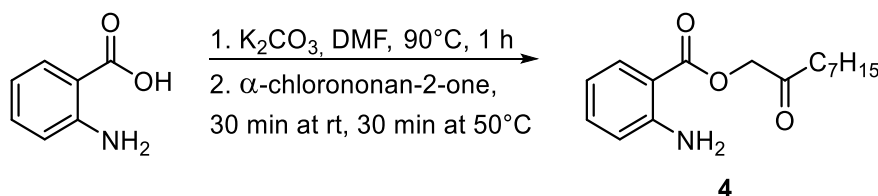


Supporting Information

Chemical synthesis

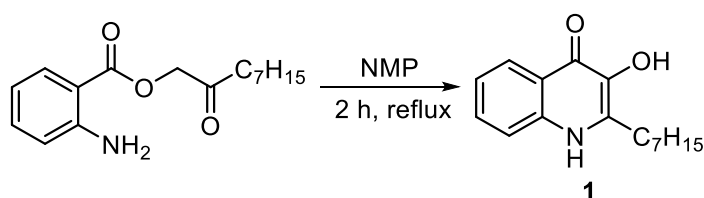
Synthesis of 2-oxononyl 2'-aminobenzoate **4**



Anthranilic acid (3.26 g, 23.8 mmol, 1.2 eq.) was dissolved in DMF (44 mL) and K_2CO_3 (2.93 g, 21.19 mmol, 1.07 eq.) was added. The mixture was heated at $90^\circ C$ for 1 h. After reaching room temperature, α -chlorononan-2-one (3.5 g, 19.8 mmol, 1.0 eq.) was added. The mixture was stirred for 30 min at room temperature and 30 min at $50^\circ C$. After letting cool to room temperature, the mixture was poured in ice-water and the precipitate collected by filtration and dried.

2-oxononyl 2-aminobenzoate (**4**) was obtained as a white solid (5.15 g, 94 %): 1H -NMR ($CDCl_3$ 400.13 MHz) δ (ppm): 0.88 (t, $J = 7.0$ Hz, 3H, $-CH_3$), 1.21 – 1.35 (m, 8H, $-(CH_2)_4-CH_3$), 1.63 (m, 2H, $-CO-CH_2-CH_2-$), 2.50 (t, $J = 7.4$ Hz, 2H, $-CO-CH_2-CH_2-$), 4.83 (s, 2H, $COO-CH_2-CO-$), 5.68 (s, br, 2H, $-NH_2$), 6.66 (m, 2H, H-5 and H-3), 7.29 (m, 1H, H-4), 7.93 (dd, $J = 8.5$ Hz, $J = 1.7$ Hz, 1H, H-6). ^{13}C -NMR ($CDCl_3$ 100.61 MHz) δ (ppm): 14.1 ($-CH_3$), 22.7, 23.4, 29.1, 29.2, 31.7 ($-(CH_2)_5-CH_3$), 39.0 ($-CO-CH_2-$), 68.1 ($-COO-CH_2-CO-$), 110.0 (C-1), 116.7 (C-5 and C-3), 131.5 (C-6), 134.7 (C-4), 150.9 (C-2), 167.3 ($-COO-$), 204.9 ($-CO-$). ESI-HRMS: $m/z = 278.1752$ $[M+H]^+$, calc. for $C_{16}H_{23}NO_3 + H^+ = 278.1751$; $m/z = 300.1574$ $[M+Na]^+$, calc. for $C_{16}H_{23}NO_3 + Na^+ = 300.1570$.

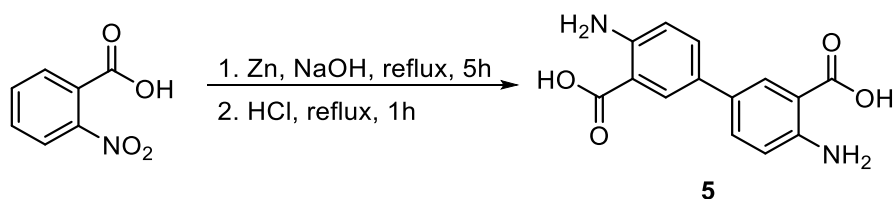
Synthesis of 2-heptyl-3-hydroxy-4-quinolone (**1**)



Compound **4** (1.91 g, 6.9 mmol) was dissolved in NMP (19.2 mL) and the solution was refluxed for 2 h. After reaching room temperature, the solution was poured in ice-water and the precipitated collected by filtration and dried.

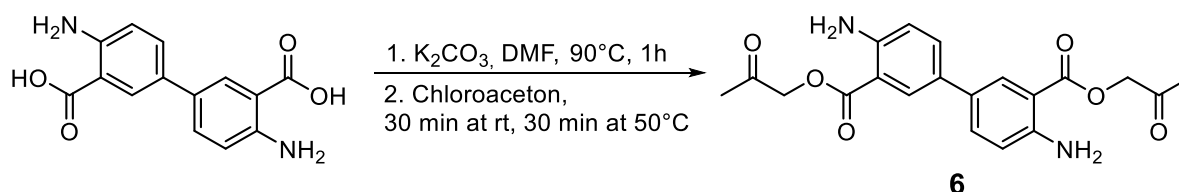
2-heptyl-3-hydroxyquinolin-4(1H)-one (**1**) was obtained as white solid (1.50 g, 84 %): 1H -NMR ($DMSO-d_6$ 400.13 MHz) δ (ppm): 0.84 (t, $J = 6.9$ Hz, 3H, $-CH_3$), 1.20 – 1.37 (m, 8H, $-(CH_2)_4-CH_3$), 1.67 (m, 2H, $-CH_2-(CH_2)_4-CH_3$), 2.72 (t, $J = 7.9$ Hz, 2H, $-CH_2-(CH_2)_5-CH_3$), 7.21 (ddd, $J = 2.6$ Hz, 5.4 Hz, 8.1 Hz, 1H, H-6), 7.52 (m, 2H, H-7 and H-8), 8.09 (d, $J = 8.1$ Hz, 1H, H-5), 11.40 (s, 1H, NH). ^{13}C -NMR ($DMSO-d_6$ 100.61 MHz) δ (ppm): 13.9 ($-CH_3$), 22.0, 28.4, 28.7, 31.2 ($-(CH_2)_4-CH_3$), 27.8 ($-CH_2-(CH_2)_4-CH_3$), 28.1 ($-CH_2-(CH_2)_5-CH_3$), 117.7 (C-8), 121.5 (C-6), 122.1 (C-4a), 124.5 (C-5), 129.9 (C-7), 135.5 (C-2), 137.4 (C-8a), 137.8 (C-3), 168.9 (C-4). ESI-HRMS: $m/z = 260.1651$ $[M+H]^+$, calc. for $C_{16}H_{21}NO_2 + H^+ = 260.1645$; $m/z = 282.1470$ $[M+Na]^+$, calc. for $C_{16}H_{21}NO_2 + Na^+ = 282.1465$.

Synthesis of 4,4'-diamino-[1,1'-biphenyl]-3,3'-dicarboxylic acid (**5**)



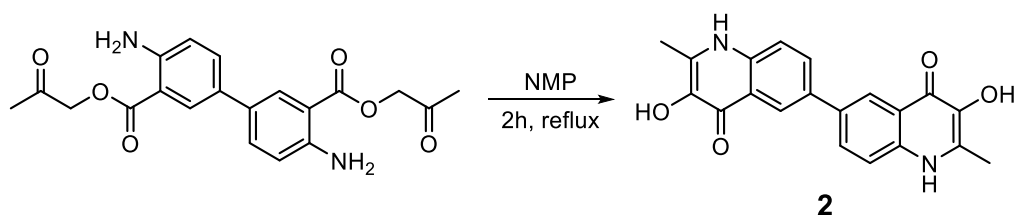
o-Nitrobenzoic acid (6.685 g, 0.04 mol) was dissolved in 200 mL of 12.5 M aq. NaOH to result in a 0.2 M solution. To the solution was added 50 g Zn (0.765 mol) and the mixture heated to 100°C and kept at this temperature for 5 h. After the solution reached room temperature, 100 mL conc. HCl was slowly added and the mixture heated to 100°C for 1 h. After reaching room temperature, the precipitate was isolated by filtration under vacuum and washed with water. The compound was obtained as a green-yellow solid (3.87 g, 71 %). ¹H-NMR (DMSO-*d*₆ 400.1 MHz) δ (ppm): 6.80 (d, 2H, *J* = 8.7 Hz, H-5 and H-5'), 7.57 (dd, 2H, *J* = 8.7 Hz, *J* = 2.3 Hz, H-6 and H-6'), 7.84 (d, 2H, *J* = 2.3 Hz, H-2 and H-2'). ¹³C-NMR (DMSO-*d*₆ 100.6 MHz) δ (ppm): 109.9 (2C, C-3 and C-3'), 117.9 (2C, C-5 and C-5'), 126.6 (2C, C-1 and C-1'), 127.5 (2C, C-2 and C-2'), 131.4 (2C, C-6 and C-6'), 150.1 (2C, C-4 and C-4'), 169.6 (2C, 2xCOOH).

Synthesis of bis(2-oxopropyl) 4,4'-diamino-[1,1'-biphenyl]-3,3'-dicarboxylate (**6**)



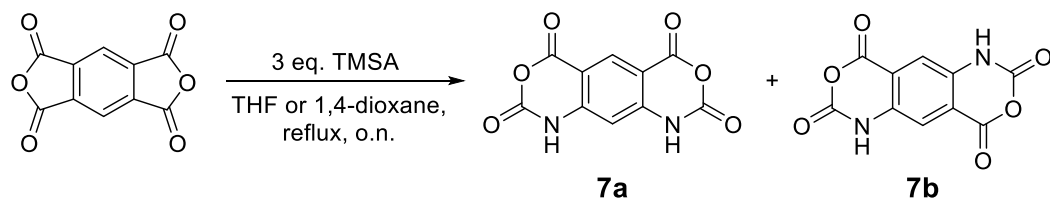
Compound **5** (1.718 g, 6.31 mmol) was dissolved in 25 mL DMF and K₂CO₃ (9.465 mmol, 1.5 eq.) was added. The mixture was heated at 90°C for 1 h. After reaching room temperature, chloroacetone (1.75 ml, 3 eq.) was added. The mixture was stirred for 30 min at room temperature and 30 min at 50°C. At room temperature, the mixture was poured in ice-water. The mixture was extracted with ethyl acetate, the combined organic phases washed with brine, filtered and the solvent evaporated leaving a brown solid. The solid was suspended in a small volume of ethyl acetate and collected by filtration. The solid was washed with small volumes of ethyl acetate and dried leaving the clean product as a brown solid (1.25 g, 51.5%). ¹H-NMR (DMSO-*d*₆ 400.1 MHz) δ (ppm): 2.16 (s, 6H, 2x -CH₃), 4.98 (s, 4H, 2x -CH₂-), 6.67 (s, br, 4H, 2x -NH₂), 6.87 (d, 2H, *J* = 8.6 Hz, H-5 and H-5'), 7.52 (dd, 2H, *J* = 8.6 Hz, *J* = 2.3 Hz, H-6 and H-6'), 7.90 (d, 2H, *J* = 2.3 Hz, H-2 and H-2'). ¹³C-NMR (DMSO-*d*₆ 100.6 MHz) δ (ppm): 25.9 (2C, 2x -CH₃), 68.3 (2C, 2x -CH₂-), 108.3 (2C, C-3 and C-3'), 117.4 (2C, C-5 and C-5'), 126.5 (2C, C-1 and C-1'), 126.9 (2C, C-2 and C-2'), 132.1 (2C, C-6 and C-6'), 150.2 (2C, C-4 and C-4'), 166.5 (2C, 2x COOH), 202.2 (2C, 2x -CO-). ESI-HRMS: *m/z* = 385.1396 [M+H]⁺, calc. for C₂₀H₂₀N₂O₆ + H⁺ = 385.1394; *m/z* = 407.1217 [M+Na]⁺, calc. for C₂₀H₂₀N₂O₆ + Na⁺ = 407.1214.

Synthesis of 3,3'-dihydroxy-2,2'-dimethyl-[6,6'-biquinoline]-4,4'-(1*H*,1'*H*)-dione (**2**)



Compound **6** (1.0 g, 2.6 mmol) was dissolved in 10 mL NMP and the solution was refluxed for 2 h. After reaching room temperature, the solution was poured in ice-water and the precipitated collected by filtration. The slightly impure product (780 mg) was purified by washing with THF (5x 15 mL). The pure product was obtained as a light brown solid (680 mg, 75%). ¹H-NMR (DMSO-*d*₆ 600.2 MHz) δ (ppm): 2.40 (s, 6H, 2x -CH₃), 7.63 (d, 2H, J = 8.7 Hz, H-8 and H-8'), 7.96 (dd, 2H, J = 8.7 Hz, J = 2.1 Hz, H-7 and H-7'), 8.16 (s, br, 2H, 2x -OH), 8.40 (d, 2H, J = 2.1 Hz, H-5 and H-5'), 11.62 (s, br, 2x -NH). ¹³C-NMR (DMSO-*d*₆ 100.6 MHz) δ (ppm): 14.1 (2C, 2x -CH₃), 118.6 (2C, C-8 and C-8'), 121.5 (2C, C-5 and C-5'), 122.6 (2C, C-4a and C-4a'), 128.6 (2C, C-7 and C-7'), 131.7 (2C, C-2 and C-2'), 132.8 (2C, C-6 and C-6'), 136.5 (2C, C-8a and C-8a') 138.3 (C-3 and C-3'), 168.7 (C-4 and C-4'). ESI-HRMS: $m/z = 349.1184$ [M+H]⁺, calc. for C₂₀H₁₆N₂O₄ + H⁺ = 349.1183; $m/z = 371.1007$ [M+Na]⁺, calc. for C₂₀H₁₆N₂O₄ + Na⁺ = 371.1002; $m/z = 719.2117$ [2M+Na]⁺, calc. for C₄₀H₃₂N₄O₈ + Na⁺ = 719.2112.

Synthesis of 1,9-dihydro-2*H*,4*H*-benzo[1,2-*d*:5,4-*d'*]bis([1,3]oxazine)-2,4,6,8-tetraone (**7a**) and 1,6-dihydrobenzo[1,2-*d*:4,5-*d'*]bis([1,3]oxazine)-2,4,7,9-tetraone (**7b**)



Pyromellitic dianhydride (1 eq.) was suspended in THF or 1,2-dioxane (0.8 M) and TMSA (3eq.) was added dropwise. The colourless mixture was refluxed overnight and turned yellow/orange. The mixture was allowed to cool to room temperature and the precipitated collected by centrifugation. The precipitate was washed with THF or 1,4-dioxane and dried under vacuum.

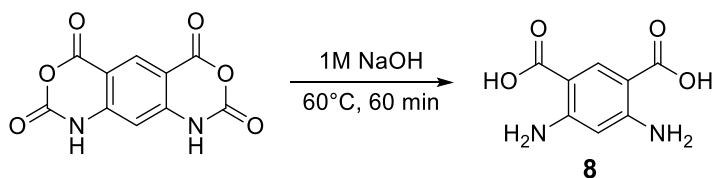
The reaction in THF resulted in a yellow solution with light-yellow precipitate containing a mixture of isomers **7a**:**7b** in a ratio of 1:0.85 (23 %) that could not be separated.

The reaction in 1,4-dioxane gave an orange reaction solution with white precipitate. After extensive washing of the precipitate with 1,4-dioxane, pure **7a** was obtained as white solid (21%). The supernatants were combined, the solvent evaporated and the precipitate washed again extensively with 1,4-dioxane. After several repetitions of this method a small amount of pure **7b** could be isolated as yellow solid for characterization.

