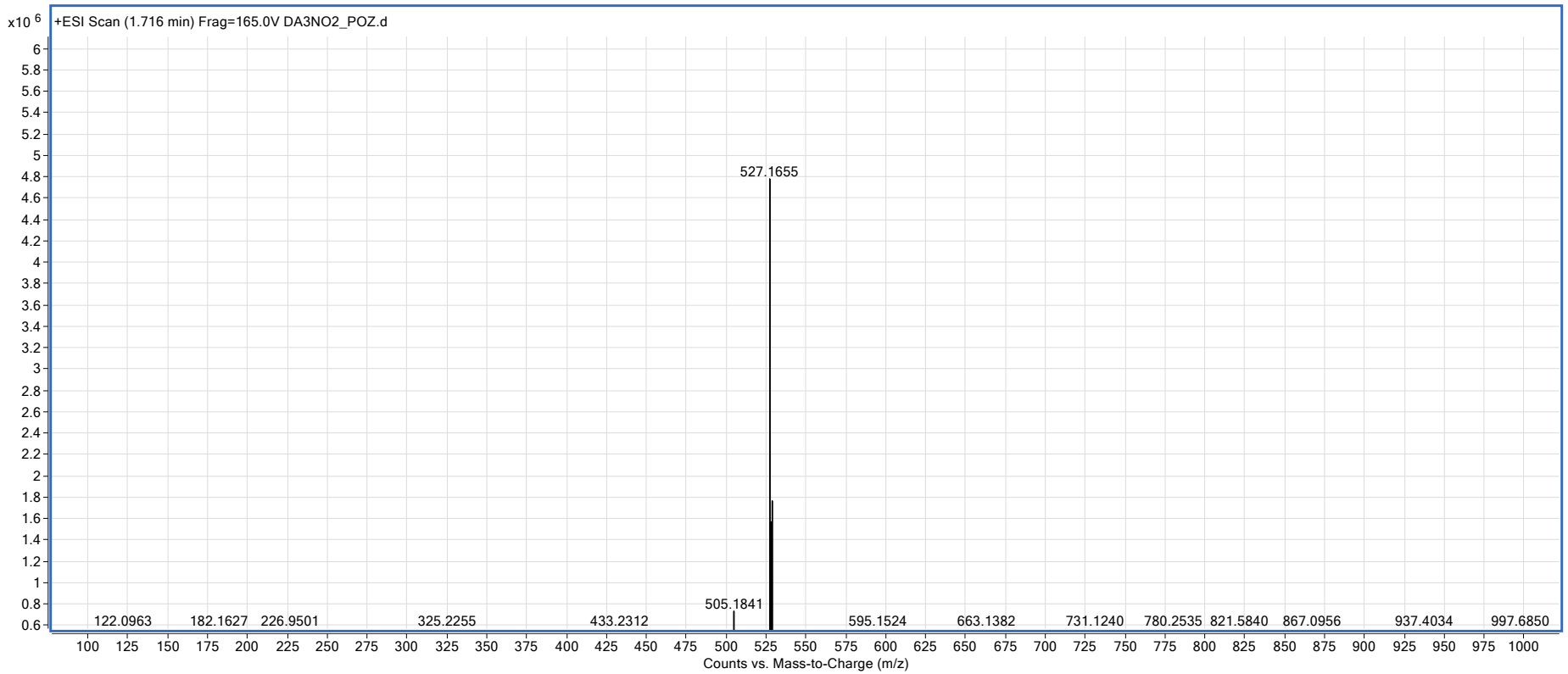
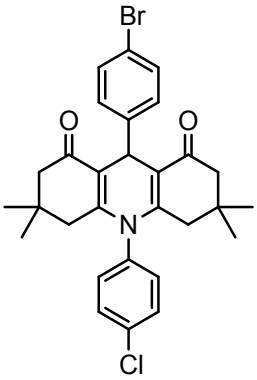


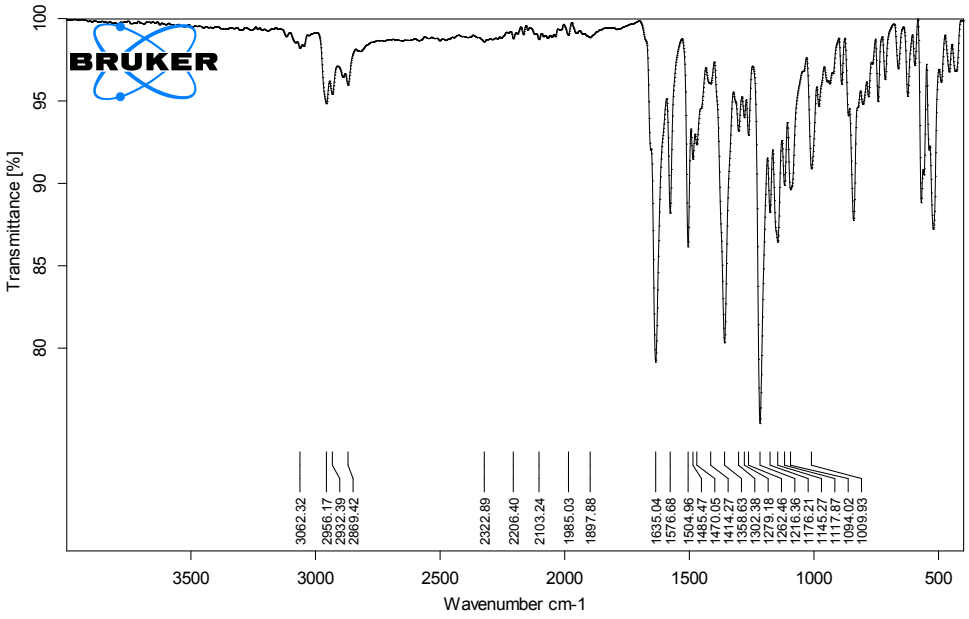
Fig. S6. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4c**

9-(4-Bromophenyl)-10-(4-chlorophenyl)-3,3,6,6-tetramethyl-3,4,6,7,9,10 hexahydroacridine-1,8(2H,5H)-dione (4d)

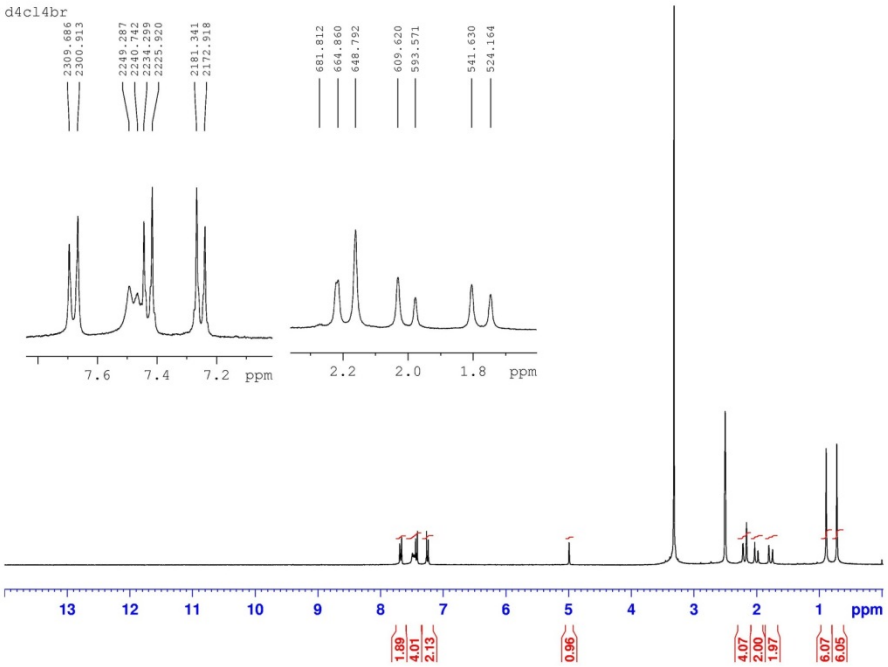


As yellow crystals, (0.504 g, 94 %), mp. (304-305 ^{o}C) [50] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.78 (d, 2H, J= 17.47 Hz, -CH_2), 2.01 (d, 2H, J= 16.05 Hz, -CH_2), 2.16-2.19 (m, 4H, -CH_2), 5.00 (s, 1H, -CH), 7.26 (d, 2H, J= 8.42 Hz, Ar-H), 7.42-7.50 (m, 4H, Ar-H), 7.68 (d, 2H, J= 8.77 Hz, Ar-H); ^{13}C-NMR (75 MHz, DMSO–d_6) δ (ppm): 26.56, 29.66, 32.27, 32.45, 41.35, 49.96, 113.08, 119.25, 130.33, 130.54, 131.26, 134.44, 137.67, 145.96, 150.81, 195.54**;** IR (cm^{-1}): 3062 w (Ar-H), 2956 w (-CH), 1635 s (C=O), 1576 s (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{29}H_{29}BrClNO_2$: 537.1070; found: 538.1123 ([M+H]$^{+}$).

