Supplementary Information for

One-Pot, Efficient and Green Synthesis of Acridinedione Derivatives using Highly Monodisperse Platinum Nanoparticles Supported with Reduced Graphene Oxide

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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, 1-octanamine (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.

Raman spectrum was carried out using an in via Raman microprobe (Renishaw Instruments) with 514 nm laser excitation.

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@rGO

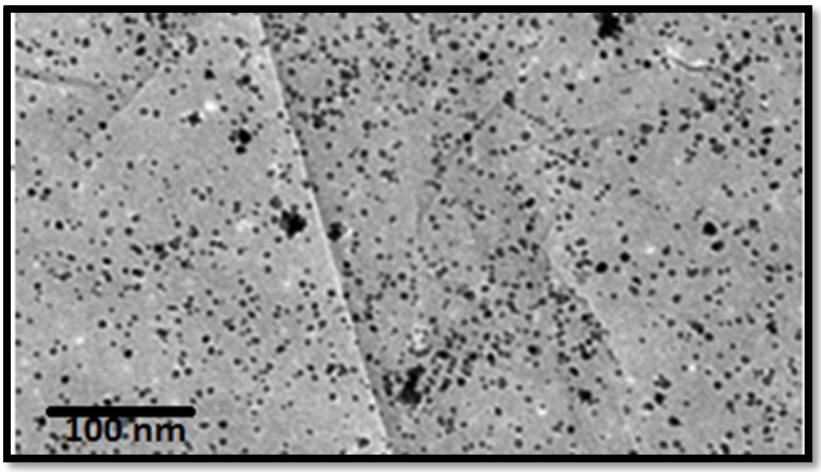


Fig. S1 Low-magnification TEM images of the Pt NPs@rGO

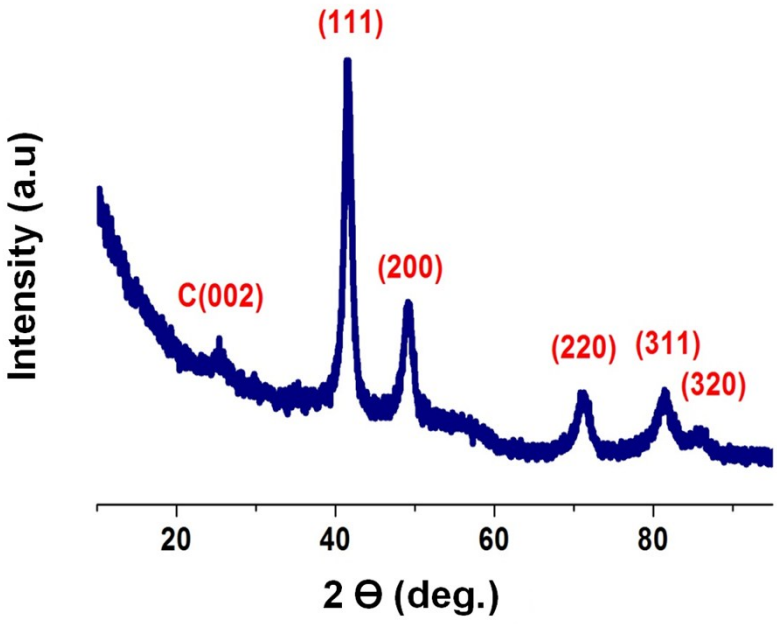


Fig. S2. XRD of Pt NPs@rGO

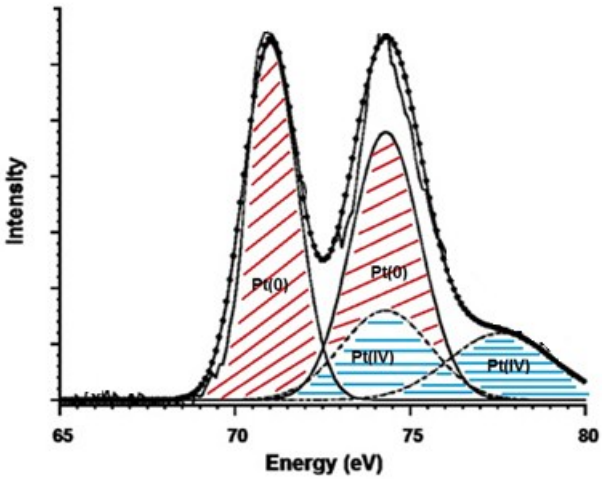


Fig. S3. Pt 4f electron spectra of Pt NPs@rGO

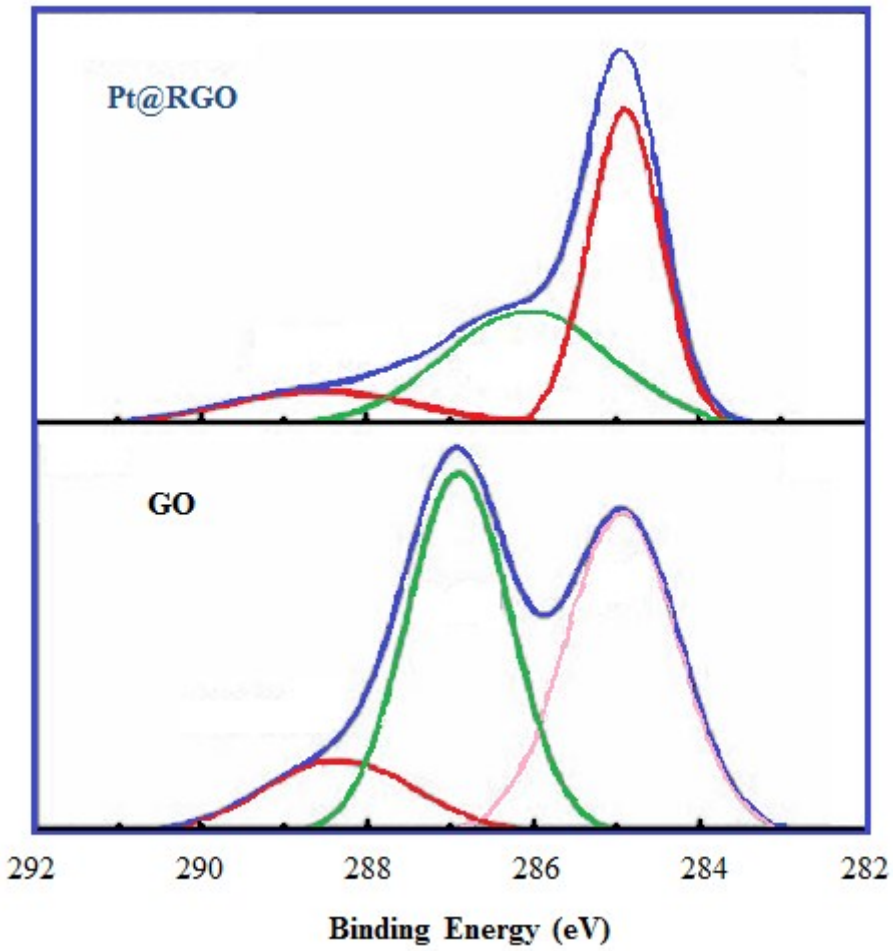


Fig. S4. XPS spectra of C 1s for Pt NPs@rGO and GO

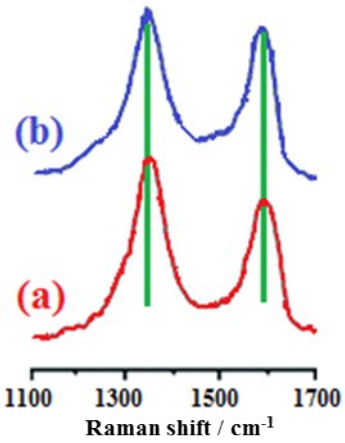


Fig. S5. The Raman spectra of Pt NPs@rGO (a) and RGO (b)

Table S1. The effect of molar ratio (Pt/rGO) on model reaction in the presence of Pt NPs@rGO

Entry	R	R'	Time(min)	Yield (%)	Pt/rGO
4a	-H	4-Cl	60	94	1
4a	-H	4-Cl	60	90	0.7
4a	-H	4-Cl	60	84	0.5

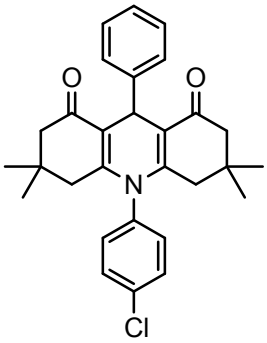
Characterization of acridinedione derivatives

Whereas the infrared (IR) spectra of the novel synthesized 1, 8-dioxoacridine compounds (**4i and 4j**) aromatic C–H stretching bands are observed between 3056 and 3018 cm^{-1}, the aliphatic C–H stretching bands were observed between 2959 and 2955 cm^{-1}. The compound **4i** of cyan bond was showed at 2223 cm^{-1} and the carbonyl group bonds of compounds **4i** and **4j** were showed sharp peaks between 1632 and 1634 cm^{-1}, respectively.

The ^{1}H-NMR spectra of the compounds **4i** and **4j** belonging to protons of the methyl groups showed singlet peaks between 0.70-0.90 ppm. The methane (-CH_2) protons of compounds **4i** and **4j** were observed in the region between 1.77-2.21 ppm. The signals for the -CH protons of all compounds were observed between 4.95–5.10 ppm and the signals for the aromatic protons were observed in the range between 6.61-7.70 ppm. The hydroxyl (-OH) proton of the compound **4j** was showed at 9.05 ppm.

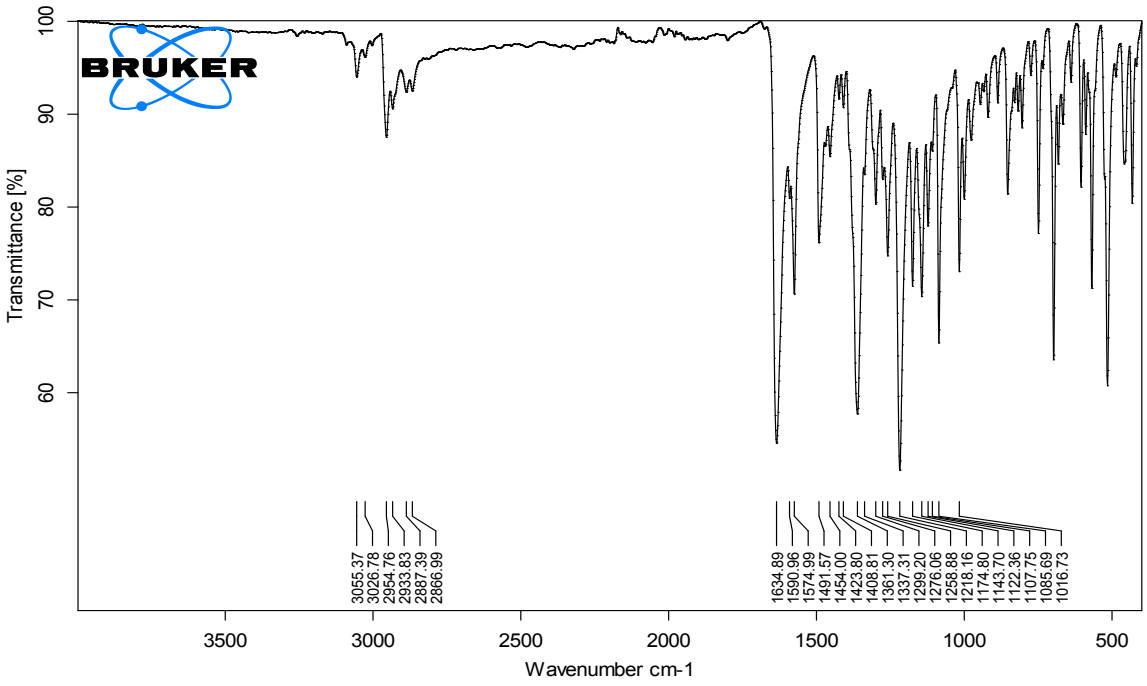
The signals observed in ^{13}C-NMR (APT) spectrums of all novel acridinedione molecules (**4i** and **4j**) are determined to be in line with the recommended molecule structures. Further, when their high resolution mass spectra (HRMS) are examined, the observed molecule ion peaks are in compliance with 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, mp. (300-302 °C) [30] (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)



