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Supporting Information

for

Synthesis, crystal structures and properties of carbazole-based [6]helicenes fused with an azine ring

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Experimental procedures and analytical data, copies of ^{1}H and ^{13}C NMR spectra of all new compounds, X-ray data for 9c and 10a–c, HPLC spectra of helicenes 10a–c, UV–vis and fluorescence spectra of 10a–c

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Experimental section

General information: ^{1}H and ^{13}C NMR spectra were recorded on a 250 MHz spectrometer (Bruker DPX-250). Chemical shifts were reported in ppm relative to Me_4Si. The UV-vis spectra were recorded on a Varian Cary 50 Probe spectrophotometer. Fluorescence spectra were recorded on a Varian Cary Eclipse Fluorescence Spectrophotometer. The HR-ESI mass-spectra were obtained on a BRUKER maXis spectrometer equipped with an electrospray ionization (ESI) source. Melting points were determined on a Stuart SMP30 instrument in glass capillaries and are uncorrected. Flash column chromatography was performed on silica gel (70–230 mesh, Aldrich). Reactions were monitored by thin layer chromatography (silica gel 60 F_{254}) and visualized using UV. Commercial alkynes, 9-ethyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-9*H*-carbazole, catalysts, ICl, 2,3-dihaloazines, diisopropylamine, triethylamine, PPh_3, TFA, triflic acid, anhydrous DMSO, THF were used as received.

9-Ethyl-3-(3-(phenylethynyl)quinoxalin-2-yl)-9*H*-carbazole (2a): A stirred mixture of 2-chloro-3-(phenylethynyl)quinoxaline **1a** [1] (132 mg, 0.5 mmol), 9-ethyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-9*H*-carbazole (161 mg, 0.5 mmol), $Pd(PPh_3)_4$ (58 mg, 0.05 mmol), K_2CO_3 (345 mg, 2.5 mmol), 1,4-dioxane (8 mL) and water (4 mL) was heated at 100 °C for 17 h under argon. After evaporatation of the reaction mixture the residue was diluted with water (50 mL) and extracted with CH_2Cl_2 (3 × 15 mL). The extract was dried over Na_2SO_4. Flash column chromatography was carried out on silica gel (3.5 × 50 cm) using CH_2Cl_2 as the eluent. The yellow fraction with R_f 0.45 gave compound **2a** (203 mg, 96%). Compound **2a** was obtained as lemon yellow needles with mp 158–160 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.47 (t, J = 7.1 Hz, 3 H), 4.42 (q, J = 7.1 Hz, 2 H), 7.21–7.35 (m, 4 H), 7.43–7.57 (m, 5 H), 7.70–7.78 (m, 2 H), 8.12–8.18 (m, 3 H), 8.29 (dd, J = 8.6, 1.4 Hz, 1 H), 9.03 (d, J = 1.0 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$) δ 13.9, 37.8, 89.3, 94.9, 108.4, 108.8, 119.4, 120.8, 121.9, 122.4, 122.7, 123.2, 126.1, 127.9, 128.2, 128.5, 128.8, 129.2, 129.5, 129.8, 130.6, 132.3, 138.3, 140.6, 140.7, 140.9, 141.1, 155.5 ppm. HRMS (ESI): MH^+, found 424.1815. $C_{30}H_{22}N_3$ requires 424.1808. $M+Na^+$, found 446.1633. $C_{30}H_{21}N_3Na$ requires 446.1628.

Another catalytic systems, *e.g.* $Pd(PPh_3)_4/K_3PO_4$/THF (80 °C, 24 h, 36% yield) and $Pd(PPh_3)_4/K_3PO_4$/1,4-dioxane (100 °C, 24 h, 44% yield), were less effective.

9-Ethyl-3-(3-(phenylethynyl)pyrazin-2-yl)-9H-carbazole (2b): Synthesis of compound **2b** was carried out similarly to **2a** from 2-chloro-3-(phenylethynyl)pyrazine **1b** [1] (108 mg, 0.5 mmol). Flash column chromatography was performed on silica gel (2 × 20 cm) using ethylacetate - petrolium ether (1:3, v/v) as the eluent. From the yellow fraction with R_f 0.2–0.3 compound **2b** was isolated (153 mg, 82%). Compound **2b** was obtained as yellowish solid with mp 133–135 °C (CH_3CN). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.52 (t, J = 7.2 Hz, 3 H), 4.47 (q, J = 7.2 Hz, 2 H), 7.26–7.40 (m, 4 H), 7.48–7.59 (m, 5 H), 8.14 (d, J = 7.7 Hz, 1 H), 8.28 (dd, J = 8.6, 1.7 Hz, 1 H), 8.54 (d, J = 2.3 Hz, 1 H), 8.64 (d, J = 2.3 Hz, 1 H), 9.02 (d, J = 1.6 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$) δ 11.1, 35.0, 85.5, 91.5, 105.4, 106.0, 116.6, 117.8, 119.1, 119.2, 119.9, 120.4, 123.2, 124.5, 124.7, 125.6, 126.5, 129.2, 134.2, 137.7, 138.1, 138.6, 139.5, 153.3 ppm. HRMS (ESI): MH^+, found 374.1666. $C_{26}H_{20}N_3$ requires 374.1652. $M+Na^+$, found 396.1484. $C_{26}H_{19}N_3Na$ requires 396.1471.

3-(3-Chloroquinoxalin-2-yl)-9-ethyl-9*H*-carbazole (4a) was synthesized in a similar manner as descibed in [1]**.** A stirred mixture of 2,3-dichloroquinoxaline **3a** (100 mg, 0.5 mmol), 9-ethyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-9*H*-carbazole (193 mg, 0.6 mmol), 5% Pd/C (32 mg, 0.015 mmol), PPh_3 (16 mg, 0.06 mmol), 2M aqueous solution K_2CO_3 (2 mL) and toluene (1 mL) was heated at 100 °C for 24 h under argon. The reaction mixture was then extracted with $CHCl_3$ (3 × 20 mL). The extract was dried over Na_2SO_4 and purified by flash column chromatography on silica gel (3.5 × 45 cm) with $CHCl_3$ as the eluent. The first and second fractions were recovered starting materials: 43 mg (43%) of **3a** and 142 mg (73%) of the boronic acid. The fraction with R_f 0.6 gave compound **4a** (28 mg, 15%). Compound **4a** was obtained as lemon yellow crystals with mp 120–122 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.51 (t, J = 7.2 Hz, 3 H), 4.47 (q, J = 7.2 Hz, 2 H), 7.31–7.34 (m, 1 H), 7.47–7.59 (m, 3 H), 7.78–7.85 (m, 2 H), 8.04–8.12 (m, 2 H), 8.19–8.22 (m, 2 H), 8.70 (d, J = 1.2 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$) δ 13.9, 37.8, 108.3, 108.8, 119.5, 120.8, 122.5, 122.9, 123.1, 126.2, 126.4, 127.3, 127.5, 128.1, 129.2, 130.4 (2C), 140.6, 140.7, 140.8, 141.3, 153.8 ppm. HRMS (ESI): MH^+, found 358.1107 (^{35}Cl); 360.1081 (^{37}Cl). $C_{22}H_{17}ClN_3$ requires 358.1106 (^{35}Cl); 360.1078 (^{37}Cl). $M+Na^+$, found 380.0924 (^{35}Cl); 382.0902 (^{37}Cl). $C_{22}H_{16}ClN_3Na$ requires 380.0925 (^{35}Cl); 382.0897 (^{37}Cl).

3-(3-Bromopyridin-2-yl)-9-ethyl-9*H*-carbazole (4b) and 3,3'-(pyridine-2,3-diyl)bis(9-ethyl-9*H*-carbazole) (5b). A stirred mixture of 2,3-dibromopyridine **3b** (119 mg, 0.5 mmol), 9-ethyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-9*H*-carbazole (161 mg, 0.5 mmol), $Pd(PPh_3)_4$ (58

mg, 0.05 mmol), K_2CO_3 (345 mg, 2.5 mmol), 1,4-dioxane (8 mL) and water (4 mL) was heated at 100 °C for 17 h under argon. After evaporation of the reaction mixture the residue was diluted with water (100 mL) and extracted with CH_2Cl_2 (3 × 15 mL). The extract was dried over Na_2SO_4. Flash column chromatography on silica gel (3.5 × 55 cm) was then carried out using CH_2Cl_2 as the eluent. From the colorless fraction with R_f 0.3 compound **4b** was isolated (142 mg, 80%). The yellowish fraction with R_f 0.2 gave compound **5b** (20 mg, 8%).

3-(3-Bromopyridin-2-yl)-9-ethyl-9H-carbazole (**4b**). Yellowish oil. ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.52 (t, J = 7.1 Hz, 3 H), 4.46 (q, J = 7.1 Hz, 2 H), 7.17 (dd, J = 8.0, 4.6 Hz, 1 H), 7.28–7.34 (m, 1 H), 7.47–7.58 (m, 3 H), 7.91 (d, J = 8.5 Hz, 1 H), 8.07 (d, J = 8.0 Hz, 1 H), 8.20 (d, J = 7.7 Hz, 1 H), 8.55 (s, 1 H), 8.72 (d, J = 4.6 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.9, 37.7, 107.9, 108.7, 119.2, 120.1, 120.7, 121.9, 122.6, 122.7, 123.3, 125.9, 127.3, 130.4, 140.2, 140.5, 141.4, 148.1, 159.0 ppm. HRMS (ESI): MH^+ (^{81}Br), found 353.0476; MH^+ (^{79}Br), found 351.0497. $C_{19}H_{16}BrN_2$ requires 353.0472 (^{81}Br), 351.0491 (^{79}Br).

3,3'-(Pyridine-2,3-diyl)bis(9-ethyl-9H-carbazole) (**5b**). Yellowish oil. ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.38 (t, J = 7.2 Hz, 3 H), 1.41 (t, J = 7.2 Hz, 3 H), 4.29 (q, J = 7.2 Hz, 2 H), 4.33 (q, J = 7.2 Hz, 2 H), 7.12–7.27 (m, 5 H), 7.34–7.52 (m, 6 H), 7.90 (dd, J = 7.7, 1.6 Hz, 1 H), 7.97 (d, J = 7.7 Hz, 1 H), 8.05 (d, J = 7.7 Hz, 1 H), 8.12 (br s, 1 H), 8.38 (d, J = 1.3 Hz, 1 H), 8.77 (dd, J = 4.7, 1.6 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.7(8), 13.8(0), 37.5(8), 37.6(2), 107.6, 108.2, 108.4, 108.6, 118.8, 118.9, 120.5, 120.6, 121.2, 121.5, 122.3, 122.9, 123.0, 123.2, 123.4, 125.5, 125.8, 127.8, 128.2, 131.4, 131.5, 136.7, 139.1, 139.2, 139.6, 140.3, 147.9, 158.1 ppm. HRMS (ESI): MH^+, found 466.2287. $C_{33}H_{28}N_3$ requires 466.2278.

9-Ethyl-3-(3-(phenylethynyl)pyridin-2-yl)-9*H*-carbazole (6) was synthesized in a similar manner as descibed in [1]. A stirred mixture of 3-(3-bromopyridin-2-yl)-9-ethyl-9*H*-carbazole **4b** (92 mg, 0.25 mmol), $Pd(PPh_3)_2Cl_2$ (18 mg, 0.025 mmol), CuI (2 mg, 0.01 mmol), *i*-Pr_2NH (0.5 mL) and DMSO (2.5 mL) was heated at 80 °C for 20 min under argon. A solution of phenylacetylene (93 mg, 0.1 mL, 0.75 mmol) in *i*-Pr_2NH (1 mL) was then added by portions for 1 h. The reaction mixture was stirred at 80 °C for 24 h, evaporated without heating to remove *i*-Pr_2NH, treated with H_2O (50 mL) and extracted with CH_2Cl_2 (3 × 15 mL). The extract was dried over Na_2SO_4 and evaporated to dryness. The residue was purified by flash column chromatography on silica gel (3.5 × 30 cm) with CH_2Cl_2 as the eluent. The fraction with R_f 0.2 and violet fluorescence gave compound **6** (69 mg, 74%). Compound **6** was obtained as a yellow brown oil. ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.55 (t, J = 7.2 Hz, 3 H), 4.50 (q, J = 7.2 Hz, 2 H), 7.27–7.37

(m, 5 H), 7.48–7.60 (m, 5 H), 8.04 (dd, *J* = 7.8, 1.7 Hz, 1 H), 8.19 (d, *J* = 7.8 Hz, 1 H), 8.30 (dd, *J* = 8.6, 1.7 Hz, 1 H), 8.76 (dd, *J* = 4.8, 1.7 Hz, 1 H), 9.01 (d, *J* = 1.4 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.9, 37.8, 88.5, 94.4, 108.0, 108.7, 117.5, 119.2, 120.6, 120.7, 121.8, 122.6, 123.1, 123.4, 125.7, 127.5, 128.4, 128.5, 130.2, 131.5, 140.4(9), 140.5(2), 141.0, 148.6, 160.2 ppm. HRMS (ESI): MH^+, found 373.1711. $C_{27}H_{21}N_2$ requires 373.1699.

1-Ethyl-7-iodo-6-phenyl-1*H*-carbazolo[3,4-*a*]phenazine (7a) was synthesized in a similar manner as descibed in [1]. To a stirred suspension of 9-ethyl-3-(3-(phenylethynyl)quinoxalin-2-yl)-9*H*-carbazole **2a** (85 mg, 0.2 mmol) in dry CH_3CN (17 mL) a solution of ICl (33 mg, 0.2 mmol) in dry CH_3CN (2 mL) was added. The reaction mixture was kept at room temperature for 24 h in the dark. The yellow orange needles precipitate of **7a** (48 mg) was filtered off and washed on the filter with CH_3CN (2 mL). The filtrate was then evaporated to dryness. The residue was extracted with CH_2Cl_2 (15 mL) and saturated $Na_2S_2O_3$ solution (5 mL). The organic layer was separated and dried over Na_2SO_4 and purified by flash column chromatography on silica gel (2.5 × 55 cm) with CH_2Cl_2 as the eluent. The bright yellow orange fraction with R_f 0.85 gave 24 mg of cyclization product **7a**. Total yield was 72 mg (65%). 1-Ethyl-7-iodo-6-phenyl-1*H*-carbazolo[3,4-*a*]phenazine **7a** was obtained as yellow orange needles with mp 248–250 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.50 (t, *J* = 7.2 Hz, 3 H), 4.52 (q, *J* = 7.2 Hz, 2 H), 6.29 (d, *J* = 8.4 Hz, 1 H), 6.63 (ddd, *J* = 8.2, 7.0, 1.2 Hz, 1 H), 7.27–7.30 (m, 1 H), 7.37 (d, *J* = 7.9 Hz, 1 H), 7.43–7.52 (m, 3 H), 7.63–7.66 (m, 2 H), 7.82–7.92 (m, 2 H), 7.95 (d, *J* = 9.0 Hz, 1 H), 8.38–8.47 (m, 2 H), 9.81 (d, *J* = 9.0 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$) δ 13.8, 37.8, 107.9, 110.8, 112.2, 118.0, 118.8, 123.3, 124.4, 124.8, 125.4, 128.5, 128.8, 128.9, 129.5, 129.6, 129.9, 130.6, 132.5, 139.5, 141.5, 141.6, 142.5, 142.6, 143.0 (2C), 146.4, 149.0 ppm. HRMS (ESI): MH^+, found 550.0785. $C_{30}H_{21}IN_3$ requires 550.0775. $M+Na^+$, found 572.0584. $C_{30}H_{20}IN_3Na$ requires 550.0594.

When using a 1.5-fold excess of ICl, a hardly separable mixture of **7a** and its 4-iodo derivative **8a** in a 7.7:1 ratio was obtained.

7-Ethyl-13-iodo-12-phenyl-7*H*-quinoxalino[5,6-*c*]carbazole (7b) was synthesized in a similar manner as descibed in [1]. To a stirred suspension of 9-ethyl-3-(3-(phenylethynyl)pyrazin-2-yl)-9*H*-carbazole **2b** (59 mg, 0.16 mmol) in dry CH_3CN (2 mL) a solution of ICl (15 mg, 0.09 mmol) in dry CH_3CN (1.5 mL) was added. After 1 h, the next portion of the solution of ICl (5 mg, 0.03 mmol) in dry CH_3CN (1.5 mL) was added. The stirred

reaction mixture was kept at room temperature for 20 h in the dark and then evaporated to dryness. The residue was extracted with CH_2Cl_2 (30 mL) and saturated $Na_2S_2O_3$ solution (5 mL). The organic layer was separated and dried over Na_2SO_4. The extract was purified by flash column chromatography on silica gel (2 × 25 cm) with ethyl acetate - petroleum ether (1:3, v/v) as the eluent. The yellow fraction with R_f 0.45 gave 46 mg (75%) of cyclization product **7b**. 7-Ethyl-13-iodo-12-phenyl-7*H*-quinoxalino[5,6-*c*]carbazole **7b** was obtained as yellow needles with mp 217–219 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.49 (t, *J* = 7.2 Hz, 3 H), 4.51 (q, *J* = 7.2 Hz, 2 H), 6.20 (d, *J* = 8.5 Hz, 1 H), 6.67 (ddd, *J* = 8.3, 7.0, 1.2 Hz, 1 H), 7.31 (ddd, *J* = 8.0, 7.0, 0.9 Hz, 1 H), 7.42 (d, *J* = 7.9 Hz, 1 H), 7.48–7.65 (m, 5 H), 7.98 (d, *J* = 9.0 Hz, 1 H), 8.90 (d, *J* = 1.8 Hz, 1 H), 8.97 (d, *J* = 1.8 Hz, 1 H), 9.62 (d, *J* = 9.0 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.9, 37.7, 107.9, 111.3, 111.7, 116.8, 118.8, 123.4, 123.6, 124.5, 125.3, 126.0, 128.6, 128.8, 130.0, 132.5, 139.1, 140.4, 141.3, 141.7, 143.9, 144.0, 146.7, 147.4 ppm. HRMS (ESI): MH^+, found 500.0625. $C_{26}H_{19}IN_3$ requires 500.0618.

When using equimolar amount of ICl, a hardly separable mixture of **7b** and its 4-iodo derivative **8b** in a 10:1 ratio (69% total yield) was obtained.

7-Ethyl-10,13-diiodo-12-phenyl-7*H*-quinoxalino[5,6-*c*]carbazole (8b): To a suspension of 7-ethyl-13-iodo-12-phenyl-7*H*-quinoxalino[5,6-*c*]carbazole **7b** (25 mg, 0.05 mmol) in dry CH_3CN (4 mL), a solution of ICl (24 mg, 0.15 mmol) in dry CH_3CN (2 mL) was added. The reaction mixture was stirred at room temperature for 24 h in the dark. After evaporation in air without heating the residue was extracted with CH_2Cl_2 (30 mL) and saturated $Na_2S_2O_3$ solution (5 mL). The extract dried over Na_2SO_4 and purified by flash column chromatography on silica gel (2 × 25 cm) using a mixture of ethyl acetate - petroleum ether (1:3, v/v) as the eluent. The cyclization product **8b** (30 mg, 97%) was isolated from the yellow fraction with R_f 0.5. Compound **8b** was obtained as a yellow solid with mp 254–255 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.51 (t, *J* = 7.2 Hz, 3 H), 4.53 (q, *J* = 7.2 Hz, 2 H), 6.44 (d, *J* = 1.4 Hz, 1 H), 7.18 (d, *J* = 8.7 Hz, 1 H), 7.55–7.62 (m, 5 H), 7.66–7.75 (m, 1 H), 7.97 (d, *J* = 9.0 Hz, 1 H), 8.92 (d, *J* = 1.8 Hz, 1 H), 8.99 (d, *J* = 1.8 Hz, 1 H), 9.66 (d, *J* = 9.0 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.8, 37.8, 83.0, 109.9, 111.3, 111.9, 115.8, 124.4, 125.1, 126.4, 128.9, 129.9, 130.0, 132.1, 133.1, 133.5, 138.2, 140.4, 141.1, 141.6, 144.0, 144.2, 145.9, 147.2 ppm. HRMS (ESI): MH^+, found 625.9576. $C_{26}H_{18}I_2N_3$ requires 625.9585.

7-Ethyl-13-iodo-12-phenyl-7*H*-quinolino[8,7-*c*]carbazole (7c) was synthesized in a similar manner as descibed in **[1].** To a stirred suspension of 9-ethyl-3-(3-(phenylethynyl)pyridin-2-yl)-9*H*-carbazole **6** (74 mg, 0.2 mmol) in dry CH_3CN (6 mL) a solution of ICl (52 mg, 0.3 mmol) in dry CH_3CN (3 mL) was added. The reaction mixture was kept at room temperature for 24 h in the dark. The yellow orange needles precipitate of **7c** (51 mg) was filtered off and washed on the filter with CH_3CN (2 mL). The filtrate was then evaporated to dryness. The residue was extracted with CH_2Cl_2 (20 mL) and saturated $Na_2S_2O_3$ (5 mL). The organic layer was separated and dried over Na_2SO_4 and purified by flash column chromatography on silica gel (2.5 × 25 cm) with CH_2Cl_2 as the eluent. The yellow fraction with R_f 0.7 gave 11 mg of cyclization product **7c**. Total yield of **7c** was 62 mg (62%). Compound **7c** was obtained as yellow needles with mp 196–197 °C. ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.55 (t, J = 7.0 Hz, 3 H), 4.58 (q, J = 7.0 Hz, 2 H), 6.25 (d, J = 8.4 Hz, 1 H), 6.68 (t, J = 7.6 Hz, 1 H), 7.28–7.34 (m, 1 H), 7.44 (d, J = 8.0 Hz, 1 H), 7.52–7.65 (m, 6 H), 7.99 (d, J = 9.0 Hz, 1 H), 8.81 (d, J = 8.2 Hz, 1 H), 9.01 (d, J = 3.4 Hz, 1 H), 9.78 (d, J = 9.0 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.9, 37.7, 107.8, 108.6, 110.9, 116.5, 118.5, 122.0, 123.6, 124.0, 124.1, 125.2, 126.8, 127.3, 128.5, 128.6, 129.9, 132.8, 139.0, 141.4, 142.8, 143.7, 146.4, 147.7, 149.4 ppm. HRMS (ESI): MH^+, found 499.0681. $C_{27}H_{19}IN_2$ requires 499.0666.

1-Ethyl-6-phenyl-7-(*p*-tolylethynyl)-1*H*-carbazolo[3,4-*a*]phenazine (9a): A stirred mixture of 1-ethyl-7-iodo-6-phenyl-1*H*-carbazolo[3,4-*a*]phenazine **7a** (110 mg, 0.2 mmol), $Pd(PPh_3)_2Cl_2$ (14 mg, 0.02 mmol), CuI (2 mg, 0.01 mmol), Et_3N (3 mL) and dry THF (5 mL) was heated at 85 °C for 20 min under argon. A solution of *p*-tolylacetylene (35 mg, 0.3 mmol) and Et_3N (2 mL) in dry THF (2 mL) was then added by portions for 3 h. The reaction mixture was stirred for total 24 h at 85 °C. After subsequent evaporation, the residue was treated with H_2O (100 mL) and extracted with CH_2Cl_2 (2 × 20 mL). The extract was dried over Na_2SO_4 and concentrated. Flash column chromatography on silica gel (3.5 × 55 cm) was then carried out using CH_2Cl_3 as the eluent. The yellow orange fraction with R_f 0.6 (yellow fluorescence under UV 356 nm) gave 90 mg (84%) of compound **9a**. The product was then heated with hexane (3 mL) for crystallization and filtered off. 1-Ethyl-7-iodo-6-phenyl-1*H*-carbazolo[3,4-*a*]phenazine **9a** was obtained as orange needles with orange fluorescence in the solid state under UV (356 nm) and mp 214–217 °C (ethyl acetate - petroleum ether, 1:3, v/v). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.54 (t, J = 7.1 Hz, 3 H), 2.41 (s, 3 H), 4.56 (q, J = 7.1 Hz, 2 H), 6.42 (d, J = 8.4 Hz, 1 H), 6.70 (ddd, J = 8.0, 6.7, 1.0 Hz, 1 H), 7.19 (d, J = 7.9 Hz, 2 H), 7.27–7.34 (m, 1 H), 7.36–7.45 (m, 3 H), 7.46–7.55 (m, 3 H), 7.82–8.00 (m, 5 H), 8.39–8.44 (m, 1 H),

8.46–8.50 (m, 1 H), 9.81 (d, J = 8.9 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.8, 21.7, 37.7, 87.8, 100.1, 107.9, 110.7, 118.5, 118.8, 120.9, 121.6, 123.4, 123.9, 124.7, 125.5, 125.6, 128.2, 128.4, 129.0, 129.2, 129.3, 129.6, 130.0, 130.1, 131.7, 131.9, 138.4, 139.5, 141.5, 141.8, 142.2, 142.4, 142.5, 142.6, 146.3 ppm. HRMS (ESI): MH^+, found 538.2265. $C_{39}H_{28}N_3$ requires 538.2278.

