Supporting Information for:

Iron-Catalyzed Arylation of α-Aryl-α-diazoesters

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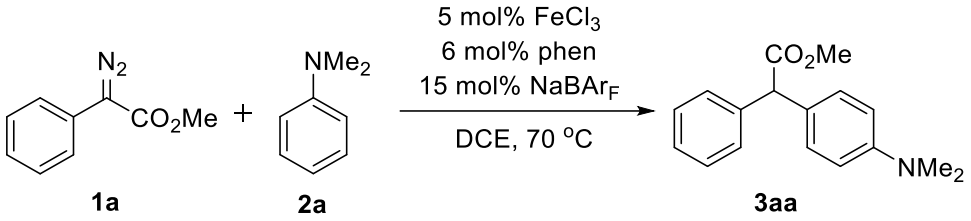
CONTENTS:

1. General Information:

All reactions and manipulations were performed using standard Schlenk techniques. All solvents were purified and dried using standard procedures.[1] $FeCl_3$ (Aldrich, ≥ 99.998% (metals basis)), $FeCl_3.6H_2O$ (Aldrich, ≥ 98%), $CoCl_2$, and $NiCl_2$ were purchased form Aldrich, Acros, and Alfa-Aesar Co, Ltd and used as received. All of the diazo compounds were prepared according to the literature procedures.[2] $NaBAr_F$ was prepared at hundreds gram scale starting from easily accessible 1-bromo-3,5-bis(trifluoromethyl)benzene in one port with 60–70% yield following the slightly modified literature procedures.[3] Melting points were measured on a RY–I apparatus and uncorrected. NMR spectra were recorded with a Bruker AV 400 spectrometer at 400 MHz (^{1}H NMR), 100 MHz (^{13}C NMR). Chemical shifts (δ values) were reported in ppm down field from internal Me_4Si (^{1}H and ^{13}C NMR). High Resolution Mass Spectra (HRMS) were recorded on an IonSpec FT-ICR mass spectrometer with Electron Spray Ionization (ESI) resource.

2. Typical Procedure of Iron-Catalyzed Arylation



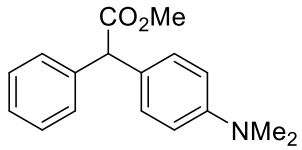
1a **2a** **3aa**

The $FeCl_3$ (2.4 mg, 0.015 mmol, 5 mol%), 1,10-phenanthroline (phen, 3.2 mg, 0.018 mmol, 6 mol%), $NaBAr_F.3H_2O$ (42.3 mg, 0.045 mmol, 15 mol%) were introduced into a Schlenk tube in argon-filled glovebox. After 3 mL 1,2-dichloroethane (DCE) was added, the resulting suspension was stirred at room temperature under an argon atmosphere for 4 h. Then 1 mL DCE solution of methyl α-diazophenylacetate **1a** (52.8 mg, 0.3 mmol) and *N*,*N*-dimethylaniline **2a** (54.5 mg, 0.45 mmol) was injected into the reaction mixture in one portion. The resulting mixture was stirred at 70 °C for specified time. The product was purified by flash chromatography on silica gel with petroleum ether/ethyl acetate (PE/EA = 15:1, v/v) as eluent. The analytical data for methyl 2-(4-

(dimethylamino)phenyl)-2-phenylacetate **3aa** are listed below.

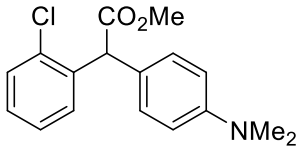
3. Analytical Data of Arylation Products

Methyl 2-(4-(dimethylamino)phenyl)-2-phenylacetate (3aa)[4]



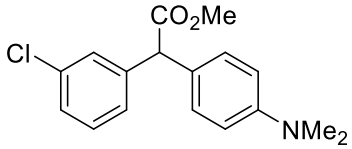
White solid; mp = 49–50 °C; 93% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30–7.27 (m, 4H, Ar-H), 7.24–7.20 (m, 1H, Ar-H), 7.17 (d, *J* = 8.7 Hz, 2H, Ar-H), 6.67 (d, *J* = 8.7 Hz, 2H, Ar-H), 4.94 (s, 1H, CH), 3.71 (s, 3H, CH_3), 2.90 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.5, 149.7, 139.3, 129.2, 128.4, 126.9, 126.3, 112.5, 56.1, 52.1, 40.4; HRMS (ESI) Calcd for $[C_{17}H_{20}NO_2, M + H]^+$: 270.1489; Found: 270.1487.

Methyl 2-(2-chlorophenyl)-2-(4-(dimethylamino)phenyl)acetate (3ba)



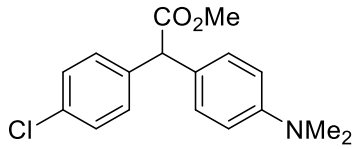
Colorless oil; 83% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36–7.34 (m, 1H, Ar-H), 7.24–7.17 (m, 1H, Ar-H), 7.16–7.14 (m, 4H, Ar-H), 6.69 (d, *J* = 8.8 Hz, 2H, Ar-H), 5.35 (s, 1H, CH), 3.71 (s, 3H, CH_3), 2.92 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.8, 149.7, 137.3, 134.0, 129.9, 129.5, 129.3, 128.2, 126.7, 124.2, 112.5, 52.9, 52.3, 40.4; HRMS (ESI) Calcd for $[C_{17}H_{19}ClNO_2, M + H]^+$: 304.1099; Found: 304.1107; Anal. Calcd for $C_{17}H_{18}ClNO_2$: C, 67.21; H, 5.97; N, 4.61. Found: C, 67.13; H, 6.18; N, 4.67.

Methyl 2-(3-chlorophenyl)-2-(4-(dimethylamino)phenyl)acetate (3ca)



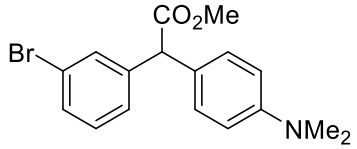
Colorless oil; 86% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30 (s, 1H, Ar-H), 7.24–7.16 (m, 5H, Ar-H), 6.69 (d, *J* = 8.7 Hz, 2H, Ar-H), 4.90 (s, 1H, CH), 3.72 (s, 3H, CH_3), 2.92 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.9, 149.8, 141.3, 134.2, 129.6, 129.2, 128.6, 127.2, 126.7, 125.5, 112.6, 55.7, 52.3, 40.5; HRMS (ESI) Calcd for $[C_{17}H_{19}ClNO_2, M + H]^+$: 304.1099; Found: 304.1106; Anal. Calcd for $C_{17}H_{18}ClNO_2$: C, 67.21; H, 5.97; N, 4.61. Found: C, 66.95; H, 5.87; N, 4.51.

Methyl 2-(4-chlorophenyl)-2-(4-(dimethylamino)phenyl)acetate (3da)



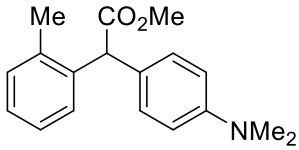
Colorless oil; 94% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.26–7.20 (m, 4H, Ar-H), 7.14 (d, *J* = 8.4 Hz, 2H, Ar-H), 6.67 (d, *J* = 8.4 Hz, 2H, Ar-H), 4.89 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.90 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.1, 149.7, 137.9, 132.8, 129.8, 129.0, 128.5, 125.7, 112.5, 55.3, 52.2, 40.4; HRMS (ESI) Calcd for $[C_{17}H_{19}ClNO_2, M + H]^+$: 304.1099; Found: 304.1106; Anal. Calcd for $C_{17}H_{18}ClNO_2$: C, 67.21; H, 5.97; N, 4.61. Found: C, 67.60; H, 6.39; N, 4.51.

Methyl 2-(3-bromophenyl)-2-(4-(dimethylamino)phenyl)acetate (3ea)



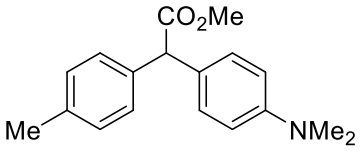
Colorless oil; 87% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.45 (s, 1H, Ar-H), 7.35 (d, *J* = 7.6 Hz, 1H, Ar-H), 7.23 (d, *J* = 8.2 Hz, 1H, Ar-H), 7.16–7.13 (m, 3H, Ar-H), 6.69 (d, *J* = 8.3 Hz, 2H, Ar-H), 4.88 (s, 1H, CH), 3.72 (s, 3H, CH_3), 2.91 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.8, 149.7, 141.6, 131.4, 130.1, 129.9, 129.1, 127.1, 125.5, 112.6, 55.6, 52.2, 40.5; HRMS (ESI) Calcd for $[C_{17}H_{19}BrNO_2, M + H]^+$: 348.0594; Found: 348.0590; Anal. Calcd for $C_{17}H_{18}BrNO_2$: C, 58.63; H, 5.21; N, 4.02. Found: C, 58.33; H, 5.13; N, 3.95.

Methyl 2-(4-(dimethylamino)phenyl)-2-*o*-tolylacetate (3fa)



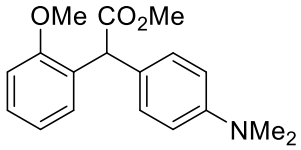
Colorless oil; 85% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.24 (d, *J* = 4.1 Hz, 1H, Ar-H), 7.18–7.14 (m, 3H, Ar-H), 7.09 (d, *J* = 8.4 Hz, 2H, Ar-H), 6.67 (d, *J* = 8.4 Hz, 2H, Ar-H), 5.11 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.89 (s, 6H, $2CH_3$), 2.27 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.7, 149.5, 137.5, 136.2, 130.4, 129.5, 127.8, 127.0, 126.0, 125.3, 112.4, 52.8, 52.1, 40.4, 19.7; HRMS (ESI) Calcd for $[C_{18}H_{21}NO_2Na, M + Na]^+$: 306.1465; Found: 306.1471; Anal. Calcd for $C_{18}H_{21}NO_2$: C, 76.30; H, 7.47; N, 4.94. Found: C, 76.02; H, 7.61; N, 4.81.

Methyl 2-(4-(dimethylamino)phenyl)-2-*p*-tolylacetate (3ga)



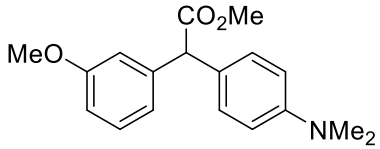
Colorless oil; 88% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.19–7.15 (m, 4H, Ar-H), 7.10 (d, *J* = 8.7 Hz, 2H, Ar-H), 6.67 (d, *J* = 8.7 Hz, 2H, Ar-H), 4.91 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.89 (s, 6H, $2CH_3$), 2.30 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.6, 149.6, 136.5, 136.3, 129.11, 129.10, 128.2, 126.5, 112.5, 55.7, 52.0, 40.5, 20.9; HRMS (ESI) Calcd for $[C_{18}H_{21}NO_2Na, M + Na]^+$: 306.1465; Found: 306.1473; Anal. Calcd for $C_{18}H_{21}NO_2$: C, 76.30; H, 7.47; N, 4.94. Found: C, 76.01; H, 7.77; N, 4.72.

Methyl 2-(4-(dimethylamino)phenyl)-2-(2-methoxyphenyl)acetate (3ha)



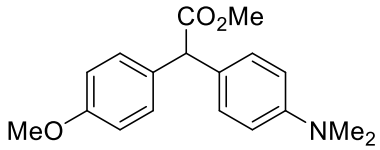
White solid; mp = 110–111 °C; 79% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.23–7.17 (m, 3H, Ar-H), 7.02 (d, *J* = 7.6 Hz, 1H, Ar-H), 6.86 (t, *J* = 7.6 Hz, 2H, Ar-H), 6.71 (d, *J* = 8.4 Hz, 1H, Ar-H), 5.18 (s, 1H, CH), 3.81 (s, 3H, CH_3), 3.69 (s, 3H, CH_3), 2.92 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.9, 156.7, 149.6, 129.7, 129.0, 128.4, 128.1, 125.0, 120.4, 112.6, 110.2, 55.4, 52.0, 50.0, 40.5; HRMS (ESI) Calcd for $[C_{18}H_{22}NO_3, M + H]^+$: 300.1594; Found: 300.1600; Anal. Calcd for $C_{18}H_{21}NO_3$: C, 72.22; H, 7.07; N, 4.68. Found: C, 71.94; H, 7.36; N, 4.50.

Methyl 2-(4-(dimethylamino)phenyl)-2-(3-methoxyphenyl)acetate (3ia)



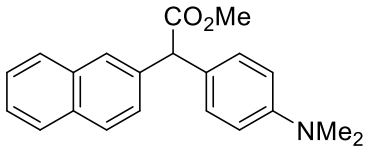
Colorless oil; 80% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.23–7.17 (m, 3H, Ar-H), 6.90–6.86 (m, 2H, Ar-H), 6.77 (d, *J* = 8.2 Hz, 1H, Ar-H), 6.68 (d, *J* = 8.4 Hz, 2H, Ar-H), 4.91 (s, 1H, CH), 3.74 (s, 3H, CH_3), 3.71 (s, 3H, CH_3), 2.90 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.3, 159.6, 149.6, 140.8, 129.3, 129.2, 126.1, 120.8, 114.3, 112.5, 112.2, 56.0, 55.1, 52.1, 40.5; HRMS (ESI) Calcd for $[C_{18}H_{22}NO_3, M + H]^+$: 300.1594; Found: 300.1587; Anal. Calcd for $C_{18}H_{21}NO_3$: C, 72.22; H, 7.07; N, 4.68. Found: C, 71.91; H, 7.30; N, 4.56.

Methyl 2-(4-(dimethylamino)phenyl)-2-(4-methoxyphenyl)acetate (3ja)



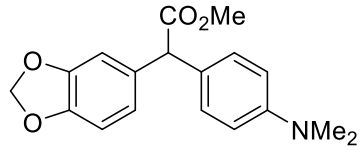
White solid; mp = 76–77 °C; 82% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.22 (d, *J* = 8.8 Hz, 2H, Ar-H), 7.16 (d, *J* = 8.8 Hz, 2H, Ar-H), 6.83 (d, *J* = 8.8 Hz, 2H, Ar-H), 6.68 (d, *J* = 8.8 Hz, 2H, Ar-H), 4.89 (s, 1H, CH), 3.75 (s, 3H, CH_3), 3.70 (s, 3H, CH_3), 2.90 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.7, 158.5, 149.6, 131.4, 129.4, 129.0, 126.7, 113.8, 112.5, 55.2, 55.1, 52.0, 40.5; HRMS (ESI) Calcd for $[C_{18}H_{22}NO_3, M + H]^+$: 300.1594; Found: 300.1595; Anal. Calcd for $C_{18}H_{21}NO_3$: C, 72.22; H, 7.07; N, 4.68. Found: C, 72.02; H, 7.03; N, 4.64.

Methyl 2-(4-(dimethylamino)phenyl)-2-(naphthalen-2-yl)acetate (3ka)



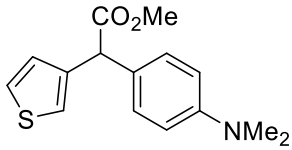
Colorless oil; 86% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.78–7.75 (m, 4H, Ar-H), 7.43–7.39 (m, 3H, Ar-H), 7.21 (d, *J* = 8.8 Hz, 2H, Ar-H), 6.68 (d, *J* = 8.8 Hz, 2H, Ar-H), 5.11 (s, 1H, CH), 3.74 (s, 3H, CH_3), 2.89 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.4, 149.7, 136.8, 133.3, 132.4, 129.3, 128.1, 127.9, 127.5, 126.9, 126.8, 126.2, 126.0, 125.8, 112.6, 56.2, 52.1, 40.5; HRMS (ESI) Calcd for $[C_{21}H_{22}NO_2, M + H]^+$: 320.1646; Found: 320.1643.

Methyl 2-(benzo[*d*][1,3]dioxol-5-yl)-2-(4-(dimethylamino)phenyl)acetate (3la)



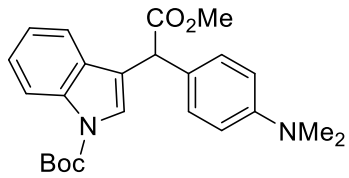
Colorless oil; 80% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.16 (d, *J* = 8.4 Hz, 2H, Ar-H), 6.82 (s, 1H, Ar-H), 6.75–6.71 (m, 2H, Ar-H), 6.68 (d, *J* = 8.4 Hz, 2H, Ar-H), 5.89 (s, 2H, CH_2), 4.85 (s, 1H, CH), 3.71 (s, 3H, CH_3), 2.91 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.4, 149.6, 147.7, 146.5, 133.2, 129.0, 126.4, 121.6, 112.6, 109.0, 108.0, 100.9, 55.6, 52.1, 40.5; HRMS (ESI) Calcd for $[C_{18}H_{20}NO_4, M + H]^+$: 314.1387; Found: 314.1378; Anal. Calcd for $C_{18}H_{19}NO_4$: C, 69.00; H, 6.11; N, 4.47. Found: C, 68.67; H, 6.64; N, 4.38.

Methyl 2-(4-(dimethylamino)phenyl)-2-(thiophen-3-yl)acetate (3ma)



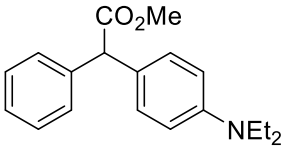
White solid; mp = 64–65 °C; 92% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.24–7.23 (m, 1H, Ar-H), 7.18 (d, *J* = 8.8 Hz, 2H, Ar-H), 7.14 (s, 1H, Ar-H), 7.01 (d, *J* = 4.4 Hz, 1H, Ar-H), 6.67 (d, *J* = 8.4 Hz, 2H, Ar-H), 4.95 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.91 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.1, 149.7, 139.5, 128.9, 127.9, 126.0, 125.5, 122.3, 112.5, 52.1, 51.6, 40.5; HRMS (ESI) Calcd for $[C_{15}H_{17}NO_2SNa, M + Na]^+$: 298.0872; Found: 298.0865; Anal. Calcd for $C_{15}H_{17}NO_2S$: C, 65.43; H, 6.22; N, 5.09. Found: C, 65.34; H, 6.12; N, 4.98.

***tert*-Butyl 3-(1-(4-(dimethylamino)phenyl)-2-methoxy-2-oxoethyl)-1H-indole -1-carboxylate (3na)**



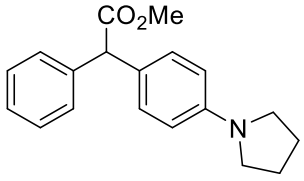
Colorless oil; 88% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.11 (d, *J* = 2.4 Hz, 1H, Ar-H), 7.61 (s, 1H, Ar-H), 7.36 (d, *J* = 7.8 Hz, 1H, Ar-H), 7.28–7.25 (m, 3H, Ar-H), 7.15 (t, *J* = 7.6 Hz, 1H, Ar-H), 6.68 (d, *J* = 8.8 Hz, 2H, Ar-H), 5.06 (s, 1H, CH), 3.73 (s, 3H, CH_3), 2.89 (s, 6H, $2CH_3$), 1.65 (s, 9H, $3CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.9, 149.8, 149.7, 135.4, 129.5, 129.0, 124.9, 124.3, 124.2, 122.4, 119.2, 118.6, 115.2, 112.6, 83.5, 52.2, 47.6, 40.4, 28.1; HRMS (ESI) Calcd for $[C_{24}H_{29}N_2O_4, M + H]^+$: 409.2122; Found: 409.2127.

Methyl 2-(4-(diethylamino)phenyl)-2-phenylacetate (3ab)[5]



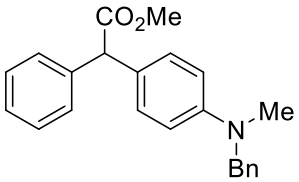
Colorless oil; 88% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32–7.27 (m, 4H, Ar-H), 7.24–7.20 (m, 1H, Ar-H), 7.13 (d, *J* = 8.8 Hz, 2H, Ar-H), 6.61 (d, *J* = 8.8 Hz, 2H, Ar-H), 4.92 (s, 1H, CH), 3.71 (s, 3H, CH_3), 3.30 (q, *J* = 7.6 Hz, 4H, $2CH_2$), 1.12 (t, *J* = 7.6 Hz, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.5, 146.8, 139.4, 129.3, 128.4, 126.8, 124.9, 111.5, 56.0, 52.0, 44.2, 12.5; HRMS (ESI) Calcd for $[C_{19}H_{24}NO_2, M + H]^+$: 298.1802; Found: 298.1802.