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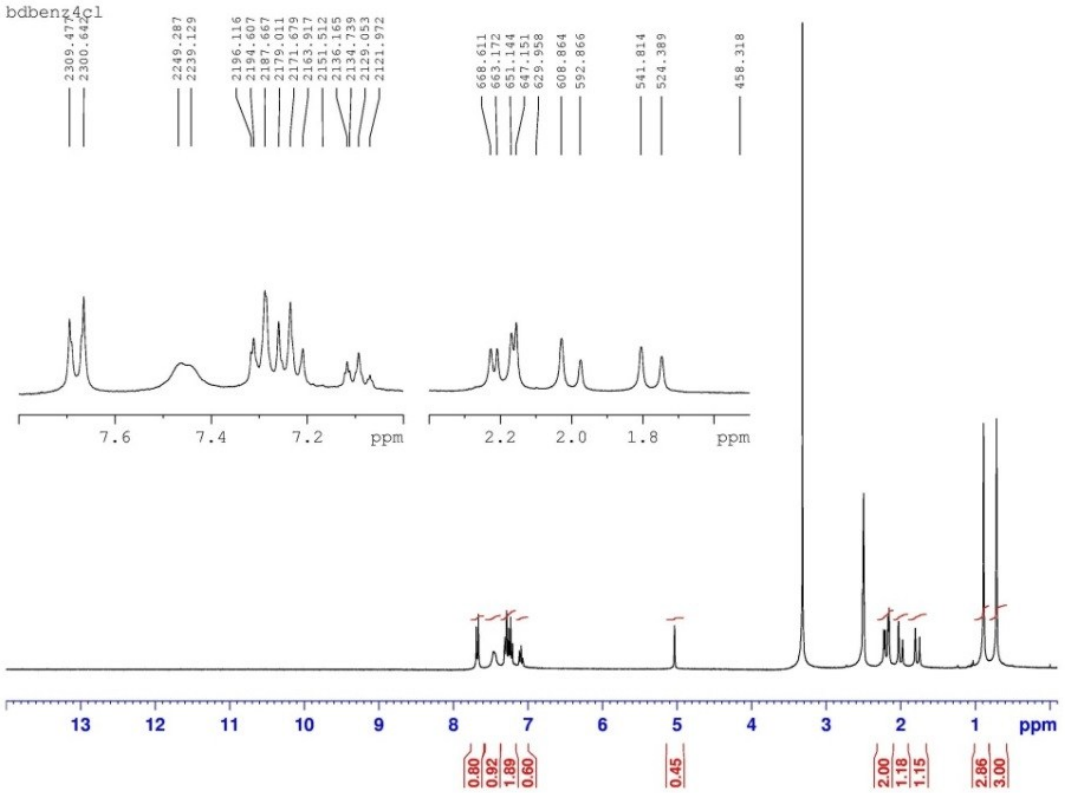
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2249.287
2239.129
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2163.917
2151.512
2136.165
2134.739
2129.053
2121.972
668.611
663.172
651.144
647.151
629.958
608.864
592.866
541.814
524.389
458.318
7.6
7.4
7.2
ppm
2.2
2.0
1.8
ppm
13
12
11
10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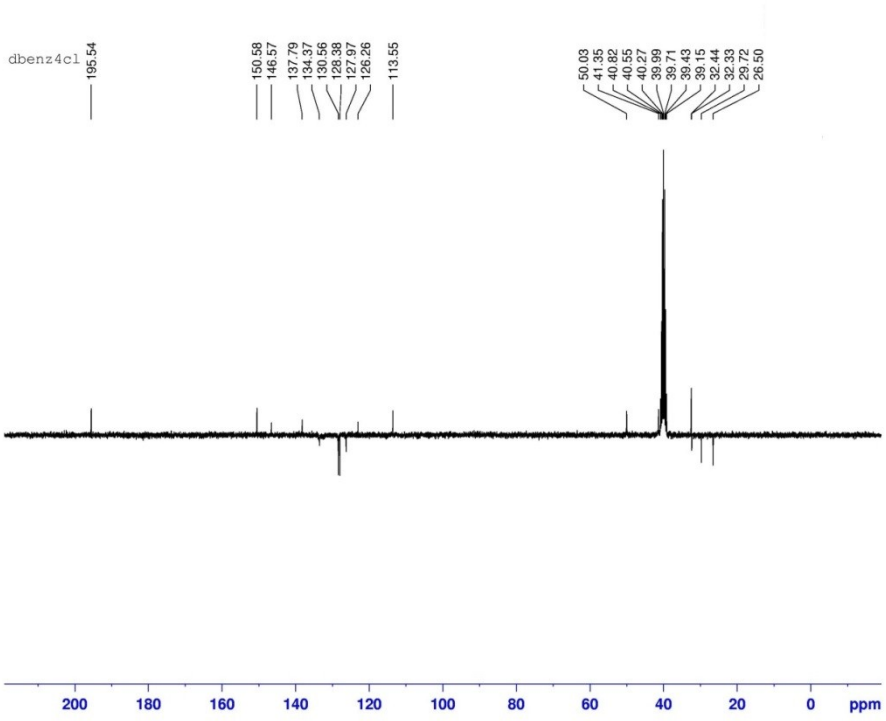
0.45
2.00
1.18
1.15
2.86
3.00

c)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39.43
39.15
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140
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20
0
ppm

d)

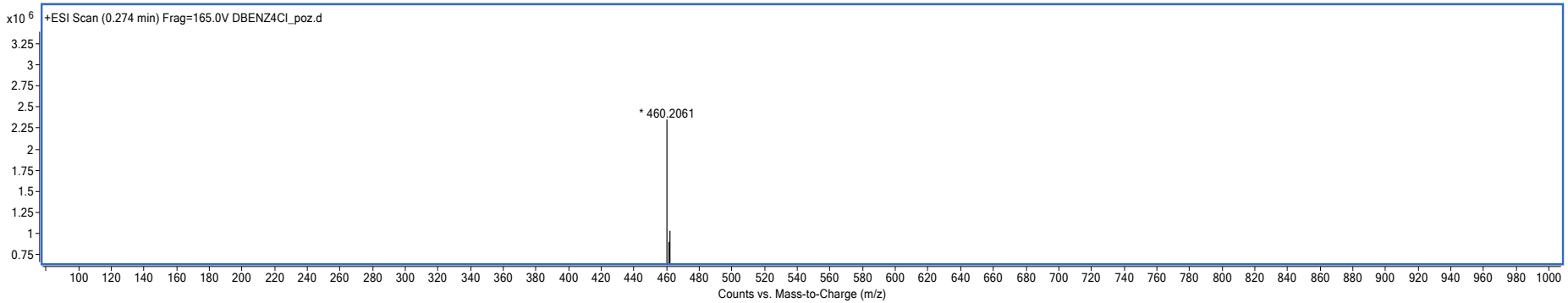
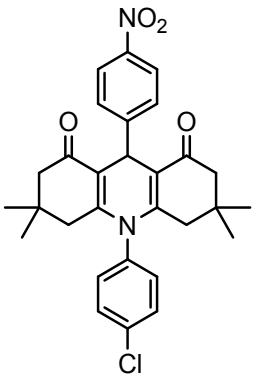


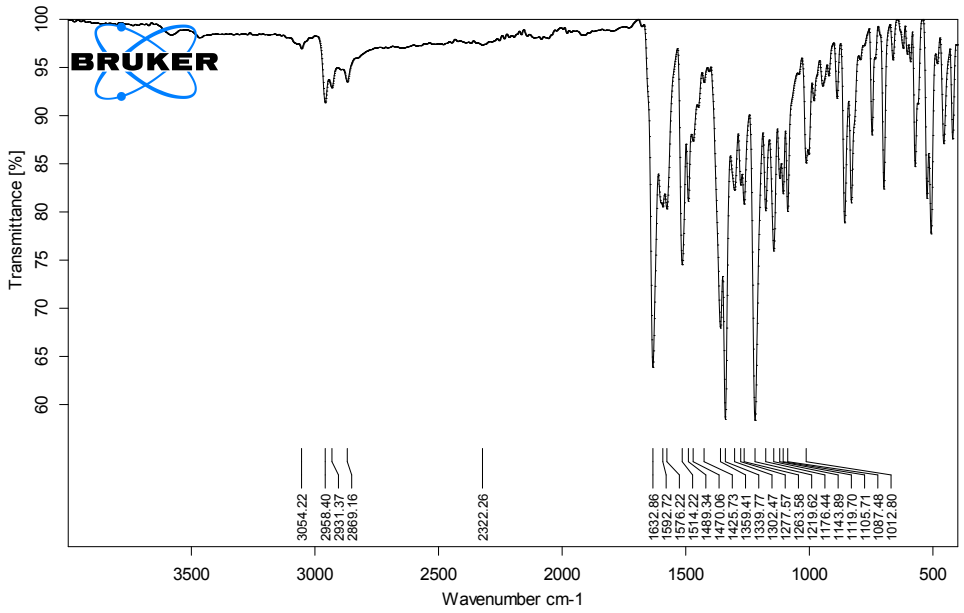
Fig. S6. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4a**

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

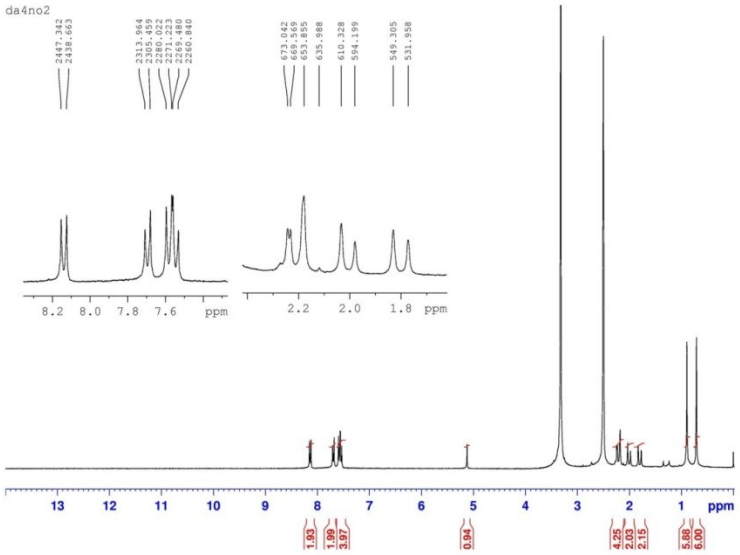


As yellow crystals, mp. (315-317 °C) [31] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.80 (d, 2H, *J*= 17.35 Hz, -CH_2), 2.01 (d, 2H, *J*= 16.13 Hz, -CH_2), 2.18-2.24 (m, 4H, -CH_2), 5.10 (s, 1H, -CH), 7.54-7.60 (m, 4H, Ar-H), 7.70 (d, 2H, *J*= 8.51 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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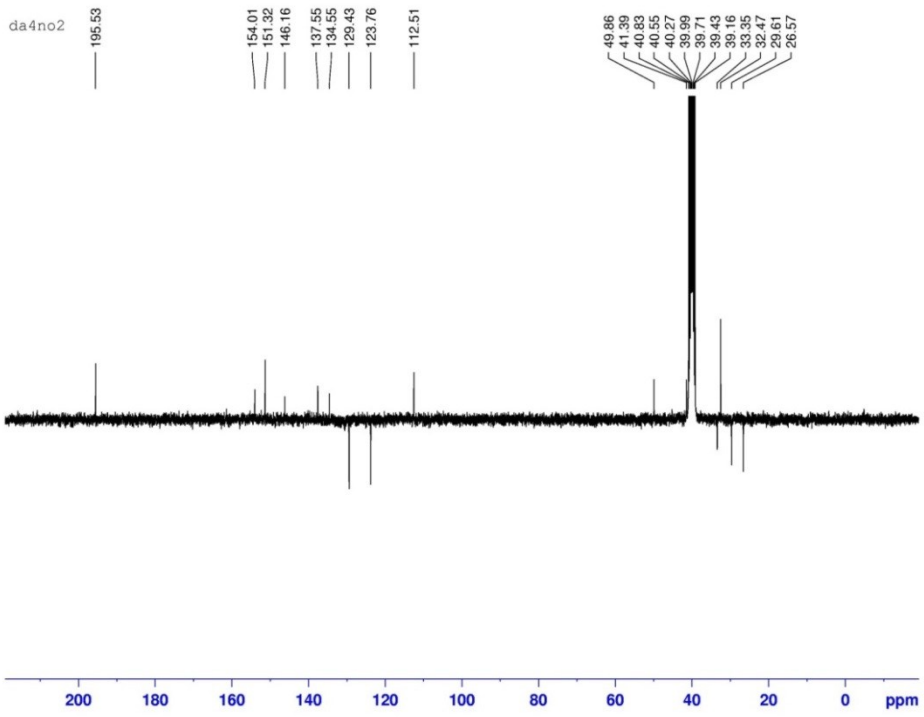
668.569
653.855
635.988
610.328
594.199
549.305
531.958
8.2 8.0 7.8 7.6 ppm
2.2 2.0 1.8 ppm
13 12 11 10 9 8 7 6 5 4 3 2 1 ppm
1.93
1.99
3.97
0.94
4.05
2.03
2.15
5.88
6.00

c)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129.43
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112.51
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40.83
40.55
40.27
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39.43
39.16
33.35
32.47
29.61
26.57
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d)