7-Ethyl-12-phenyl-13-(*p*-tolylethynyl)-7*H*-quinoxalino[5,6-*c*]carbazole (9b): A stirred mixture of 7-ethyl-13-iodo-12-phenyl-7*H*-quinoxalino[5,6-*c*]carbazole **7b** (50 mg, 0.1 mmol), $PdCl_2(PPh_3)_2$ (7 mg, 0.01 mmol), CuI (2 mg, 0.01 mmol), Et_3N (3 mL) was heated at 85 °C for 20 min under argon. A solution of *p*-tolylacetylene (23 mg, 0.2 mmol) in Et_3N (1.6 mL) was then dropped for 3 h. The reaction mixture was stirred at 85 °C for total 24 h. followed by evaporation. The residue was then diluted with H_2O (50 mL) and extracted with $CHCl_3$ (3 × 10 mL). The extract was dried over Na_2SO_4. Flash column chromatography on silica gel (2 × 20 cm) was carried out using a mixture of ethyl acetate - petroleum ether (1:3, v/v) as the eluent. Compound **9b** (40 mg, 82%) was isolated from the yellow fraction with R_f 0.3 (yellow-green fluorescence under UV 356 nm). Compound **9b** was synthesized as yellow plates with green fluorescence in the solid state under UV (356 nm) and mp 152–154 °C (hexane). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.54 (t, J = 7.2 Hz, 3 H), 2.38 (s, 3 H), 4.57 (q, J = 7.2 Hz, 2 H), 6.28 (d, J = 8.5 Hz, 1 H), 6.69 (ddd, J = 8.1, 7.3, 0.8 Hz, 1 H), 7.14 (d, J = 7.9 Hz, 2 H), 7.28–7.36 (m, 3 H), 7.42–7.53 (m, 4 H), 7.78–7.82 (m, 2 H), 7.99 (d, J = 9.0 Hz, 1 H), 9.03 (dd, J = 4.1, 1.9 Hz, 2 H), 9.59 (d, J = 9.0 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 14.0, 21.6, 37.8, 88.5, 101.2, 108.0, 111.6, 117.3, 118.9, 120.3, 121.4, 123.1, 123.3, 124.6, 125.4, 125.7, 128.4, 128.6, 129.0, 129.6, 131.9, 132.0, 138.9, 139.2, 140.6, 141.4, 141.6, 141.9, 143.4, 144.0, 145.6 ppm. HRMS (ESI): MH^+, found 488.2099. $C_{35}H_{26}N_3$ requires 488.2121. $M+Na^+$, found 510.1916. $C_{35}H_{25}N_3Na$ requires 510.1946.

7-Ethyl-12-phenyl-13-(*p*-tolylethynyl)-7*H*-quinolino[8,7-*c*]carbazole (9c): Compound **9c** was obtained similarly to **9a** starting from **7c** (50 mg, 0.1 mmol). The reaction was carried out at 80–82 °C. Flash column chromatography was carried out on silica gel (3.5 × 45 cm) with CH_2Cl_2 as the eluent. The yellow fraction with R_f 0.6 and light blue fluorescence under UV (356 nm) gave compound **9c** (43 mg, 88%) as yellow prisms (CH_2Cl_2) with mp 210–212 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.53 (t, J = 7.2 Hz, 3 H), 2.40 (s, 3 H), 4.56 (q, J = 7.2 Hz, 2 H), 6.36 (d, J = 8.3 Hz, 1 H), 6.68

(ddd, *J* = 8.3, 7.0, 1.1 Hz, 1 H), 7.18 (d, *J* = 7.9 Hz, 2 H), 7.25–7.35 (m, 3 H), 7.42 (d, *J* = 8.1 Hz, 1 H), 7.46–7.52 (m, 3 H), 7.63 (dd, *J* = 8.2, 4.4 Hz, 1 H), 7.77–7.81 (m, 2 H), 7.96 (d, *J* = 9.1 Hz, 1 H), 8.98 (dd, *J* = 8.2, 1.7 Hz, 1 H), 9.10 (dd, *J* = 4.4, 1.7 Hz, 1 H), 9.74 (d, *J* = 9.1 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 13.9, 21.6, 37.7, 87.6, 99.1, 107.9, 111.0, 117.1, 118.6, 119.8, 120.4, 121.1, 123.5, 123.6, 124.1, 124.5 (2C), 125.4, 128.0, 128.2, 129.2, 129.7, 131.3, 132.1, 135.6, 138.6 (2C), 139.2, 141.3, 141.4, 142.2, 148.7 ppm. HRMS (ESI): MH^+, found 487.2180. $C_{36}H_{27}N_2$ requires 487.2174.

8-Ethyl-17-*p*-tolyl-8*H*-carbazolo[3,4-*a*]naphtho[1,2-*c*]phenazine (10a) was synthesized in a similar manner as descibed in [1, compound **14c**]. To a solution of compound **9a** (54 mg, 0.1 mmol) in CH_2Cl_2 (10 mL) CF_3SO_3H (0.1 mL) was added. The dark red reaction mixture was kept at room temperature for 24 h in the dark. Then it was mixed with saturated aqueous K_2CO_3 (50 mL)and separated in a separating funnel.. The yellow CH_2Cl_2 phase was dried over Na_2SO_4 and purified by flash column chromatography on silica gel (2 × 50 cm) with CH_2Cl_2 as the eluent. The bright yellow fraction with R_f 0.9 gave the cyclization product (50 mg, 92 %). Compound **10a** was obtained as a yellow orange solid with mp 294–295 °C. ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.61 (t, *J* = 7.2 Hz, 3 H), 2.58 (s, 3 H), 4.62 (q, *J* = 7.2 Hz, 2 H), 6.71 (d, *J* = 8.1 Hz, 1 H), 6.81 (t, *J* = 7.4 Hz, 1 H), 7.18 (d, *J* = 7.8 Hz, 1 H), 7.39 (d, *J* = 7.6 Hz, 1 H), 7.46–7.52 (m, 4 H), 7.77 (d, *J* = 7.8 Hz, 2 H), 7.81–7.90 (m, 2 H), 7.94 (d, *J* = 8.9 Hz, 1 H), 8.20 (d, *J* = 8.3 Hz, 1 H), 8.32–8.39 (m, 3 H), 9.48 (s, 1 H), 9.66 (d, *J* = 8.9 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 14.0, 21.4, 37.9, 108.2, 109.6, 118.0, 120.2, 122.7, 123.4, 123.8, 124.9, 125.3, 125.4, 125.7, 126.4, 126.9, 127.1, 128.8, 129.0, 129.1, 129.2 (2C), 129.4, 129.5, 129.6, 130.3, 130.7, 132.4, 137.3, 137.8, 140.0, 140.7, 141.7, 141.8, 141.9, 142.2, 143.8 ppm. UV-vis (CH_2Cl_2), λ_{max} nm (lg ε): 264 (4.75), 303 (4.72), sh 324 (4.59), 357 (4.36), 374 (4.46), 433 (4.23), end absorption up to 507 nm. HRMS (ESI): MH^+, found 538.2285. $C_{39}H_{28}N_3$ requires 538.2278.

7-Ethyl-16-*p*-tolyl-7*H*-naphtho[1',2';7,8]quinoxalino[5,6-*c*]carbazole (10b): Compound **10b** was obtained similarly to **10a** starting from 7-ethyl-12-phenyl-13-(*p*-tolylethynyl)-7*H*-quinoxalino[5,6-*c*]carbazole **9b** (49 mg, 0.1 mmol). Flash column chromatography was carried out on silica gel (2 × 40 cm) with CH_2Cl_2 as the eluent. The yellow fraction with R_f 0.3 gave the cyclization product **10b** (40 mg, 82%) as a yellow orange solid with mp 225–227 °C (hexane). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.61 (t, *J* = 7.2 Hz, 3H), 2.56 (s, 3 H), 4.63 (q, *J* = 7.2 Hz, 2H), 6.73 (d, *J* = 7.9 Hz, 1H), 6.80–

6.86 (m, 1 H), 7.18 (ddd, *J* = 8.1, 7.2, 0.9 Hz, 1 H), 7.37–7.55 (m, 5 H), 7.76 (d, *J* = 7.9 Hz, 2 H), 7.98 (d, *J* = 8.9 Hz, 1 H), 8.21 (d, *J* = 8.2 Hz, 1 H), 8.37 (d, *J* = 8.4 Hz, 1 H), 8.90 (d, *J* = 2.0 Hz, 1 H), 8.94 (d, *J* = 2.0 Hz, 1 H), 9.30 (s, 1 H), 9.50 (d, *J* = 8.9 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 14.0, 21.4, 37.9, 108.3, 110.1, 118.0, 119.5, 121.8, 122.8, 123.4, 124.6, 125.1, 125.4, 125.7, 126.2, 126.4, 126.7, 127.6, 128.9, 129.0, 129.1, 130.3, 130.7, 131.8, 137.2, 137.7, 139.7, 140.1, 140.6, 141.3, 142.1, 142.7, 143.2 ppm. UV-vis (CH_2Cl_2), λ_{max} (lg ε): 294 (4.57), 323 (4.54), 359 (4.35), 397 (4.03), 418 nm (3.96). HRMS (ESI): MH^+, found 488.2120. $C_{35}H_{26}N_3$ requires 488.2121. $M+Na^+$, found 510.1929. $C_{35}H_{25}N_3Na$ requires 510.1946.

7-Ethyl-16-*p*-tolyl-7*H*-naphtho[2',1';5,6]quinolino[8,7-*c*]carbazole (10c) was synthesized in a similar manner as descibed in [1, compound **14a**]. A dark solution of 7-ethyl-12-phenyl-13-(*p*-tolylethynyl)-7*H*-quinolino[8,7-*c*]carbazole **9c** (49 mg, 0.1 mmol) in CF_3COOH (3 mL) was heated at 85 °C for 24 h. The reaction mixture was evaporated to dryness, treated with saturated K_2CO_3 (2 mL) and CH_2Cl_2 (20 mL), extracted in a separating funnel and separated. The organic phase was dried over Na_2SO_4 and purified by flash column chromatography on silica gel (2.5 × 30 cm) with CH_2Cl_2 as the eluent. The yellow fraction with R_f 0.5 gave cyclization product **10c** (46 mg, 94 %). Compound **10c** was obtained as a yellow orange solid with mp 223–225 °C (EtOH). ^{1}H NMR (250 MHz, $CDCl_3$): δ = 1.60 (t, *J* = 7.2 Hz, 3 H), 2.57 (s, 3 H), 4.62 (q, *J* = 7.2 Hz, 2 H), 6.68 (d, *J* = 7.9 Hz, 1 H), 6.80 (ddd, *J* = 7.9, 7.0, 0.8 Hz, 1 H), 7.16 (ddd, *J* = 8.2, 7.1, 1.1 Hz, 1 H), 7.38 (ddd, *J* = 8.0, 7.0, 1.1 Hz, 1 H), 7.46–7.58 (m, 5 H), 7.73 (d, *J* = 8.0 Hz, 2 H), 7.98 (d, *J* = 8.9 Hz, 1 H), 8.14 (d, *J* = 8.0 Hz, 1 H), 8.37 (d, *J* = 8.2 Hz, 1 H), 8.61 (s, 1 H), 8.96 (dd, *J* = 8.4, 1.4 Hz, 1 H), 9.03 (dd, *J* = 4.4, 1.5 Hz, 1 H), 9.61 (d, *J* = 8.9 Hz, 1 H) ppm. ^{13}C NMR (62.9 MHz, $CDCl_3$): δ = 14.1, 21.4, 37.9, 108.2, 109.8, 117.7, 119.3, 120.7, 120.8, 123.0, 123.3, 123.5, 124.7, 125.1, 125.7, 125.8, 125.9, 126.0, 126.1, 126.2, 127.4, 129.2, 129.3, 130.2, 130.7, 130.9, 131.1, 137.4, 137.9, 139.6, 140.2, 140.8, 147.7, 148.8 ppm. UV-vis (CH_2Cl_2), λ_{max} (lg ε): 265 (4.63), 285 (4.53), sh 306 (4.48), 324 (4.56), 371 (4.08), sh 388 (3.96), 411 nm (3.79). HRMS (ESI): MH^+ found 487.2175. $C_{36}H_{27}N_2$ requires 487.2169.

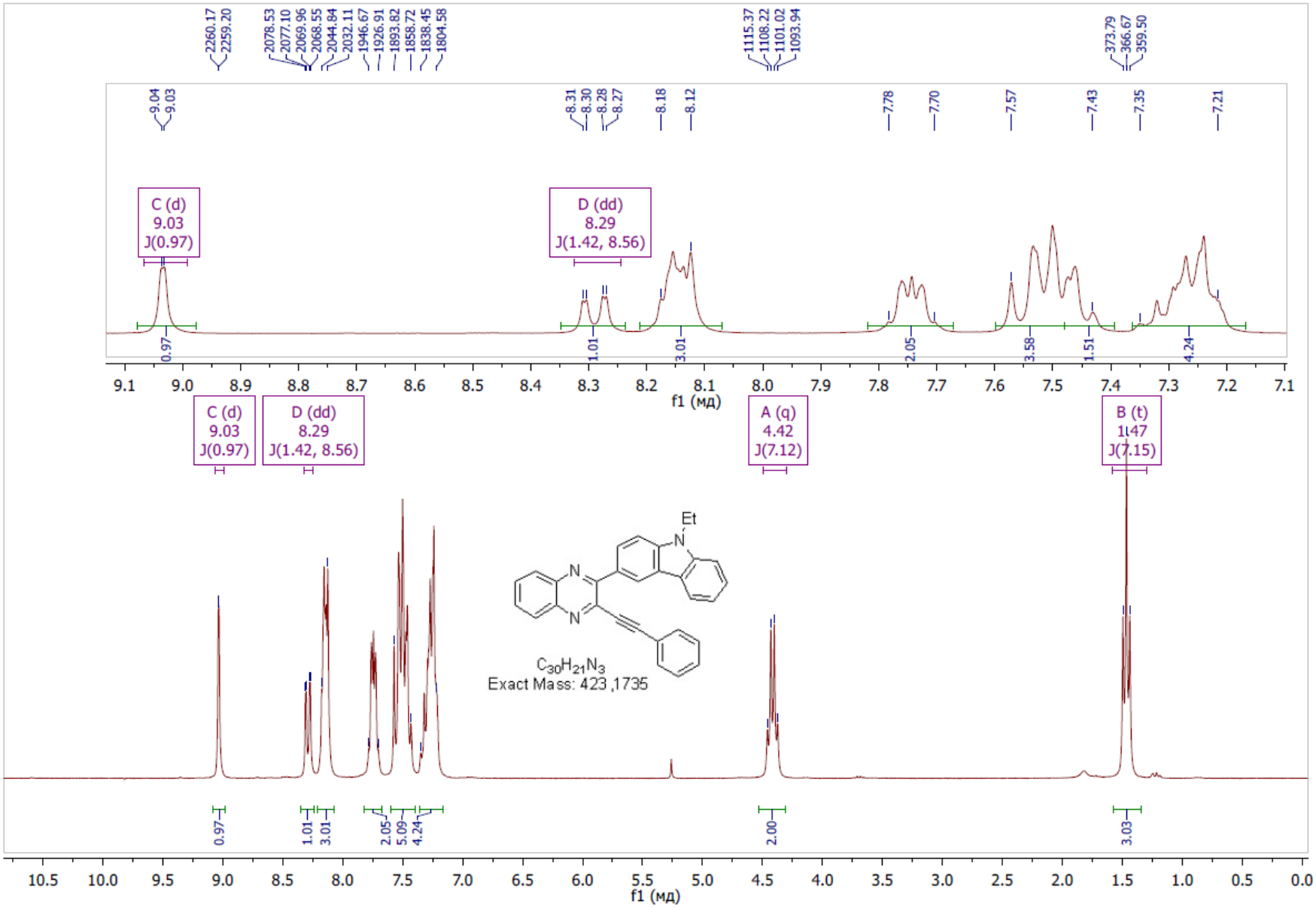


Figure S1. ^{1}H NMR spectrum of **2a** ($CDCl_3$, 250 MHz)

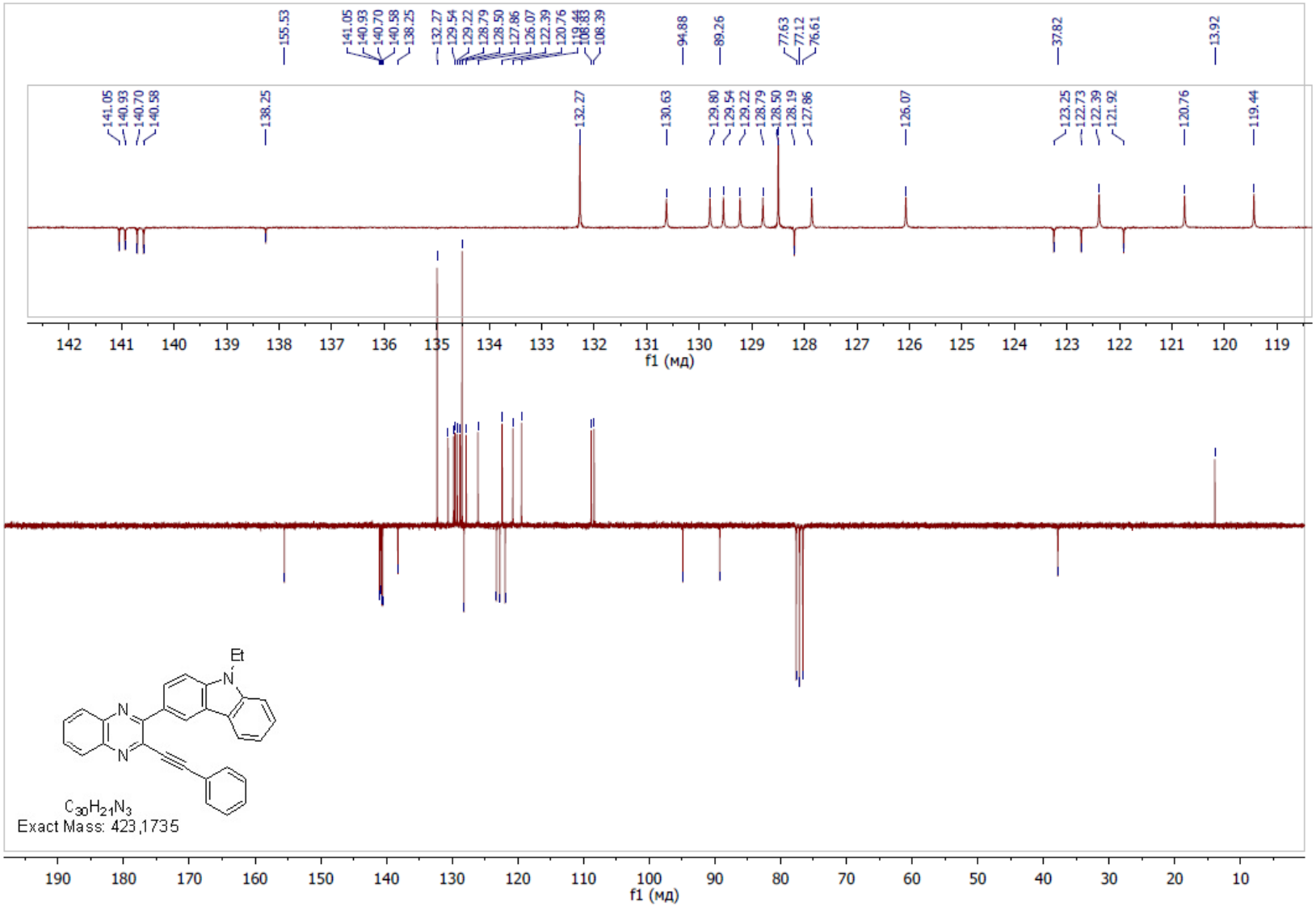


Figure S2. ^{13}C NMR APT spectrum of **2a** ($CDCl_3$, 62.9 MHz)

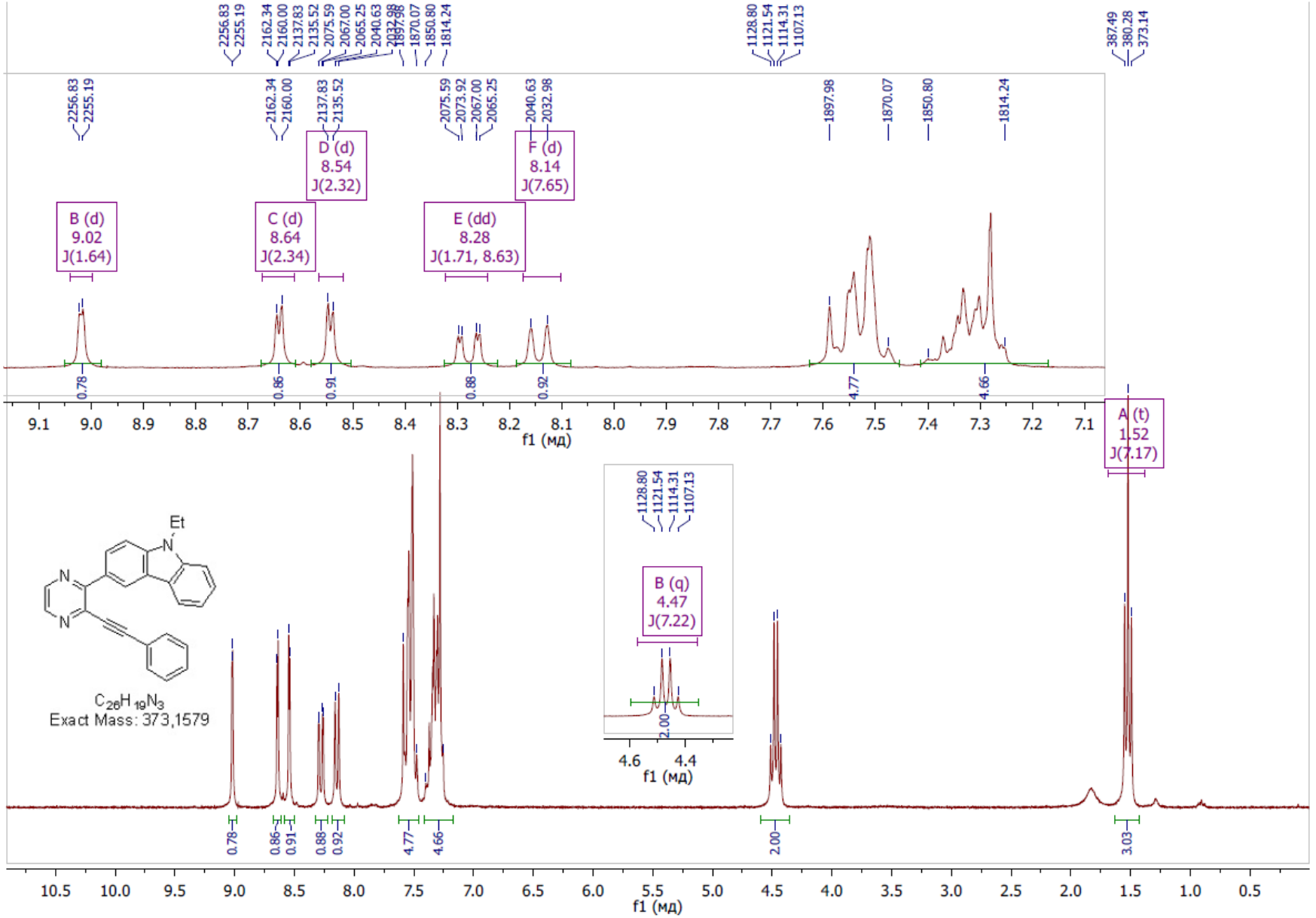


Figure S3. ^{1}H NMR spectrum of **2b** ($CDCl_3$, 250 MHz)