Methyl 2-phenyl-2-(4-(pyrrolidin-1-yl)phenyl)acetate (3ac)



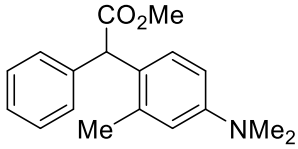
White solid; mp = 69–70 °C; 90% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30–7.29 (m, 4H, Ar-H), 7.22–7.21 (m, 1H, Ar-H), 7.16 (d, *J* = 7.6 Hz, 2H, Ar-H), 6.51 (d, *J* =7.8 Hz, 2H, Ar-H), 4.94 (s, 1H, CH), 3.71 (s, 3H, CH_3), 3.29−3.19 (m, 4H, 2NCH2), 2.02−1.90 (m, 4H, 2CH2); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.6, 147.0, 139.5, 129.3, 128.4, 126.8, 111.6, 56.1, 52.1, 47.5, 25.4; HRMS (ESI) Calcd for $[C_{19}H_{22}NO_2, M + H]^+$: 296.1645; Found: 296.1653. This compound is known and the spectroscopic data match those reported.[4]

Methyl 2-(4-(benzyl(methyl)amino)phenyl)-2-phenylacetate (3ad) [5]



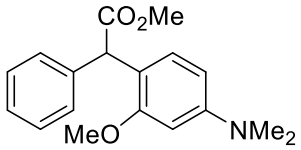
Colorless oil; 82% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.29–7.26 (m, 6H, Ar-H), 7.22–7.18 (m, 4H, Ar-H), 7.15–7.13 (m, 2H, Ar-H), 6.67 (d, *J* = 8.0 Hz, 2H, Ar-H), 4.92 (s, 1H, CH), 4.46 (s, 2H, CH_2), 3.68 (s, 3H, CH_3), 2.96 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.4, 148.8, 139.3, 138.8, 129.3, 128.5, 128.4, 126.9, 126.8, 126.6, 126.2, 112.2, 56.5, 56.0, 52.1, 38.5; HRMS (ESI) Calcd for $[C_{23}H_{23}NO_2Na, M + Na]^+$: 368.1621; Found: 368.1614.

Methyl 2-(4-(dimethylamino)-2-methylphenyl)-2-phenylacetate (3ae)



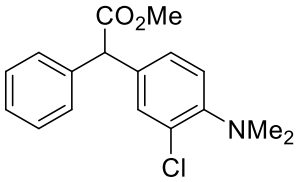
Colorless oil; 88% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30–7.27 (m, 2H, Ar-H), 7.24–7.22 (m, 3H, Ar-H), 7.10 (d, *J* = 9.4 Hz, 1H, Ar-H), 6.56–6.55 (m, 2H, Ar-H), 5.13 (s, 1H, CH), 3.71 (s, 3H, CH_3), 2.90 (s, 6H, $2CH_3$), 2.24 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.7, 149.6, 138.7, 136.9, 128.8, 128.7, 128.3, 126.8, 124.9, 114.6, 110.3, 52.8, 52.1, 40.4, 20.2; HRMS (ESI) Calcd for $[C_{18}H_{21}NO_2Na, M + Na]^+$: 306.1465; Found: 306.1471.

Methyl 2-(4-(dimethylamino)-2-methoxyphenyl)-2-phenylacetate (3af)



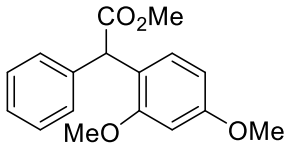
White solid; mp = 69–70 °C; 84% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30–7.29 (m, 4H, Ar-H), 7.25–7.22 (m, 1H, Ar-H), 6.88 (d, *J* = 8.0 Hz, 1H, Ar-H), 6.26–6.22 (m, 2H, Ar-H), 5.23 (s, 1H, CH), 3.80 (s, 3H, CH_3), 3.69 (s, 3H, CH_3), 2.91 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.9, 157.5, 151.1, 138.5, 129.4, 128.8, 128.3, 126.8, 115.8, 104.4, 95.8, 55.3, 52.0, 50.0, 40.6; HRMS (ESI) Calcd for $[C_{18}H_{22}NO_3, M + H]^+$: 300.1594; Found: 300.1596; Anal. Calcd for $C_{18}H_{21}NO_3$: C, 72.22; H, 7.07; N, 4.68. Found: C, 72.32; H, 7.21; N, 4.51.

Methyl 2-(3-chloro-4-(dimethylamino)phenyl)-2-phenylacetate (3ag)



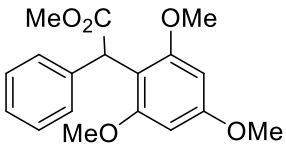
Colorless oil; 17% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36–7.28 (m, 6H, Ar-H), 7.15 (d, *J* = 8.3 Hz, 1H, Ar-H), 7.01 (d, *J* = 8.3 Hz, 1H, Ar-H), 4.94 (s, 1H, CH), 3.75 (s, 3H, CH_3), 2.79 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.8, 149.5, 138.3, 133.5, 130.8, 128.7, 128.4, 128.2, 127.6, 127.5, 120.0, 56.0, 52.5, 43.7; HRMS (ESI) Calcd for $[C_{17}H_{19}ClNO_2, M + H]^+$: 304.1099; Found: 304.1102.

Methyl 2-(2,4-dimethoxyphenyl)-2-phenylacetate (3ai)[6]



Light yellow oil; 70% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.35–7.27 (m, 5H), 6.93 (d, *J* = 8.5 Hz, 1H), 6.46 (d, *J* = 2.5 Hz, 1H), 6.41 (dd, *J* = 8.5, 2.5 Hz, 1H), 5.24 (s, 1H), 3.80 (s, 3H), 3.78 (s, 3H), 3.72 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 173.7, 160.1, 157.8, 138.1, 129.6, 129.0, 128.6, 127.1, 120.3, 104.0, 98.6, 55.6, 55.4, 52.2, 50.2; HRMS (ESI) Calcd for $[C_{18}H_{18}O_4Na, M + Na]^+$: 309.1097; Found:. 309.1101.

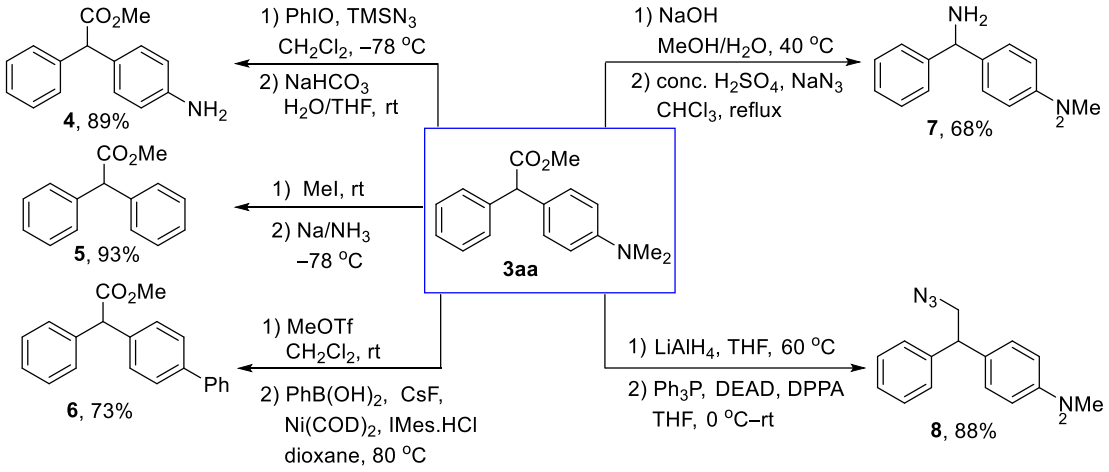
Methyl 2-phenyl-2-(2,4,6-trimethoxyphenyl)acetate (3aj)[6]



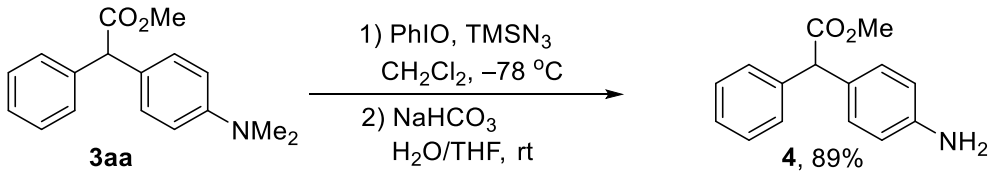
Light yellow solid; mp = 110–111 °C; 62% yield; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32 (d, *J* = 7.6 Hz, 2H, Ar-H), 7.25 (t, *J* = 7.6 Hz, 2H, Ar-H), 7.21–7.17 (m, 1H, Ar-H), 6.15 (s, 2H,

Ar-H), 5.31 (s, 1H, CH), 3.80 (s, 3H, CH_3), 3.78 (s, 6H, $2CH_3$), 3.68 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 174.1, 160.4, 158.1, 138.9, 129.2, 127.9, 126.5, 109.5, 90.9, 55.7, 55.2, 51.9, 45.7; HRMS (ESI) Calcd for $[C_{18}H_{20}O_5Na, M + Na]^+$: 339.1203; Found: 339.1203.

4. Transformations of Arylation Products



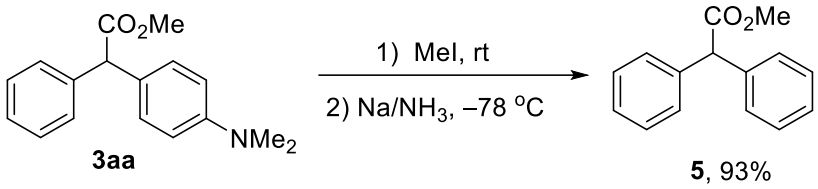
4.1 Synthesis of methyl 2-(4-aminophenyl)-2-phenylacetate (4)[7]



A dry Schlenk tube under an N_2 atmosphere was charged with **3aa** (51 mg, 0.19 mmol, 1 equiv) and CH_2Cl_2 (2 mL) and cooled to –78 °C. PhIO (167 mg, 0.76 mmol, 4 equiv) was added in one portion under an N_2 flush and azidotrimethylsilane ($TMSN_3$, 87 mg, 0.76 mmol, 4 equiv) was added slowly. A small sample was taken after 4 h and quenched with H_2O (1 mL). ^1H NMR showed clean conversion to a bisazide. The –78 °C reaction was hydrolyzed by throwing directly into 20 °C solution of aqueous saturated $NaHCO_3$/THF (1:1, 10 mL) and stirred vigorously for 48 h. 1M HCl was added until neutral. THF was removed in vacuo, and residue partitioned between H_2O (10 mL). The organic phase separated and the aqueous phase back-extracted with CH_2Cl_2 3 times. The combined organic extracts were dried over Na_2SO_4, and solvents

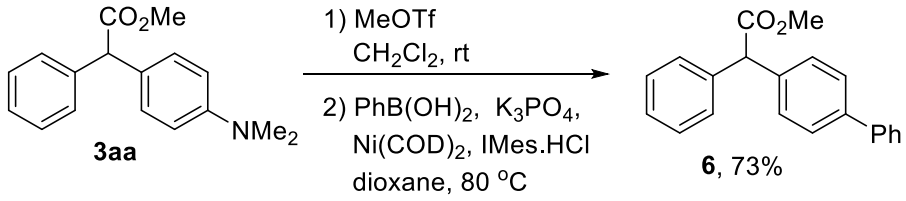
removed in vacuo and the residue was purified by silica gel chromatography (PE/EA = 4:1) gave compound **4** as a yellow oil in 89% yield (41 mg, 0.17 mmol). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.30–7.25 (m, 5H, Ar-H), 7.09 (d, *J* = 8.4 Hz, 2H, Ar-H), 6.64 (d, *J* = 8.4 Hz, 2H, Ar-H), 4.93 (s, 1H, CH), 3.73 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.4, 145.5, 139.2, 129.5, 128.5, 128.4, 127.0, 115.2, 56.2, 52.2.

4.2 Synthesis of methyl 2,2-diphenylacetate (5)[8]



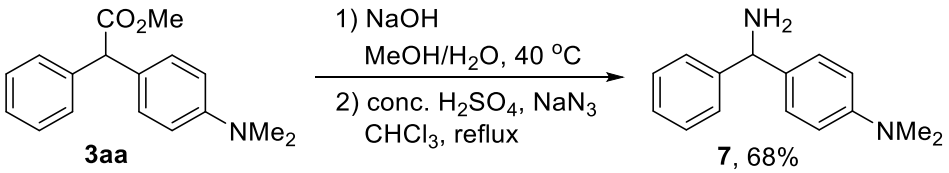
In a 25 mL pear-shaped flask equipped with a magnetic stir bar, **3aa** (390 mg, 1.45 mmol, 1 equiv) was dissolved in iodomethane (0.9 mL, 14.5 mmol, 10 equiv). The neat reaction mixture was stirred at ambient temperature for 8 h at which time TLC analysis showed the starting material to be completely consumed. The iodomethane was removed in vacuo to furnish the quaternary ammonium iodide quantitatively without need for further purification. The quaternary ammonium salt was dissolved/suspended in THF (8.0 mL) and added to a rapidly stirring solution of sodium (334 mg, 14.5 mmol, 10 equiv) in liquid ammonia (approx. 50 mL) at –78 °C. After 3.5 min, the cold reaction mixture was treated with benzylmethyl ether (4 mL) and the deep blue color was supplanted almost immediately by a bright orange. The mixture was then treated with isopropanol (20 mL) and stirred at –78 °C for another 5 min by which time all color had dissipated from the reaction. Diethyl ether (20 mL) and saturated aqueous ammonium chloride (20 mL) were added carefully and the reaction vessel was allowed to warm to room temperature. The organic phase was then dried over Na_2SO_4, concentrated, and the residue purified by a column chromatography on silica gel (PE/EA = 20:1) to give **5** as a white solid in 93% yield (305 mg, 1.35 mmol). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.34–7.31 (m, 7H, Ar-H), 7.28–7.24 (m, 3H, Ar-H), 5.04 (s, 1H, CH), 3.74 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.9, 138.6, 128.6, 128.6, 127.3, 57.0, 52.3.

4.3 Synthesis of methyl 2-([1,1'-biphenyl]-4-yl)-2-phenylacetate (6)[9]



A dry Schlenk tube equipped with a magnetic stir bar was charged with **3aa** (538 mg, 2 mmol, 1 equiv) and CH_2Cl_2 (5 mL). To the resultant stirring solution was added methyl trifluoromethanesulfonate (MeOTf, 394 mg, 2.4 mmol, 1.2 equiv) in one portion at rt. The solution was stirred at rt for 2 h, at which time TLC analysis indicated complete consumption of **3aa**. The MeOTf and CH_2Cl_2 was removed in vacuo to furnish the ammonium triflate. The *N*,*N*,*N*-trimethylanilinium trifluoromethanesulfonate (68 mg, 0.157 mmol, 1 equiv), bis(cyclooctadiene)nickel ($Ni(COD)_2$, 8.6 mg, 0.0314 mmol, 0.2 equiv), 1,3-bis(2,4,6-trimethylphenyl)imidazoliumchloride (IMes.HCl, 10.8 mg, 0.0314 mmol, 0.2 equiv), phenylboronic acid (38 mg, 0.314 mmol, 2 equiv) and K_3PO_4 (100 mg, 0.471 mmol, 3 equiv) were combined in a Schlenk tube in argon-filled glovebox, 1.0 mL degassed dioxane was added. The heterogeneous mixture was heated to 80 ℃ and stirred for 12 h. Upon cooling to rt the mixture was filtered through a plug of silica, washing with EA. The solvent was removed in vacuo and the residue was purified by a column chromatography on silica gel (PE/EA = 20:1) to afford **6** in 73% yield (35 mg, 0.116 mmol). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.57–7.54 (m, 4H, Ar-H), 7.45–7.28 (m, 10H, Ar-H), 5.08 (s, 1H, CH), 3.77 (s, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.9, 140.6, 140.2, 138.5, 137.6, 129.0, 128.73, 128.66, 128.6, 127.34, 127.29, 127.1, 56.7, 52.4.

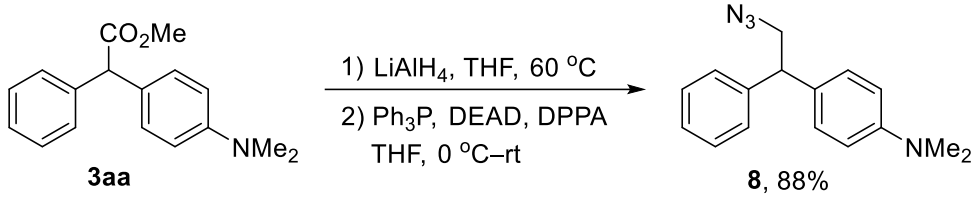
4.4 Synthesis of 4-(amino(phenyl)methyl)-*N*,*N*-dimethylaniline (7)



A Schlenk tube under an N_2 atmosphere was charged with **3aa** (100 mg, 0.37 mmol, 1

equiv), NaOH (44 mg, 1.1 mmol, 3 equiv), MeOH (2 mL), H_2O (1 mL). This reaction mixture was stirred overnight at 60 °C. The residue was subsequently acidified with 1M HCl to pH = 2. The reaction mixture was extracted with CH_2Cl_2 3 times. The combined organic extracts were dried over Na_2SO_4, and solvents removed in vacuo to give corresponding carboxylic acid in 97% yield (91 mg, 0.36 mmol) as a colorless solid. The carboxylic acid (51 mg, 0.2 mmol, 1 equiv), $CHCl_3$ (4 mL), conc. H_2SO_4 (0.15 mL) were added to a Schlenk tube under N_2 atmosphere. The heterogeneous mixture was heated to 40 ℃ and NaN_3 (59 mg, 0.9 mmol, 4.5 equiv) was added in 5 portions in 90 min, then reaction mixture was stirred 4 h at 80 °C. Upon cooling to 0 ℃ the mixture was subsequently alkalized with 1M NaOH to pH > 11. The organic phase separated and the aqueous phase back-extracted with $CHCl_3$ 3 times. The combined organic extracts were dried over Na_2SO_4, and solvents removed in vacuo and the residue was purified by silica gel chromatography (PE/EA = 2:1) to gave the title compound **7** in 70% yield (31 mg, 0.14 mmol) as a yellow solid. Mp = 80–82 °C; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.38 (d, *J* = 7.4 Hz, 2H, Ar-H), 7.30 (t, *J* = 7.3 Hz, 2H, Ar-H), 7.23–7.18 (m, 3H, Ar-H), 6.69 (d, *J* = 8.6 Hz, 2H, Ar-H), 5.14 (s, 1H, CH), 2.91 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 149.6, 146.2, 133.7, 128.3, 127.6, 126.8, 126.6, 112.6, 59.1, 40.7; HRMS (ESI) Calcd for $[C_{15}H_{18}N_2Na$, M + Na$]^+$: 249.1362; Found: 249.1577; Anal. Calcd for $C_{15}H_{18}N_2$: C, 79.61; H, 8.02; N, 12.38. Found: C, 79.35; H, 7.86; N, 12.41.