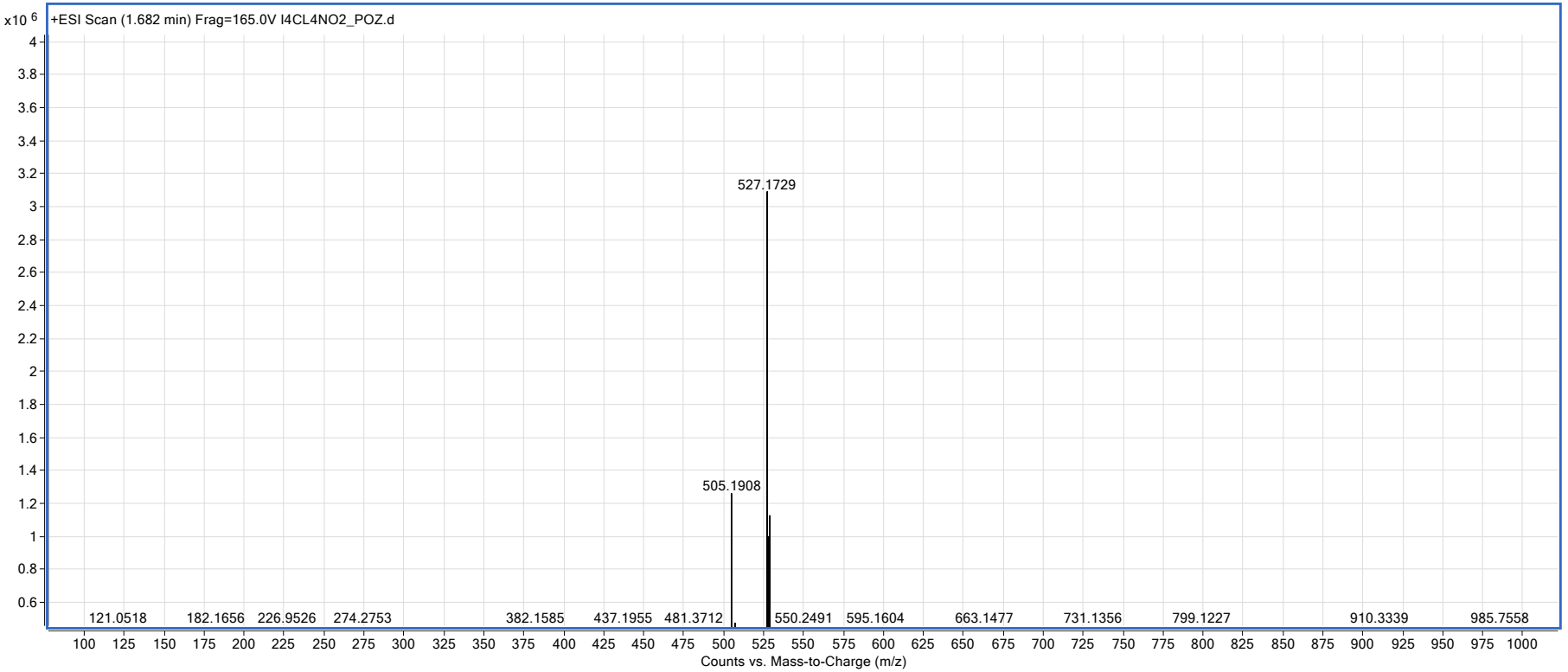
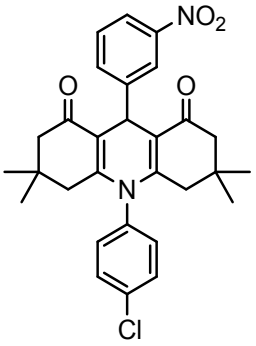


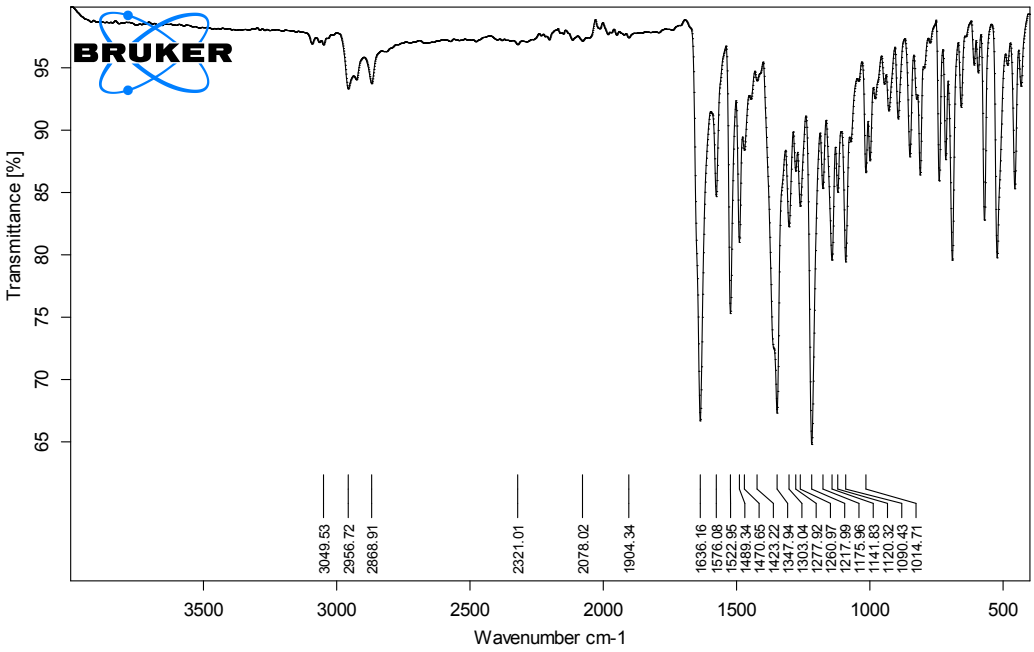
Fig. S7. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4b**

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, mp. (285-287 °C) [32] (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)



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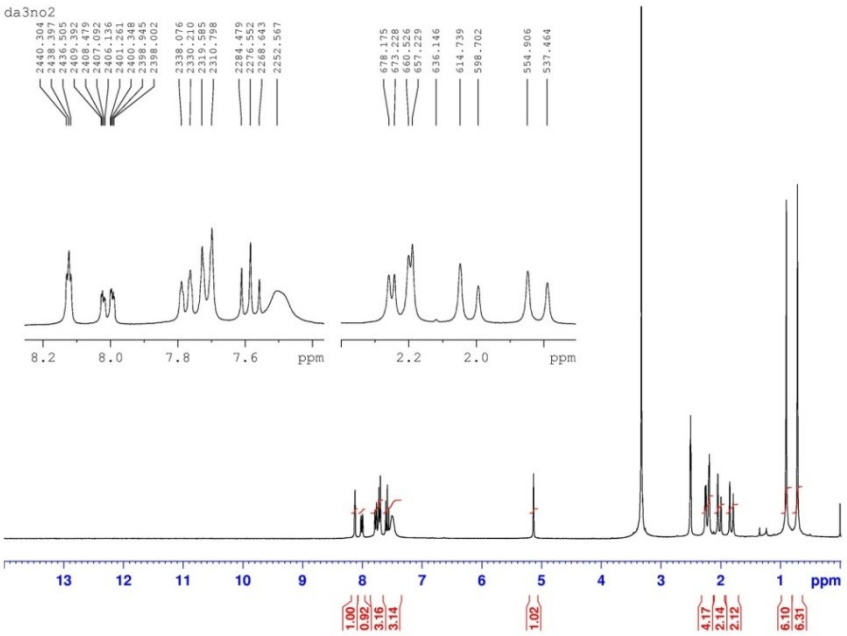
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2252.567
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673.228
660.526
657.229
636.146
614.739
598.702
554.906
537.464
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7.8
7.6
ppm
2.2
2.0
ppm
13
12
11
10
9
8
7
6
5
4
3
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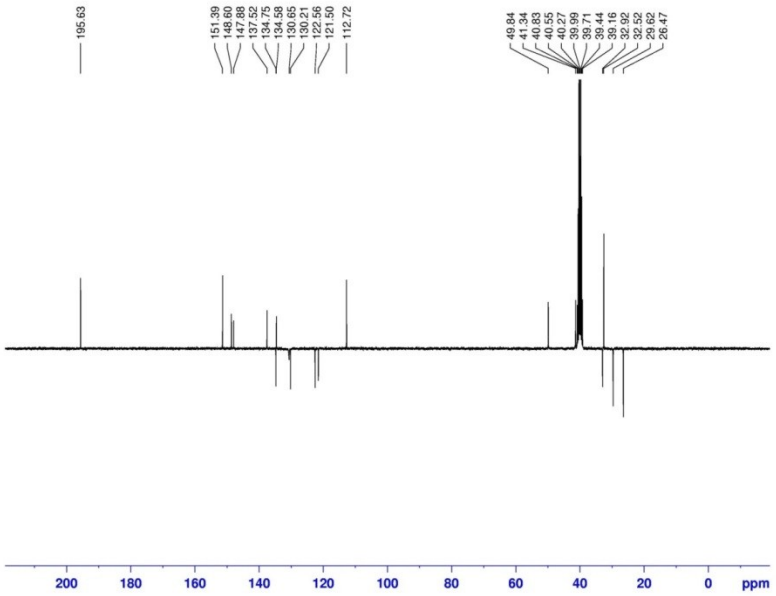
2.12
6.10
6.31

c)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39.44
39.15
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ppm

d)

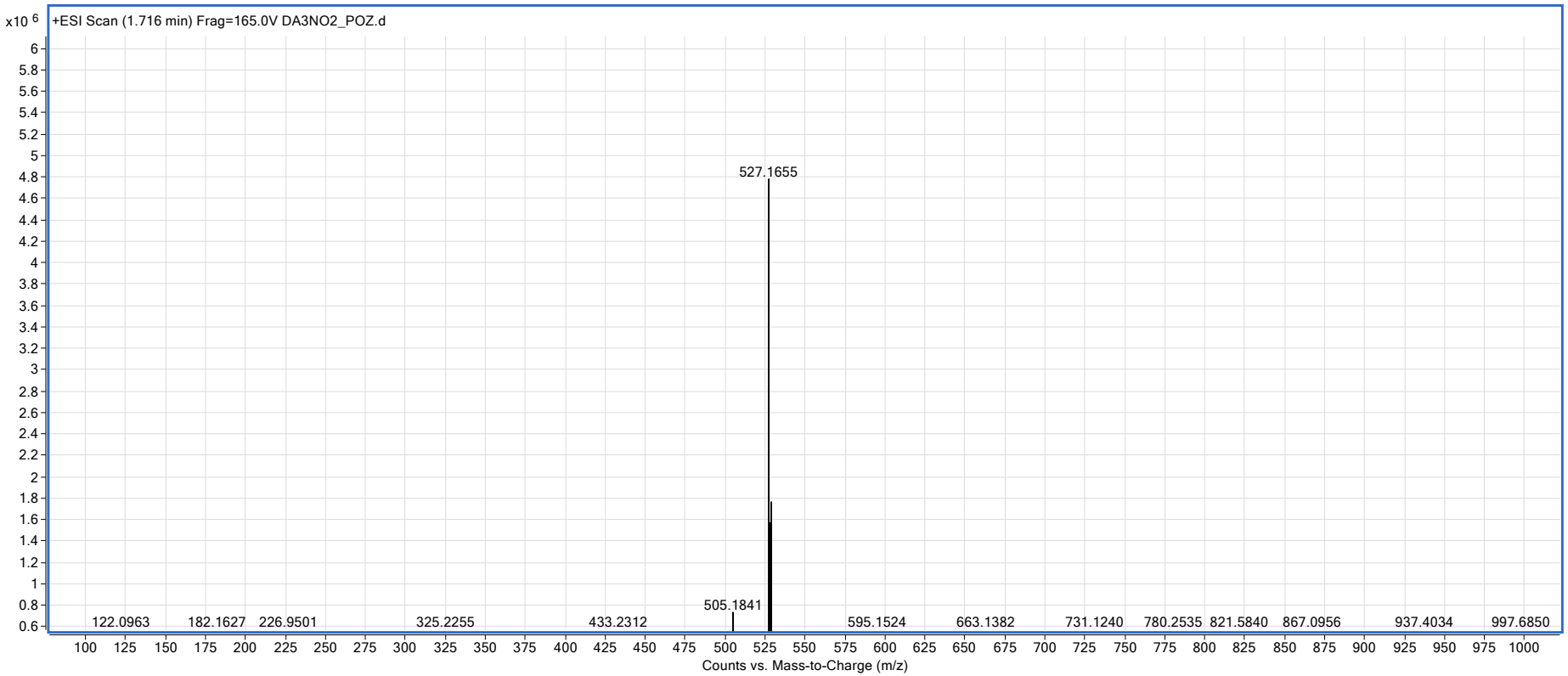
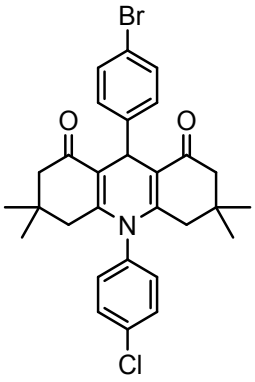