1,9-dihydro-2*H*,4*H*-benzo[1,2-*d*:5,4-*d'*]bis([1,3]oxazine)-2,4,6,8-tetraone (**7a**): ¹H-NMR (DMSO-*d*₆ 400.13 MHz) δ (ppm): 6.79 (s, 1H, H-10), 8.31 (s, 1H, H-5), 12.09 (s, br, 2H, 2x -NH). ¹³C-NMR (DMSO-*d*₆ 100.6 MHz) δ (ppm): 99.4 (C-10), 106.7 (2C, C-4a and C-5a), 131.9 (C-5), 146.7 (2C, C-9a and C-10a), 146.8 (2C, C-2 and C-8), 158.4 (2C, C-4 and C-6). ESI-HRMS: $m/z = 249.0149$ [M+H]⁺, calc. for C₁₀H₄N₂O₆ + H⁺ = 249.0142.

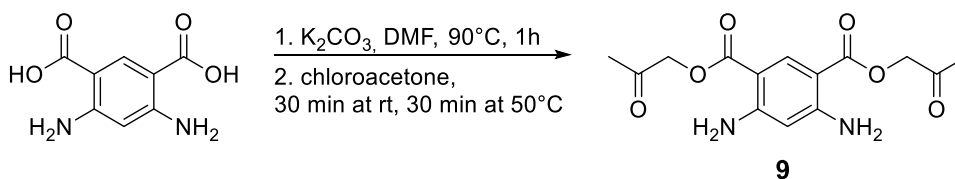
1,6-dihydrobenzo[1,2-d:4,5-d']bis([1,3]oxazine)-2,4,7,9-tetraone (**7b**): $^1\text{H-NMR}$ (DMSO- d_6 400.13 MHz) δ (ppm): 7.60 (s, 2H, H-5 and H-10), 11.83 (s, 2H, 2x -NH). $^{13}\text{C-NMR}$ (DMSO- d_6 100.6 MHz) δ (ppm): 114.7 (2C, C-5 and C-10), 117.3 (2C, C-5a and C-10a), 136.0 (2C, C-4a and C-9a), 146.4 (2C, C-2 and C-7), 159.1 (2C, C-4 and C-9).

Synthesis of 4,6-diaminoisophthalic acid **8**



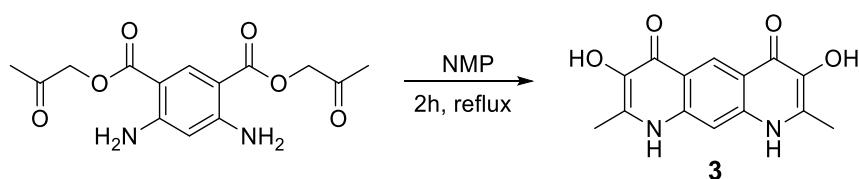
The compound **7a** was dissolved in 1 M NaOH (250 mM) while the reaction was warmed up to 60°C. The reaction was stirred at 60°C for 1 h and afterwards cooled with an ice-bath and brought to pH 4 with acetic acid. The precipitated was filtered, washed with water, and dried under vacuum. The product was obtained as a white solid (59 %). $^1\text{H-NMR}$ (DMSO- d_6 400.13 MHz) δ (ppm): 5.84 (s, 1H, H-5), 6.89 (s, 4H, 2x -NH $_2$), 8.29 (s, 1H, H-2). $^{13}\text{C-NMR}$ (DMSO- d_6 100.6 MHz) δ (ppm): 97.2 (C-5), 100.7 (2C, C-1 and C-3), 137.9 (C-2), 154.9 (2C, C-4 and C-6), 168.9 (2C, 2x -COOH). ESI-HRMS: $m/z = 197.0558$ [M+H] $^+$, calc. for $\text{C}_8\text{H}_8\text{N}_2\text{O}_4 + \text{H}^+ = 197.0557$; $m/z = 219.0377$ [M+Na] $^+$, calc. for $\text{C}_8\text{H}_8\text{N}_2\text{O}_4 + \text{Na}^+ = 219.0376$; $m/z = 415.0860$ [2M+Na] $^+$, calc. for $\text{C}_{16}\text{H}_{16}\text{N}_4\text{O}_8 + \text{Na}^+ = 415.0860$.

Synthesis of bis(2-oxopropyl) 4,6-diaminoisophthalate (**9**)



4,6-Diaminoisophthalic acid (**8**) (0.358 g, 1.825 mmol) was dissolved in 8 mL DMF and 378 mg K_2CO_3 (2.73 mmol, 1.5 eq.) was added. The mixture was heated at 90°C for 1 h. After reaching room temperature, 440 μL chloroacetone (5.475 mmol, 3.0 eq.) was added. The mixture was stirred for 30 min at room temperature and 30 min at 50°C. At room temperature, the mixture was poured in water and extracted with ethyl acetate. The combined organic phases were washed with water, dried over Na_2SO_4 , filtered and the solvent evaporated. The residue was dissolved in small amounts of DCM and added on a silica gel column equilibrated with petrol ether/ethyl acetate 1:1. The residue was purified by column chromatography with petrol ether/ethyl acetate 1:1 and 1:2. The product was obtained as slightly yellow solid (226 mg, 40%). $R_f = 0.23$ (petrol ether/ethyl acetate 1:1). $^1\text{H-NMR}$ (DMSO- d_6 400.13 MHz) δ (ppm): 2.12 (s, 6H, 2x -CH $_3$), 4.89 (s, 4H, 2x -CH $_2$ -), 5.94 (s, 1H, H-5), 6.92 (s, 4H, 2x -NH $_2$), 8.47 (s, 1H, H-2). $^{13}\text{C-NMR}$ (DMSO- d_6 100.6 MHz) δ (ppm): 25.8 (2C, 2x -CH $_3$), 67.9 (2C, 2x -CH $_2$ -), 97.1 (C-5), 99.9 (2C, C-1 and C-3), 137.5 (C-2), 154.8 (2C, C-4 and C-6), 165.7 (2C, 2x -COO-), 202.4 (2C, 2x -CO-). ESI-HRMS: $m/z = 331.0904$ [M+Na] $^+$, calc. for $\text{C}_{14}\text{H}_{16}\text{N}_2\text{O}_6 + \text{Na}^+ = 331.0901$; $m/z = 639.1905$ [2M+Na] $^+$, calc. for $\text{C}_{28}\text{H}_{32}\text{N}_4\text{O}_{12} + \text{Na}^+ = 639.1909$.

Synthesis of 3,7-dihydroxy-2,8-dimethylpyrido[3,2-g]quinoline-4,6(1H,9H)-dione (**3**)



Bis(2-oxopropyl) 4,6-diaminophthalate **9** (1.46 g, 4.736 mmol) was dissolved in 20 mL NMP and refluxed for 2 h. The reaction was cooled to room temperature and the precipitate collected by filtration, washed with water, and dried. The product was obtained as a yellowish-brown solid ($m = 789$ mg, 61.2%). $^1\text{H-NMR}$ (DMSO- d_6 400.13 MHz) δ (ppm): 2.37 (s, 6H, 2x -CH $_3$), 7.47 (s, 1H, H-10), 8.06 (s, br, 2H, 2x -OH), 8.95 (s, 1H, H-5), 11.33 (s, 2H, 2x -NH). $^{13}\text{C-NMR}$ (DMSO- d_6 100.6 MHz) δ (ppm): 14.3 (2C, 2x -CH $_3$), 101.3 (C-10), 118.9 (2C, C-4a and C-5a), 123.6 (C-5), 133.4 (2C, C-2 and C-8), 136.2 (2C, C-3 and C-7), 138.2 (2C, C-9a and C-10a), 170.0 (2C, C-4 and C-6). ESI-HRMS: $m/z = 295.0690$ [M+Na] $^+$, calc. for C $_{14}$ H $_{12}$ N $_2$ O $_4$ + Na $^+$ = 295.0689; $m/z = 567.1482$ [2M+Na] $^+$, calc. for C $_{28}$ H $_{24}$ N $_4$ O $_8$ + Na $^+$ = 567.1486.

Table S1. Conditions used for formation experiments and resulting PQS-metal ion complexes.

Salt	Final molarity of salt*, μM	Final molarity of PQS*, μM	Detection of metal-PQS complexes in MeOH	Detection of metal-PQS complexes in Acetone
CuCl ₂	30	60	-	-
ZnCl ₂	30	60	-	-
NiCl ₂	30	60	-	-
CoCl ₂	30	60	-	-
MnCl ₂	30	60	-	-
AlCl ₃	30	90	+	+
FeCl ₃	30	90	+	+
Na ₃ VO ₄	30	150	+	+
Na ₂ MoO ₄	30	180	+	+

* Stock solutions were prepared in DMSO (DMSO/H₂O (1:1) for Na₂MoO₄).

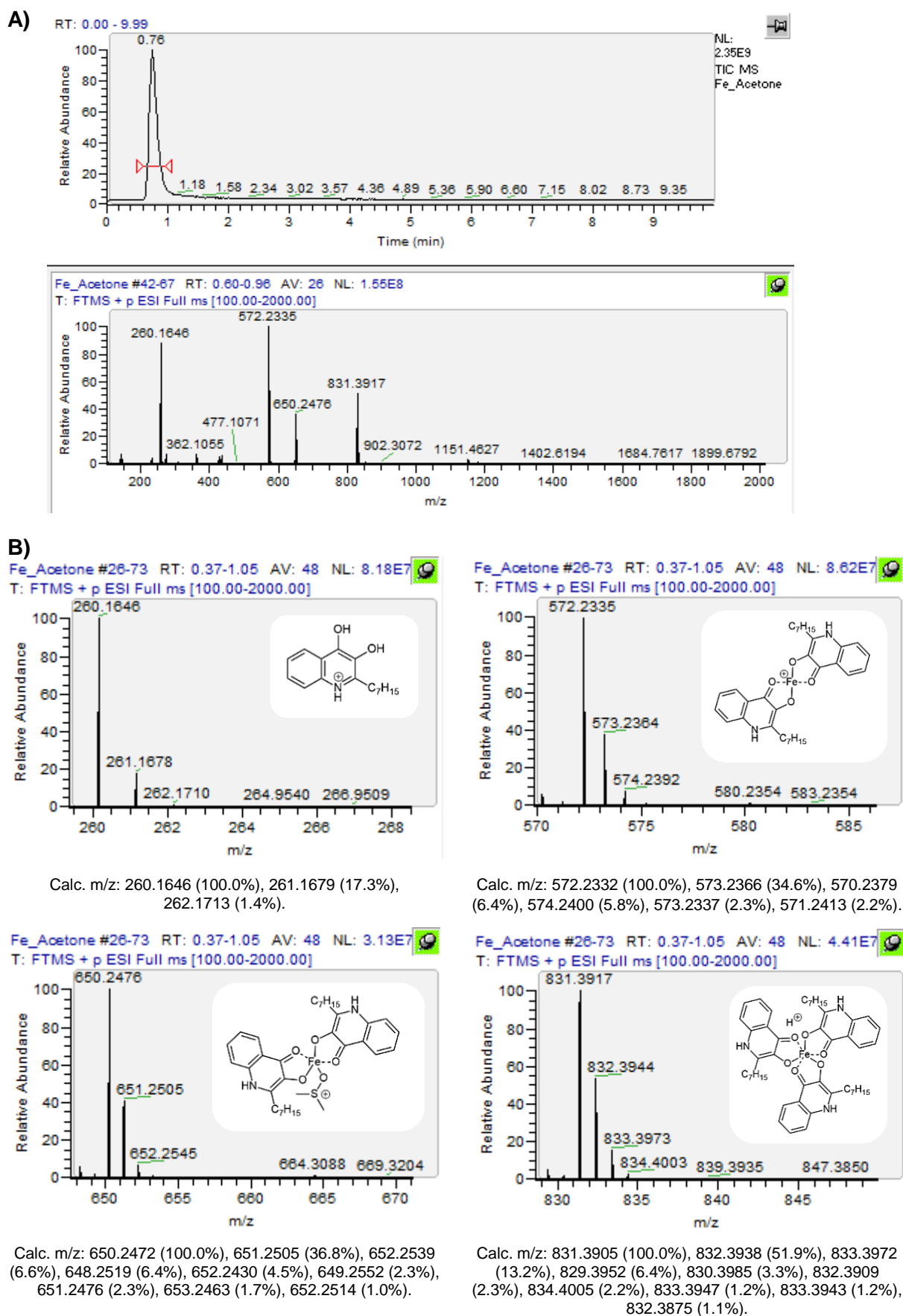
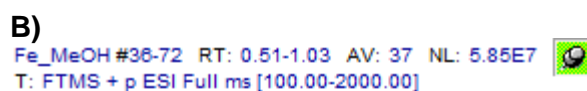
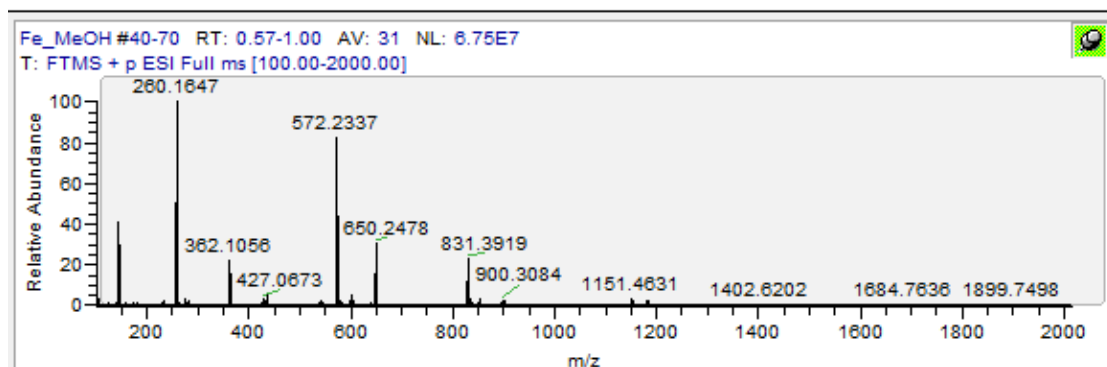
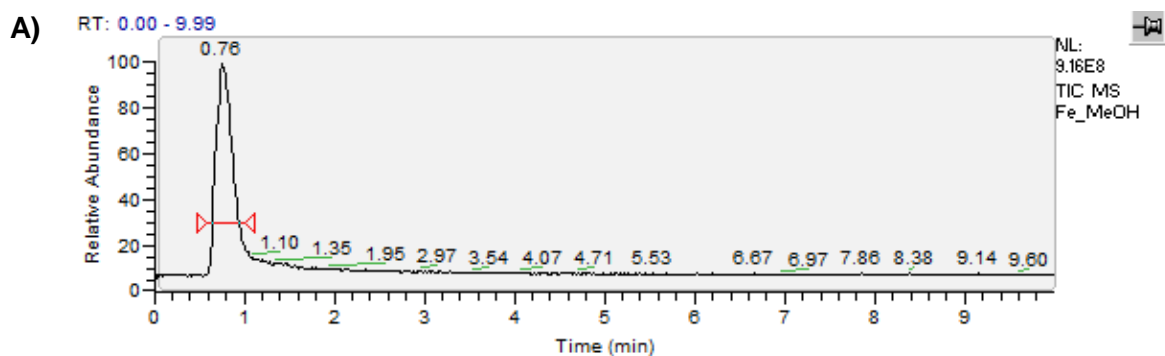
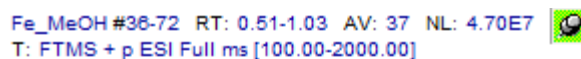


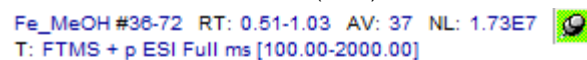
Figure S1. A) Full HRMS-spectrum of Fe(III)-PQS complexes in acetone. B) Detected and calculated m/z for PQS and complexes. Insets: proposed complexes structures.



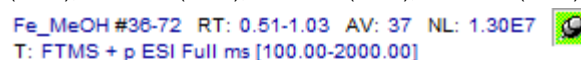
Calc. m/z: 260.1646 (100.0%), 261.1679 (17.3%), 262.1713 (1.4%).



Calc. m/z: 572.2332 (100.0%), 573.2366 (34.6%), 570.2379 (6.4%), 574.2400 (5.8%), 573.2337 (2.3%), 571.2413 (2.2%).



