Supporting Information

Transition Metal-Free Rongalite-Mediated Geminal C(sp^3)–*H* Functionalization of Fluorenes

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1. General information: All chemicals and solvents were purchased from Alfa Aesar, Spectrochem, SRL, Finar and used as received. Fluorene derivatives, rongalite and potassium carbonate is purchased from Sisco Research Laboratories Pvt. Ltd. Some of the fluorene derivatives **1c-d**[1], **1f**[2], **1o**[3], **1q-s**[4], **1t**[5] & **1u**[6] were prepared by following the literature reports. The conformation of the reactions was monitored using analytical on Thin Layer Chromatography (TLC) Merck silica gel G/GF 254 plates and used UV-Cabinet for visualization of compound spots on TLC plate. Purification of compounds using column chromatography was performed with the Rankem silica gel (60-120 mesh. Finding the melting points of solid compounds was determined by open capillaries using Stuart SMP30 melting point apparatus and is uncorrected. NMR (^{1}H, ^{13}C and ^{19}F) spectra of all the synthesized compounds were recorded on a Bruker AVANCE HD (400 MHz, 100 MHz, and 376 MHz) spectrometer using $CDCl_3$ and DMSO-d_6 as solvents and TMS as an internal standard. The data of the compounds was recorded as chemical shifts (δ ppm) (multiplicity, coupling constant (Hz), integration). Abbreviations for the multiplicity as follows: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, dd = doublet of doublet. The mass spectrum analysis was recorded in Bruker- micro-TOF MS analyser 2.

2. General Procedures

2.1 General Procedure for synthesis of (9-methyl-9*H*-fluoren-9-yl) methanol (3a-3u). An oven dried 10 mL reaction flask equipped with a magnetic stirring bar was charged with appropriate fluorene derivatives 1 (0.6 mmol), rongalite 2 (2.1 mmol), K_2CO_3 (1.8 mmol) and DMSO (2 mL). The mixture was stirred at 100 °C for the appropriate time (6 h). The progress of the reaction was monitored by TLC using hexanes and ethyl acetate as an eluent. After completion of reaction, reaction mixture was extracted with ethyl acetate (3 x 10 mL). The organic layers were separated, dried (Na_2SO_4) and evaporated to give a residue that was purified on a short pad of silica gel by column chromatography using ethyl acetate and hexanes (10/90) as an eluent.

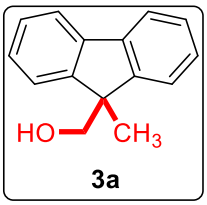
2.2 Procedure for synthesis of (9-methyl-9*H*-fluoren-9-yl)methyl 2-(4-isobutylphenyl)propanoate (4).[7] To the oven-dried round bottom flask equipped with a magnetic stir bar were added 9-Methyl-9*H*-fluoren-9-yl)methanol (100 mg, 0.47 mmol), ibuprofen (147 mg, 0.71 mmol), *N*,*N*-dimethylaminopyridine (DMAP) (116 mg, 0.95 mmol), dicyclohexylcarbodiimide (DCC) (117 mg, 0.57 mmol, 1.2 equiv.) and 2 mL of CH_2Cl_2. The

resulting reaction mixture was stirred at room temperature. The progress of the reaction was monitored by TLC. After the completion of the reaction (3 h), the reaction mixture was washed with water and extracted with EtOAc. The combined organic layers were washed with brine, dried with anhydrous Na_2SO_4, and concentrated under a vacuum. The crude product was purified by silica gel column chromatography (eluent: petroleum ether/EtOAc = 9.5:0.5, v/v) to afford 4-acetylphenyl 2-(4-isobutylphenyl) propanoate 4 as a white solid 108 mg, 89% yield.

2.3 Procedure for synthesis of 9*H*-fluorene-9-carbaldehyde (5).[8] To a solution of (9-methylfluoren-9-yl)methanol (100 mg, 0.47 mmol) in CH_2Cl_2 (2 mL) was added PCC (204 mg, 0.95 mmol) at 0 °C. The reaction progress was monitored by TLC. Upon completion (60 min), the solvent was removed under reduced pressure, the crude residue was purified by column chromatography on silica gel (petroleum ether/ethyl acetate, 95:5) to afford the desired product as a white solid (78 mg, 79% yield).

3. Spectral data of Products 3a-3u

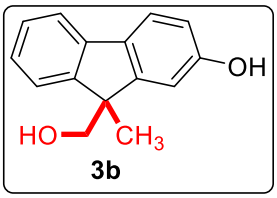
9-Methyl-9*H*-fluoren-9-yl) methanol (3a). White crystalline powder; Yield: 104 mg, 82%;



3a

mp: 123−124 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.82 (d, J = 7.2 Hz, 2H), 7.56 (d, J = 7.2 Hz, 2H), 7.35 (t, J = 7.2 Hz, 2H), 7.30 (t, J = 7.2 Hz, 2H), 4.99 (s, 1H), 3.54 (s, 2H), 1.45 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 150.9, 140.0, 127.5, 127.4, 124.4, 120.3, 68.5, 52.4, 21.8; HRMS (ESI) m/z: [M+Na]$^+$ calcd for $C_{15}H_{14}NaO$: 233.0942; found: 233.0947.

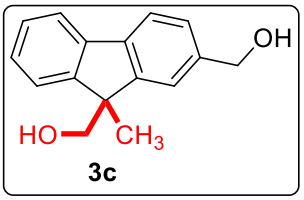
9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-ol (3b). White crystalline solid; Yield: 111 mg,



3b

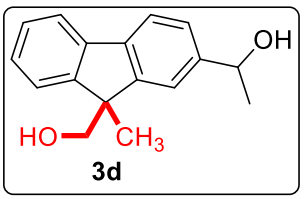
89%; mp: 157−158 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 20:80); ^{1}H NMR (400 MHz, DMSO-d_6) δ 9.44 (s, 1H), 7.62 (dd, J = 19.8, 7.8 Hz, 2H), 7.46 (d, J = 7.6 Hz, 1H), 7.28 (t, J = 7.4 Hz, 1H), 7.17 (t, J = 7.2 Hz, 1H), 6.95 (d, J = 2.4 Hz, 1H), 6.75 (dd, J = 8.2, 2.4 Hz, 1H), 4.97 (t, J = 5.4 Hz, 1H), 3.51 (dd, J = 10.4, 5.2 Hz, 1H), 3.43 (dd, J = 10.4, 5.2 Hz, 1H), 1.39 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 157.5, 152.8, 150.1, 140.4, 131.1, 127.4, 125.7, 124.1, 121.1, 119.1, 114.6, 111.7, 68.6, 52.2, 22.0; HRMS (ESI) *m/z*: [M+Na]$^+$ calcd for $C_{15}H_{14}NaO_2$: 249.0891; found: 249.0847.

(9-Methyl-9*H*-fluorene-2,9-diyl)dimethanol (3c). White crystalline solid; Yield: 104 mg, 85%; mp: 152−153 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 20:80); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.81 – 7.75 (m, 2H), 7.56 – 7.51 (m, 2H), 7.37 – 7.25 (m, 3H), 5.21 (t, J = 5.6 Hz, 1H), 4.99 (t, J = 5.2 Hz, 1H), 4.57 (d, J = 5.8 Hz, 2H), 3.52 (s, 2H), 1.44 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 155.7, 155.6, 146.7, 144.8, 143.4, 132.3, 131.9, 130.8, 129.2, 127.4, 124.9, 124.7, 73.3, 68.5, 57.1, 26.7; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{16}H_{16}NaO_2$: 263.1048; found: 263.1055.



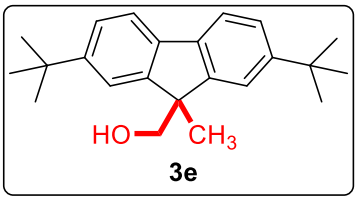
3c

1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-ol (3d). White crystalline solid; Yield: 105 mg, 87%; mp: 114−115 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 20:80, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.77 (dd, J = 12, 8.0 Hz, 2H), 7.54 (d, J = 8.0 Hz, 2H), 7.36 – 7.32 (m, 2H), 7.27 (td, J = 7.2, 1.6 Hz, 1H), 5.17 (dd, J = 4.4, 3.2 Hz, 1H), 4.98 (q, J = 5.2 Hz, 1H), 4.82 – 4.75 (m, 1H), 3.56 – 3.48 (m, 2H), 1.44 (d, J = 1.6 Hz, 3H), 1.38 (d, J = 7.2 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 151.0, 150.7, 146.9, 140.0, 138.5, 127.5, 127.0, 124.9, 124.4, 121.3, 120.1, 119.8, 68.9, 68.6, 52.3, 26.5, 21.9; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{17}H_{18}NaO_2$: 277.1204; found: 277.1214.



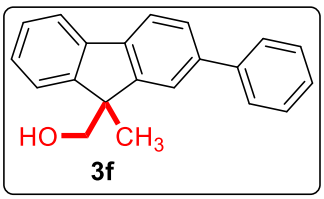
3d

(2,7-Di-tert-butyl-9-methyl-9*H*-fluoren-9-yl)methanol (3e). Pale yellow colour solid; Yield: 63 mg, 67%; mp: 143−144 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.65 (d, J = 8 Hz, 2H), 7.56 (d, J = 1.6 Hz, 2H), 7.36 (dd, J = 8, 1.8 Hz, 2H), 4.98 – 4.90 (m, 1H), 3.53 (d, J = 5.2 Hz, 2H), 1.45 (s, 3H), 1.34 (s, 18H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 150.9, 149.6, 137.3, 123.9, 120.9, 119.4, 68.7, 52.4, 35.0, 31.8, 22.1; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{23}H_{30}NaO$: 345.2194; found: 345.2207.



3e

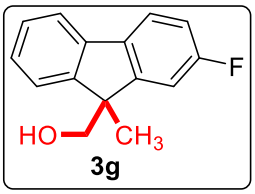
(9-Methyl-2-phenyl-9*H*-fluoren-9-yl)methanol (3f). White semiliquid; Yield: 94 mg, 80%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.91 (dd, J = 8, 0.6 Hz, 1H), 7.87 – 7.84 (m, 2H), 7.75 – 7.72 (m, 2H), 7.66 (dd, J = 8, 1.8 Hz, 1H), 7.58 (dt,



3f

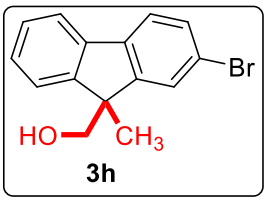
J = 7.2, 0.8 Hz, 1H), 7.52 – 7.47 (m, 2H), 7.38 (td, J = 7.6, 1.2 Hz, 2H), 7.32 (td, J = 7.2, 1.2 Hz, 1H), 5.03 (t, J = 5.4 Hz, 1H), 3.65 – 3.57 (m, 2H), 1.51 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, DMSO-d_6) δ 151.7, 151.2, 141.1, 139.7, 139.5, 139.4, 129.3, 127.7, 127.6, 127.5, 127.2, 126.3, 124.4, 122.8, 120.8, 120.5, 68.5, 52.6, 21.8; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{21}H_{18}NaO$: 309.1255; found: 309.1265.

(2-Fluoro-9-methyl-9*H*-fluoren-9-yl)methanol (3g). Pale yellow colour semiliquid; Yield: 113 mg, 84%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^1H NMR (400 MHz, DMSO-d_6) δ 7.87 – 7.79 (m, 2H), 7.56 – 7.52 (m, 1H), 7.41 – 7.26 (m, 3H), 7.18 (ddd, J = 9.6, 8.2, 2.4 Hz, 1H), 5.03 (t, J = 5.2 Hz, 1H), 3.61 (dd, J = 10.4, 5.4 Hz, 1H), 3.51 (dd, J = 10.2, 5.6 Hz, 1H), 1.44 (s, 3H). ^{19}F NMR (376 MHz, DMSO-d_6) δ 115.01; $^{13}C\{^1H\}$ NMR (100 MHz, DMSO-d_6) δ 163.5 (d,$^1J_{C\text{-}F}$ = 240 Hz), 153.5, (d,$^3J_{C\text{-}F}$ = 8 Hz), 150.7, 139.2, 136.3, 127.7, 127.1, 124.2, 121.7, (d,$^3J_{C\text{-}F}$ = 8 Hz), 120.2, 114.6, (d,$^2J_{C\text{-}F}$ = 23 Hz), 112.0, (d,$^2J_{C\text{-}F}$ = 23 Hz) , 68.2, 52.8, 21.6; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{15}H_{13}FNaO$: 251.0848; found: 251.0859.



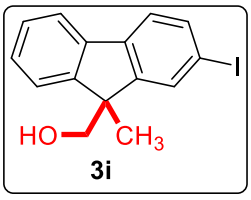
3g

(2-Bromo-9-methyl-9*H*-fluoren-9-yl) methanol (3h). White powder; Yield: 102 mg, 88%; mp: 83−84 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^1H NMR (400 MHz, DMSO-d_6) δ 7.89 – 7.72 (m, 3H), 7.54 (p, J = 5.4 Hz, 2H), 7.34 (h, J = 7.4 Hz, 2H), 5.06 (d, J = 11.1 Hz, 1H), 3.64 (q, J = 8.3 Hz, 1H), 3.53 – 3.45 (m, 1H), 1.43 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, DMSO-d_6) δ 153.4, 150.5, 139.4, 139.0, 130.4, 127.9, 127.8, 127.6, 124.3, 122.2, 120.6, 120.5, 68.1, 52.9, 21.6; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{15}H_{13}BrNaO$: 311.0047; found: 311.0056.



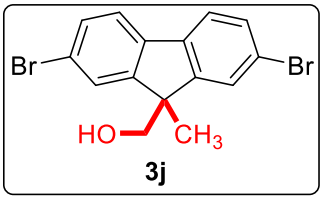
3h

(2-Iodo-9-methyl-9*H*-fluoren-9-yl) methanol (3i). Pale yellow colour semiliquid; Yield: 99 mg, 86%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^1H NMR (400 MHz, DMSO-d_6) δ 7.92 (d, J = 15.6 Hz, 1H), 7.82 (q, J = 6.6 Hz, 1H), 7.74 – 7.61 (m, 2H), 7.53 (q, J = 6.7 Hz, 1H), 7.34 (p, J = 6.5 Hz, 2H), 5.06 – 4.98 (m, 1H), 3.61 (dq, J = 10.4, 5.1 Hz, 1H), 3.47 (t, J = 7.2 Hz, 1H), 1.41 (d, J = 14.3 Hz, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, DMSO-d_6) δ 153.4, 150.3, 139.8, 139.1, 136.2, 133.3, 128.0, 127.7, 124.2, 122.5, 120.6, 93.4, 68.1, 52.8, 40.6, 40.4, 40.1, 39.9, 39.7, 39.5, 39.3, 21.6; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{15}H_{13}INaO$: 358.9909; found: 358.9927.



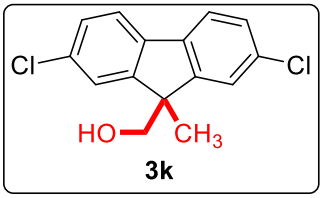
3i

(2,7-Dibromo-9-methyl-9*H*-fluoren-9-yl)methanol (3j). White crystalline solid; Yield: 98 mg, 85%; mp: 171−172 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.93 (d, J = 1.6 Hz, 1H), 7.79 (d, J = 8.4 Hz, 1H), 7.75 (d, J = 4 Hz, 1H), 7.72 (dd, J = 8.0, 1.6 Hz, 1H), 7.66 (d, J = 8.0 Hz, 1H), 7.54 (dd, J = 8.0, 2.0 Hz, 1H), 5.041 (t, , J = 5.6 Hz 1H), 3.59 (d, J = 5.6 Hz, 2H), 1.42 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 153.1, 138.4, 130.6, 127.5, 122.5, 121.1, 67.8, 53.3, 40.4, 21.4; HRMS (ESI) m/z: [M+Na]$^+$ calcd for $C_{15}H_{12}Br_2NaO$: 388.9153; found: 388.9177.



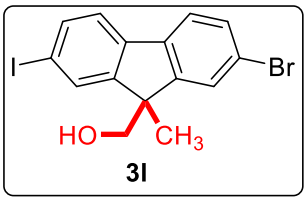
3j

(2,7-Dichloro-9-methyl-9*H*-fluoren-9-yl)methanol (3k). White crystalline solid; Yield: 108 mg, 91%; mp: 163−164 °C. The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.86 (d, J = 8.0 Hz, 2H), 7.63 (d, J = 2.0 Hz, 2H), 7.42 (dd, J = 8.4, 2.4 Hz, 2H), 5.05 (t, J = 5.4 Hz, 1H), 3.61 (d, J = 5.6 Hz, 2H), 1.43 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 152.9, 138.0, 132.4, 127.8, 124.7, 122.1, 67.8, 53.2, 40.6, 40.4, 40.2, 39.9, 39.7, 39.5, 39.3, 21.4; HRMS (ESI) m/z: [M+Na]$^+$ calcd for $C_{15}H_{12}Cl_2NaO$: 301.0163; found: 301.0171.



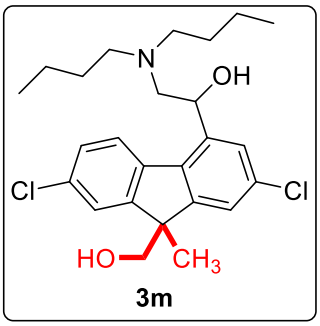
3k

(2-Bromo-7-iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3l). Pale yellow crystalline solid; Yield: 97 mg, 86%; mp: 189-190 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.93 (d, J = 1.6 Hz, 1H), 7.72 (dd, J = 8.0, 1.6 Hz, 1H), 7.66 (d, J = 8.0 Hz, 1H), 7.54 (dd, J = 8, 1.6 Hz, 1H), 5.04 (t, J = 5.2 Hz, 1H), 3.59 (d, J = 5.2 Hz, 2H), 1.42 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 153.1, 138.8, 138.5, 136.5, 133.2, 130.6, 127.4, 122.8, 122.5, 121.1, 94.0, 67.8, 53.2, 21.4; HRMS (ESI) m/z: [M+Na]$^+$ calcd for $C_{15}H_{12}BrINaO$: 436.9014; found: 436.9038.



3l

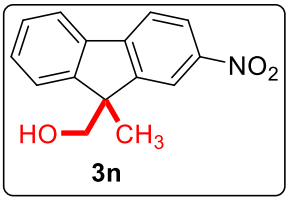
2-(Dibutylamino)-1-(2,7-dichloro-9-(hydroxymethyl)-9-methyl-9*H*-fluoren-4-yl)ethan-1-ol (3m). Pale yellow colour semiliquid; Yield: 72 mg, 69%; The title compound was prepared



3m

according to the general procedure described above (EtOAc:hexanes = 20:80); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.98 (d, J = 8.6 Hz, 1H), 7.65 (d, J = 2.2 Hz, 1H), 7.53 – 7.50 (m, 2H), 7.39 (dd, J = 8.4, 2.2 Hz, 1H), 5.29 – 5.24 (m, 1H), 5.07 (t, J = 5.4 Hz, 1H), 3.57 (dt, J = 19.8, 5.2 Hz, 2H), 2.74 (dd, J = 13.4, 4.5 Hz, 1H), 2.63 – 2.58 (m, 1H), 2.46 – 2.40 (m, 2H), 1.42 (s, 3H), 1.34 – 1.11 (m, 12H), 0.81 (t, J = 7.2 Hz, 6H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 153.7, 142.5, 137.8, 134.4, 132.8, 132.2, 132.0, 127.4, 125.9, 125.6, 124.6, 122.8, 69.3, 68.0, 60.7, 54.0, 52.4, 29.1, 21.8, 20.4, 14.4; HRMS (ESI) m/z: [M+Na]$^{+}$ calcd for $C_{25}H_{32}NCl_2NaO_2$: 472.1786; found: 472.1806.

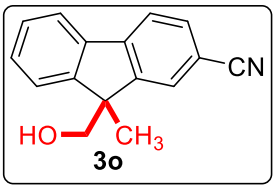
(9-Methyl-2-nitro-9*H*-fluoren-9-yl)methanol (3n). Pale yellow colour semiliquid**;** Yield: 89



3n

mg, 63%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.81 (dt, J = 29.8, 8.5 Hz, 3H), 7.60 – 7.49 (m, 2H), 7.40 – 7.29 (m, 2H), 5.10 – 4.99 (m, 1H), 3.64 (dt, J = 10.6, 5.2 Hz, 1H), 3.49 (dt, J = 10.2, 4.8 Hz, 1H), 1.43 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 153.4, 150.5, 139.4, 139.0, 130.4, 127.9, 127.8, 127.6, 124.3, 122.2, 120.6, 120.5, 68.1, 52.9, 21.6; HRMS (ESI) m/z: [M+Na]$^{+}$ calcd for $C_{15}H_{12}NNaO_3$: 278.0793; found: 278.0809.

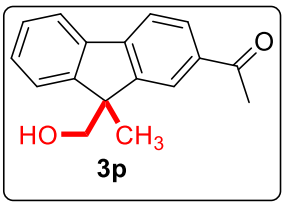
9-(Hydroxymethyl)-9-methyl-9*H*-fluorene-2-carbonitrile (3o). Colourless semiliquid;



3o

Yield: 110 mg, 89%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.06 – 8.03 (m, 2H), 7.99 – 7.95 (m, 1H), 7.84 (dd, J = 7.9, 1.5 Hz, 1H), 7.65 – 7.60 (m, 1H), 7.45 – 7.41 (m, 2H), 5.08 (t, J = 5.4 Hz, 1H), 3.71 (dd, J = 10.4, 5.4 Hz, 1H), 3.58 (dd, J = 10.4, 5.5 Hz, 1H), 1.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 151.6, 144.9, 138.4, 132.1, 129.2, 128.2, 128.0, 124.4, 121.7, 121.3, 120.1, 109.3, 67.9, 53.0, 21.3; HRMS (ESI) m/z: [M+Na]$^{+}$ calcd for $C_{16}H_{13}NNaO$: 258.0895; found: 258.0918.

1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl) ethan-1-one (3p). White crystalline solid;

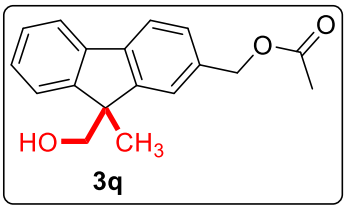


3p

Yield: 109 mg, 90%; mp: 93−94 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.15 (d, J = 1.6 Hz, 1H), 8.01 (dd, J = 7.8, 1.6 Hz, 1H), 7.97 – 7.90 (m, 2H), 7.64 – 7.56

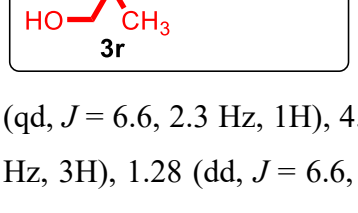
(m, 1H), 7.44 – 7.36 (m, 2H), 5.04 (t, J = 5.6 Hz, 1H), 3.67 (dd, J = 10.4, 5.6 Hz, 1H), 3.57 (dd, J = 10.2, 5.4 Hz, 1H), 2.63 (s, 3H), 1.49 (s, 3H).); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6) δ 198.1, 152.1, 151.1, 144.8, 138.9, 136.0, 128.7, 128.6, 127.8, 124.5, 124.0, 121.5, 120.3, 68.3, 52.7, 40.6, 40.4, 40.1, 39.9, 39.7, 39.5, 39.3, 27.3, 21.6; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{17}H_{16}NaO_2$: 275.1048; found: 275.1054.

(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)mesthyl acetate (3q). Colourless semiliquid; Yield: 100 mg, 83%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.60 – 7.56 (m, 2H), 7.34 – 7.30 (m, 2H), 7.12 (td, J = 7.4, 1.6 Hz, 2H), 7.06 (td, J = 7.3, 1.5 Hz, 1H), 4.89 (s, 2H), 4.80 – 4.75 (m, 1H), 3.36 – 3.27 (m, 2H), 1.85 (s, 3H), 1.21 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6) δ 170.8, 151.1, 140.0, 139.6, 135.2, 127.8, 127.6, 127.6, 124.4, 124.4, 120.5, 120.3, 68.4, 66.3, 52.5, 21.8, 21.2; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{18}H_{18}NaO_3$: 305.1154; found: 305.1179.



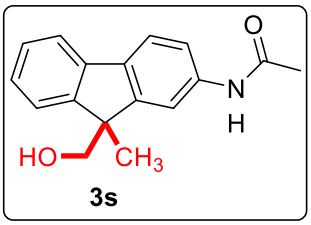
3q

1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethyl acetate (3r). Colourless semiliquid; Yield: 102 mg, 87%; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.59 – 7.54 (m, 2H), 7.33 – 7.29 (m, 2H), 7.08 (dtd, J = 22.4, 7.3, 1.2 Hz, 3H), 5.64 (qd, J = 6.6, 2.3 Hz, 1H), 4.77 (td, J = 5.3, 2.8 Hz, 1H), 3.34 – 3.26 (m, 2H), 1.82 (d, J = 2.2 Hz, 3H), 1.28 (dd, J = 6.6, 0.9 Hz, 3H), 1.21 (d, J = 2.4 Hz, 3H; $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6) δ 170.2, 151.1, 140.8, 139.7, 139.6, 127.6, 127.4, 125.5, 124.4, 122.1, 122.0, 120.4, 120.2, 72.4, 68.4, 52.5, 22.7, 21.8, 21.5; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{19}H_{20}NaO_3$: 319.1310; found: 319.1326.



3r

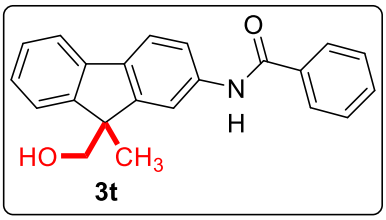
***N*-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)acetamide (3s).** White crystalline solid; Yield: 79 mg, 79%; mp: 182−183 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 20:80); ^{1}H NMR (400 MHz, DMSO-d_6) δ 10.01 (s, 1H), 7.77 – 7.71 (m, 3H), 7.64 – 7.60 (m, 1H), 7.51 (d, J = 7.3 Hz, 1H), 7.32 (td, J = 7.5, 1.3 Hz, 1H), 7.24 (td, J = 7.5, 1.3 Hz, 1H), 5.01 (s, 1H), 3.54 (dd, J = 10.3, 5.2 Hz, 1H), 3.45 (dd, J = 10.3, 5.4 Hz, 1H), 2.07 (s, 3H), 1.42 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6) δ 168.6, 151.5, 150.5, 140.0, 139.0, 134.9, 127.5,



3s

126.6, 124.2, 120.4, 119.7, 118.5, 115.3, 68.6, 52.4, 24.5, 21.9; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{17}H_{17}NNaO_2$: 290.1157; found: 290.1170.

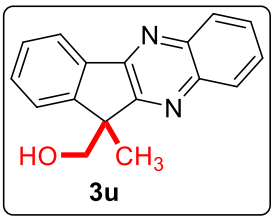
N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)benzamide (3t). White crystalline solid;



3t

Yield: 93 mg, 81%; mp: 161−162 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 20:80); ^{1}H NMR (400 MHz, DMSO-d_6) δ 10.35 (s, 1H), 8.03 – 7.99 (m, 3H), 7.83 – 7.76 (m, 3H), 7.61 – 7.53 (m, 4H), 7.34 (td, J = 7.5, 1.2 Hz, 1H), 7.26 (td, J = 7.5, 1.3 Hz, 1H), 5.06 (t, J = 5.3 Hz, 1H), 3.60 – 3.49 (m, 2H), 1.46 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 165.8, 151.4, 150.7, 139.9, 138.7, 135.6, 135.4, 132.0, 128.8, 128.1, 127.6, 126.8, 124.3, 120.4, 119.9, 116.7, 68.6, 52.5, 21.9; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{22}H_{19}NNaO_2$: 352.1313; found: 352.1329.

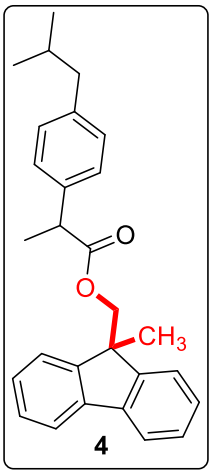
(11-Methyl-11*H*-indeno[1,2-*b*]quinoxalin-11-yl)methanol (3u).White crystalline solid;



3u

Yield: 97 mg, 81%; mp: 128−129 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.17 – 8.10 (m, 3H), 7.84 – 7.77 (m, 3H), 7.64 (td, J = 7.5, 1.3 Hz, 1H), 7.55 (td, J = 7.4, 1.2 Hz, 1H), 4.79 (t, J = 5.4 Hz, 1H), 4.03 (dd, J = 10.2, 5.4 Hz, 1H), 3.96 (dd, J = 10.3, 5.4 Hz, 1H), 1.52 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 165.5, 154.6, 152.3, 142.2, 141.3, 136.8, 132.1, 129.8, 129.3, 129.3, 129.3, 128.6, 125.0, 122.2, 67.9, 51.1, 20.7; HRMS (ESI) m/z: $[M+Na]^+$ calcd for $C_{17}H_{14}N_2NaO$: 285.1004; found: 285.1023.

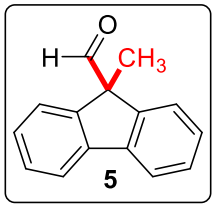
(9-methyl-9*H*-fluoren-9-yl)methyl 2-(4-isobutylphenyl) propanoate (4). White semiliquid;



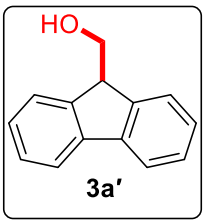
4

yield: 108 mg, 89%; The title compound was prepared according to the general procedure 4 described above (EtOAc:hexanes = 10:90). ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.79 – 7.69 (m, 2H), 7.34 – 7.23 (m, 4H), 7.21 – 7.17 (m, 1H), 7.15 – 7.10 (m, 1H), 7.05 – 6.96 (m, 4H), 4.21 – 4.15 (m, 1H), 4.04 (dt, J = 10.6, 2.1 Hz, 1H), 3.65 – 3.59 (m, 1H), 2.34 (d, J = 8.3 Hz, 2H), 1.73 (dt, J = 13.7, 6.3 Hz, 1H), 1.29 (d, J = 1.2 Hz, 3H), 1.21 (dt, J = 7.2, 2.1 Hz, 3H), 0.76 (dt, J = 6.7, 2.1 Hz, 6H; ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 173.9, 149.1, 149.0, 140.2, 139.9, 138.0, 129.4, 128.1, 128.0, 127.6, 127.6, 124.2, 124.1, 120.5, 69.9, 50.1, 44.7, 44.7, 30.0, 22.5, 21.5, 18.2; HRMS (ESI) m/z: $[M+NH_4]^+$ calcd for $C_{28}H_{34}NO_2$: 416.2590; found: 416.2600.