a)



b)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2249.287
2240.742
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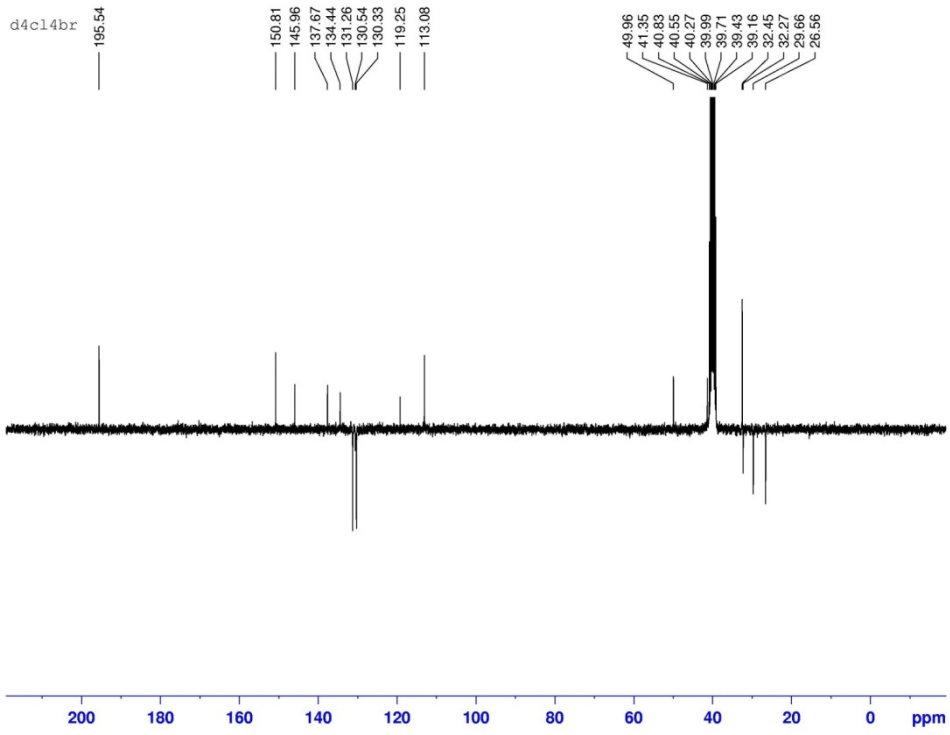
2225.920
2181.341
2172.918
681.812
664.860
648.792
609.620
593.571
541.630
524.164
7.6
7.4
7.2 ppm
2.2
2.0
1.8 ppm
13
12
11
10
9
8
7
6
5
4
3
2
1 ppm
1.89
4.01
2.13
0.96
4.07
2.00
1.97
6.07
6.05

c)


d4cl4br
195.54
150.81
145.96
137.67
134.44
131.26
130.54
130.33
119.25
113.08
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41.35
40.83
40.55
40.27
39.99
39.71
39.43
39.16
32.45
32.27
29.66
26.56
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

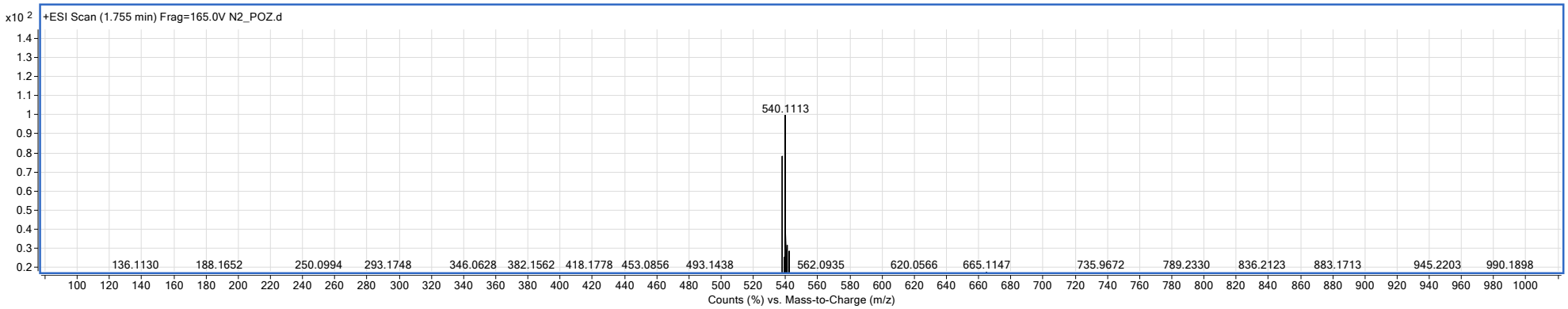
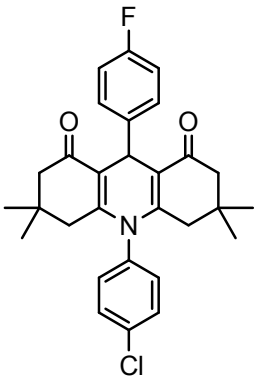


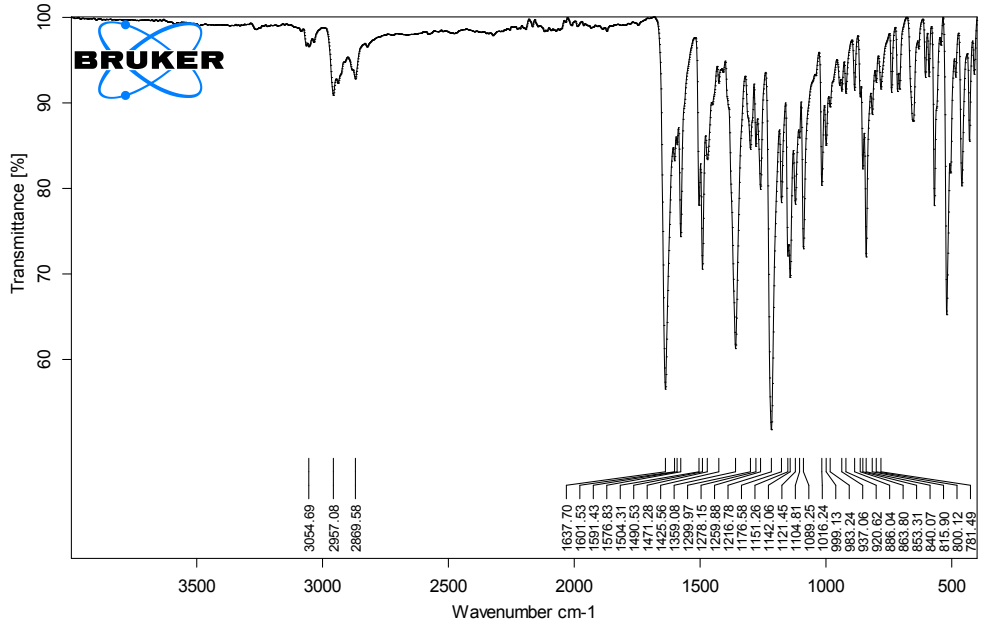
Fig. S7. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4d**

10-(4-Chlorophenyl)-9-(4-fluorophenyl)-3,3,6,6-tetramethyl-3,4,6,7,9,10-hexahydroacridine-1,8 (2H,5H)-dione (4e)

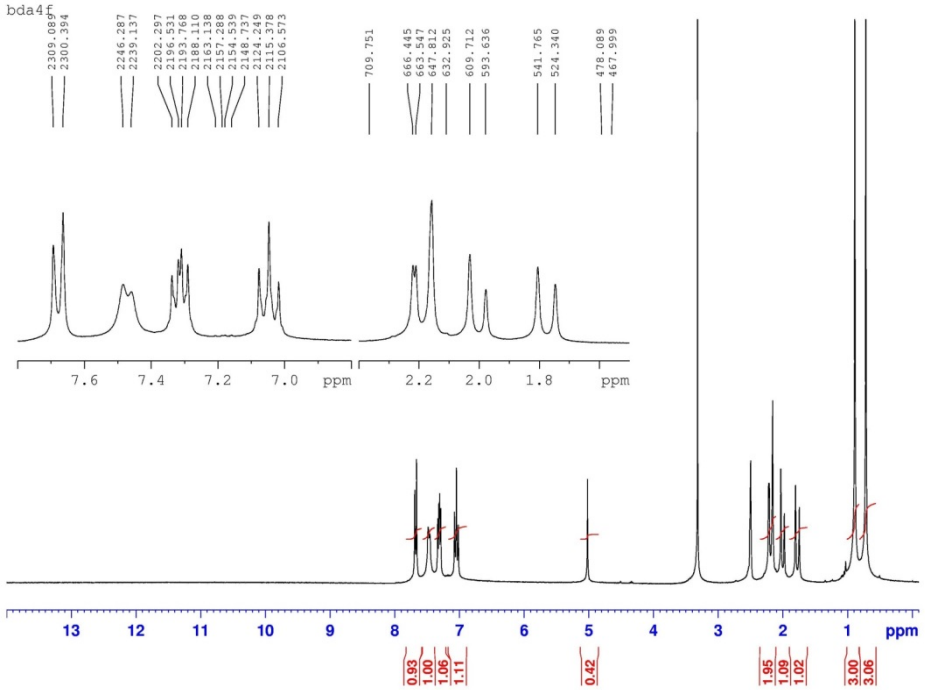


As yellow crystals, (0.434 g, 91 %), mp. (280-282 ^{o}C) [52] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.78 (d, 2H, J= 17.43 Hz, -CH_2), 2.01 (d, 2H, J= 16.08 Hz, -CH_2), 2.16-2.22 (m, 4H, -CH_2), 5.05 (s, 1H, -CH), 7.05 (t, 2H, J= 8.84 Hz, Ar-H), 7.29-7.34 (m, 2H, Ar-H), 7.48 (d, 2H, J= 7.15 Hz, Ar-H), 7.68 (d, 2H, J= 8.70 Hz, Ar-H); ^{13}C-NMR (75 MHz, DMSO–d_6) δ (ppm): 26.52, 29.68, 31.84, 32.45, 41.35, 49.98, 113.42, 114.86, 129.79, 130.53, 134.42, 137.72, 142.80, 150.64, 159.29, 195.55; IR (cm^{-1}): 3054 w (Ar–H), 2957 s (-CH), 1637 s (C=O), 1576 s (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{29}H_{29}ClFNO_2$: 477.1871; found: 478.1956 ([M+H]$^{+}$).