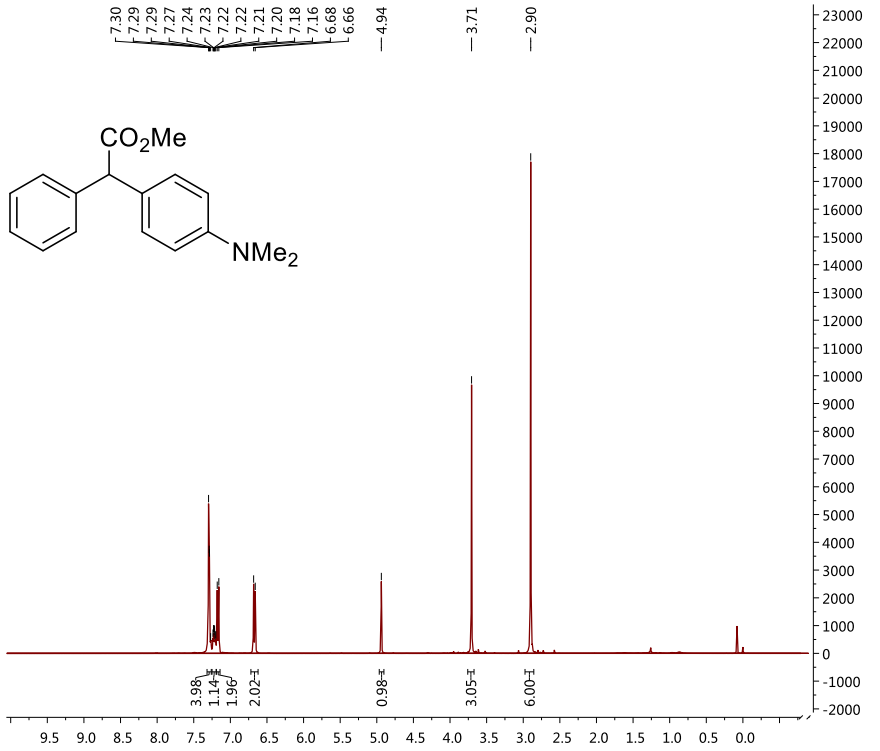
4.5 Synthesis of 4-(2-azido-1-phenylethyl)-*N*,*N*-dimethylaniline (8)



A 100 mL three-neck flask was charged with **3aa** (538 mg, 2 mmol, 1 equiv), $LiAlH_4$ (76 mg, 2 mmol, 1 equiv), 20 mL THF under N_2 atmosphere. The mixture was stirred for 2 h at 60 °C and quenched by H_2O, 10% aqueous NaOH (3.0 mL) carefully at 0 ℃. The solution was then filtered and washed with EtOAc. The combined organic layers were dried over Na_2SO_4 and the solvent was removed under reduced pressure to give the crude product. The crude product was purified by silica gel column chromatography (PE/EA = 2:1) to afford the corresponding alcohol in 98% yield as a white solid. Mp = 88–90 °C; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32–7.18 (m, 5H, Ar-H), 7.13 (d, *J* = 8.7 Hz, 2H, Ar-H), 6.70 (d, *J* = 8.7 Hz, 2H, Ar-H), 4.11 (s, 3H, CH, CH_2), 2.91 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 149.5, 142.1, 128.9, 128.6, 128.2, 126.5, 112.9, 66.3, 52.7, 40.6; HRMS (ESI) Calcd for $[C_{16}H_{19}NONa, M + Na]^+$: 264.1359; Found: 264.1355. The alcohol (121 mg, 0.5 mmol, 1 equiv), Ph_3P (262 mg, 1.0 mmol, 2 equiv), diethyl azodicarboxylate (DEAD, 174 mg, 1.0 mmol, 2 equiv) were added to a Schlenk tube under N_2 atmosphere at 0 °C, then diphenylphosphoryl azide (DPPA, 165 mg, 0.6 mmol, 1.2 equiv) was added slowly. The solution was stirred for 2 h at 0 °C. The solvent was removed under reduced pressure to give the crude product, which was purified by silica gel column chromatography (PE/EA = 10:1) to afford the product in 90% yield as a colorless oil (120 mg, 0.45 mmol). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.28–7.15 (m, 5H, Ar-H), 7.06 (d, *J* = 8.3 Hz, 2H, Ar-H), 6.65 (d, *J* = 8.4 Hz, 2H, Ar-H), 4.11 (t, *J* = 7.7 Hz, 1H, CH), 3.77 (d, *J* = 7.7 Hz, 2H, CH_2), 2.85 (s, 6H, $2CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$): δ 149.3, 141.9, 128.8, 128.4, 127.8, 126.6, 112.5, 55.5, 49.6, 40.3; HRMS (ESI) Calcd for $[C_{16}H_{19}N_4, M + H]^+$: 267.1604; Found: 267.1605.

5. NMR Spectra of Arylation Products

Methyl 2-(4-(dimethylamino)phenyl)-2-phenylacetate (3aa)



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6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
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12	Experiment	1D
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14	Receiver Gain	64
15	Relaxation Delay	1.0000
16	Pulse Width	13.0000
17	Acquisition Time	2.7999
18	Acquisition Date	2009-10-17T12:38:00
19	Modification Date	2009-10-17T12:38:00
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23	Nucleus	1H
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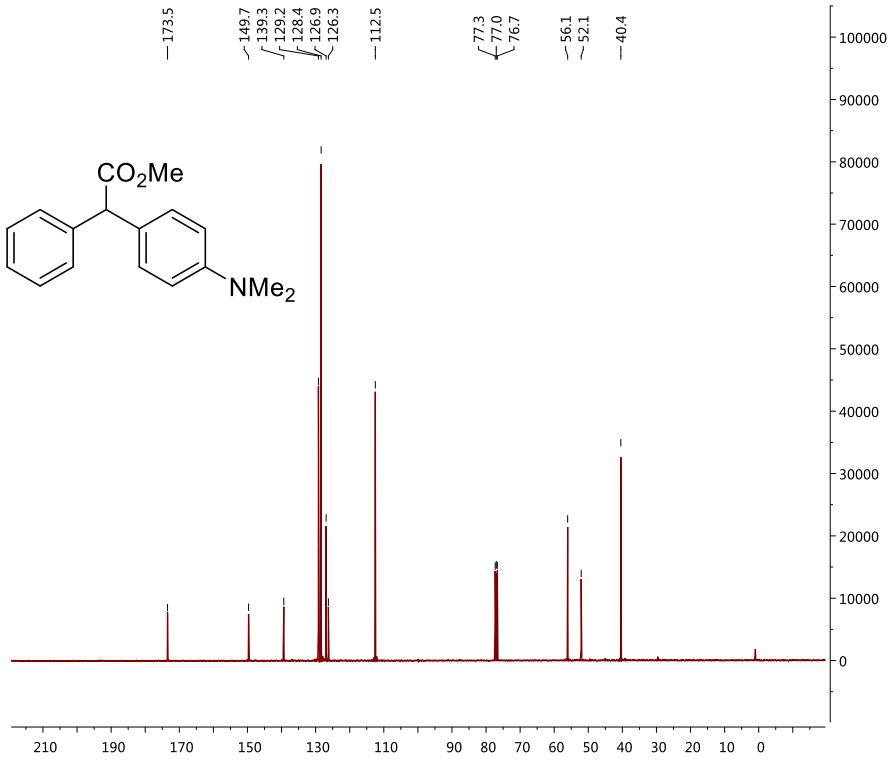
25	Spectral Size	65536



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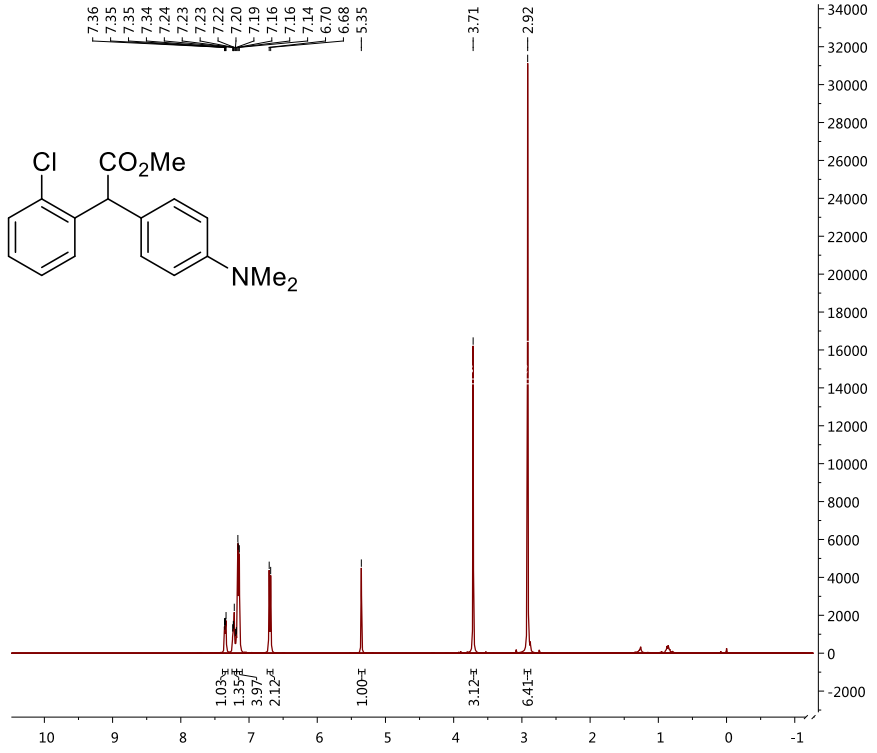
Methyl 2-(2-chlorophenyl)-2-(4-(dimethylamino)phenyl)acetate (3ba)



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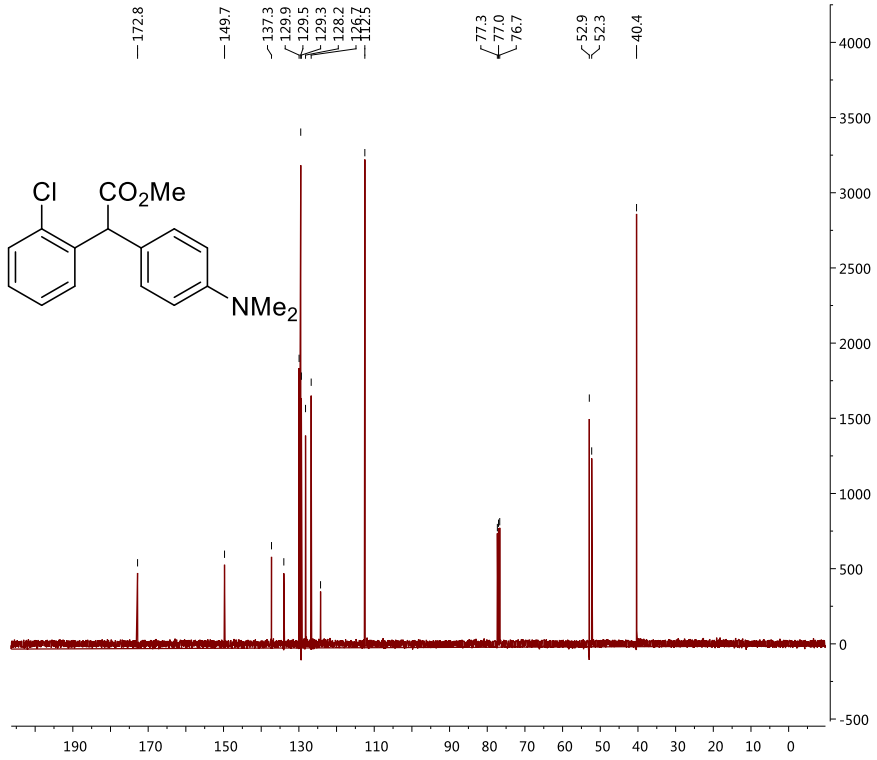
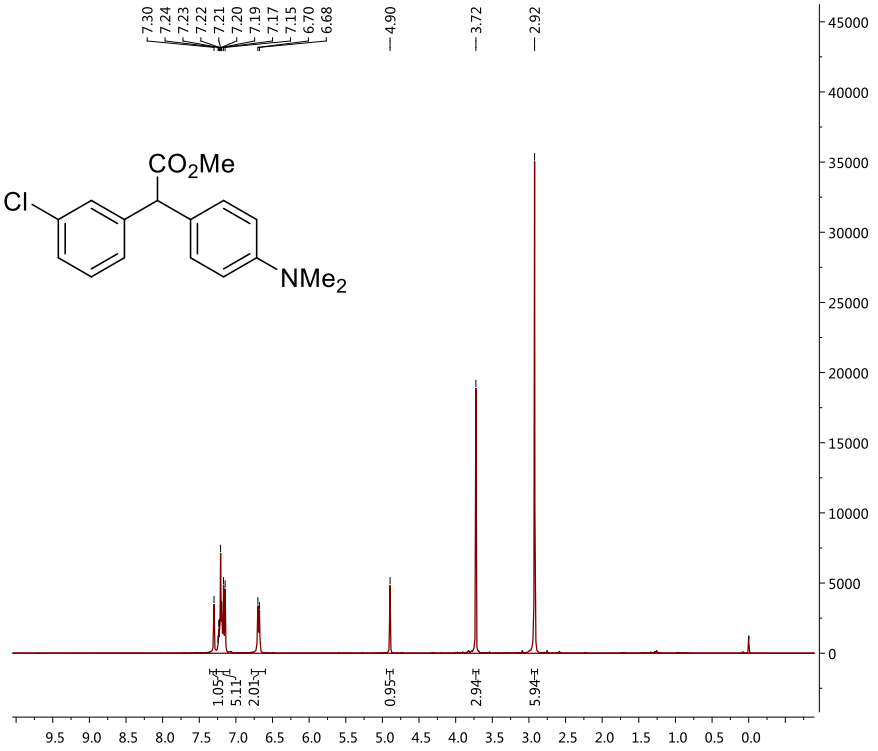
24	Acquired Size	16384
25	Spectral Size	32768

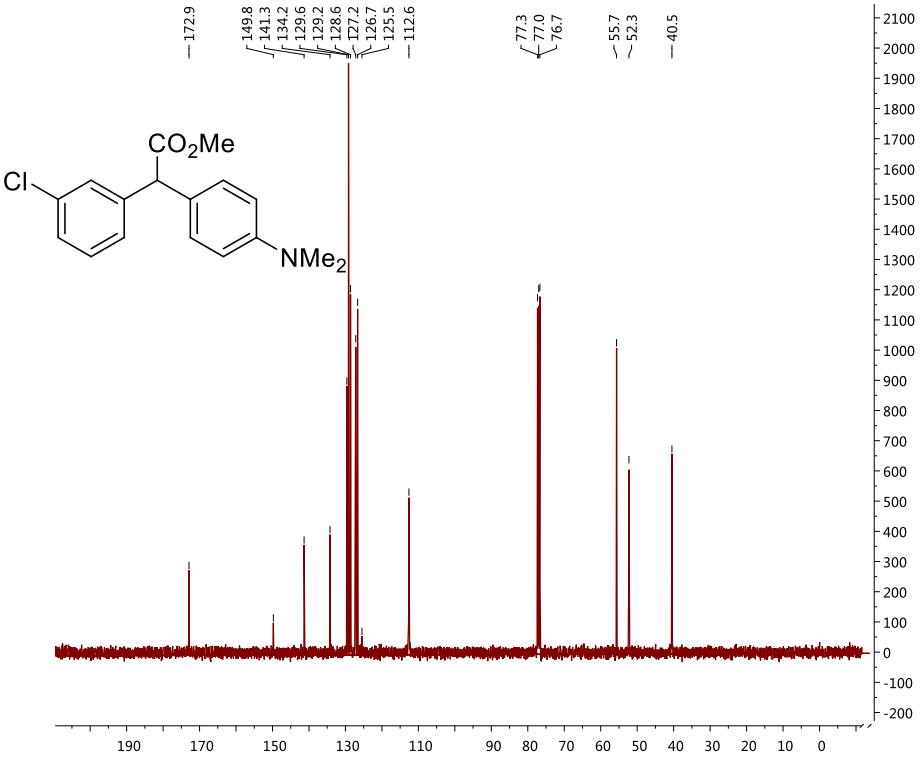


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-23B/ 2/ fid
2	Title	cy-25-23B
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	109
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.0000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-14T21:09:00
19	Modification Date	2011-04-14T21:11:00
20	Spectrometer Frequency	100.65
21	Spectral Width	29761.9
22	Lowest Frequency	-4817.6
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(3-chlorophenyl)-2-(4-(dimethylamino)phenyl)acetate (3ca)

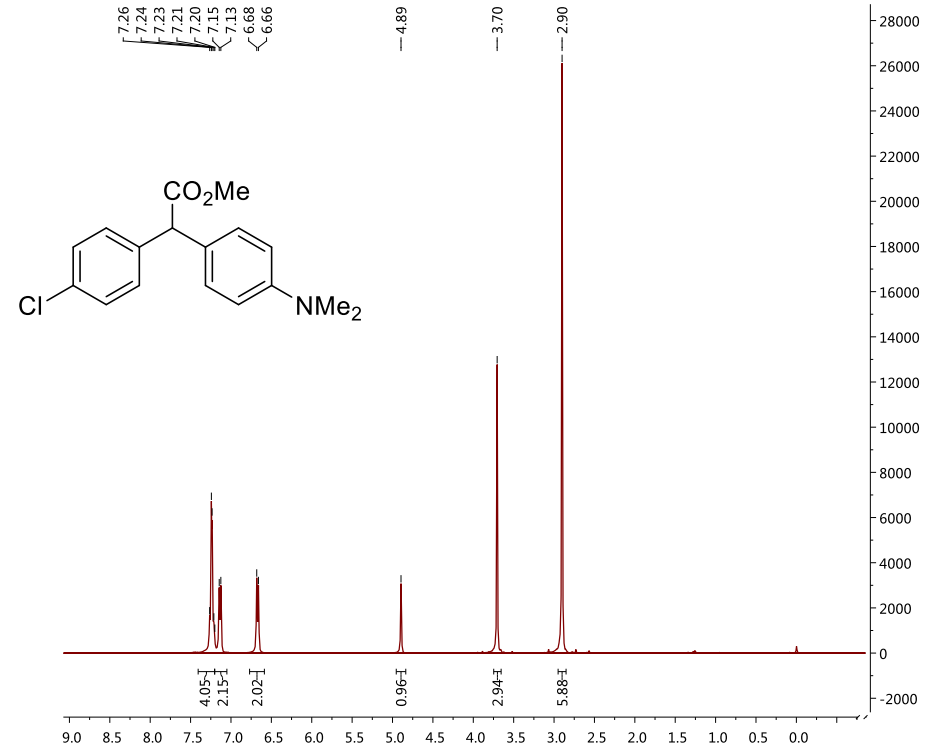


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-19B/ 1/ fid
2	Title	cy-25-19B
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.5
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	81
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-11T16:41:00
19	Modification Date	2011-04-11T16:41:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1661.1
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

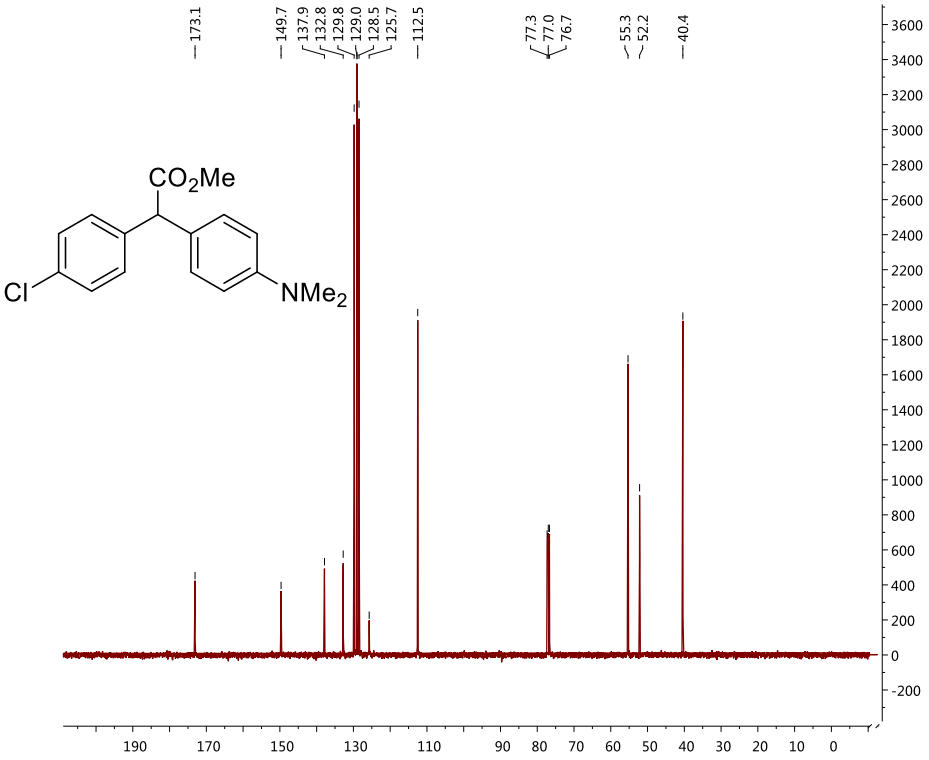


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-19B/ 2/ fid
2	Title	cy-25-19B
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	270
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-11T16:42:00
19	Modification Date	2011-04-11T16:49:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-chlorophenyl)-2-(4-(dimethylamino)phenyl)acetate (3da)