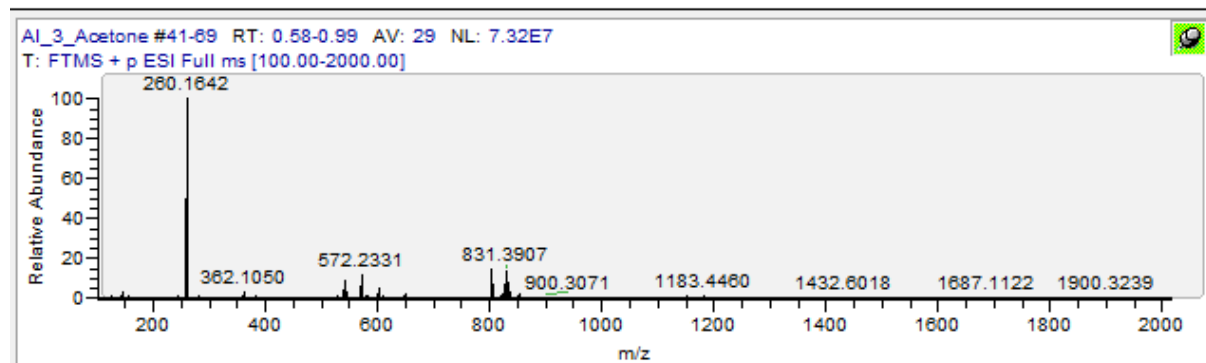
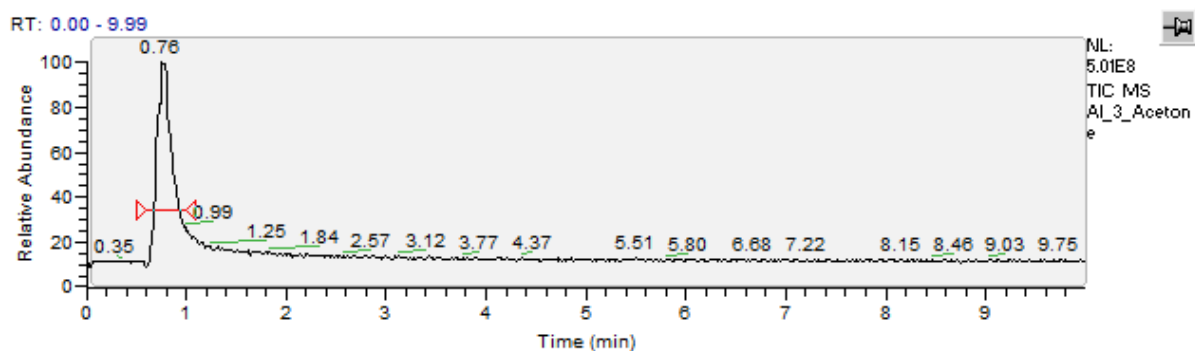
Calc. m/z: 650.2472 (100.0%), 651.2505 (36.8%), 652.2539 (6.6%), 648.2519 (6.4%), 652.2430 (4.5%), 649.2552 (2.3%), 651.2476 (2.3%), 653.2463 (1.7%), 652.2514 (1.0%).



Calc. m/z: 831.3905 (100.0%), 832.3938 (51.9%), 833.3972 (13.2%), 829.3952 (6.4%), 830.3985 (3.3%), 832.3909 (2.3%), 834.4005 (2.2%), 833.3947 (1.2%), 833.3943 (1.2%), 832.3875 (1.1%).

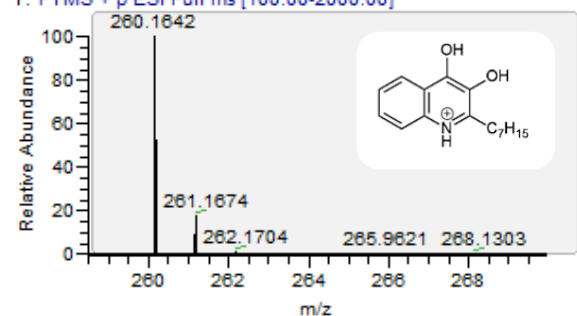
Figure S2. A) Full HRMS-spectrum of Fe(III)-PQS complexes in methanol. B) Detected and calculated m/z for PQS and complexes. Insets: proposed complexes structures.

A)



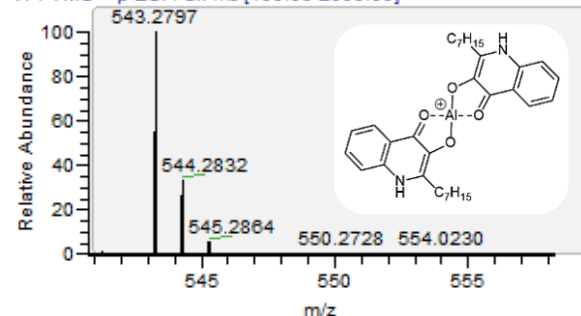
B)

Al_3_Acetone #38-72 RT: 0.54-1.03 AV: 35 NL: 6.42E7



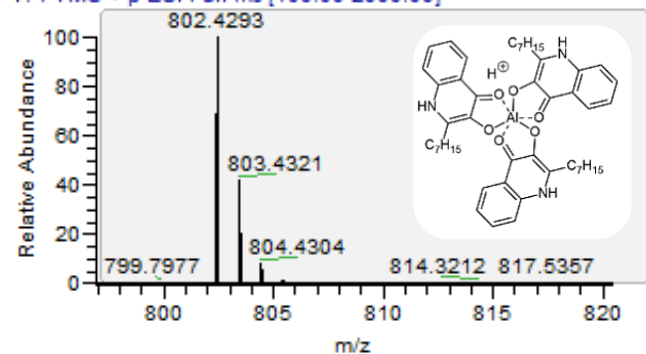
Calc. m/z: 260.1646 (100.0%), 261.1679 (17.3%), 262.1713 (1.4%).

Al_3_Acetone #38-72 RT: 0.54-1.03 AV: 35 NL: 5.54E6



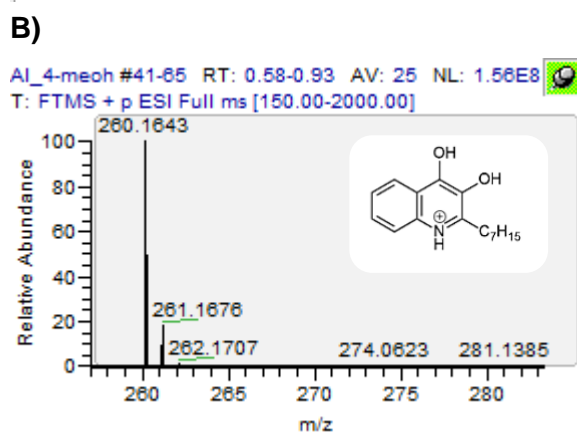
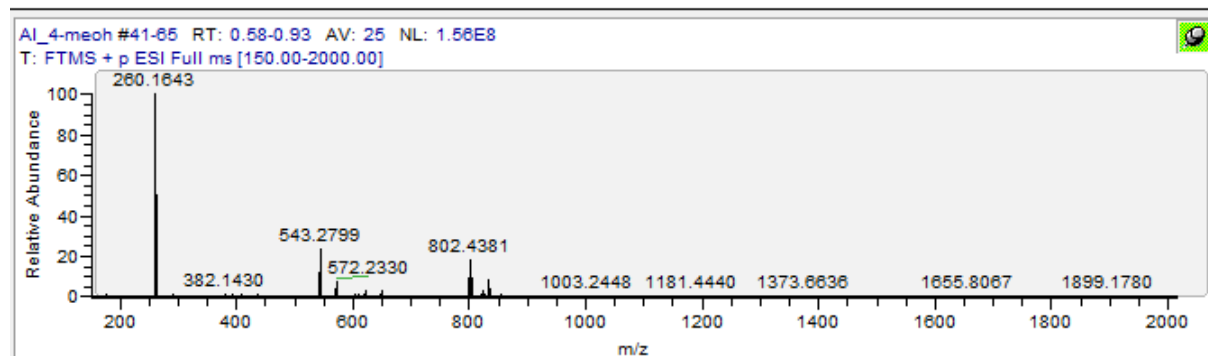
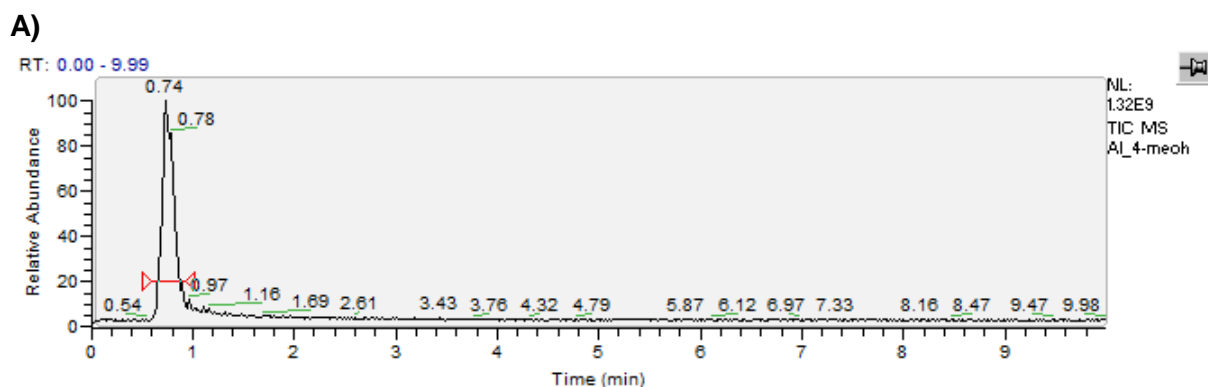
Calc. m/z: 543.2798 (100.0%), 544.2832 (34.6%), 545.2866 (5.8%).

Al_3_Acetone #31-79 RT: 0.44-1.13 AV: 49 NL: 6.31E6

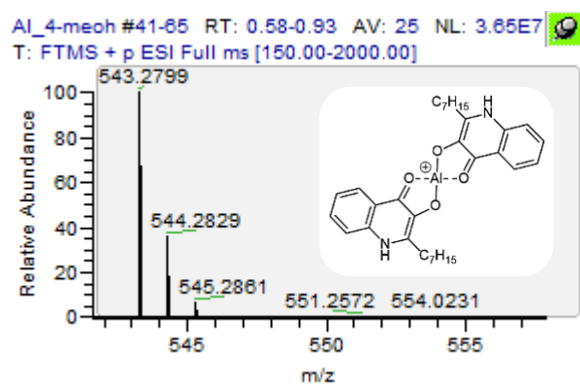


Calc. m/z: 802.4371 (100.0%), 803.4404 (51.9%), 804.4438 (13.2%), 805.4471 (2.2%), 804.4413 (1.2%), 803.4341 (1.1%).

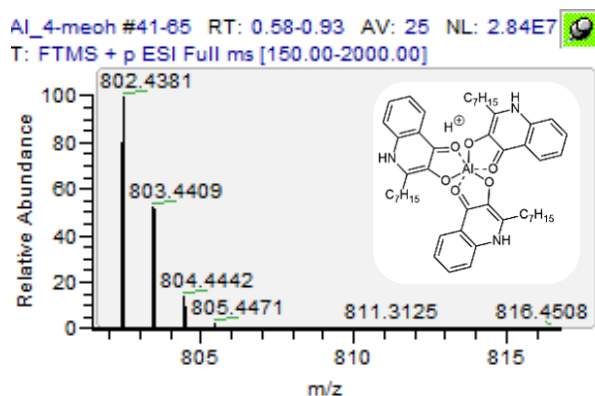
Figure S3. A) Full HRMS-spectrum of Al-PQS complexes in acetone. B) Detected and calculated m/z for PQS and complexes. Insets: proposed complexes structures.



Calc. m/z: 260.1646 (100.0%), 261.1679 (17.3%), 262.1713 (1.4%).

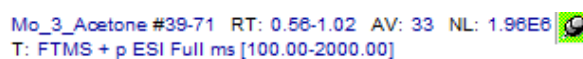
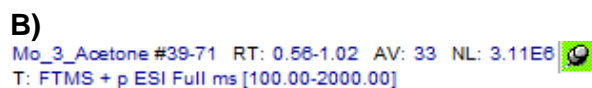
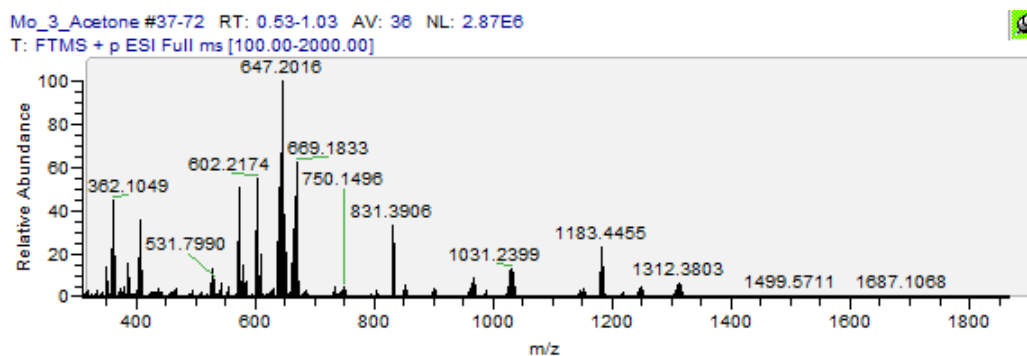
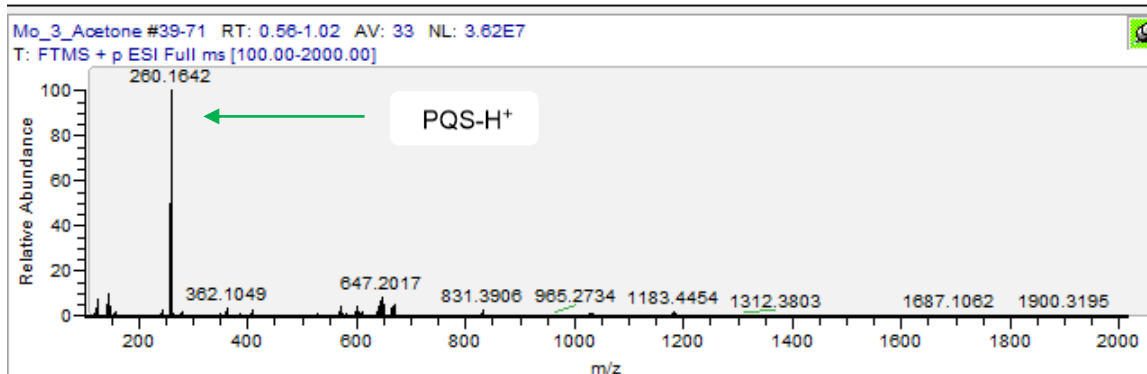
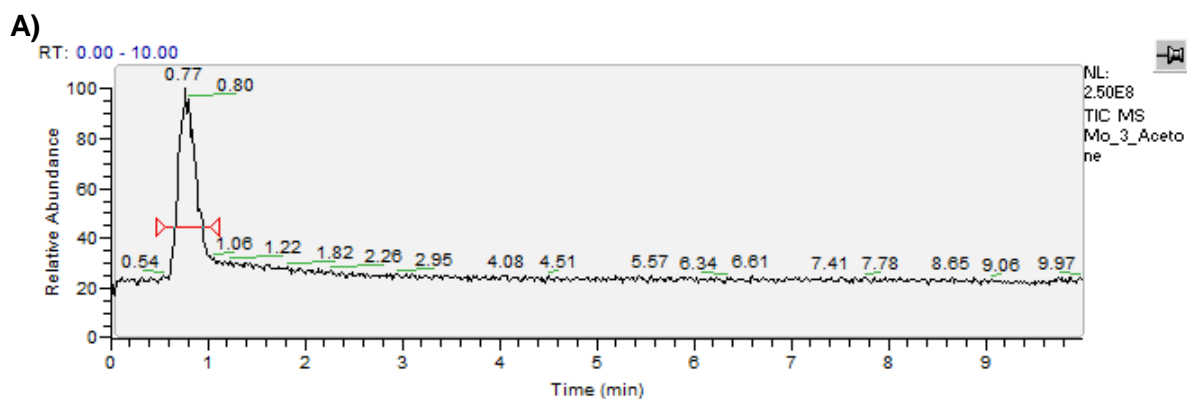


Calc. m/z: 543.2798 (100.0%), 544.2832 (34.6%), 545.2866 (5.8%).