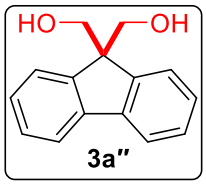
9*H*-fluorene-9-carbaldehyde (5).Colourless semiliquid; yield: 86 mg, 79%; The title compound was prepared according to the general procedure 5 described above (EtOAc:hexanes = 10:90); ^{1}H NMR (400 MHz, DMSO-d_6) δ ^{1}H NMR (400 MHz, DMSO) δ 8.93, 7.98, 7.98, 7.98, 7.98, 7.97, 7.96, 7.96, 7.96, 7.53, 7.52, 7.52, 7.52, 7.51, 7.50, 7.50, 7.50, 7.50, 7.48, 7.48, 7.48, 1.62; ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 197.9, 144.2, 141.5, 129.2, 128.4, 125.1, 121.1, 62.9, 17.7.



(9H-fluoren-9-yl)methanol (3a′) White crystalline powder; mp: 106−108 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.86 (dt, J = 7.5, 1.0 Hz, 2H), 7.67 (dq, J = 7.4, 0.9 Hz, 2H), 7.39 (tt, J = 7.5, 1.0 Hz, 2H), 7.31 (td, J = 7.4, 1.2 Hz, 2H), 5.08 (t, J = 5.1 Hz, 1H), 4.01 (t, J = 7.0 Hz, 1H), 3.74 (dd, J = 7.0, 5.1 Hz, 2H). ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) δ 145.6, 141.1, 127.6, 127.2, 125.7, 120.3, 64.2, 50.5.



(9H-fluorene-9,9-diyl)dimethanol (3a′′) White crystalline powder; mp: 146−148 °C; The title compound was prepared according to the general procedure described above (EtOAc:hexanes = 10:90, v/v); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.83 (d, J = 7.5 Hz, 2H), 7.60 (d, J = 7.5 Hz, 2H), 7.37 (td, J = 7.4, 1.2 Hz, 2H), 7.28 (td, J = 7.4, 1.2 Hz, 2H), 4.85 (t, J = 5.3 Hz, 2H), 3.71 (d, J = 5.3 Hz, 4H). ^{13}C{^{1}H} NMR (100 MHz, DMSO- d_6) δ 148.03, 140.88, 127.67, 127.09, 125.63, 120.19, 64.24, 57.97.



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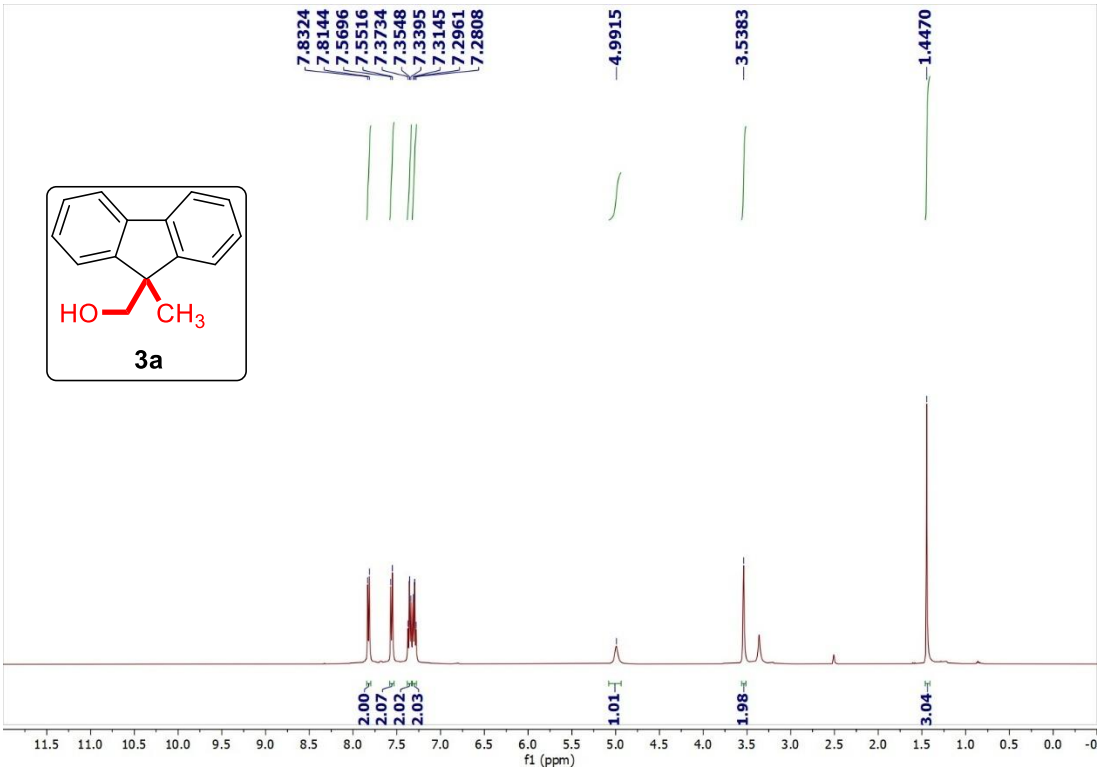
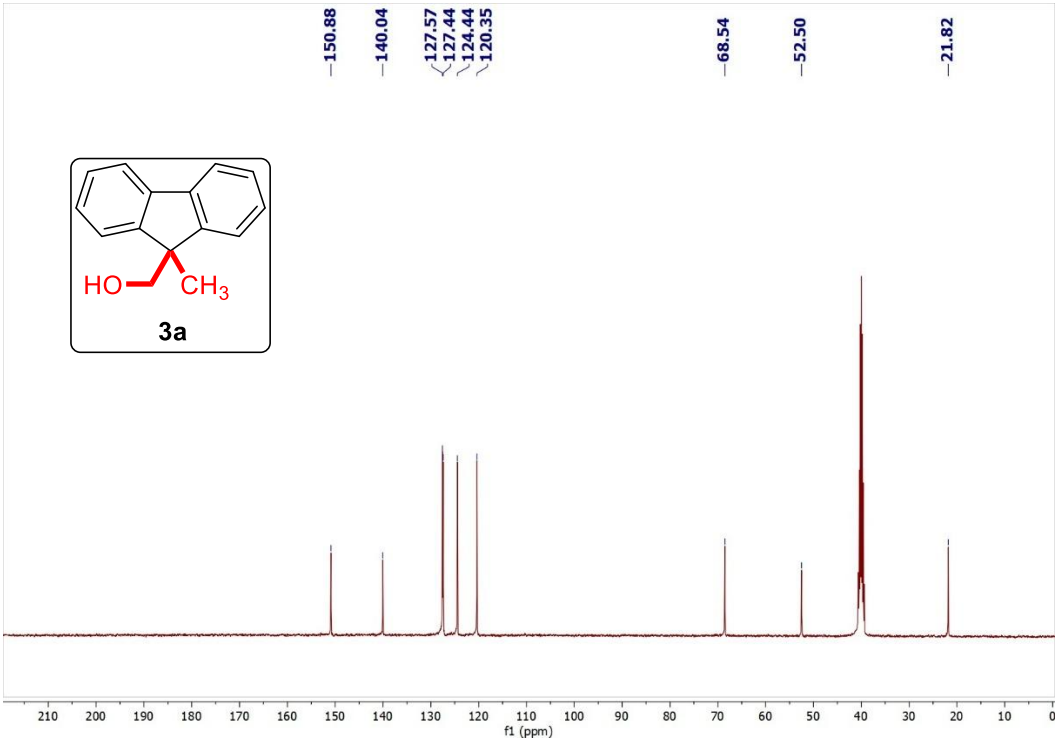
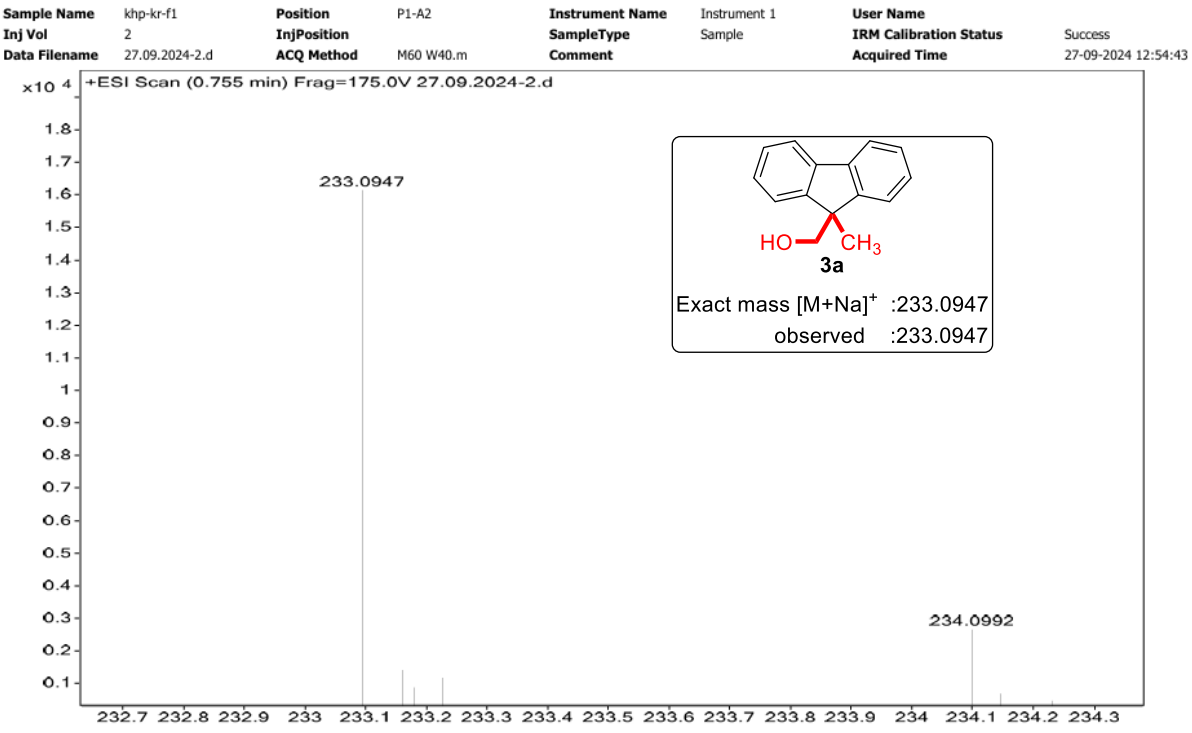
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (9-Methyl-9*H*-fluoren-9-yl)methanol (3a)



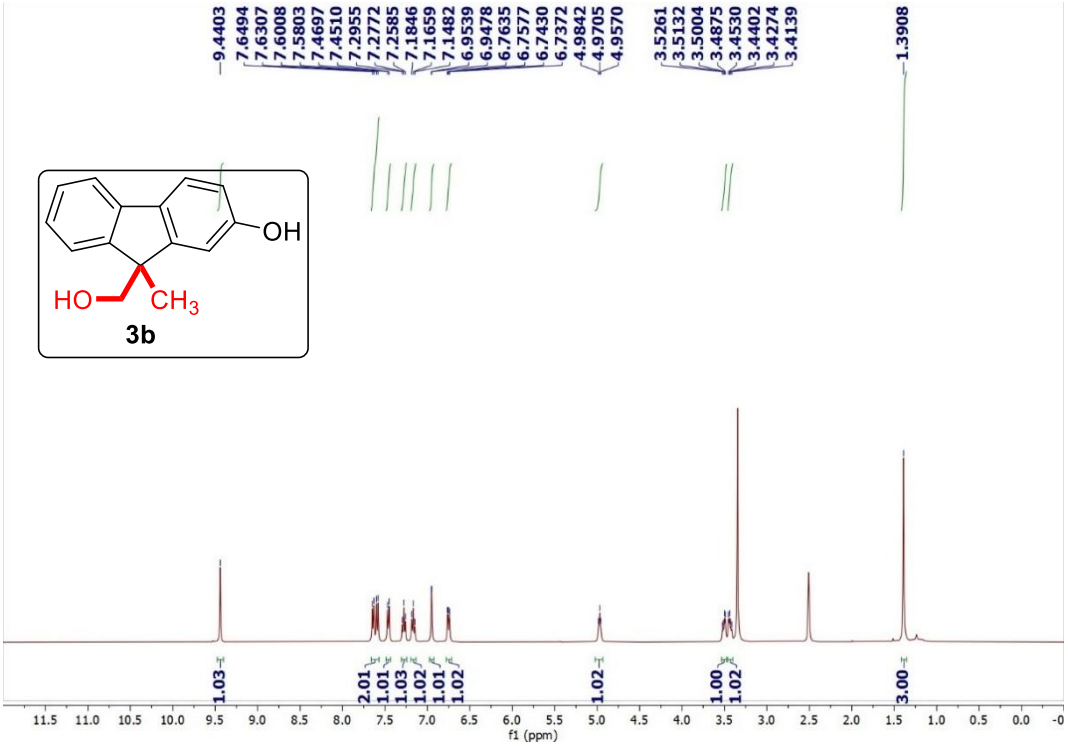
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (9-Methyl-9*H*-fluoren-9-yl)methanol (3a)



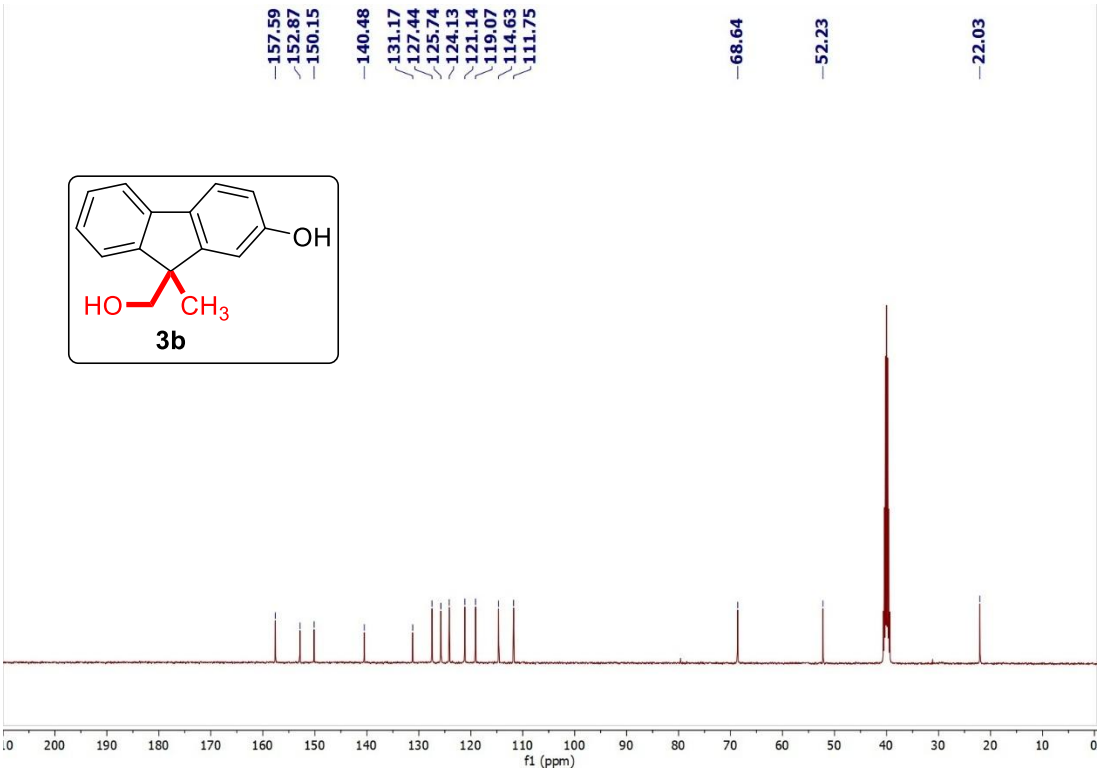
HRMS of (9-Methyl-9*H*-fluoren-9-yl)methanol (3a)



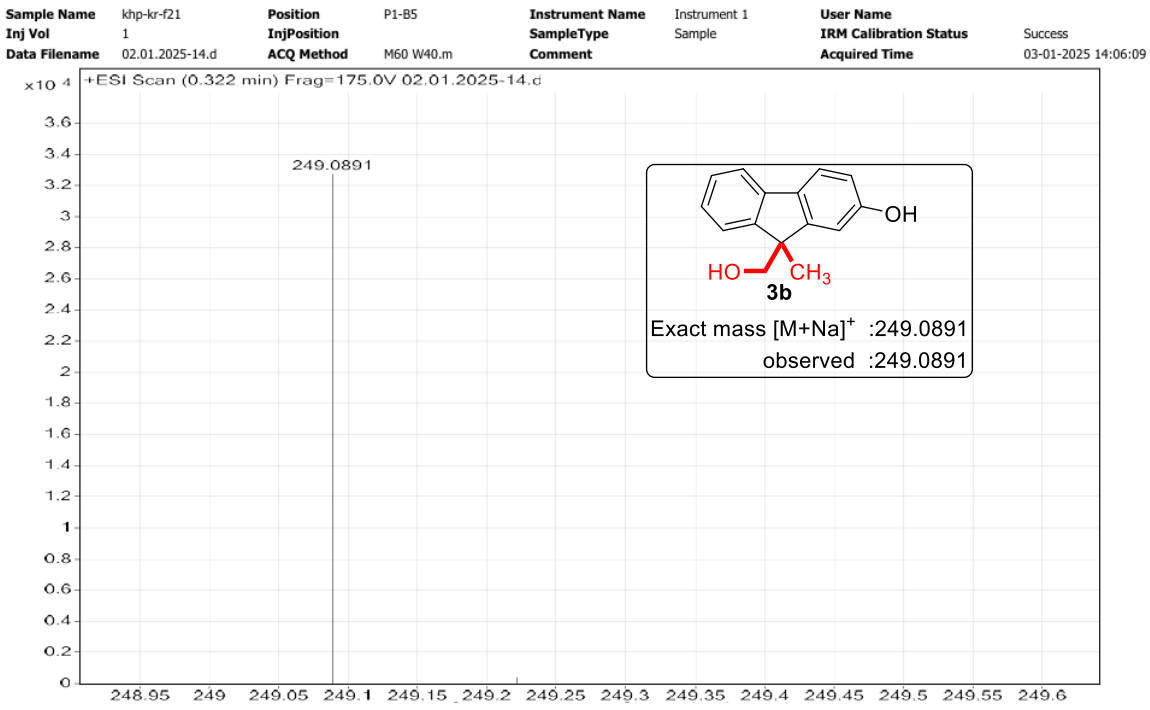
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of 9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-ol (3b)



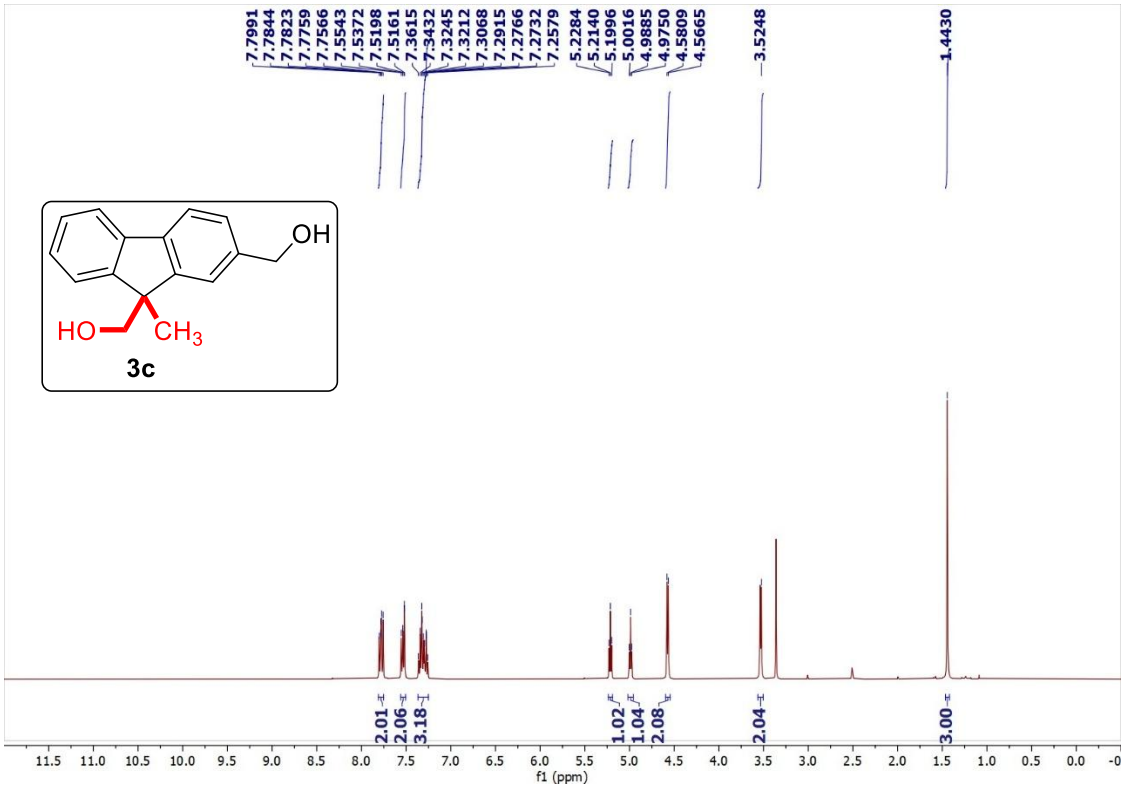
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of 9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-ol (3b)



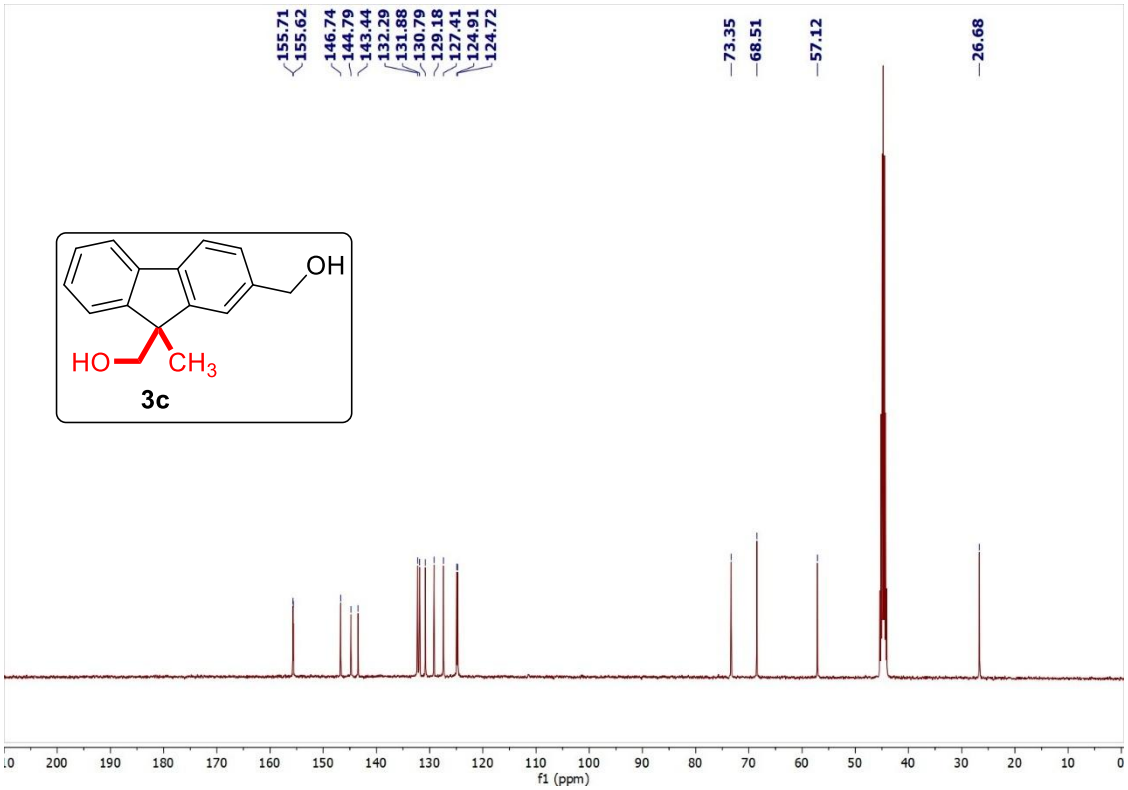
HRMS of 9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-ol (3b)



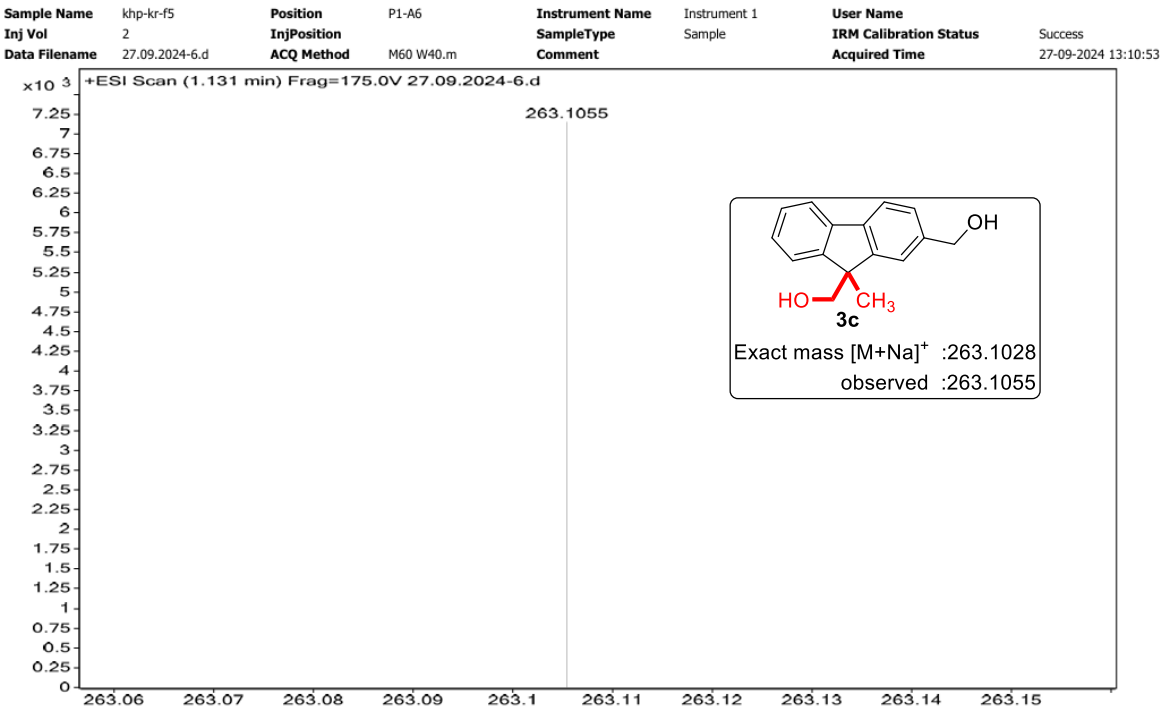
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (9-Methyl-9*H*-fluorene-2,9-diyl)dimethanol (3c)



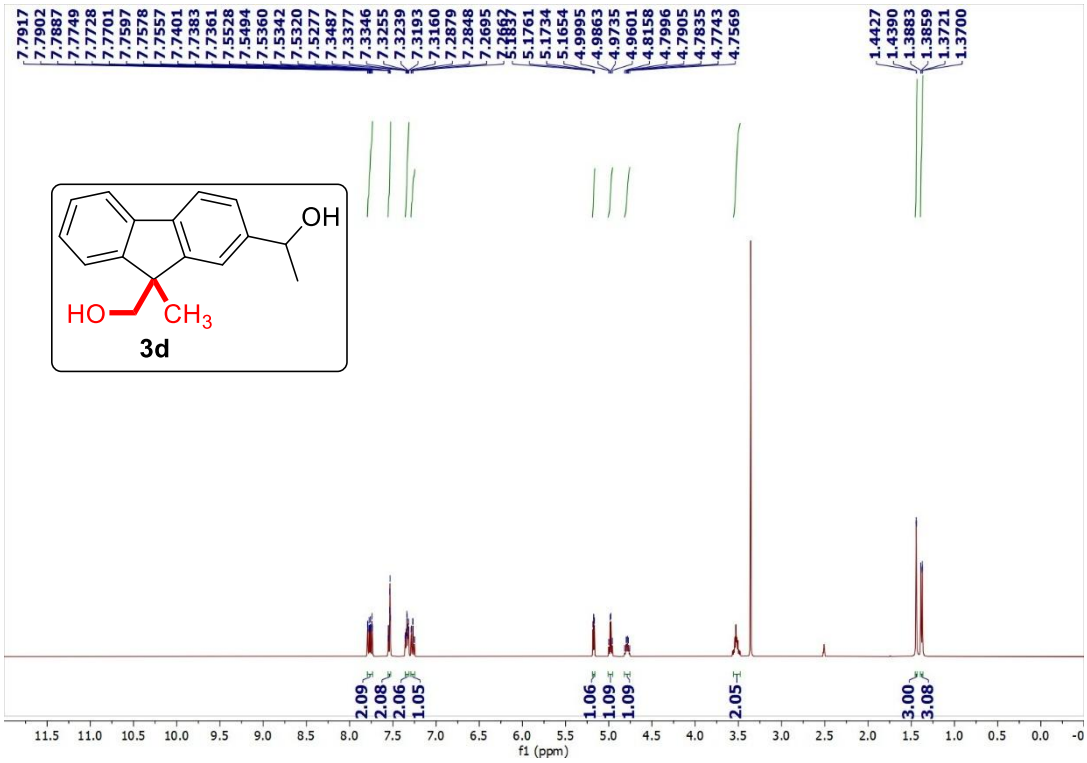
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (9-Methyl-9*H*-fluorene-2,9-diyl)dimethanol (3c)