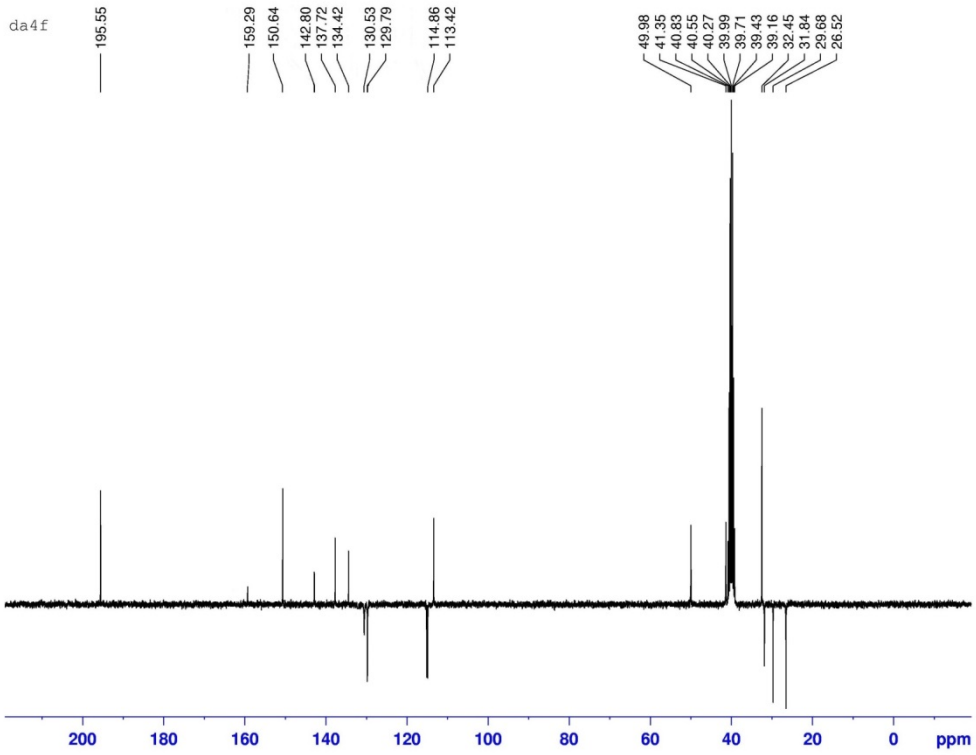
a)



b)


bda4f
2309.088
2300.394
2246.287
2239.137
2202.297
2196.531
2193.768
2188.110
2163.138
2157.488
2154.539
2148.737
2124.249
2115.378
2106.573
709.751
666.445
663.547
647.812
632.925
609.712
593.636
541.765
524.340
478.089
467.999
7.6
7.4
7.2
7.0
ppm
2.2
2.0
1.8
ppm
13
12
11
10
9
8
7
6
5
4
3
2
1
ppm
0.93
1.00
1.06
1.11
0.42
1.95
1.09
1.02
3.00
3.06

c)


da4f
195.55
159.29
150.64
142.80
137.72
134.42
130.53
129.79
114.86
113.42
49.98
41.35
40.83
40.55
40.27
39.99
39.71
39.43
39.16
32.45
31.84
29.68
26.52
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

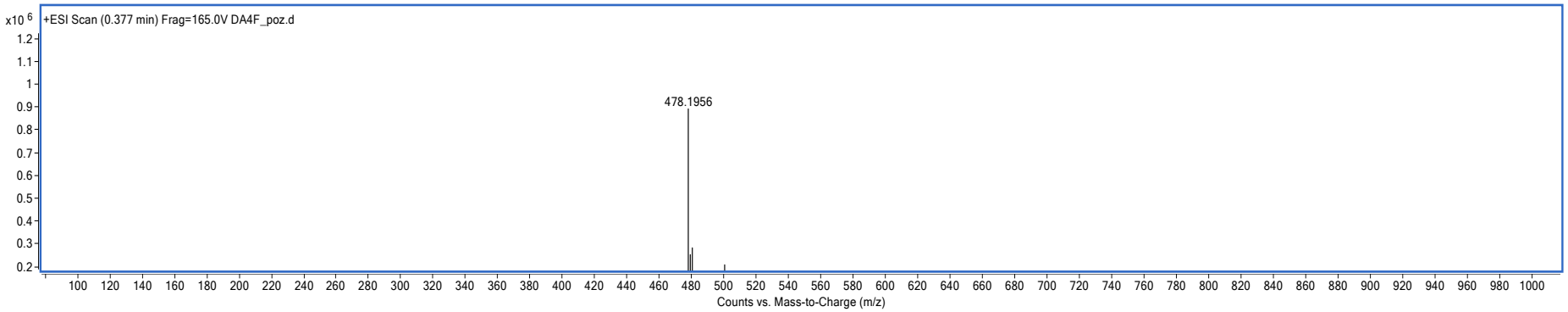
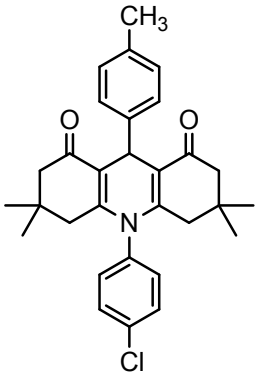


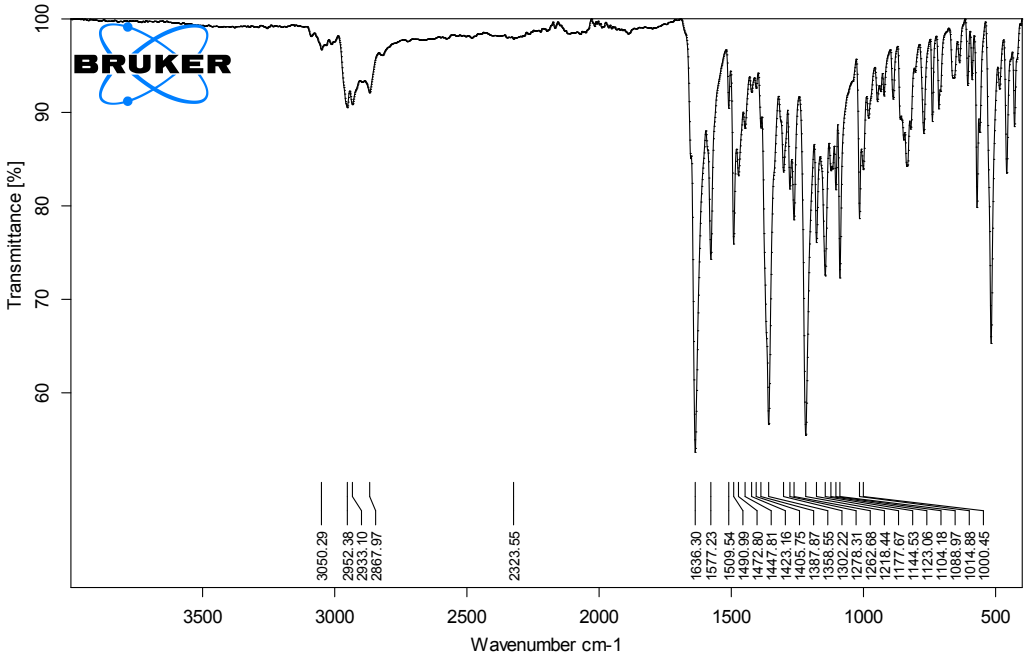
Fig. S8. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4e**

10-(4-Chlorophenyl)-3,3,6,6-tetramethyl-9-(p-tolyl)-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4f)