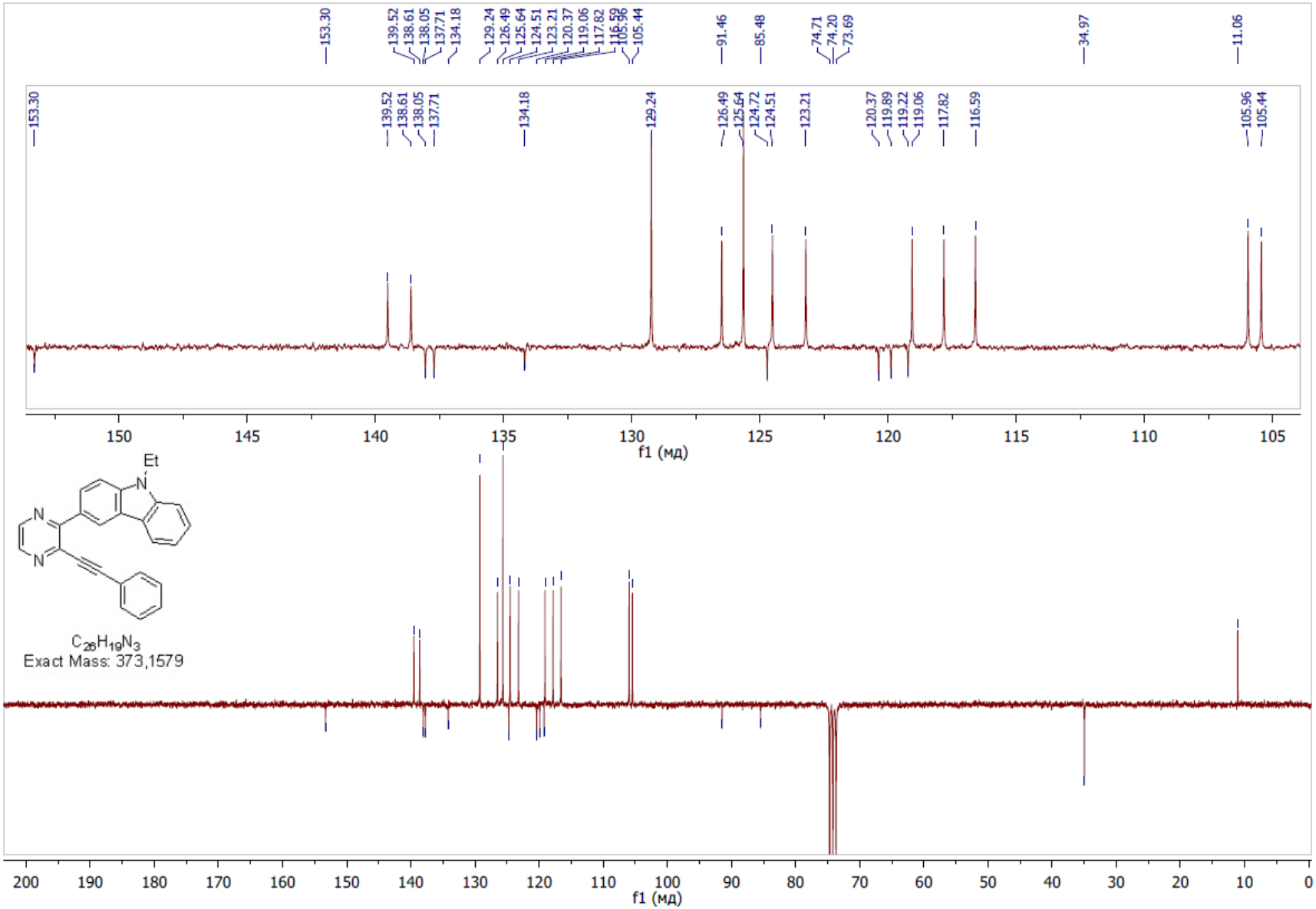


Figure S4. ^{13}C NMR APT spectrum of **2b** ($CDCl_3$, 62.9 MHz)

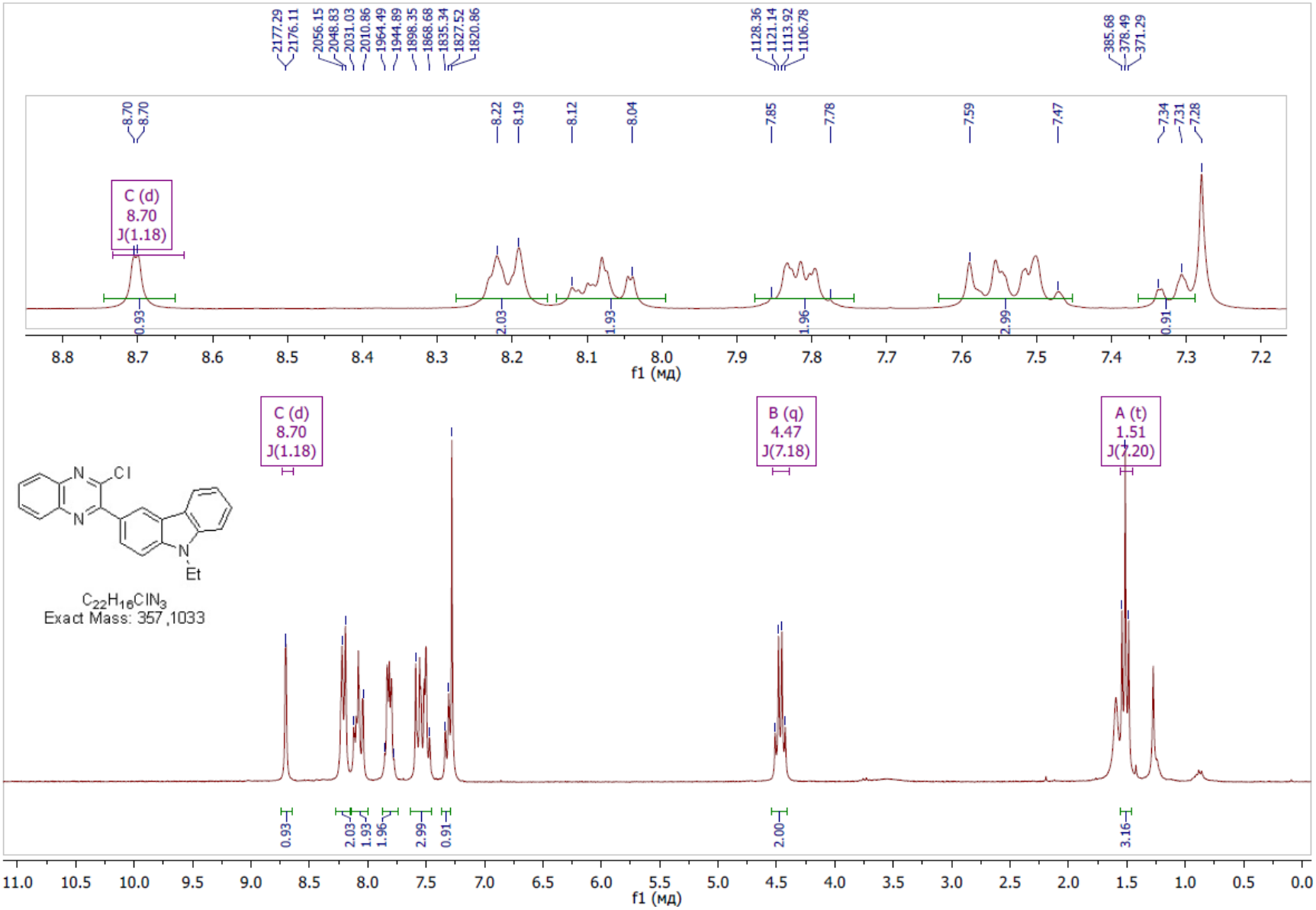


Figure S5. ^{1}H NMR spectrum of **4a** ($CDCl_3$, 250 MHz)

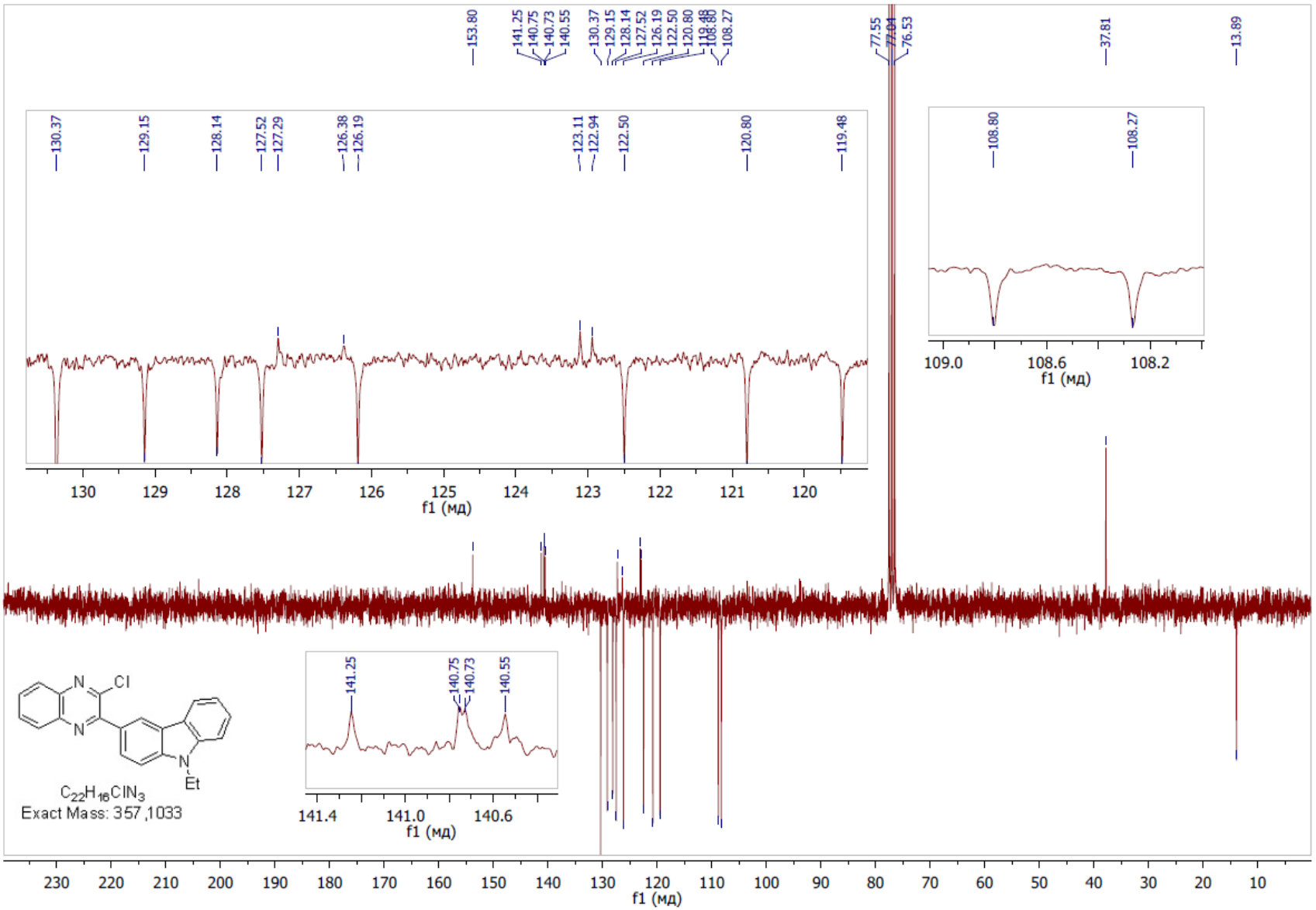


Figure S6. ^{13}C NMR APT spectrum of **4a** ($CDCl_3$, 62.9 MHz)

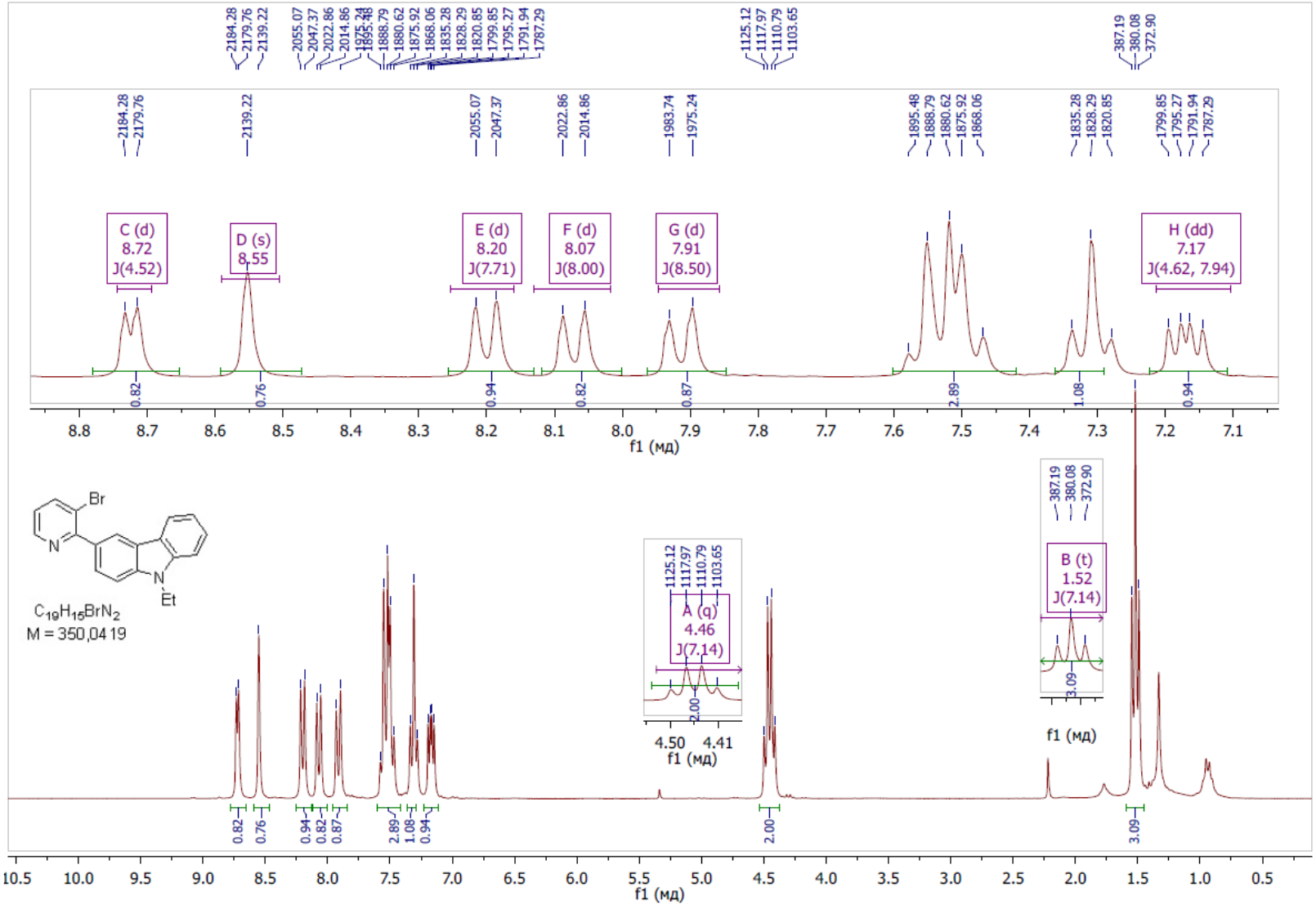


Figure S7. ^{1}H NMR spectrum of **4b** ($CDCl_3$, 250 MHz)

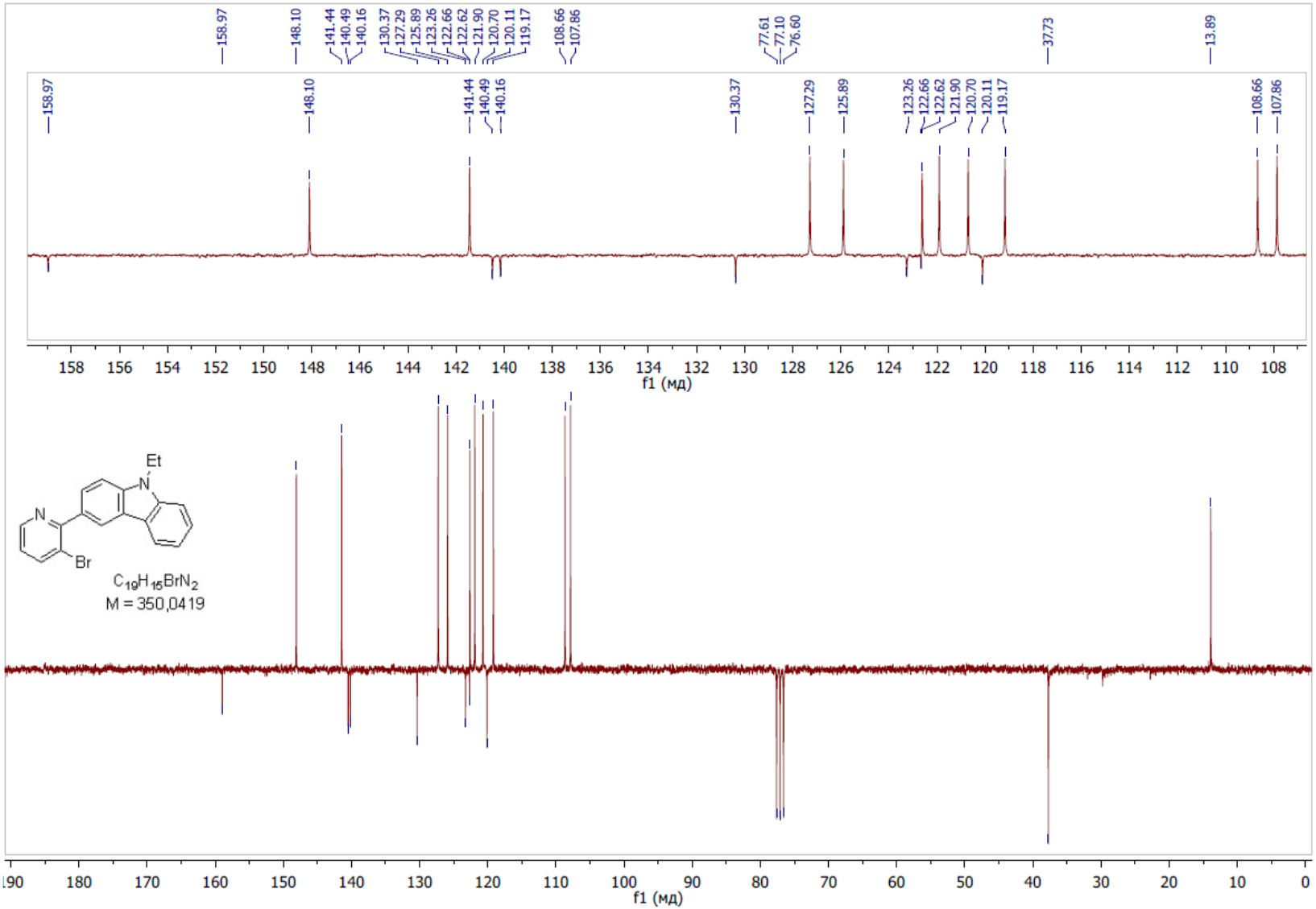


Figure S8. ^{13}C NMR APT spectrum of **4b** ($CDCl_3$, 62.9 MHz)

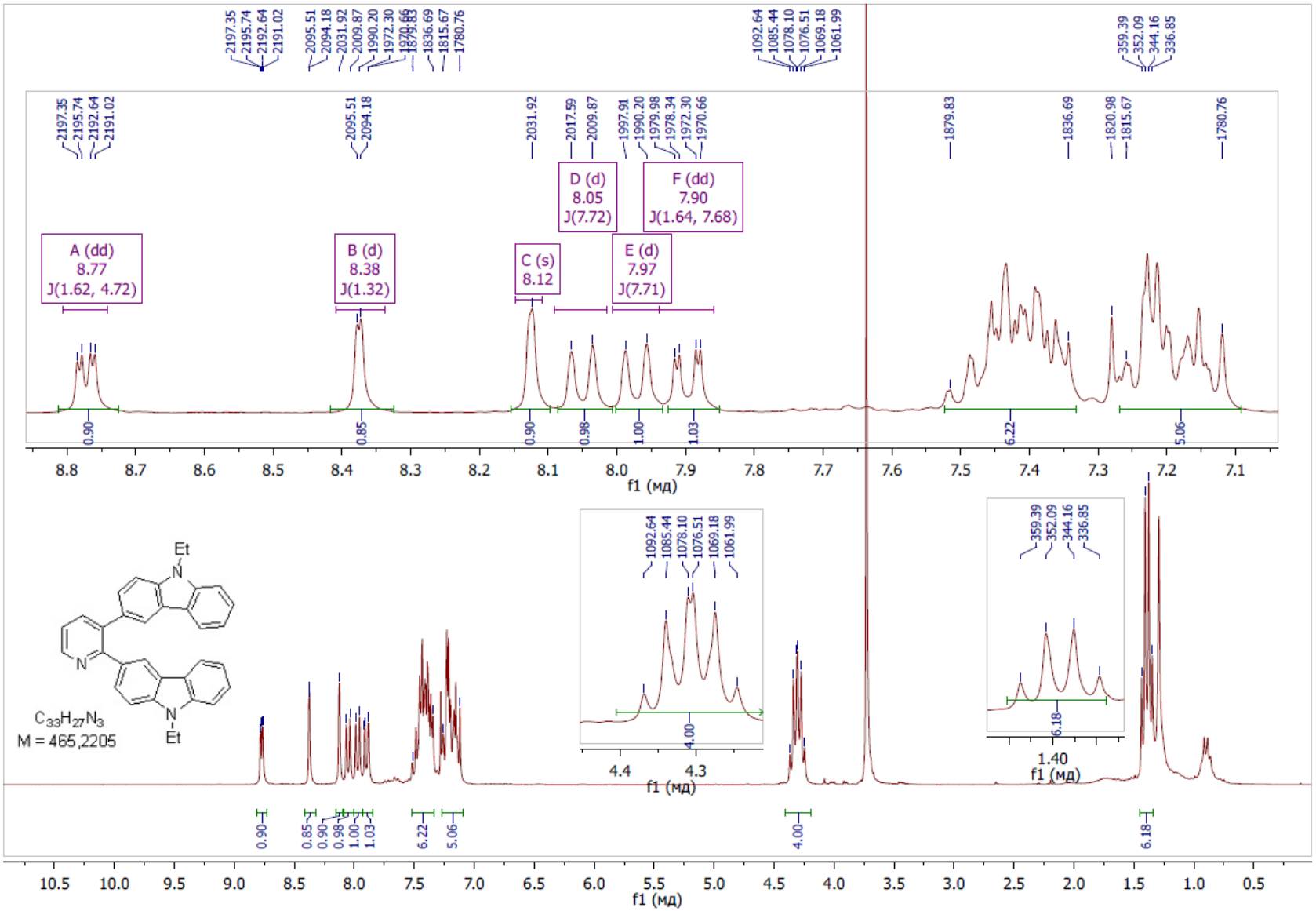


Figure S9. ^{1}H NMR spectrum of **5b** ($CDCl_3$, 250 MHz)