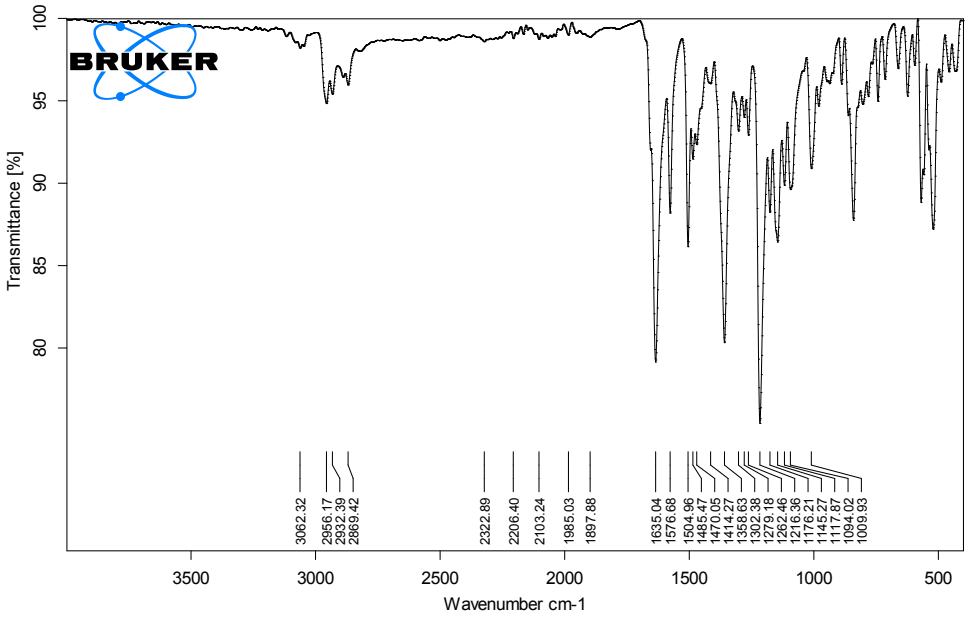
Fig. S8. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4c**

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

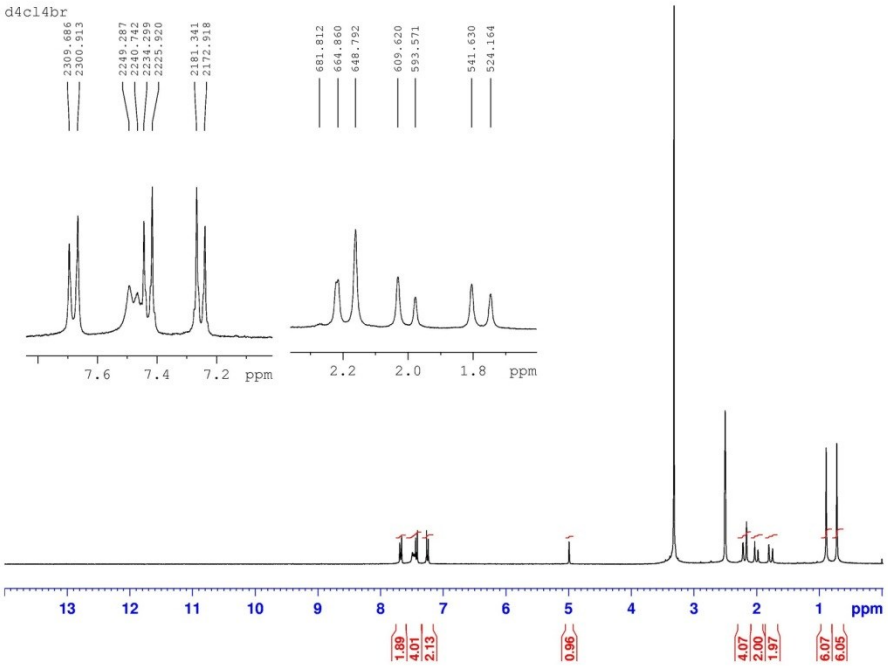


As yellow crystals, mp. (304-305 °C) [31] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.78 (d, 2H, *J*= 17.47 Hz, -CH_2), 2.01 (d, 2H, *J*= 16.05 Hz, -CH_2), 2.16-2.19 (m, 4H, -CH_2), 5.00 (s, 1H, -CH), 7.26 (d, 2H, *J*= 8.42 Hz, Ar-H), 7.42-7.50 (m, 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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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
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2
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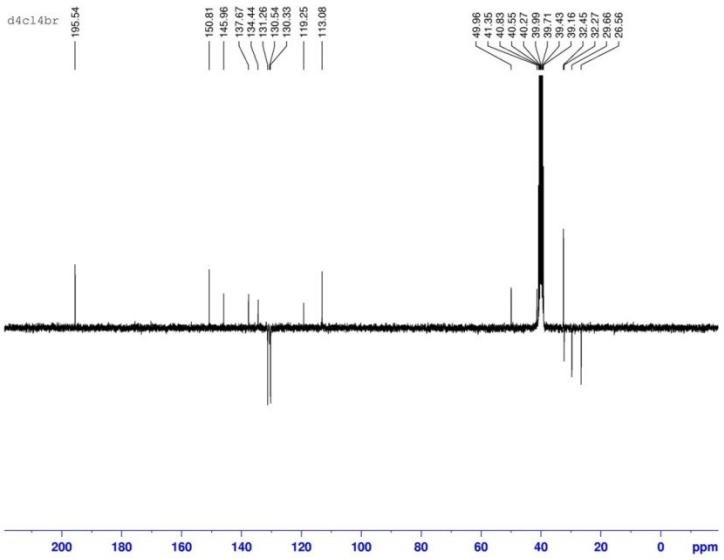
2.00
1.97
6.07
6.05

c)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195.54
150.81
145.96
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134.44
131.26
130.54
130.33
119.25
113.08
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40.83
40.55
40.27
39.99
39.71
39.43
39.15
32.45
32.27
29.66
26.56
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

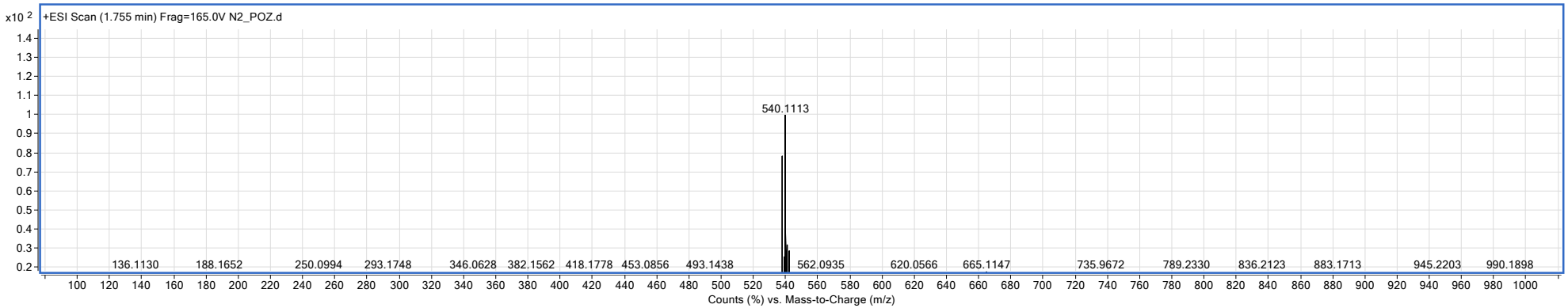
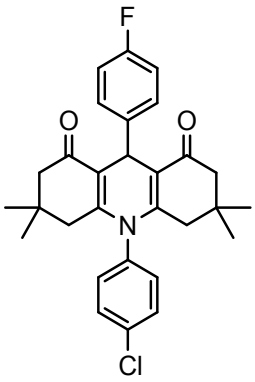


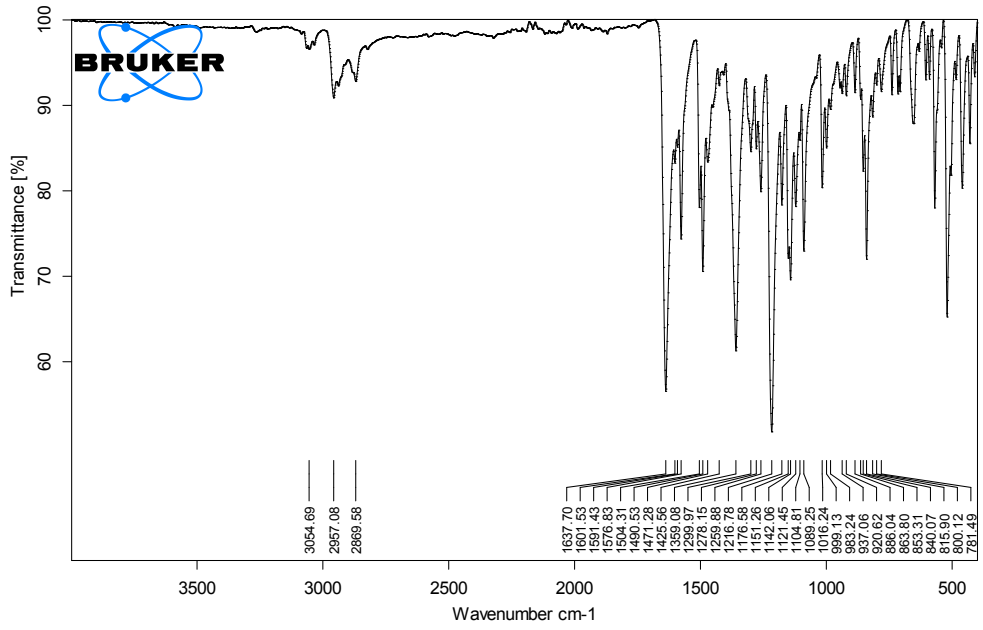
Fig. S9. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4d**

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

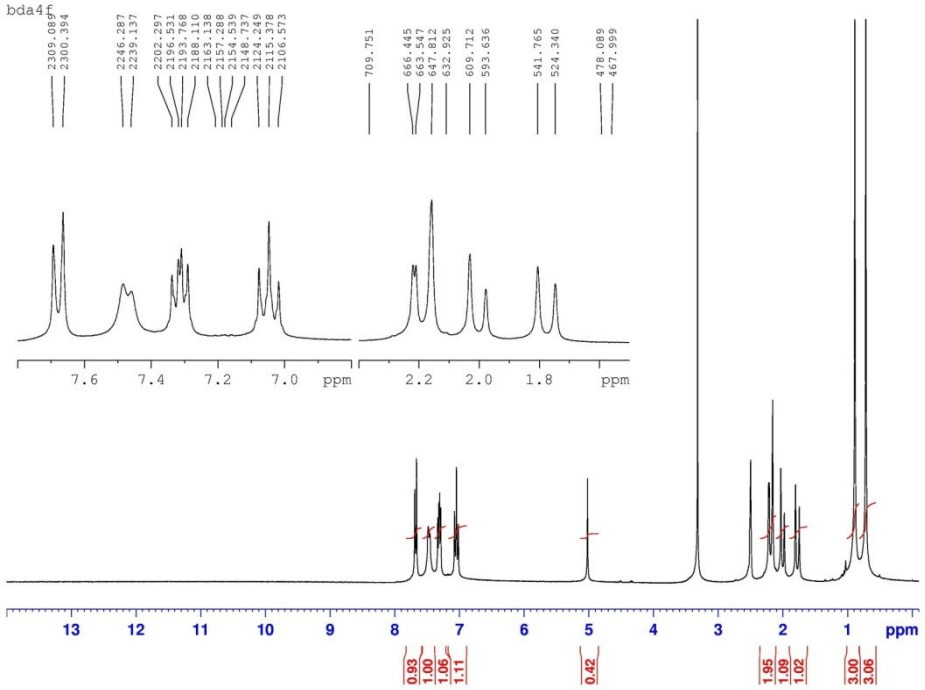


As yellow crystals, mp. (280-282 °C) [33] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.78 (d, 2H, *J*= 17.43 Hz, -CH_2), 2.01 (d, 2H, *J*= 16.08 Hz, -CH_2), 2.16-2.22 (m, 4H, -CH_2), 5.05 (s, 1H, -CH), 7.05 (t, 2H, *J*= 8.84 Hz, Ar-H), 7.29-7.34 (m, 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]$^+$).