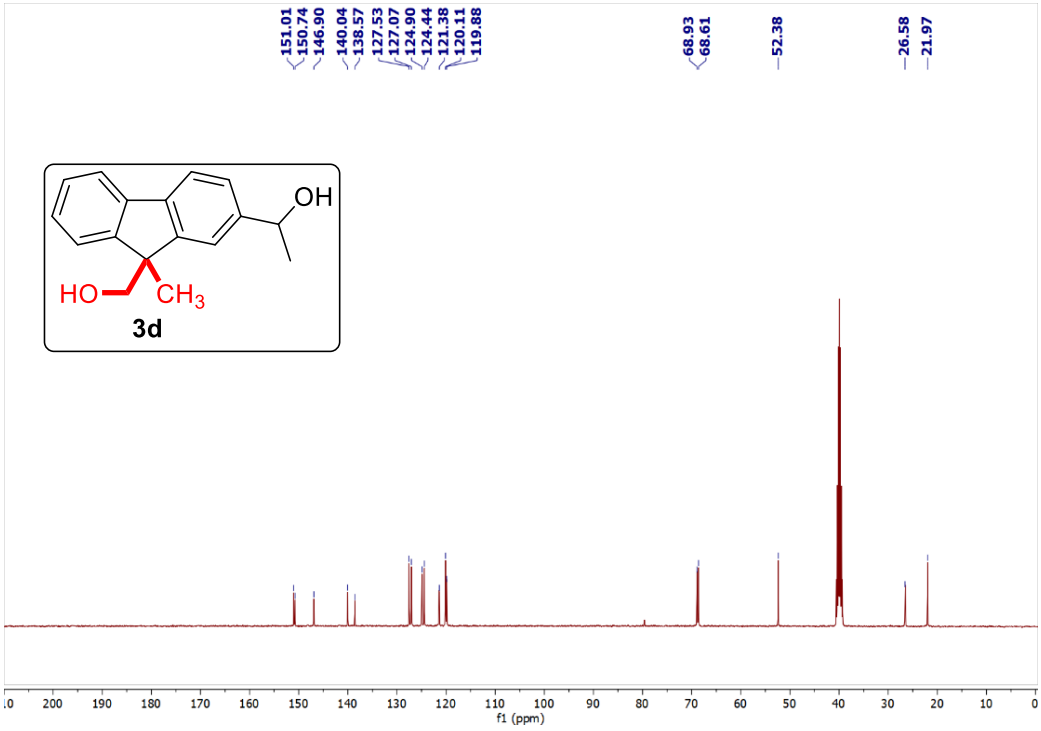
HRMS of (9-Methyl-9*H*-fluorene-2,9-diyl)dimethanol (3c)



^{1}H NMR (400 MHz, DMSO-d_6) spectrum of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-ol (3d)

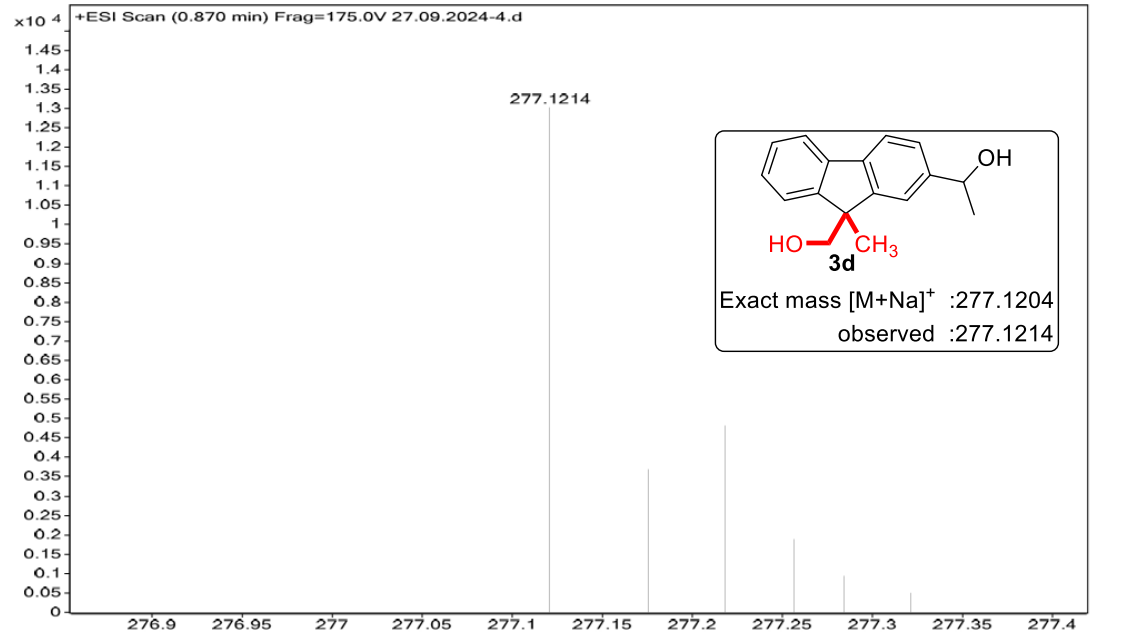


^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-ol (3d)

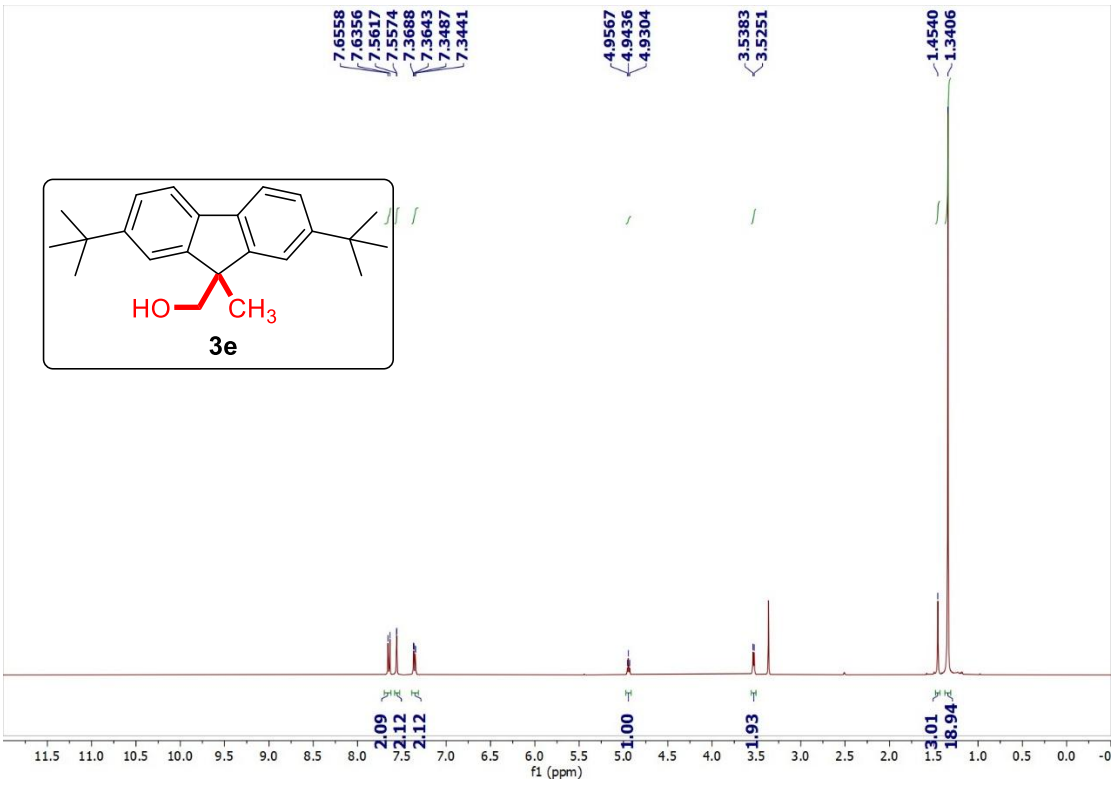


HRMS of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-ol (3d)

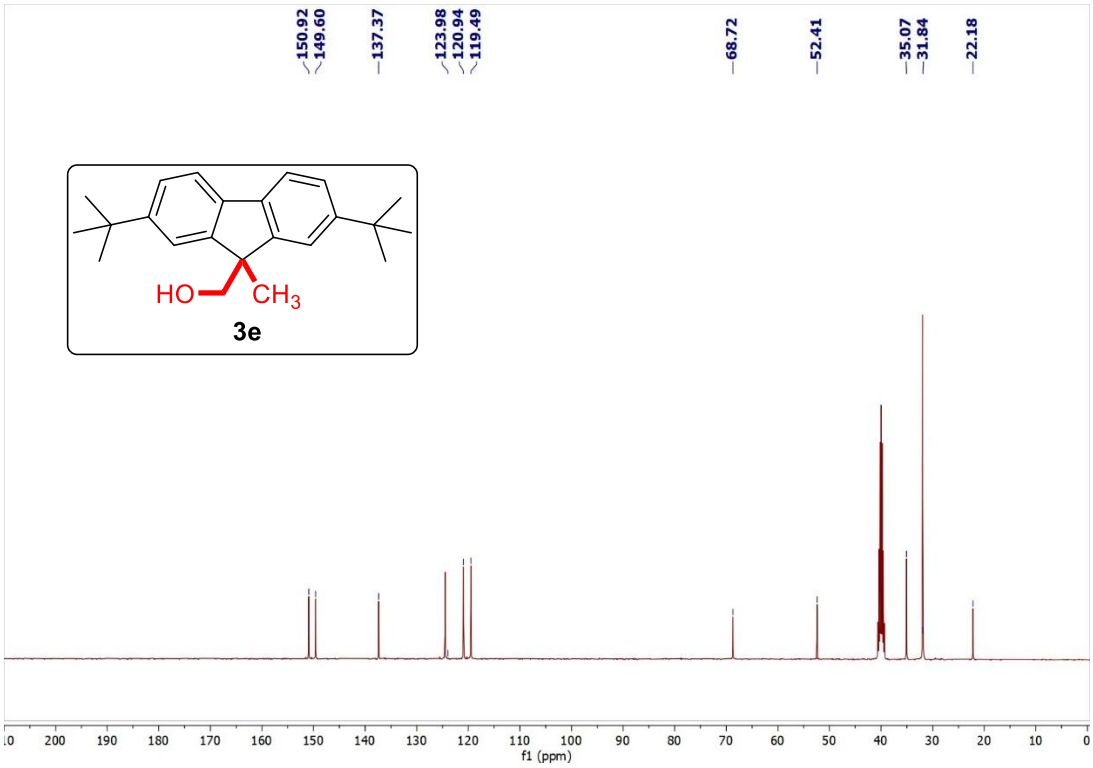
Sample Name	khp-kr-f3	**Position**	P1-A4	**Instrument Name**	Instrument 1	**User Name**	
Inj Vol	2	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	27.09.2024-4.d	**ACQ Method**	M60 W40.m	**Comment**		**Acquired Time**	27-09-2024 13:02:45



^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (2,7-Di-tert-butyl-9-methyl-9*H*-fluoren-9-yl)methanol (3e)

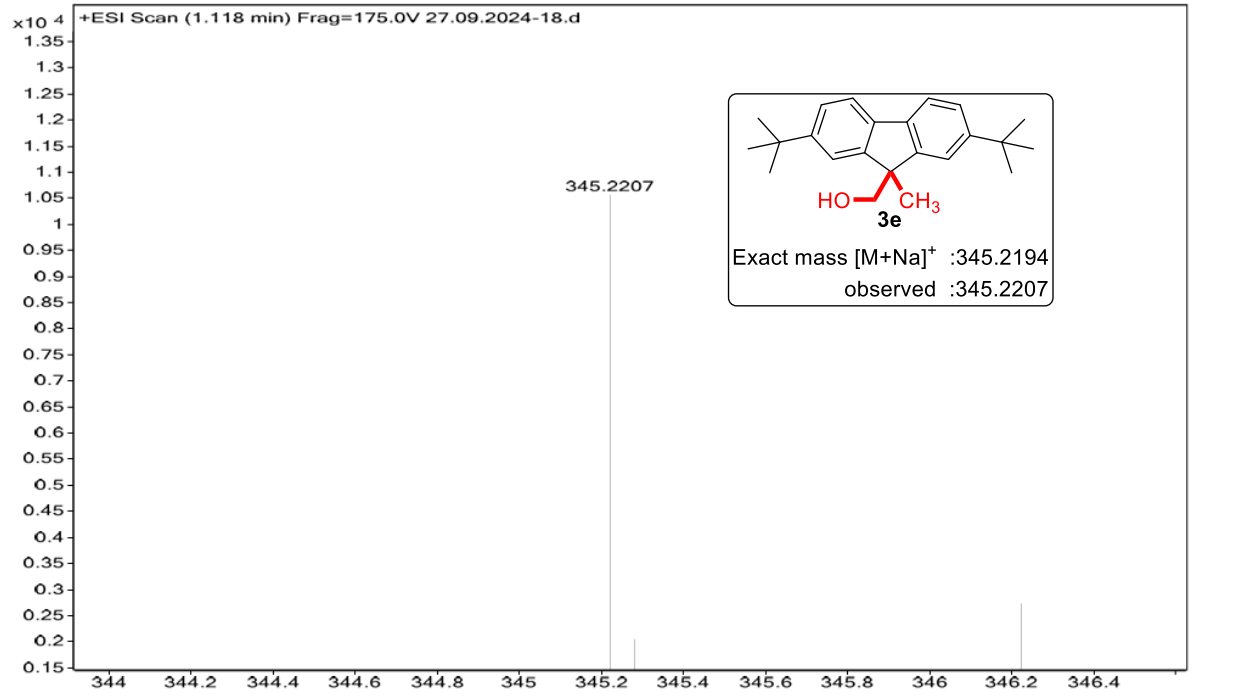


^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (2,7-Di-tert-butyl-9-methyl-9*H*-fluoren-9-yl)methanol (3e)

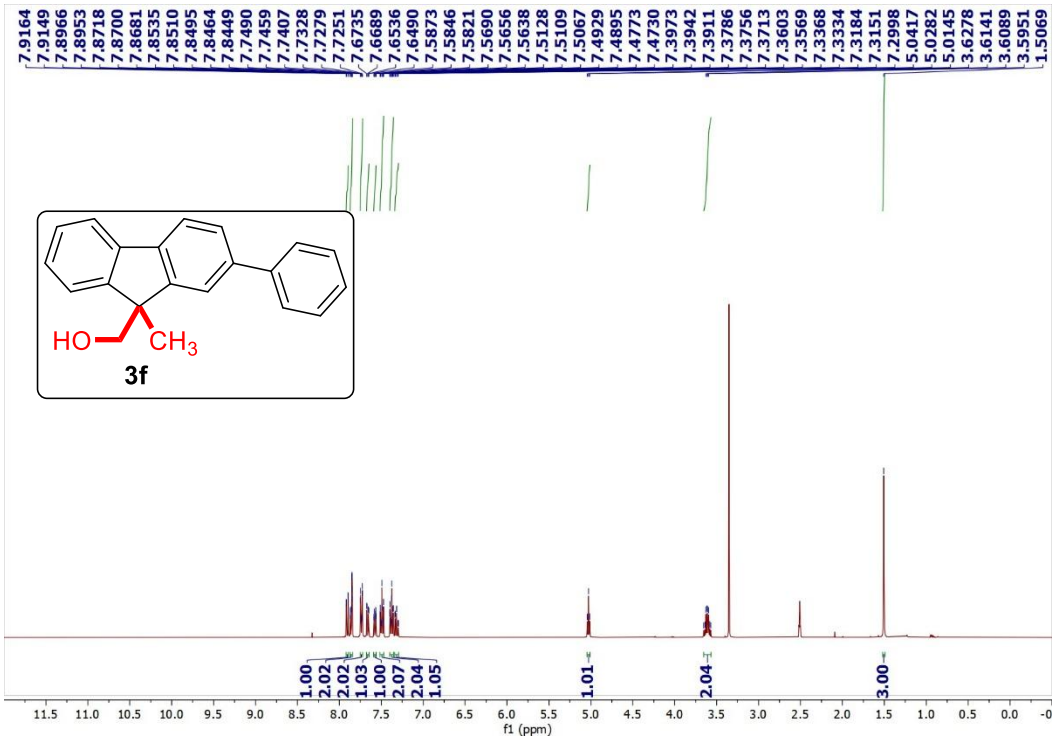


HRMS of of (2,7-Di-tert-butyl-9-methyl-9*H*-fluoren-9-yl)methanol (3e)

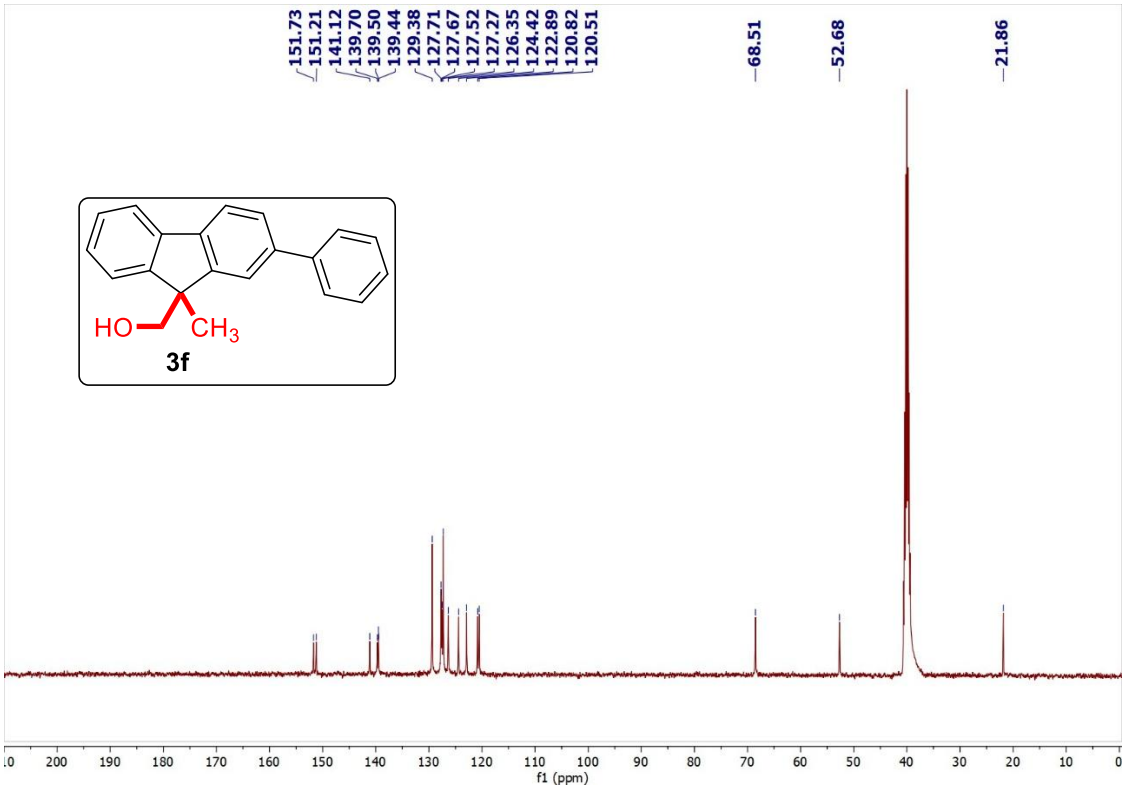
Sample Name	khp-kr-f17	**Position**	P1-B9	**Instrument Name**	Instrument 1	**User Name**	
Inj Vol	2	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	27.09.2024-18.d	**ACQ Method**	M60 W40.m	**Comment**		**Acquired Time**	27-09-2024 13:59:09



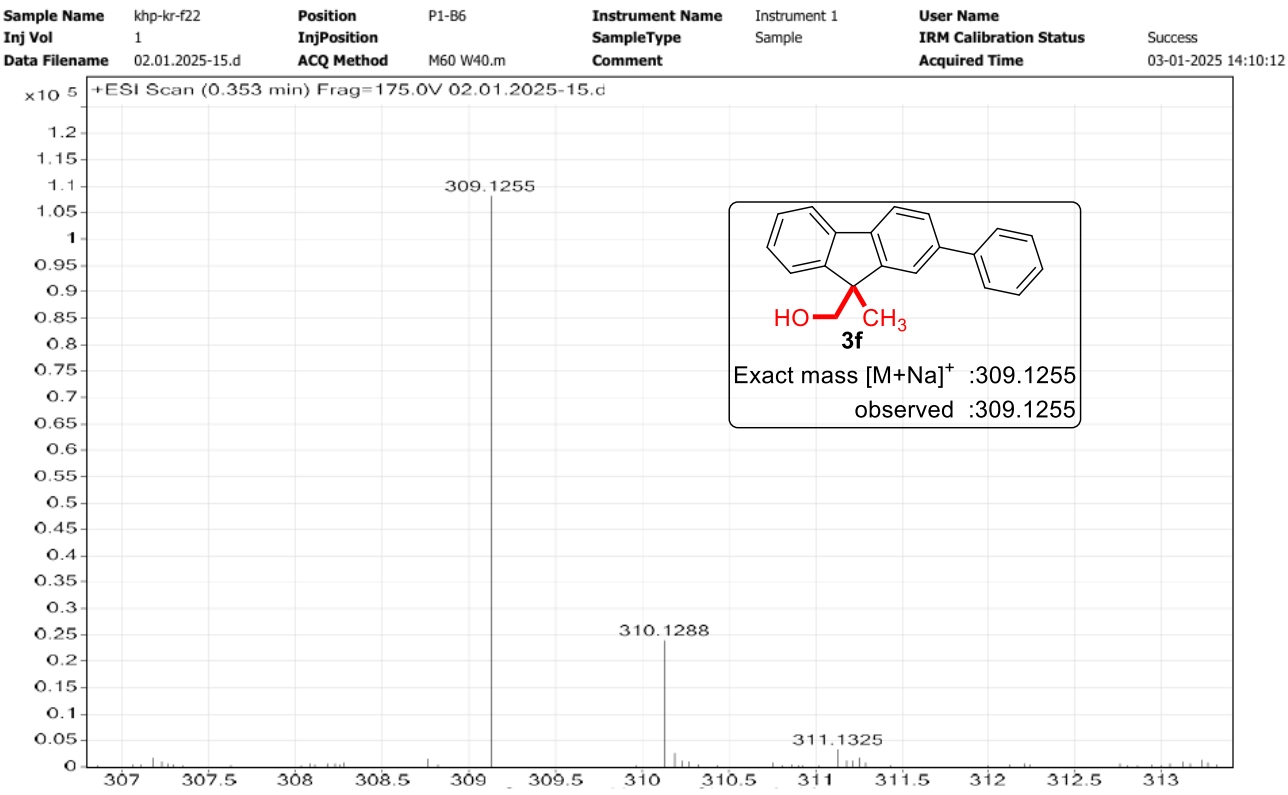
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (9-Methyl-2-phenyl-9*H*-fluoren-9-yl)methanol (3f)



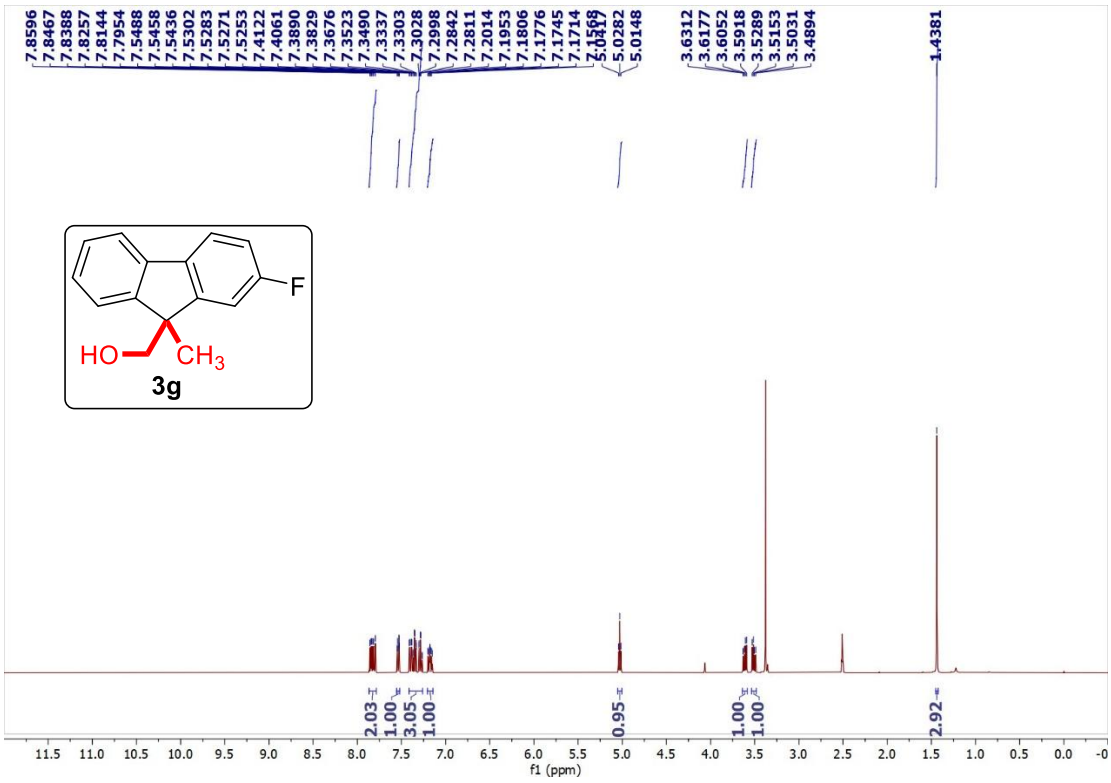
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (9-Methyl-2-phenyl-9*H*-fluoren-9-yl)methanol (3f)



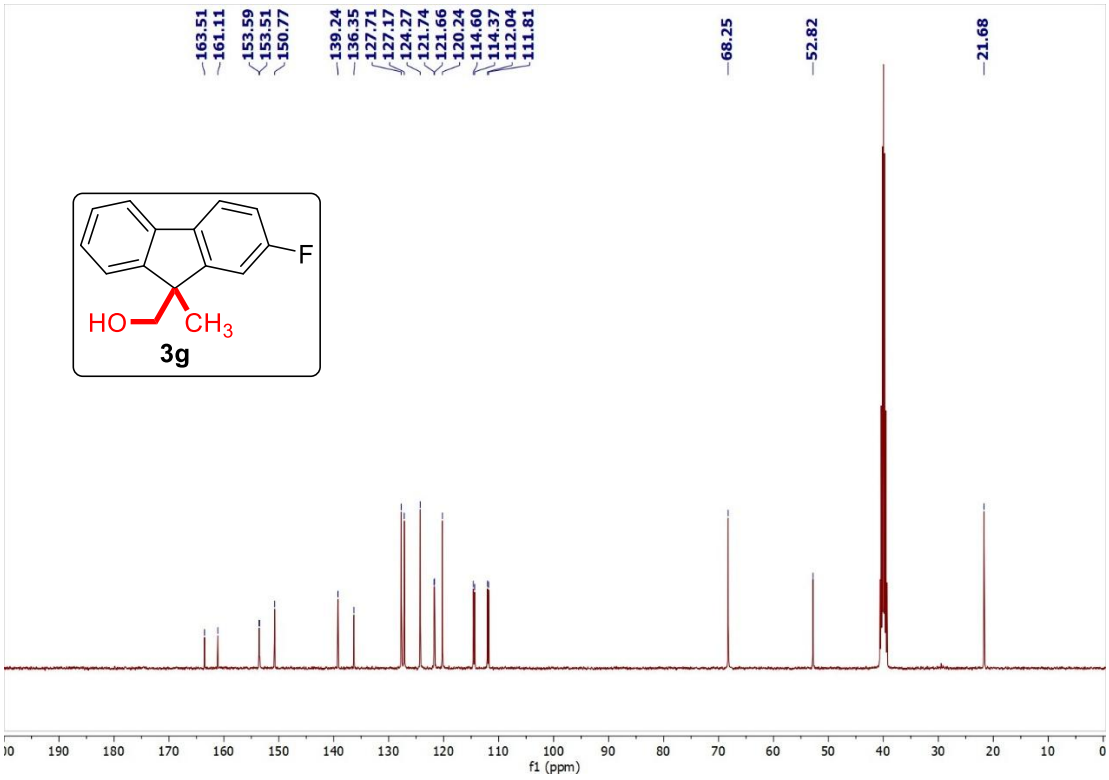
HRMS of (9-Methyl-2-phenyl-9*H*-fluoren-9-yl)methanol (3f)