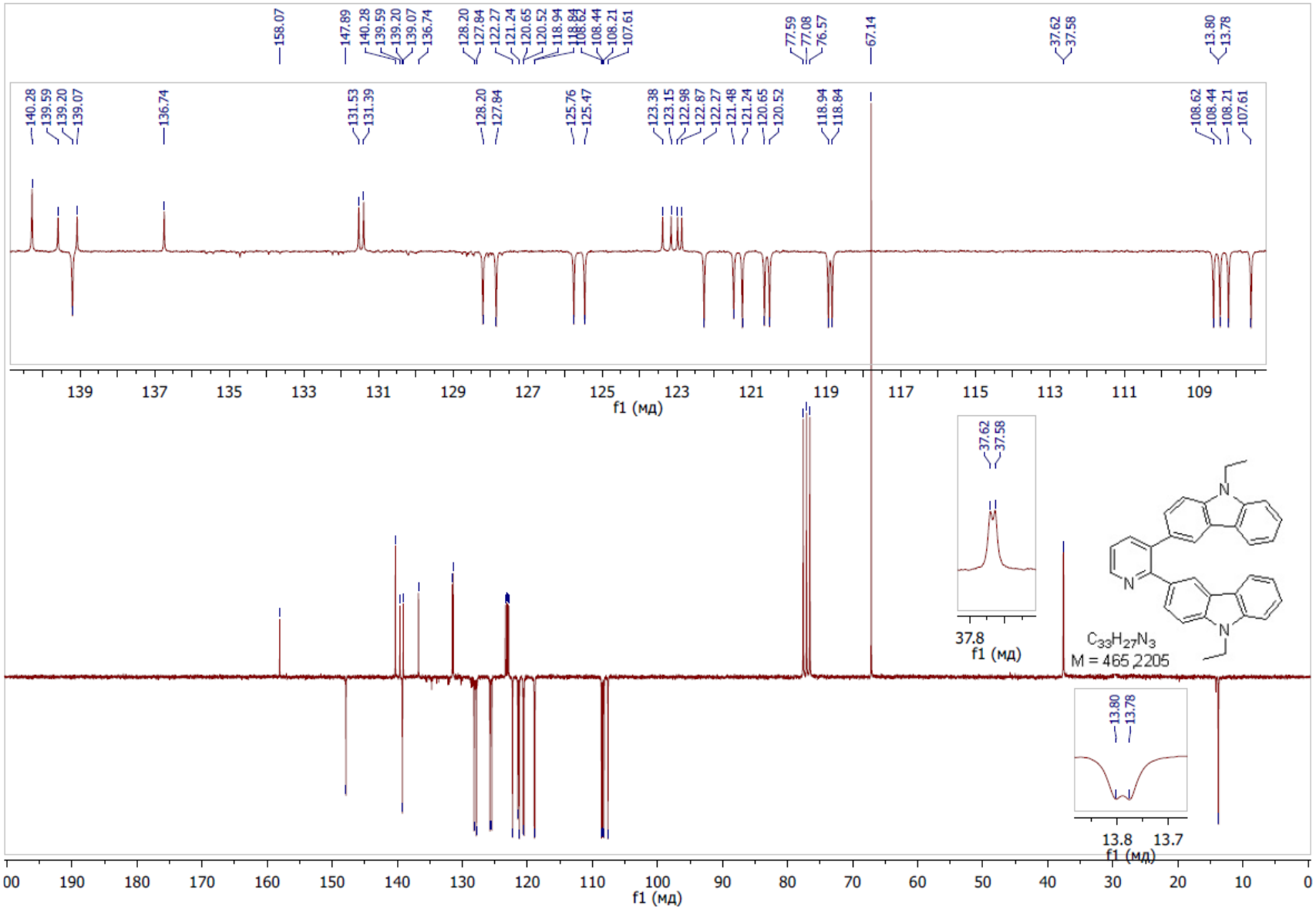


Figure S10. ^{13}C NMR APT spectrum of **5b** ($CDCl_3$, 62.9 MHz)

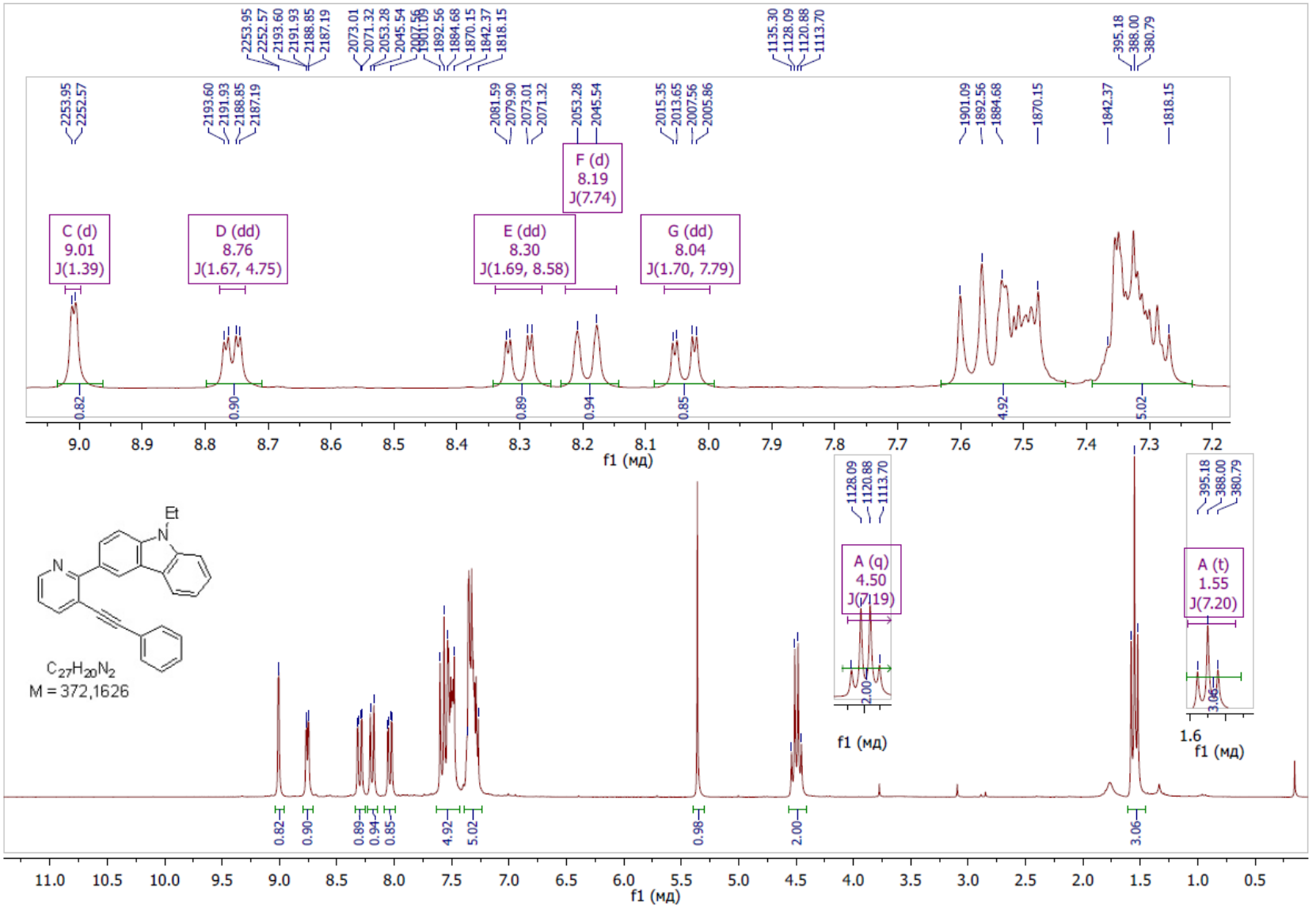


Figure S11. ^{1}H NMR spectrum of **6** ($CDCl_3$, 250 MHz)

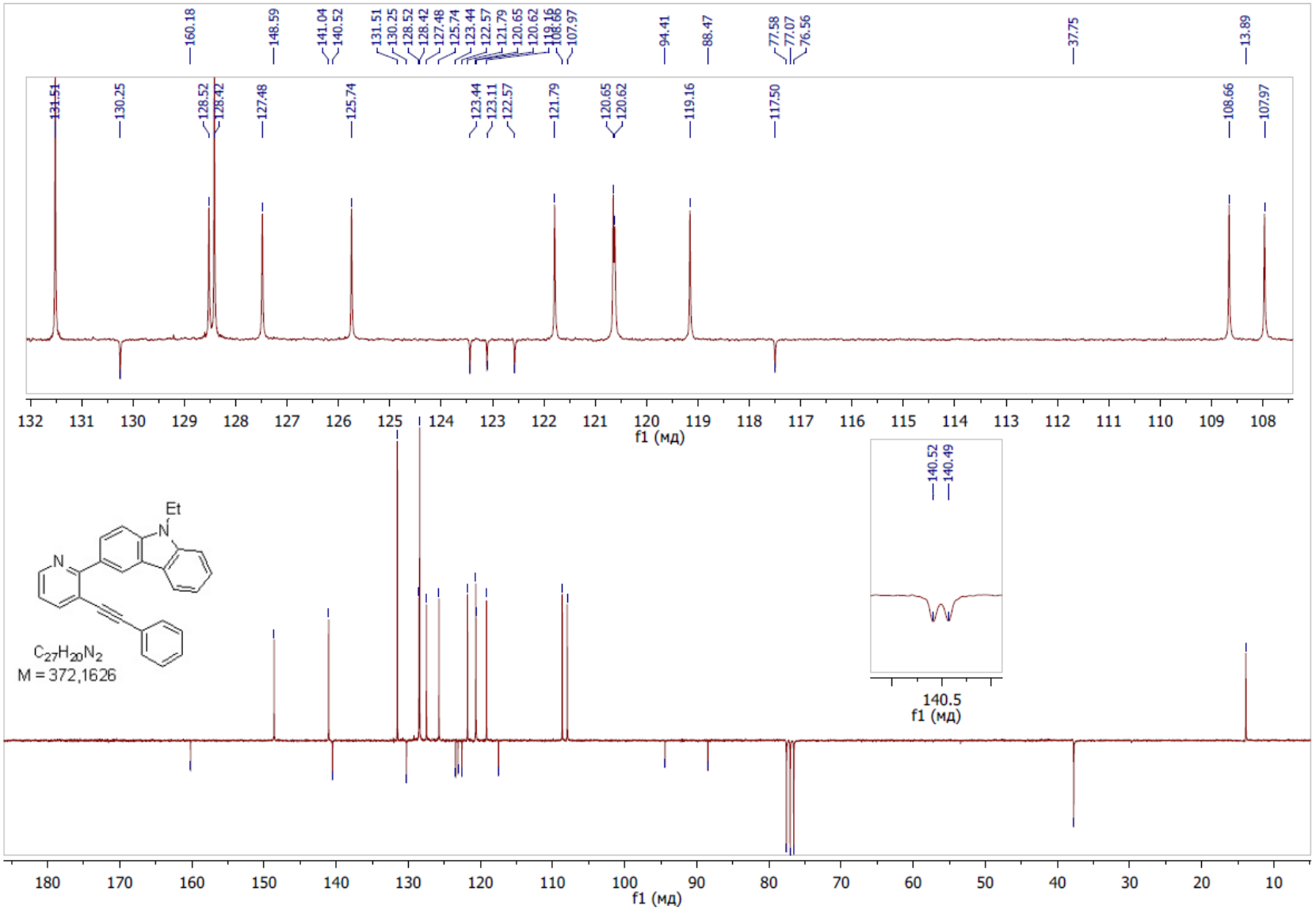


Figure S12. ^{13}C NMR APT spectrum of **6** ($CDCl_3$, 62.9 MHz)

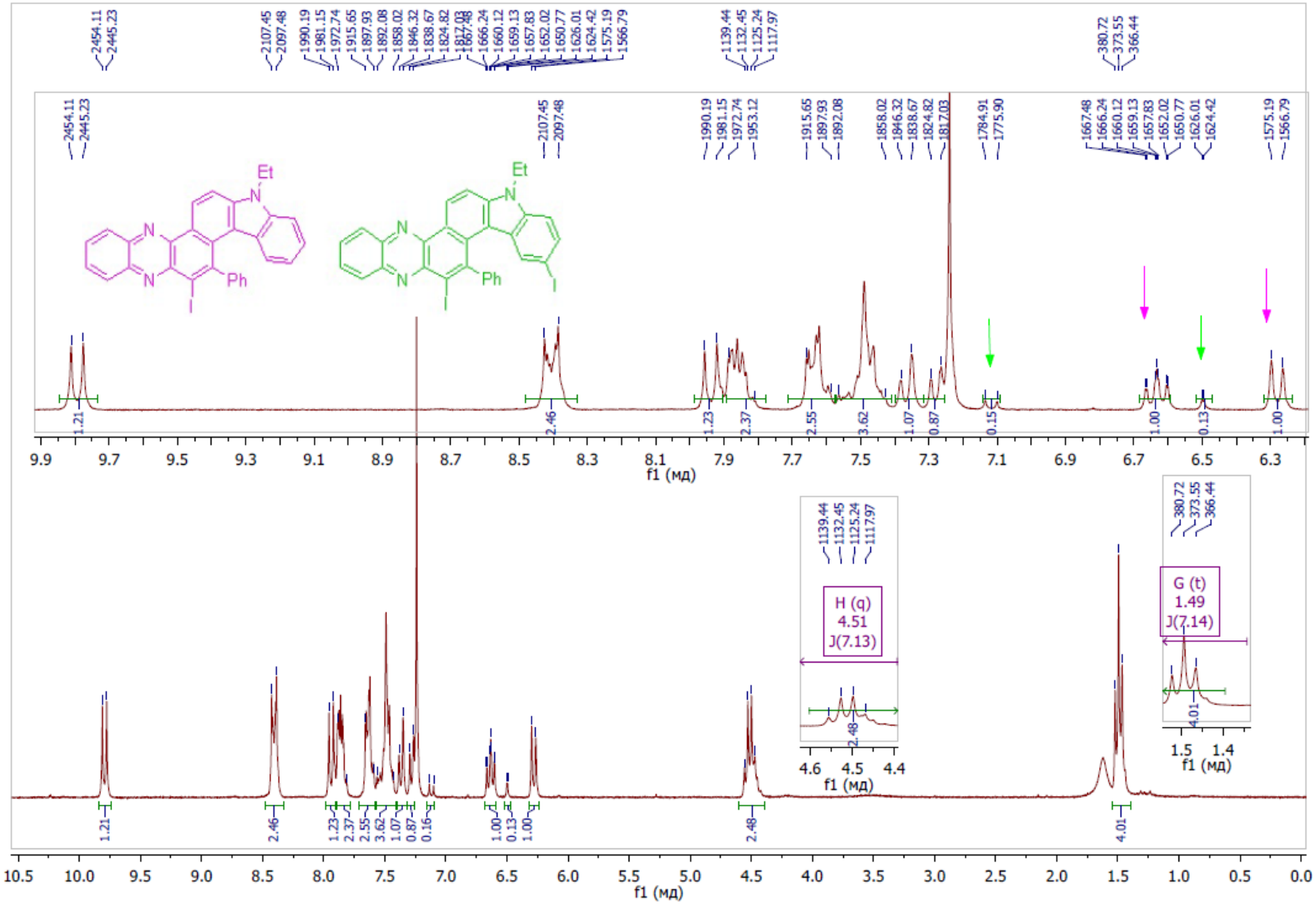


Figure S13. ^{1}H NMR spectrum of the mixture **7a** and **8a** ($CDCl_3$, 250 MHz)

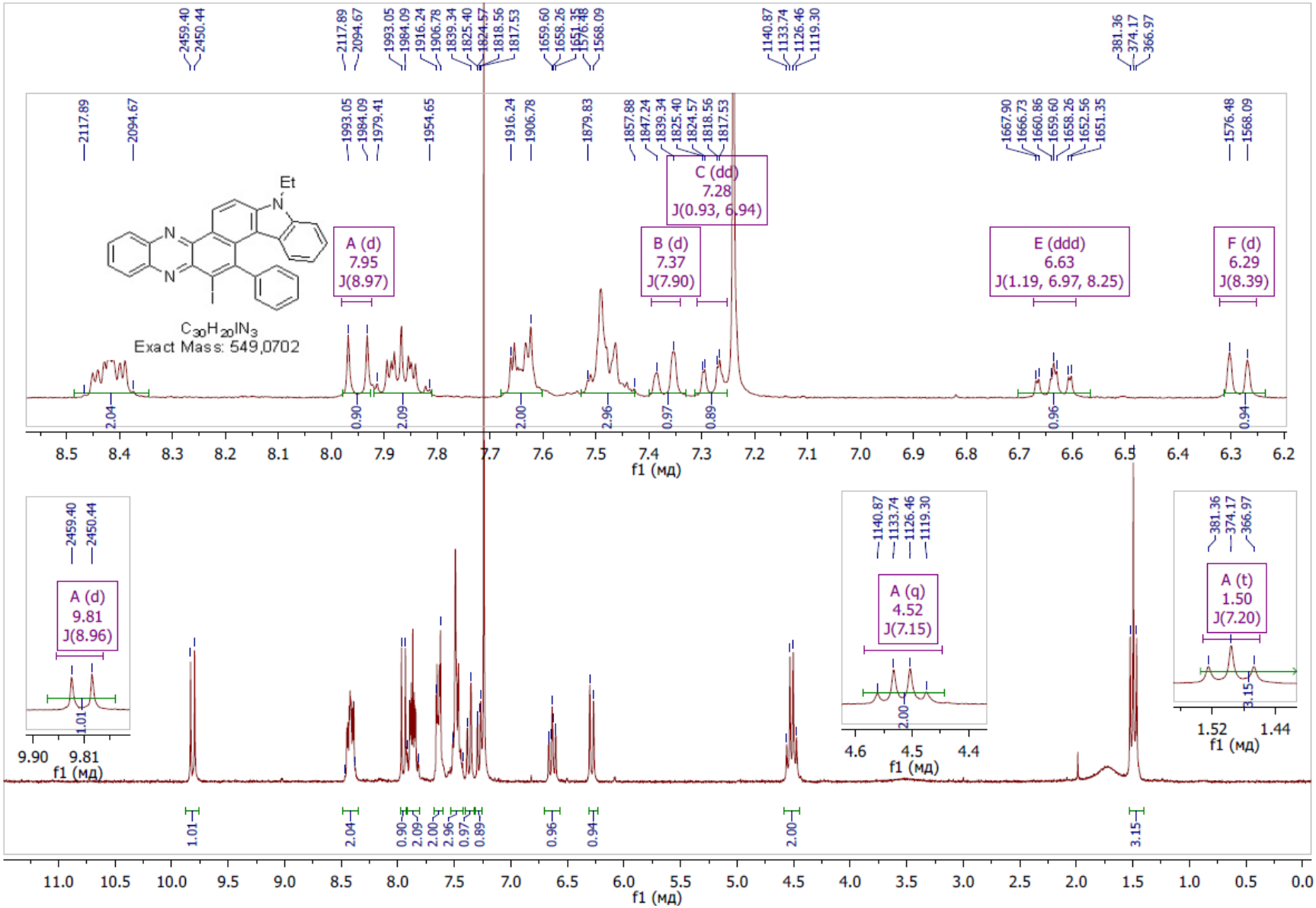


Figure S14. ^{1}H NMR spectrum of **7a** ($CDCl_3$, 250 MHz)

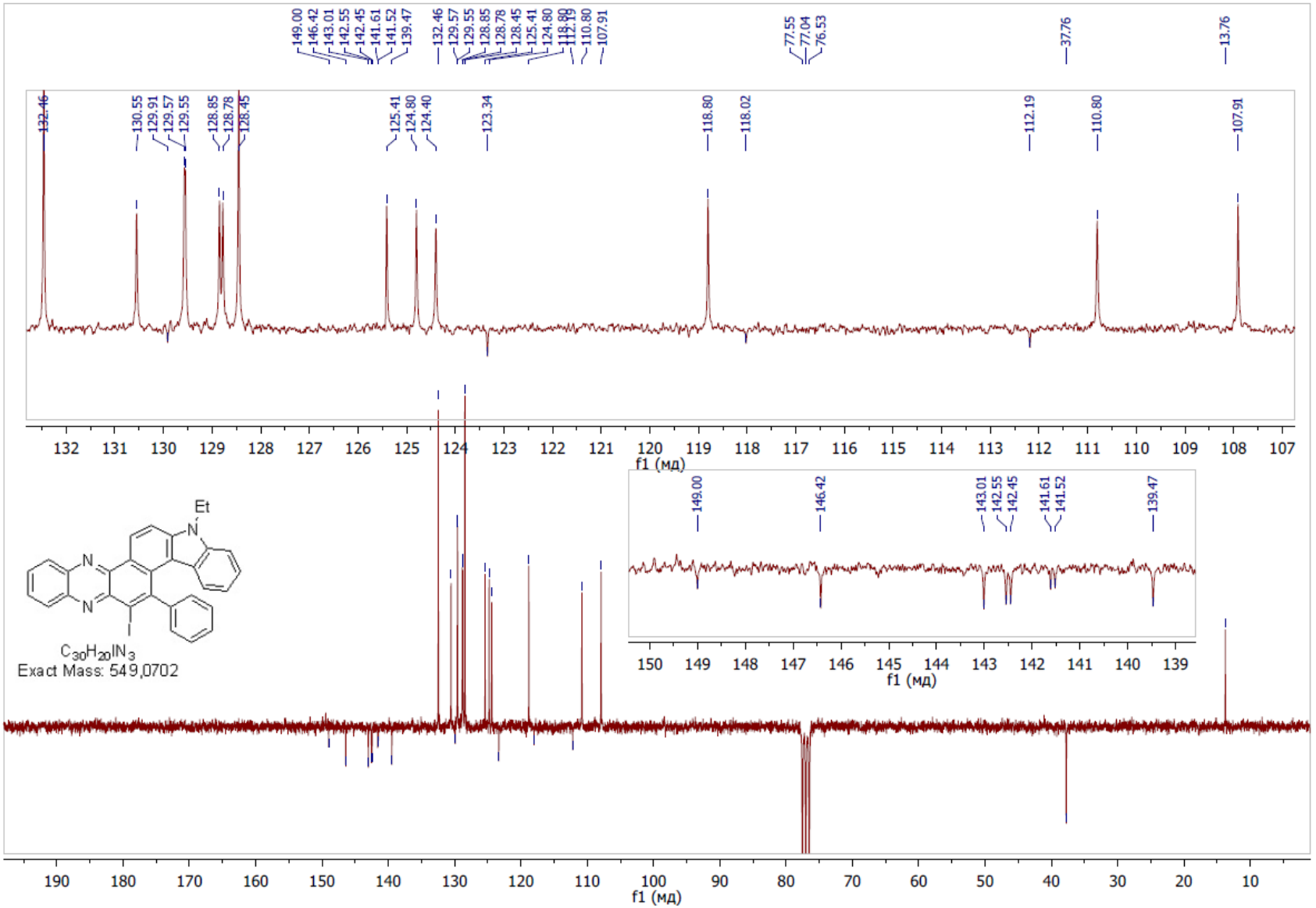


Figure S15. ^{13}C NMR APT spectrum of **7a** ($CDCl_3$, 62.9 MHz)

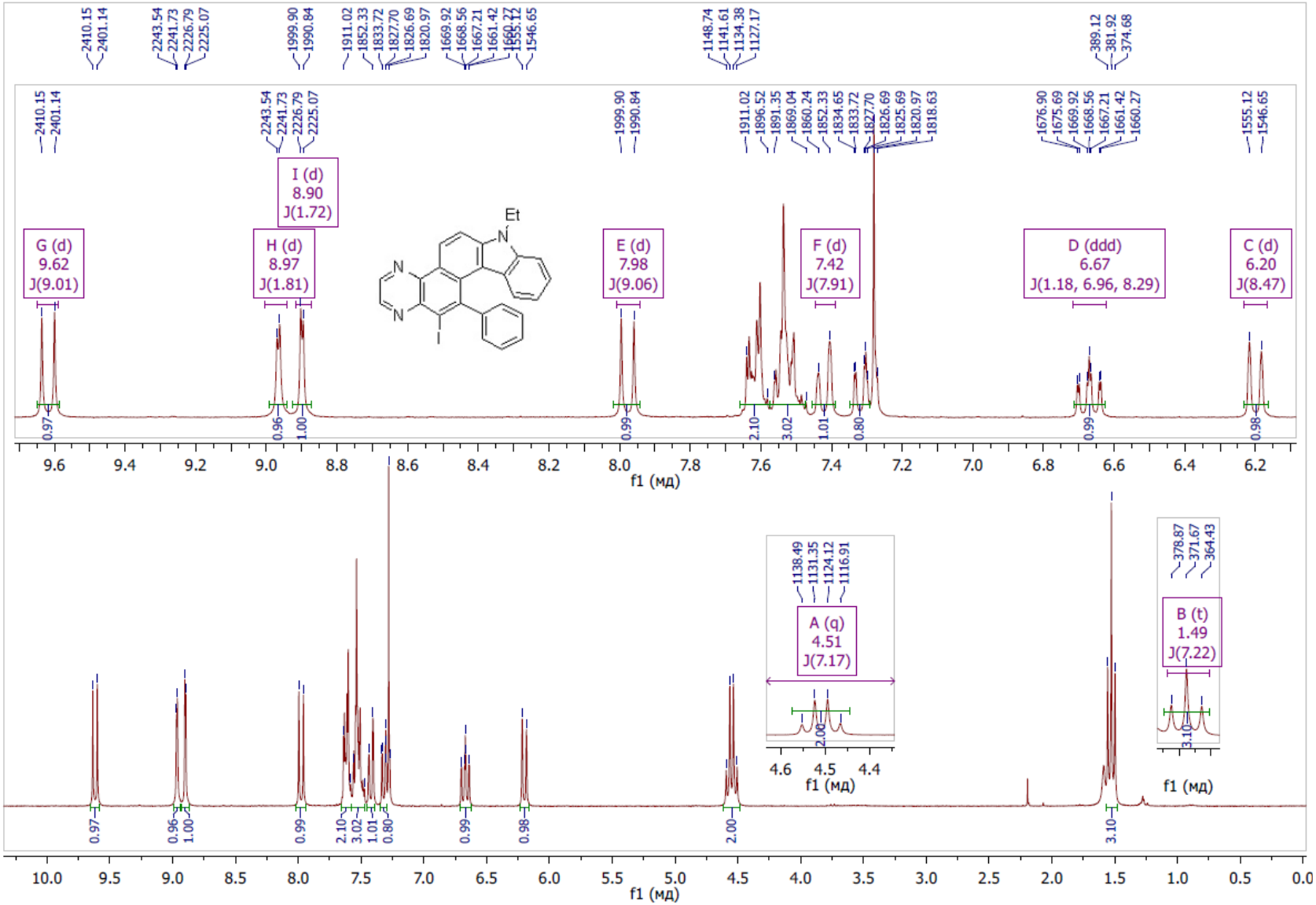


Figure S16. ^{1}H NMR spectrum of **7b** ($CDCl_3$, 250 MHz)