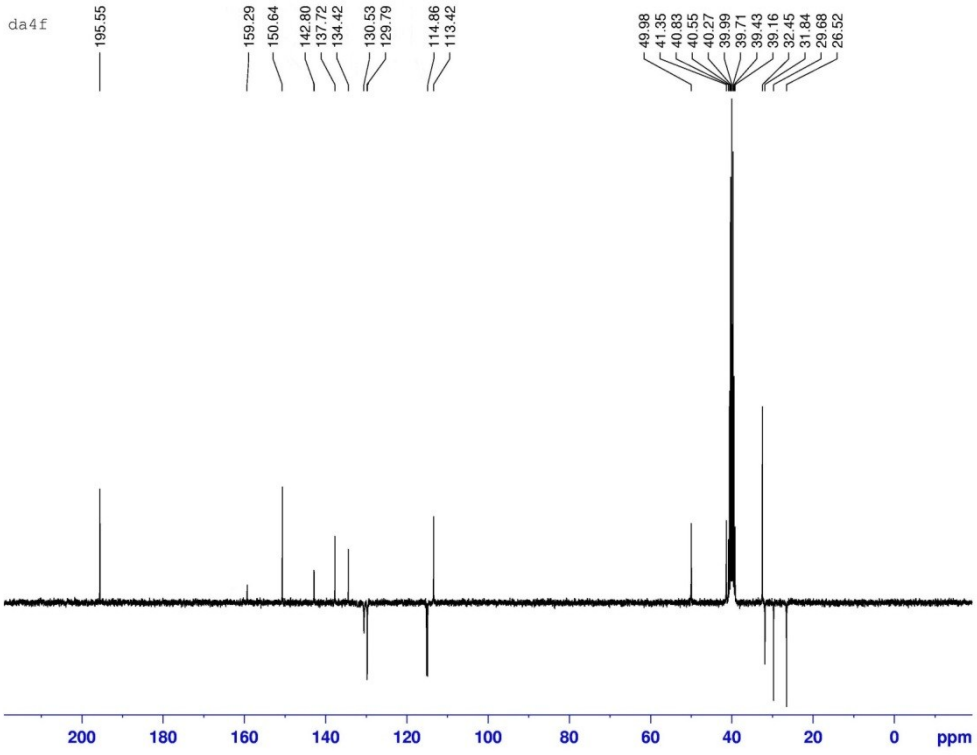
a)



b)


bda4f
2309.089
2300.394
2246.287
2239.137
2202.297
2196.531
2193.768
2188.110
2183.288
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)

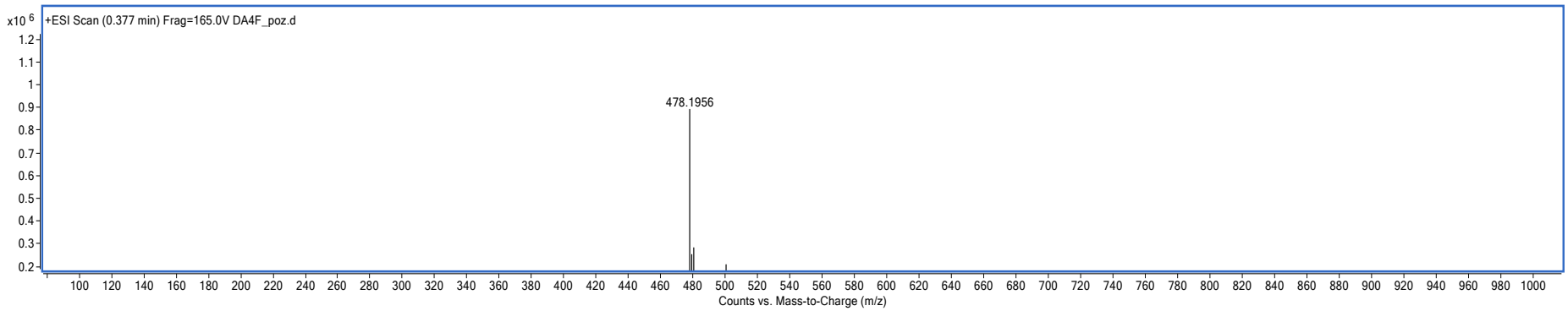
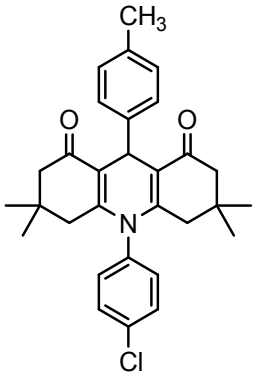


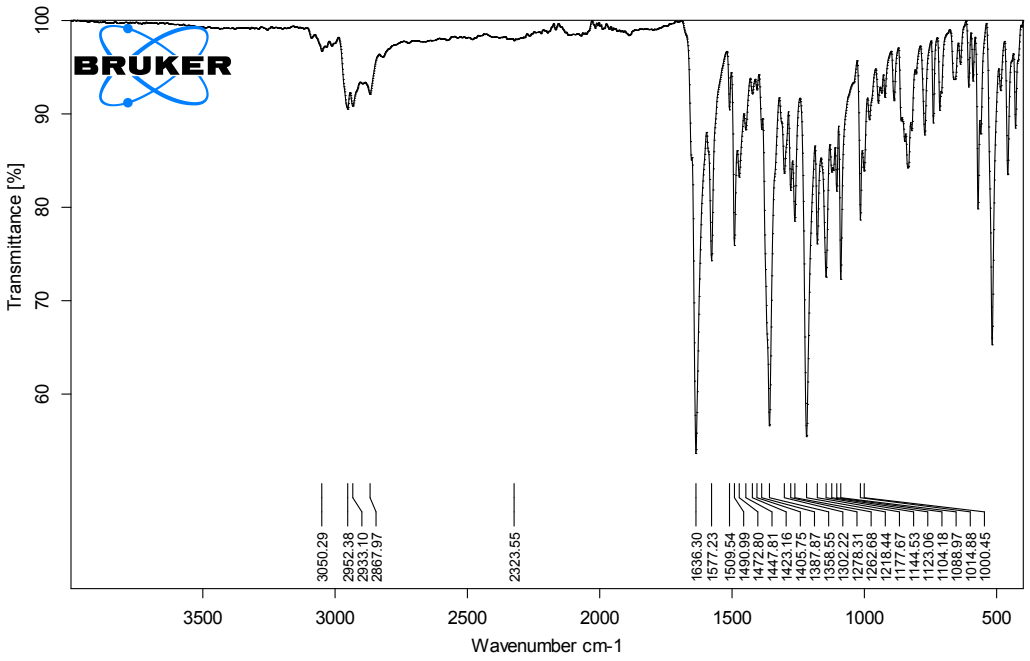
Fig. S10. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4e**

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

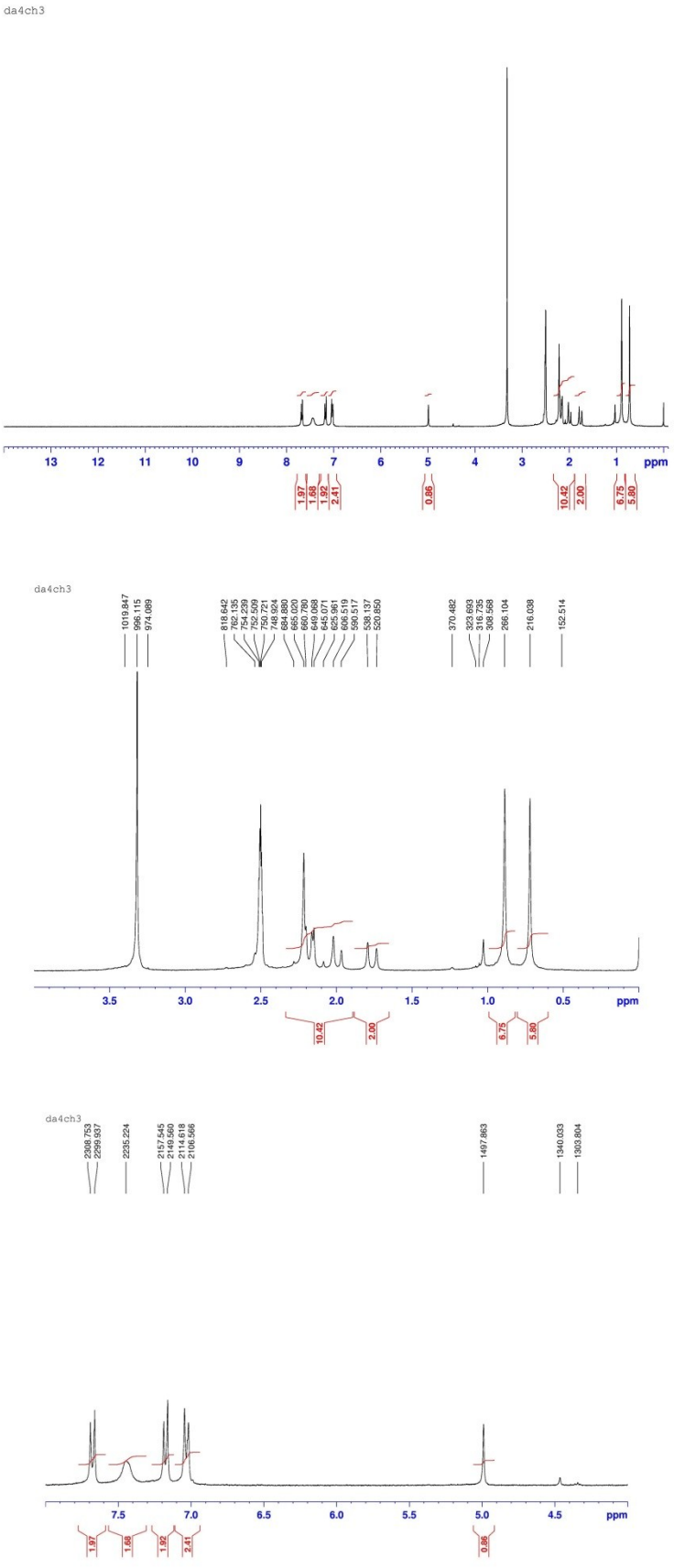


As yellow crystals, mp. (262-265 °C) [32] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.75 (s, 6H, 2x-CH_3), 0.80 (s, 6H, 2x-CH_3), 1.76 (d, 2H, *J*= 17.29 Hz, -CH_2), 1.97-2.22 (m, 9H, -CH_2 and –CH_3), 5.00 (s, 1H, -CH), 7.04 (d, 2H, *J*= 8.05 Hz, Ar-H), 7.18 (d, 2H, *J*= 8.00 Hz, Ar-H), 7.35-7.55 (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]$^+$).

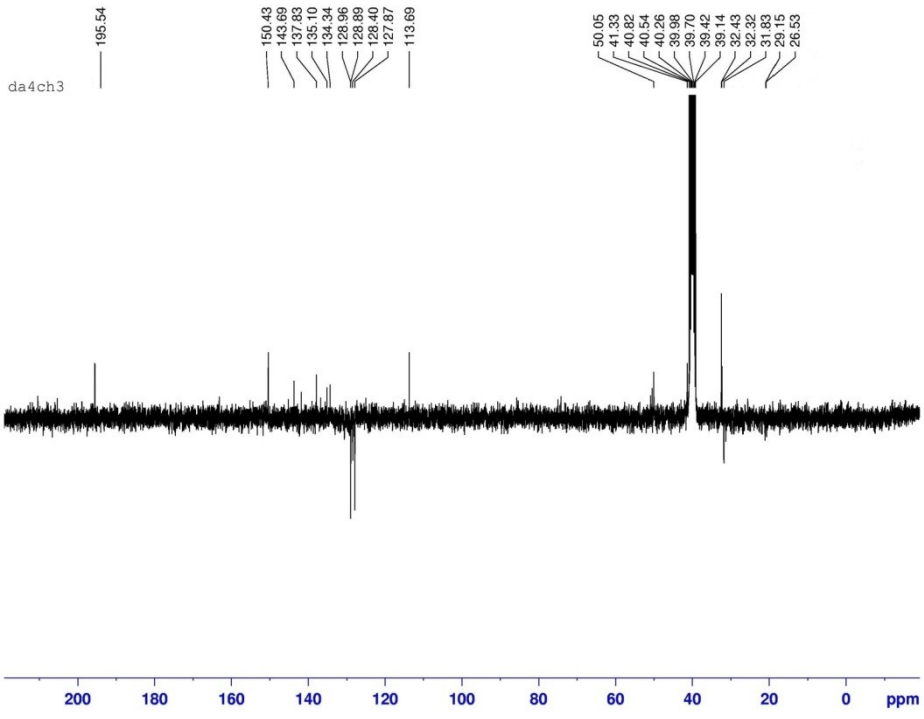
a)



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
1019.847 996.115 974.089 818.642 762.135 754.299 752.369 750.721 748.924 684.880 665.020 660.769 649.068 645.071 625.961 606.519 590.517 538.137 520.850 370.482 323.693 316.735 308.568 266.104 216.038 152.514
3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
10.42 2.00 6.75 5.80
da4ch3
2308.757 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)

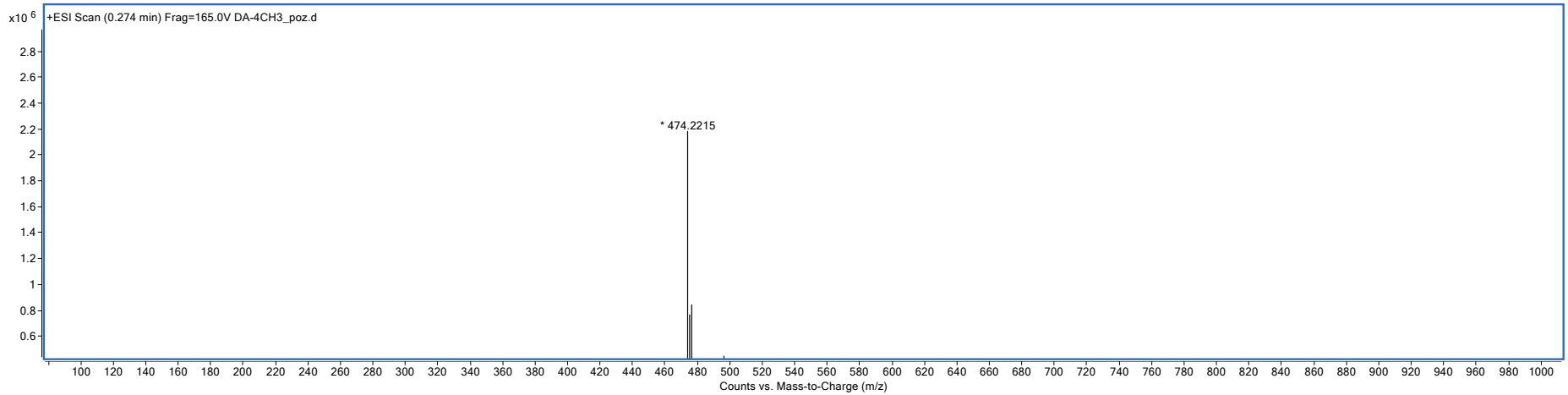
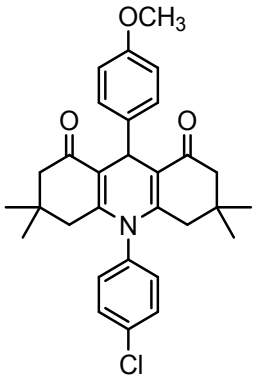