Calc. m/z: 802.4371 (100.0%), 803.4404 (51.9%), 804.4438 (13.2%), 805.4471 (2.2%), 804.4413 (1.2%), 803.4341 (1.1%).

Figure S4. **A)** Full HRMS-spectrum of Al-PQS complexes in methanol. **B)** Detected and calculated m/z for PQS and complexes. Insets: proposed complexes structures.



Calc. m/z: 647.2014 (100.0%), 645.2006 (69.1%), 644.2018 (66.0%), 641.2028 (61.5%), 649.2034 (39.9%), 646.2020 (39.6%), 643.2010 (38.3%), 648.2047 (34.6%), 646.2040 (23.9%), 645.2052 (22.8%), 642.2061 (21.3%), 650.2068 (13.8%), 647.2053 (13.7%), 644.2044 (13.3%), 649.2081 (5.8%), 647.2074 (4.0%), 646.2085 (3.8%), 643.2095 (3.6%), 651.2101 (2.3%), 648.2087 (2.3%), 645.2078 (2.2%), 649.2056 (1.2%).

Calc. m/z: 669.1833 (100.0%), 667.1826 (69.1%), 666.1837 (66.0%), 663.1847 (61.5%), 671.1854 (39.9%), 668.1839 (39.6%), 665.1830 (38.3%), 670.1867 (34.6%), 668.1859 (23.9%), 667.1871 (22.8%), 664.1881 (21.3%), 672.1887 (13.8%), 669.1873 (13.7%), 666.1863 (13.3%), 671.1900 (5.8%), 669.1893 (4.0%), 668.1905 (3.8%), 665.1914 (3.6%), 673.1921 (2.3%), 670.1906 (2.3%), 667.1897 (2.2%), 671.1876 (1.2%).

Figure S5. A) Full HRMS-spectrum of Mo(VI)-PQS complexes in acetone. **B)** Detected and calculated m/z for complexes and their proposed structures.

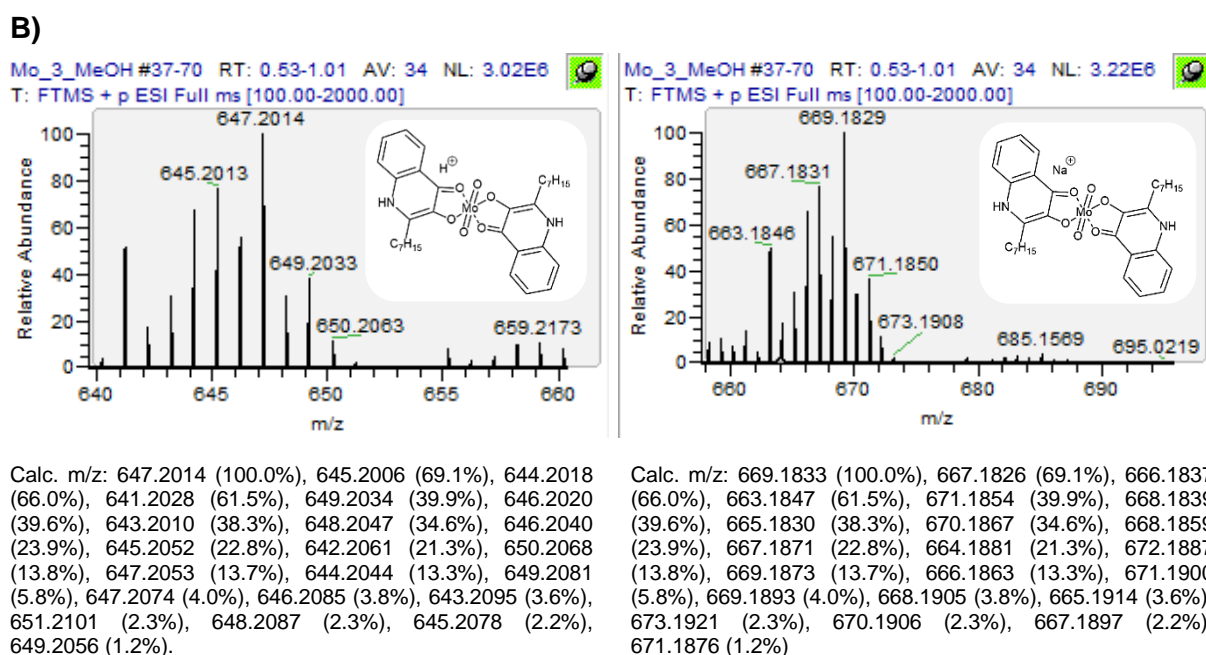
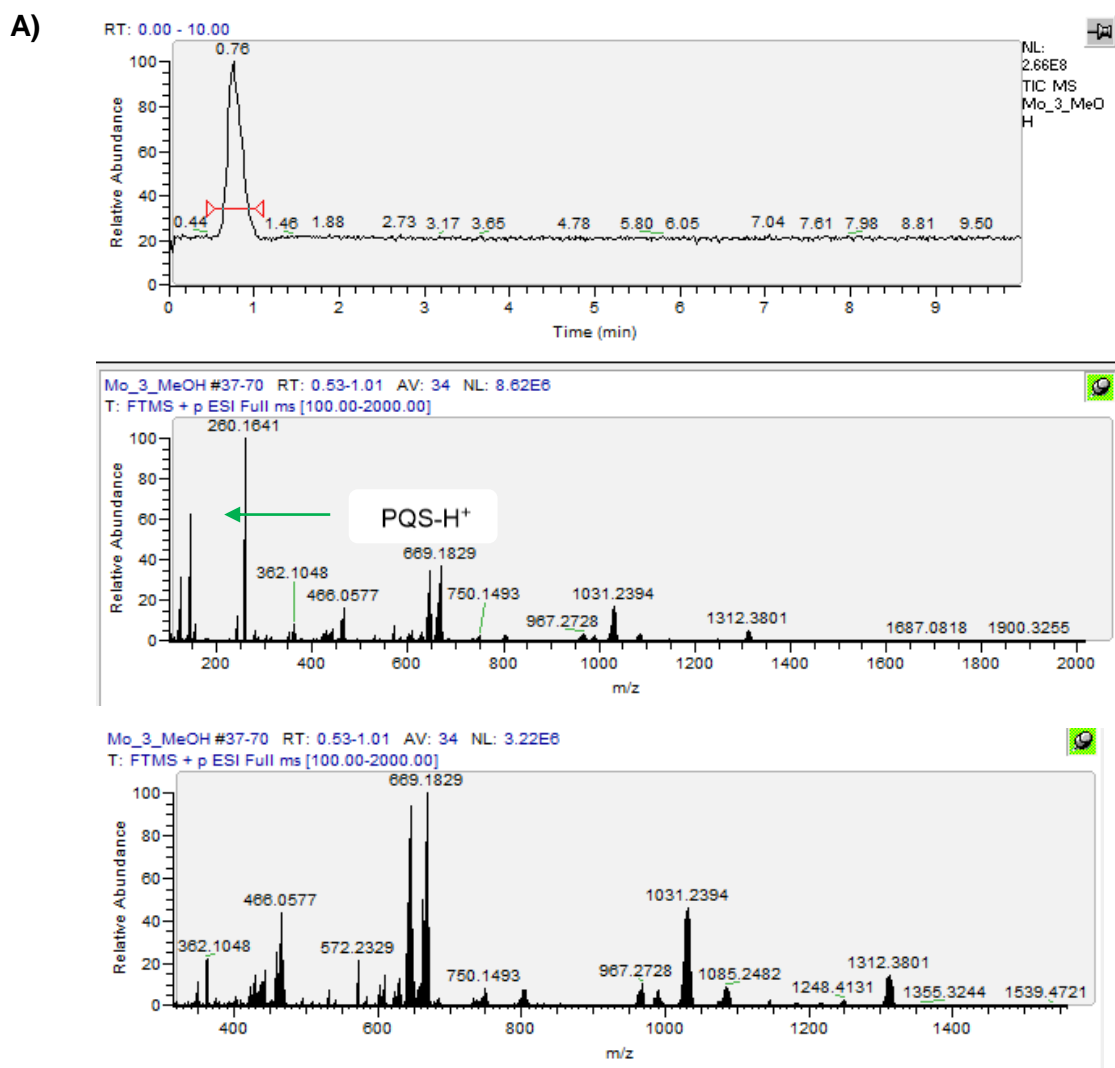
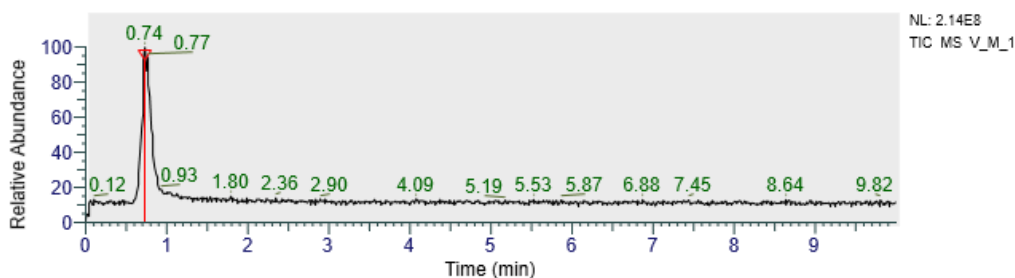


Figure S6. A) Full HRMS-spectrum of Mo (VI)-PQS complexes in methanol. **B)** Detected and calculated m/z for complexes and their proposed structures.

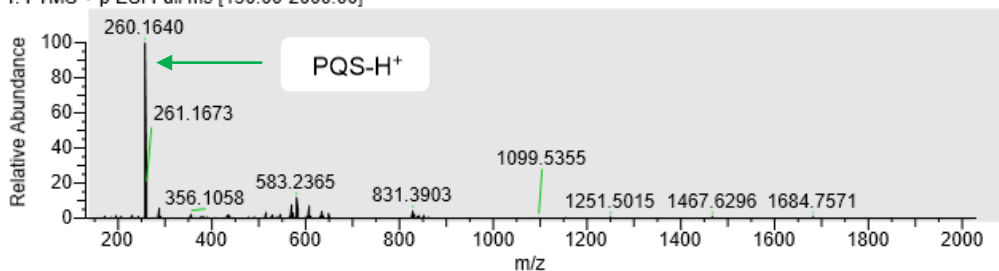
A)

RT :0.00-9.99

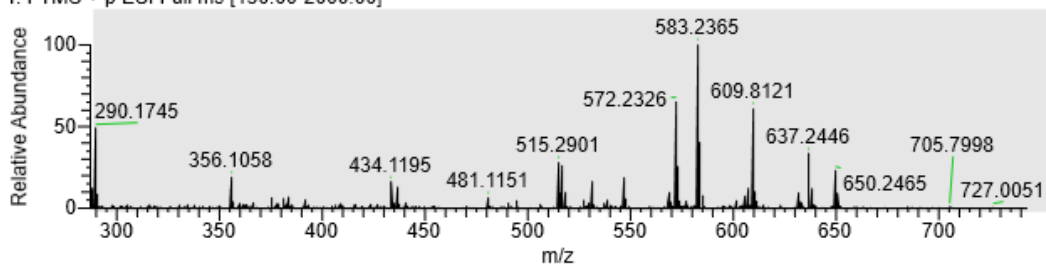


~Spectrum 1 51 - V_M_1 - C1T1

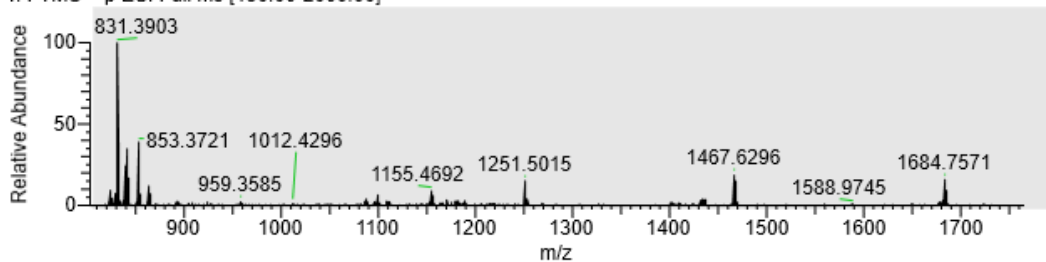
V_M_1 #51 RT: 0.74 AV: 1 NL: 6.81E7
T: FTMS + p ESI Full ms [150.00-2000.00]



V_M_1 #51 RT: 0.74 AV: 1 NL: 8.01E6
T: FTMS + p ESI Full ms [150.00-2000.00]

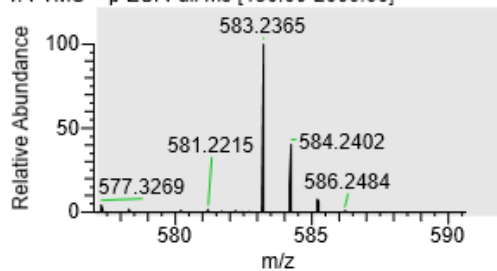


V_M_1 #51 RT: 0.74 AV: 1 NL: 2.85E6
T: FTMS + p ESI Full ms [150.00-2000.00]

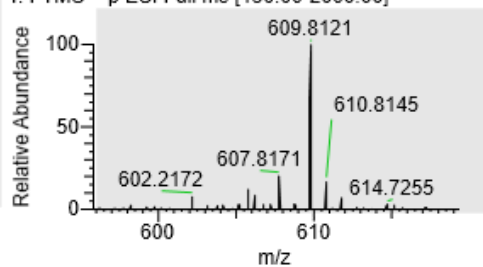


B)

V_M_1 #51 RT: 0.74 AV: 1 NL: 8.01E6
T: FTMS + p ESI Full ms [150.00-2000.00]



V_M_1 #51 RT: 0.74 AV: 1 NL: 4.88E6
T: FTMS + p ESI Full ms [150.00-2000.00]



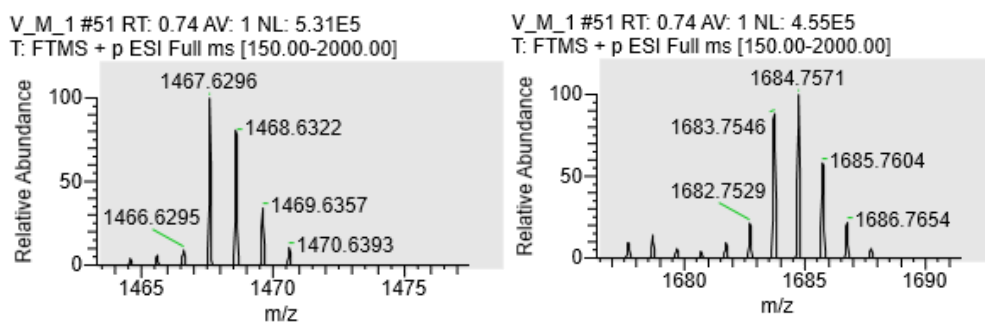


Figure S7. A) Full HRMS-spectrum of V (V)-PQS complexes in methanol. B) Detailed excerpts of unidentified V (V)-PQS complexes.