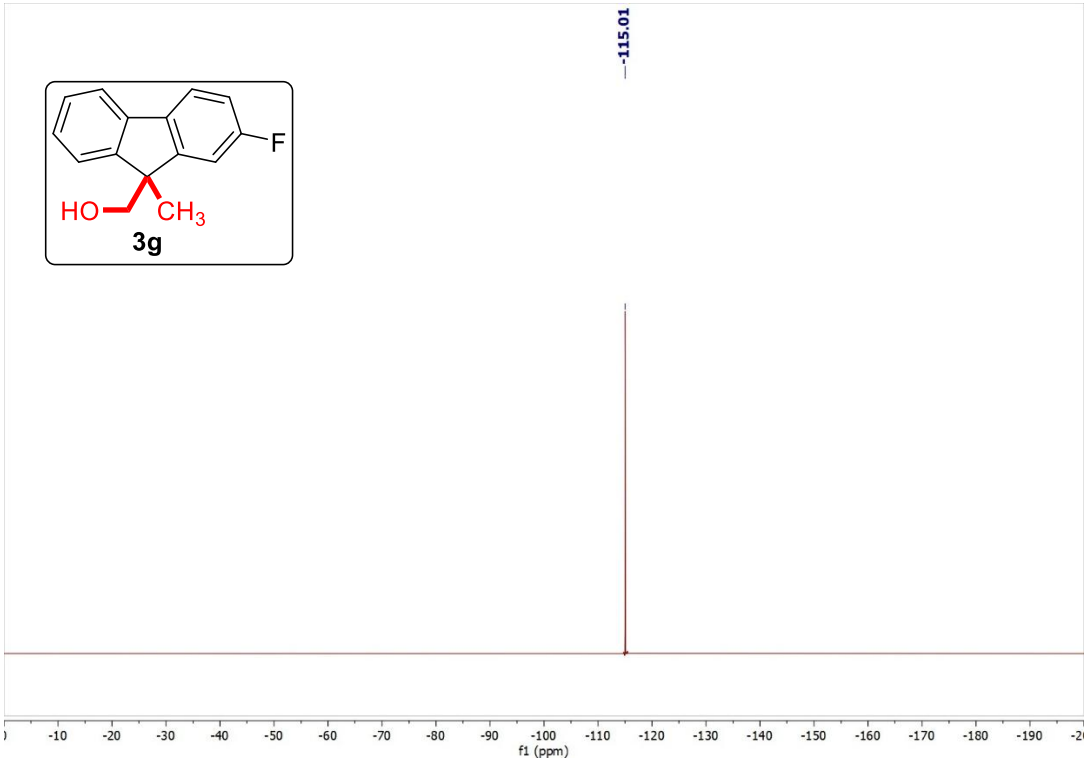
^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of(2-Fluoro-9-methyl-9*H*-fluoren-9-yl)methanol (3g)



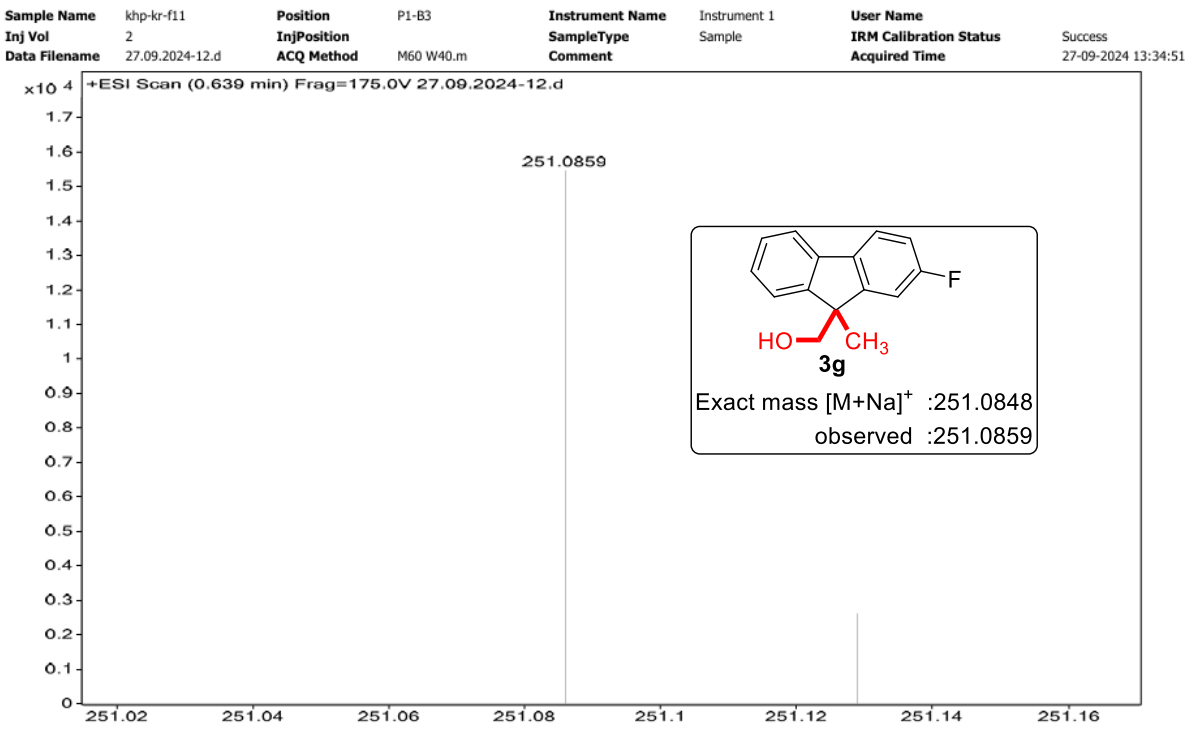
^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (2-Fluoro-9-methyl-9*H*-fluoren-9-yl)methanol (3g)



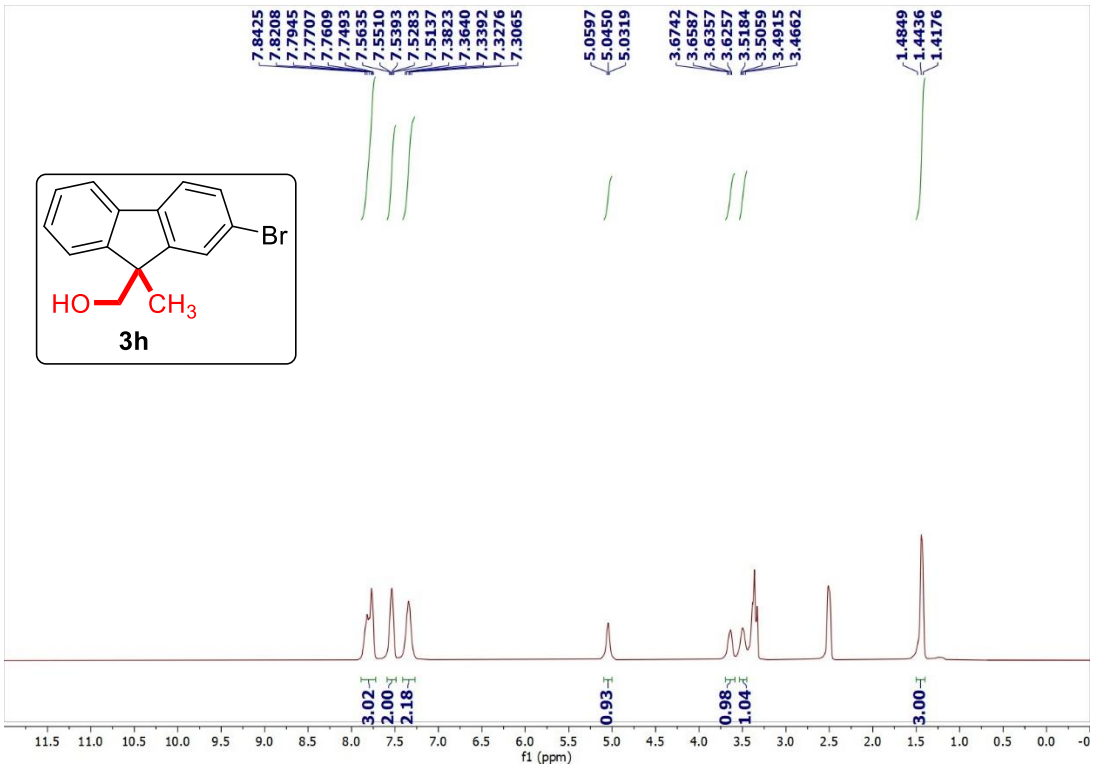
^{19}F spectrum of (2-Fluoro-9-methyl-9*H*-fluoren-9-yl)methanol (3g)



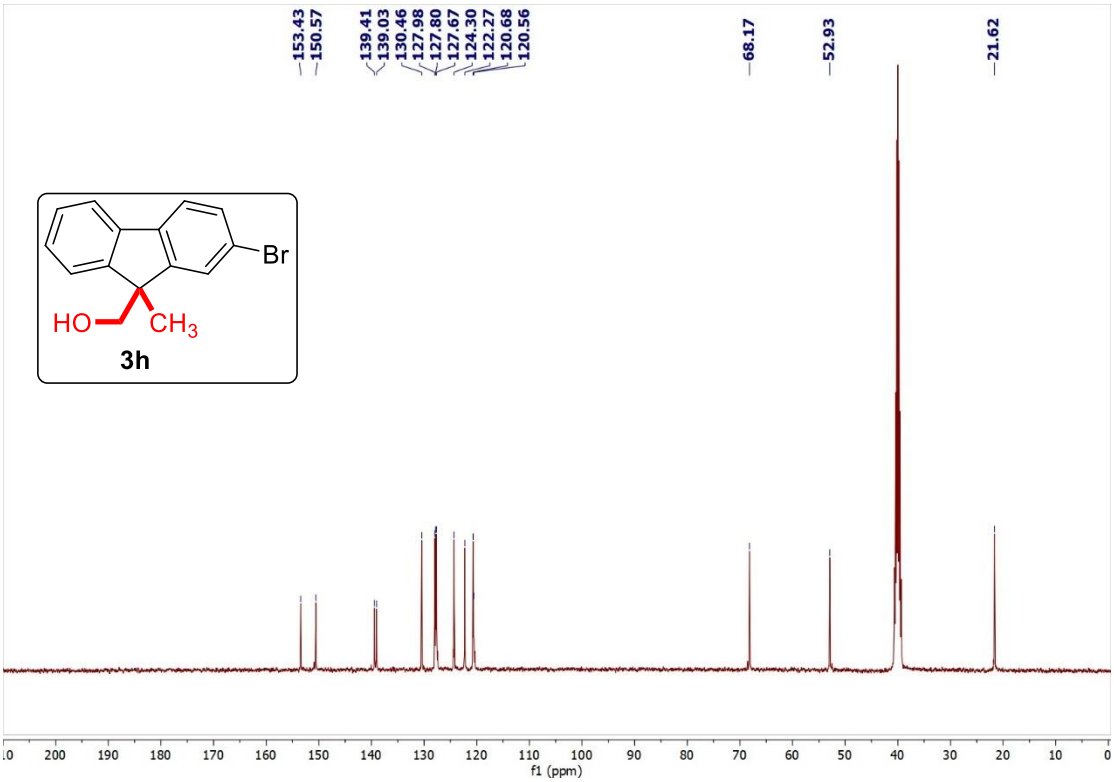
HRMS of (2-Fluoro-9-methyl-9*H*-fluoren-9-yl)methanol (3g)



^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (2-Bromo-9-methyl-9*H*-fluoren-9-yl)methanol (3h)

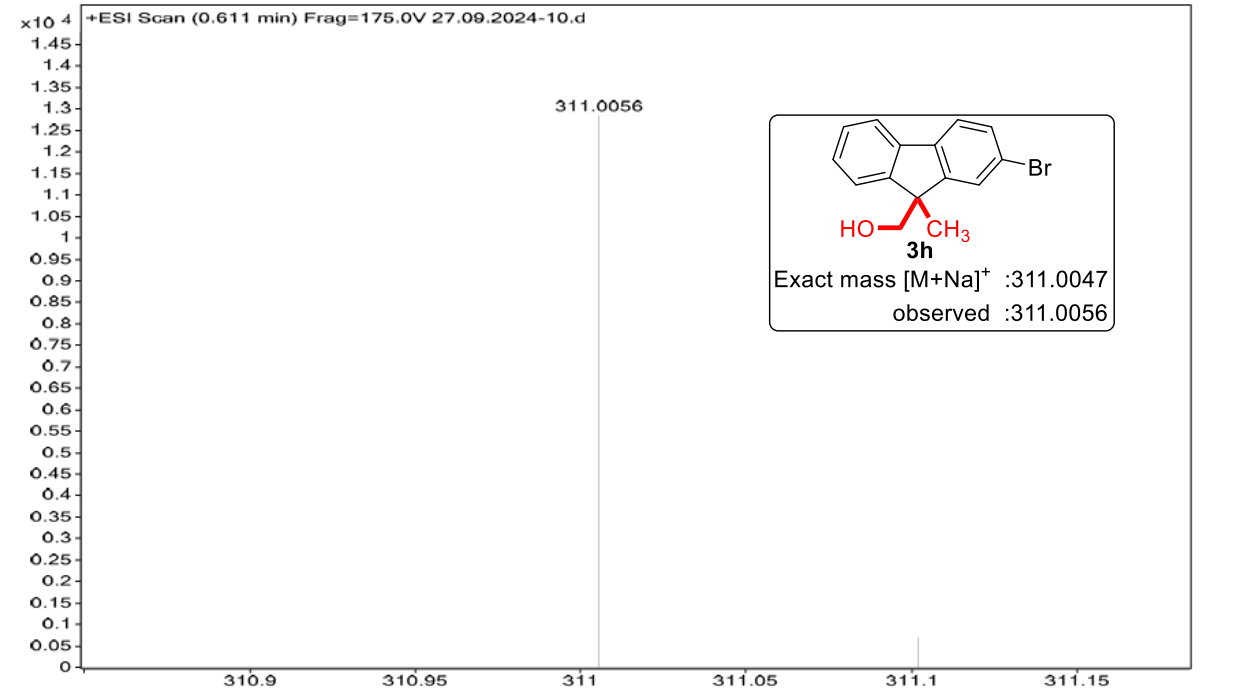


^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (2-Bromo-9-methyl-9*H*-fluoren-9-yl)methanol (3h)

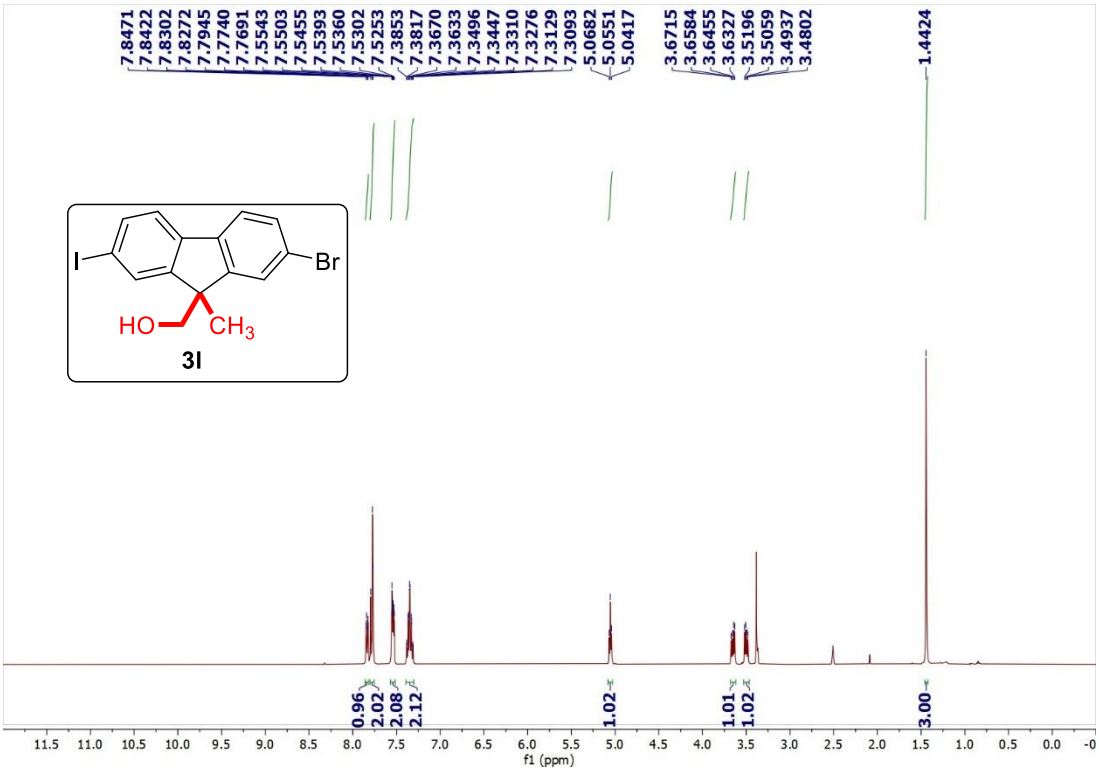


HRMS of (2-Bromo-9-methyl-9*H*-fluoren-9-yl)methanol (3h)

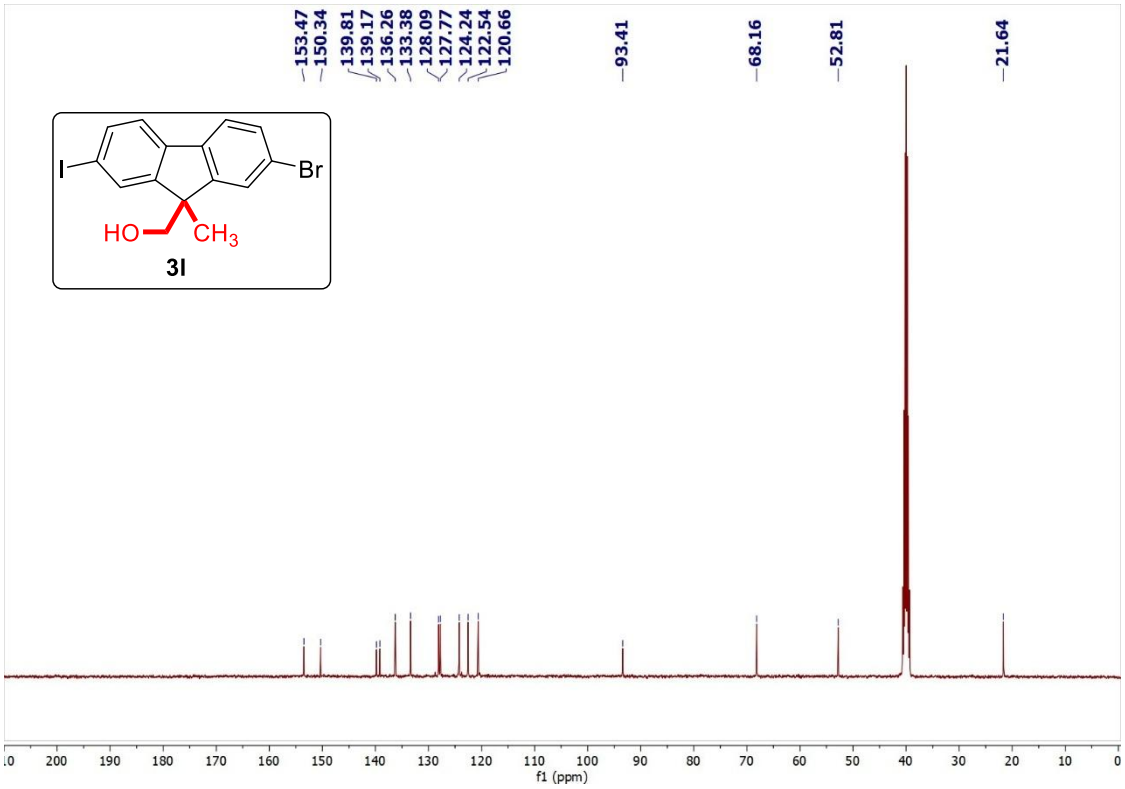
Sample Name	khp-kr-f9	**Position**	P1-B1	**Instrument Name**	Instrument 1	**User Name**	
Inj Vol	2	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	27.09.2024-10.d	**ACQ Method**	M60 W40.m	**Comment**		**Acquired Time**	27-09-2024 13:26:50



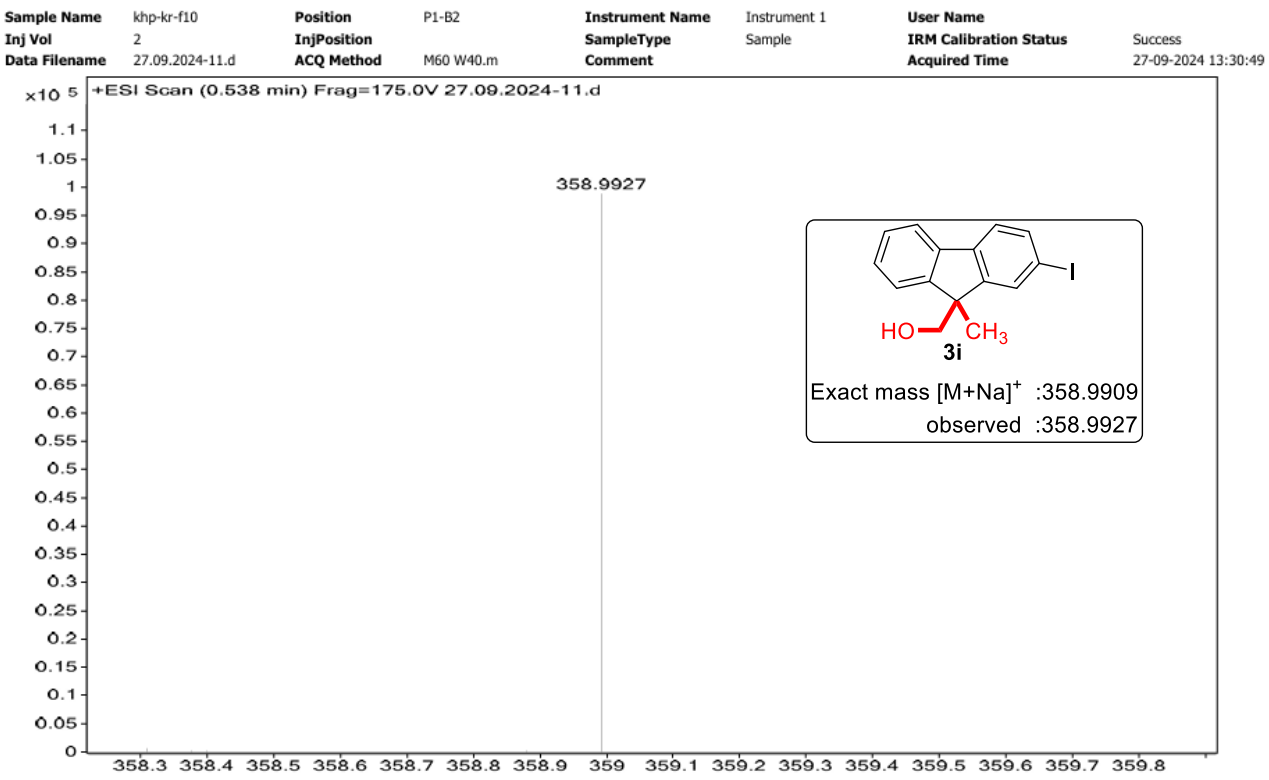
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (2-Iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3i)



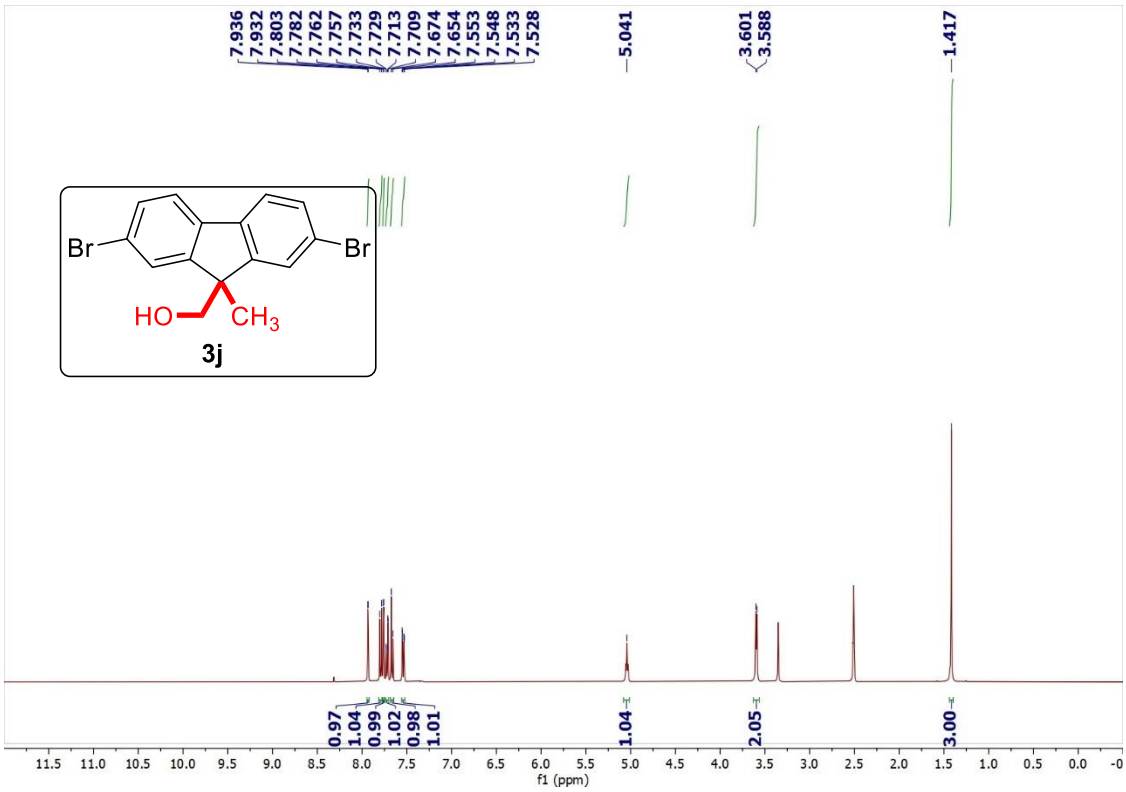
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (2-Iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3i)



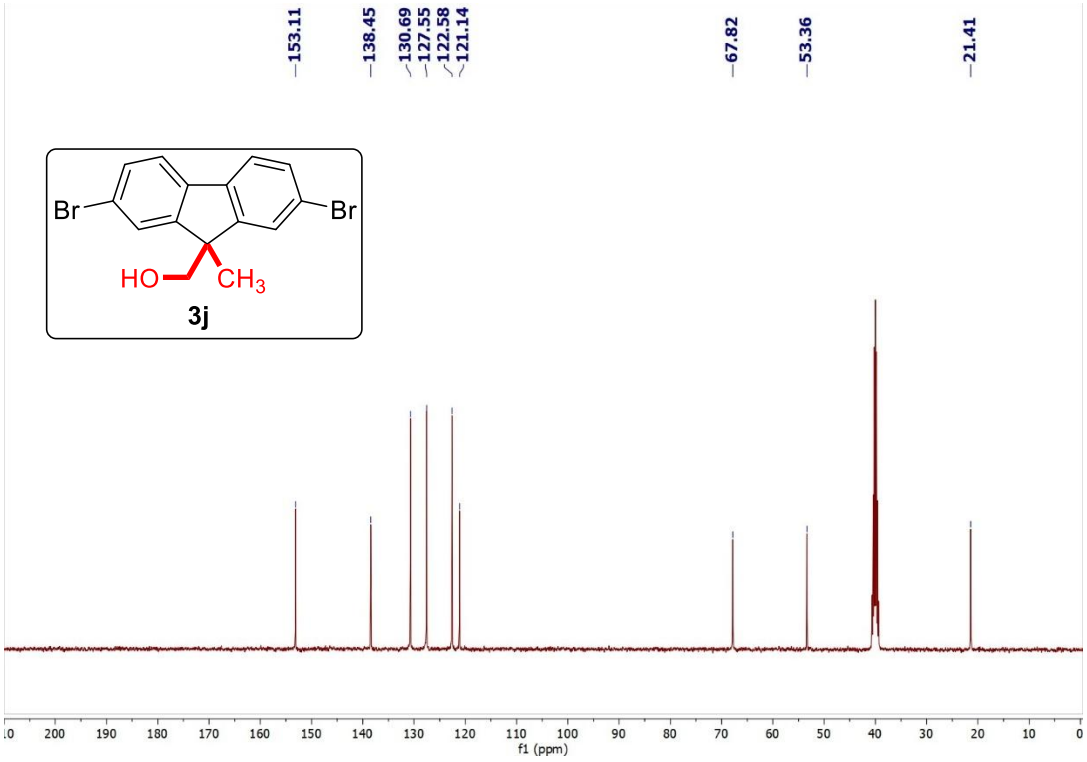
HRMS of (2-Iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3i)



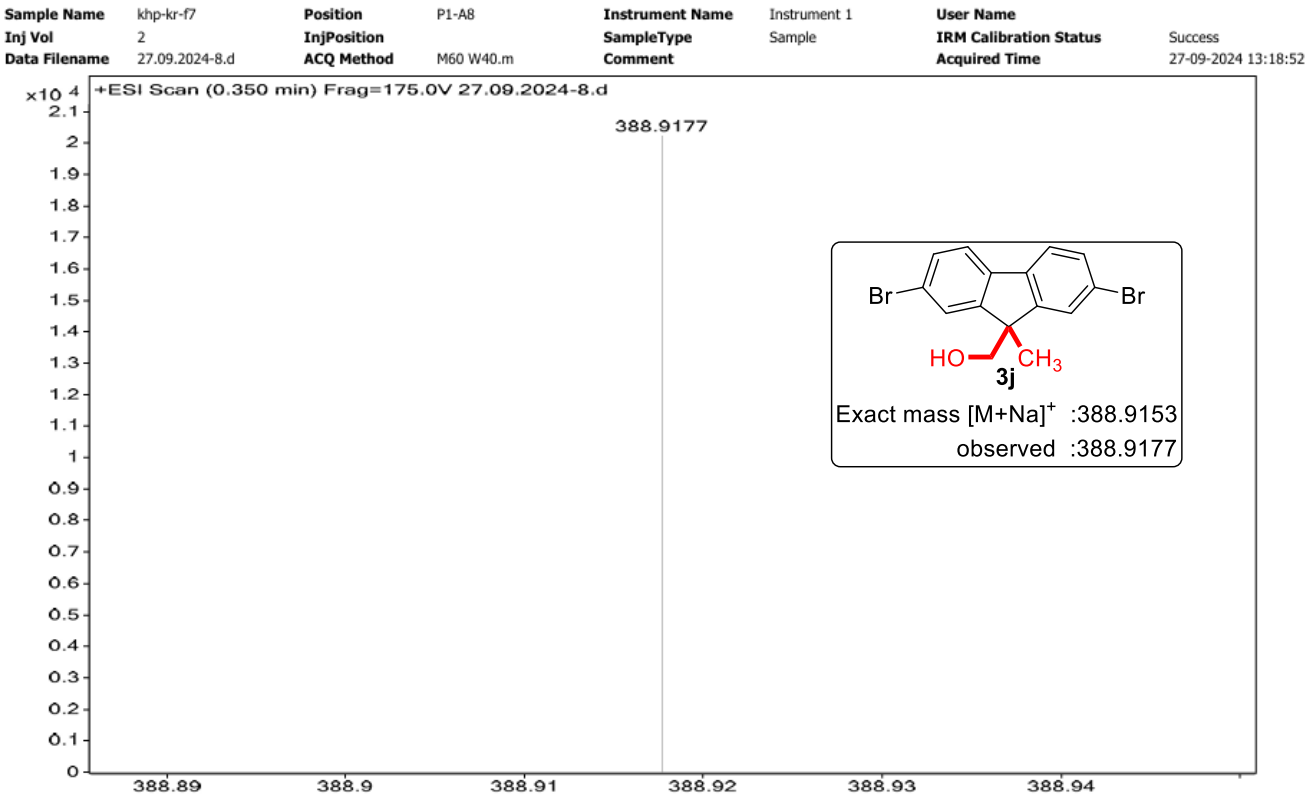
^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (2,7-Dibromo-9-methyl-9*H*-fluoren-9-yl)methanol (3j)