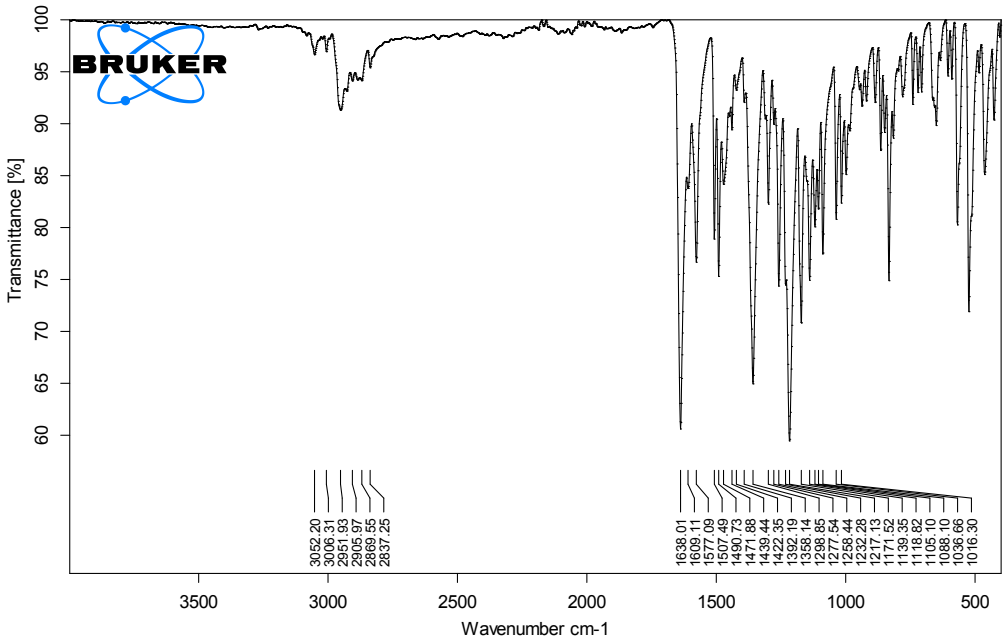
Fig. S11. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4f**

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)

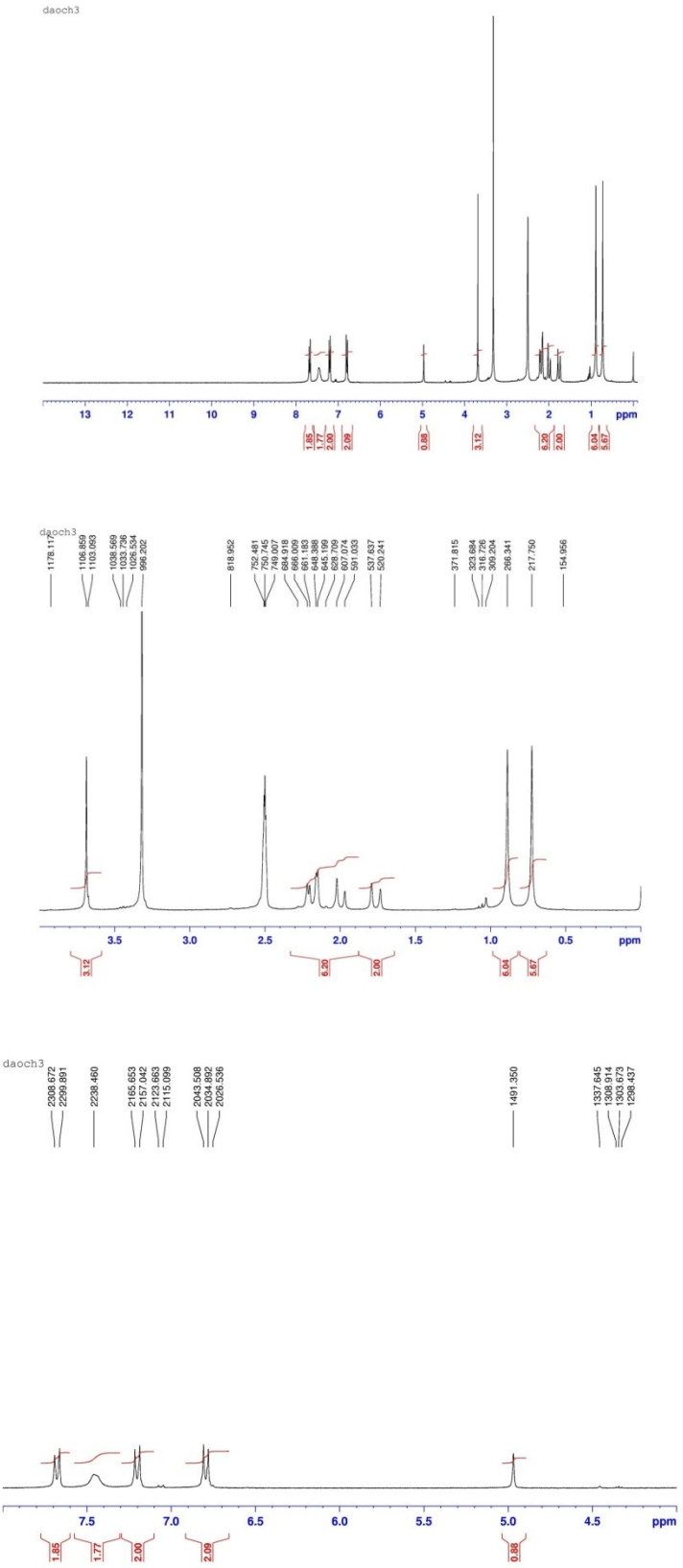


As yellow crystals, mp. (255-257 °C) [34] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.75 (s, 6H, 2x-CH_3), 0.85 (s, 6H, 2x-CH_3), 1.76 (d, 2H, *J*= 17.40 Hz, -CH_2), 1.97-2.22 (m, 6H,-CH_2), 3.70 (s, 1H, -OCH_3), 4.95 (s, 1H, -CH), 6.80 (d, 2H, *J*= 8.62 Hz, Ar-H), 7.20 (d, 2H, *J*= 8.61 Hz, 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]$^{+}$).

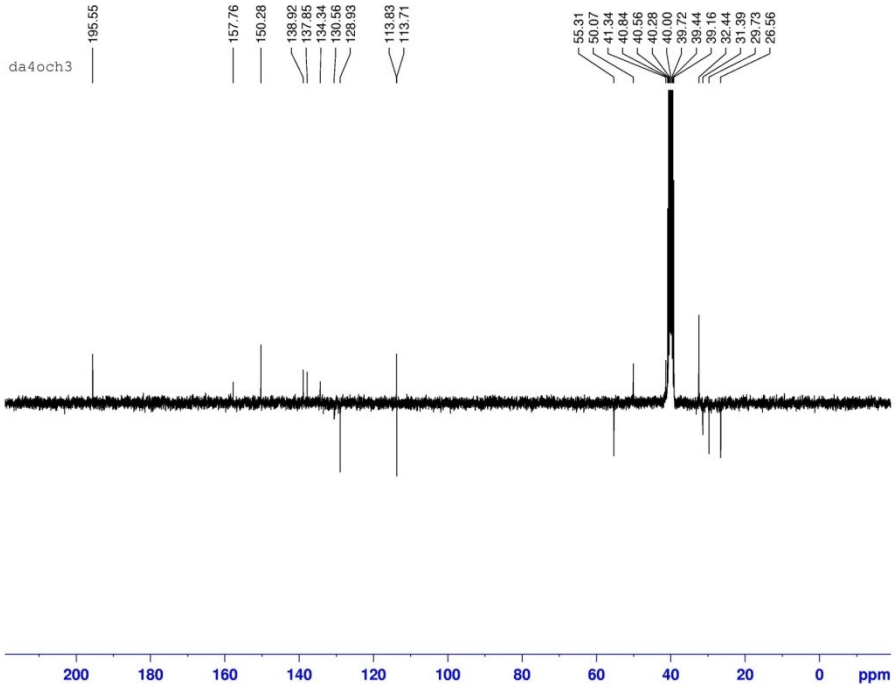
a)



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 1103.060 1038.569 1033.736 1009.634 996.202 818.952 752.481 750.745 749.007 684.918 668.099 661.183 648.388 645.199 630.709 607.074 591.033 537.637 520.241 371.815 323.884 315.760 309.204 266.341 217.750 154.956
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)

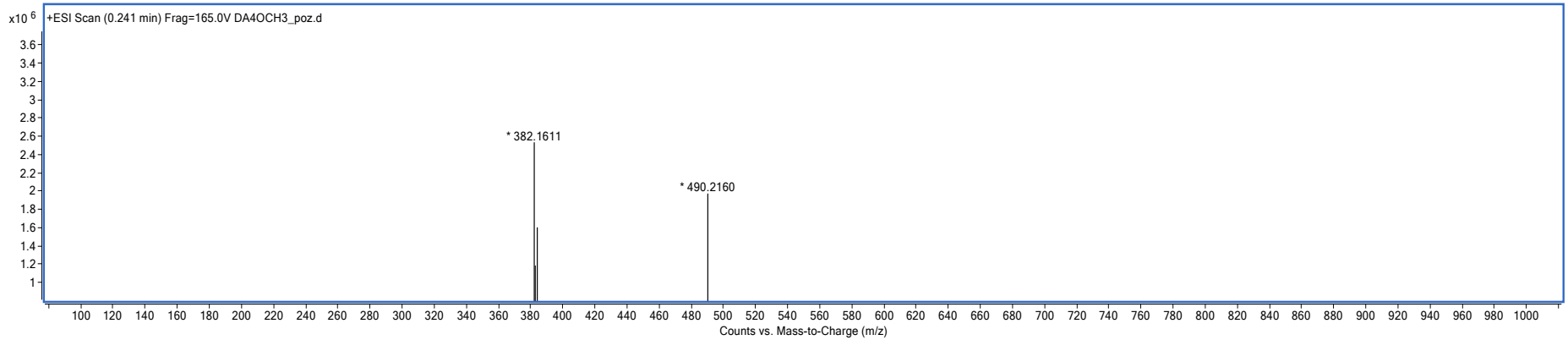
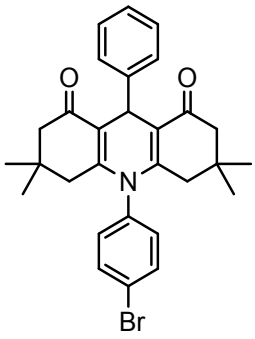


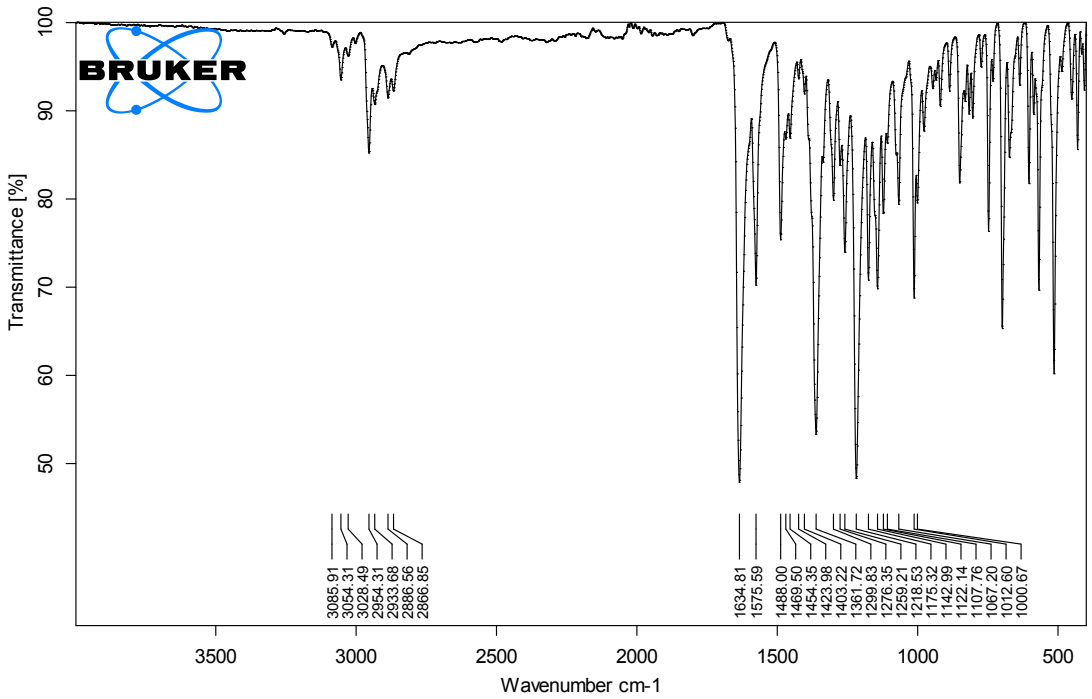
Fig. S12. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4g**