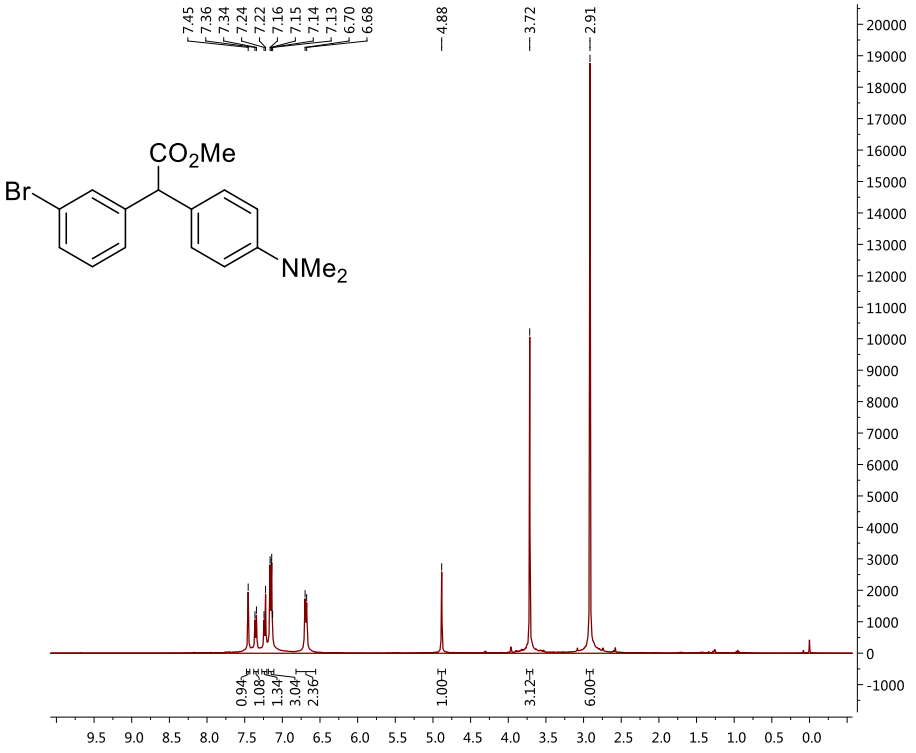


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-18B/ 1/ fid
2	Title	cy-25-18B
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	36
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-10T09:25:00
19	Modification Date	2011-04-10T09:25:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1673.9
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

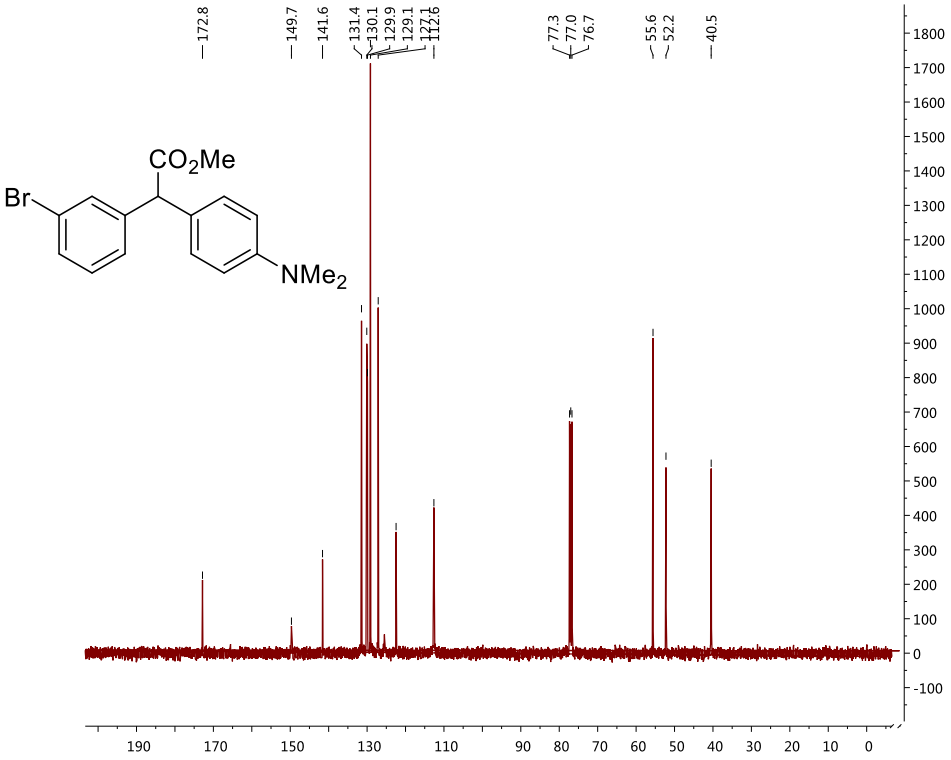


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-18B/ 2/ fid
2	Title	cy-25-18B
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	207
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-10T09:27:00
19	Modification Date	2011-04-10T09:32:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(3-bromophenyl)-2-(4-(dimethylamino)phenyl)acetate (3ea)

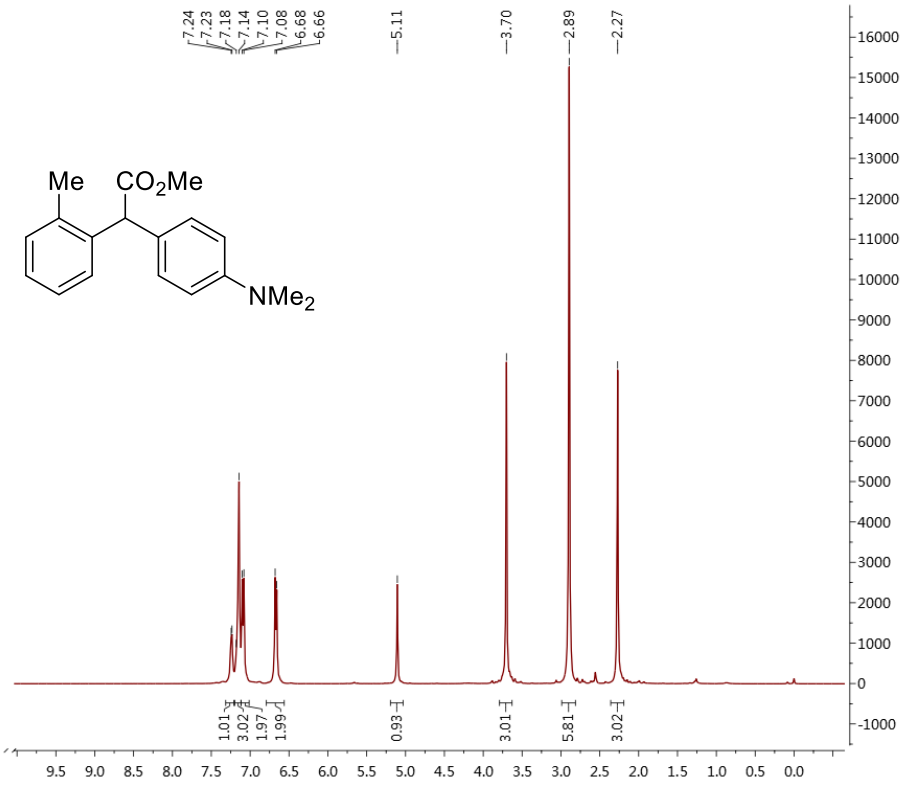


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-19C/ 1/ fid
2	Title	cy-25-19C
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.4
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	45
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-18T20:31:00
19	Modification Date	2011-04-18T20:31:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1665.8
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

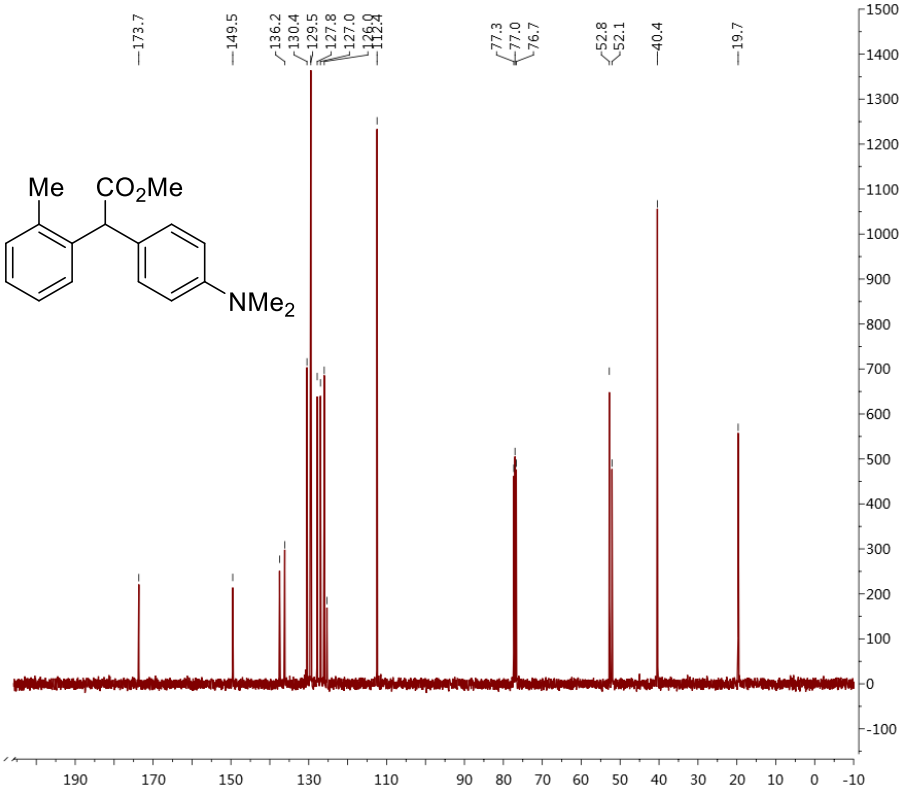


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-19C/ 2/ fid
2	Title	cy-25-19C
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	210
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-18T20:33:00
19	Modification Date	2011-04-18T20:38:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-o-tolylacetate (3fa)

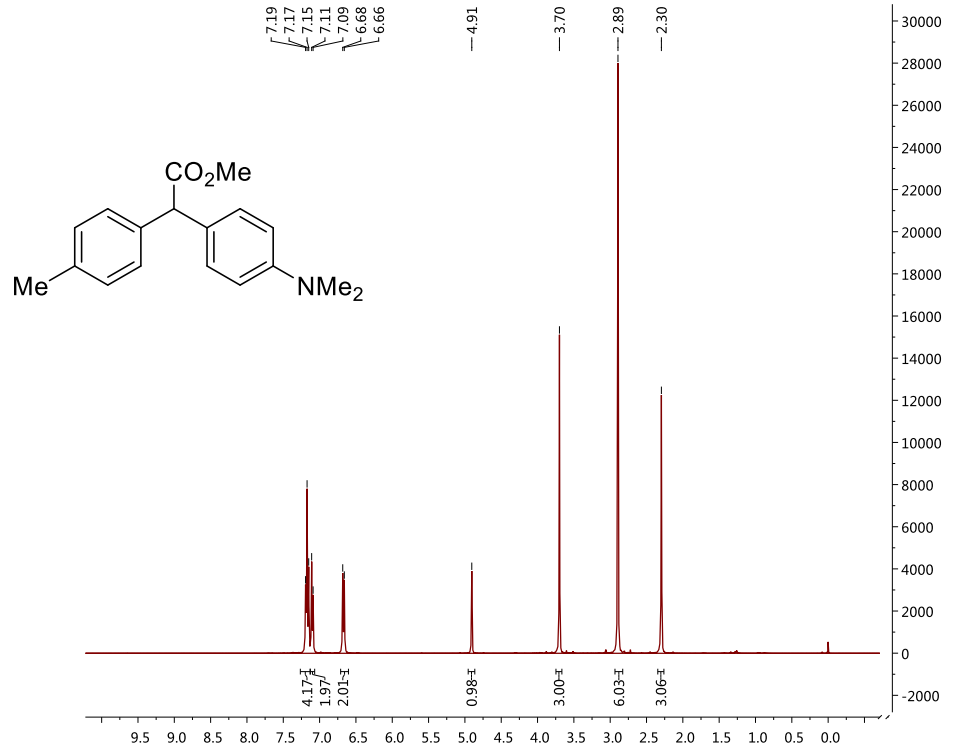


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-23C/ 1/ fid
2	Title	cy-25-23C
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	289.4
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	32
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-30T10:10:00
19	Modification Date	2011-04-30T10:10:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1682.6
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

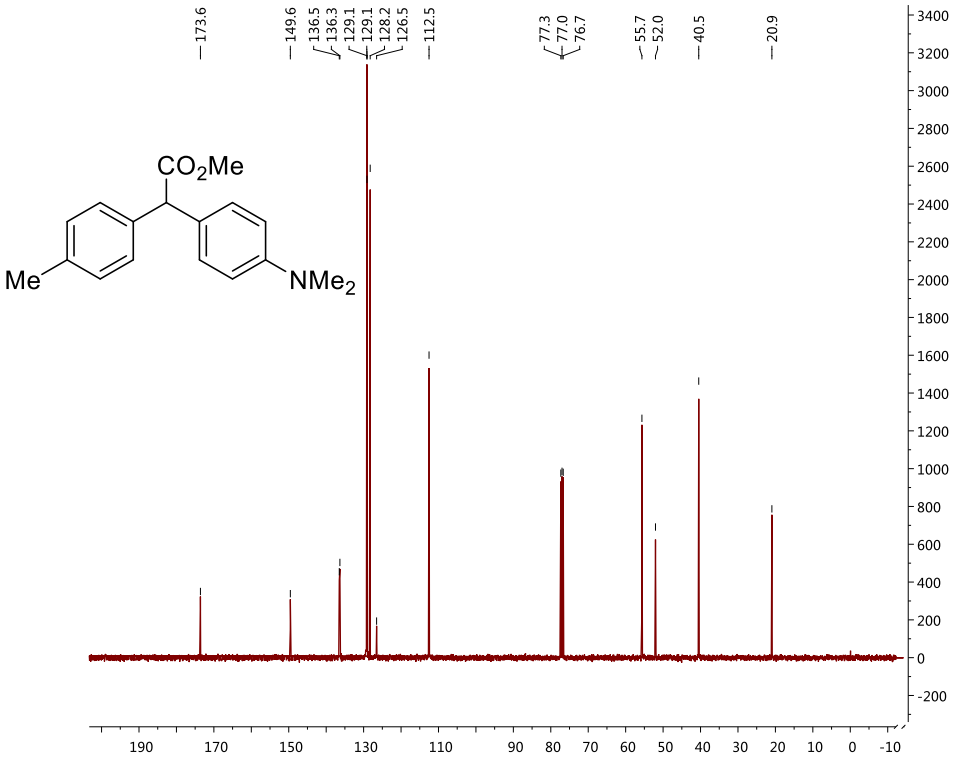


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-23C/ 2/ fid
2	Title	cy-25-23C
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	289.8
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	114
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-30T10:12:00
19	Modification Date	2011-04-30T10:14:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-p-tolylacetate (3ga)

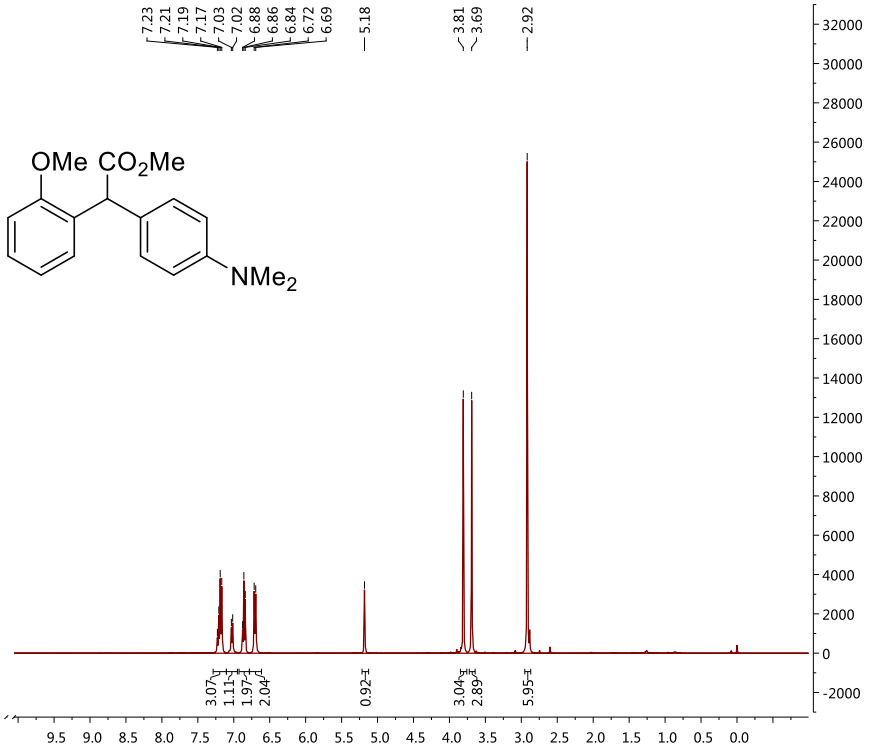


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-18A/ 1/ fid
2	Title	cy-25-18A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	36
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-10T0 9:15:00
19	Modification Date	2011-04-10T0 9:15:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1680.4
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

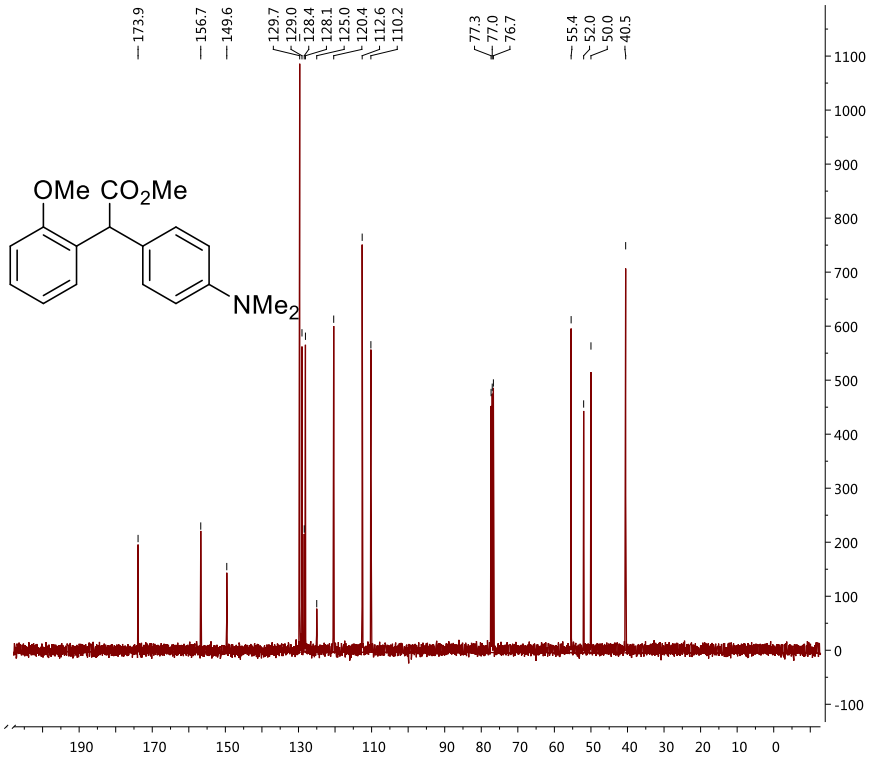


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-18A/ 2/ fid
2	Title	cy-25-18A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	174
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-10T0 9:16:00
19	Modification Date	2011-04-10T0 9:20:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-(2-methoxyphenyl)acetate (3ha)

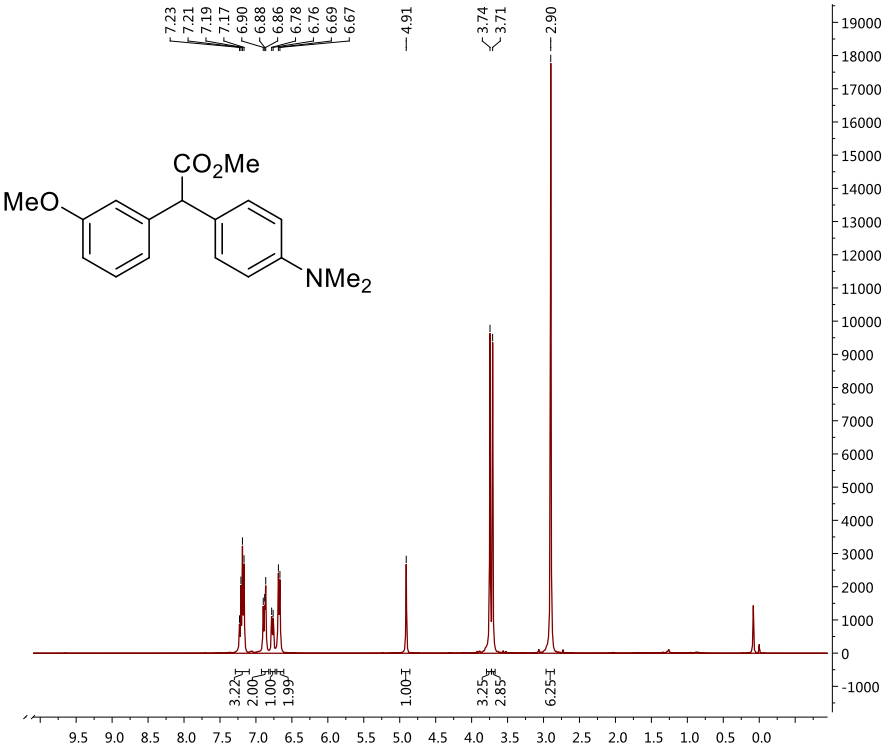


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-23A/ 1/ fid
2	Title	cy-25-23A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	51
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-14T21:15:00
19	Modification Date	2011-04-14T21:15:00
20	Spectrometer Frequency	400.23
21	Spectral Width	8223.7
22	Lowest Frequency	-1640.3
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