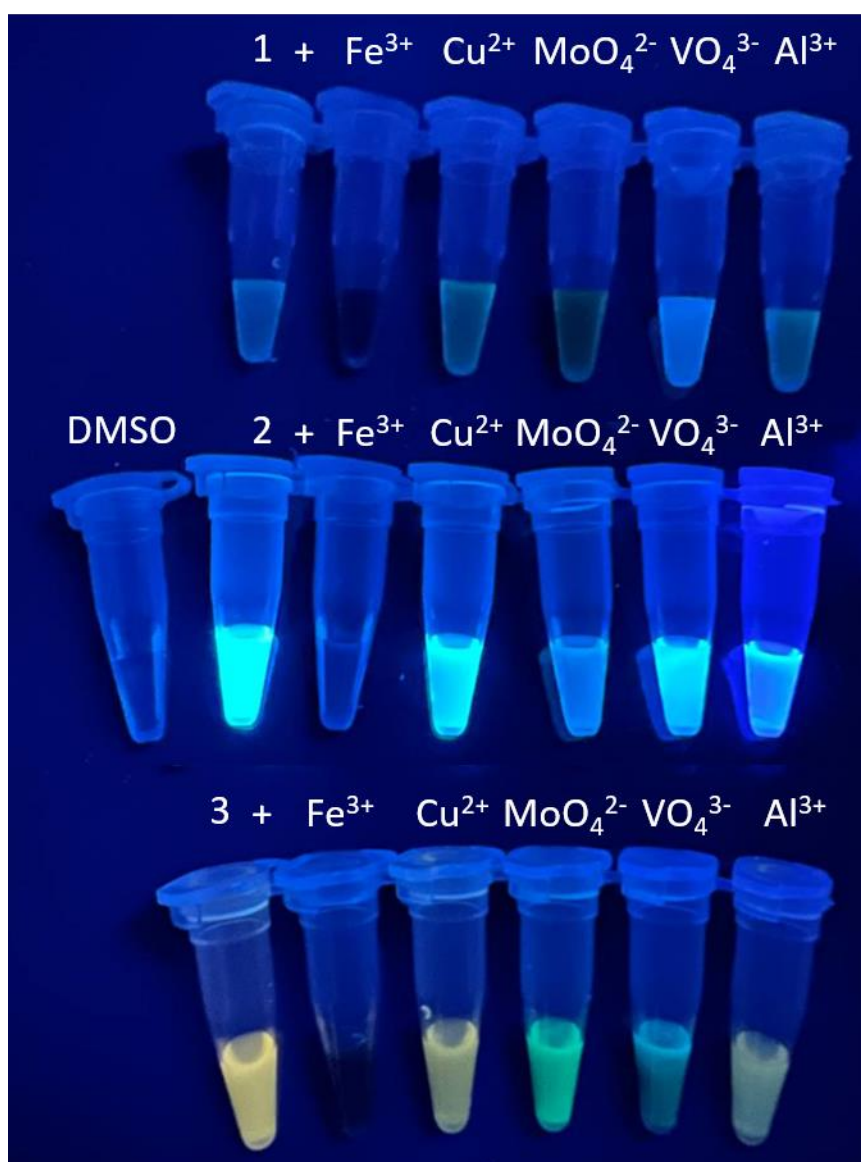
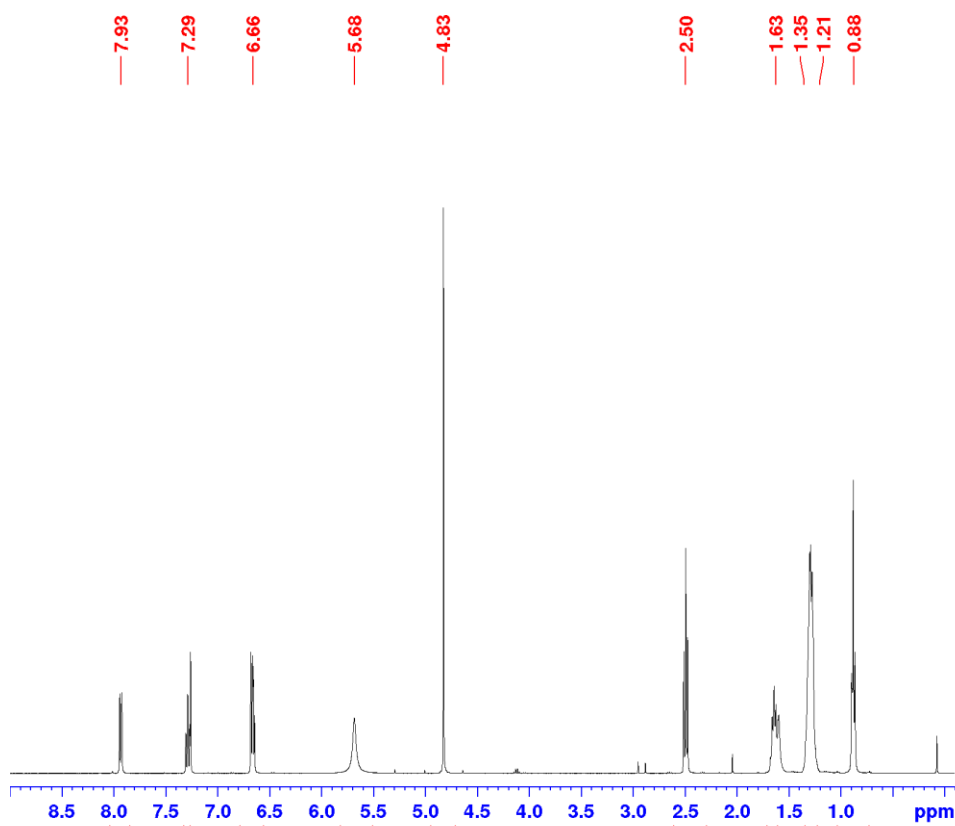


Figure S8. DMSO solutions of compound **1** (top), **2** (middle) and **3** (bottom) with metal ions under UV light (365 nm).

NMR spectra

¹H- and ¹³C-NMR spectra of **4** in CDCl₃

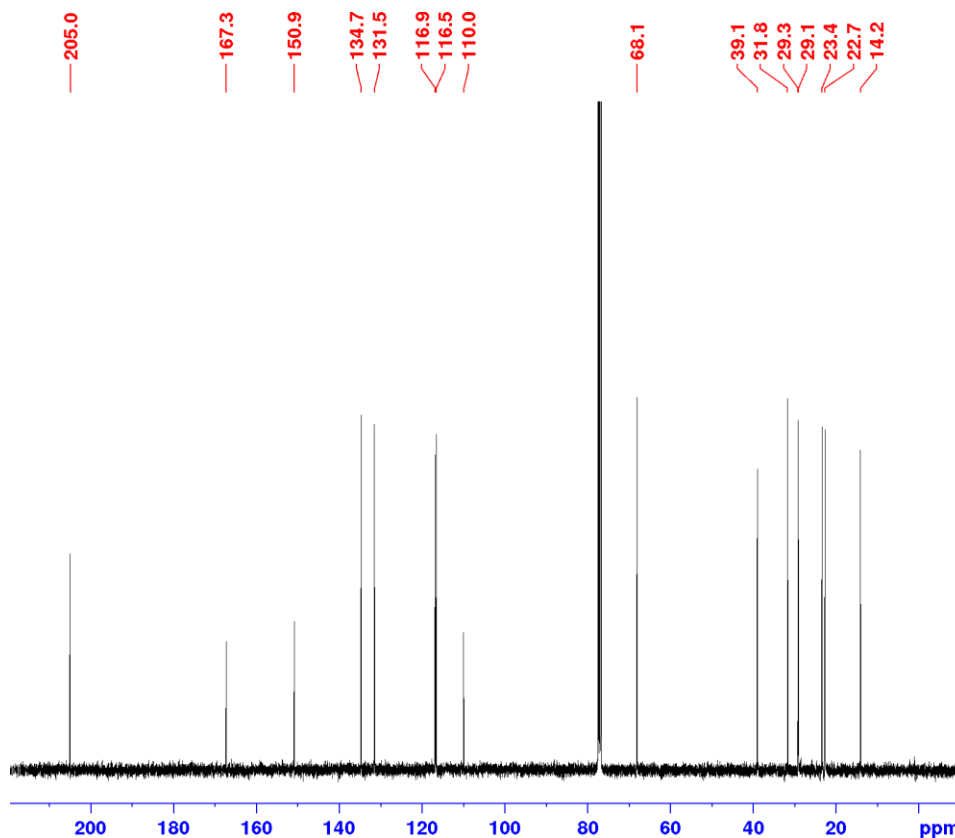


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Current Data Parameters
NAME      150805dasz-59
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20150805
Time     19.48
INSTRUM  isa400
PROBHD   5 mm PABBO BB-
PULPROG  zg30
TD       65536
SOLVENT  CDCl3
NS       8
DS       2
SWH      8223.685 Hz
FIDRES   0.125483 Hz
AQ       3.9845889 sec
RG       128
DW       60.800 usec
DE       12.00 usec
TE       302.0 K
D1       1.00000000 sec
TD0      1

===== CHANNEL f1 =====
SFO1     400.1324710 MHz
NUC1     1H
P1       10.00 usec
PLW1     23.01399994 W

F2 - Processing parameters
SI       65536
SF       400.1300097 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
```



```
Current Data Parameters
NAME      150805dasz-59
EXPNO    5
PROCNO   1

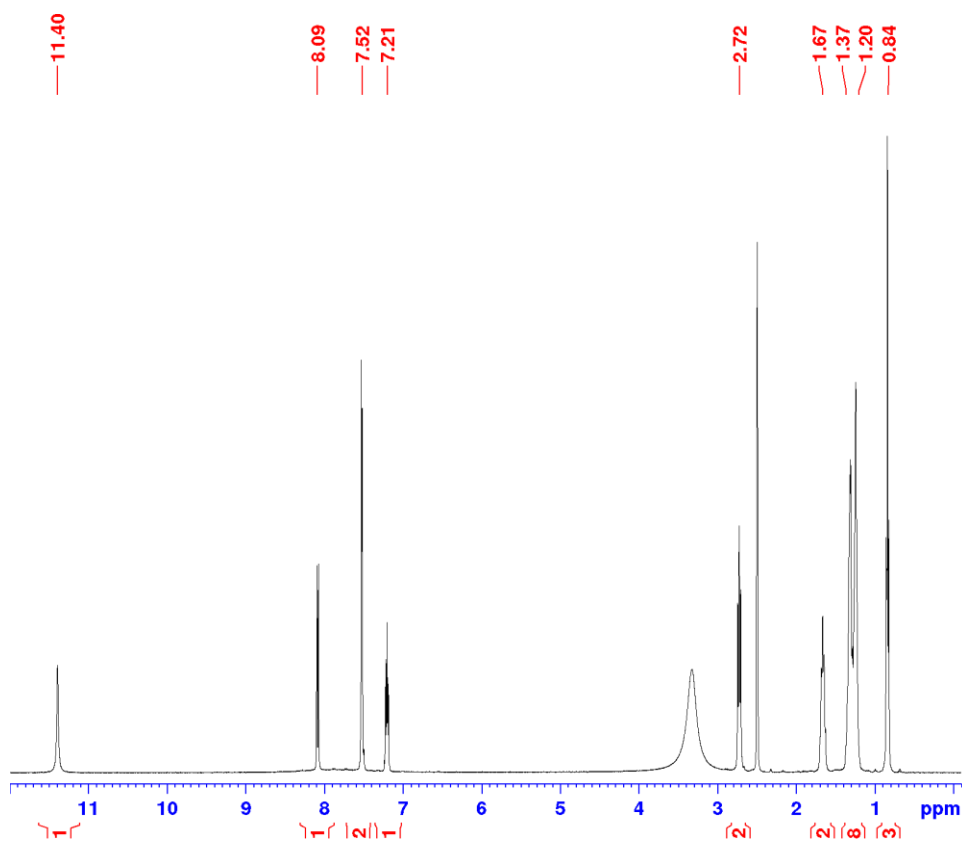
F2 - Acquisition Parameters
Date_    20150806
Time     23.19
INSTRUM  isa400
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD       65536
SOLVENT  CDCl3
NS       1024
DS       4
SWH      24038.461 Hz
FIDRES   0.366798 Hz
AQ       1.3631488 sec
RG       2050
DW       20.800 usec
DE       10.00 usec
TE       302.0 K
D1       2.00000000 sec
D11      0.03000000 sec
TD0      1

===== CHANNEL f1 =====
SFO1     100.6228298 MHz
NUC1     13C
P1       9.30 usec
PLW1     56.00000000 W

===== CHANNEL f2 =====
SFO2     400.1316005 MHz
NUC2     1H
CPDPRG[2] waltz16
PCPD2    90.00 usec
PLW2     23.00000000 W
PLW12    0.28395000 W
PLW13    0.23000000 W

F2 - Processing parameters
SI       32768
SF       100.6127546 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
```

¹H- and ¹³C-NMR spectra of **1** in DMSO-d₆

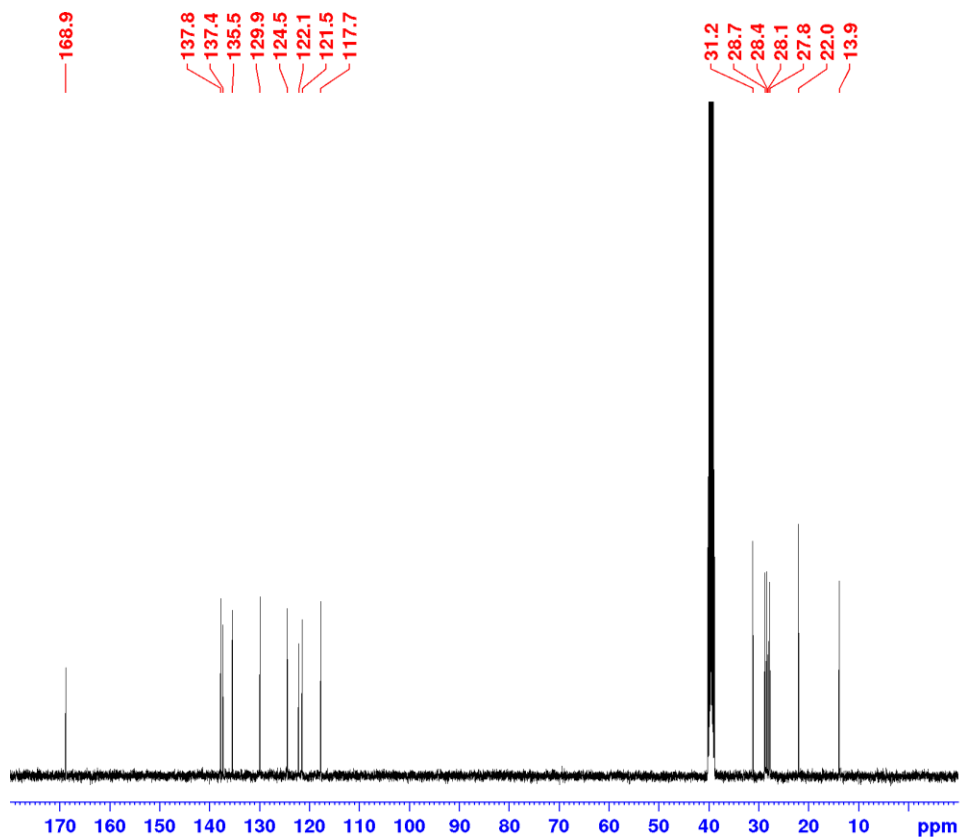


```
Current Data Parameters
NAME 150807dasz-18 (new)
EXPNO 1
PROCNO 1
```

```
F2 - Acquisition Parameters
Date_ 20150807
Time 20.28
INSTRUM isa400
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 8
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9845889 sec
RG 128
DW 60.800 usec
DE 12.00 usec
TE 302.1 K
D1 1.00000000 sec
TDO 1
```

```
===== CHANNEL f1 =====
SFO1 400.1324710 MHz
NUC1 1H
P1 10.00 usec
PLW1 23.01399994 W

F2 - Processing parameters
SI 65536
SF 400.1300054 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
```