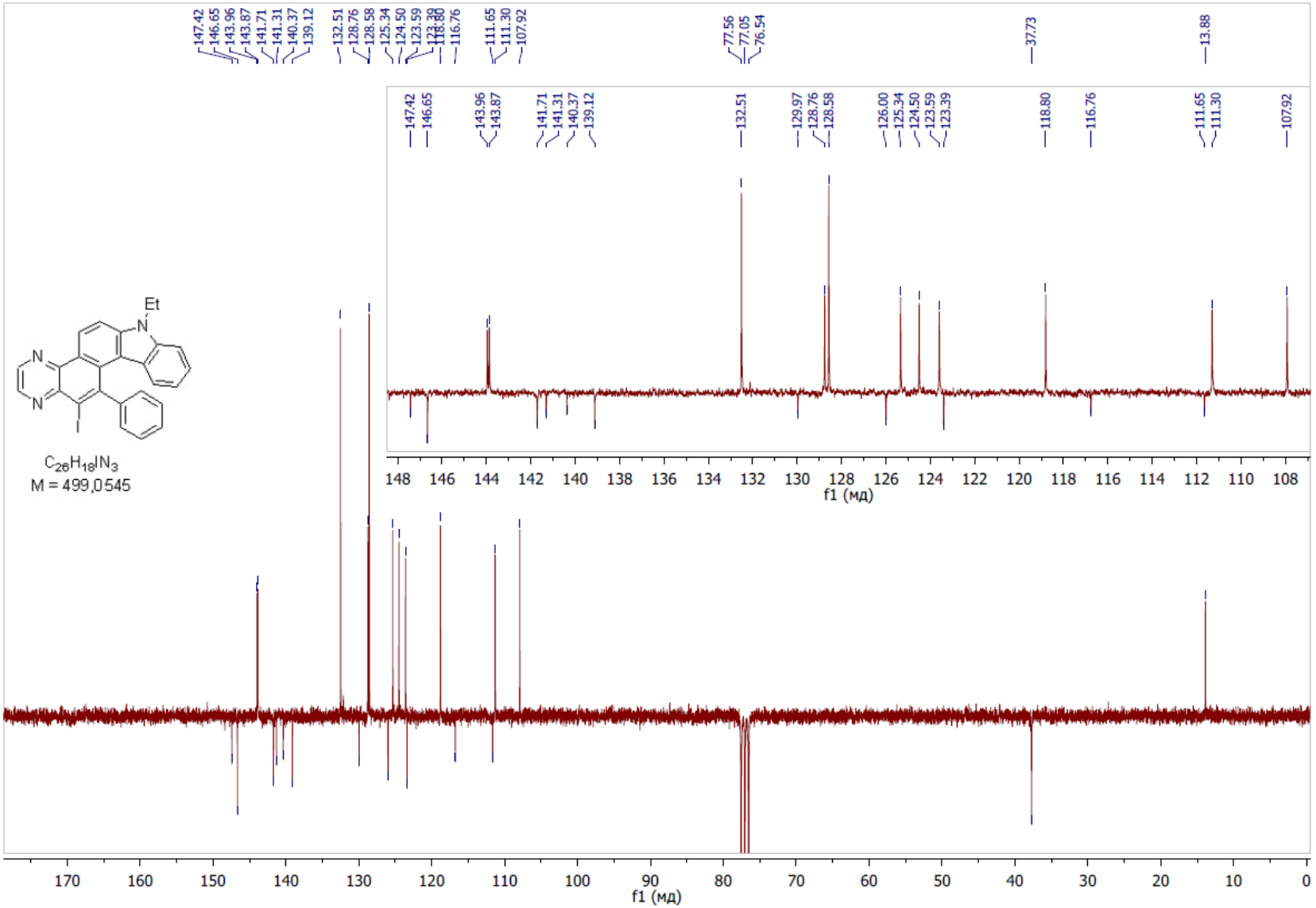


Figure S17. ^{13}C NMR APT spectrum of **7b** ($CDCl_3$, 62.9 MHz)

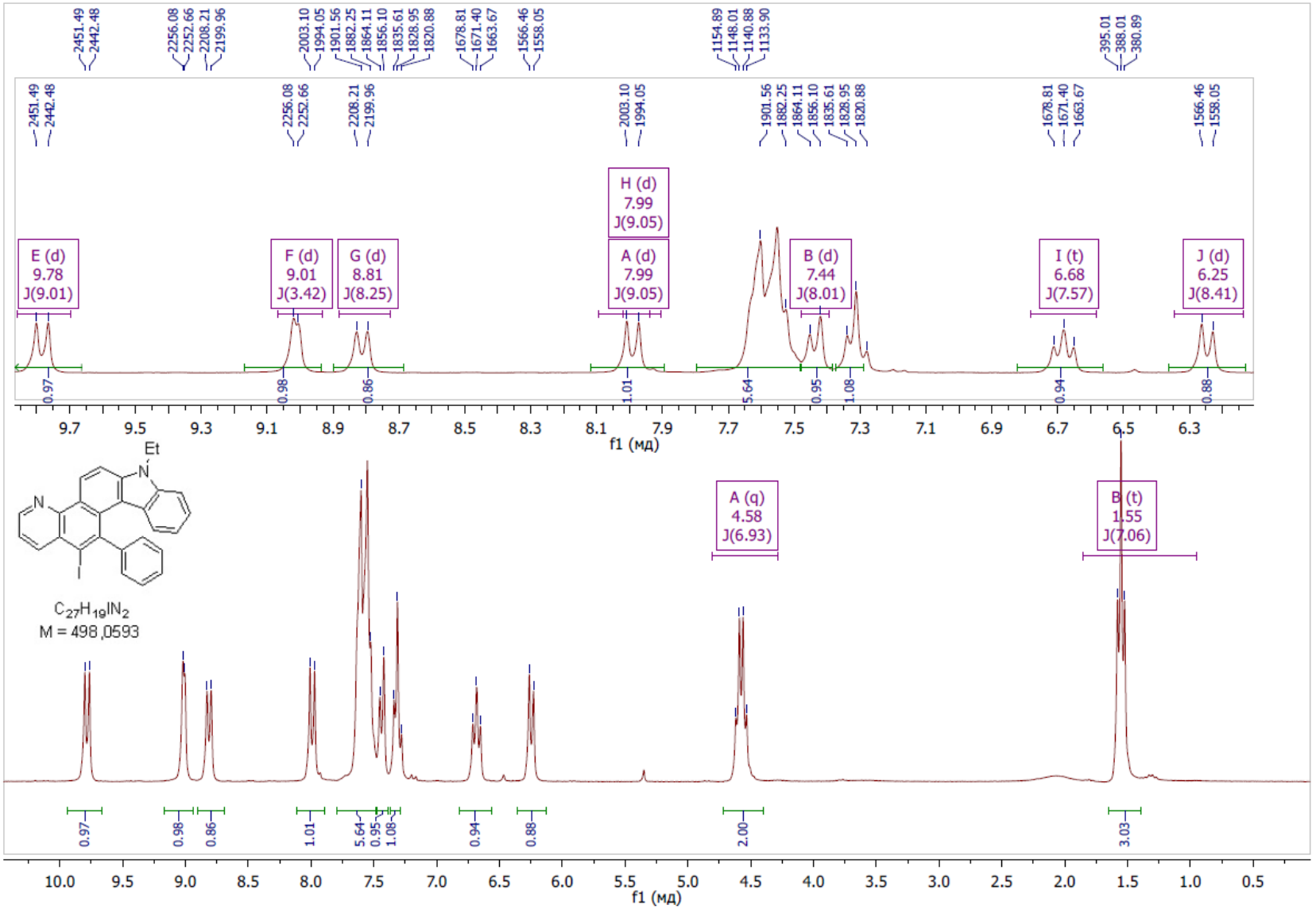


Figure S18. ^{1}H NMR spectrum of **7c** ($CDCl_3$, 250 MHz)

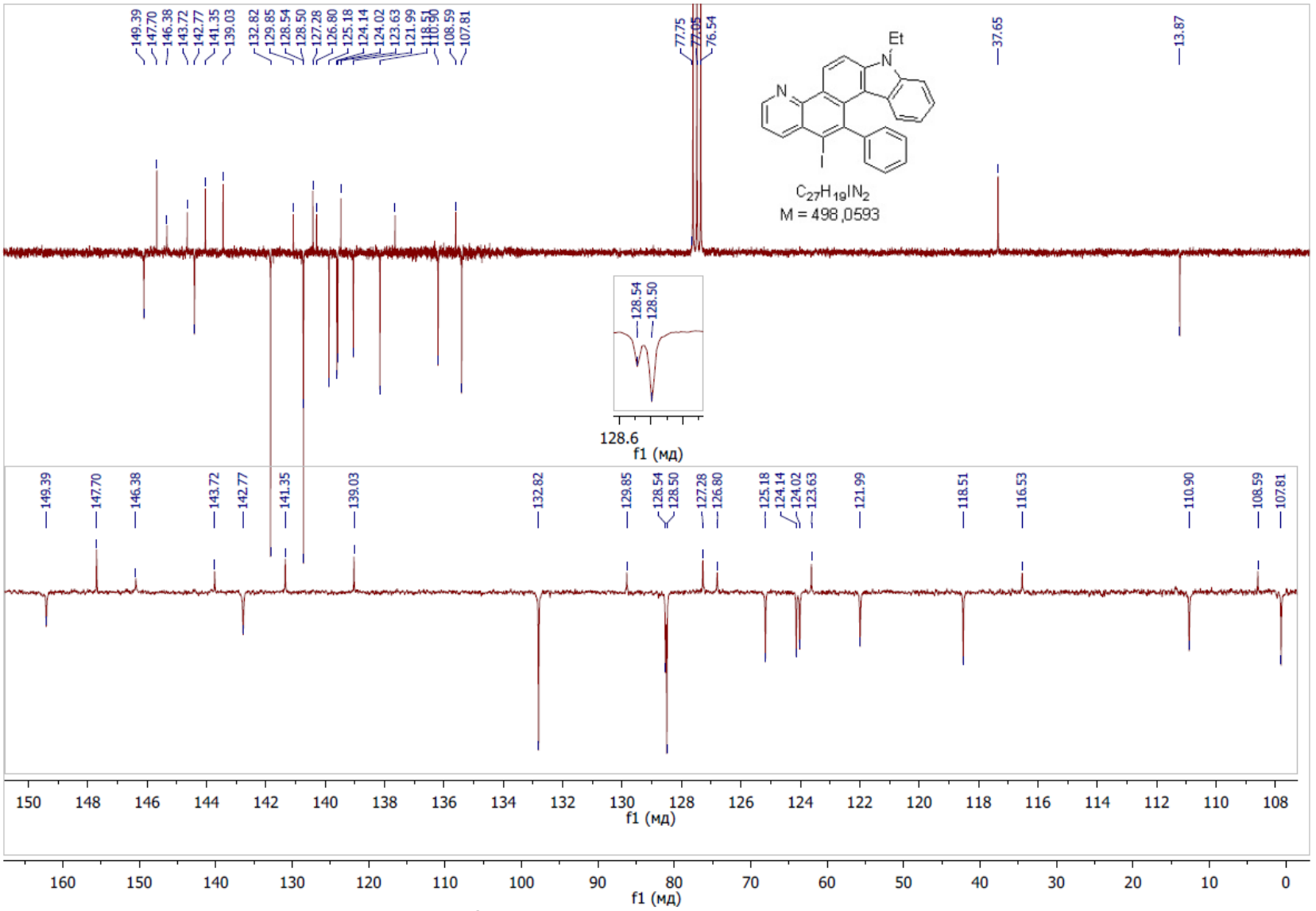


Figure S19. ^{13}C NMR APT spectrum of **7c** ($CDCl_3$, 62.9 MHz)

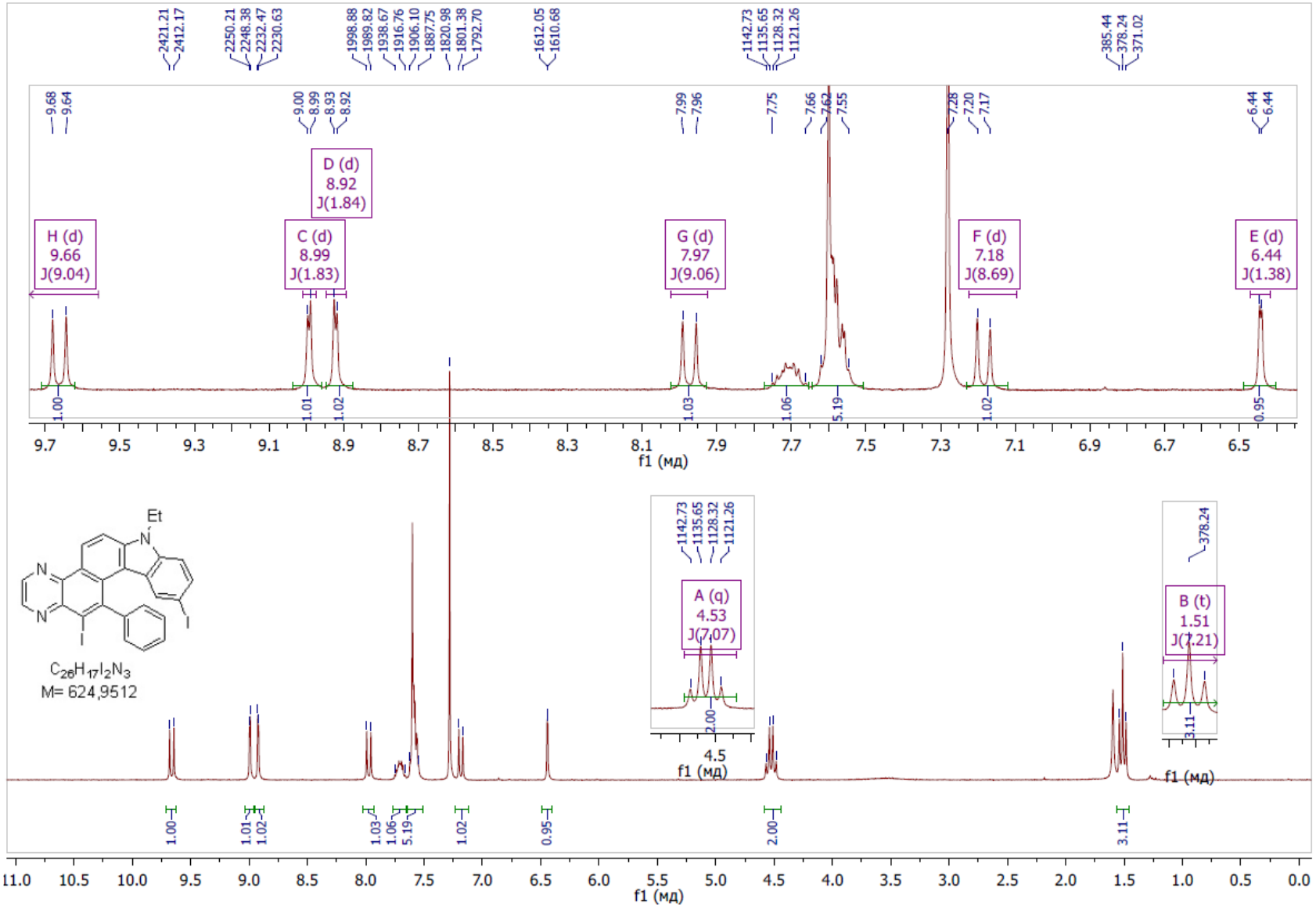


Figure S20. ^{1}H NMR spectrum of **8b** ($CDCl_3$, 250 MHz)

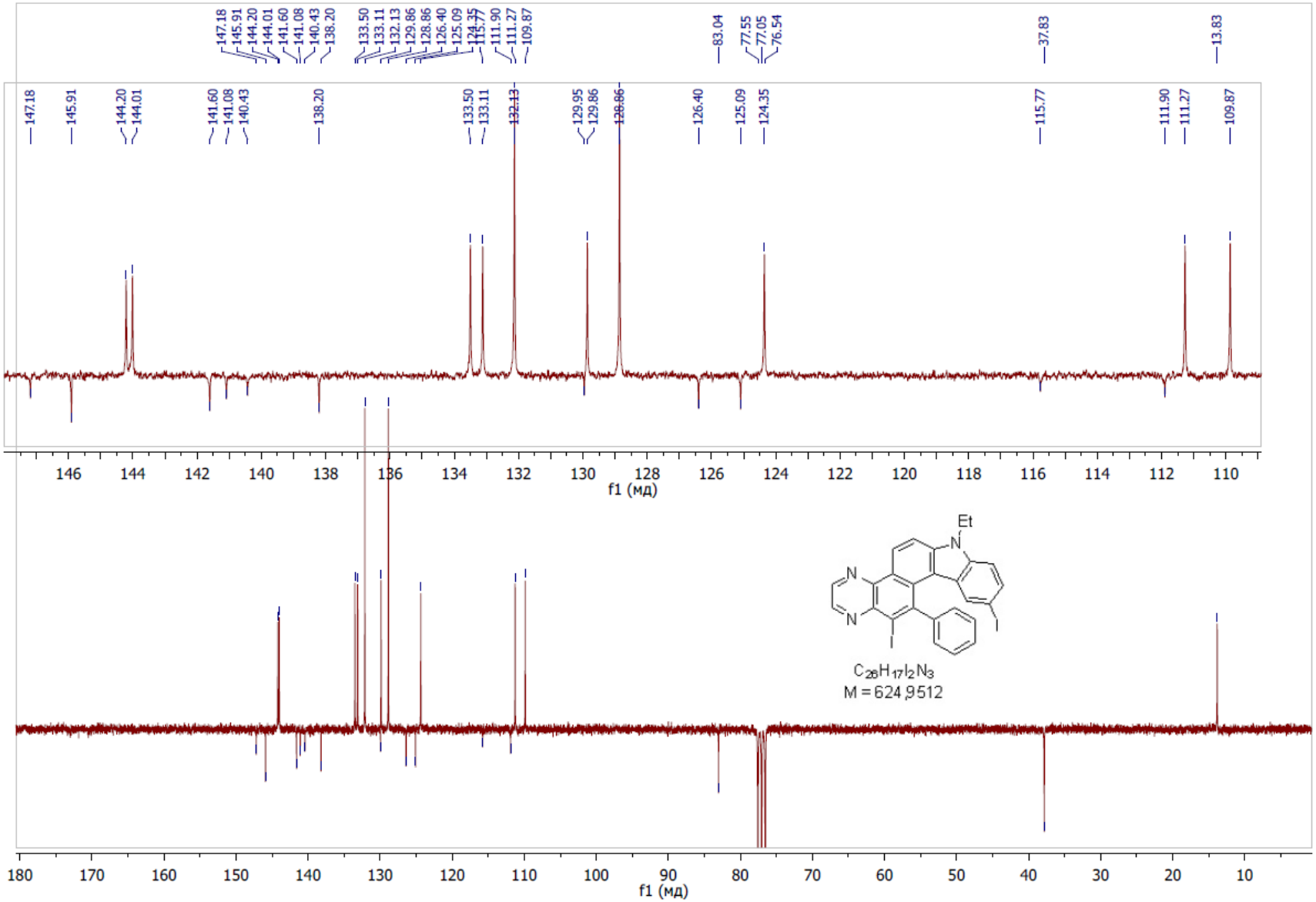


Figure S21. ^{13}C NMR APT spectrum of **8b** ($CDCl_3$, 62.9 MHz)

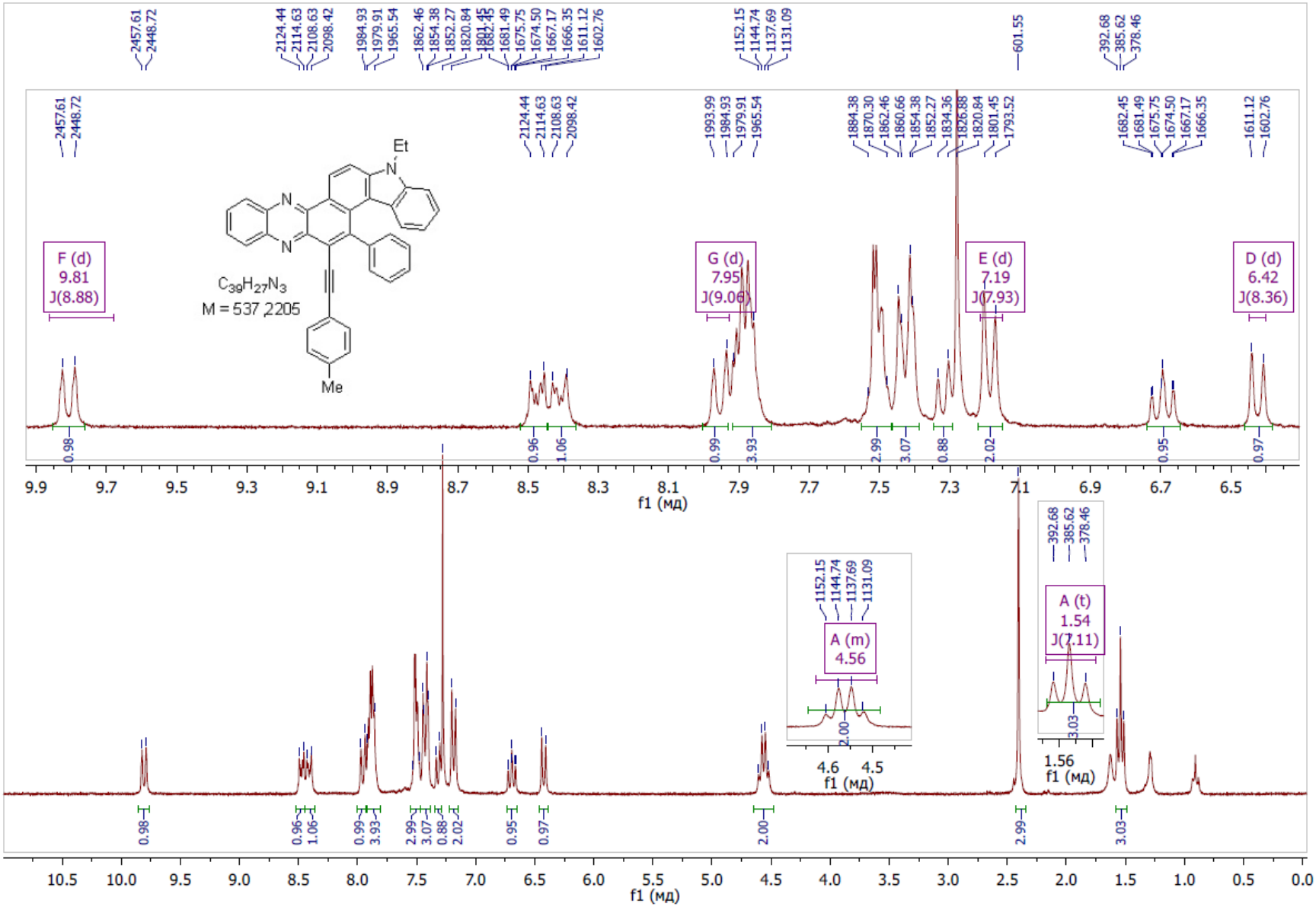


Figure S22. ^{1}H NMR spectrum of **9a** ($CDCl_3$, 250 MHz)