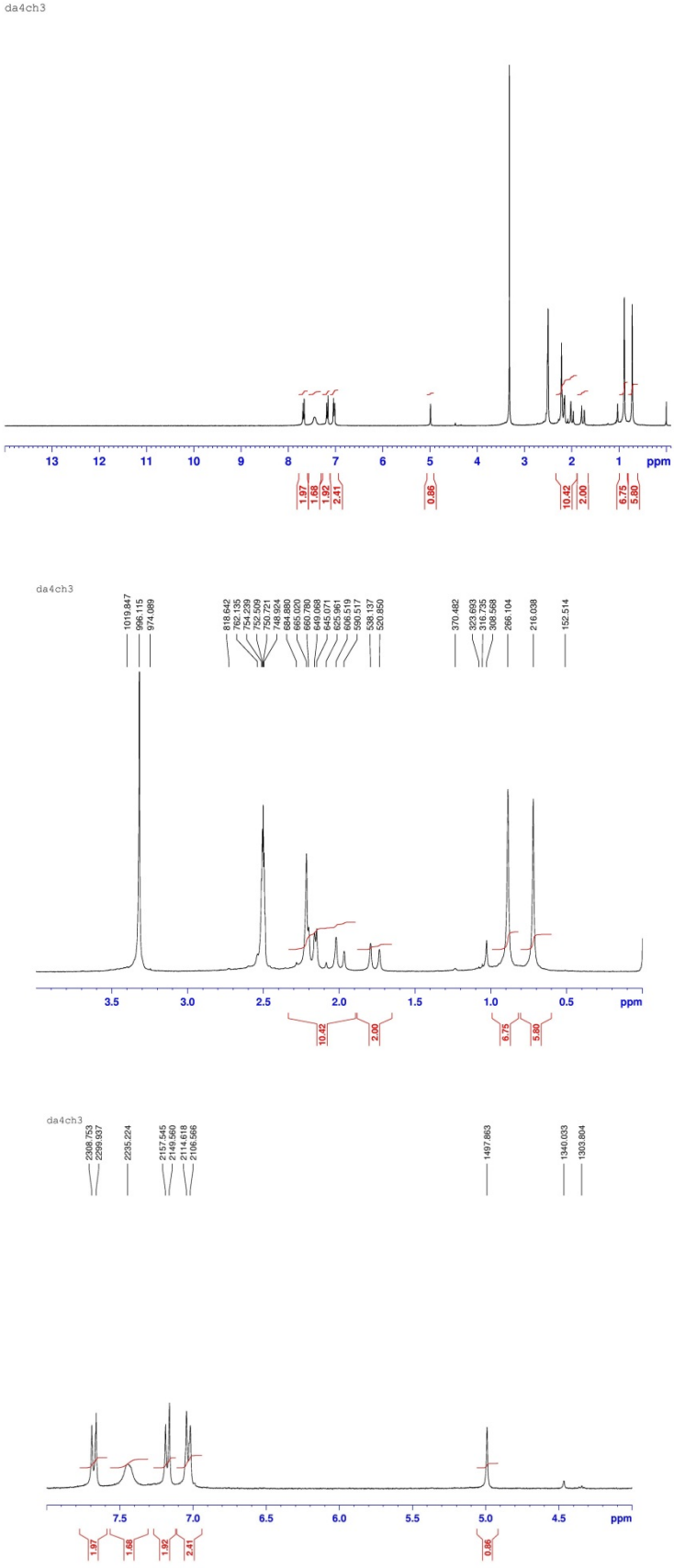


As yellow crystals, (0.435 g, 91 %), mp. (262-265 ºC) [51] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.75 (s, 6H, 2x-CH_3), 0.80 (s, 6H, 2x-CH_3), 1.76 (d, 2H, *J*= 17.29 Hz, -CH_2), 1.97-2.22 (m, 9H, -CH_2 and –CH_3), 5.00 (s, 1H, -CH), 7.04 (d, 2H, *J*= 8.05 Hz, Ar-H), 7.18 (d, 2H, *J*= 8.00 Hz, Ar-H), 7.35-7.55 (m, 2H, Ar-H), 7.68 (d, 2H, *J*= 8.82 Hz, Ar-H); ^{13}C NMR (75 MHz, DMSO–d_6) δ (ppm): 26.53, 29.15, 31.83, 32.32, 32.43, 41.33, 50.05, 113.69, 127.87, 128.40, 128.96, 134.34, 135.10, 137.83, 143.69, 150.43, 195.54; IR (cm^{-1}): 3050 w (Ar-H), 2952 w (-CH), 1636 s (C=O), 1577 s (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{30}H_{32}ClNO_2$: 473.2122; found: 474.2215 ([M+H]$^{+}$).

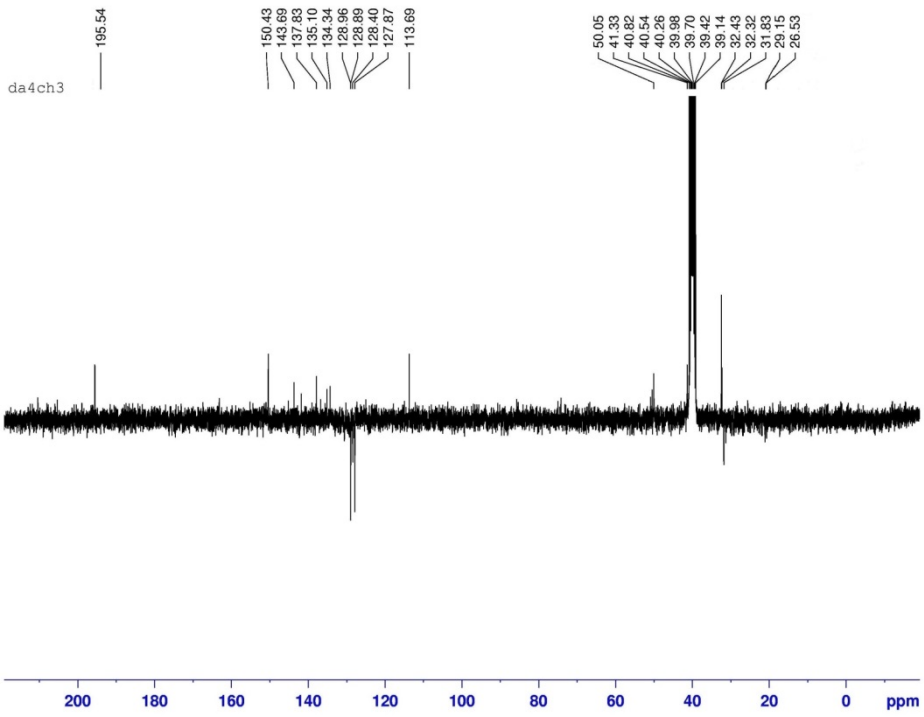
a)



b)


da4ch3
13 12 11 10 9 8 7 6 5 4 3 2 1 ppm
1.97 1.68 1.92 2.41 0.86 10.42 2.00 6.75 5.80
da4ch3
1019.847 996.115 974.089 818.642 762.135 754.239 750.721 748.924 684.880 660.020 649.068 645.071 625.961 596.517 590.517 539.137 520.850 370.482 323.693 316.735 308.568 266.104 216.038 152.514
3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
10.42 2.00 6.75 5.80
da4ch3
2308.753 2299.937 2235.224 2157.545 2149.560 2114.618 2106.566 1497.863 1340.033 1303.804
7.5 7.0 6.5 6.0 5.5 5.0 4.5 ppm
1.97 1.68 1.92 2.41 0.86

c)


da4ch3
195.54
150.43
143.69
137.83
135.10
134.34
128.96
128.89
128.40
127.87
113.69
50.05
41.33
40.82
40.54
40.26
39.98
39.70
39.42
39.14
32.43
32.32
31.83
29.15
26.53
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

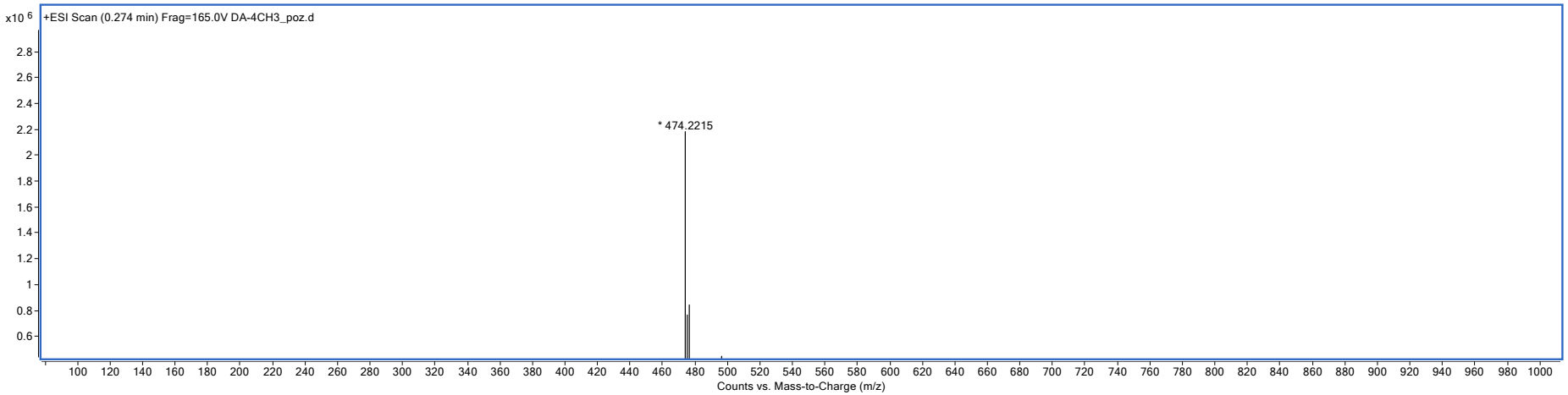
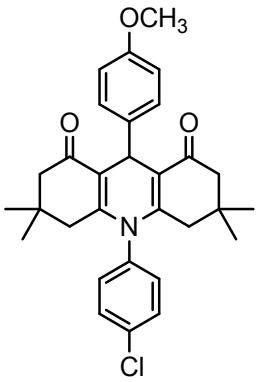