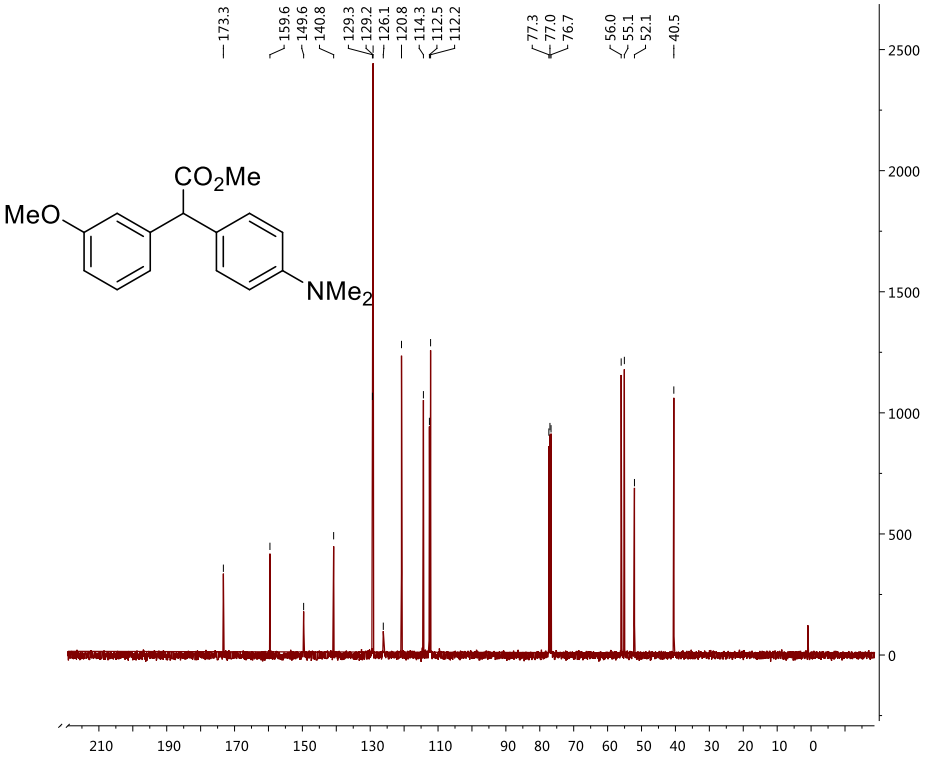


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-23A/ 2/ fid
2	Title	cy-25-23A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	89
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.0000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-14T21:17:00
19	Modification Date	2011-04-14T21:19:00
20	Spectrometer Frequency	100.64
21	Spectral Width	29761.9
22	Lowest Frequency	-4817.6
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-(3-methoxyphenyl)acetate (3ia)

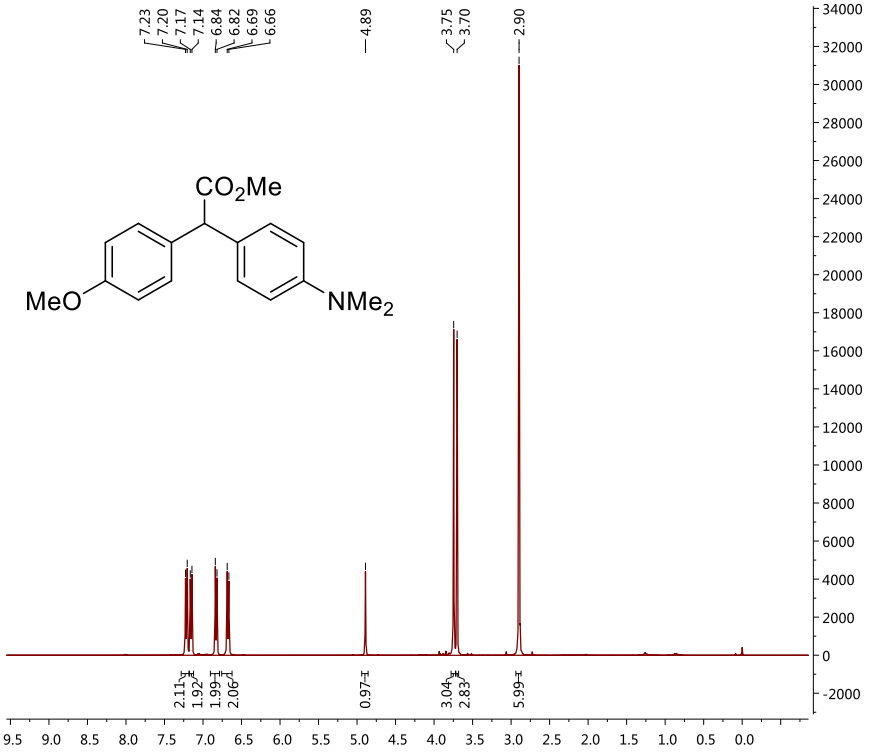


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-19A/ 1/ fid
2	Title	cy-25-19A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	36
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-11T16:54:00
19	Modification Date	2011-04-11T16:54:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1704.0
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

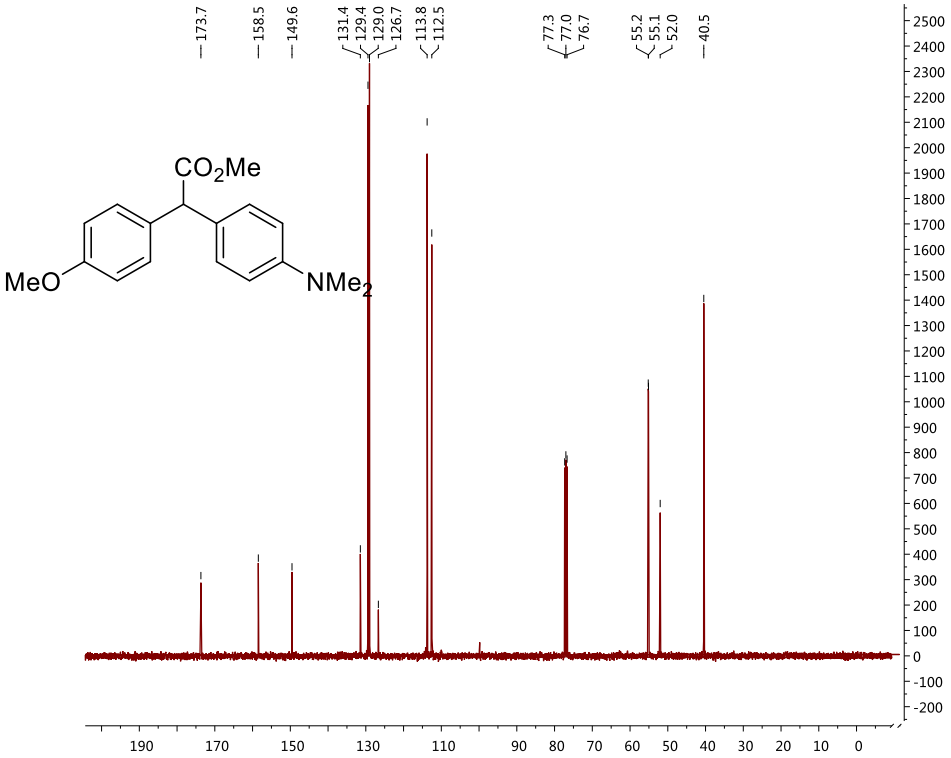


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-19A/ 2/ fid
2	Title	cy-25-19A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	196
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-11T16:55:00
19	Modification Date	2011-04-11T17:00:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4931.1
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-(4-methoxyphenyl)acetate (3ja)

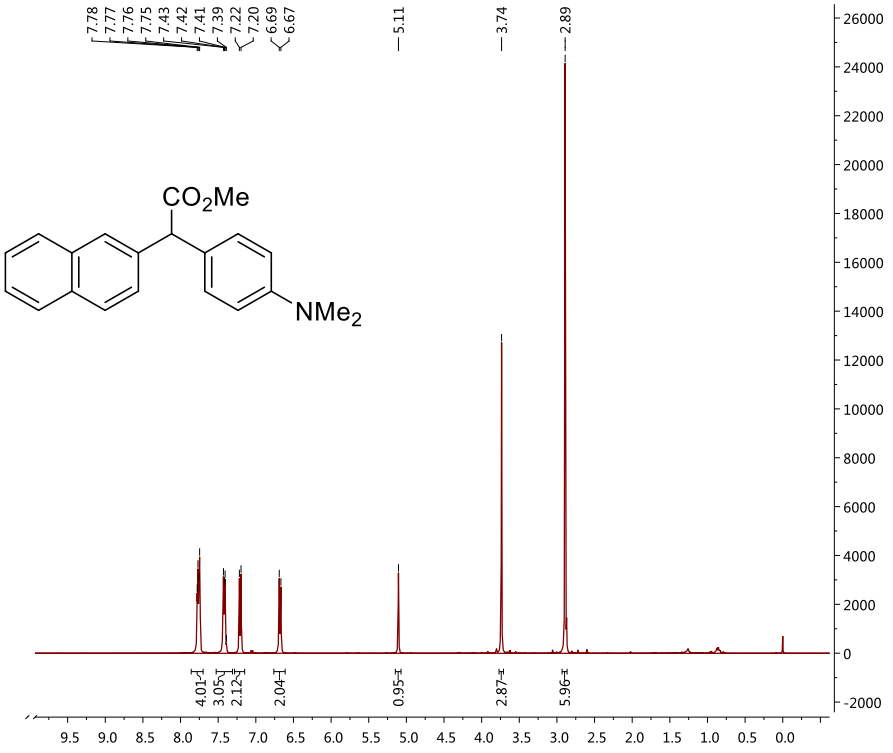


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-18C/ 1/ fid
2	Title	cy-25-18C
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	36
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-21T15:00:00
19	Modification Date	2011-04-21T15:00:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1673.7
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

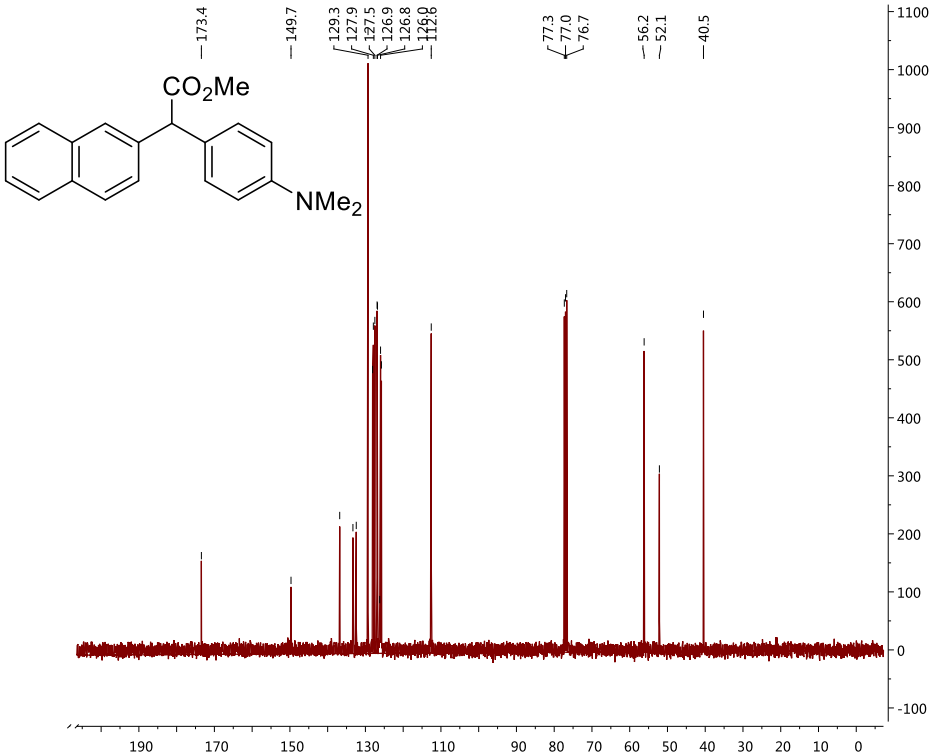


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-18C/ 2/ fid
2	Title	cy-25-18C
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	142
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-21T15:02:00
19	Modification Date	2011-04-21T15:05:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-(naphthalen-2-yl)acetate (3ka)

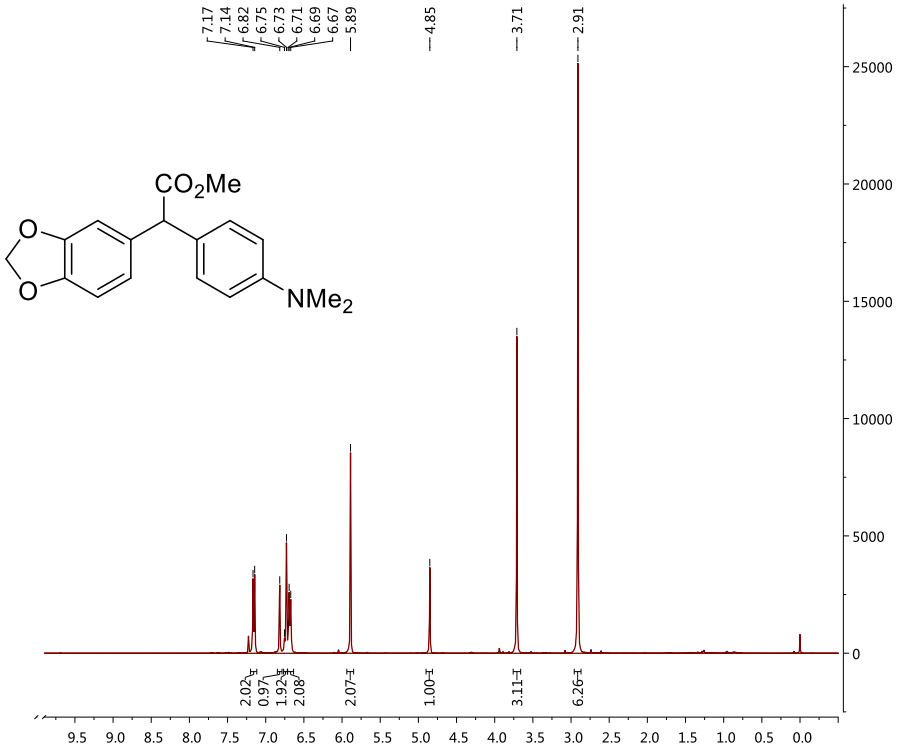


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-25A/ 1/ fid
2	Title	cy-25-25A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	45
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-18T20:06:00
19	Modification Date	2011-04-18T20:06:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1678.9
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

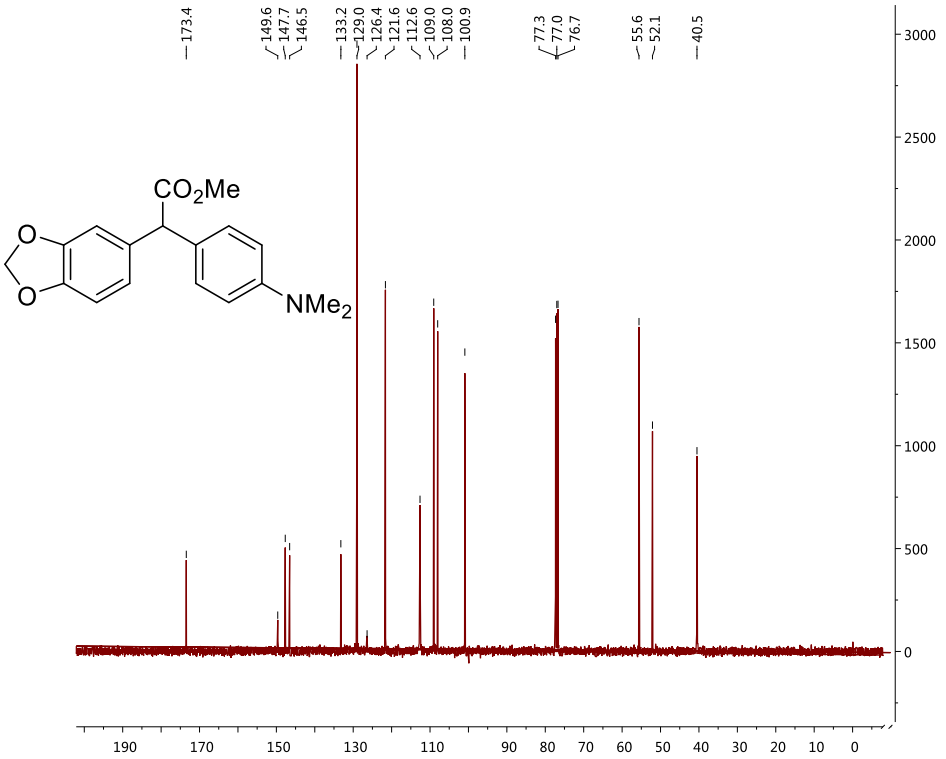


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-25A/ 2/ fid
2	Title	cy-25-25A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.7
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	111
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-18T20:09:00
19	Modification Date	2011-04-18T20:11:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(benzo[d][1,3]dioxol-5-yl)-2-(4-(dimethylamino)phenyl)acetate (3la)

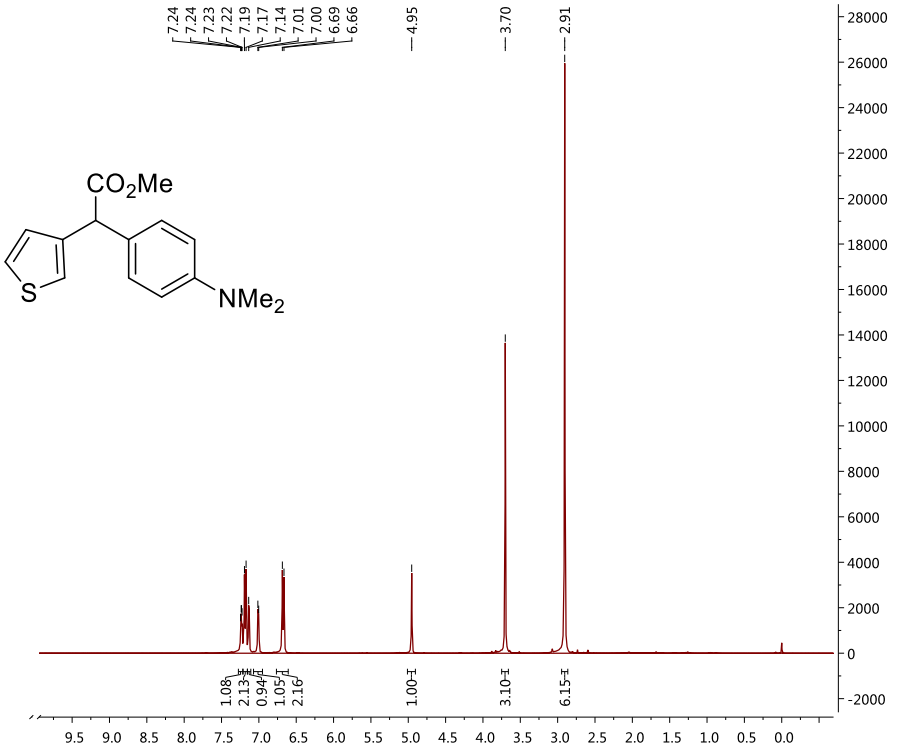


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-25B/ 1/ fid
2	Title	cy-25-25B
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	51
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-18T20:15:00
19	Modification Date	2011-04-18T20:15:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1664.1
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