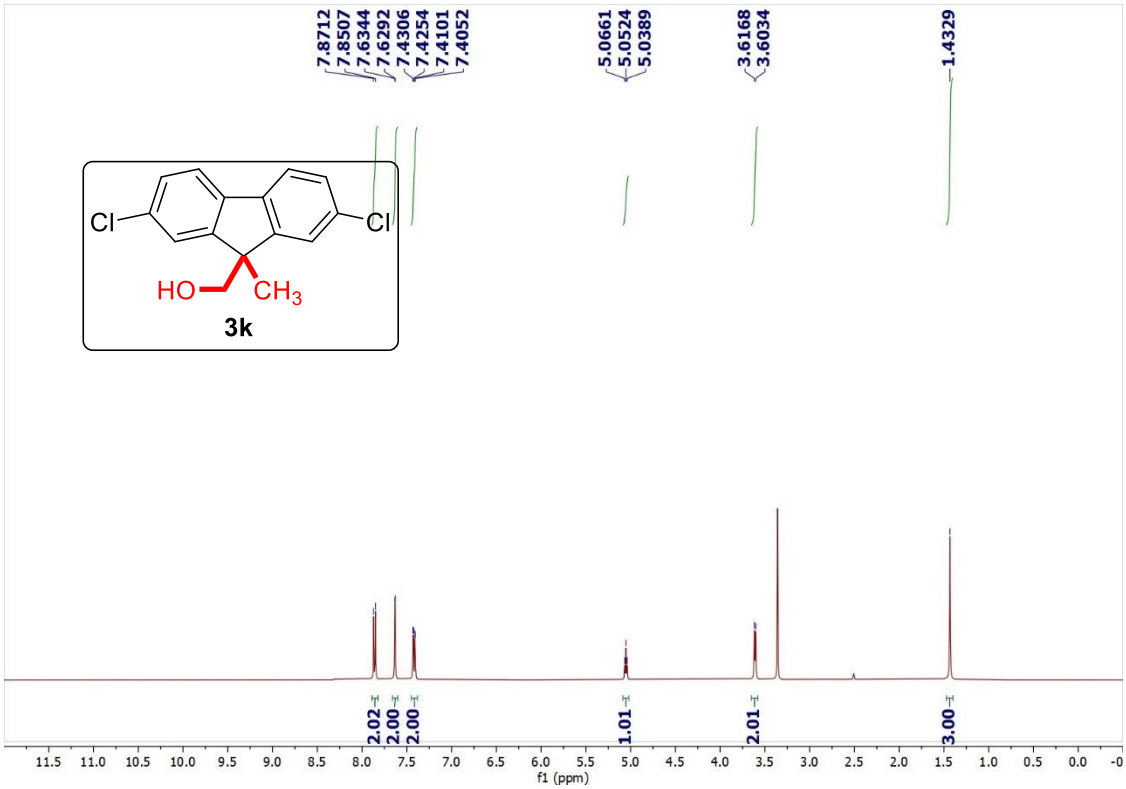
^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of of (2,7-Dibromo-9-methyl-9*H*-fluoren-9-yl)methanol (3j)



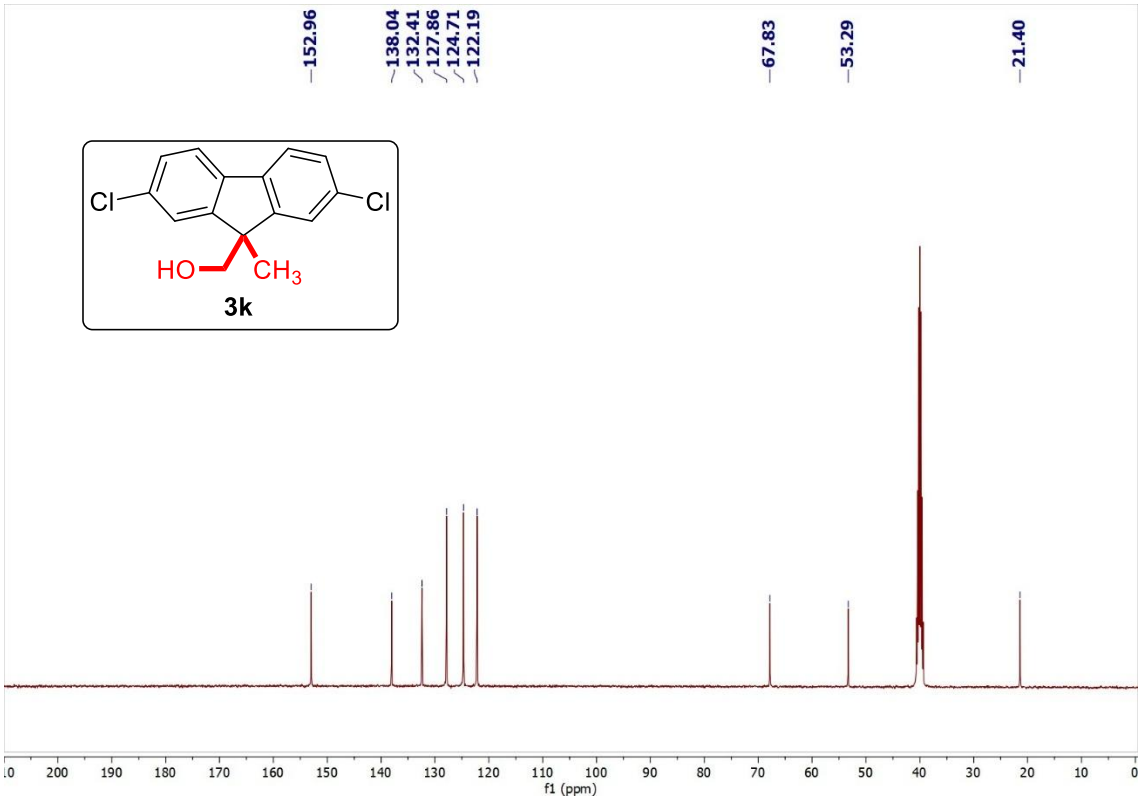
HRMS of (2,7-Dibromo-9-methyl-9*H*-fluoren-9-yl)methanol (3j)



^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (2,7-Dichloro-9-methyl-9*H*-fluoren-9-yl)methanol (3k)

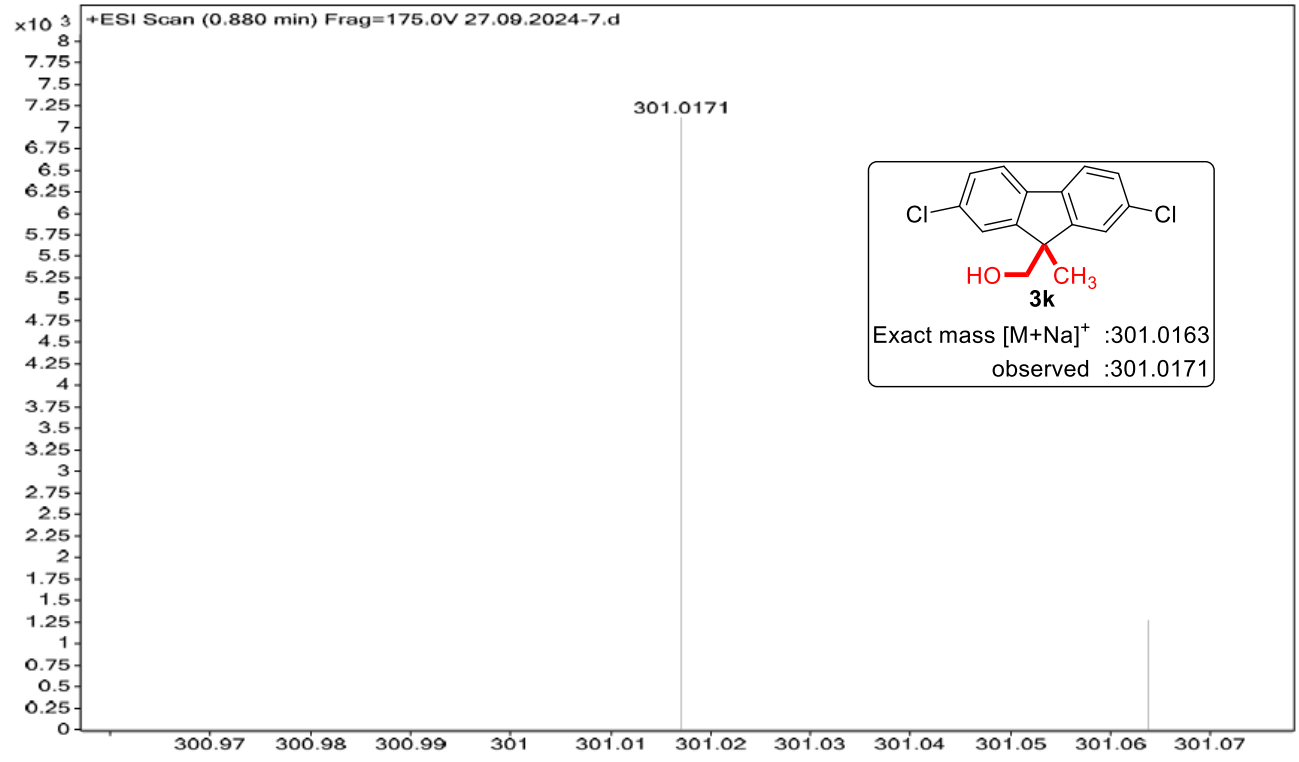


^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (2,7-Dichloro-9-methyl-9*H*-fluoren-9-yl)methanol (3k)

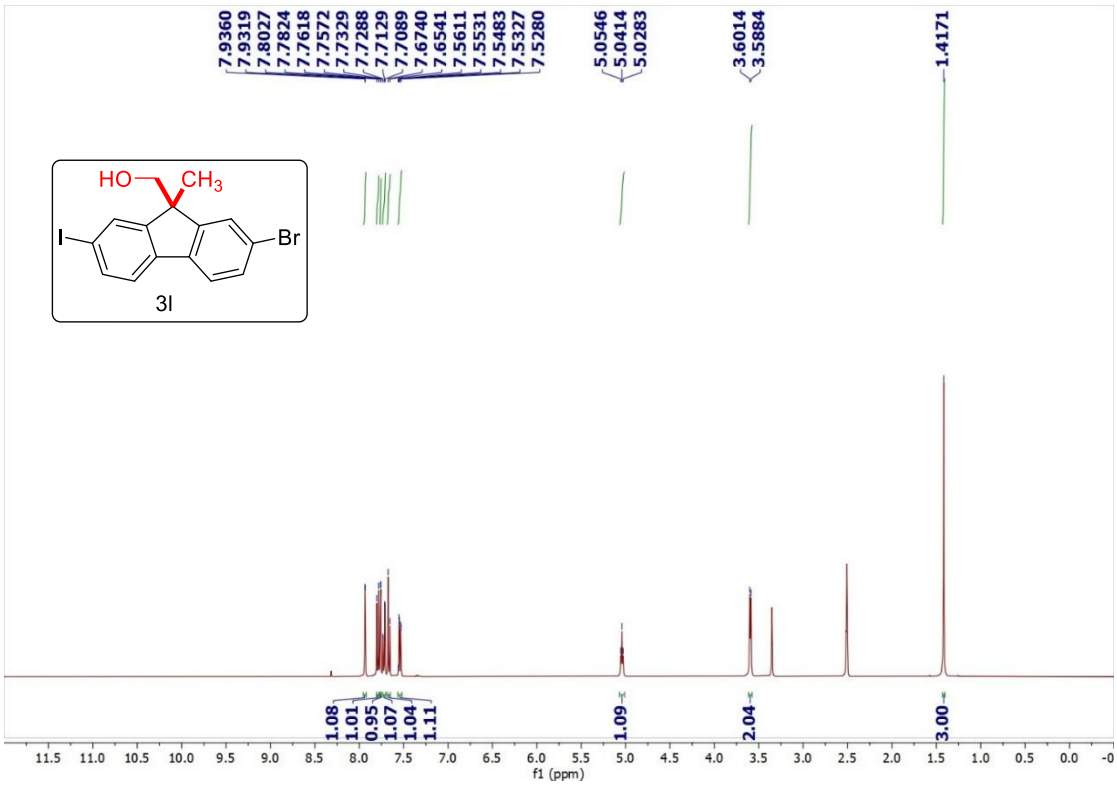


HRMS of (2,7-Dichloro-9-methyl-9*H*-fluoren-9-yl)methanol (3k)

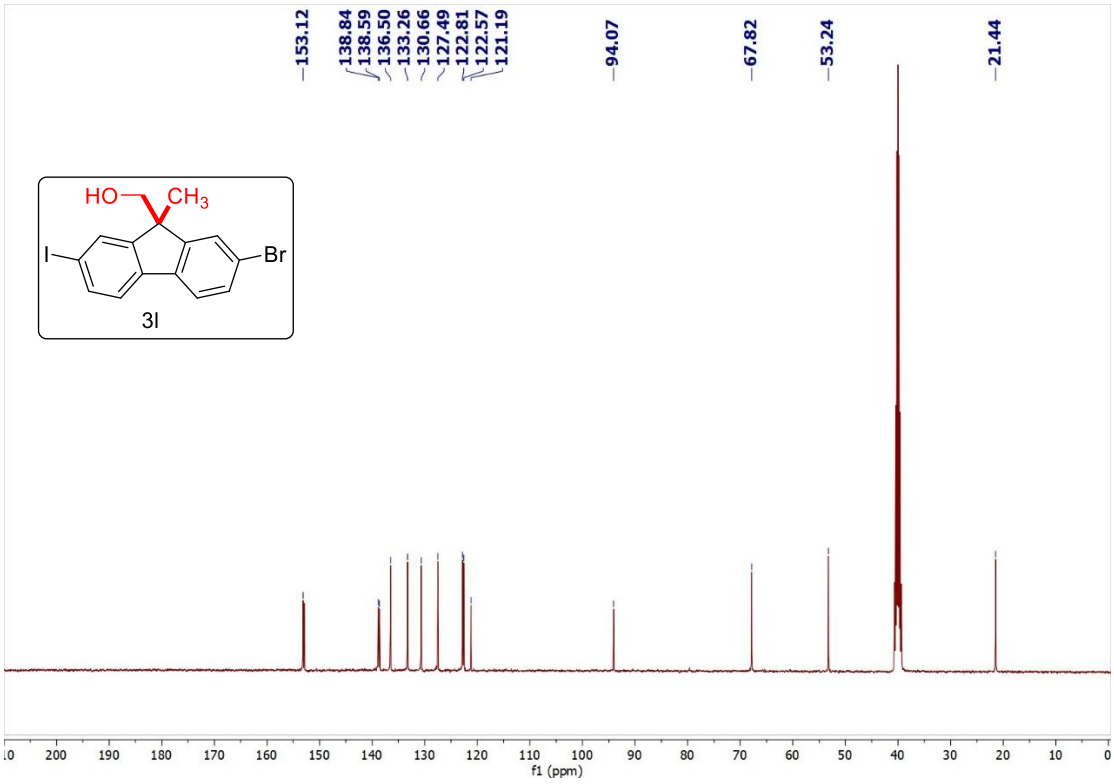
Sample Name	khp-kr-f6	**Position**	P1-A7	**Instrument Name**	Instrument 1	**User Name**	
Inj Vol	2	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	27.09.2024-7.d	**ACQ Method**	M60 W40.m	**Comment**		**Acquired Time**	27-09-2024 13:14:52



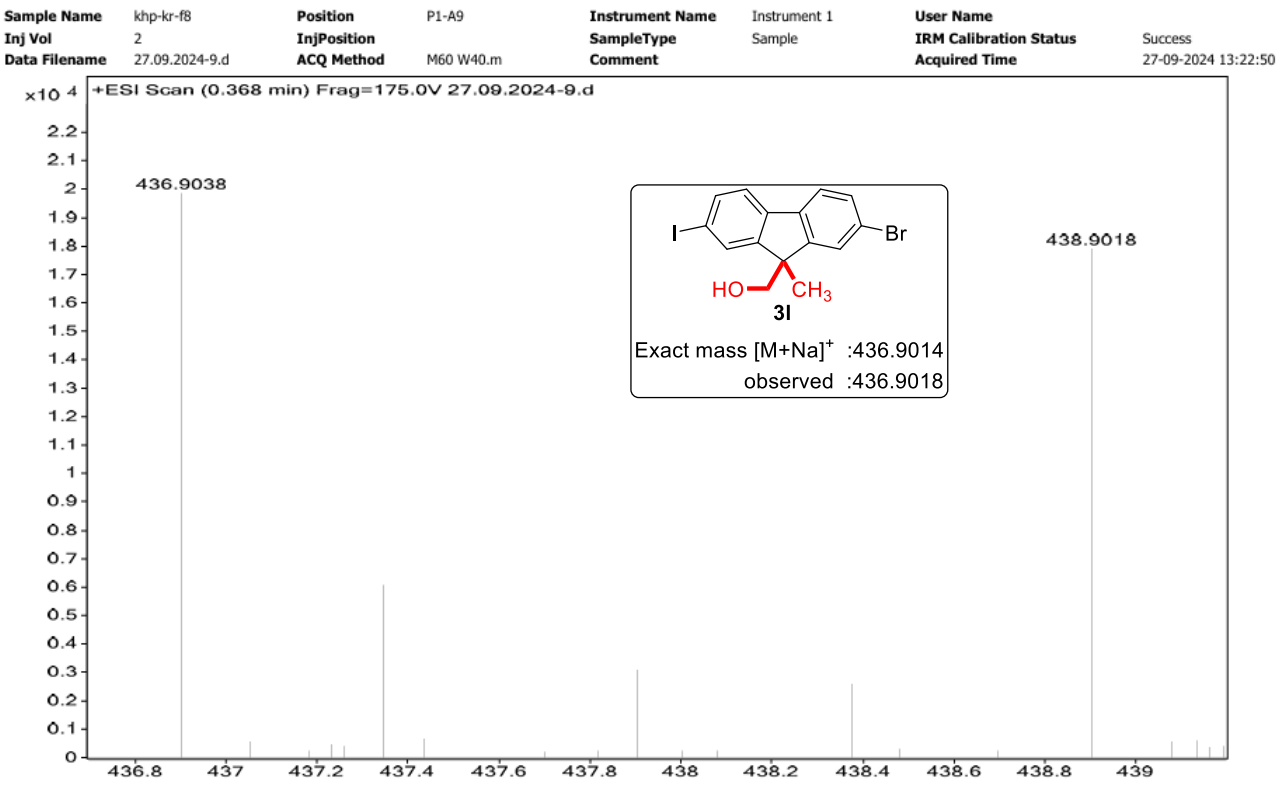
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (2-Bromo-7-iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3l)



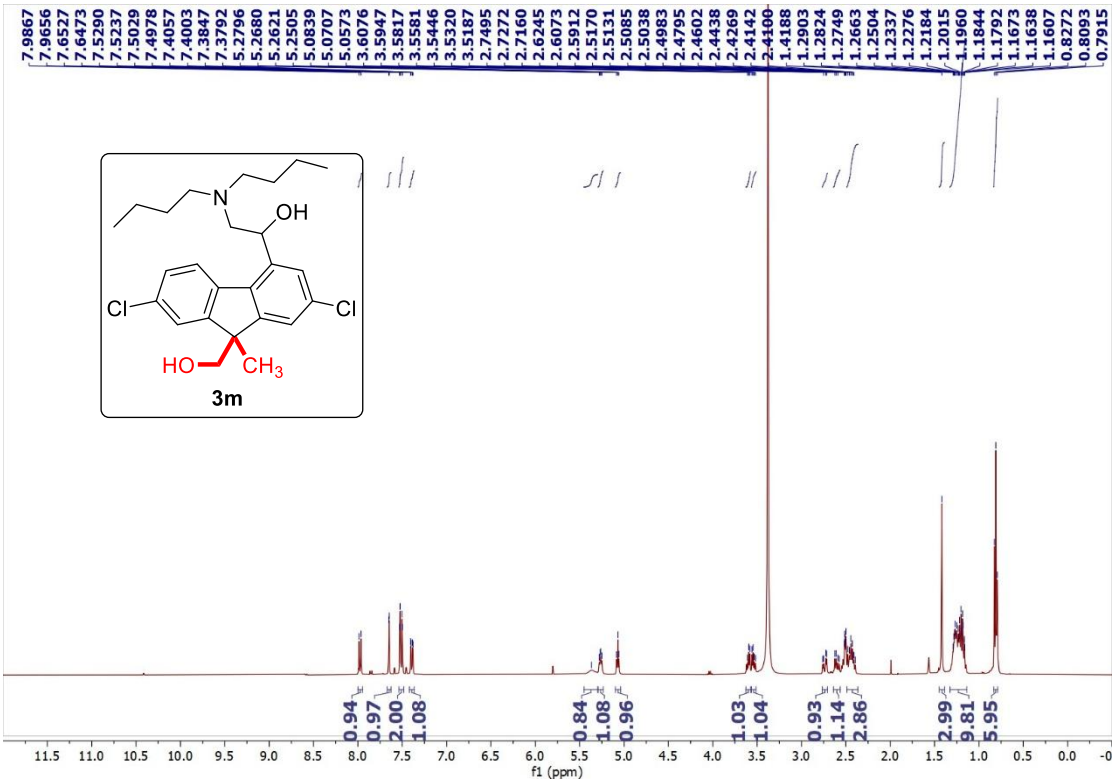
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (2-Bromo-7-iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3l)



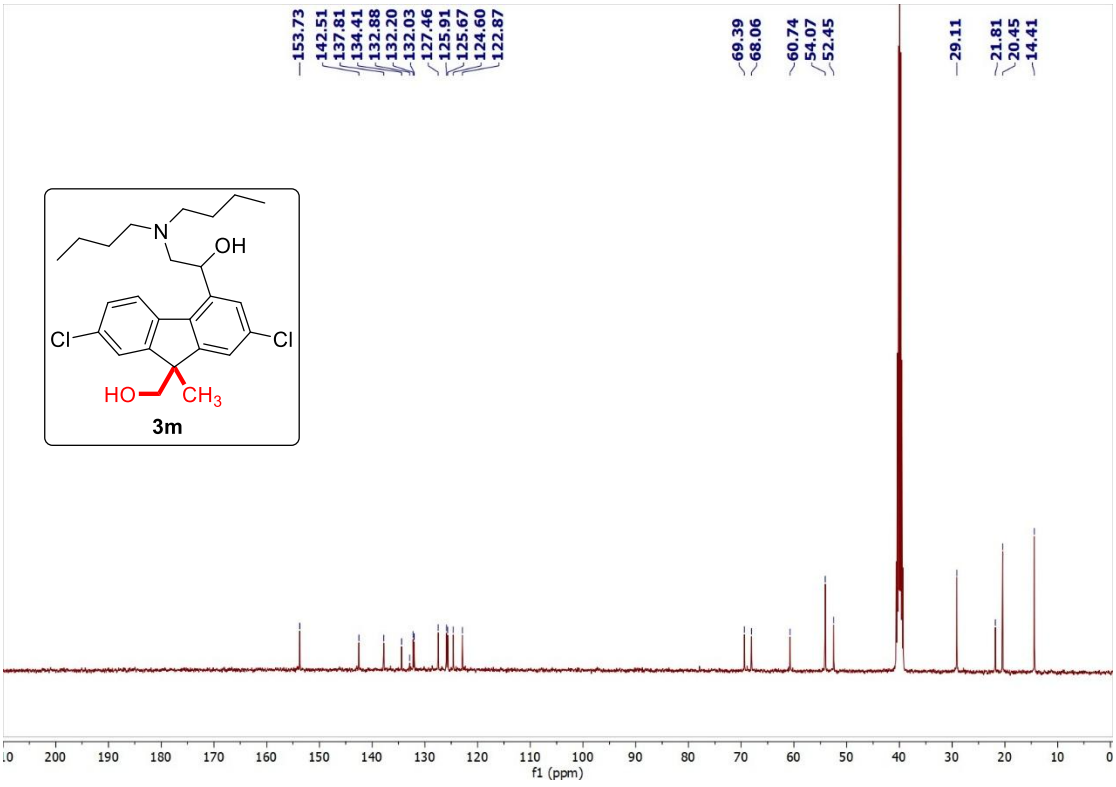
HRMS of (2-Bromo-7-iodo-9-methyl-9*H*-fluoren-9-yl)methanol (3l)



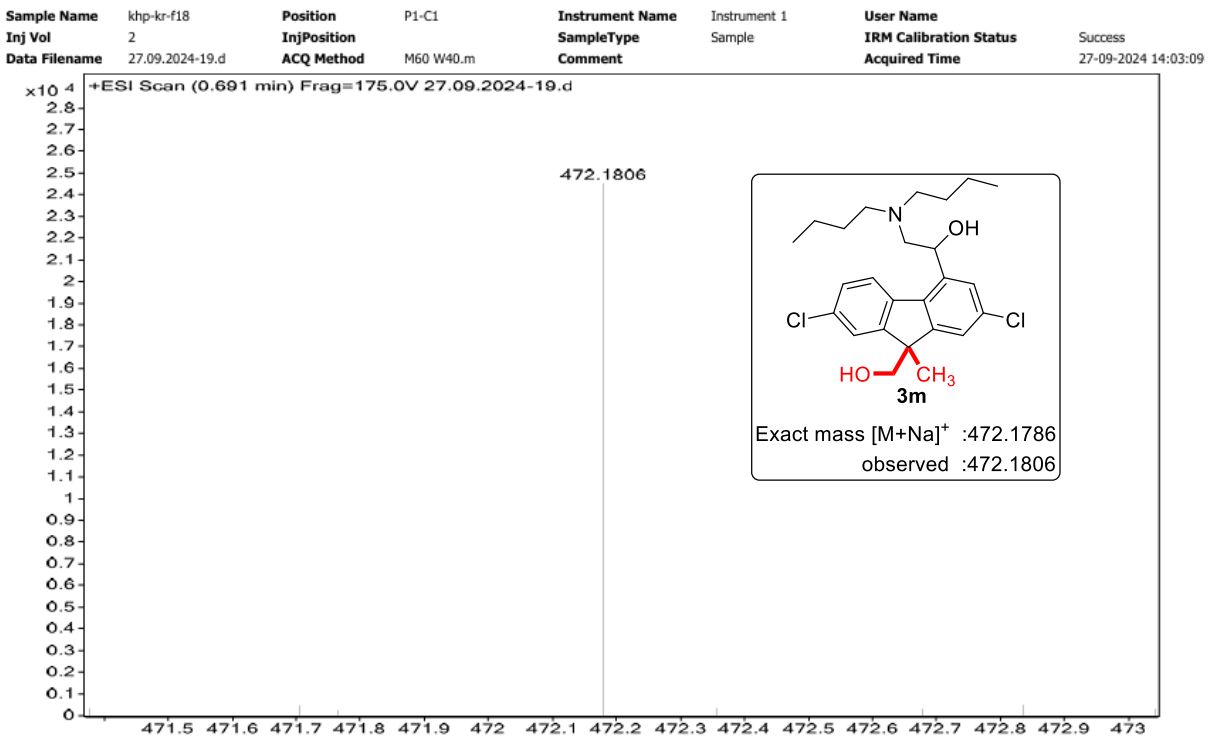
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of 2-(Dibutylamino)-1-(2,7-dichloro-9-(hydroxymethyl)-9-methyl-9*H*-fluoren-4-yl)ethan-1-ol (3m)



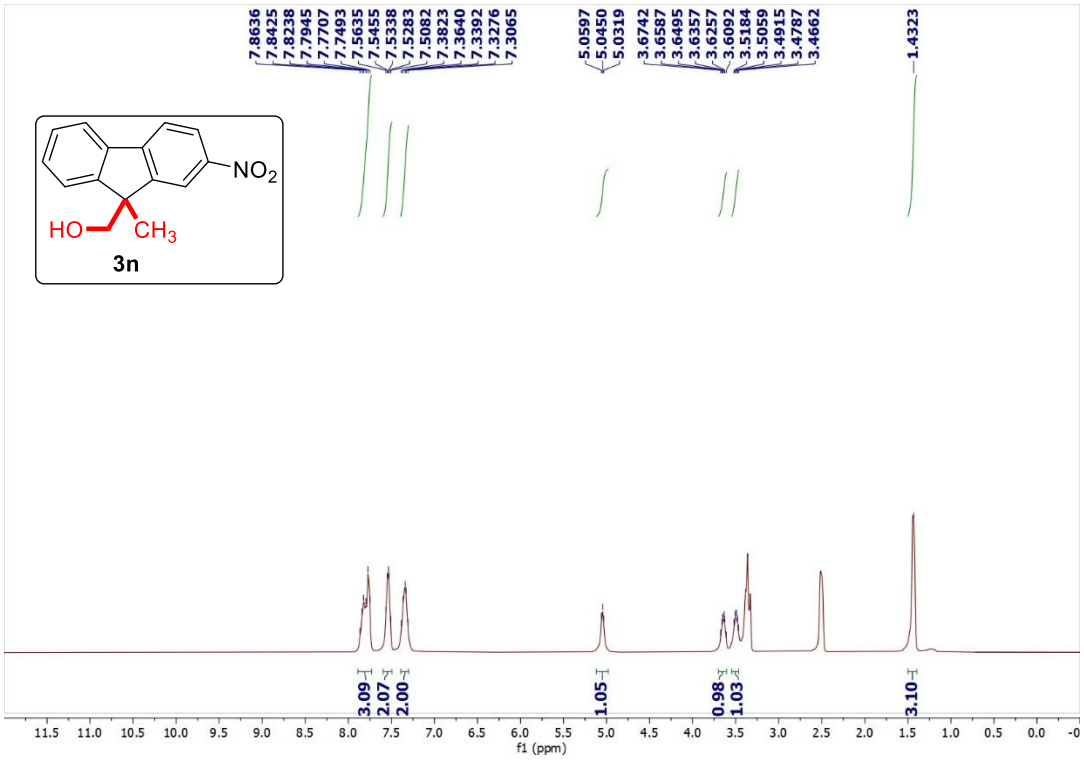
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of 2-(Dibutylamino)-1-(2,7-dichloro-9-(hydroxymethyl)-9-methyl-9*H*-fluoren-4-yl)ethan-1-ol (3m)