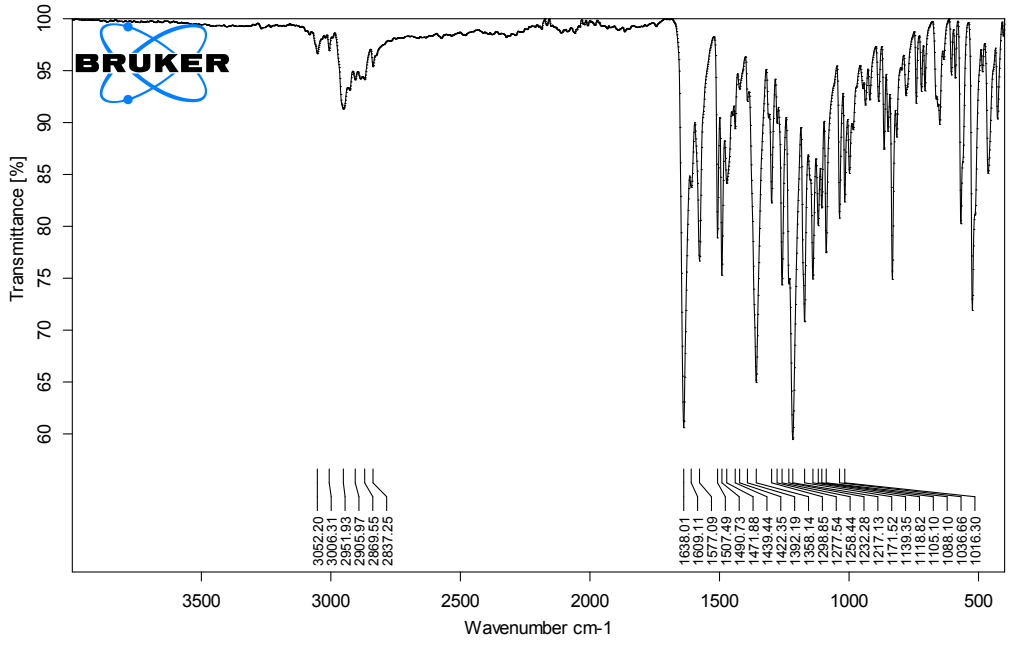
Fig. S9. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4f**

10-(4-Chlorophenyl)-9-(4-methoxyphenyl)-3,3,6,6-tetramethyl-3,4,6,7,9,10-hexahydro acridine-1,8(2H,5H)-dione (4g)

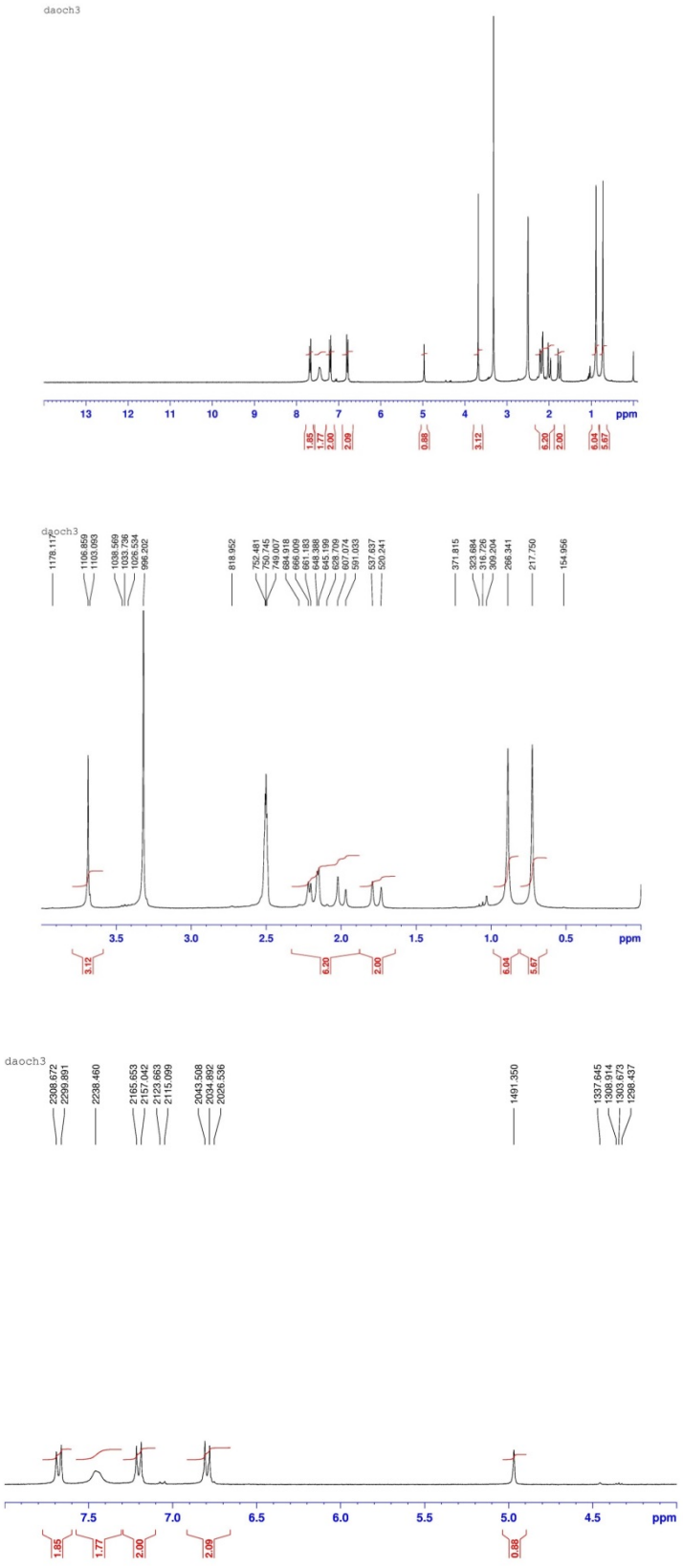


As yellow crystals, (0.440 g, 91 %), mp. (255-257 ^{o}C) [53] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.75 (s, 6H, 2x-CH_3), 0.85 (s, 6H, 2x-CH_3), 1.76 (d, 2H, J= 17.40 Hz, -CH_2), 1.97-2.22 (m, 6H,-CH_2), 3.70 (s, 1H, -OCH_3), 4.95 (s, 1H, -CH), 6.80 (d, 2H, J= 8.62 Hz, Ar-H), 7.20 (d, 2H, J= 8.61 Hz, Ar-H), 7.40-7.55 (m, 2H, Ar-H), 7.68 (d, 2H, J= 8.78 Hz, Ar-H); ^{13}C NMR (75 MHz, DMSO–d_6) δ (ppm): 26.56, 29.73, 31.39, 32.44, 50.07, 55.31, 113.71, 113.83, 128.93, 130.56, 134.34, 137.85, 138.92, 150.28, 157.76, 195.55; IR (cm^{-1}): 3006 w (Ar-H), 2951 w (-CH), 1638 s (C=O), 1577 s (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{30}H_{32}ClNO_3$: 489.2071; found: 490.2160 ([M+H]$^{+}$).

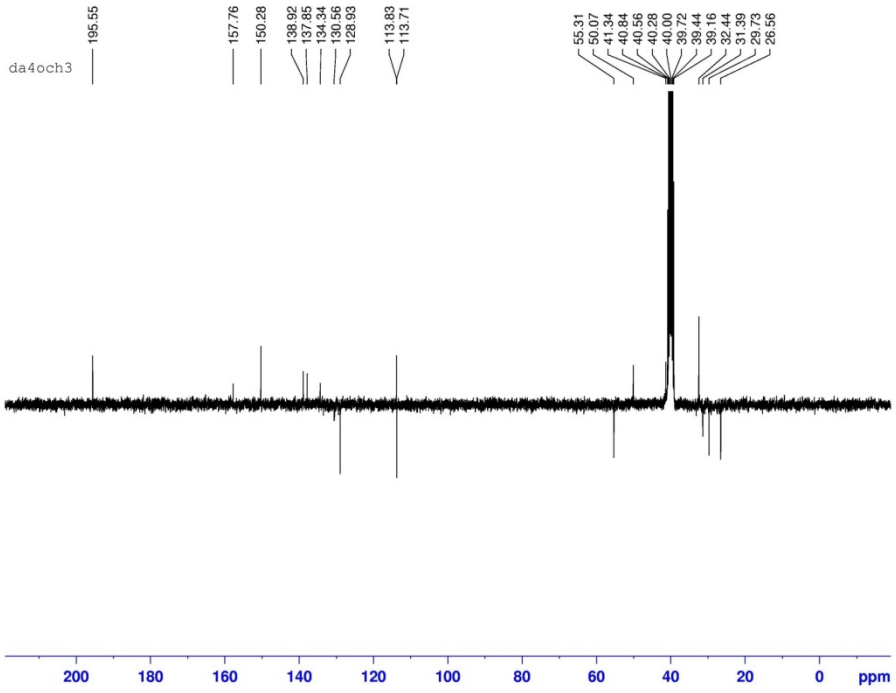
a)



b)


daoch3
13 12 11 10 9 8 7 6 5 4 3 2 1 ppm
1.85 1.77 2.00 2.09 0.88 3.12 6.20 2.00 6.04 5.67
daoch3
1178.117
1106.859
1103.660
1038.569
1033.736
1005.854
996.202
818.952
757.481
752.745
749.007
684.918
664.059
661.183
648.388
645.199
639.709
607.074
591.033
537.637
520.241
371.815
323.884
318.726
309.204
266.341
217.750
154.956
3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
3.12 6.20 2.00 6.04 5.67
daoch3
2308.672
2299.891
2238.460
2165.653
2157.042
2123.663
2115.099
2043.508
2034.892
2026.536
1491.350
1337.645
1308.914
1303.673
1298.437
7.5 7.0 6.5 6.0 5.5 5.0 4.5 ppm
1.85 1.77 2.00 2.09 0.88

c)


da4och3
195.55
157.76
150.28
138.92
137.85
134.34
130.56
128.93
113.83
113.71
55.31
50.07
41.34
40.84
40.56
40.28
40.00
39.72
39.44
39.16
32.44
31.39
29.73
26.56
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