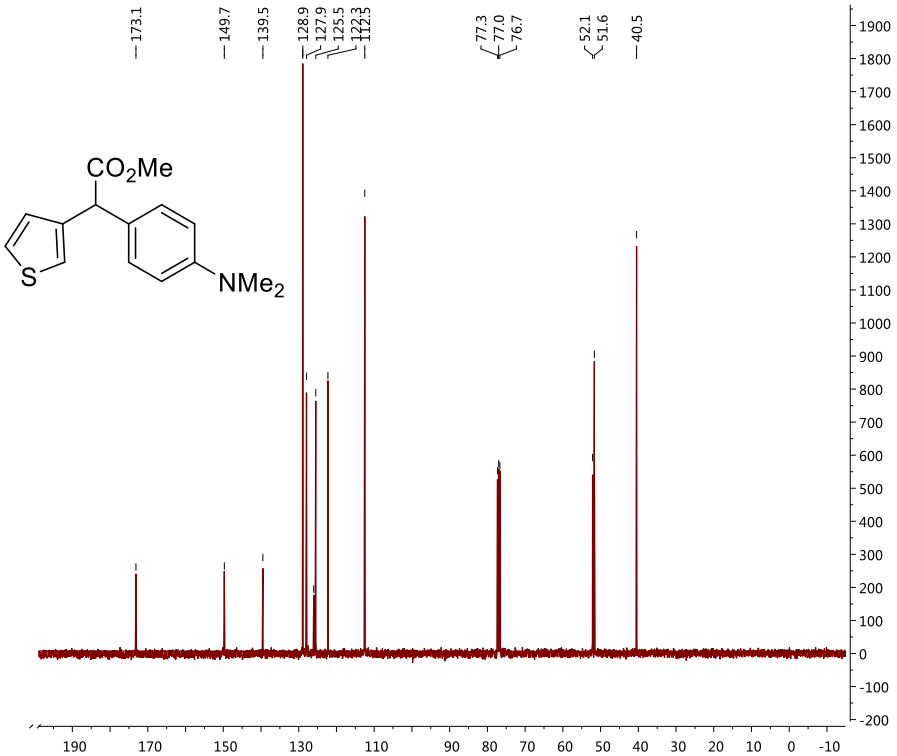


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-25B/ 2/ fid
2	Title	cy-25-25B
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.8
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	313
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-18T20:17:00
19	Modification Date	2011-04-18T20:24:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)phenyl)-2-(thiophen-3-yl)acetate (3ma)

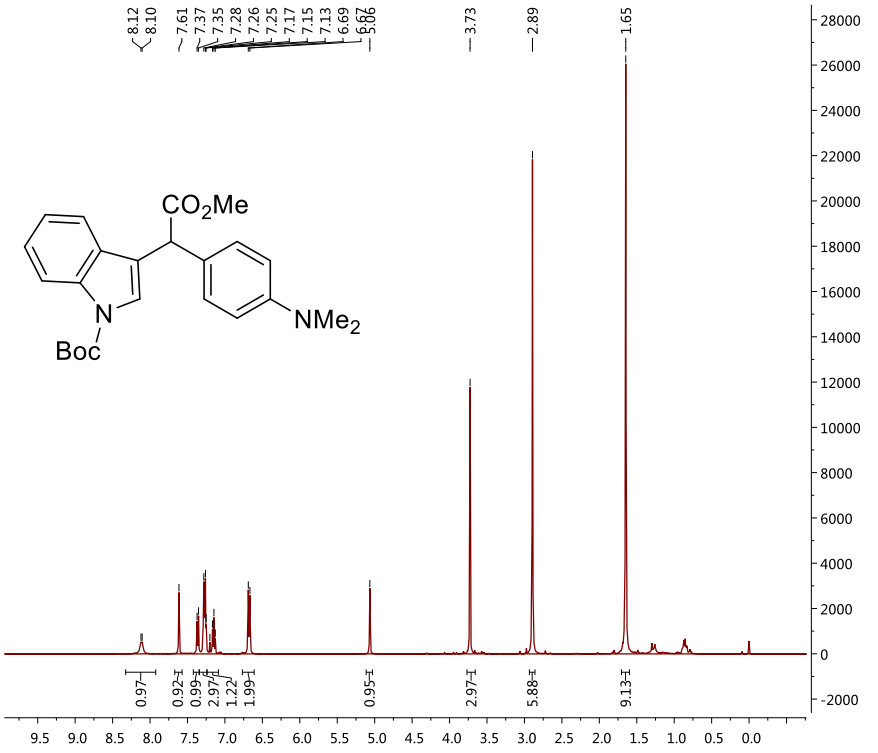


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-28B/ 1/ fid
2	Title	cy-25-28B
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	51
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-29T15:30:00
19	Modification Date	2011-04-29T15:30:00
20	Spectrometer Frequency	400.23
21	Spectral Width	8223.7
22	Lowest Frequency	-1640.3
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

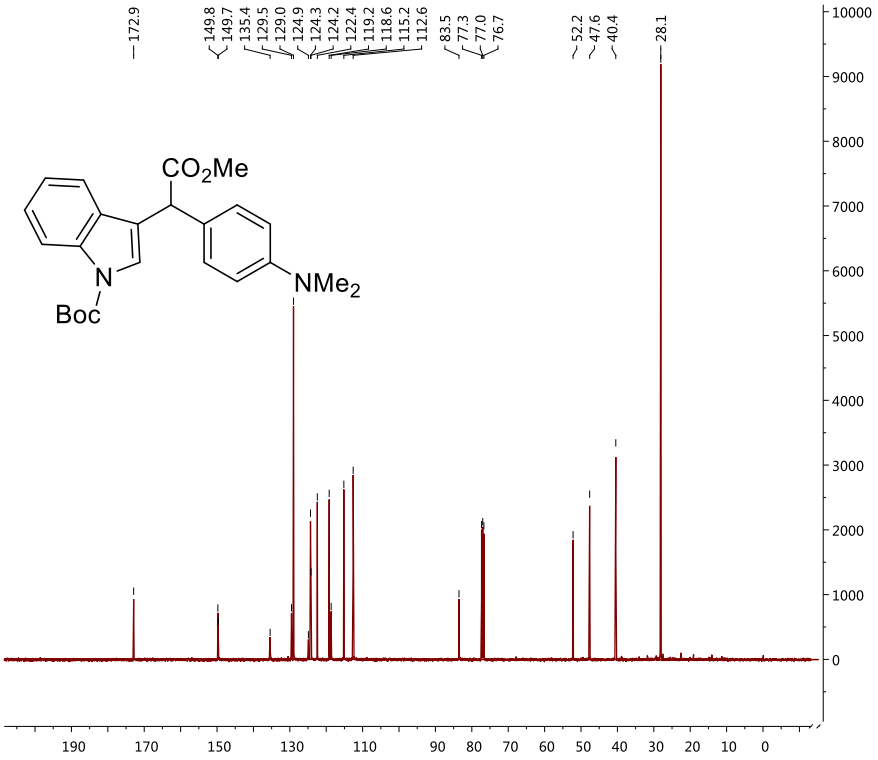


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-28B/ 2/ fid
2	Title	cy-25-28B
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	109
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.0000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-29T15:31:00
19	Modification Date	2011-04-29T15:34:00
20	Spectrometer Frequency	100.64
21	Spectral Width	29761.9
22	Lowest Frequency	-4817.6
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

tert-Butyl 3-(1-(4-(dimethylamino)phenyl)-2-methoxy-2-oxoethyl)-1H-indole -1-carboxylate (3na)

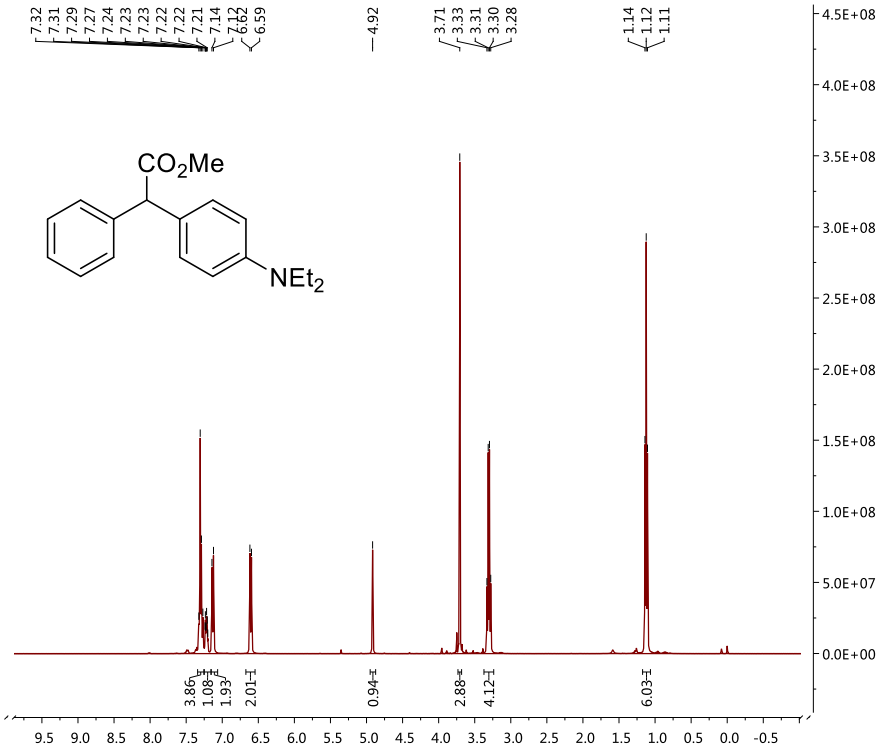


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-28A/ 1/ fid
2	Title	cy-25-28A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	28
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-21T15:12:00
19	Modification Date	2011-04-21T15:12:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1674.0
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

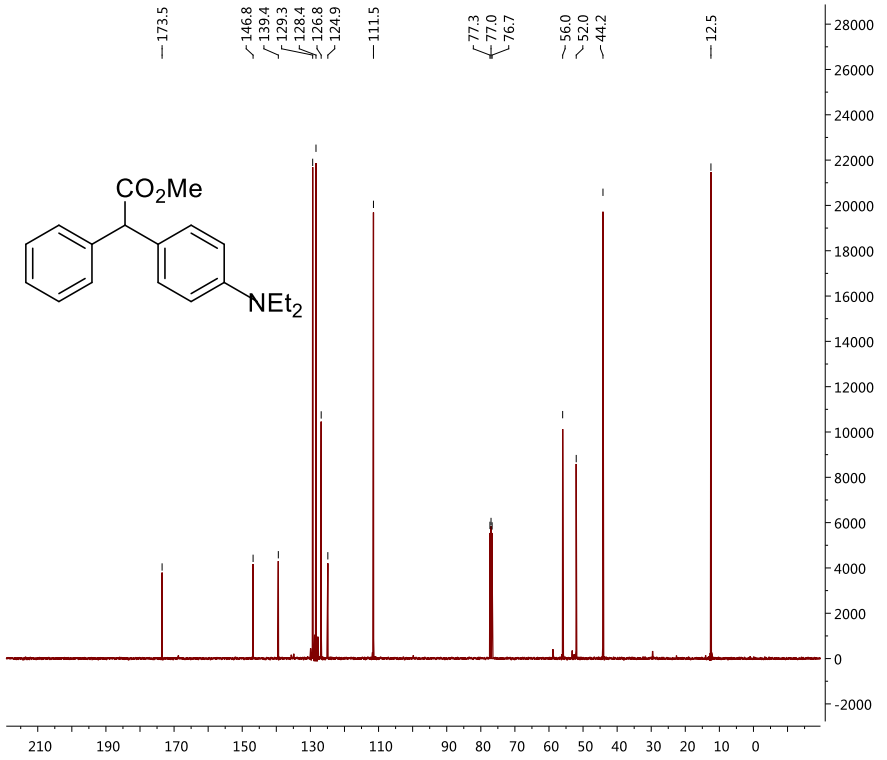


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-28A/ 2/ fid
2	Title	cy-25-28A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.1
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	394
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-21T15:14:00
19	Modification Date	2011-04-21T15:24:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(diethylamino)phenyl)-2-phenylacetate (3ab)

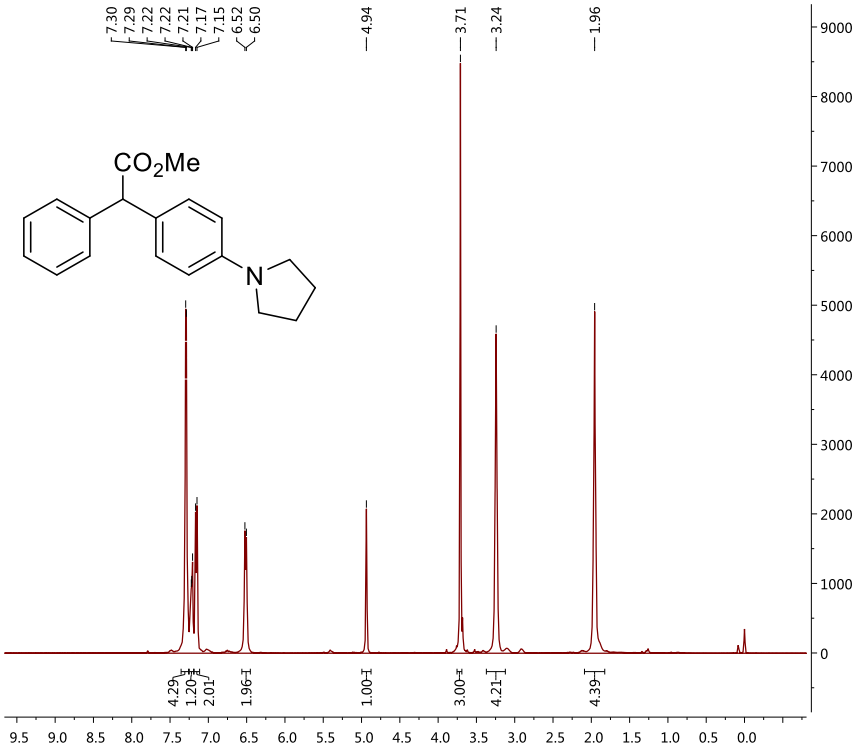


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-18-34B/ 1/ pdata/ 1/ 1r
2	Title	cy-18-34B
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	292.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	64
15	Relaxation Delay	1.0000
16	Pulse Width	13.9000
17	Acquisition Time	0.8999
18	Acquisition Date	2009-10-24T11:49:00
19	Modification Date	2009-10-24T11:49:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1671.4
23	Nucleus	1H
24	Acquired Size	7400
25	Spectral Size	32768

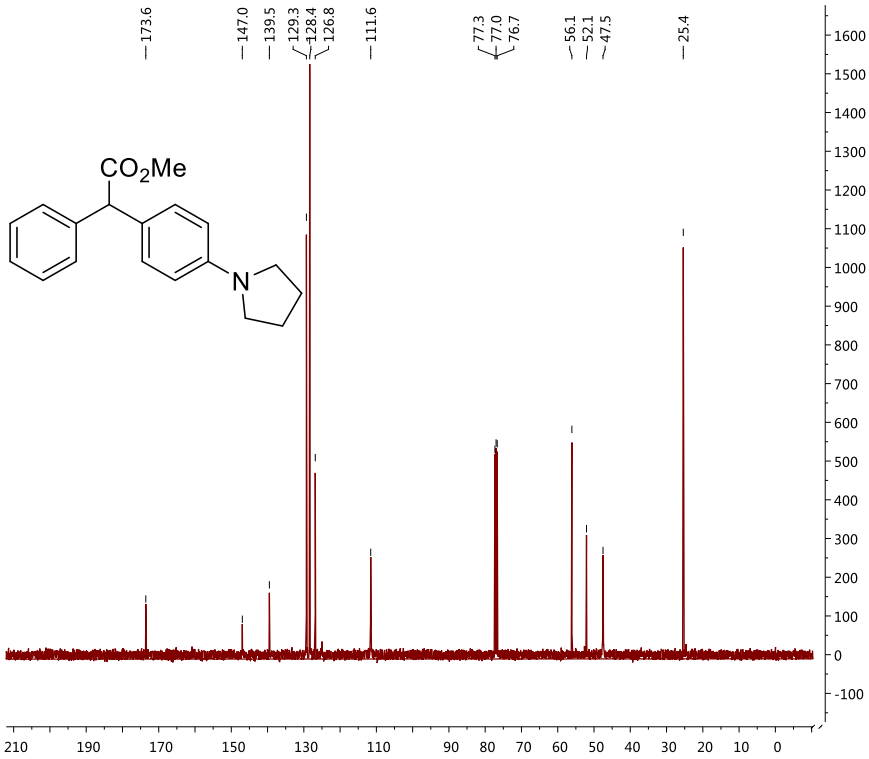


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-18-34B/ 2/ 1/ fid
2	Title	cy-18-34B-C13
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	292.1
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	687
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	9.5000
17	Acquisition Time	0.4000
18	Acquisition Date	2009-11-06T07:50:00
19	Modification Date	2009-11-06T07:50:00
20	Spectrometer Frequency	100.61
21	Spectral Width	24038.5
22	Lowest Frequency	-1958.4
23	Nucleus	13C
24	Acquired Size	9614
25	Spectral Size	32768

Methyl 2-phenyl-2-(4-(pyrrolidin-1-yl)phenyl)acetate (3ac)

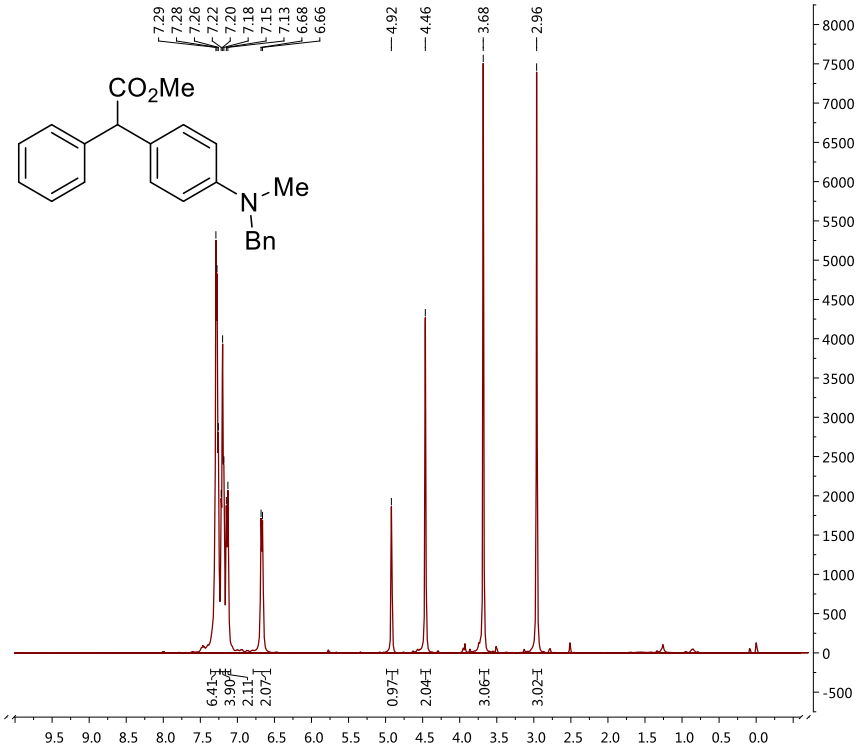


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-16A/ 1/ fid
2	Title	cy-25-16A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	289.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	40
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-10T0 8:56:00
19	Modification Date	2011-04-10T0 8:56:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1672.1
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

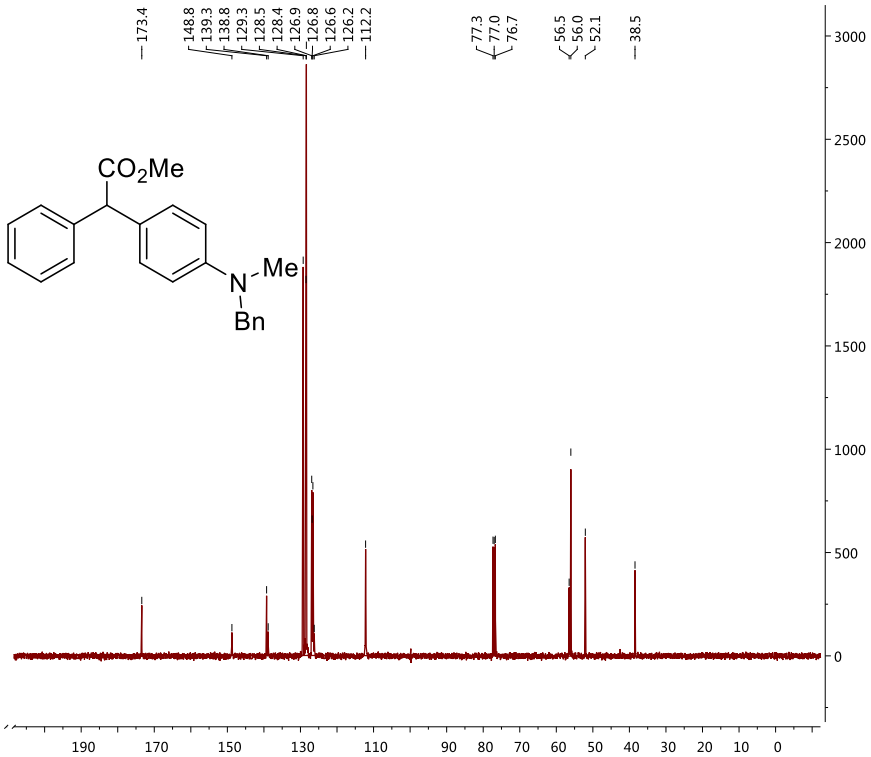


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-16A/ 2/ fid
2	Title	cy-25-16A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	289.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	114
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-10T0 8:58:00
19	Modification Date	2011-04-10T0 9:00:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(benzyl(methyl)amino)phenyl)-2-phenylacetate (3ad)