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

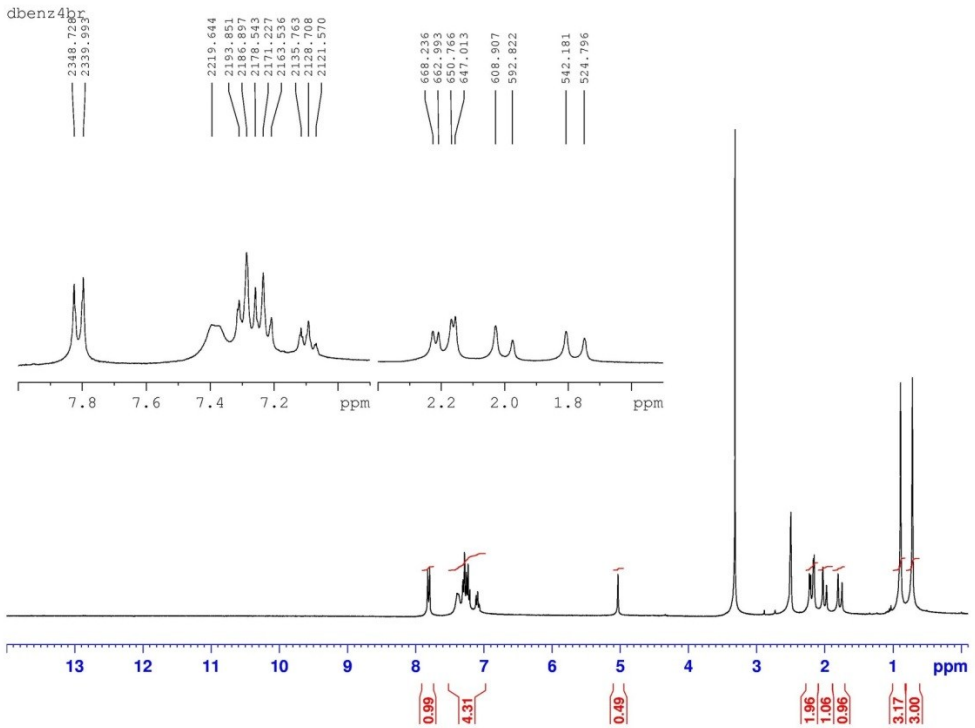


As yellow crystals, mp. (303-305 °C) [35] (ethanol). ^{1}H-NMR (300 MHz, DMSO-d_6) δ (ppm): 0.70 (s, 6H, 2x-CH_3), 0.90 (s, 6H, 2x-CH_3), 1.78 (d, 2H, *J*= 17.39 Hz, -CH_2), 2.00 (d, 2H, *J*= 16.90 Hz, -CH_2), 2.16-2.23 (m, 4H, -CH_2), 5.05 (s, 1H, -CH), 7.07-7.40 (m, 7H, Ar-H), 7.81 (d, 2H, *J*= 8.74 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]$^+$).

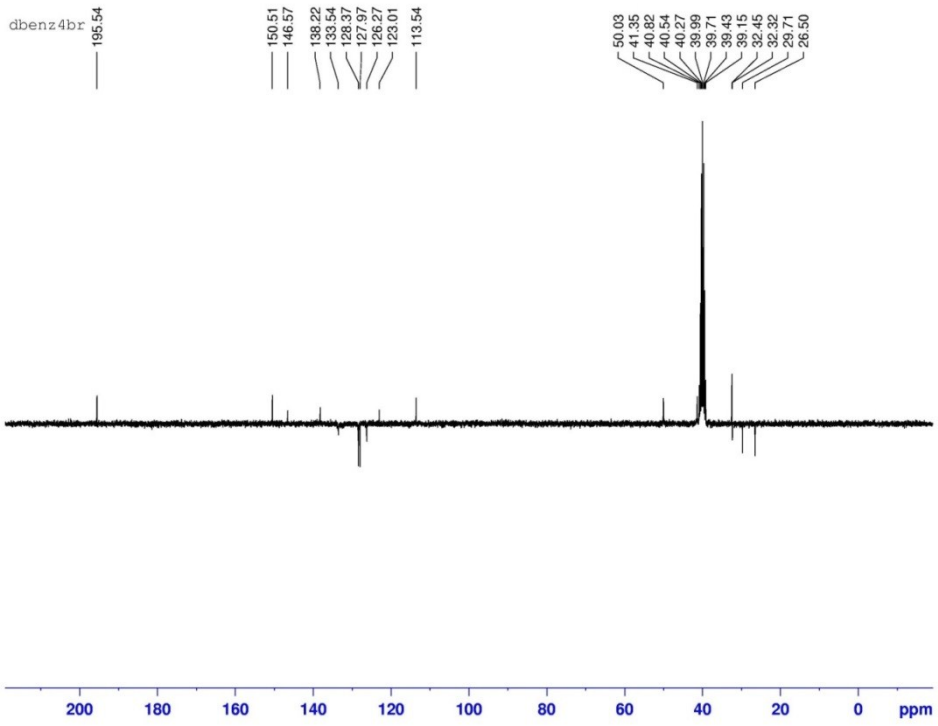
a)



b)


dbenz4br
2348.728
2339.993
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)

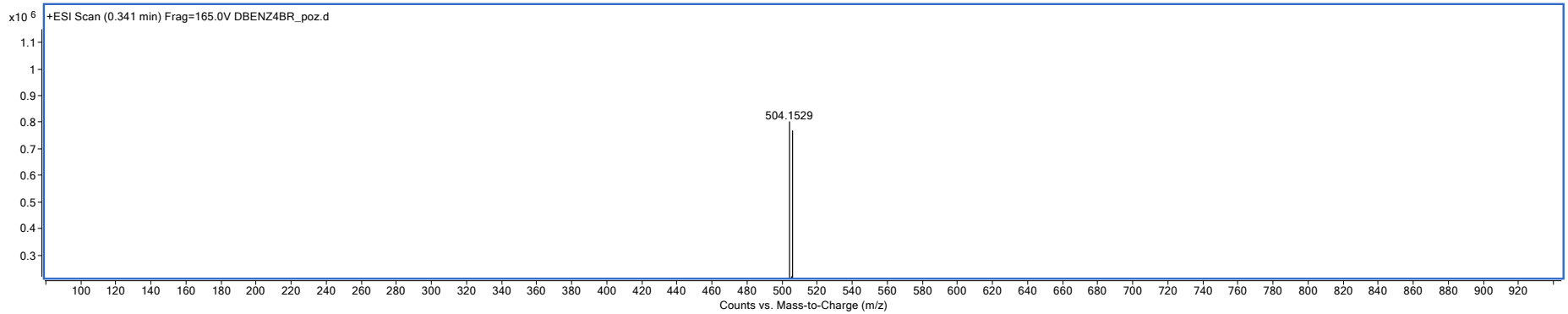
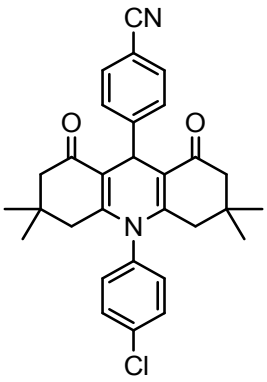
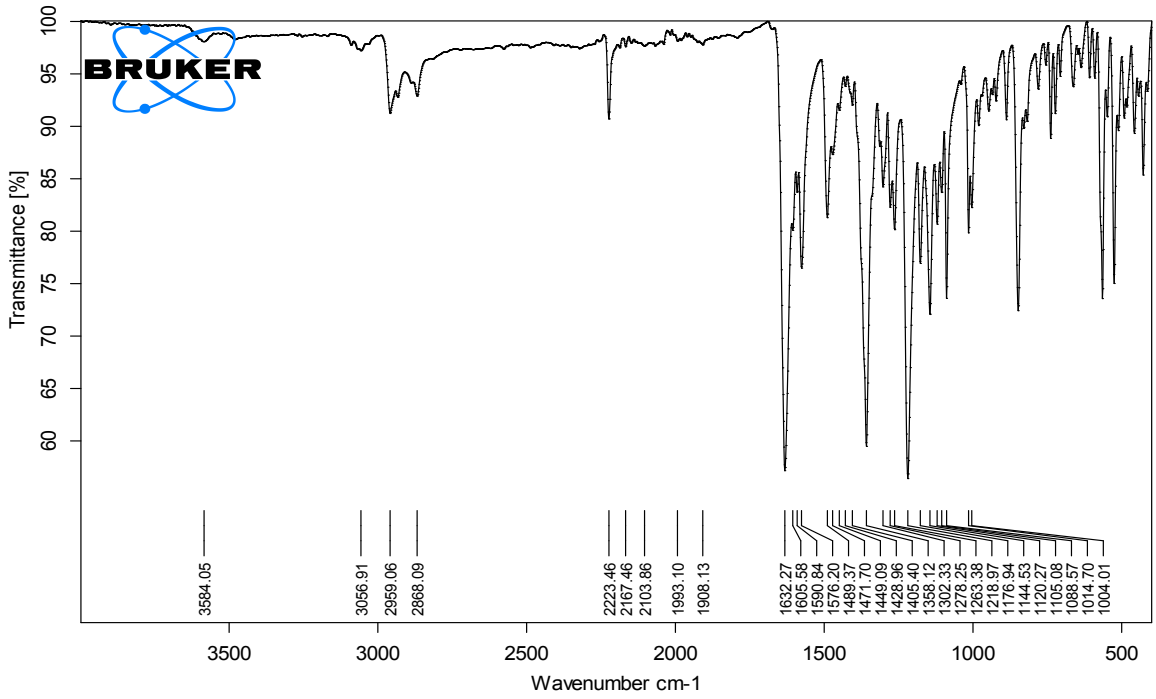


Fig. S13. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4h**

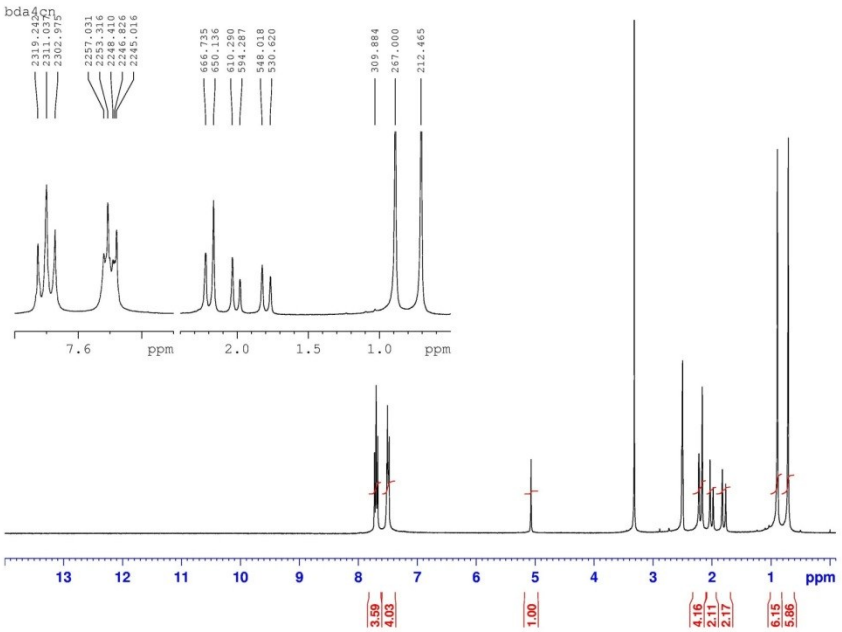
4-(10-(4-Chlorophenyl)-3,3,6,6-tetramethyl-1,8-dioxo-1,2,3,4,5,6,7,8,9,10-decahydro acridin-9-yl)benzonitrile (4i)



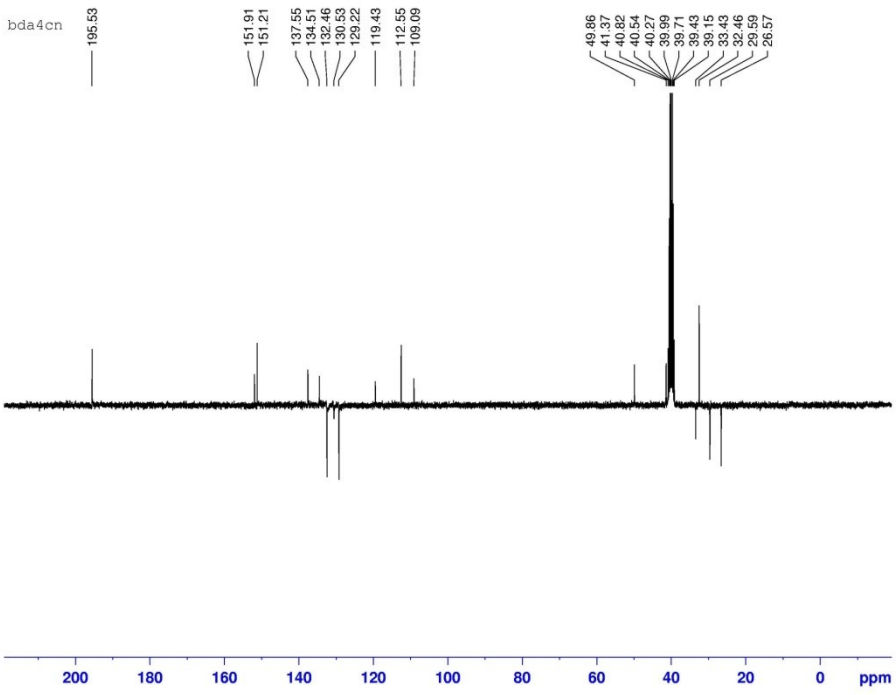
a)



b)


bda4cn
2319.247
2311.037
2302.975
2257.031
2253.316
2248.410
2246.226
2241.016
666.735
650.136
610.290
594.287
548.018
530.620
309.884
267.000
212.465
7.6
ppm
2.0
1.5
1.0
ppm
13
12
11
10
9
8
7
6
5
4
3
2
1
ppm
3.59
4.03
1.00
4.16
2.11
2.17
6.15
5.86

c)


bda4cn
195.53
151.91
151.21
137.55
134.51
132.46
130.53
129.22
119.43
112.55
109.09
49.86
41.37
40.82
40.54
40.27
39.99
39.71
39.43
39.15
33.43
32.46
29.59
26.57
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