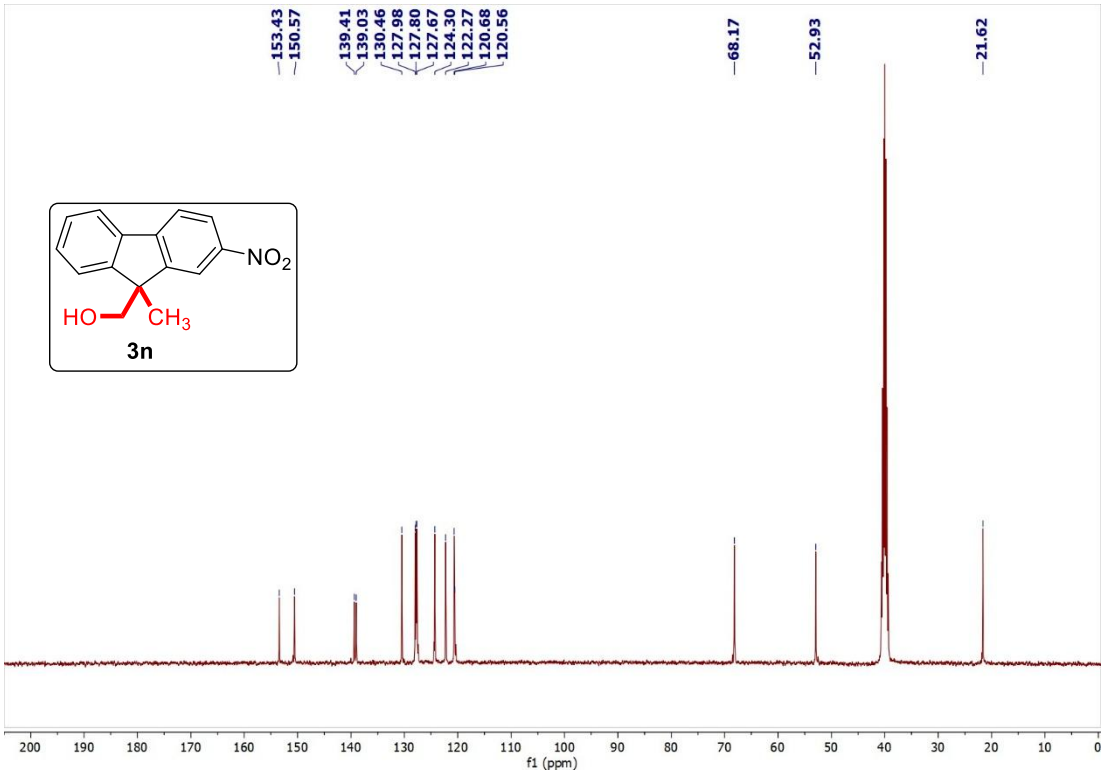
HRMS of 2-(Dibutylamino)-1-(2,7-dichloro-9-(hydroxymethyl)-9-methyl-9*H*-fluoren-4-yl)ethan-1-ol (3m)



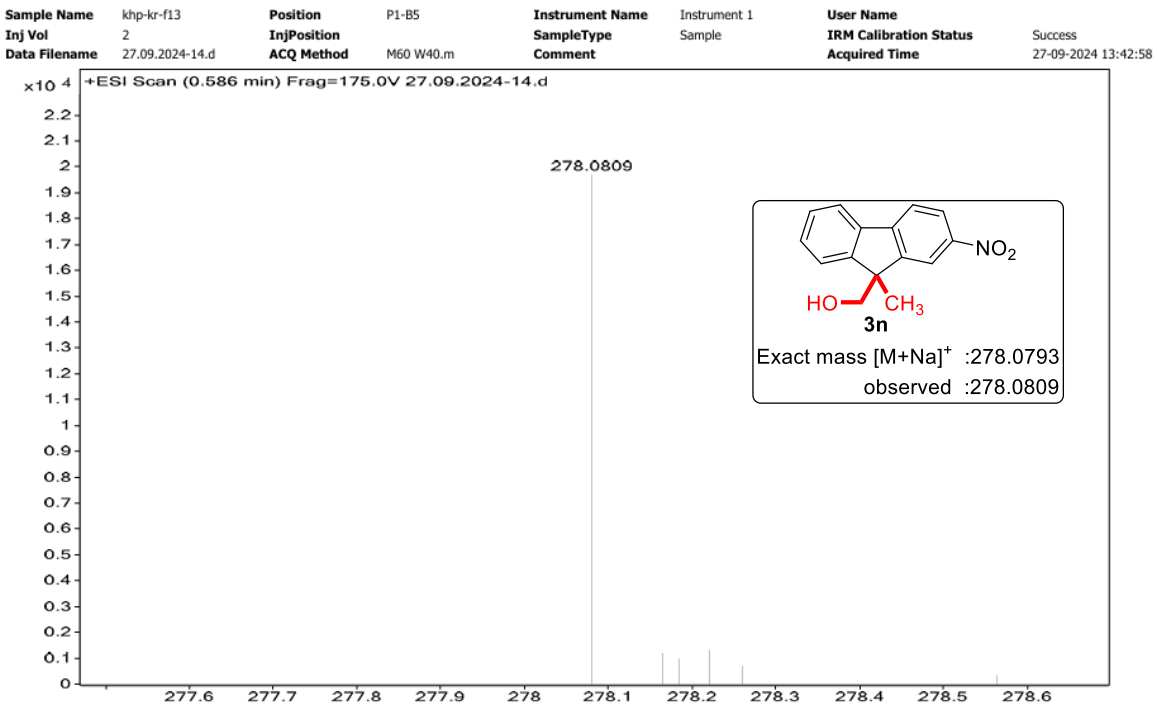
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (9-Methyl-2-nitro-9*H*-fluoren-9-yl)methanol 3 (3n)



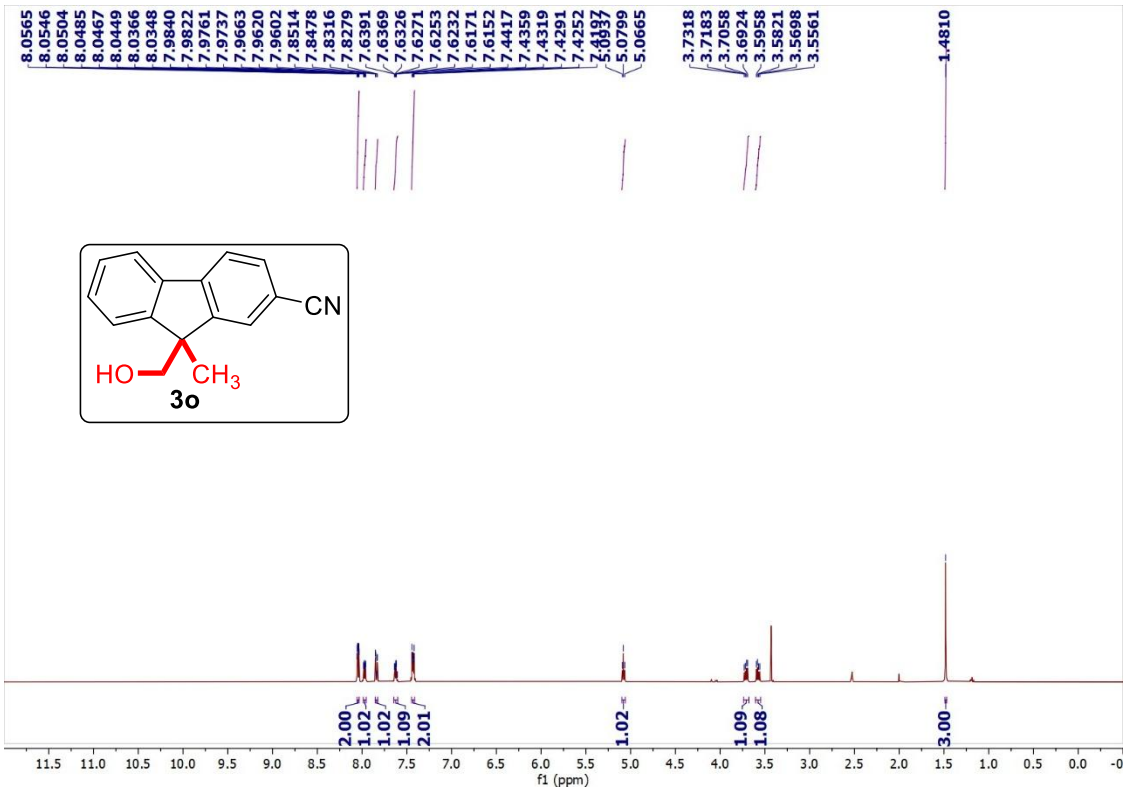
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (9-Methyl-2-nitro-9*H*-fluoren-9-yl)methanol 3 (3n)



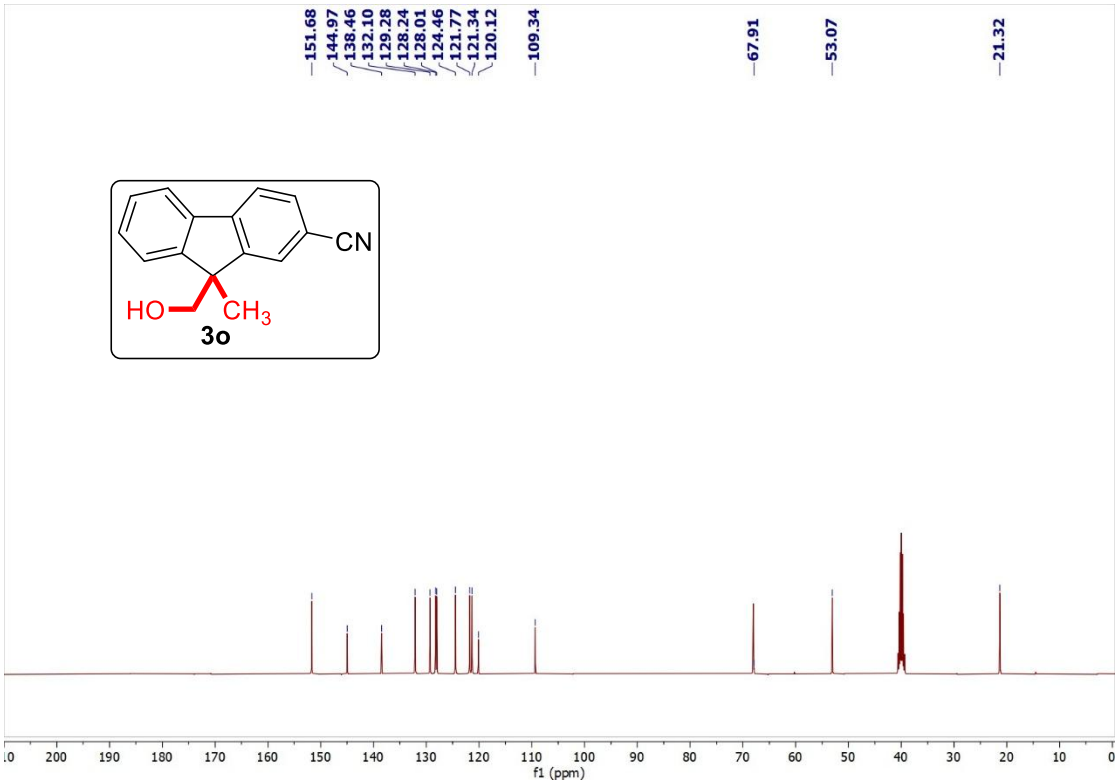
HRMS of (9-Methyl-2-nitro-9*H*-fluoren-9-yl)methanol 3 (3n)



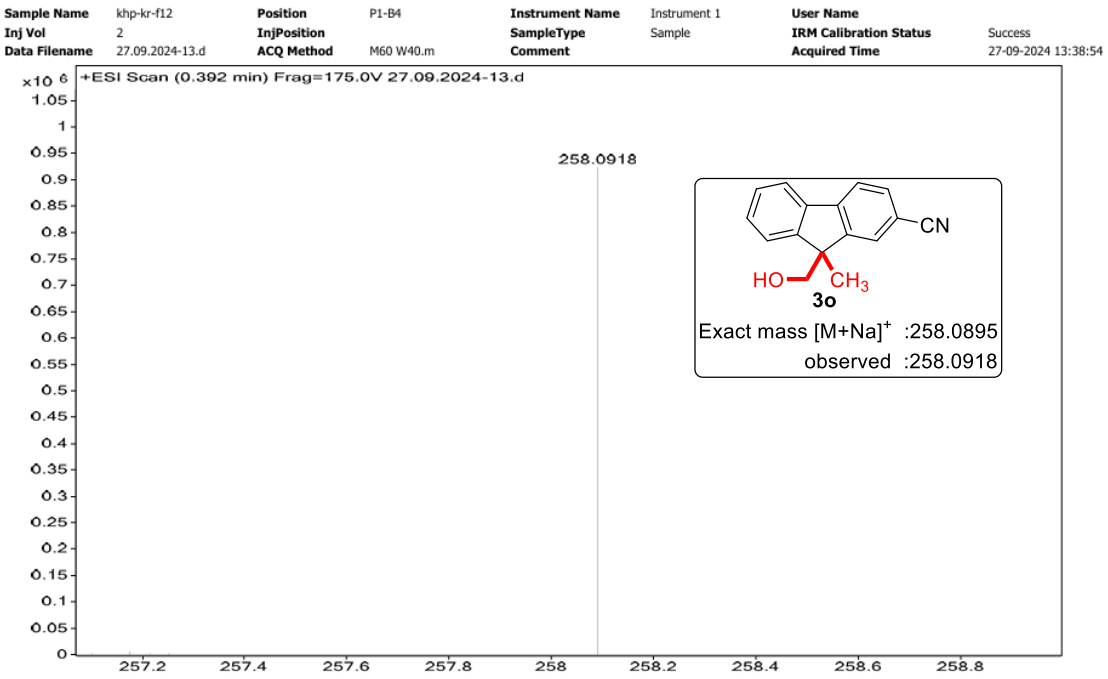
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of 9-(Hydroxymethyl)-9-methyl-9*H*-fluorene-2-carbonitrile (3o)



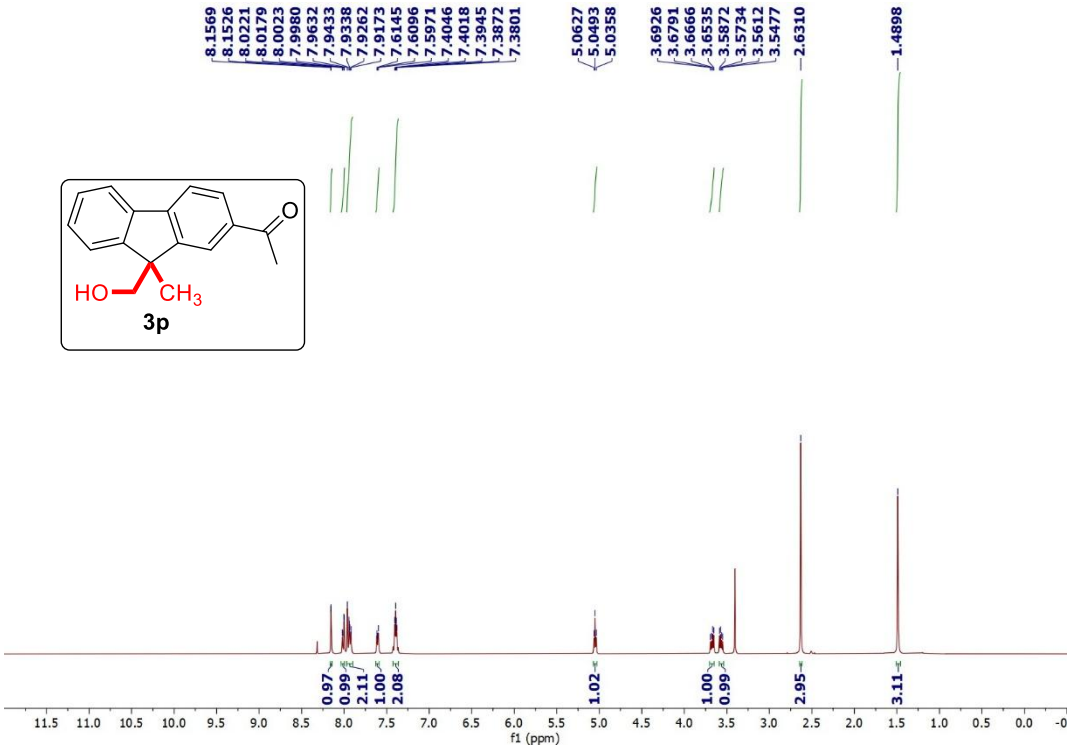
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of 9-(Hydroxymethyl)-9-methyl-9*H*-fluorene-2-carbonitrile (3o)



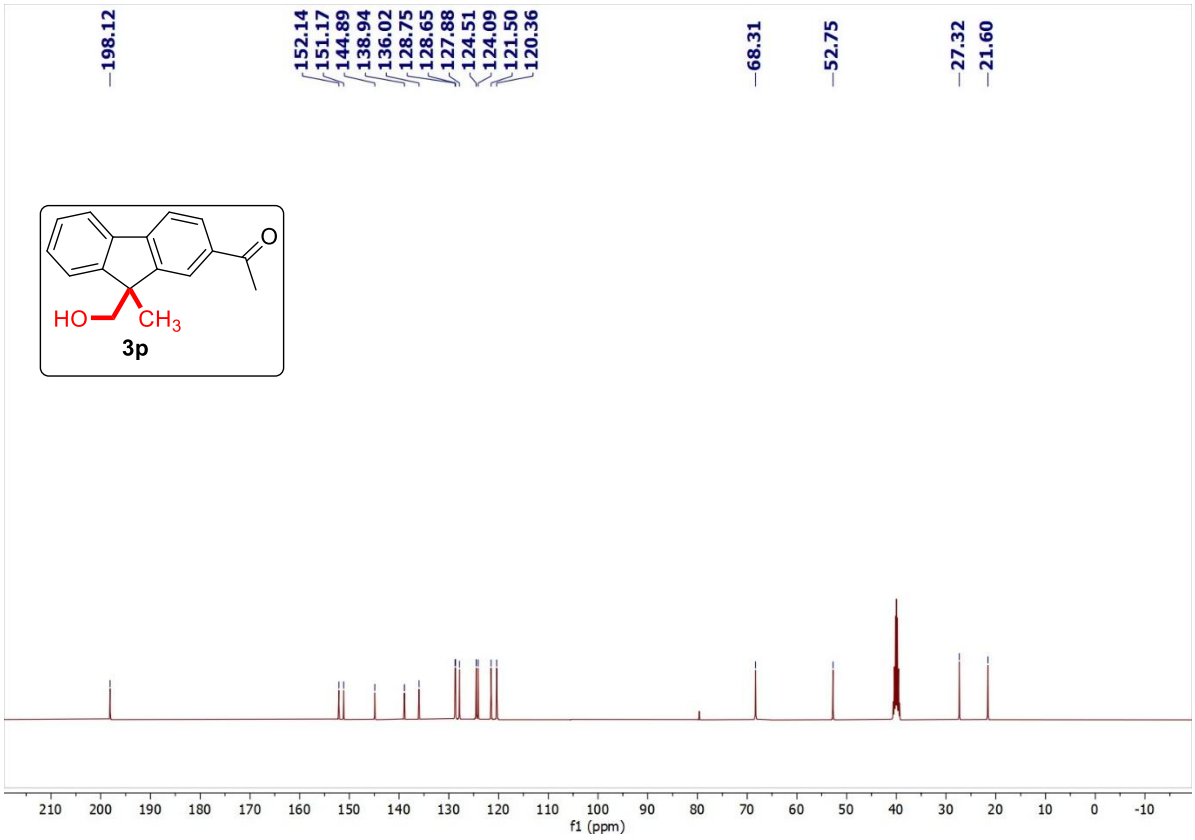
HRMS of 9-(Hydroxymethyl)-9-methyl-9*H*-fluorene-2-carbonitrile (3o)



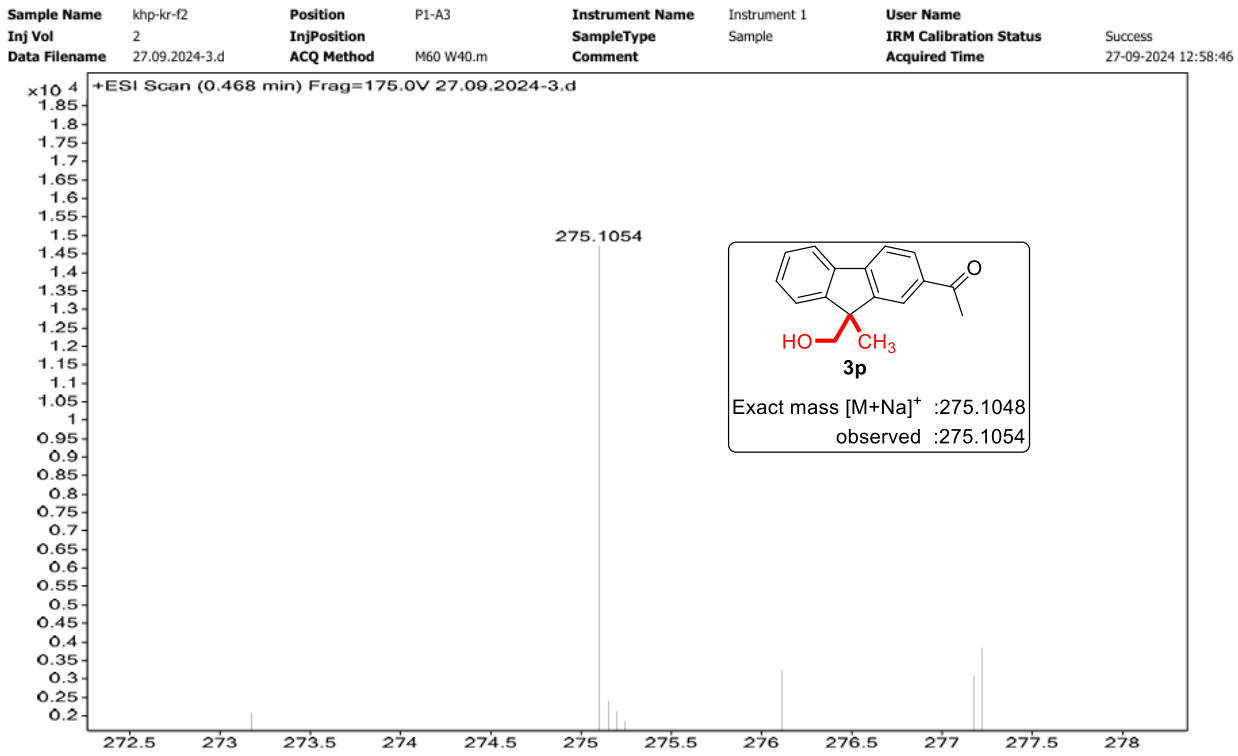
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-one (3p)



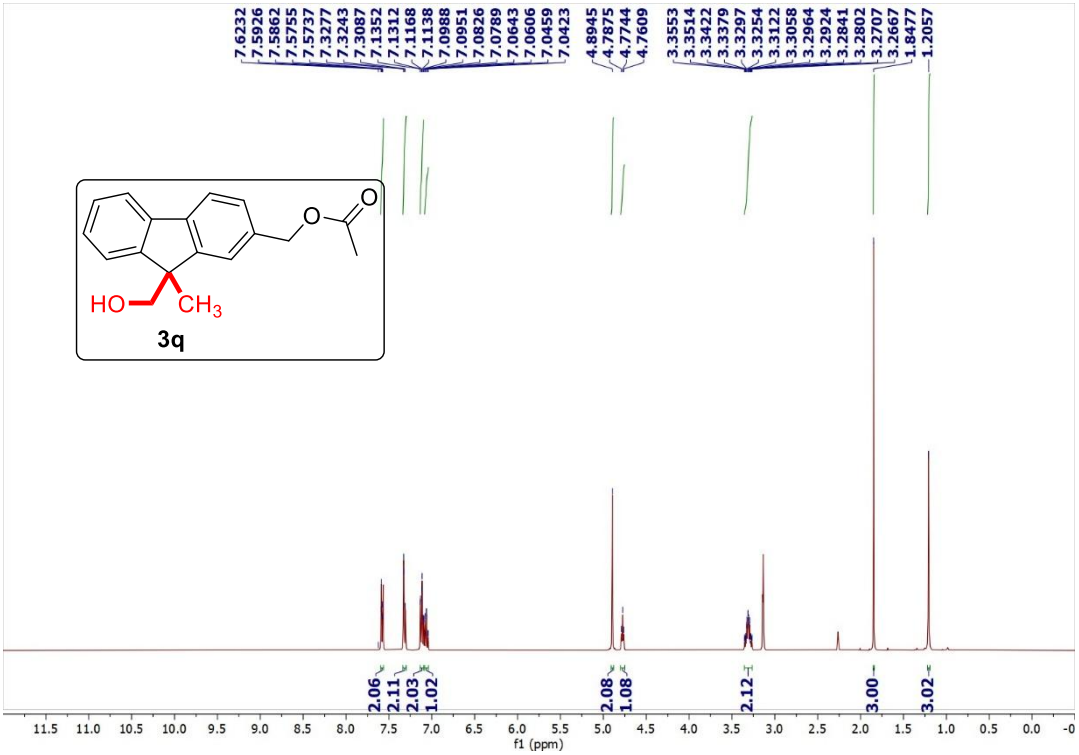
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-one (3p)



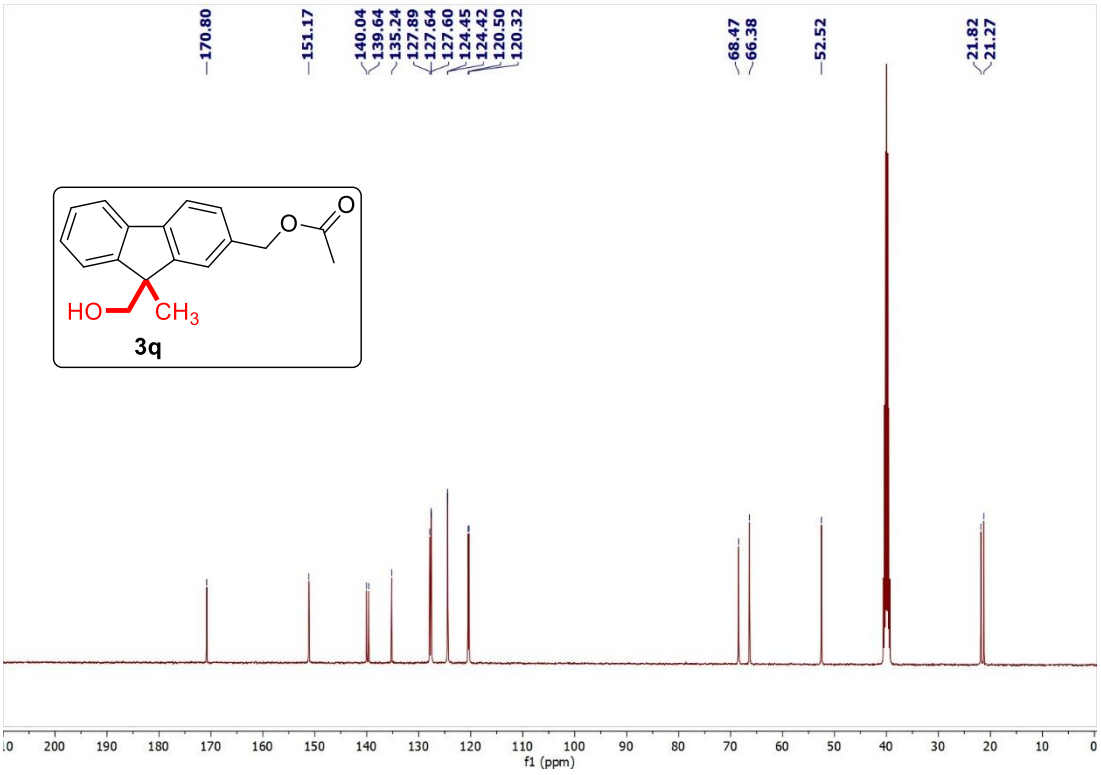
HRMS of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethan-1-one (3p)



^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)mesthyl acetate (3q)