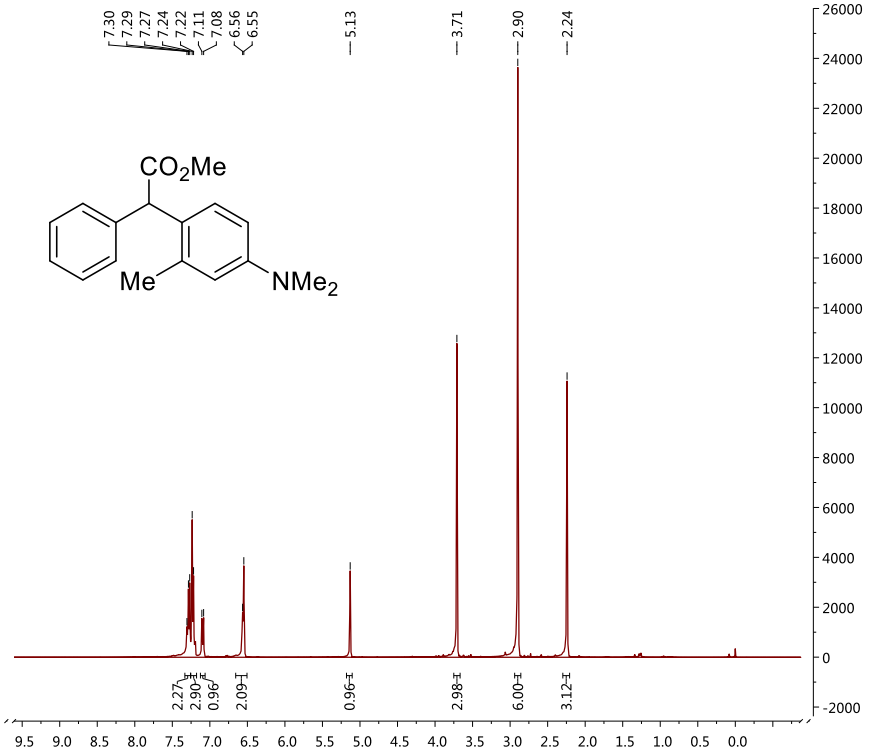


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-16B/ 1/ fid
2	Title	cy-25-16B
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	32
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-10T09:05:00
19	Modification Date	2011-04-10T09:05:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1692.5
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

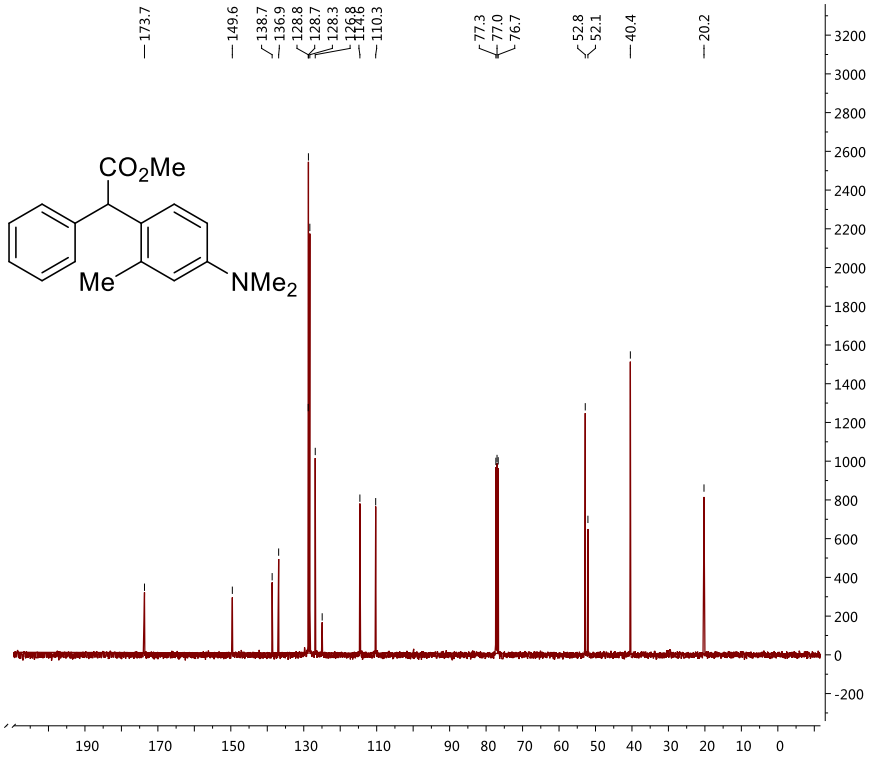


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-16B/ 2/ fid
2	Title	cy-25-16B
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	290.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	169
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-10T09:07:00
19	Modification Date	2011-04-10T09:11:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)-2-methylphenyl)-2-phenylacetate (3ae)

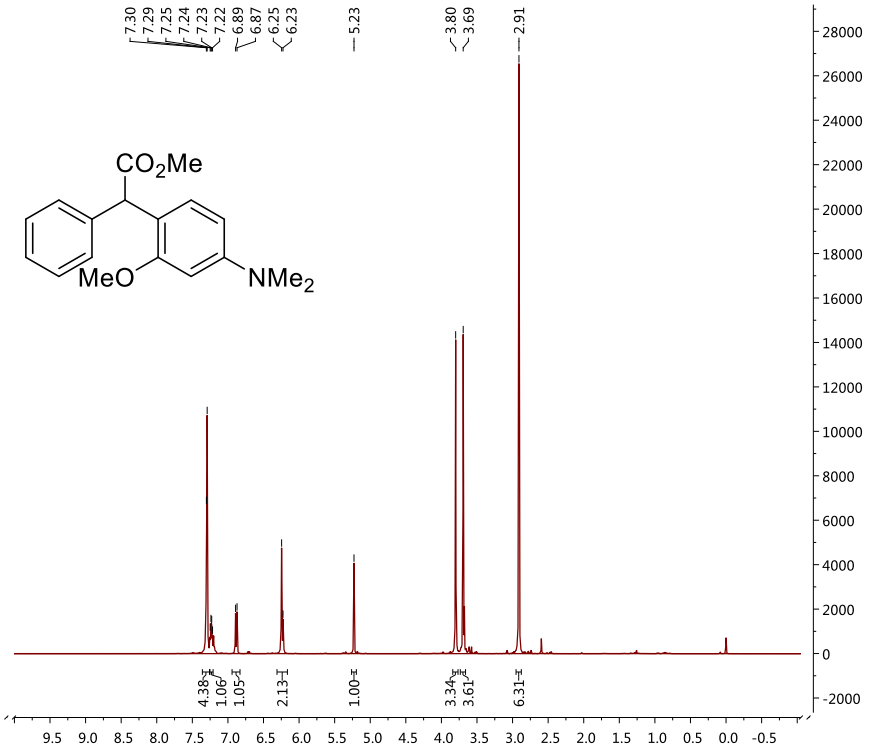


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-21/ 1/ fid
2	Title	cy-25-21
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	36
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-04-13T2 0:06:00
19	Modification Date	2011-04-13T2 0:06:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1677.6
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

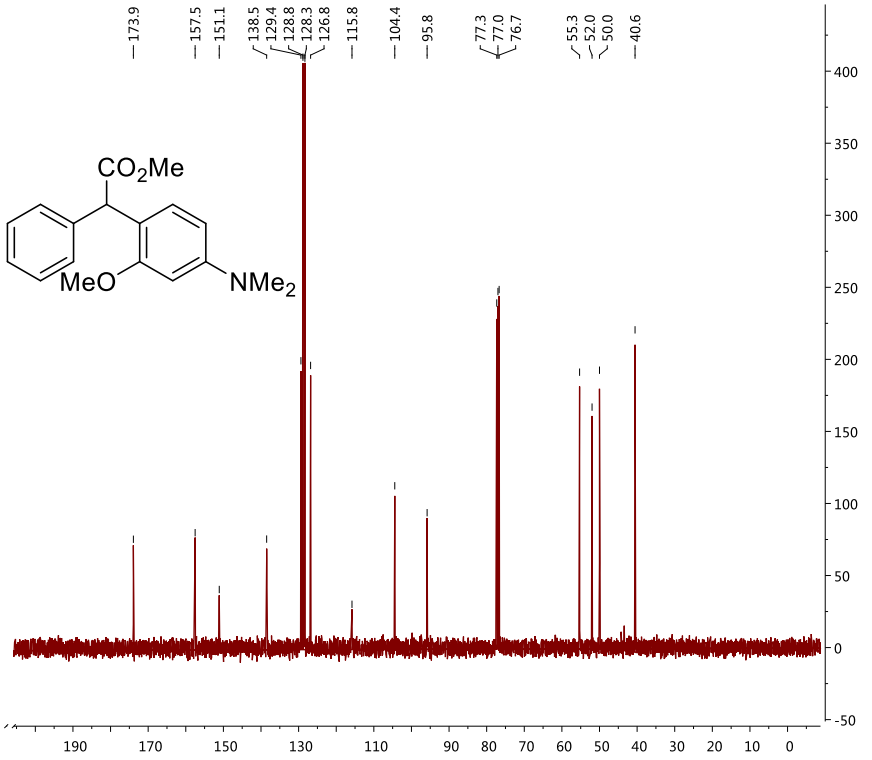


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-21/ 2/ fid
2	Title	cy-25-21
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	194
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-04-13T2 0:08:00
19	Modification Date	2011-04-13T2 0:12:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(4-(dimethylamino)-2-methoxyphenyl)-2-phenylacetate (3af)

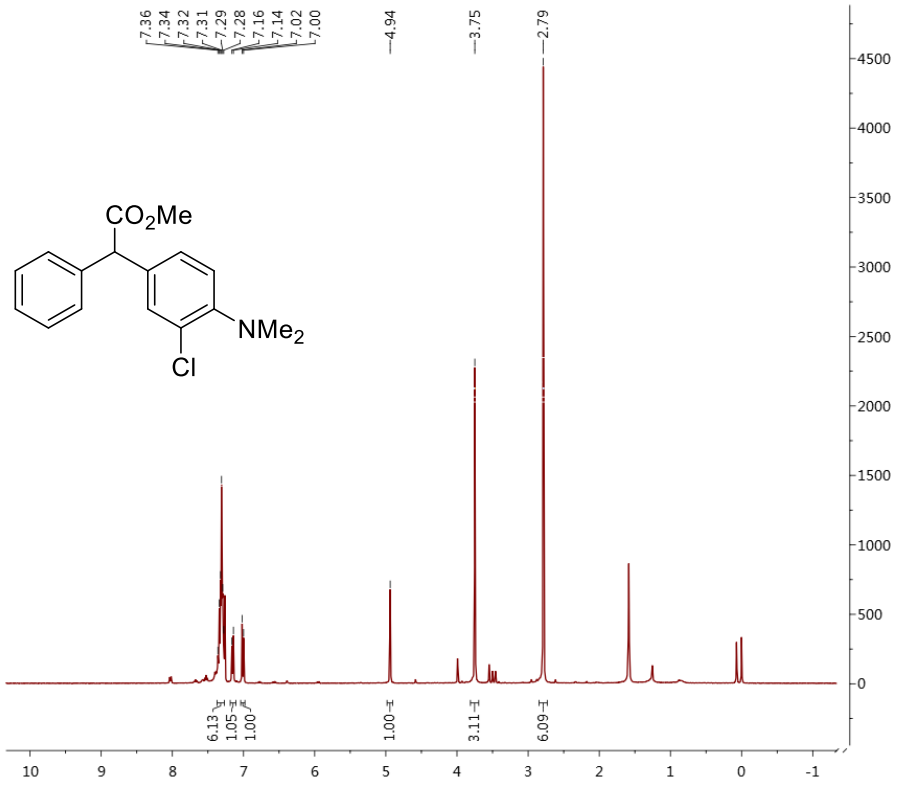


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-3A/ 1/ fid
2	Title	cy-25-3A
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.9
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	36
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-03-29T19:58:00
19	Modification Date	2011-03-29T19:58:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1674.2
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768

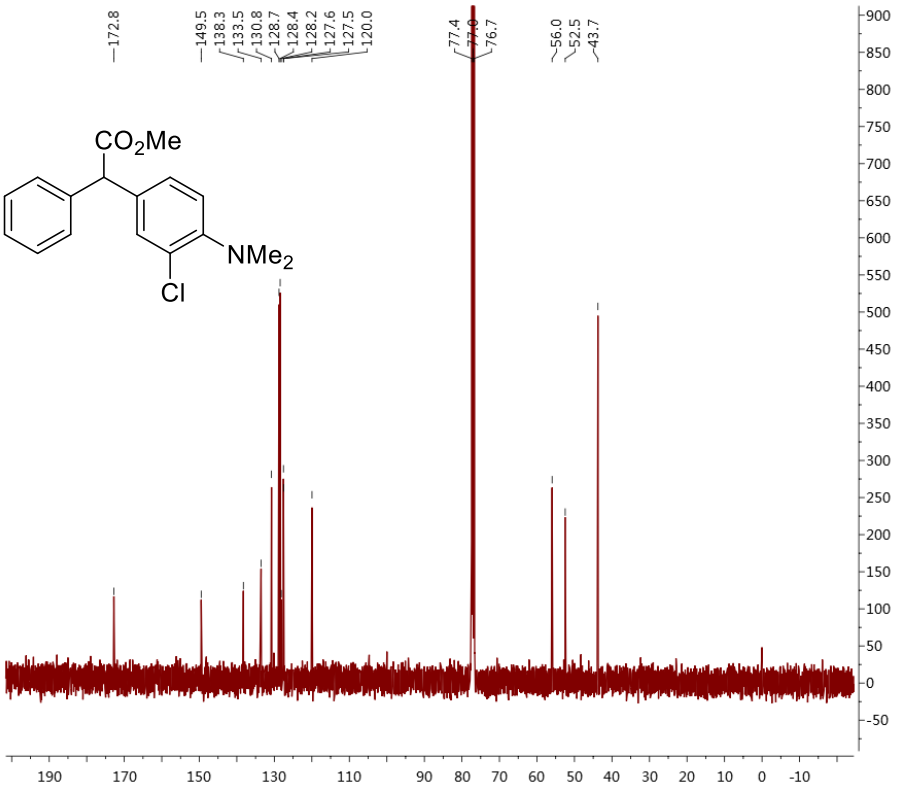


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-25-3A/ 2/ fid
2	Title	cy-25-3A
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	28
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.5000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-03-29T19:59:00
19	Modification Date	2011-03-29T20:00:00
20	Spectrometer Frequency	100.61
21	Spectral Width	29761.9
22	Lowest Frequency	-4820.2
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2-(3-chloro-4-(dimethylamino)phenyl)-2-phenylacetate (3ag)

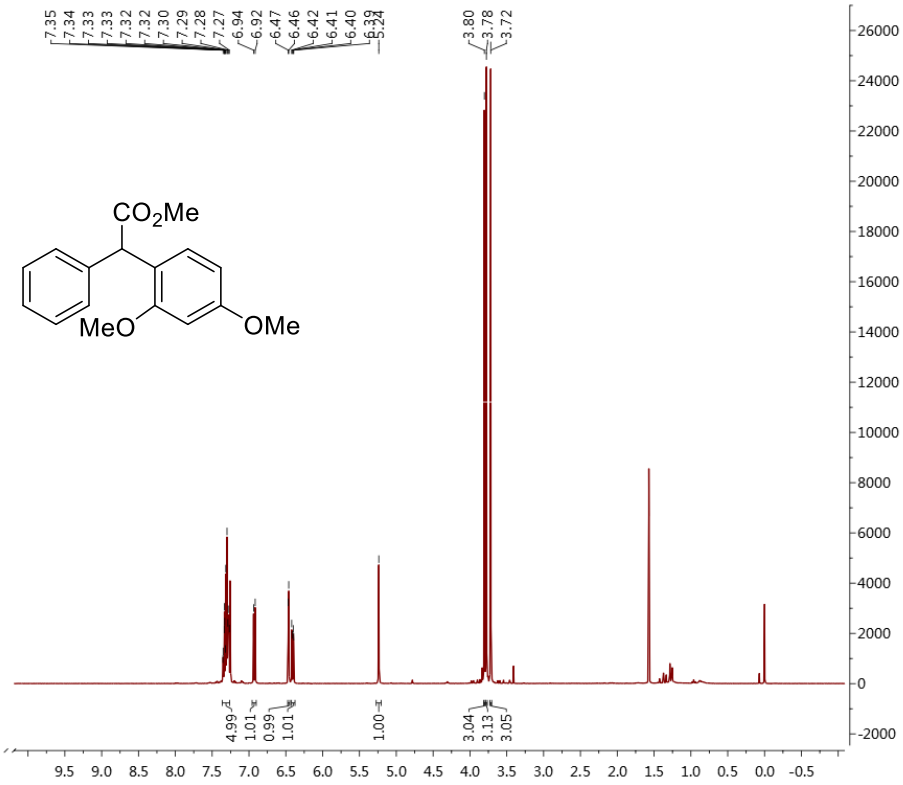


	Parameter	Value
1	Data File Name	C:/ Users/ yangjimin/ Desktop/ NMR/ yjm-3-30-A-2-2/ 1/ fid
2	Title	yjm-3-30-A-2-2
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	291.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	155
15	Relaxation Delay	1.0000
16	Pulse Width	9.1200
17	Acquisition Time	2.4999
18	Acquisition Date	2015-04-30T18:43:43
19	Modification Date	2015-04-30T18:43:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8012.8
22	Lowest Frequency	-1535.4
23	Nucleus	1H
24	Acquired Size	20031
25	Spectral Size	65536



	Parameter	Value
1	Data File Name	C:/ Users/ yangjimin/ Desktop/ NMR/ yjm-3-30-A-2-2/ 2/ fid
2	Title	yjm-3-30-A-2-2
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	292.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	1024
14	Receiver Gain	196
15	Relaxation Delay	1.0000
16	Pulse Width	9.4000
17	Acquisition Time	0.8999
18	Acquisition Date	2015-04-30T18:45:17
19	Modification Date	2015-04-30T19:18:00
20	Spectrometer Frequency	100.61
21	Spectral Width	35714.3
22	Lowest Frequency	-7796.8
23	Nucleus	13C
24	Acquired Size	32141
25	Spectral Size	65536

Methyl 2-(2,4-dimethoxyphenyl)-2-phenylacetate (3ai)