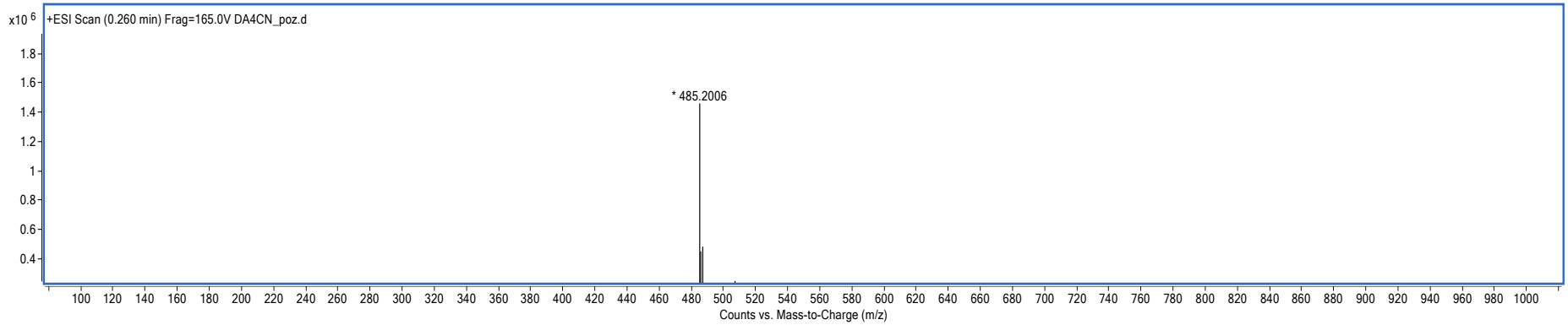
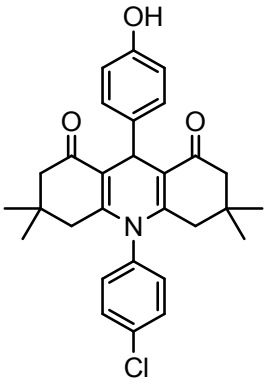
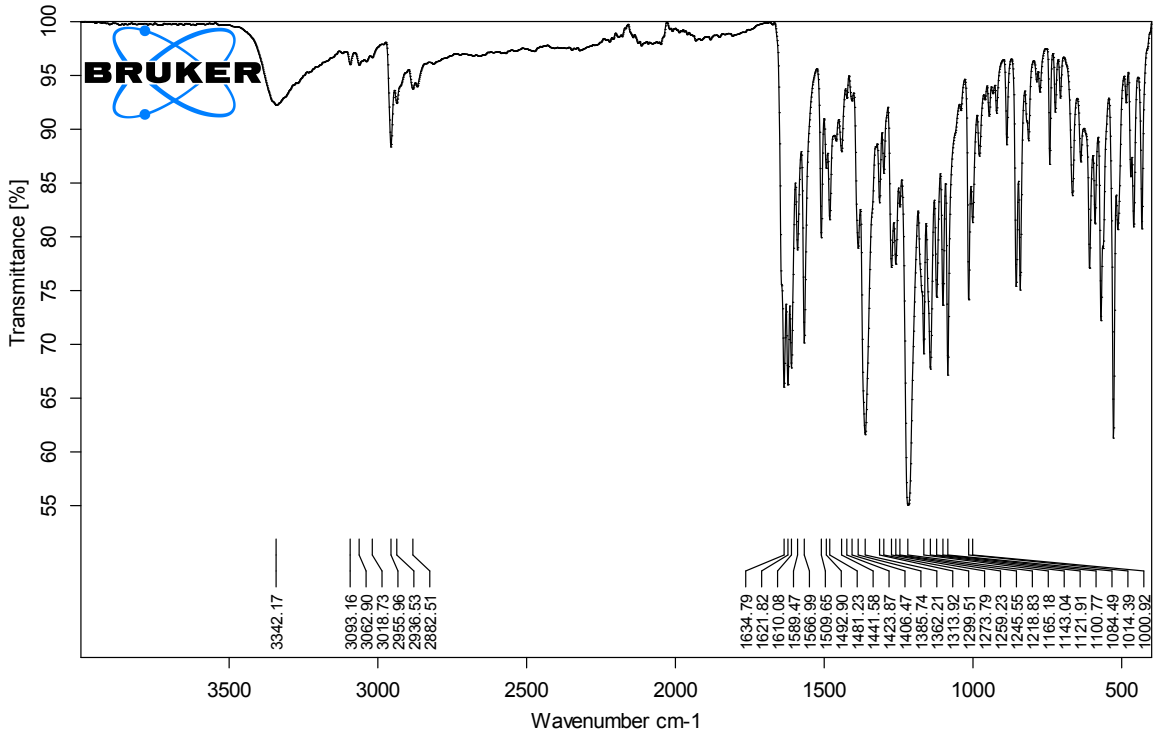


Fig. S14. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4i**

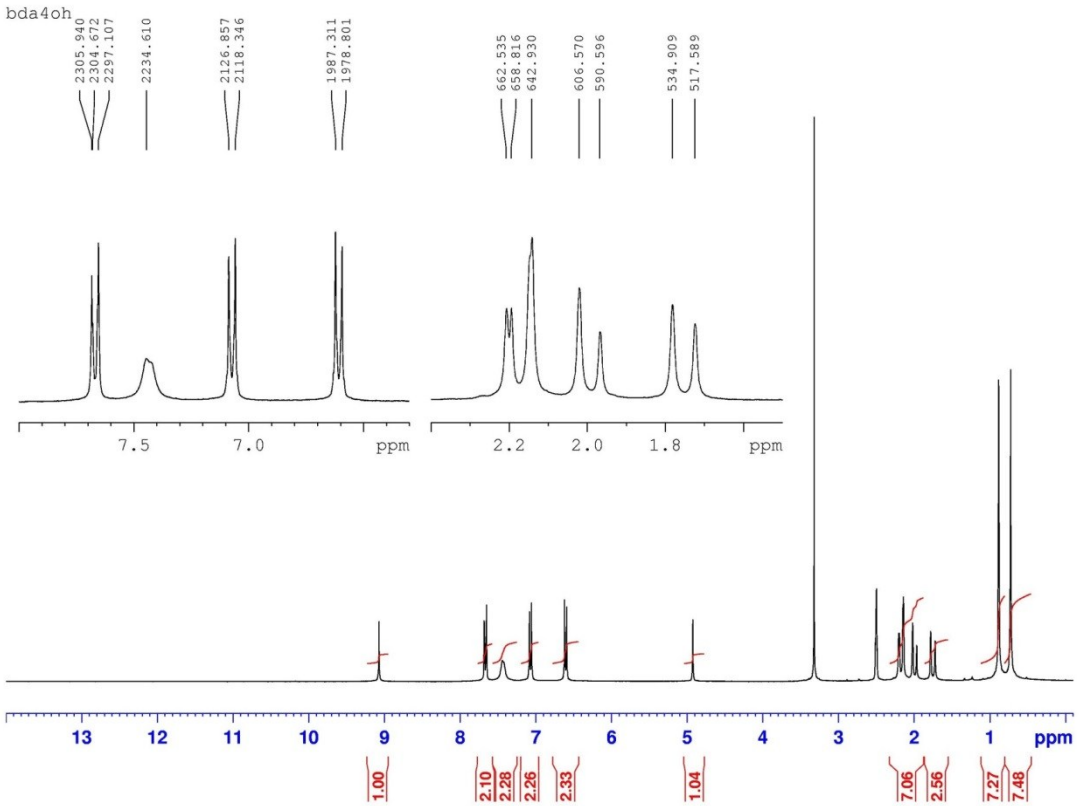
10-(4-Chlorophenyl)-9-(4-hydroxyphenyl)-3,3,6,6-tetramethyl-3,4,6,7,9,10-hexahydro acridine-1,8(2H,5H)-dione (4j)



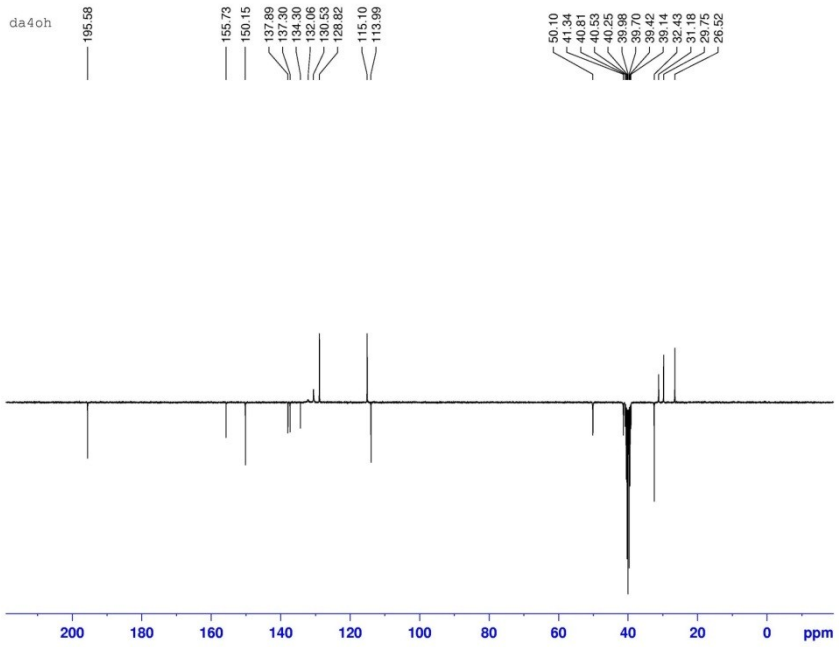
a)



b)


bda4oh
2305.940
2304.672
2297.107
2234.610
2126.857
2118.346
1987.311
1978.801
662.535
658.816
642.930
606.570
590.596
534.909
517.589
7.5
7.0
ppm
2.2
2.0
1.8
ppm
13
12
11
10
9
8
7
6
5
4
3
2
1
ppm
1.00
2.10
2.28
2.26
2.33
1.04
7.06
2.56
7.27
7.48

c)


da4oh
195.58
155.73
150.15
137.89
137.30
134.30
132.06
130.53
128.82
115.10
113.99
50.10
41.34
40.81
40.53
40.25
39.98
39.70
39.42
39.14
32.43
31.18
29.75
26.52
200
180
160
140
120
100
80
60
40
20
0
ppm

d)

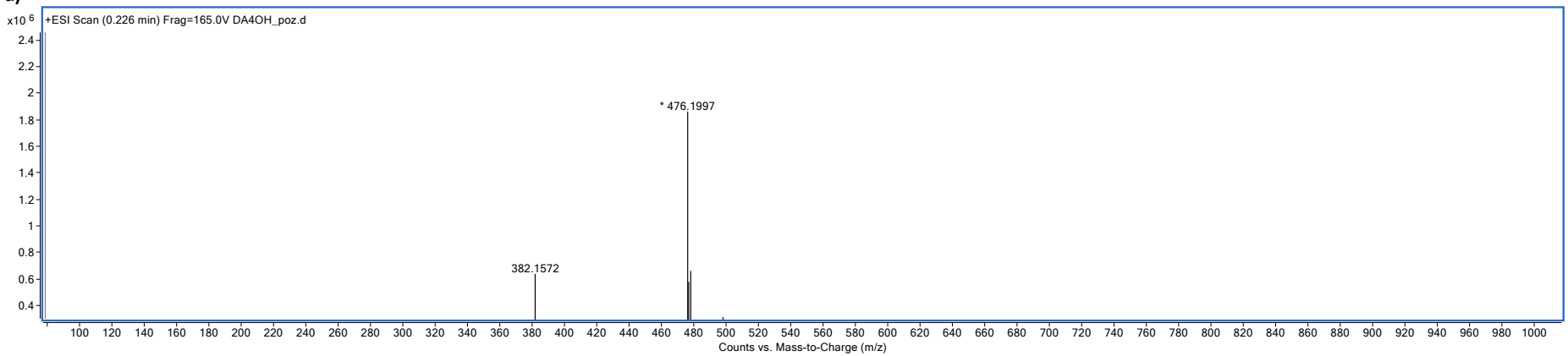


Fig. S15. a) FT-IR, **b)** ^{1}H NMR, **c)** ^{13}C NMR (APT), **d)** Q-TOF LC/HRMS of **4j**