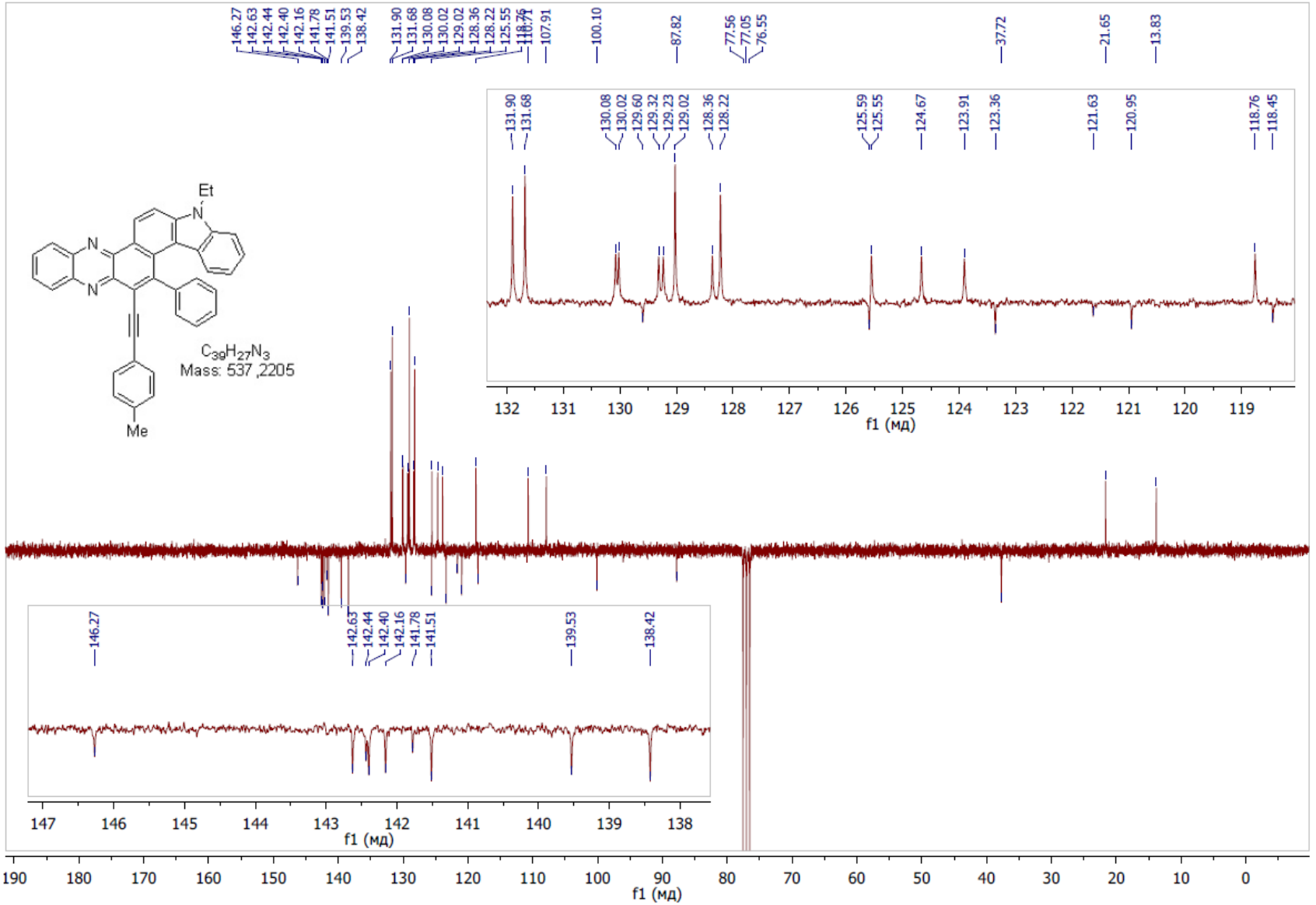


Figure S23. ^{13}C NMR APT spectrum of **9a** ($CDCl_3$, 62.9 MHz)

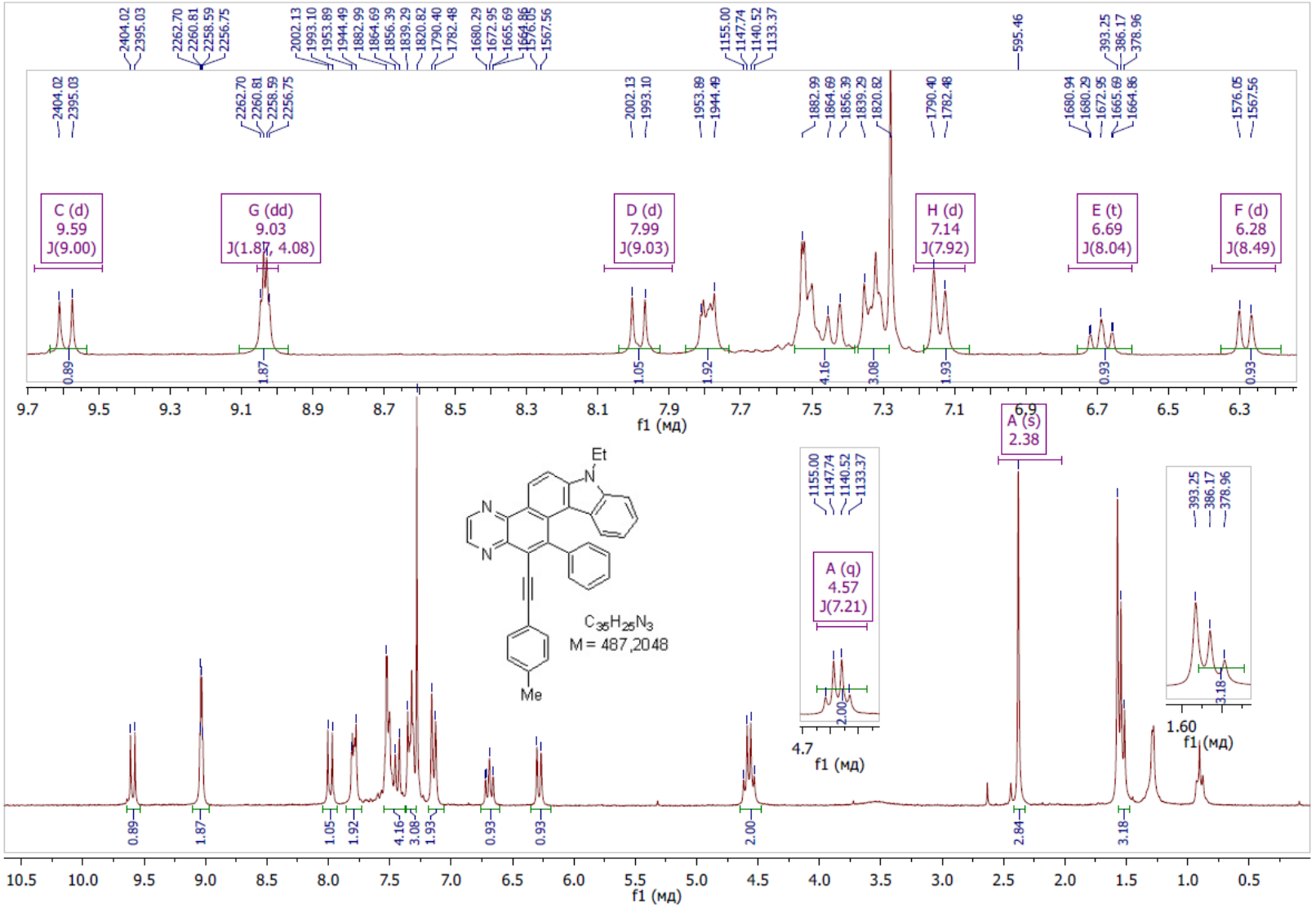


Figure S24. ^{1}H NMR spectrum of **9b** ($CDCl_3$, 250 MHz)

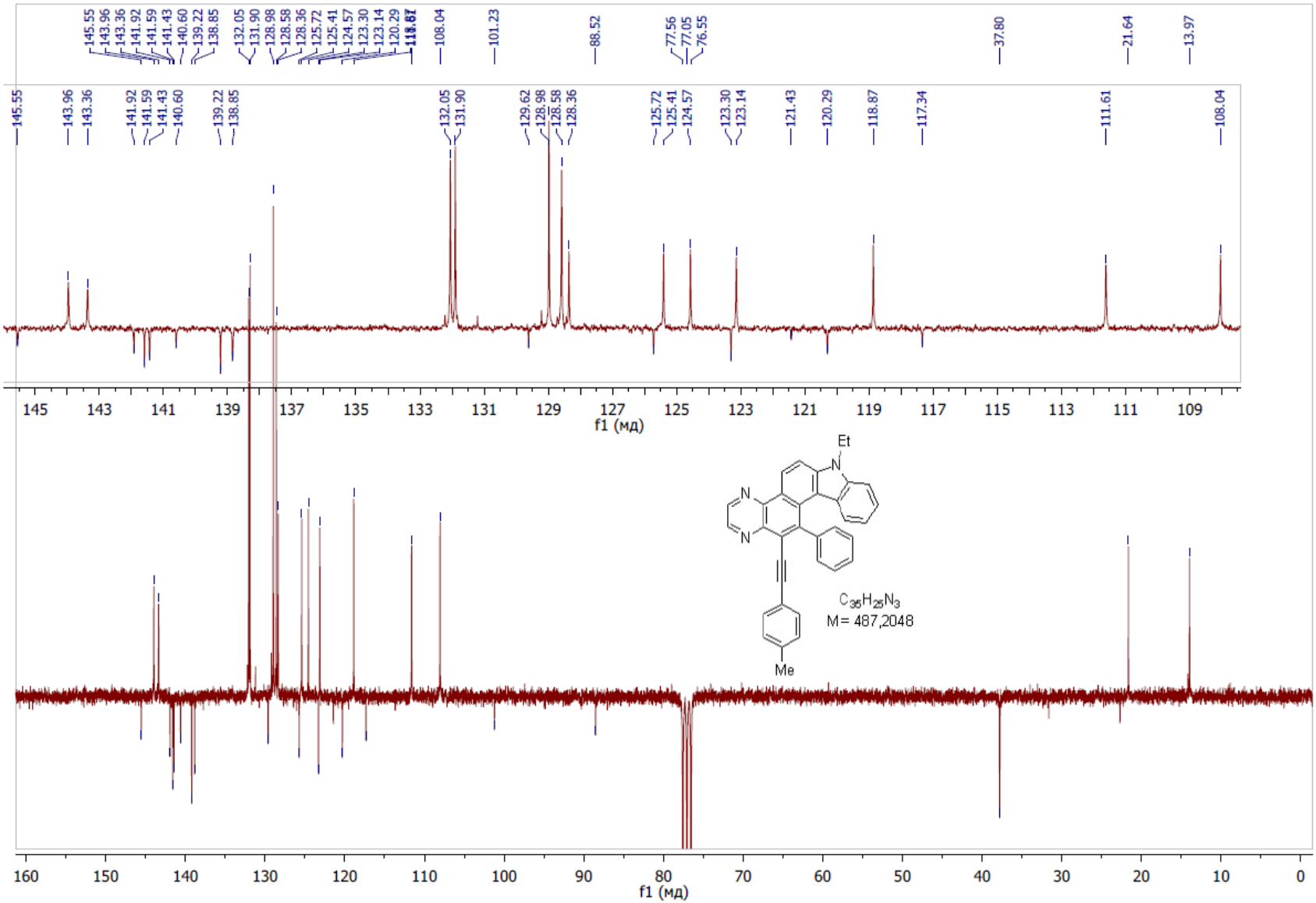


Figure S25. ^{13}C NMR APT spectrum of **9b** ($CDCl_3$, 62.9 MHz)

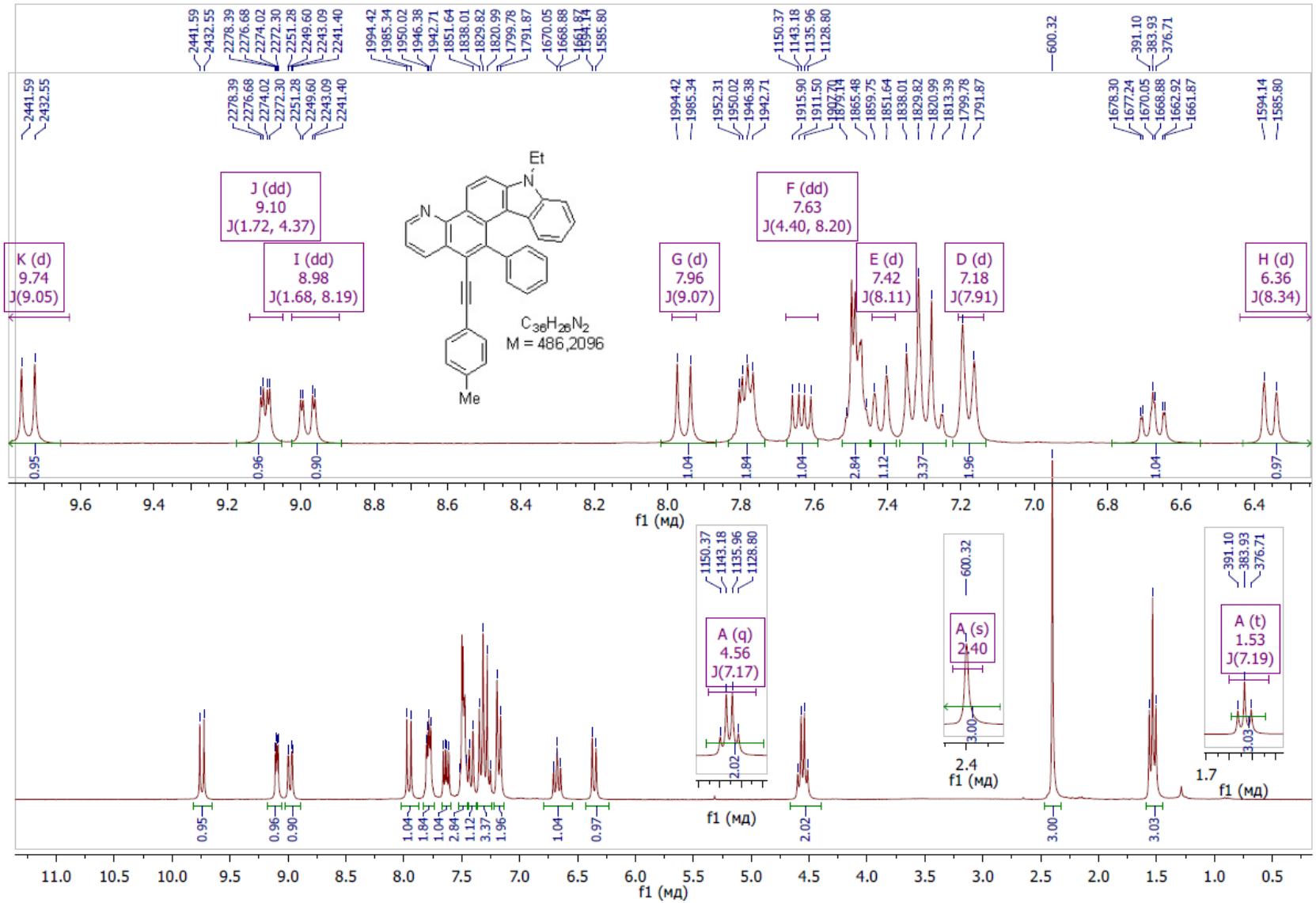


Figure S26. ^{1}H NMR spectrum of **9c** ($CDCl_3$, 250 MHz)

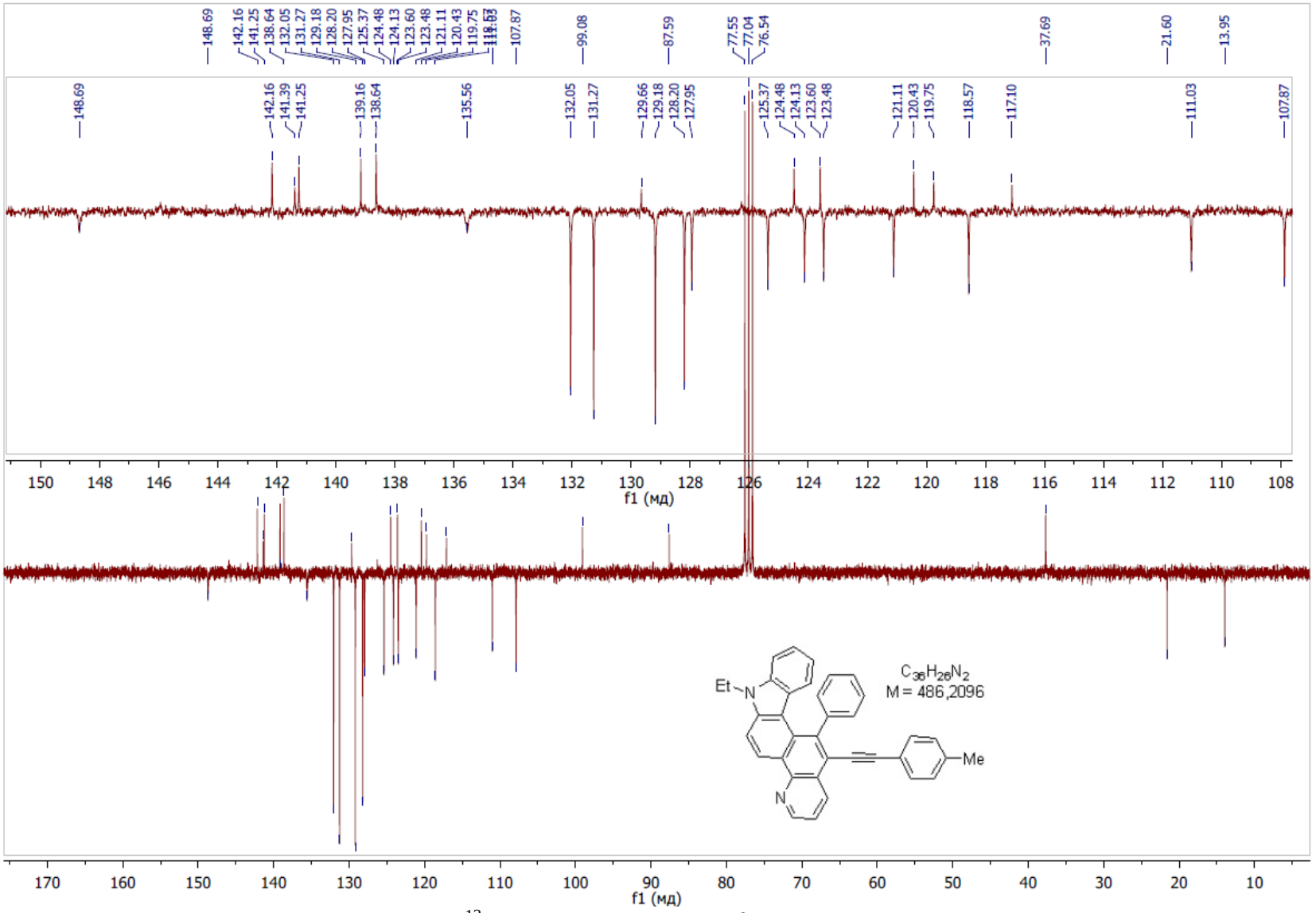


Figure S27. ^{13}C NMR APT spectrum of **9c** ($CDCl_3$, 62.9 MHz)

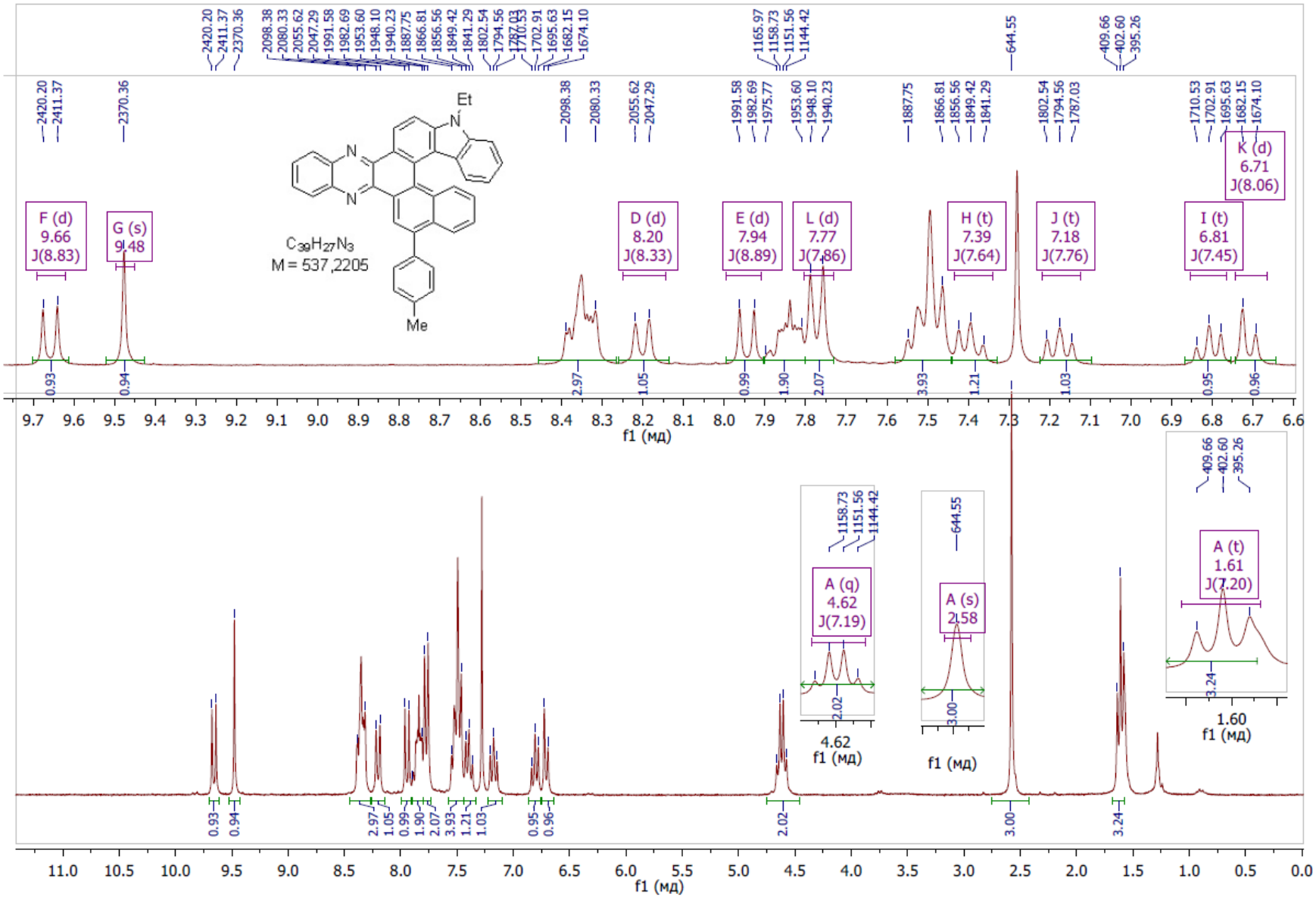


Figure S28. ^{1}H NMR spectrum of **10a** ($CDCl_3$, 250 MHz)