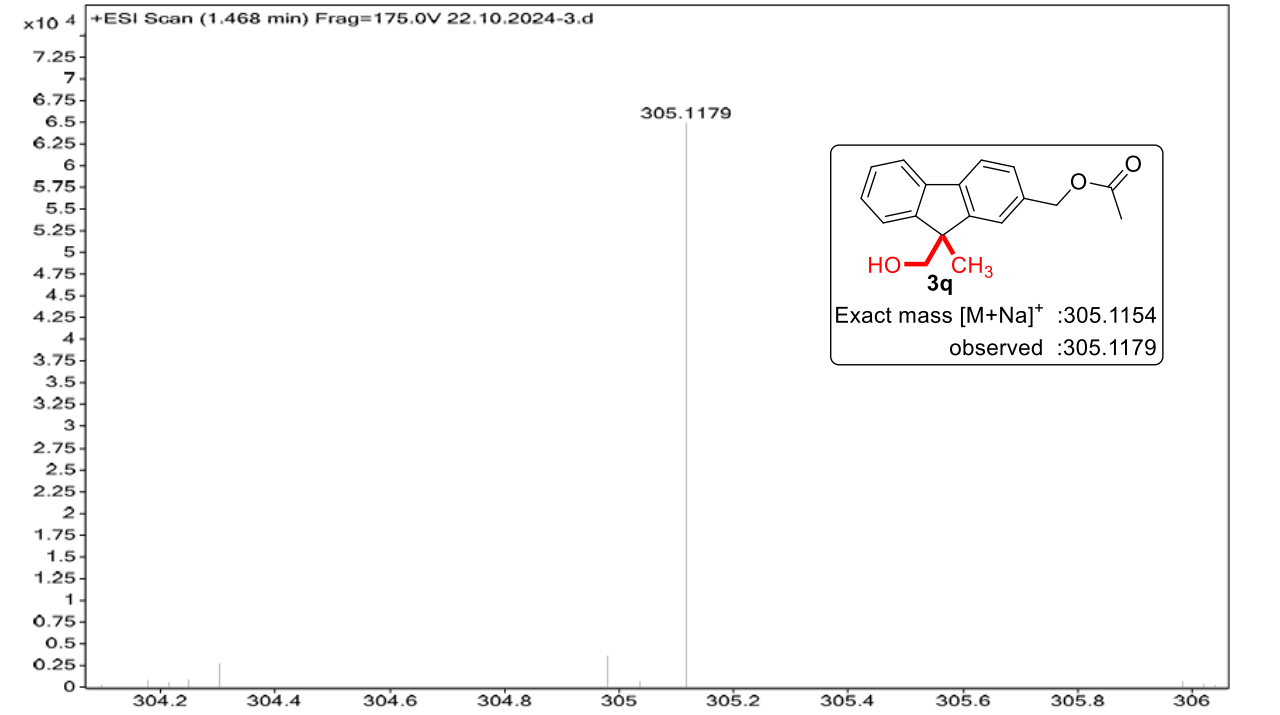


^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)mesthyl acetate (3q)

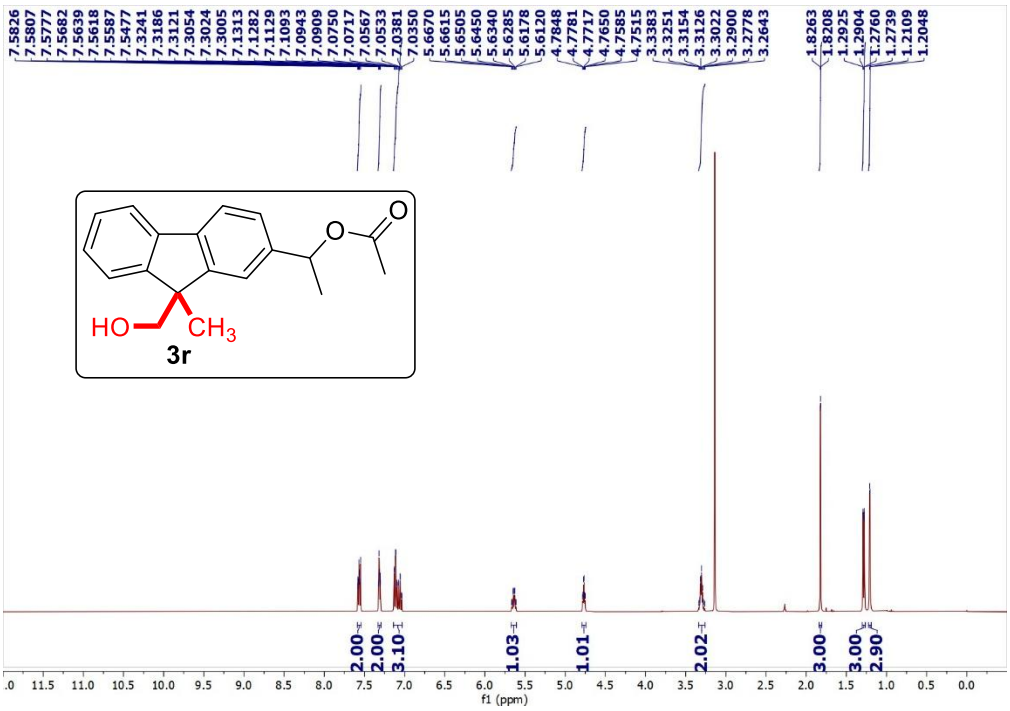


HRMS of (9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)mesthyl acetate (3q)

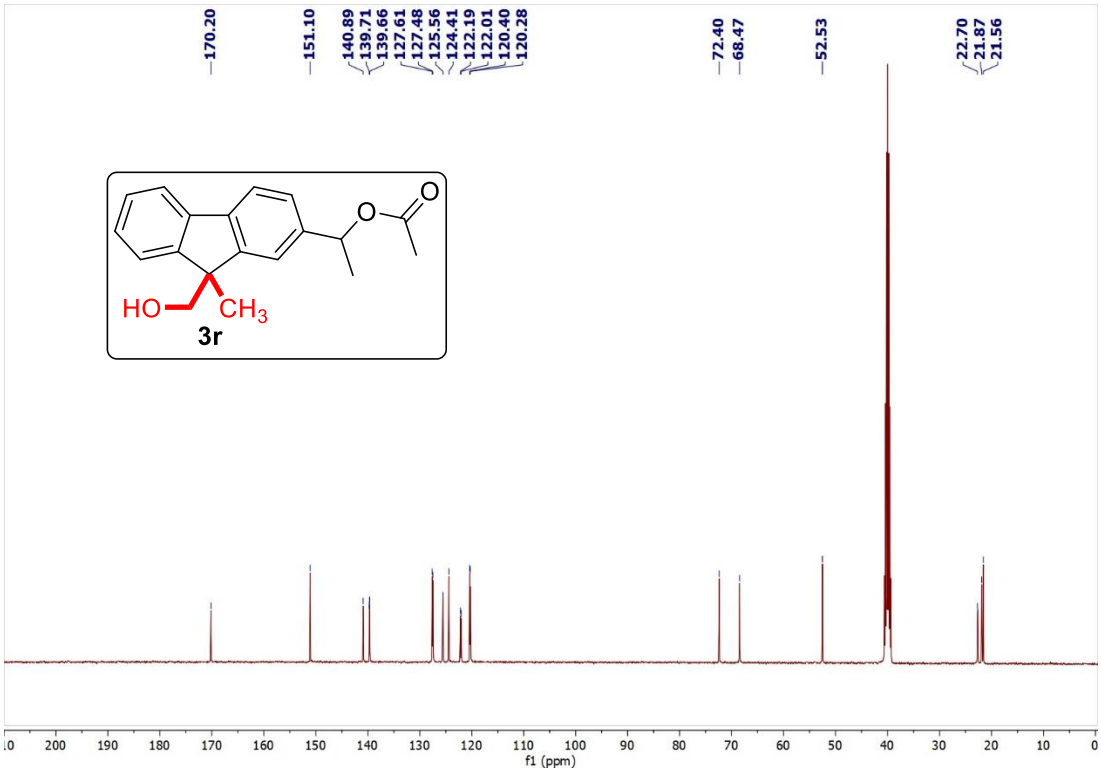
Sample Name	khp-kr-f20	**Position**	P1-A3	**Instrument Name**	Instrument 1	**User Name**	
Inj Vol	2	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	22.10.2024-3.d	**ACQ Method**	M60 W40.m	**Comment**		**Acquired Time**	22-10-2024 13:31:34



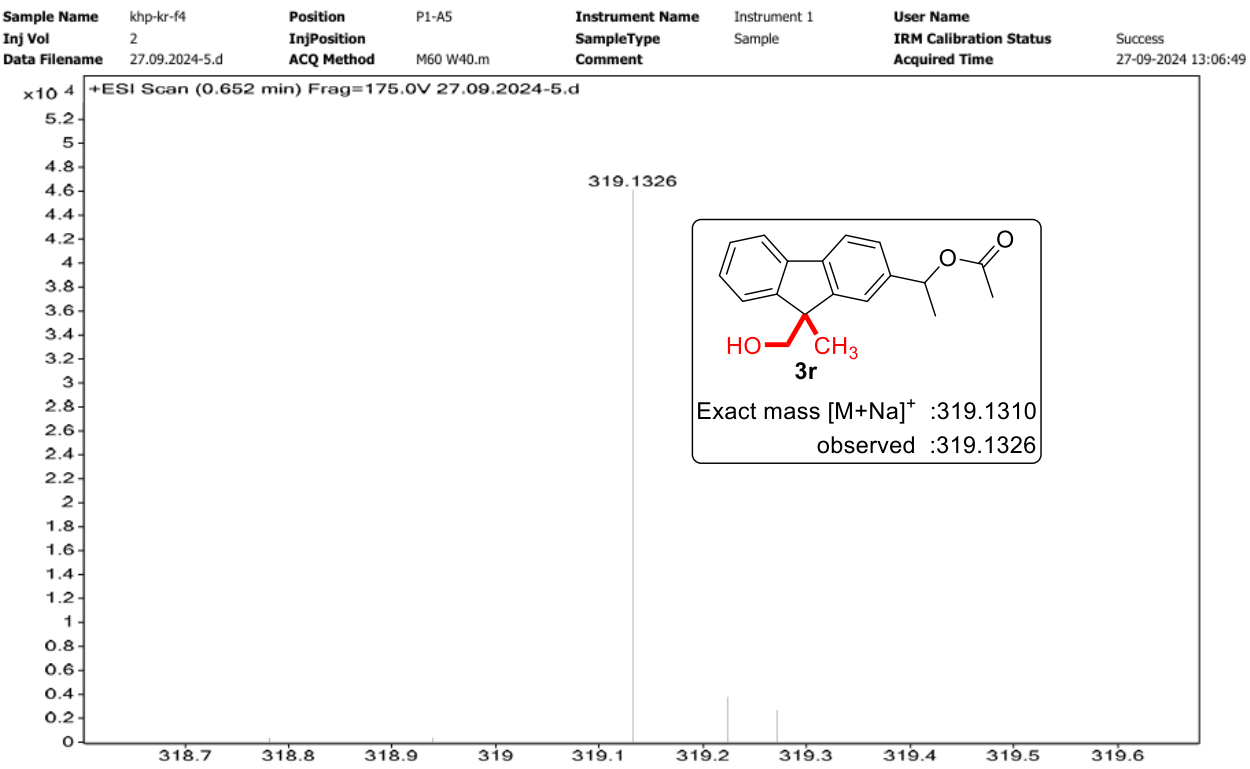
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethyl acetate (3r)



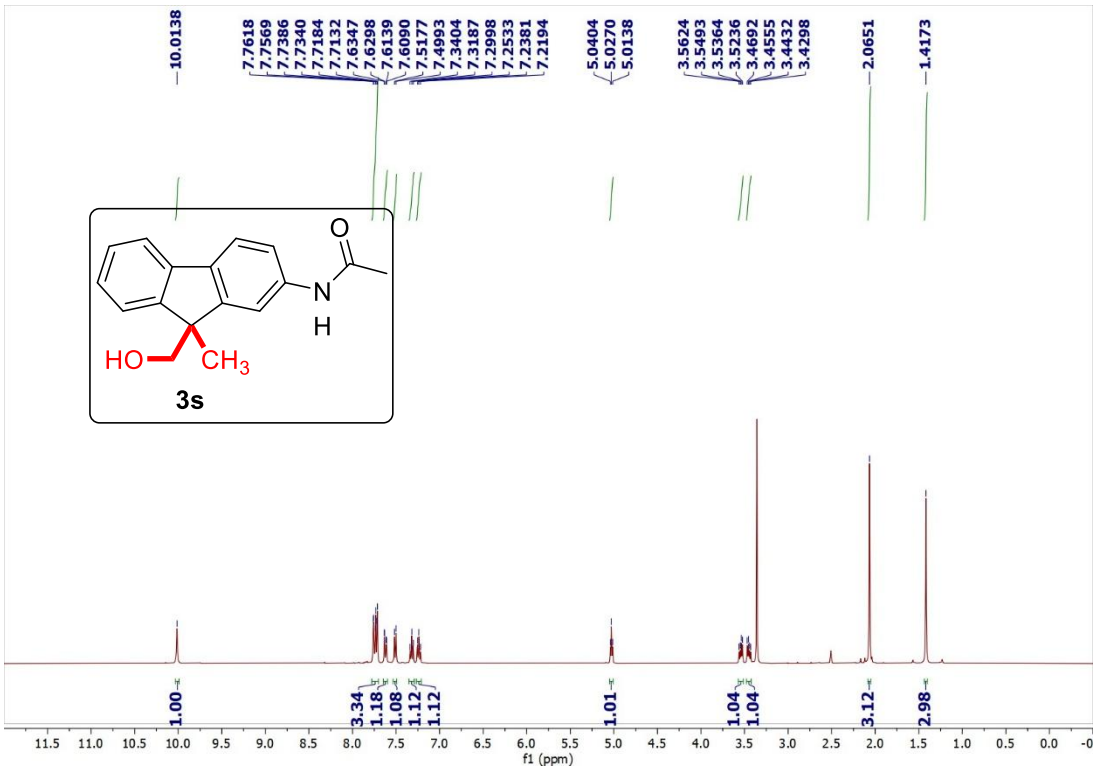
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethyl acetate (3r)



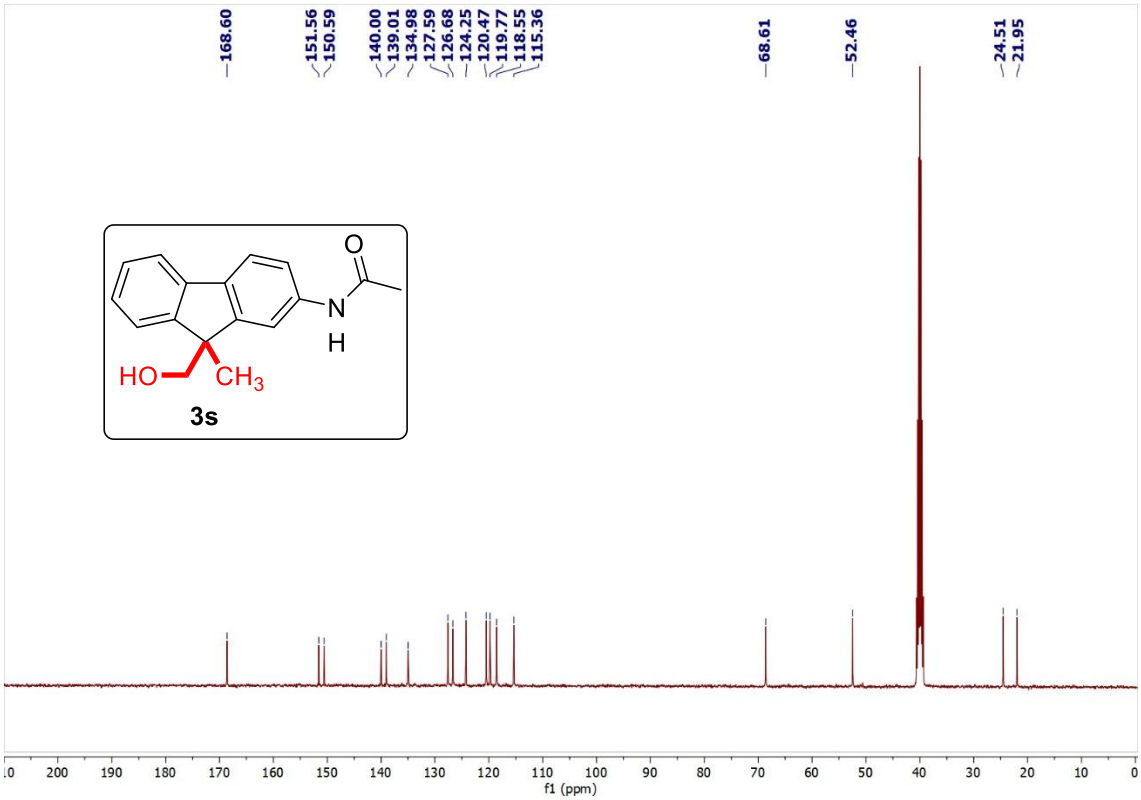
HRMS of 1-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)ethyl acetate (3r)



^{1}H NMR (400 MHz, DMSO-d_6) spectrum of N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)acetamide (3s)

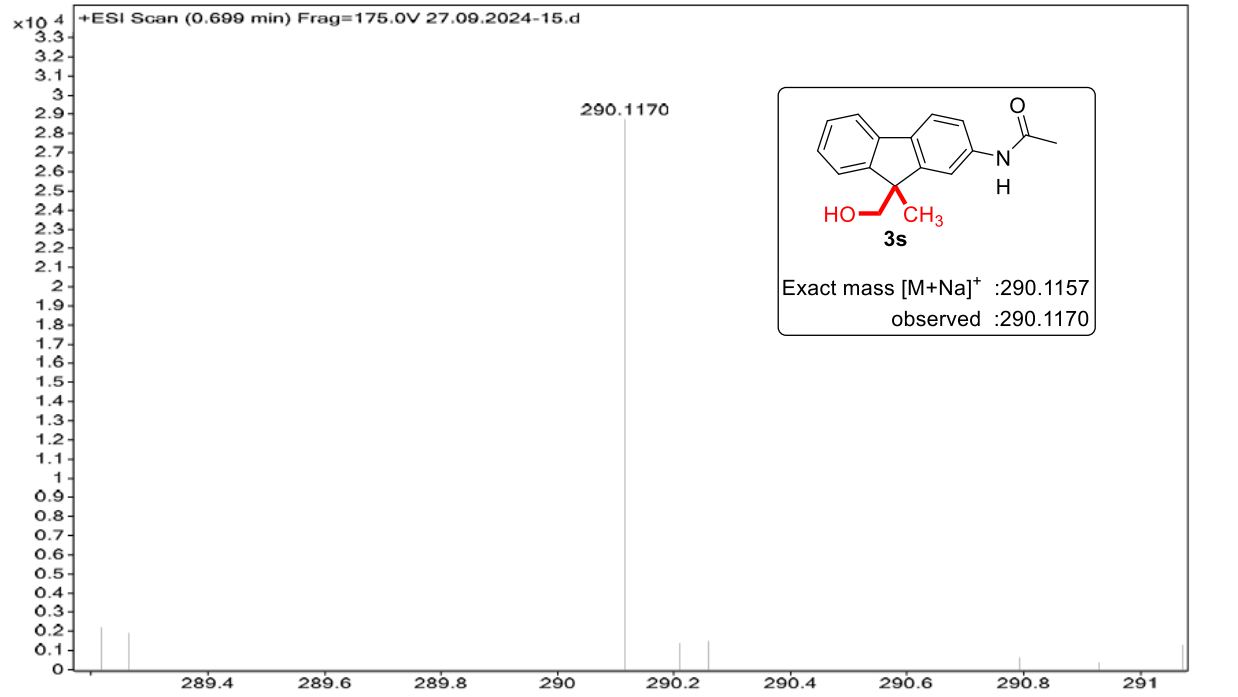


^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)acetamide (3s)

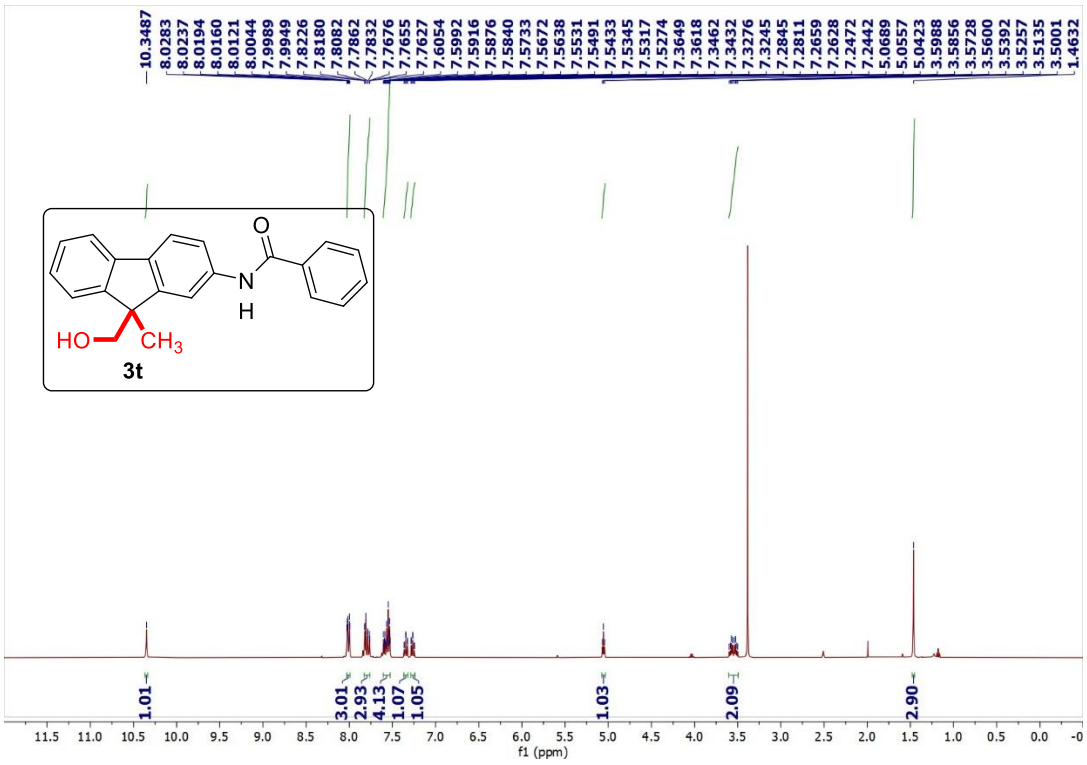


HRMS of spectrum of N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)acetamide (3s)

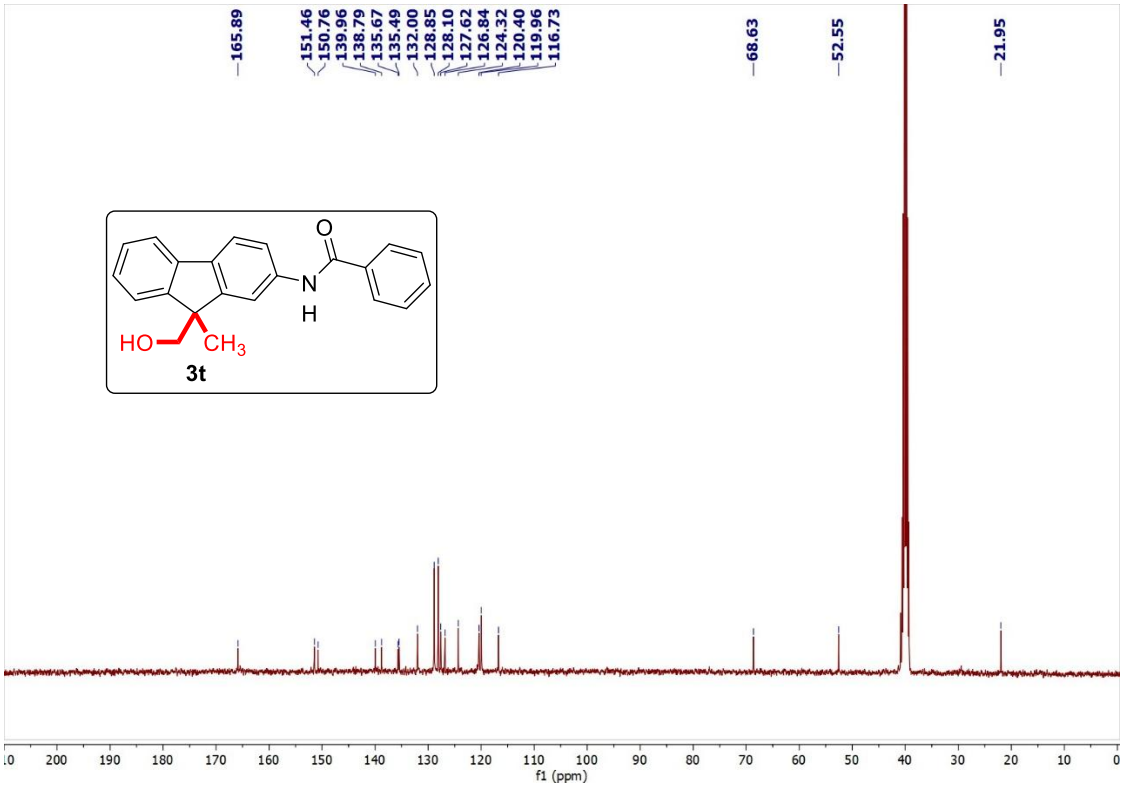
Sample Name	khp-kr-f14	**Position**	P1-B6	**Instrument Name**	Instrument 1	**User Name**	
Inj Vol	2	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	27.09.2024-15.d	**ACQ Method**	M60 W40.m	**Comment**		**Acquired Time**	27-09-2024 13:47:01



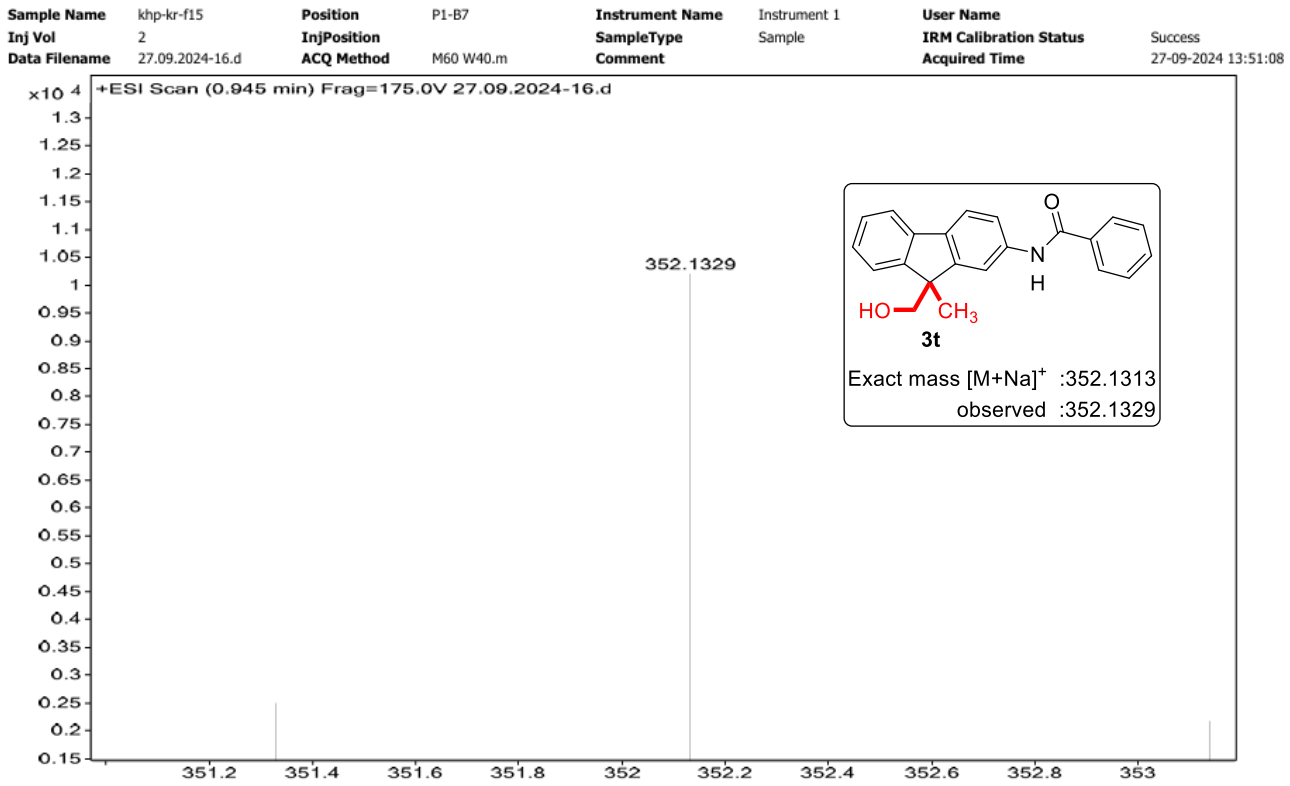
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)benzamide (3t)



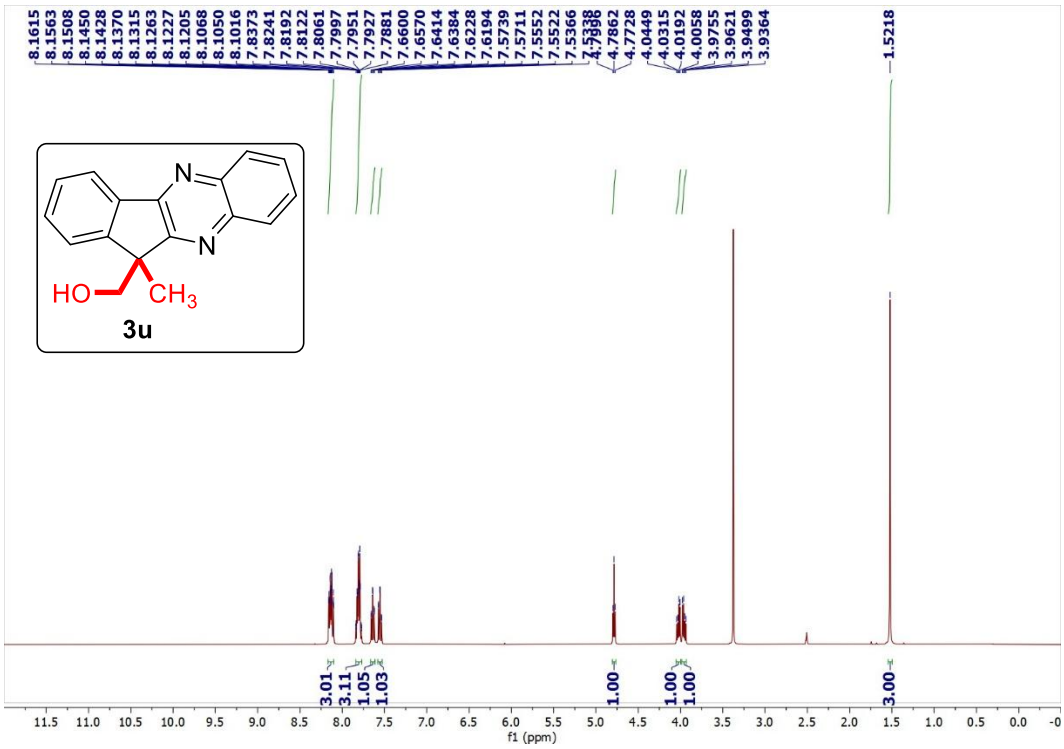
^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)benzamide (3t)