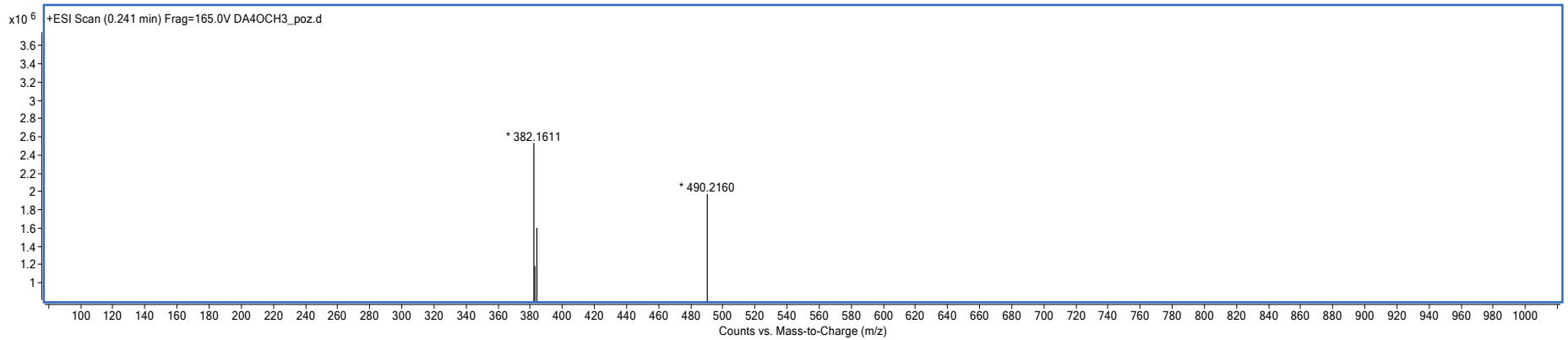
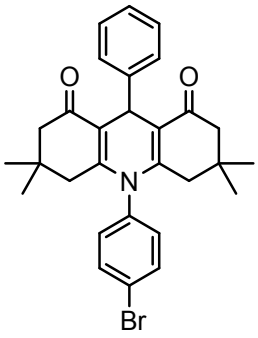


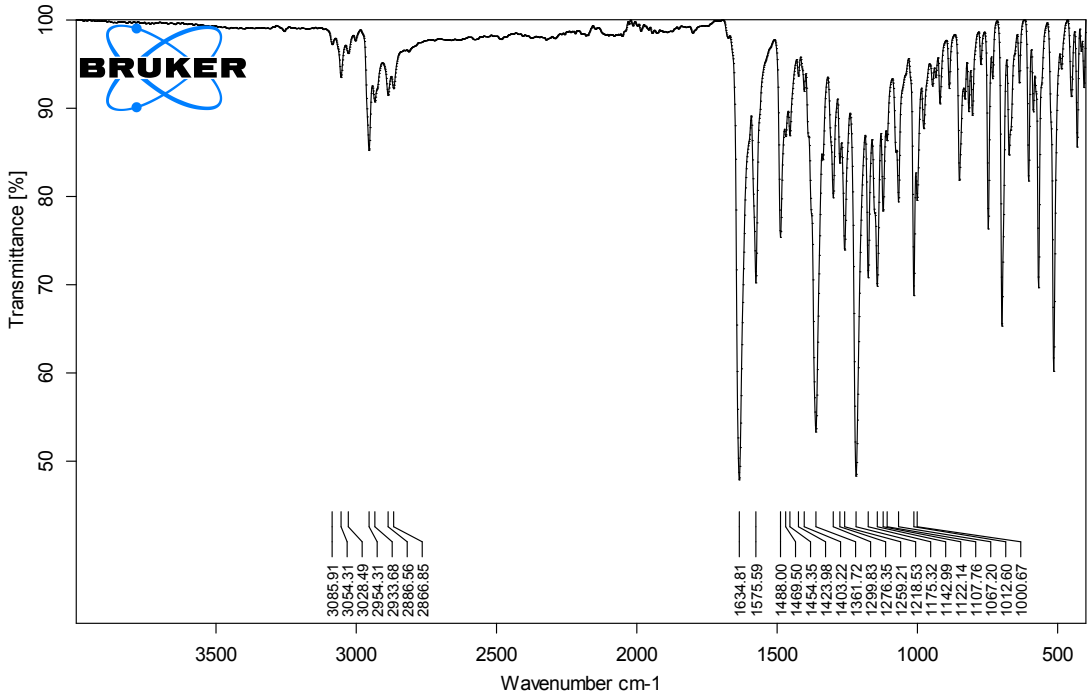
Fig. S10. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4g**

10-(4-Bromophenyl)-3,3,6,6-tetramethyl-9-phenyl-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4h)

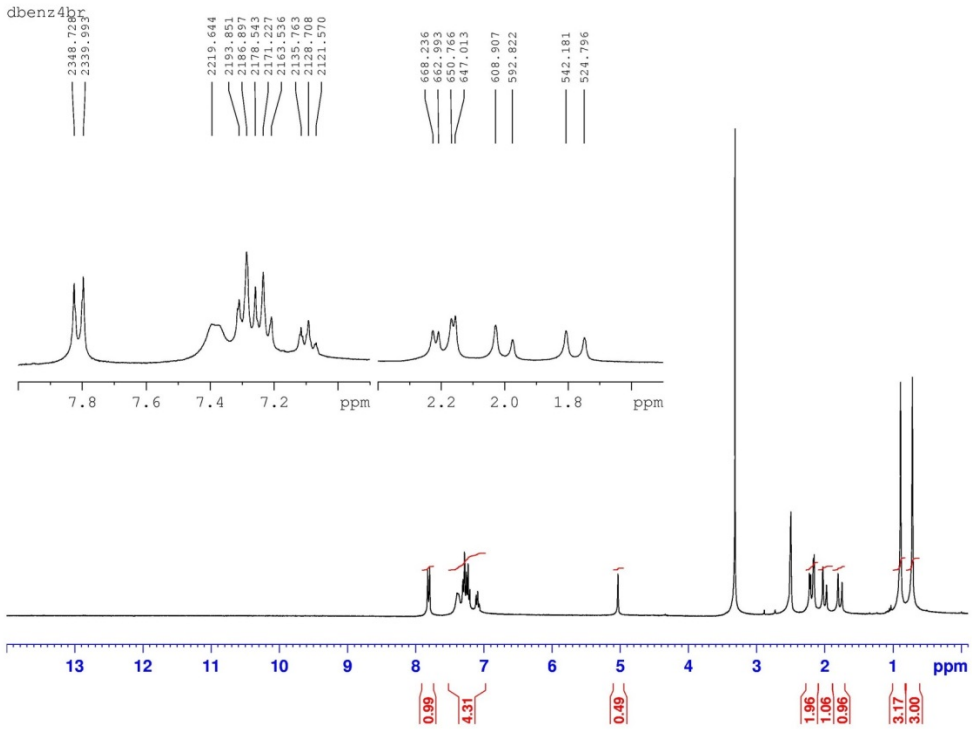


As yellow crystals, (0.472 g, 94 %), mp. (303-305 ºC) [54] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.78 (d, 2H, J= 17.39 Hz, -CH_2), 2.00 (d, 2H, J= 16.90 Hz, -CH_2), 2.16-2.23 (m, 4H, -CH_2), 5.05 (s, 1H, -CH), 7.07-7.40 (m, 7H, Ar-H), 7.81 (d, 2H, J= 8.74 Hz, Ar-H); ^{13}C-NMR (75 MHz, DMSO–d_6) δ (ppm): 26.50, 29.71, 32.32, 32.45, 41.35, 50.03, 113.54, 123.01, 126.27, 127.97, 128.37, 133.54, 138.22, 146.57, 150.51, 195.54; IR (cm^{-1}): 3028 s (Ar-H), 2954 s (-CH), 1634 s (C=O), 1575 s (C=C); HRMS (QTOF-ESI): m/z calcd. For $C_{29}H_{30}BrNO_2$: 503.1460; found: 504.1529 ($[M+H]^+$).