```
Current Data Parameters
NAME 150807dasz-18 (new)
EXPNO 5
PROCNO 1
```

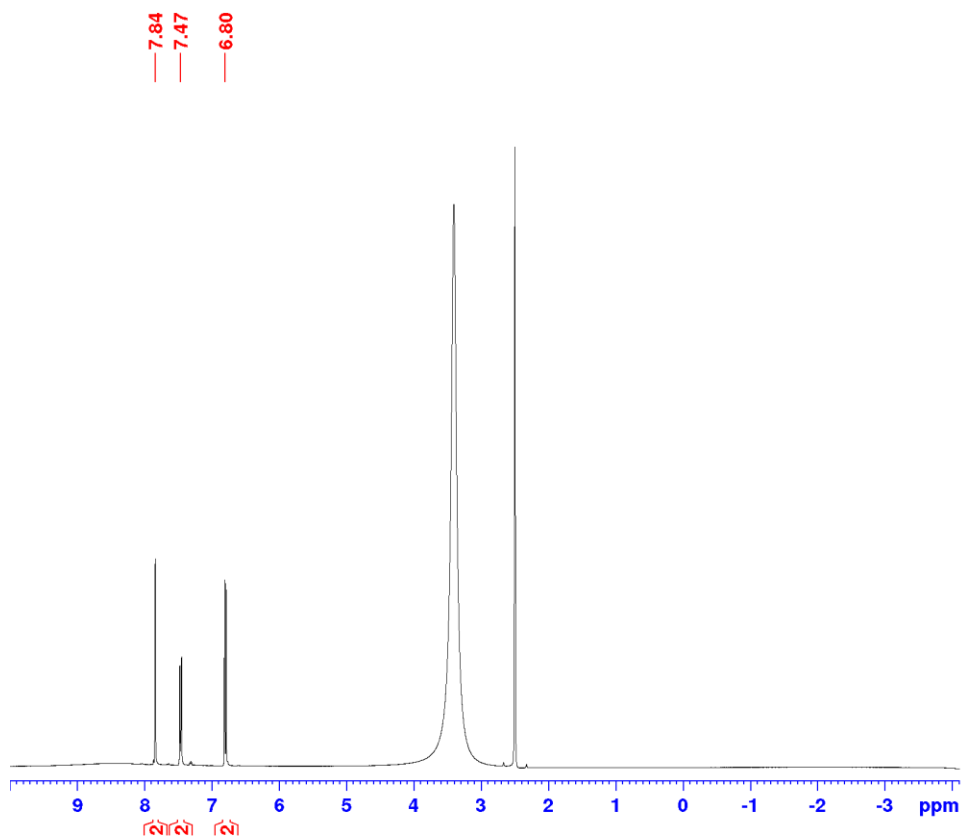
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F2 - Acquisition Parameters
Date_ 20150808
Time 12.06
INSTRUM isa400
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.366798 Hz
AQ 1.3631488 sec
RG 2050
DW 20.800 usec
DE 10.00 usec
TE 302.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TDO 1
```

```
===== CHANNEL f1 =====
SFO1 100.6228298 MHz
NUC1 13C
P1 9.30 usec
PLW1 56.00000000 W
```

```
===== CHANNEL f2 =====
SFO2 400.1316005 MHz
NUC2 1H
CPOPRG[2] waltz16
PCPD2 90.00 usec
PLW2 23.00000000 W
PLW12 0.28395000 W
PLW13 0.23000000 W
```

```
F2 - Processing parameters
SI 32768
SF 100.6128183 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
```


¹H- and ¹³C-NMR spectra of **5** in DMSO-d₆



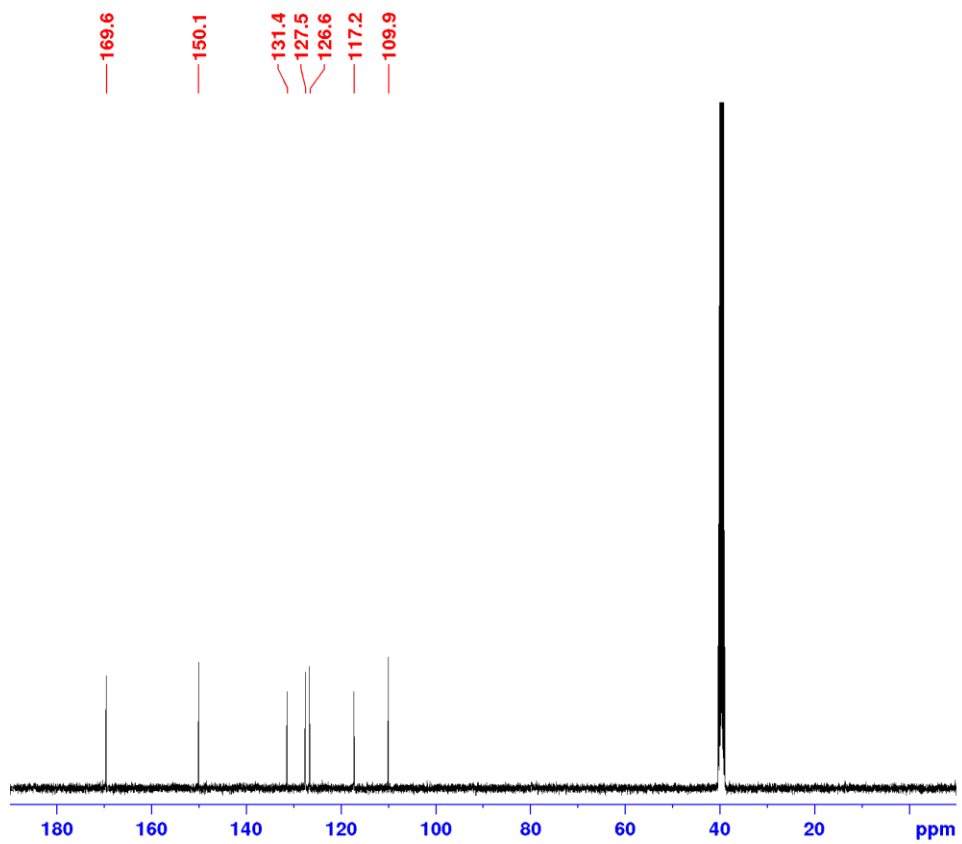
```

Current Data Parameters
NAME      170205dasz-17
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20170205
Time     16.30
INSTRUM  lsa400
PROBHD   5 mm PABBO BB-
PULPROG  zg30
TD       65536
SOLVENT  DMSO
NS       32
DS       2
SWH      8223.685 Hz
FIDRES   0.125483 Hz
AQ       3.9845889 sec
RG       90.5
DW       60.800 usec
DE       10.00 usec
TE       300.0 K
D1       1.00000000 sec
TDO     1

===== CHANNEL f1 =====
SFO1    400.1324710 MHz
NUC1     1H
P1      12.50 usec
PLW1    23.01399994 W

F2 - Processing parameters
SI       65536
SF       400.1300036 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
    
```



```

Current Data Parameters
NAME      170205dasz-17
EXPNO    5
PROCNO   1

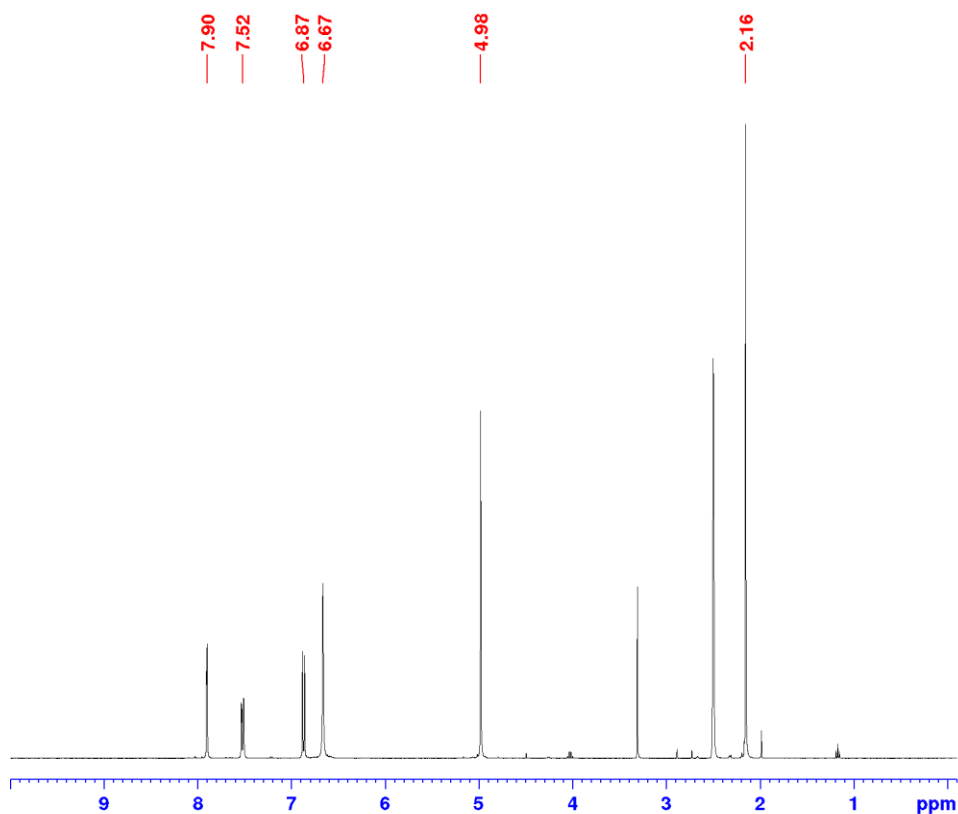
F2 - Acquisition Parameters
Date_    20170206
Time     5.44
INSTRUM  lsa400
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD       65536
SOLVENT  DMSO
NS       1024
DS       4
SWH      24038.461 Hz
FIDRES   0.366798 Hz
AQ       1.3631488 sec
RG       2050
DW       20.800 usec
DE       10.00 usec
TE       300.0 K
D1       2.00000000 sec
D11     0.03000000 sec
TDO     1

===== CHANNEL f1 =====
SFO1    100.6228298 MHz
NUC1     13C
P1       9.25 usec
PLW1    56.00000000 W

===== CHANNEL f2 =====
SFO2    400.1316005 MHz
NUC2     1H
CPDPRG[2] waltz16
PCPD2   90.00 usec
PLW2    23.00000000 W
PLW12   0.44367000 W
PLW13   0.22316000 W

F2 - Processing parameters
SI       32768
SF       100.6128098 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
    
```

¹H- and ¹³C-NMR spectra of **6** in DMSO-d₆

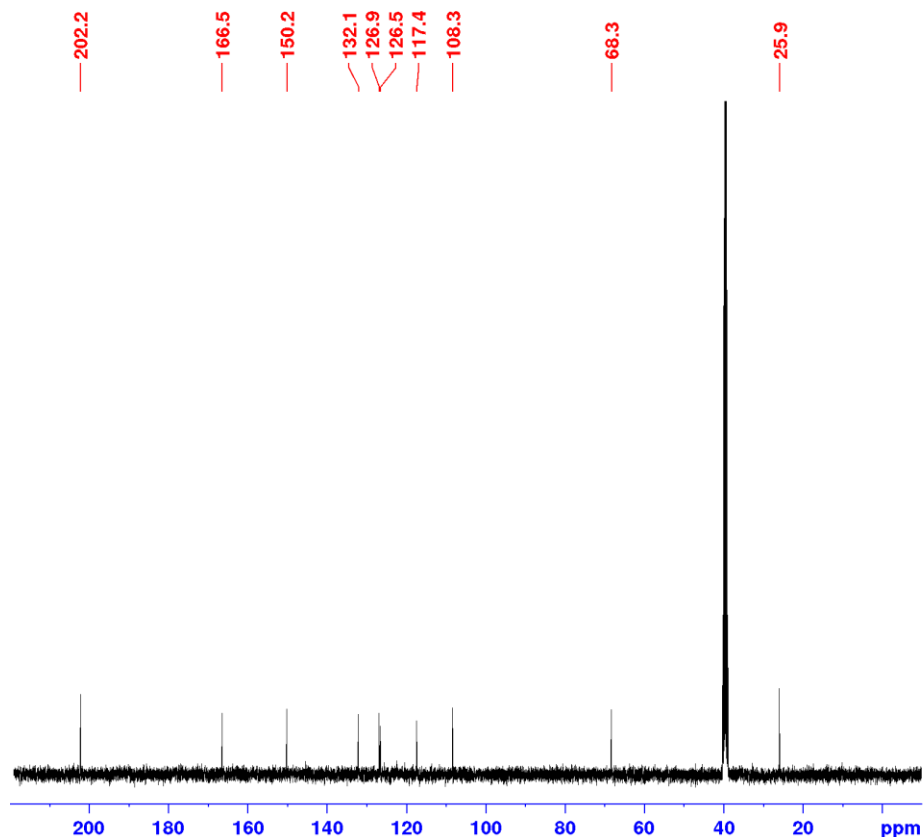


```
Current Data Parameters
NAME      170206dasz-54
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20170206
Time     20.34
INSTRUM  1s4400
PROBHD   5 mm PABBO B5-
PULPROG  zg30
TD        65536
SOLVENT  DMSO
NS        8
DS        2
SWH       8223.665 Hz
FIDRES    0.125463 Hz
AQ        3.9645889 sec
RG        287
DW        60.800 usec
DE        10.00 usec
TE        300.1 K
D1        1.00000000 sec
TD0       1

----- CHANNEL f1 -----
SFO1     400.1324710 MHz
NUC1      1H
P1        12.50 usec
PLW1     23.01399994 W

F2 - Processing parameters
SI        65536
SF        400.1300036 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
```



```
Current Data Parameters
NAME      170206dasz-54
EXPNO    3
PROCNO   1

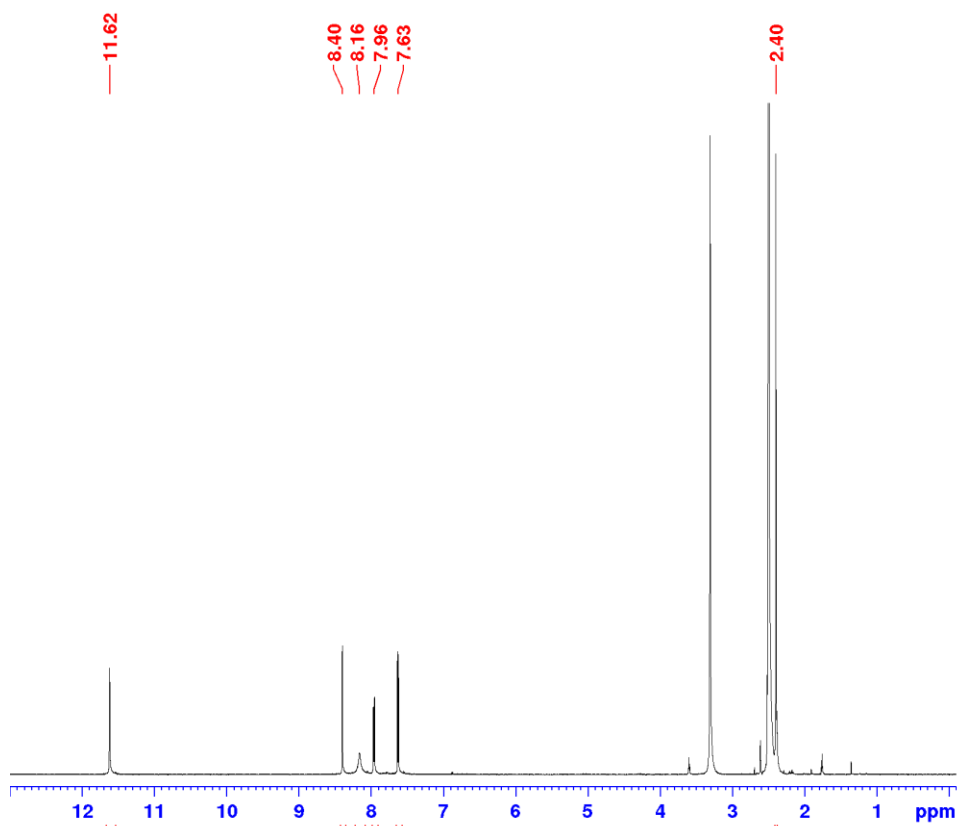
F2 - Acquisition Parameters
Date_    20170206
Time     20.47
INSTRUM  1s4400
PROBHD   5 mm PABBO B5-
PULPROG  zgpg30
TD        65536
SOLVENT  DMSO
NS        128
DS        4
SWH       24038.461 Hz
FIDRES    0.366798 Hz
AQ        1.3631488 sec
RG        2050
DW        20.800 usec
DE        10.00 usec
TE        300.0 K
D1        2.00000000 sec
D11       0.03000000 sec
TD0       1

----- CHANNEL f1 -----
SFO1     100.6228298 MHz
NUC1      13C
P1        9.25 usec
PLW1     56.00000000 W

===== CHANNEL f2 =====
SFO2     400.1316005 MHz
NUC2      1H
CPDPRG[2] waltz16
PCPD2    90.00 usec
PLN2     23.00000000 W
PLN12    0.44367000 W
PLN13    0.22316000 W

F2 - Processing parameters
SI        32768
SF        100.6128192 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
```