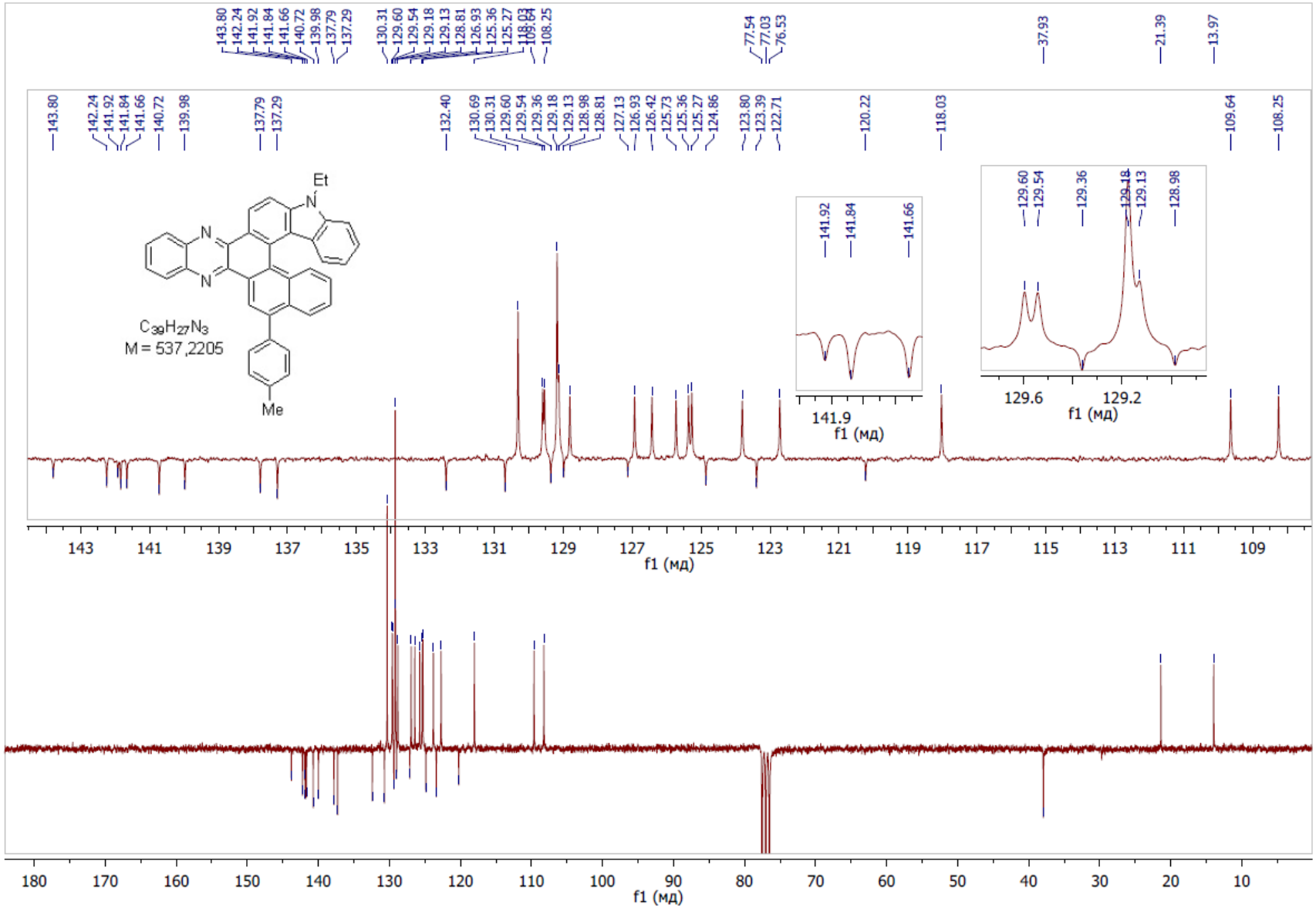


Figure S29. ^{13}C NMR APT spectrum of **10a** ($CDCl_3$, 62.9 MHz)

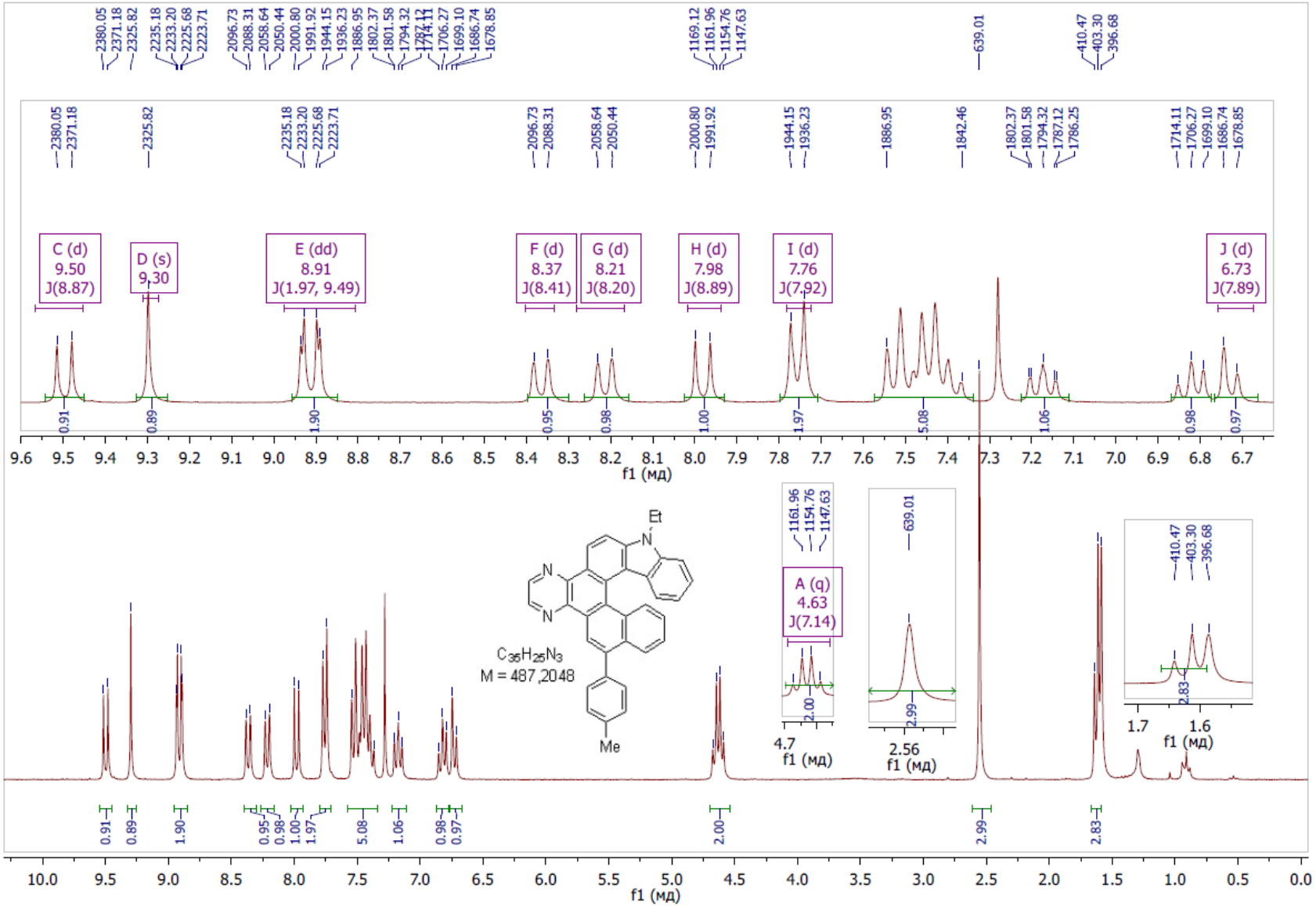


Figure S30. ^{1}H NMR spectrum of **10b** ($CDCl_3$, 250 MHz)

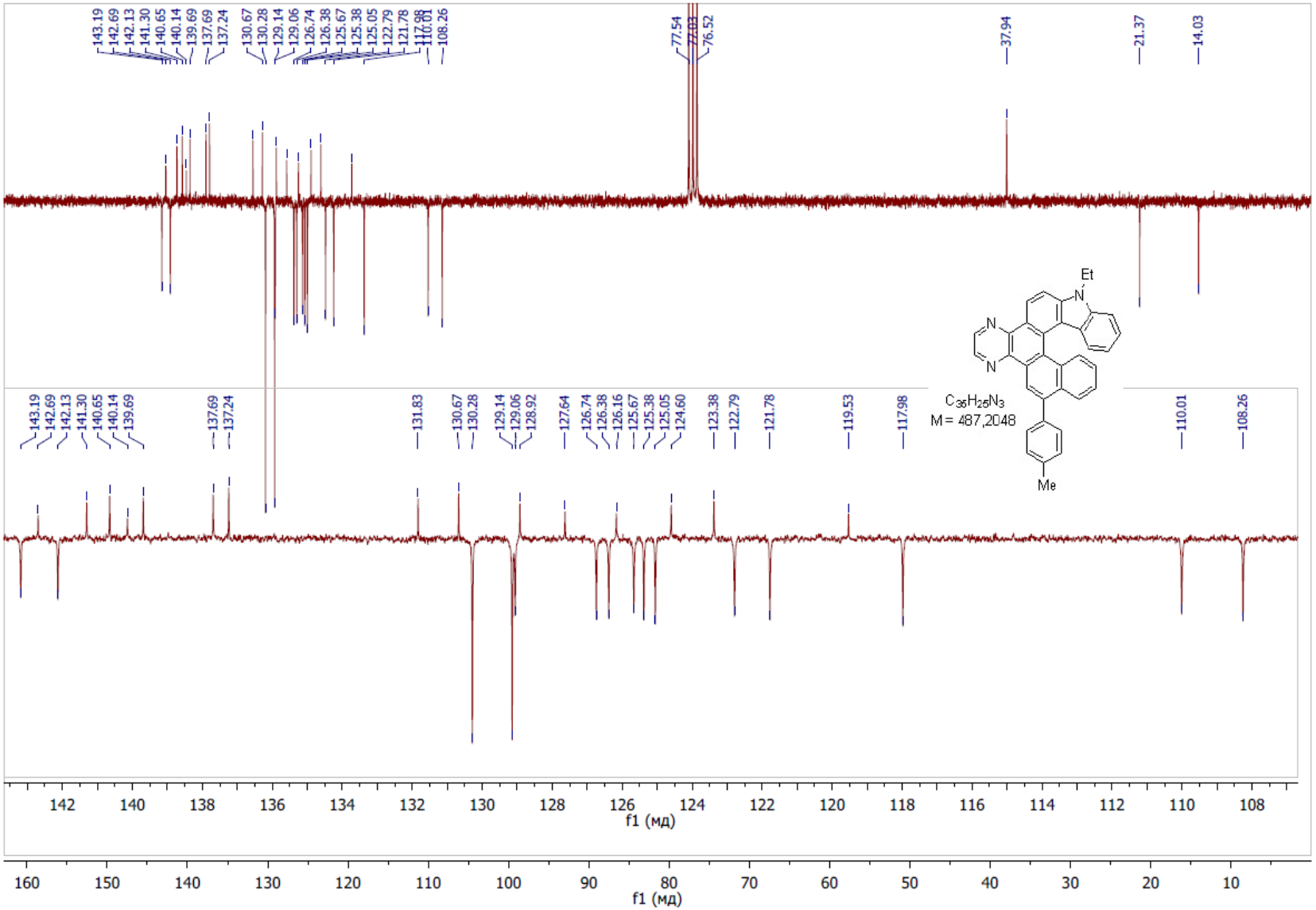


Figure S31. ^{13}C NMR APT spectrum of **10b** ($CDCl_3$, 62.9 MHz)

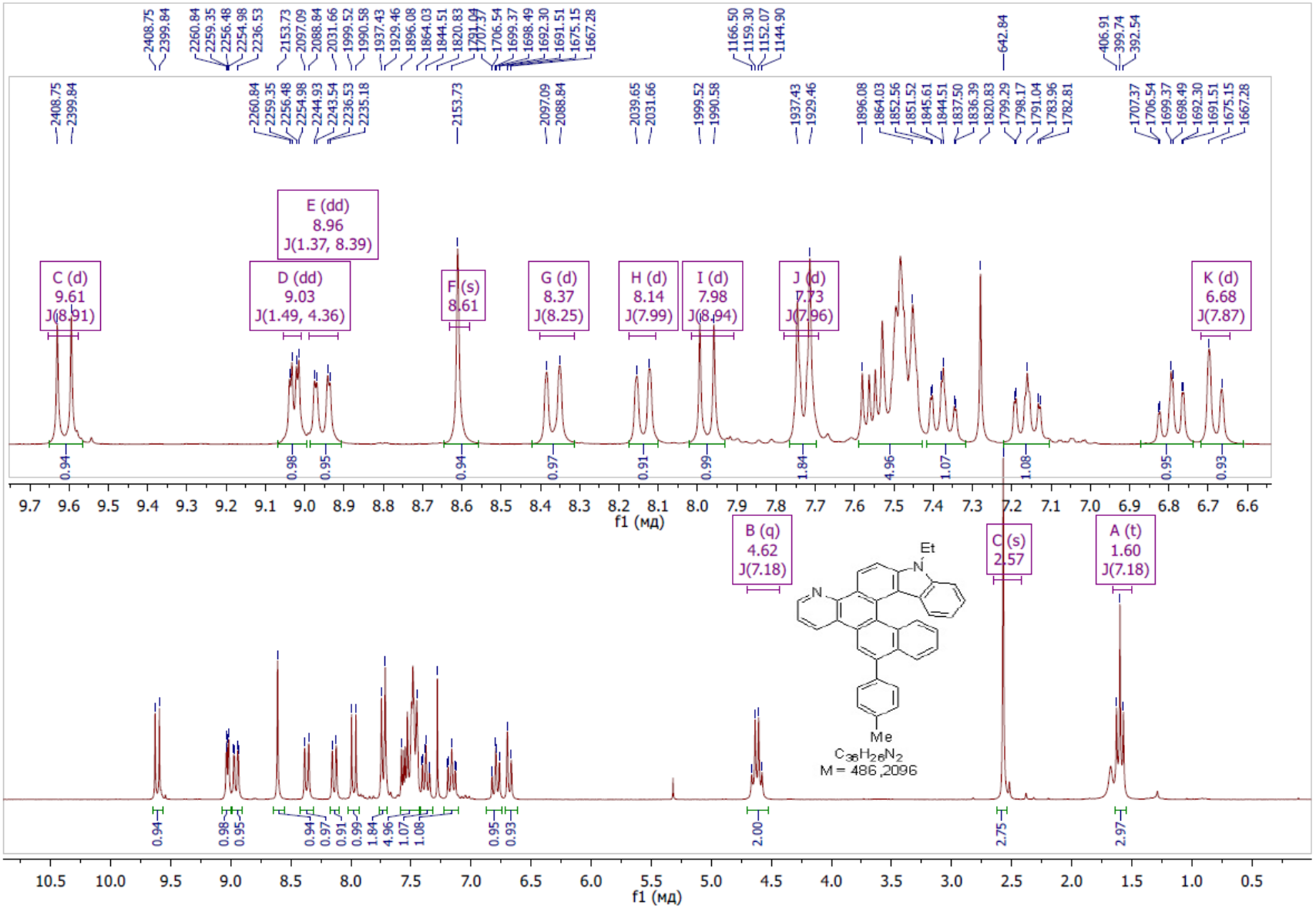


Figure S32. ^{1}H NMR spectrum of **10c** ($CDCl_3$, 250 MHz)

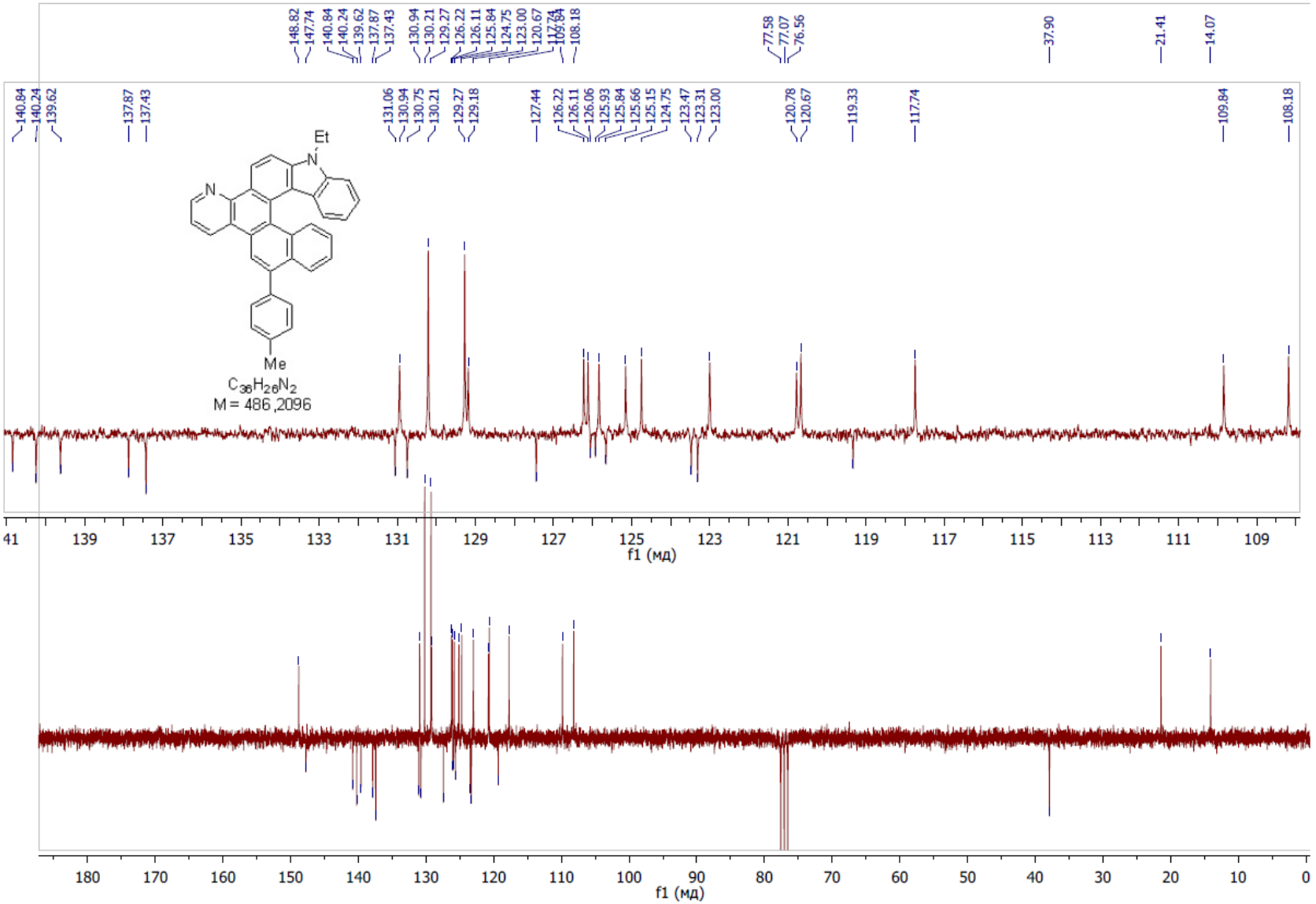


Figure S33. ^{13}C NMR APT spectrum of **10c** ($CDCl_3$, 62.9 MHz)

Crystal structure determination: X-ray measurements were conducted with Bruker APEX II CCD diffractometer and four-circle diffractometer SuperNova, Single source at offset/far, HyPix3000. Atomic coordinates, bond lengths, bond angles and thermal parameters have been deposited at the Cambridge Crystallographic Data Centre (CCDC) and allocated the deposition numbers CCDC 2034941 (**9c**), CCDC 2034943 (**10a**), CCDC 2034944 (**10b**), and CCDC 2034945 (**10c**). These data can be obtained free of charge from the Cambridge Crystallographic Data Centre via www.ccdc.cam.ac.uk/data_request/cif.

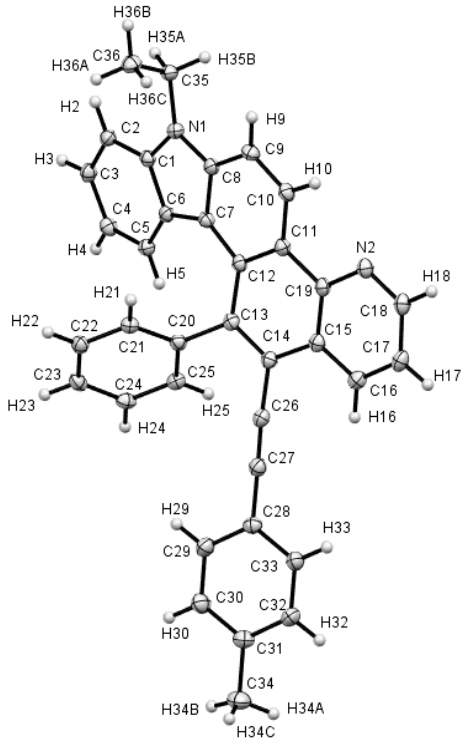


Figure S34. Molecular structure of compound **9c** showing 50% probability amplitude displacement ellipsoids.

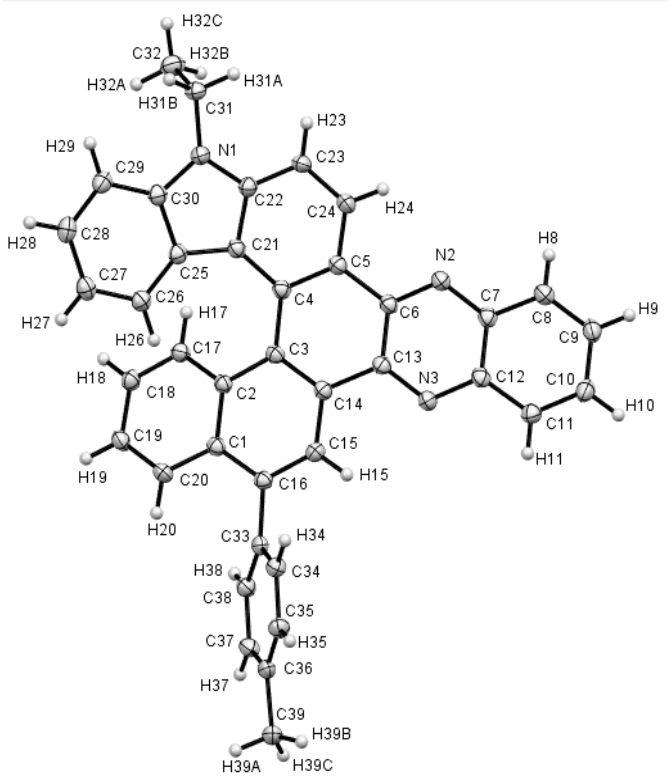


Figure S35. Molecular structure of compound **10a** showing 50% probability amplitude displacement ellipsoids.

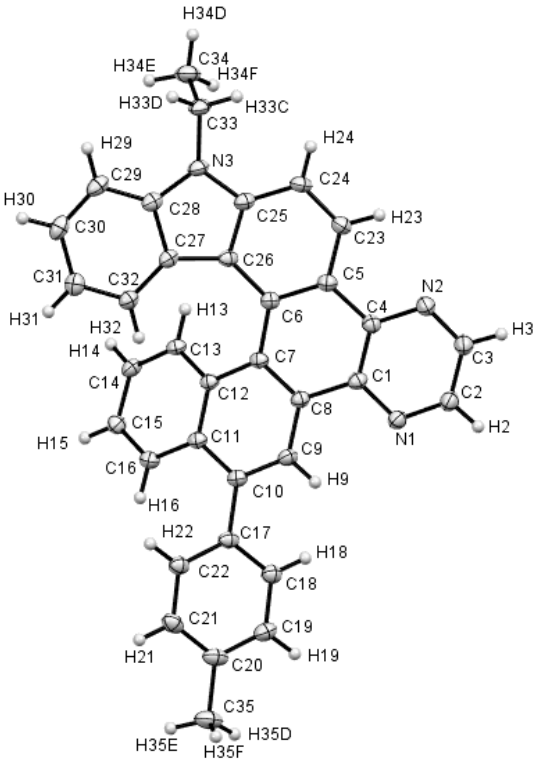


Figure S36. Molecular structure of compound **10b** showing 50% probability amplitude displacement ellipsoids (one of two independent molecules).