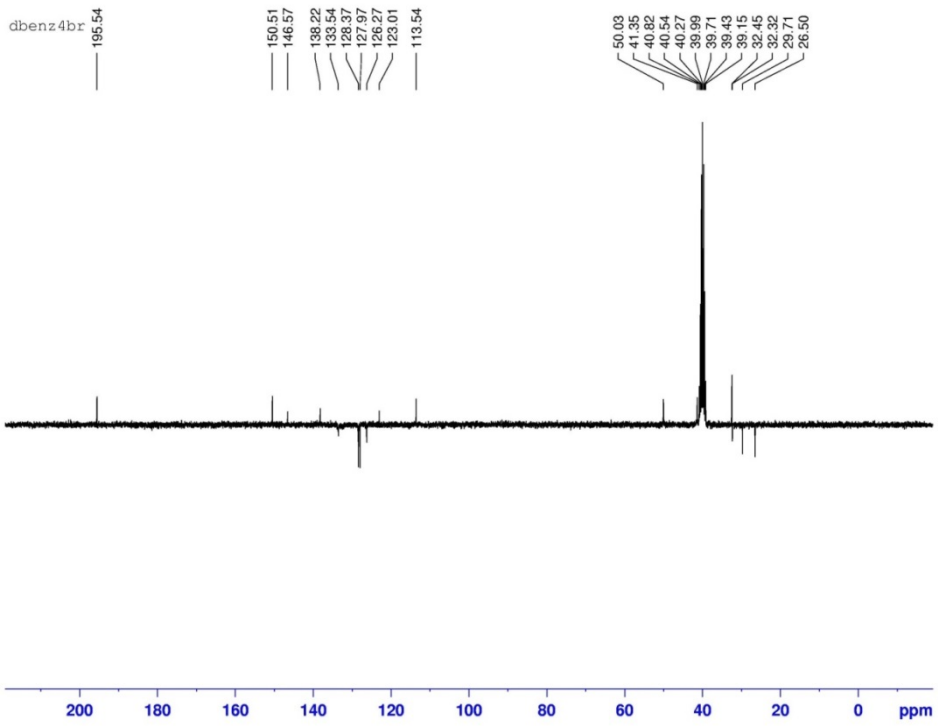
a)



b)


dbenz4br
2348.728
2339.997
2219.644
2193.851
2186.897
2178.543
2171.227
2163.536
2135.763
2128.708
2121.570
668.236
662.993
650.766
647.013
608.907
592.822
542.181
524.796
7.8
7.6
7.4
7.2
ppm
2.2
2.0
1.8
ppm
13
12
11
10
9
8
7
6
5
4
3
2
1
ppm
0.99
4.31
0.49
1.96
1.06
0.96
3.17
3.00

c)


dbenz4br
195.54
150.51
146.57
138.22
133.54
128.37
127.97
126.27
123.01
113.54
50.03
41.35
40.82
40.54
40.27
39.99
39.71
39.43
39.15
32.45
32.32
29.71
26.50
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

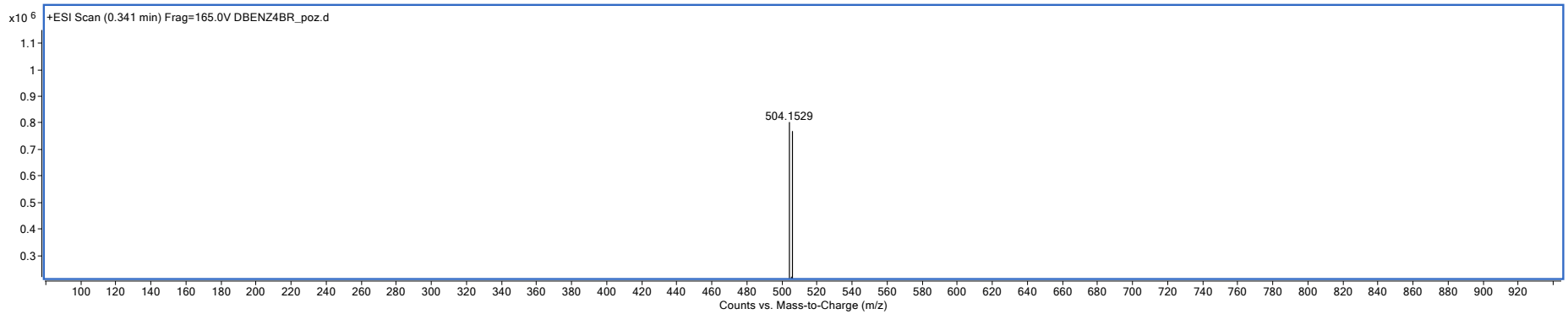
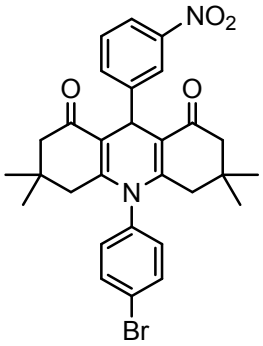
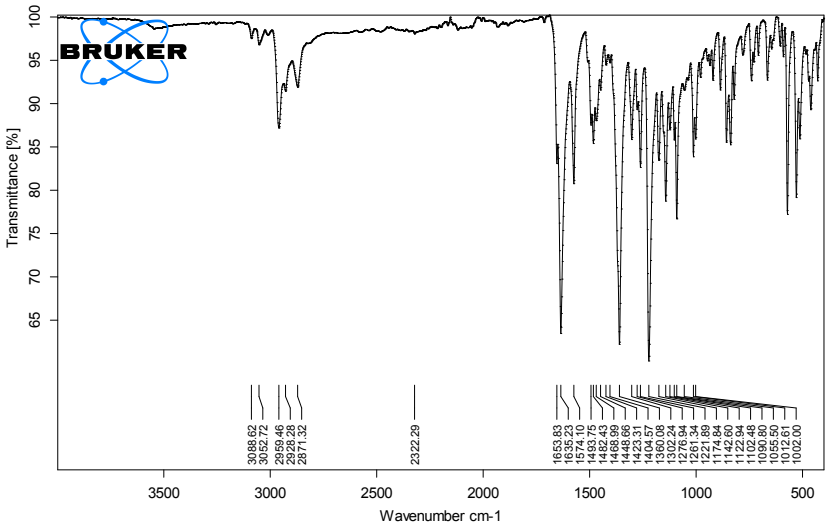


Fig. S11. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4h**

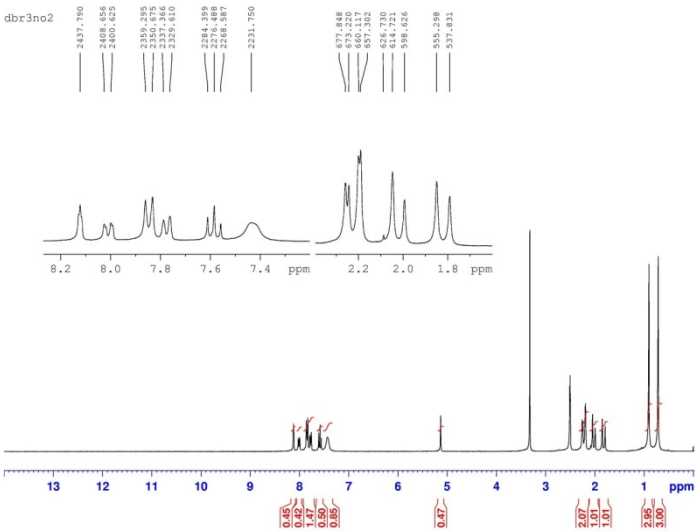
10-(4-bromophenyl)-3,3,6,6-tetramethyl-9-(3-nitrophenyl)-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4i)



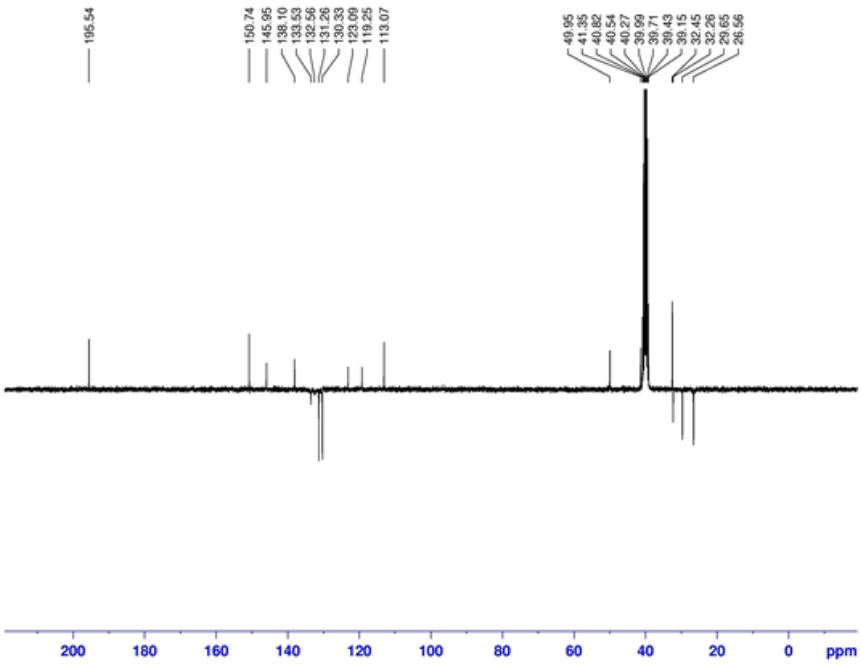
a)



b)



c)


195.54
150.74
145.95
138.10
133.53
132.56
131.26
130.33
123.09
119.25
113.07
49.95
41.35
40.82
40.54
40.27
39.99
39.71
39.43
39.15
32.45
32.26
29.65
26.56
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