¹H- and ¹³C-NMR spectra of **2** in DMSO-d₆

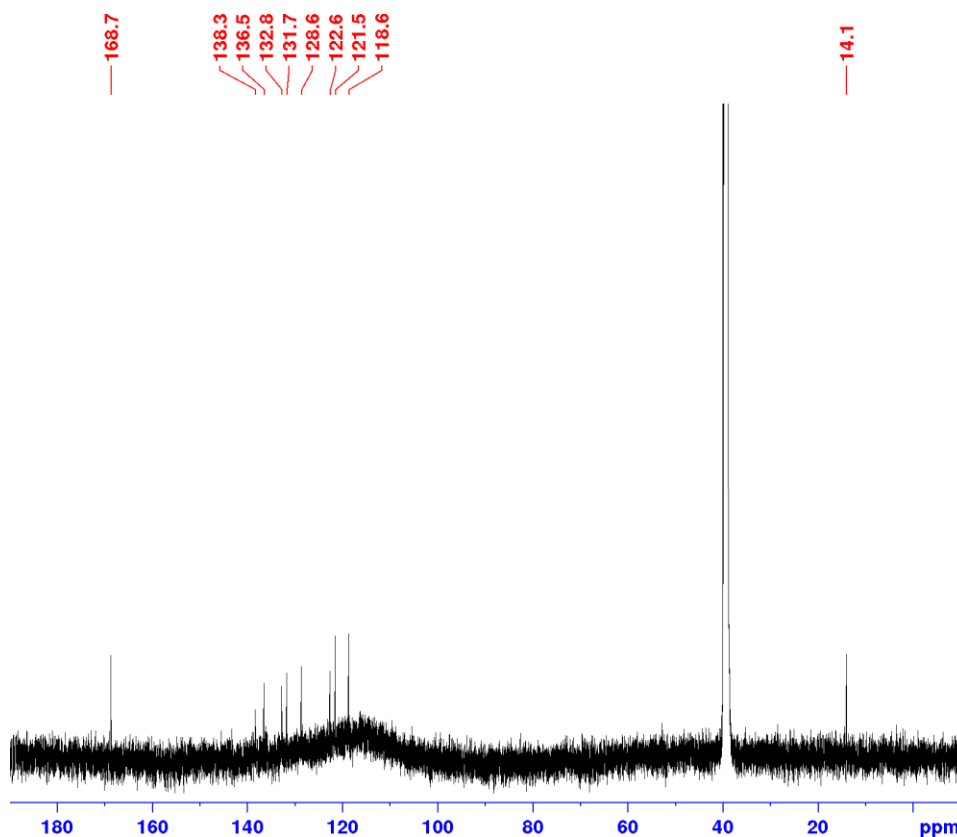


```

Current Data Parameters
NAME      170213-dasz-NB117
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20170213
Time     15.58 h
INSTRUM spect
PROBHD   Z865401_0004 (
PULPROG zg30
TD       65536
SOLVENT  DMSO
NS       16
DS       2
SWH      12019.230 Hz
FIDRES   0.366798 Hz
AQ       2.7262976 sec
RG       287
DW       41.600 usec
DE       11.00 usec
TE       300.0 K
D1       1.00000000 sec
TDO      1
SFO1     600.1737060 MHz
NUC1     1H
P1       10.31 usec
PLW1     10.00000000 W

F2 - Processing parameters
SI       65536
SF       600.1700047 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
    
```



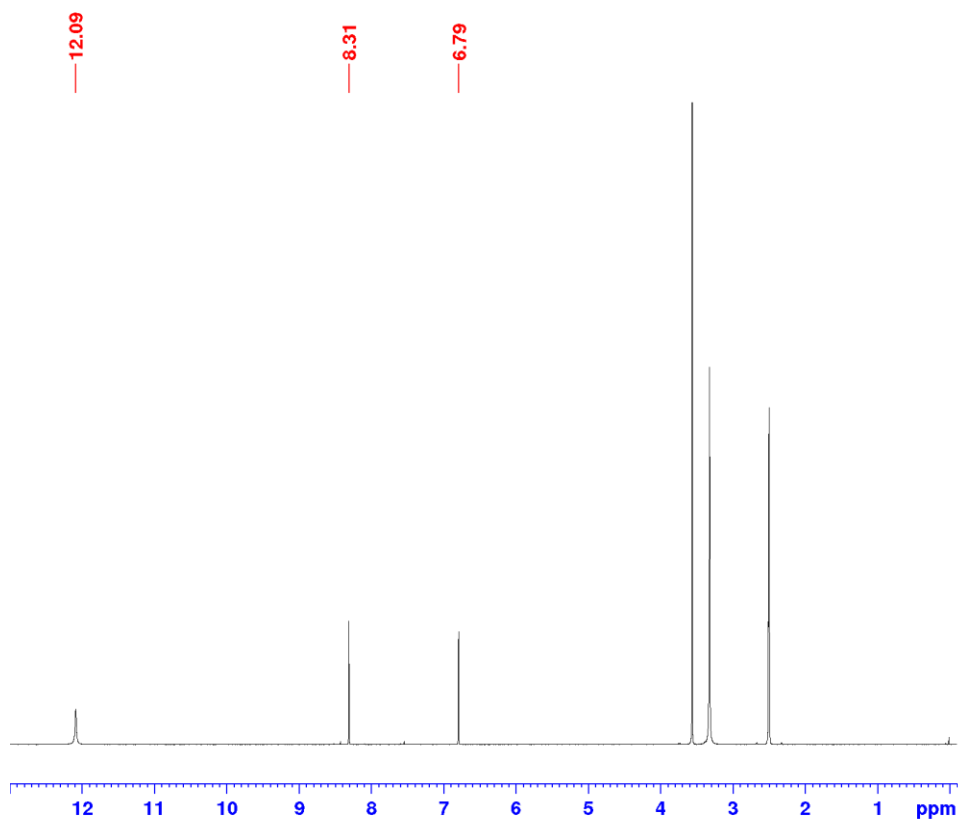
```

Current Data Parameters
NAME      170213-dasz-NB117
EXPNO    4
PROCNO   1

F2 - Acquisition Parameters
Date_    20170214
Time     8.21 h
INSTRUM spect
PROBHD   Z865401_0004 (
PULPROG zgpg30
TD       65536
SOLVENT  DMSO
NS       15416
DS       4
SWH      36057.691 Hz
FIDRES   1.100393 Hz
AQ       0.9087659 sec
RG       2050
DW       13.867 usec
DE       11.00 usec
TE       300.0 K
D1       2.00000000 sec
D11      0.03000000 sec
TDO      1
SFO1     150.9279571 MHz
NUC1     13C
P1       14.50 usec
PLW1     132.00000000 W
SFO2     600.1724007 MHz
NUC2     1H
CPDPRG[2] waltz16
PCPD2    70.00 usec
PLW2     10.00000000 W
PLW12    0.21693000 W
PLW13    0.10911000 W

F2 - Processing parameters
SI       32768
SF       150.9129419 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
    
```

¹H- and ¹³C-NMR spectra of **7a** in DMSO-d₆

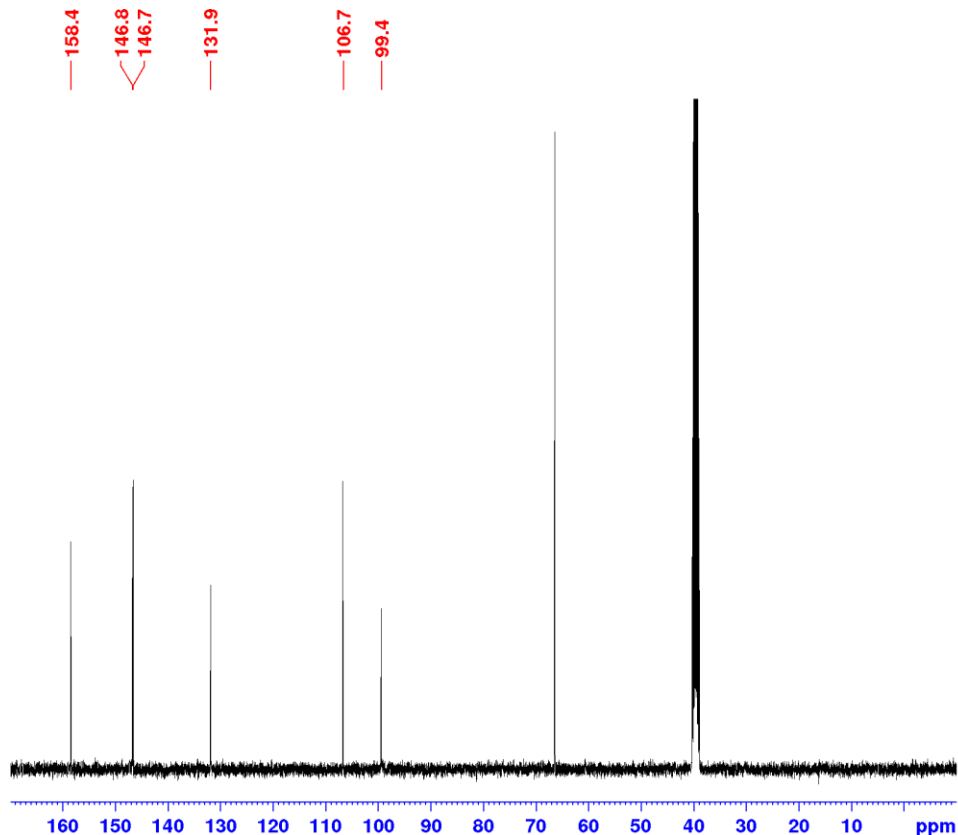


```

Current Data Parameters
NAME      190726dasz-1
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20190726
Time     14.23 h
INSTRUM  isa400
PROBHD   Z863001_0018 (
PULPROG  zg30
TD        65536
SOLVENT  DMSO
NS        8
DS        2
SWH       8223.685 Hz
FIDRES    0.250967 Hz
AQ        3.9845889 sec
RG        456
DW        60.800 usec
DE        16.26 usec
TE        300.0 K
D1        1.00000000 sec
TDO       1
SFO1     400.1324710 MHz
NUC1      1H
P1        12.90 usec
PLW1     16.00000000 W

F2 - Processing parameters
SI        65536
SF        400.1300031 MHz
WDW       EM
SSB       0
LB        0.30 Hz
GB        0
PC        1.00
    
```



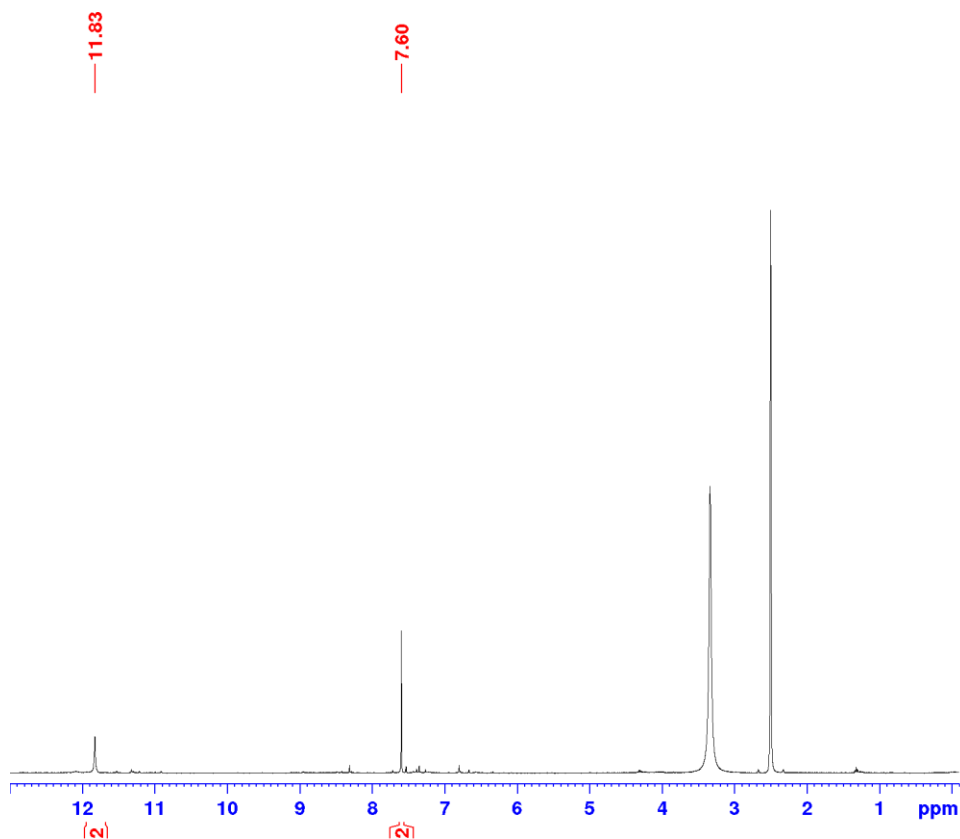
```

Current Data Parameters
NAME      190726dasz-1
EXPNO    5
PROCNO   1

F2 - Acquisition Parameters
Date_    20190727
Time     3.19 h
INSTRUM  isa400
PROBHD   Z863001_0018 (
PULPROG  zgpg30
TD        65536
SOLVENT  DMSO
NS        1024
DS        4
SWH       24038.461 Hz
FIDRES    0.733596 Hz
AQ        1.3631488 sec
RG        2050
DW        20.800 usec
DE        12.38 usec
TE        300.0 K
D1        2.00000000 sec
D11       0.03000000 sec
TDO       1
SFO1     100.6228298 MHz
NUC1      13C
P1        9.00 usec
PLW1     56.00000000 W
SFO2     400.1316005 MHz
NUC2      1H
CPDPRG[2] waltz16
PCPD2    90.00 usec
PLW2     16.00000000 W
PLW12    0.32870999 W
PLW13    0.16534001 W

F2 - Processing parameters
SI        32768
SF        100.6128162 MHz
WDW       EM
SSB       0
LB        1.00 Hz
GB        0
PC        1.40
    
```