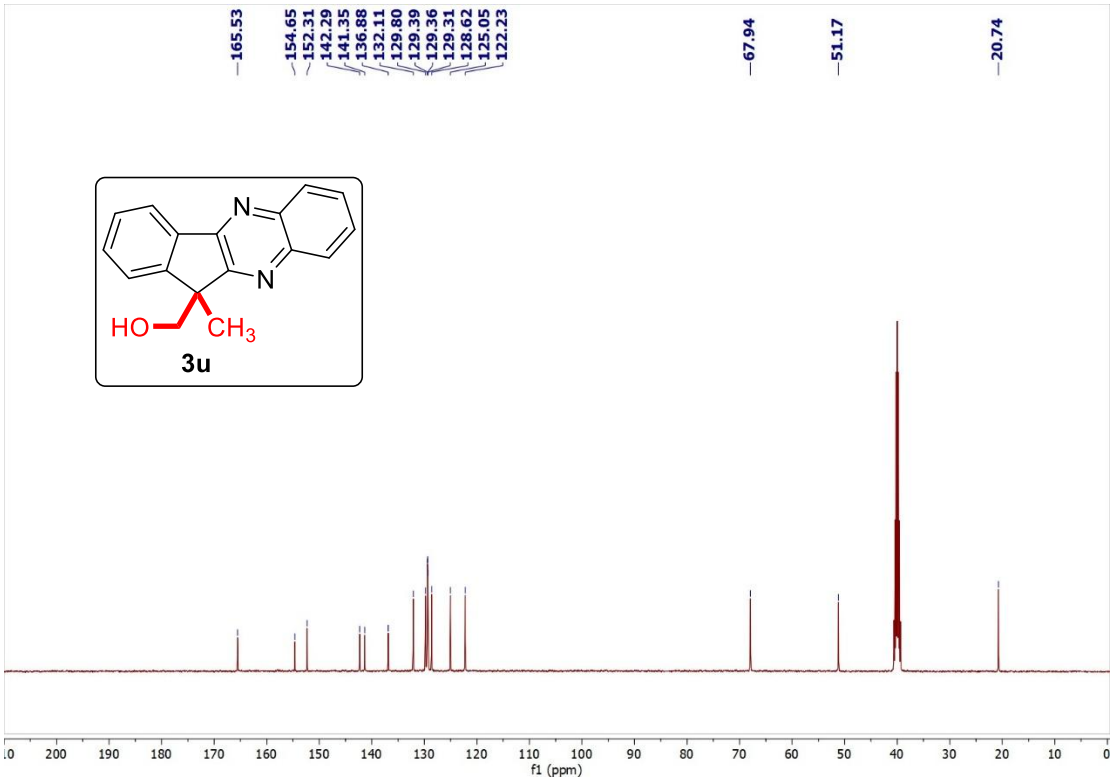
HRMS of N-(9-(Hydroxymethyl)-9-methyl-9*H*-fluoren-2-yl)benzamide (3t)



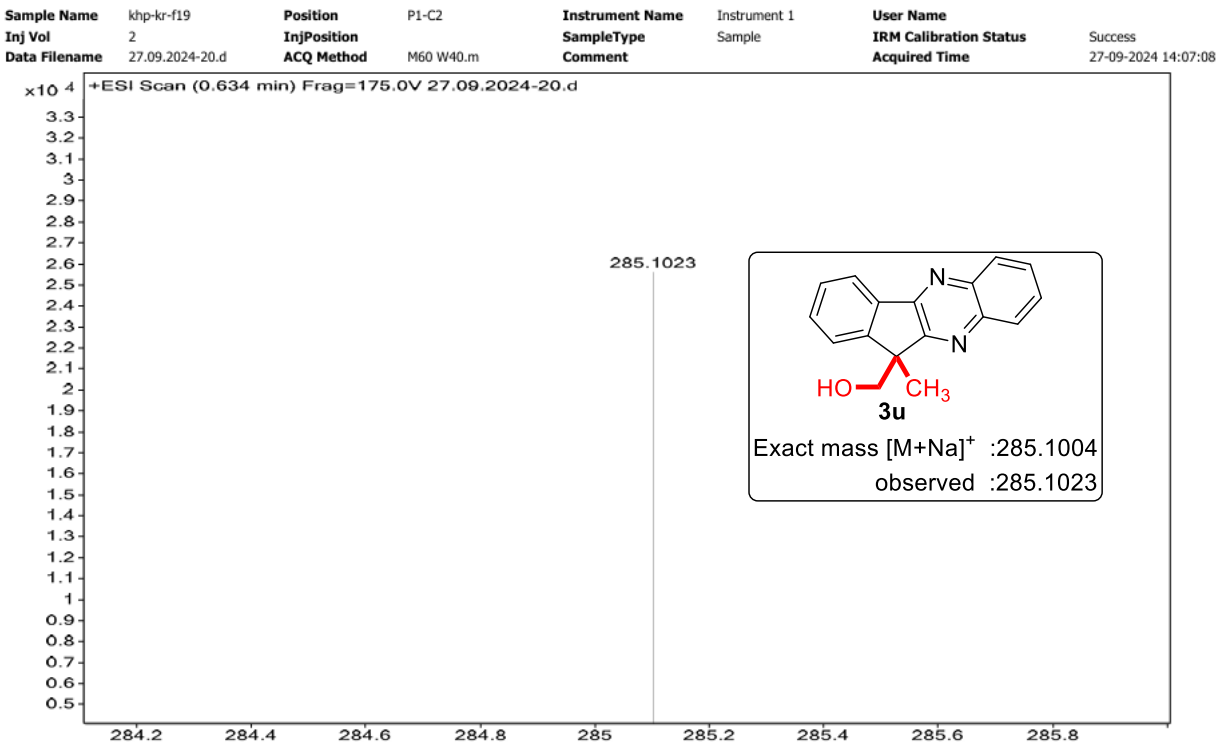
^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (11-Methyl-11*H*-indeno[1,2-b]quinoxalin-11-yl)methanol (3u)



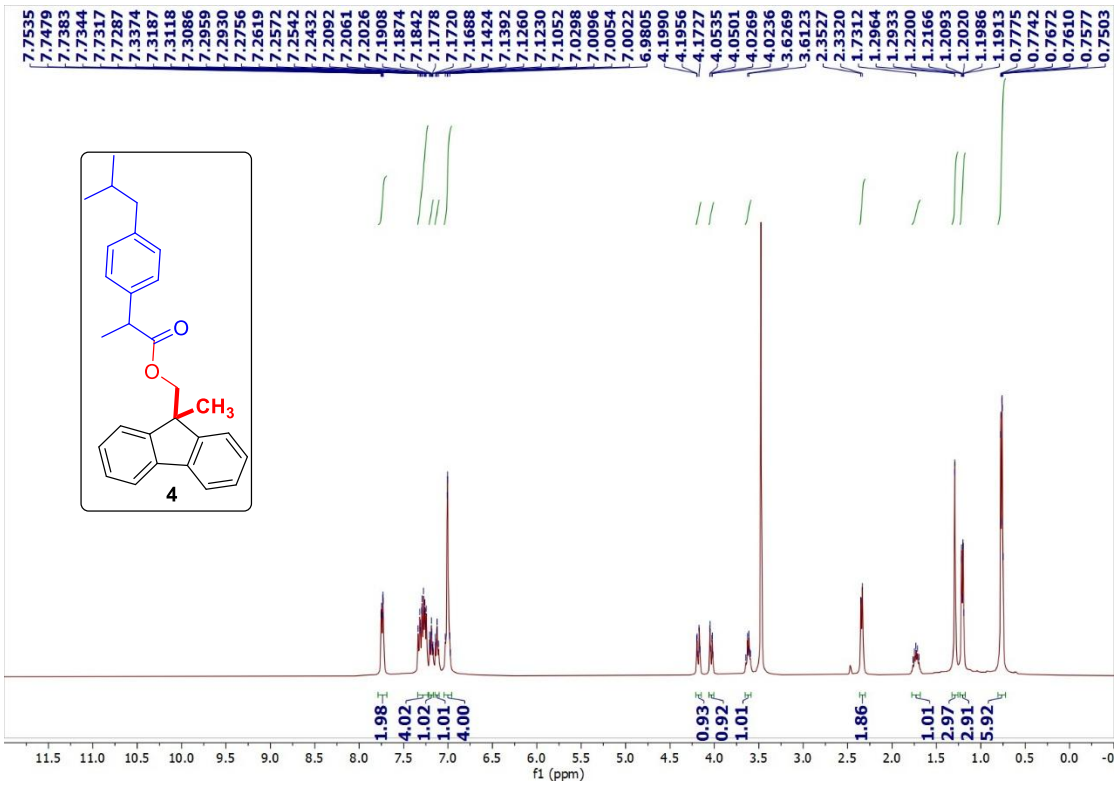
^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (11-Methyl-11*H*-indeno[1,2-b]quinoxalin-11-yl)methanol (3u)



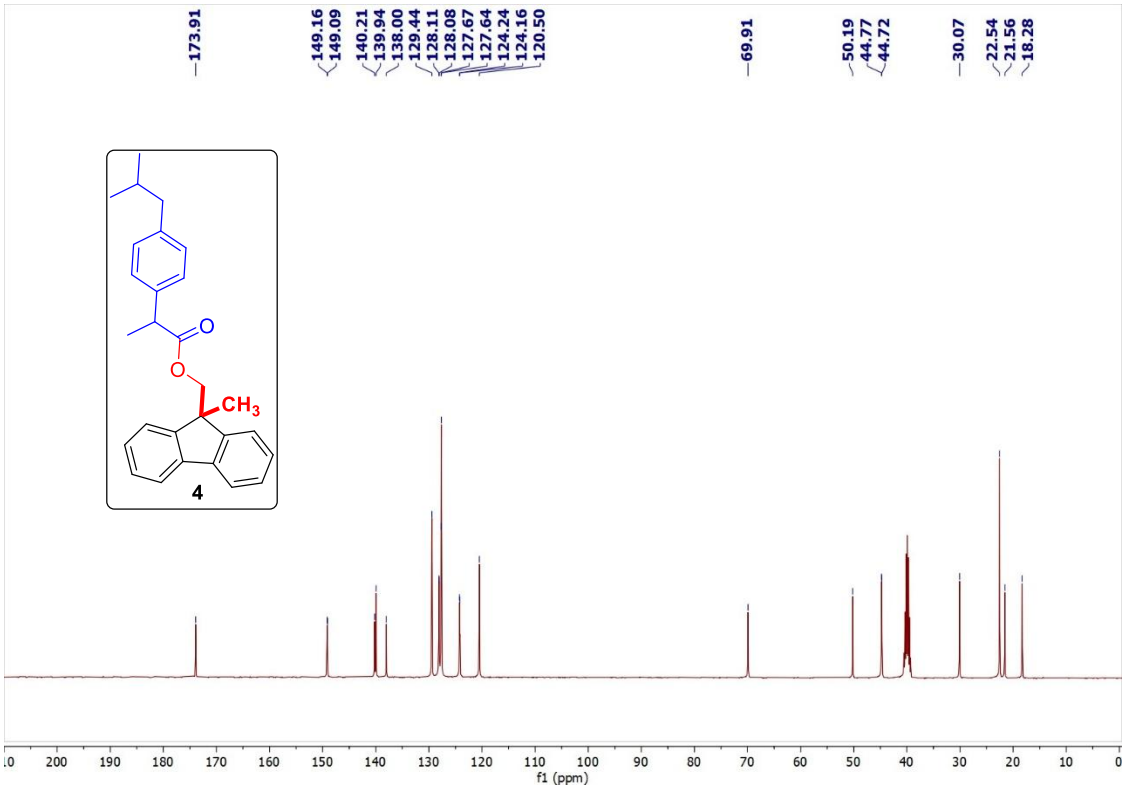
HRMS of (11-Methyl-11*H*-indeno[1,2-b]quinoxalin-11-yl)methanol (3u)



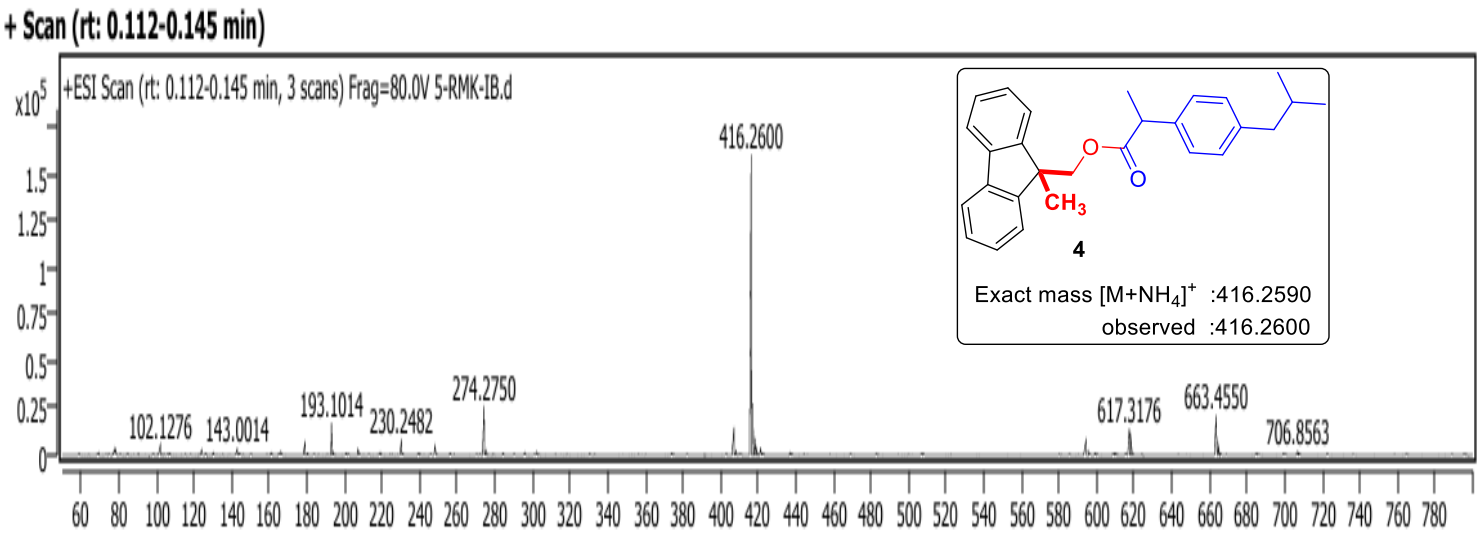
^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of (9-methyl-9*H*-fluoren-9-yl)methyl 2-(4-isobutylphenyl)propanoate (4)



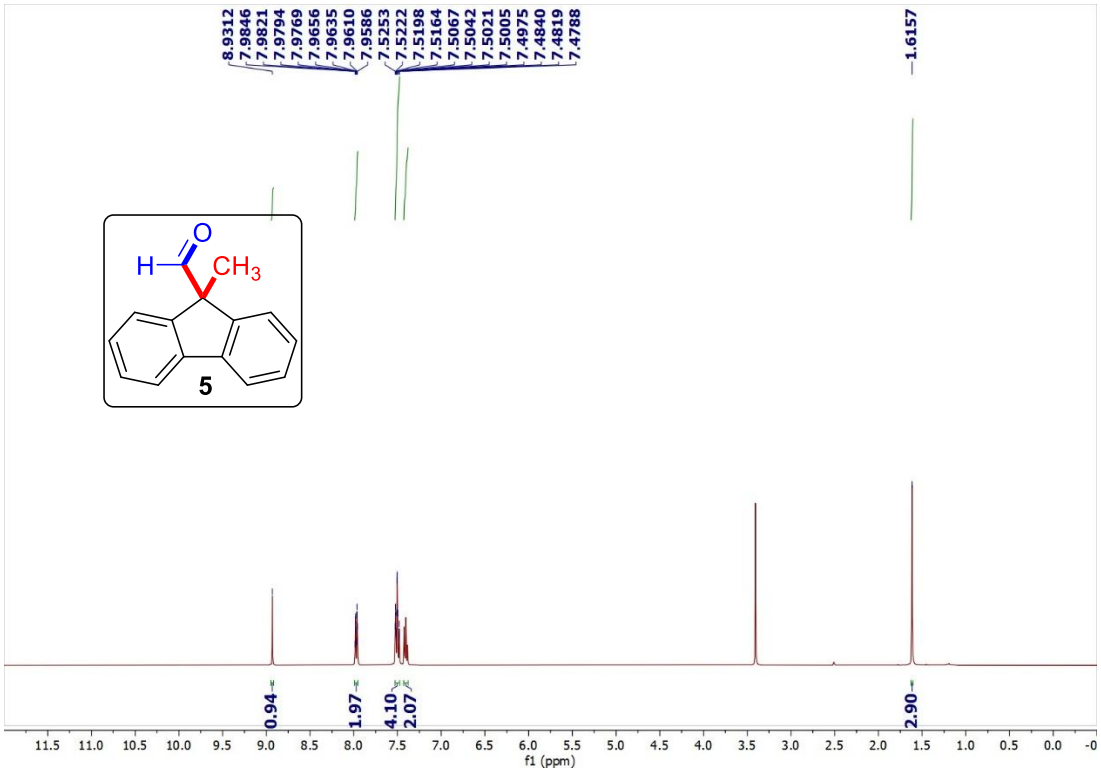
^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of (9-methyl-9*H*-fluoren-9-yl)methyl 2-(4-isobutylphenyl)propanoate (4)



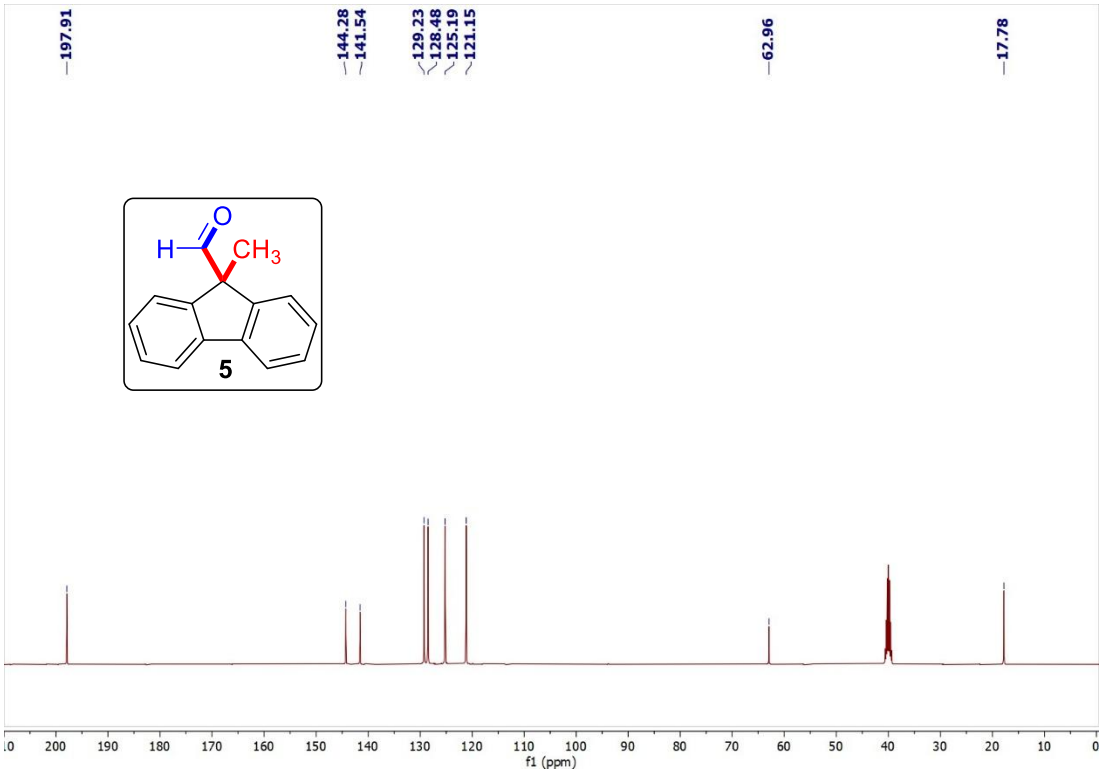
HRMS of (9-methyl-9*H*-fluoren-9-yl)methyl 2-(4-isobutylphenyl)propanoate (4)



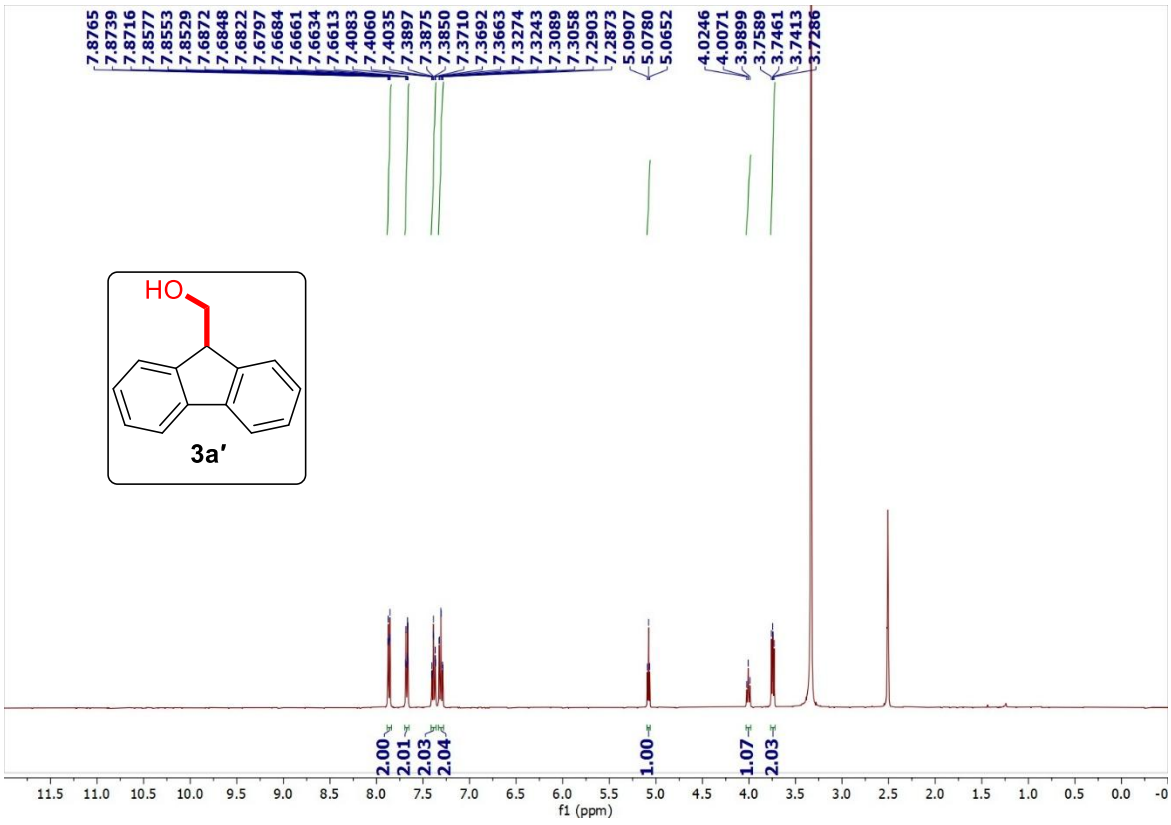
^{1}H NMR (400 MHz, DMSO-*d*$_6$) spectrum of 9*H*-fluorene-9-carbaldehyde (4b)



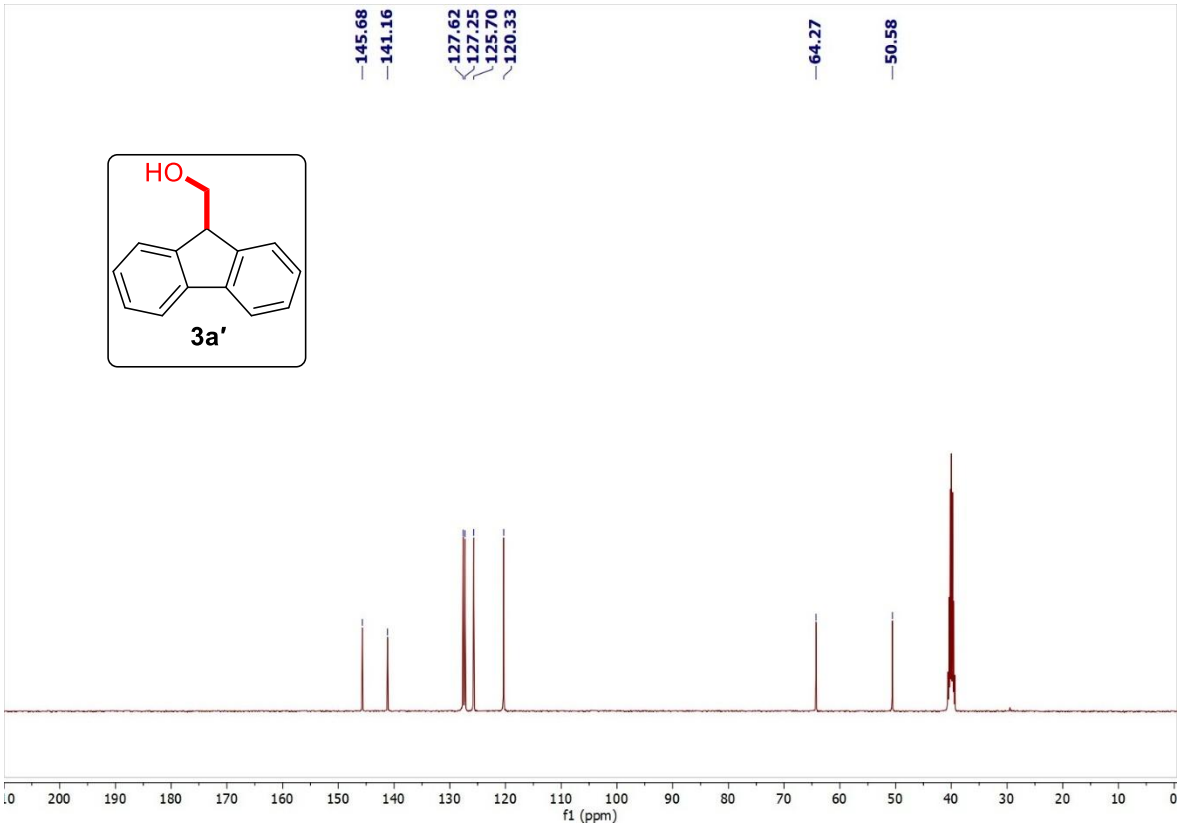
^{13}C{^{1}H} NMR (100 MHz, DMSO-*d*$_6$) spectrum of 9*H*-fluorene-9-carbaldehyde (4b)



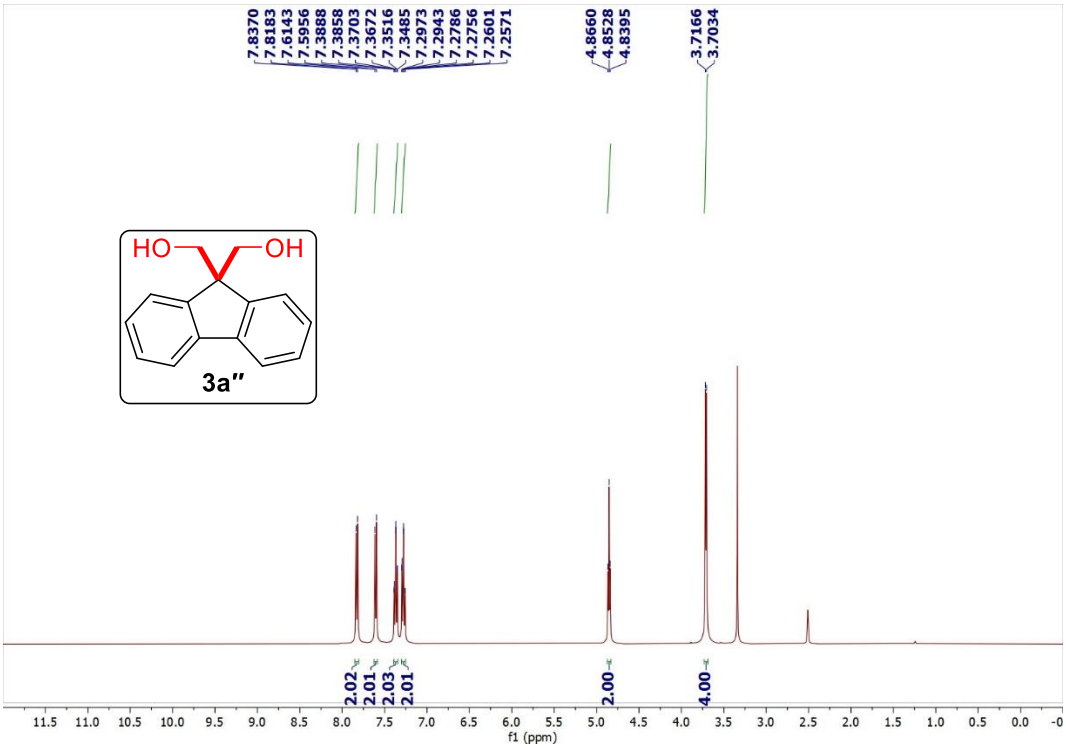
^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (9*H*-fluoren-9-yl)methanol (3a′)



^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (9*H*-fluoren-9-yl)methanol (3a′)



^{1}H NMR (400 MHz, DMSO-d_6) spectrum of (9*H*-fluorene-9,9-diyl)dimethanol (3a″)



^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6) spectrum of (9*H*-fluorene-9,9-diyl)dimethanol (3a″)