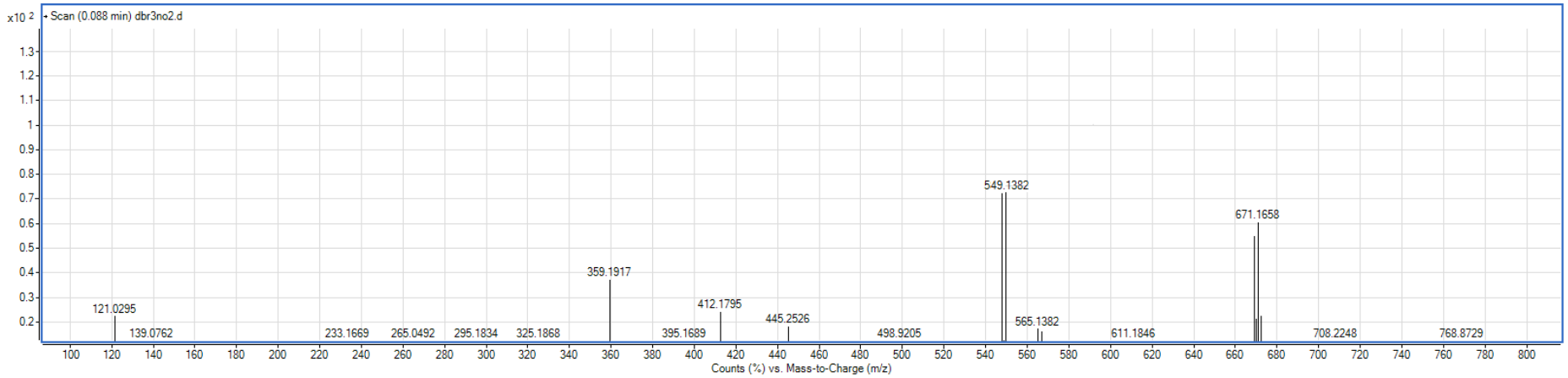
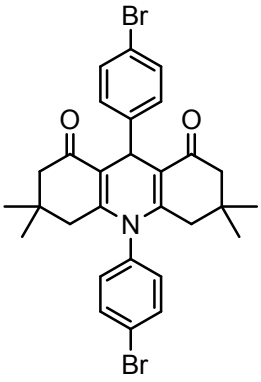
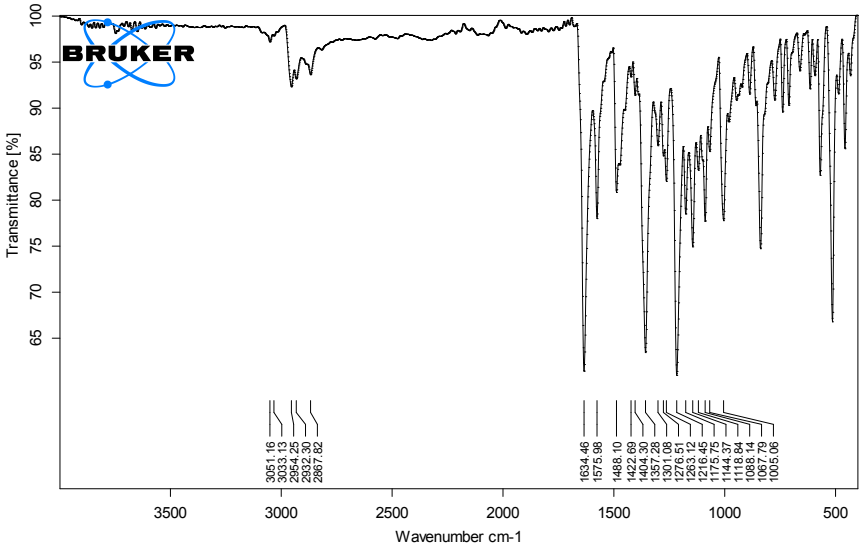


Fig. S12. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4i**

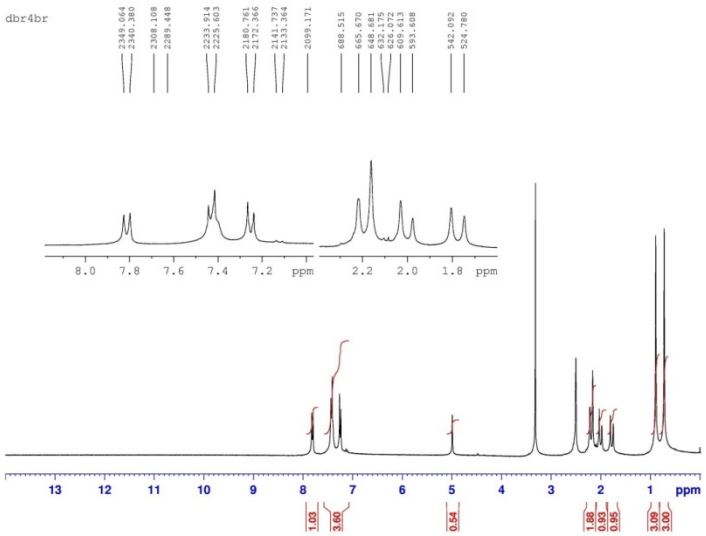
9,10-bis(4-bromophenyl)-3,3,6,6-tetramethyl-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4j)



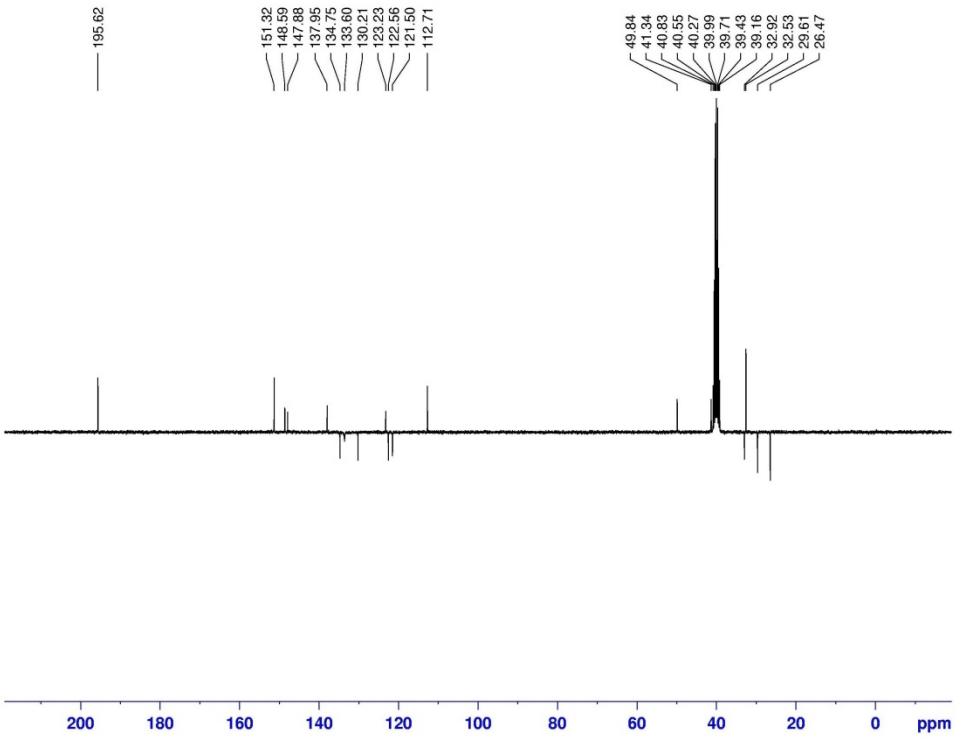
a)



b)



c)


195.62
151.32
148.59
147.88
137.95
134.75
133.60
130.21
123.23
122.56
121.50
112.71
49.84
41.34
40.83
40.55
40.27
39.99
39.71
39.43
39.16
32.92
32.53
29.61
26.47
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

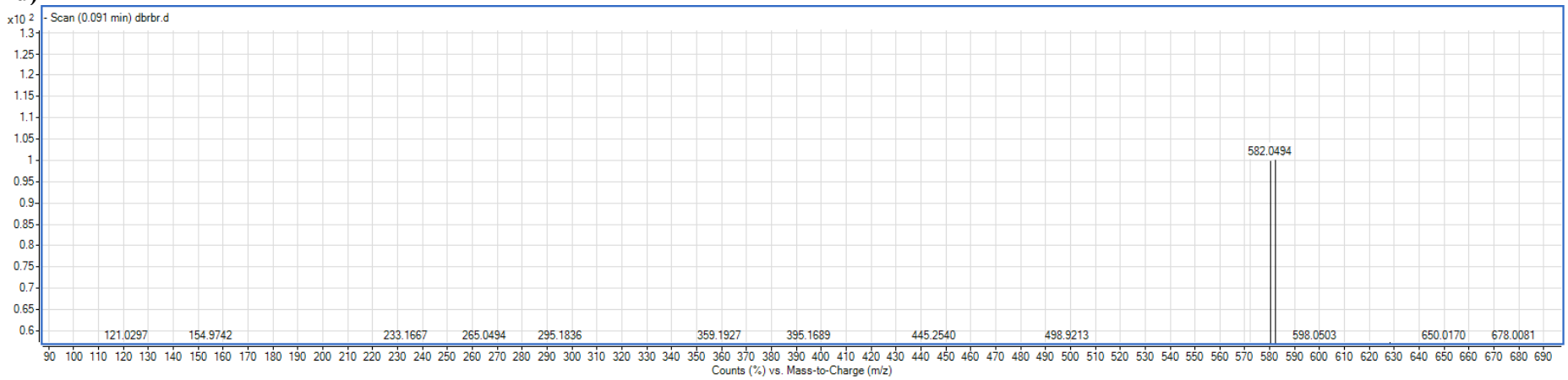


Fig. S13. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4j**