¹H- and ¹³C-NMR spectra of **7b** in DMSO-d₆

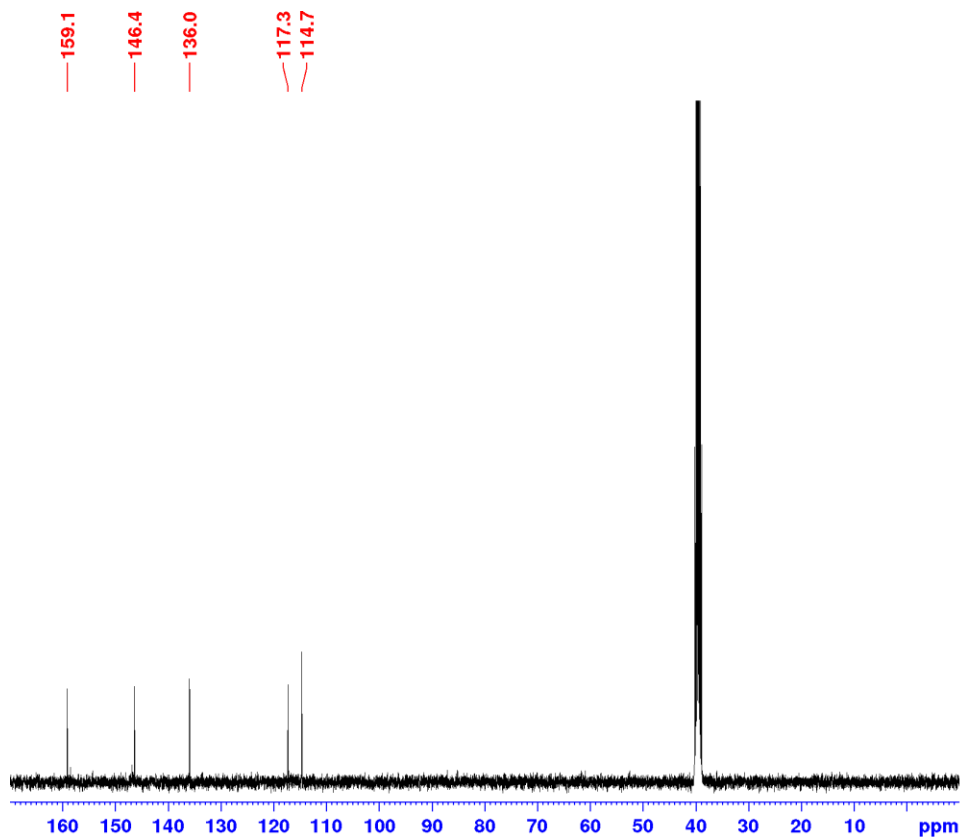


```

Current Data Parameters
NAME      190726dasz-2
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20190726
Time     14.28 h
INSTRUM  isa400
PROBHD   Z863001_0018 (
PULPROG  zg30
TD       65536
SOLVENT  DMSO
NS       8
DS       2
SWH      8223.685 Hz
FIDRES   0.250967 Hz
AQ       3.9845889 sec
RG       512
DM       60.800 usec
DE       16.26 usec
TE       300.0 K
D1       1.00000000 sec
TDO      1
SFO1     400.1324710 MHz
NUC1     1H
P1       12.90 usec
PLW1     16.00000000 W

F2 - Processing parameters
SI       65536
SF       400.1300033 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
    
```



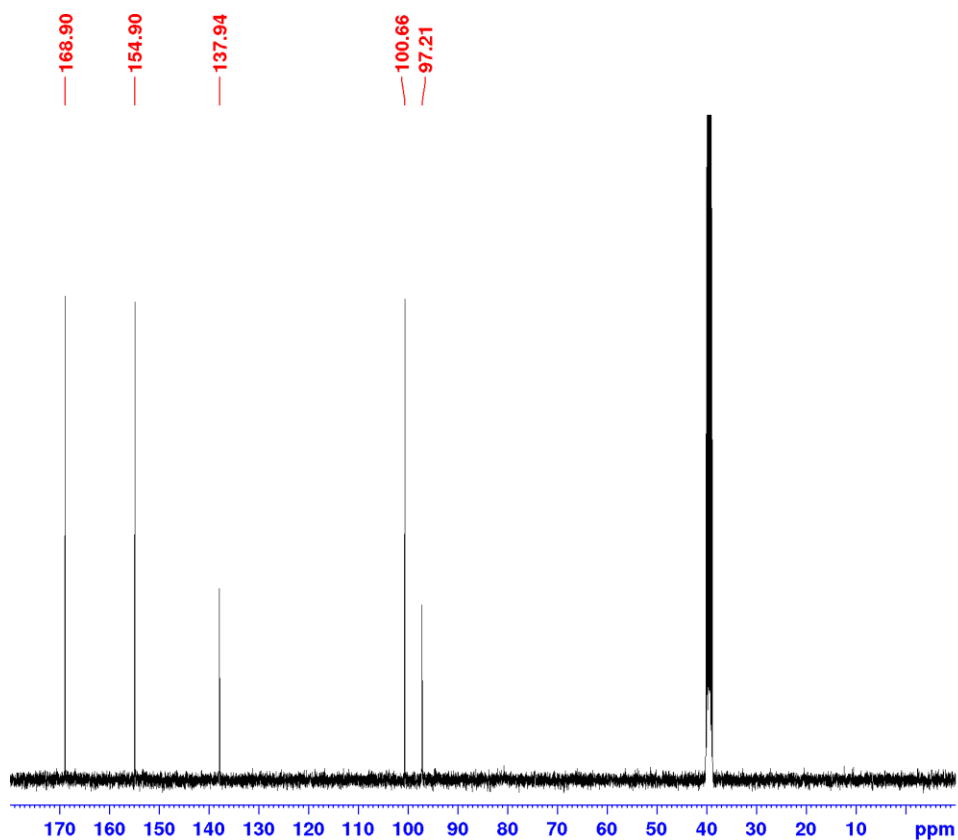
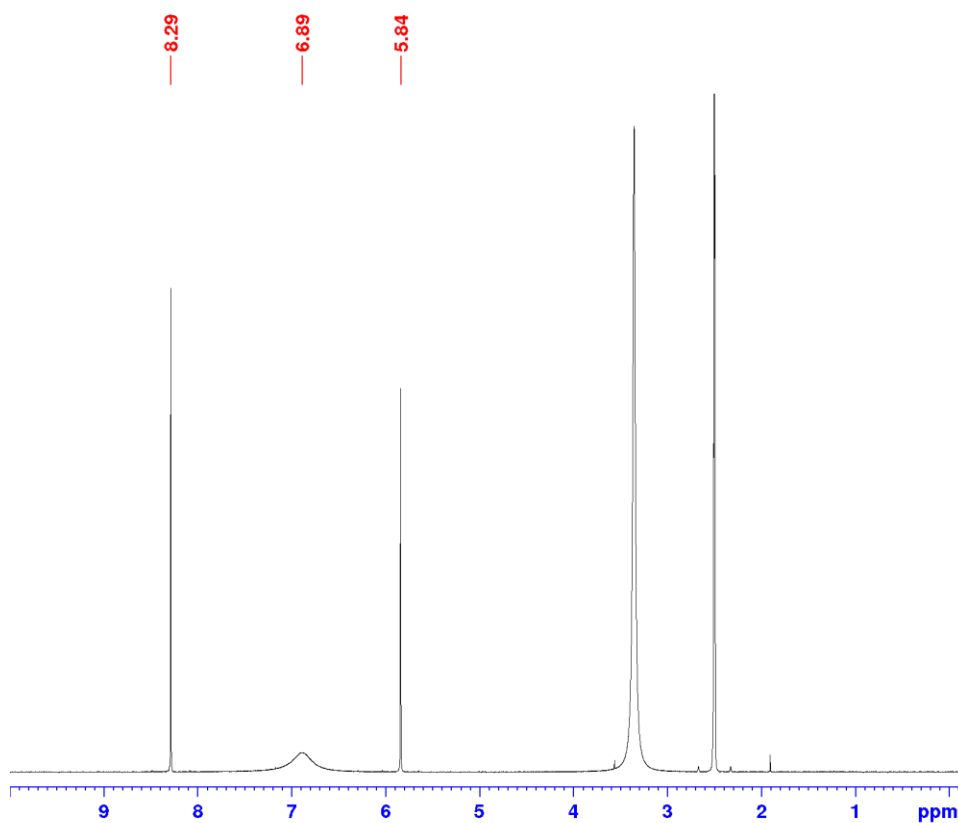
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Current Data Parameters
NAME      190726dasz-2
EXPNO    5
PROCNO   1

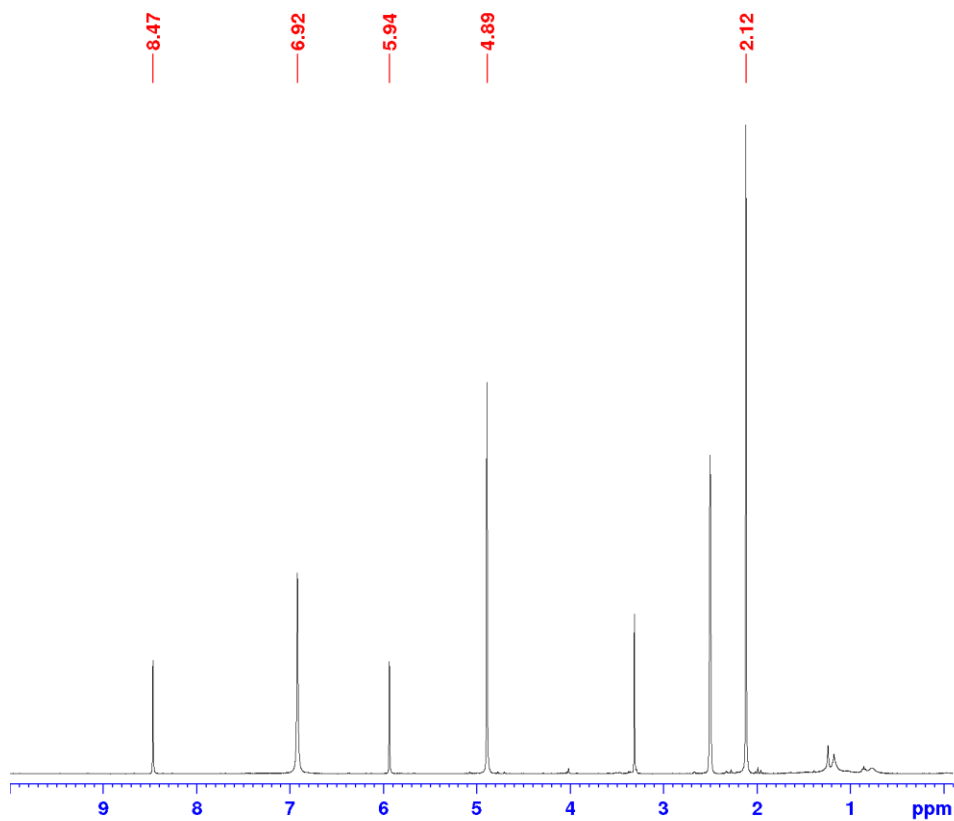
F2 - Acquisition Parameters
Date_    20190727
Time     5.02 h
INSTRUM  isa400
PROBHD   Z863001_0018 (
PULPROG  zgpg30
TD       65536
SOLVENT  DMSO
NS       1024
DS       4
SWH      24038.461 Hz
FIDRES   0.733596 Hz
AQ       1.3631488 sec
RG       2050
DM       20.800 usec
DE       12.38 usec
TE       300.0 K
D1       2.00000000 sec
D11      0.03000000 sec
TDO      1
SFO1     100.6228298 MHz
NUC1     13C
P1       9.00 usec
PLW1     56.00000000 W
SFO2     400.1316005 MHz
NUC2     1H
CPDPRG[2] waltz16
PCPD2    90.00 usec
PLW2     16.00000000 W
PLW12    0.32870999 W
PLW13    0.16534001 W

F2 - Processing parameters
SI       32768
SF       100.6128114 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
    
```

^1H - and ^{13}C -NMR spectra of **8** in DMSO-d_6



¹H- and ¹³C-NMR spectra of **9** in DMSO-d₆

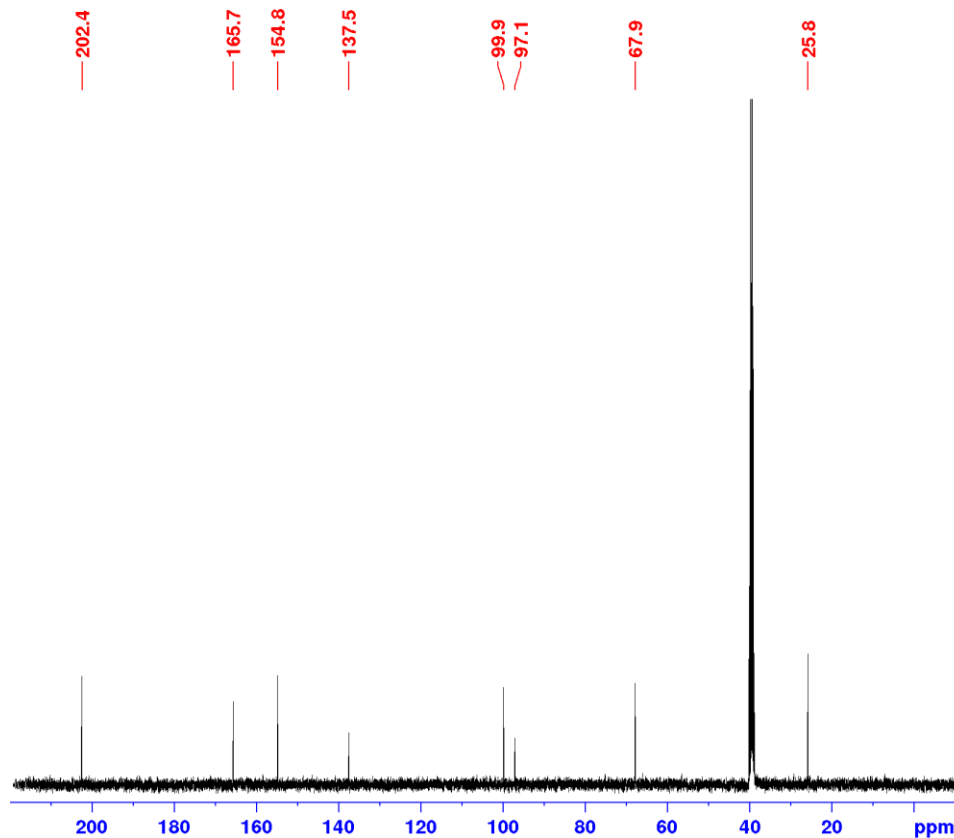


```
Current Data Parameters
NAME      170123badu-60
EXPNO    1
PROCNO   1

F2 - Acquisition Parameters
Date_    20170123
Time     14.42
INSTRUM  isa400
PROBHD   5 mm PABBO BB-
PULPROG  zg30
TD       65536
SOLVENT  DMSO
NS       8
DS       2
SWH      8223.685 Hz
FIDRES   0.125483 Hz
AQ       3.9845889 sec
RG       406
DW       60.800 usec
DE       10.00 usec
TE       300.1 K
D1       1.0000000 sec
TDO      1

===== CHANNEL f1 =====
SFO1     400.1324710 MHz
NUC1     1H
P1       12.50 usec
PLW1     23.01399994 W

F2 - Processing parameters
SI       65536
SF       400.1300033 MHz
WDW      EM
SSB      0
LB       0.30 Hz
GB       0
PC       1.00
```



```
Current Data Parameters
NAME      170123badu-60
EXPNO    2
PROCNO   1

F2 - Acquisition Parameters
Date_    20170123
Time     14.51
INSTRUM  isa400
PROBHD   5 mm PABBO BB-
PULPROG  zgpg30
TD       65536
SOLVENT  DMSO
NS       128
DS       4
SWH      24038.461 Hz
FIDRES   0.366798 Hz
AQ       1.3631488 sec
RG       2050
DW       20.800 usec
DE       10.00 usec
TE       300.0 K
D1       2.0000000 sec
D11      0.03000000 sec
TDO      1

===== CHANNEL f1 =====
SFO1     100.6228298 MHz
NUC1     13C
P1       9.25 usec
PLW1     56.00000000 W

===== CHANNEL f2 =====
SFO2     400.1316005 MHz
NUC2     1H
CPDPRG[2] waltz16
PCPD2    90.00 usec
PLW2     23.00000000 W
PLW12    0.44367000 W
PLW13    0.22316000 W

F2 - Processing parameters
SI       32768
SF       100.6128185 MHz
WDW      EM
SSB      0
LB       1.00 Hz
GB       0
PC       1.40
```

¹H- and ¹³C-NMR spectra of **3** in DMSO-d₆