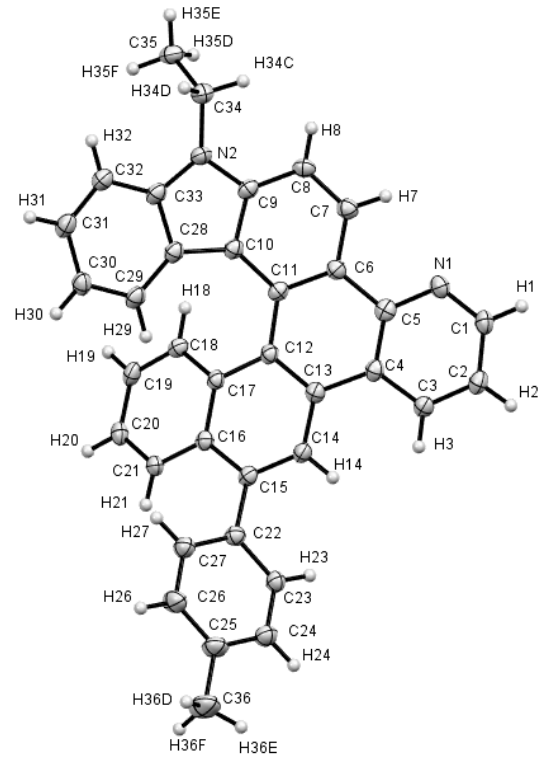
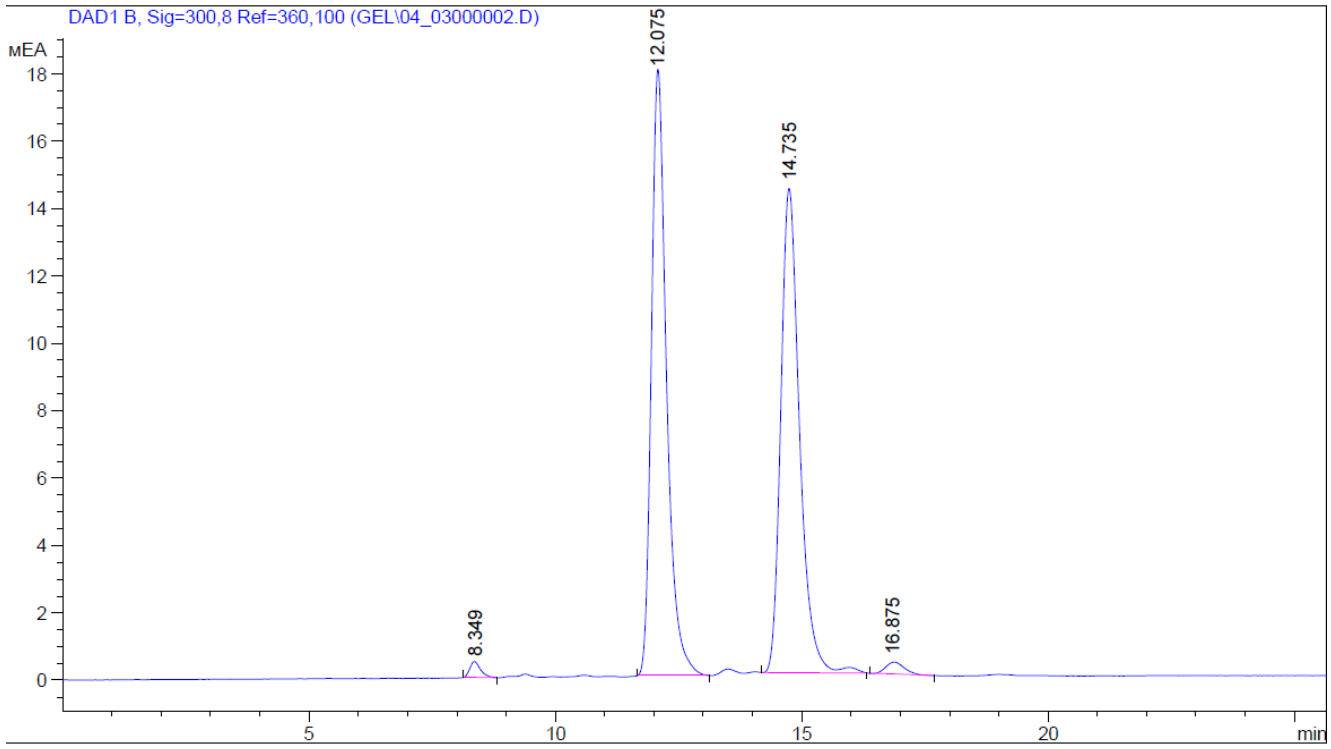


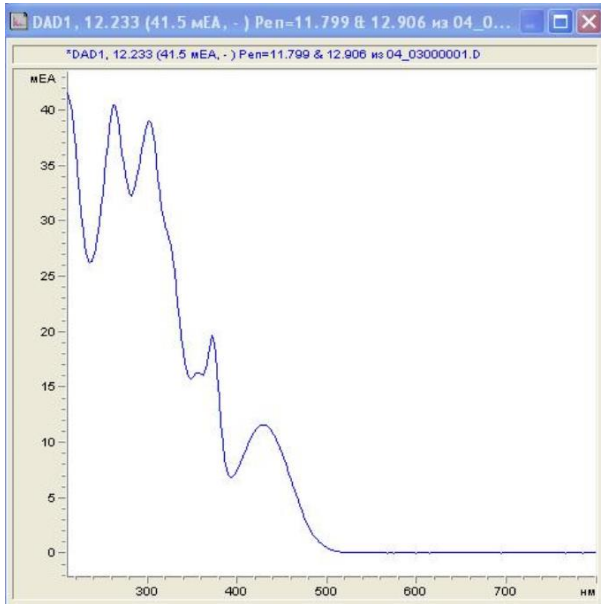
Figure S37. Molecular structure of compound **10c** showing 50% probability amplitude displacement ellipsoids (one of two independent molecules).

Table S1. Crystal data and structure refinement for compounds **9c** and **10a-c**

Compound	**9c**	**10a**	**10b**	**10c**
Empirical formula	$C_{36}H_{26}N_2$	$C_{39}H_{27}N_3$	$2(C_{35}H_{25}N_3)$	$2(C_{36}H_{26}N_2)$
Formula weight	486.59	537.63	975.16	937.17
T [K]	100.01(10)	100.01(16)	100.01(10)	100.00(13)
Crystal system	monoclinic	monoclinic	monoclinic	orthorhombic
Space group	$P2_1/c$	$P2_1/c$	$P2_1/n$	$Pca2_1$
a [Å]	11.61830(10)	9.65530(10)	13.02350(10)	7.97570(10)
b [Å]	8.88780(10)	28.6719(2)	16.31390(10)	14.9619(2)
c [Å]	24.9720(3)	9.54660(10)	23.8982(2)	41.6111(6)
α [°]	90	90	90	90
β [°]	102.2950(10)	92.2720(10)	105.5260(10)	90
γ [°]	90	90	90	90
V [Å^3]	2519.49(5)	2640.76(4)	4892.23(7)	4965.52(12)
Z	4	4	4	4
D_c [g cm^{-3}]	1.283	1.352	1.324	1.302
μ [mm^{-1}]	0.571	0.612	0.602	0.580
No. of refl. collected/ unique	42146/5308 [R_{int} = 0.0342]	35450/5037 [R_{int} = 0.0256]	64970/ 9345 [R_{int} = 0.0285]	32512/8860 [R_{int} = 0.0439]
No. of parameters	346	382	690	690
R indices (all data)	R_1 = 0.0408 wR_2 = 0.1057	R_1 = 0.0357 wR_2 = 0.0883	R_1 = 0.0400 wR_2 = 0.1056	R_1 = 0.0471 wR_2 = 0.1167
R-factor [%]	3.82	3.43	3.66	4.37
CCDC Dep. No.	2034941	2034943	2034944	2034945

The HPLC separations were performed at 25 °C using Agilent 1200 equipment on the column Kromasil 5-Cellucoat (4.6 mm × 250 mm, particle size 5 μm), photodiode array detector; mobile phase is CH_3CN of HPLC grade; injection of 5 μL of analyte solution in CH_3CN; nominal flow rate is 0.8 mL min^{-1}; UV detection at fixed wavelength 300 nm (for **10a**) and 320 nm (for **10b,c**).





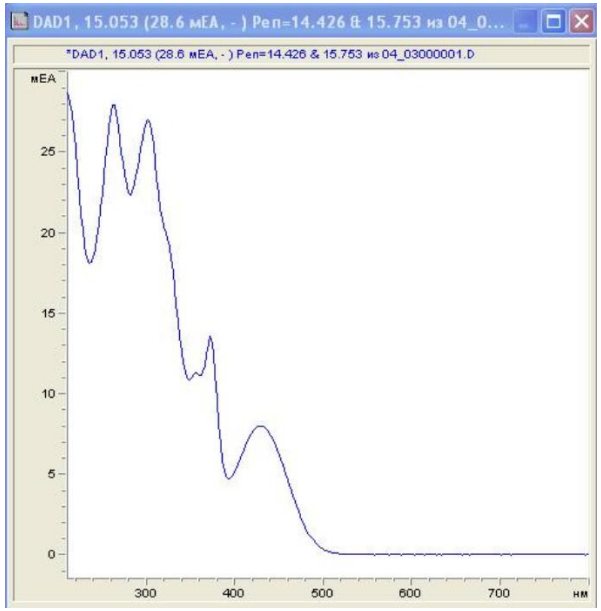
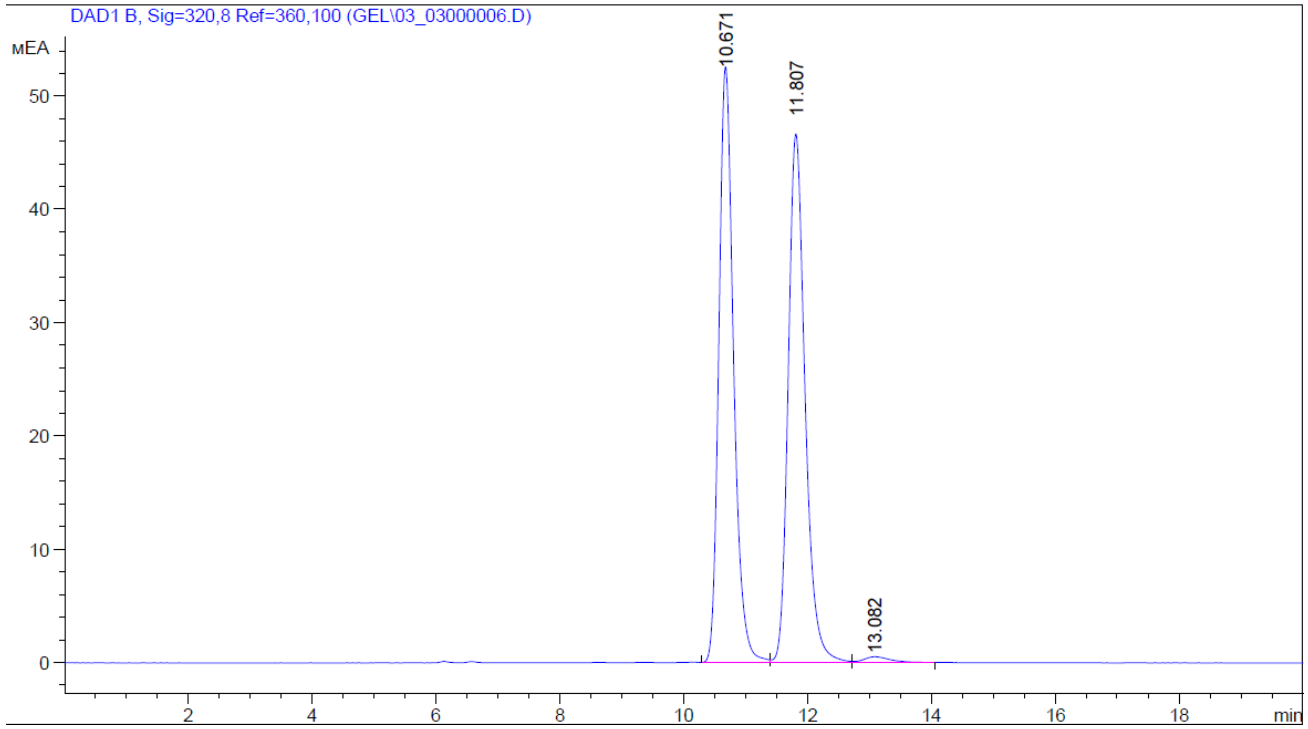
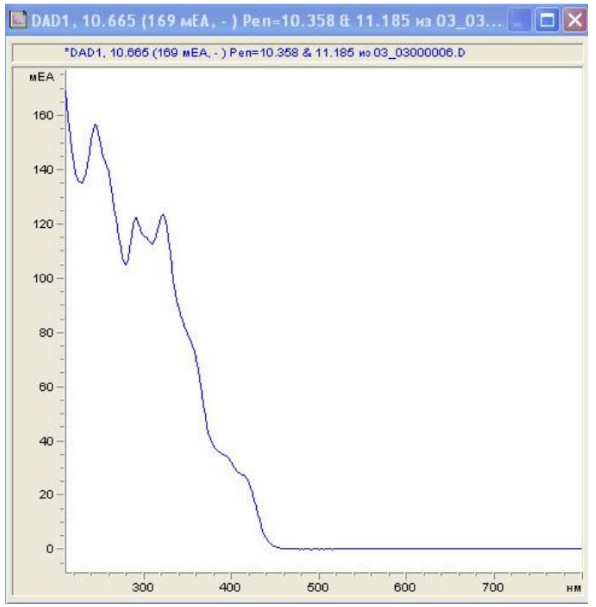


Figure S38. Chromatogram (UV-detection) of (*P*,*M*)-**10a** on Kromasil 5-Cellucoat (mobile phase CH_3CN)





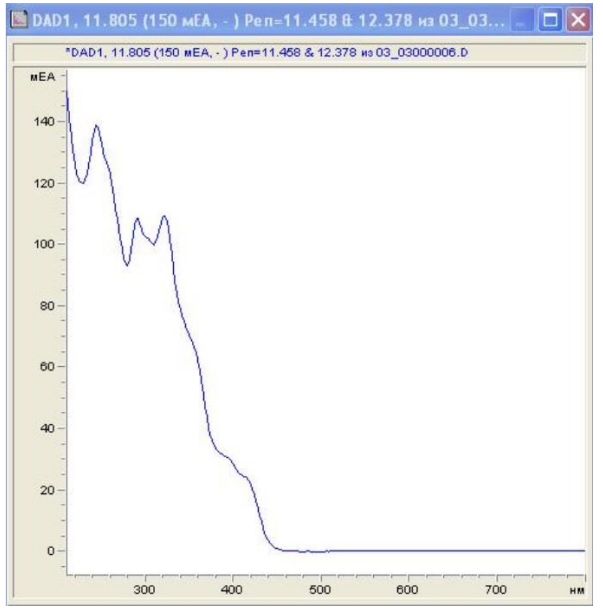
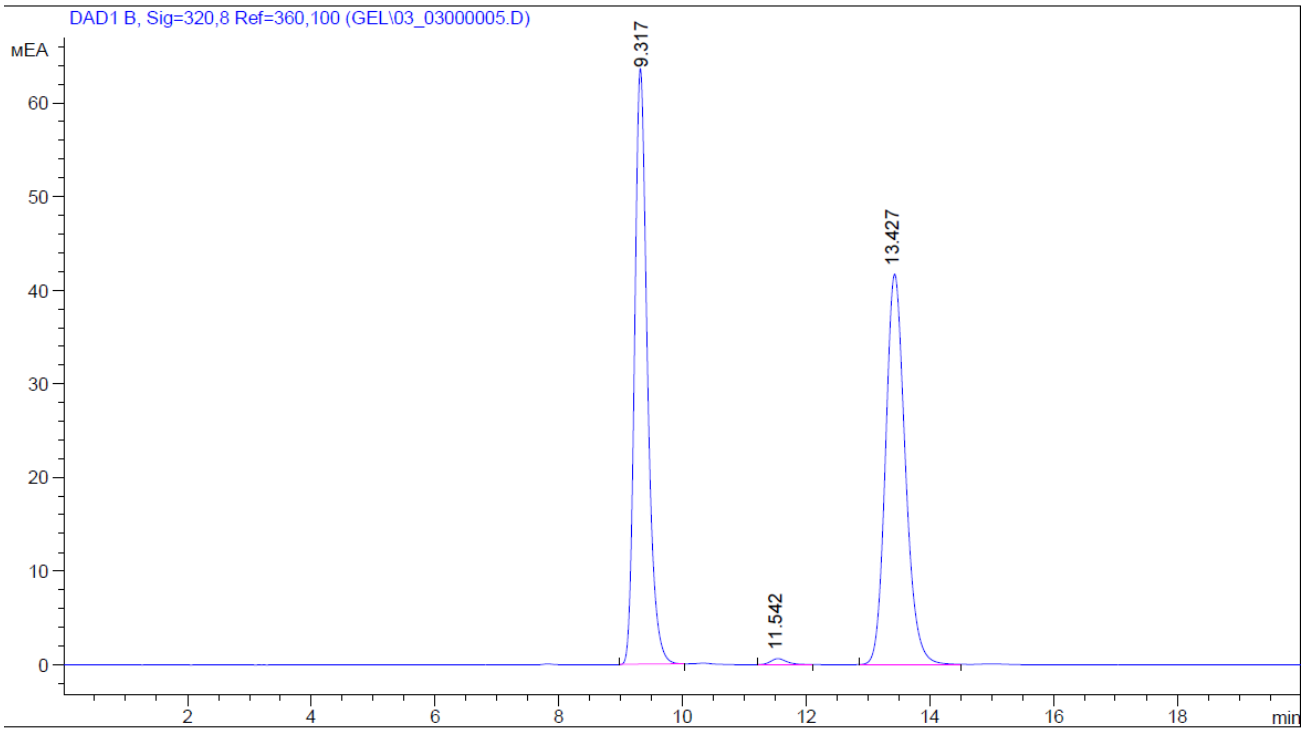
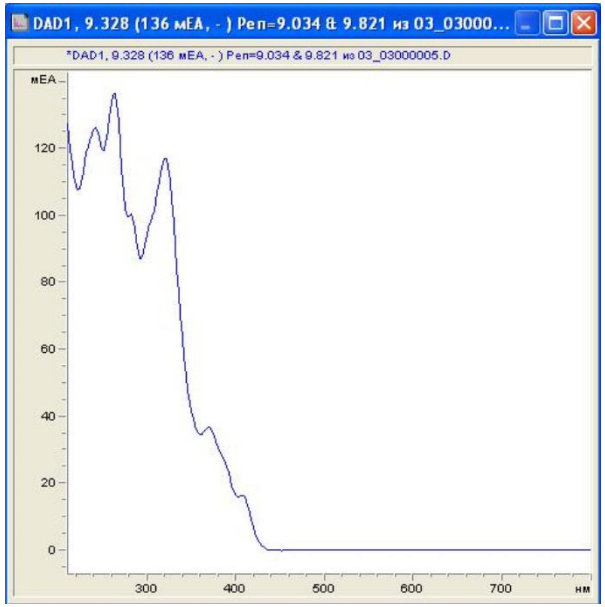


Figure S39. Chromatogram (UV-detection) of (*P*,*M*)-**10b** on Kromasil 5-Cellucoat (mobile phase CH_3CN)





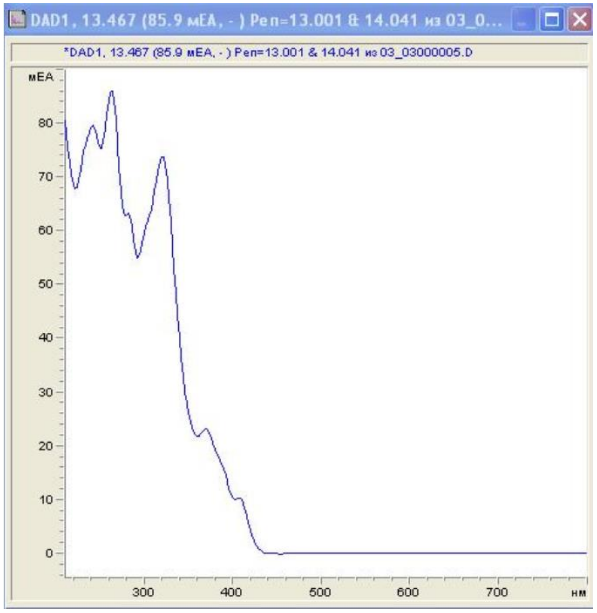


Figure S40. Chromatogram (UV-detection) of (*P*,*M*)-**10c** on Kromasil 5-Cellucoat (mobile phase CH_3CN)

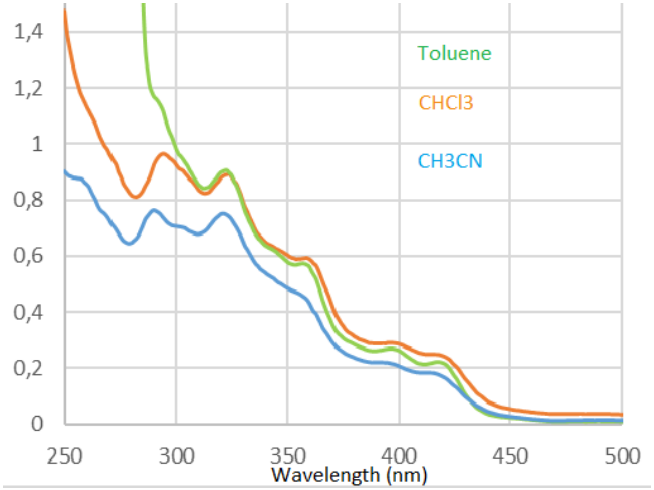


Figure S41: UV–vis spectra of [6]helicene **10b** in different solvents.

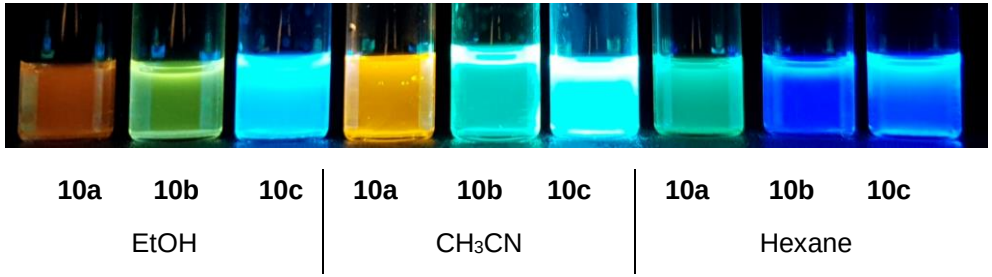


Figure S42: Solutions of [6]helicenes **10** in different solvents under UV irradiation (365 nm).

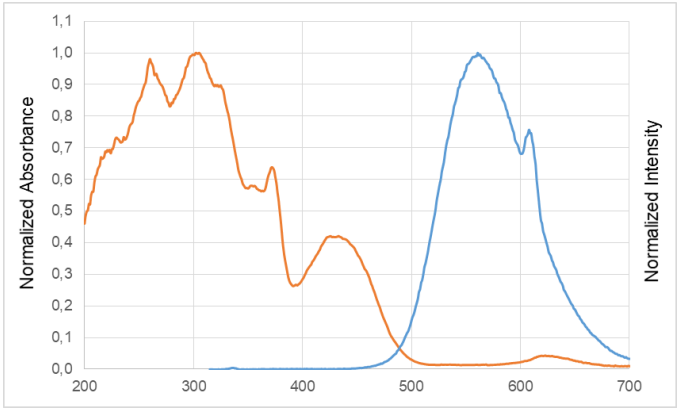


Figure S43: Normalized absorption and fluorescence spectra of **10a** in acetonitrile.

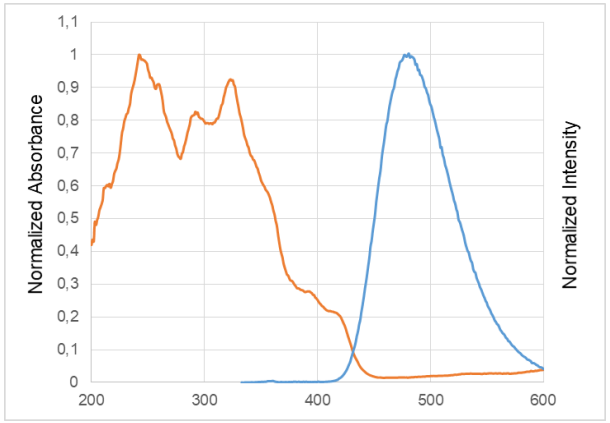


Figure S44: Normalized absorption and fluorescence spectra of **10b** in acetonitrile.

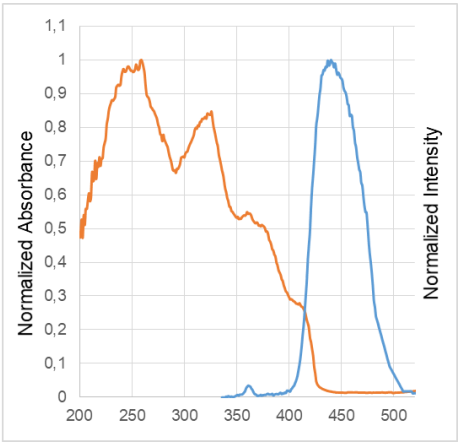


Figure S45: Normalized absorption and fluorescence spectra of **10c** in acetonitrile.

References

1. Gulevskaya, A. V.; Shvydkova, E. A.; Tonkoglazova, D. I. *Eur. J. Org. Chem.* **2018**, 5030–5043. doi:10.1002/ejoc.201800613