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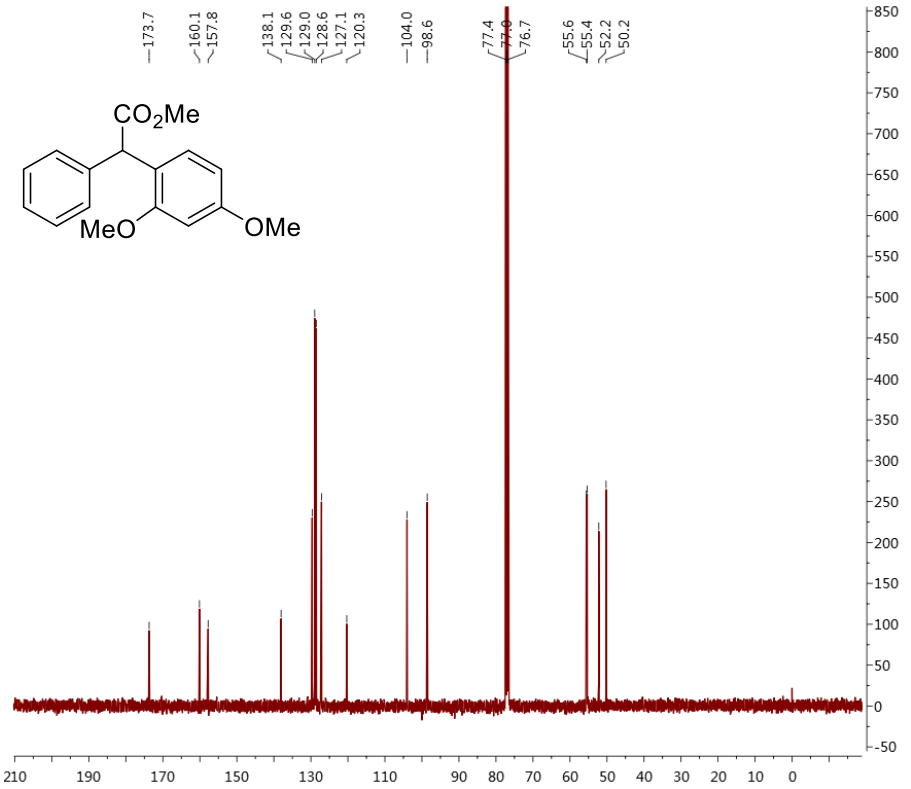
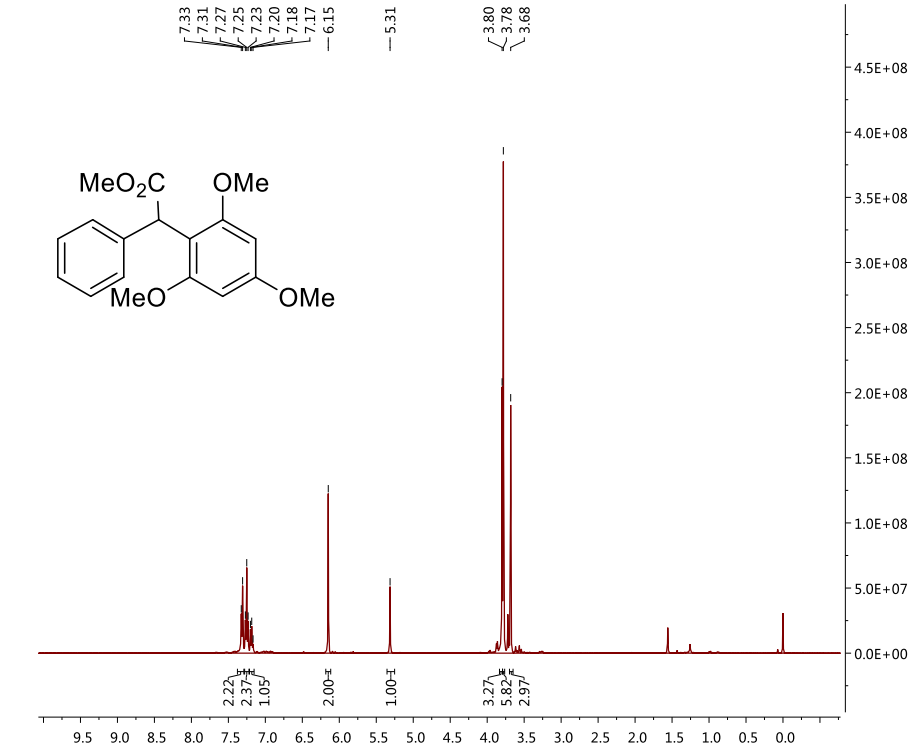
1	Data File Name	C:/ Users/ yangjimin/ Desktop/ NMR/ yjm-3-30-B-3/ 1/ fid
2	Title	yjm-3-30-B-3
3	Comment	test
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	194
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	1.9999
18	Acquisition Date	2015-04-30T18:36:05
19	Modification Date	2015-04-30T18:36:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8012.8
22	Lowest Frequency	-1535.4
23	Nucleus	1H
24	Acquired Size	16025
25	Spectral Size	32768



	Parameter	Value
1	Data File Name	C:/ Users/ yangjimin/ Desktop/ NMR/ yjm-3-30-B-3/ 2/ fid
2	Title	yjm-3-30-B-3
3	Comment	test
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.1
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	1024
14	Receiver Gain	50
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	0.8039
18	Acquisition Date	2015-04-30T18:44:06
19	Modification Date	2015-04-30T19:09:00
20	Spectrometer Frequency	100.61
21	Spectral Width	40760.9
22	Lowest Frequency	-10320.1
23	Nucleus	13C
24	Acquired Size	32768
25	Spectral Size	65536

Methyl 2-phenyl-2-(2,4,6-trimethoxyphenyl)acetate (3aj)



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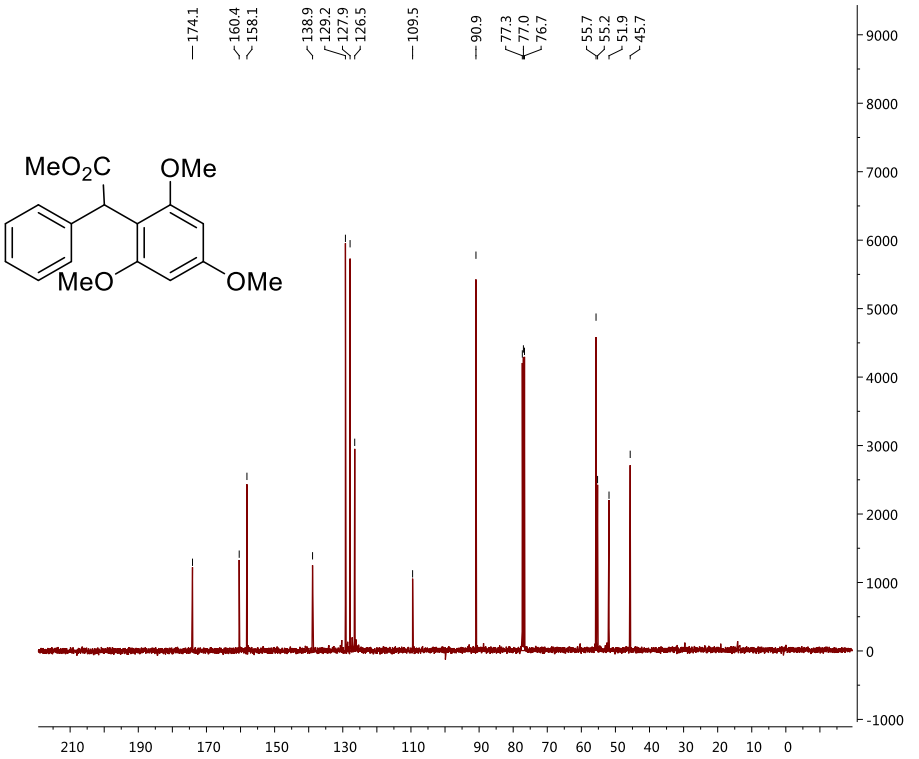
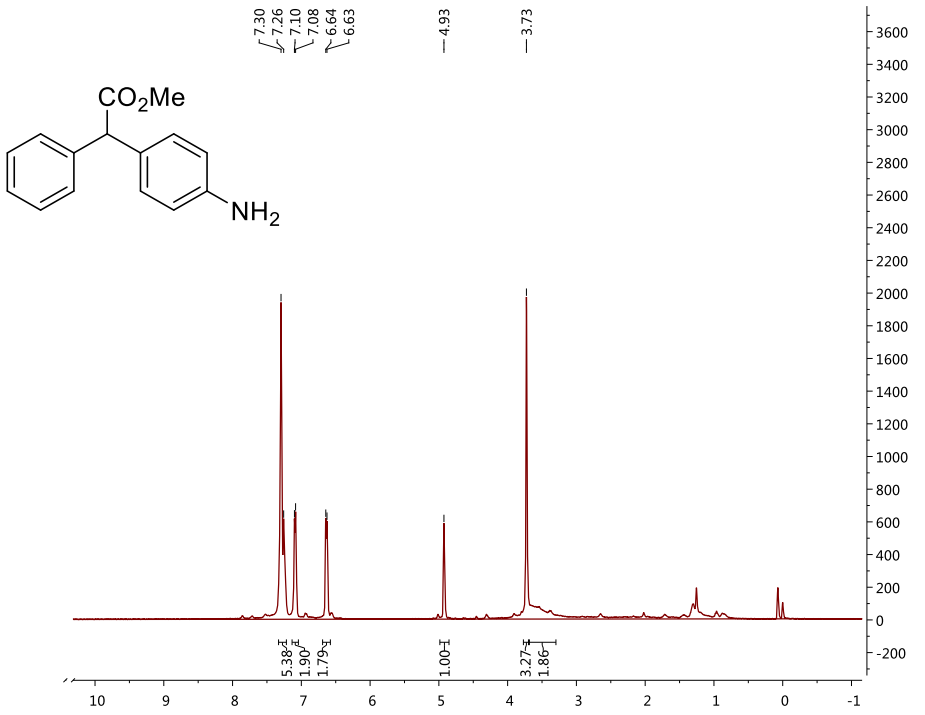
1	Data File Name	F:/ asymm/ NMR/ cy-18-27B/ 1/ pdata/ 1/ 1r
2	Title	cy-18-27-B-H
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	13.0000
17	Acquisition Time	2.7999
18	Acquisition Date	2009-10-21T20:21:00
19	Modification Date	2009-10-21T20:21:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1653.9
23	Nucleus	1H
24	Acquired Size	23025
25	Spectral Size	32768

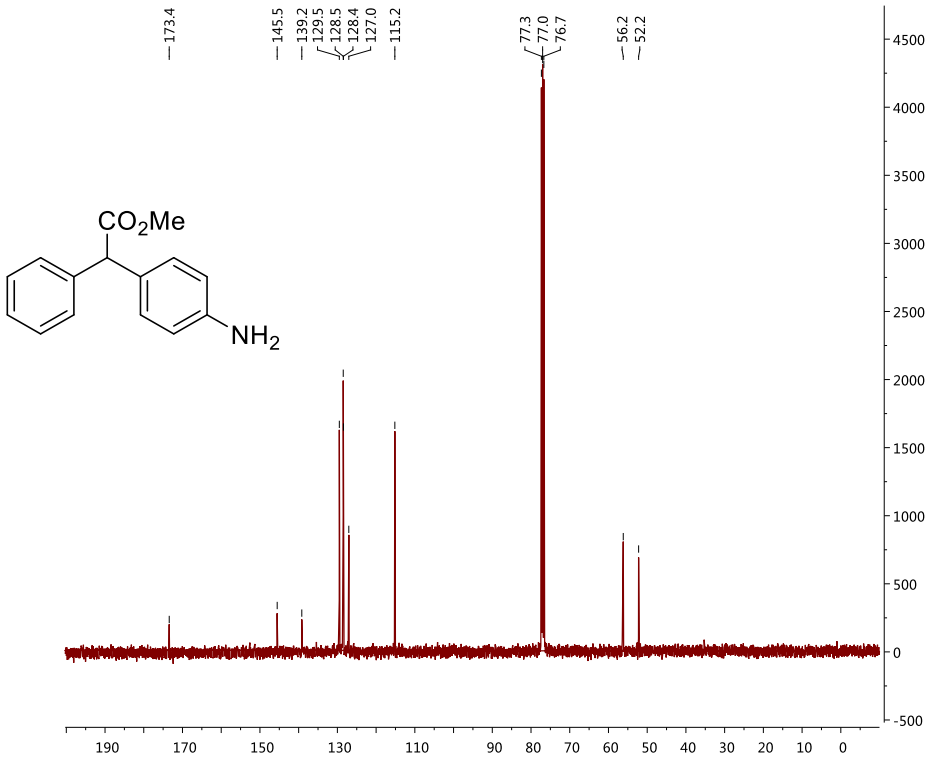


	Parameter	Value
1	Data File Name	F:/ asymm/ NMR/ cy-18-27B/ 2/ 1/ fid
2	Title	cy-18-27B-C13
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.9
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	586
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	9.1000
17	Acquisition Time	0.4000
18	Acquisition Date	2009-10-20T20:34:00
19	Modification Date	2009-10-20T20:48:00
20	Spectrometer Frequency	100.61
21	Spectral Width	24038.5
22	Lowest Frequency	-1958.4
23	Nucleus	13C
24	Acquired Size	9614
25	Spectral Size	32768

Methyl 2-(4-aminophenyl)-2-phenylacetate (4)

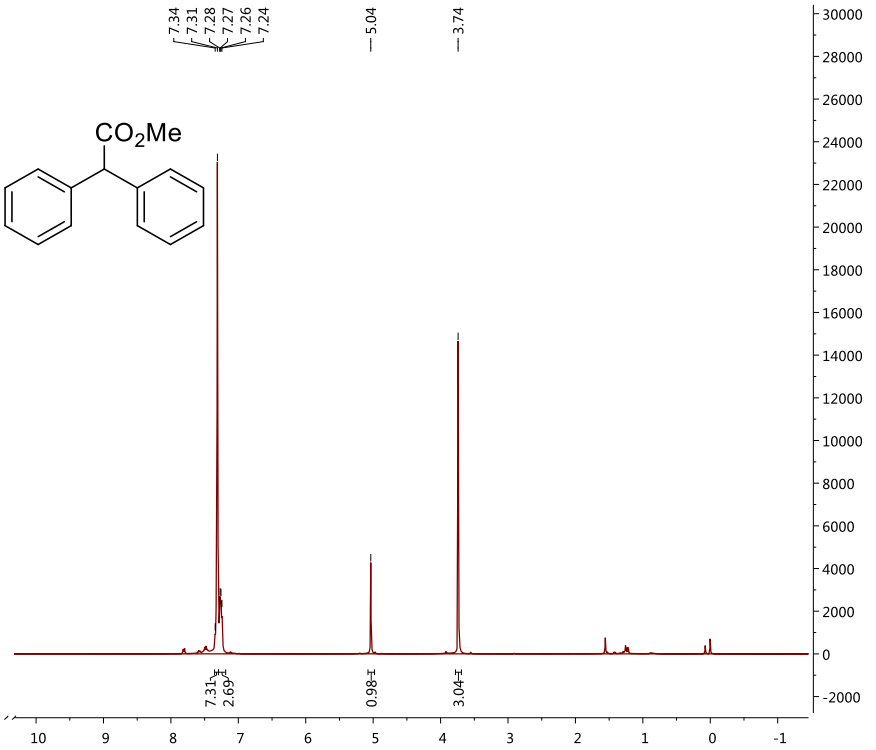


	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014年/ 2014-11/ yjm-2-27-p4/ 1/ fid
2	Title	yjm-2-27-p4
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect r
8	Author	
9	Solvent	CDCl3
10	Temperature	-102.1
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	13.7000
17	Acquisition Time	1.9999
18	Acquisition Date	2014-11-21T1 6:16:00
19	Modification Date	2014-11-21T1 6:16:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8223.7
22	Lowest Frequency	-1640.9
23	Nucleus	1H
24	Acquired Size	16446
25	Spectral Size	65536

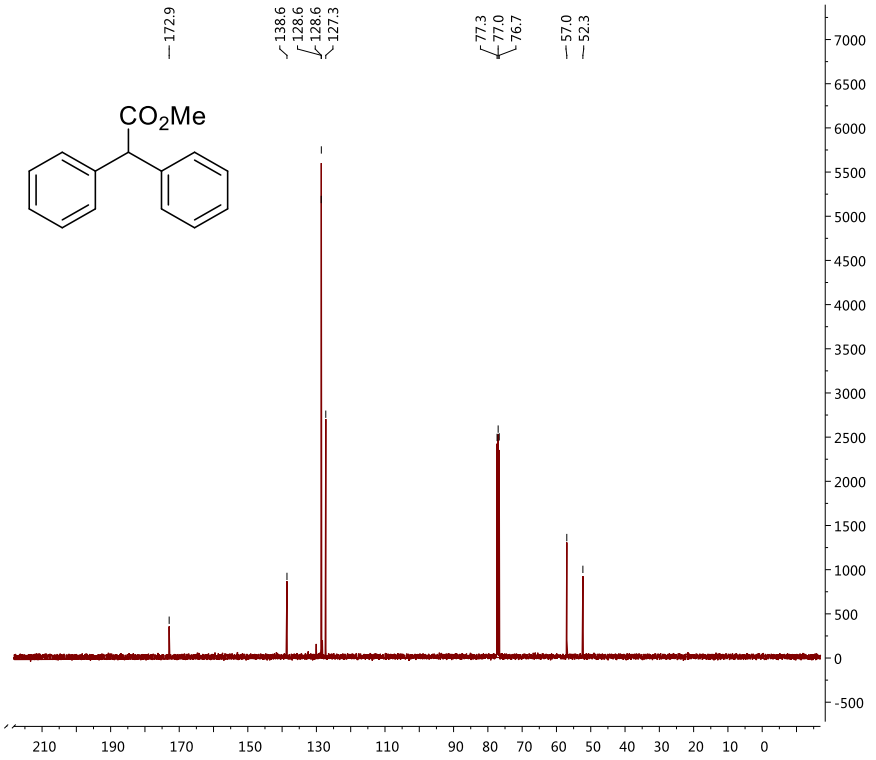


	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014-11/ yjm-2-27-p4/ 2/ fid
2	Title	yjm-2-27-p4
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	-50.0
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	1024
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.0000
17	Acquisition Time	0.4588
18	Acquisition Date	2014-11-21T1 6:18:00
19	Modification Date	2014-11-21T1 6:43:00
20	Spectrometer Frequency	100.61
21	Spectral Width	35714.3
22	Lowest Frequency	-7796.3
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

Methyl 2,2-diphenylacetate (5)

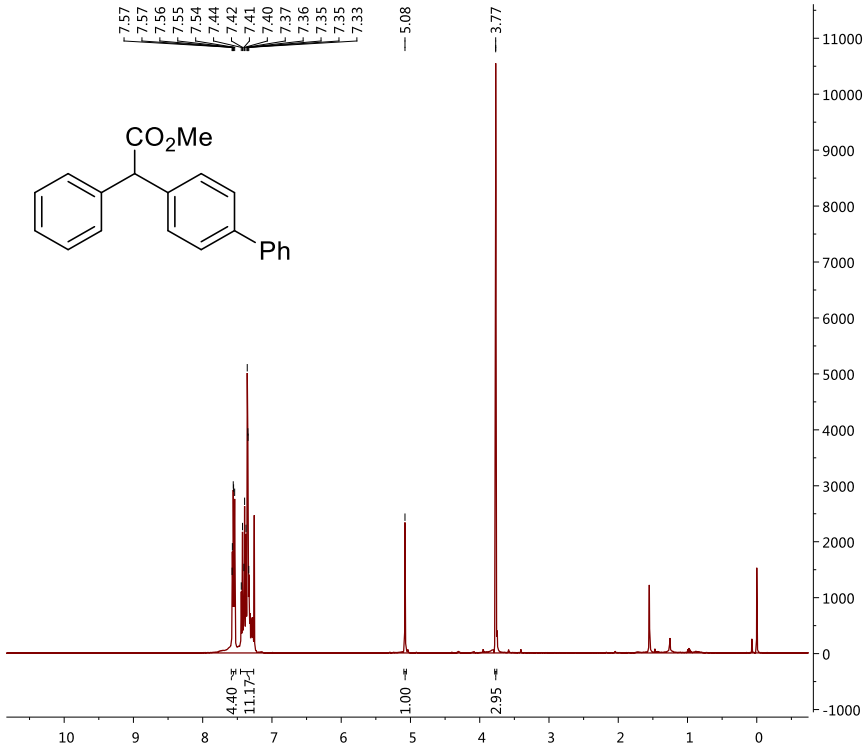


	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014-09/ yjm-2-39-b/ 1/ fid
2	Title	yjm-2-39-b
3	Comment	
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.7
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	66
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	1.9999
18	Acquisition Date	2014-09-10T14:05:47
19	Modification Date	2014-09-10T22:05:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8012.8
22	Lowest Frequency	-2125.8
23	Nucleus	1H
24	Acquired Size	16025
25	Spectral Size	32768



	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014-09/ yjm-2-39-b-C/ 1/ fid
2	Title	yjm-2-39-b-C
3	Comment	13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	295.3
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	466
14	Receiver Gain	205
15	Relaxation Delay	1.0000
16	Pulse Width	9.3000
17	Acquisition Time	0.8039
18	Acquisition Date	2014-09-10T14:29:35
19	Modification Date	2014-09-10T22:29:00
20	Spectrometer Frequency	100.61
21	Spectral Width	40760.9
22	Lowest Frequency	-15349.8
23	Nucleus	13C
24	Acquired Size	32768
25	Spectral Size	65536

Methyl 2-([1,1'-biphenyl]-4-yl)-2-phenylacetate (6)



	Parameter	Value
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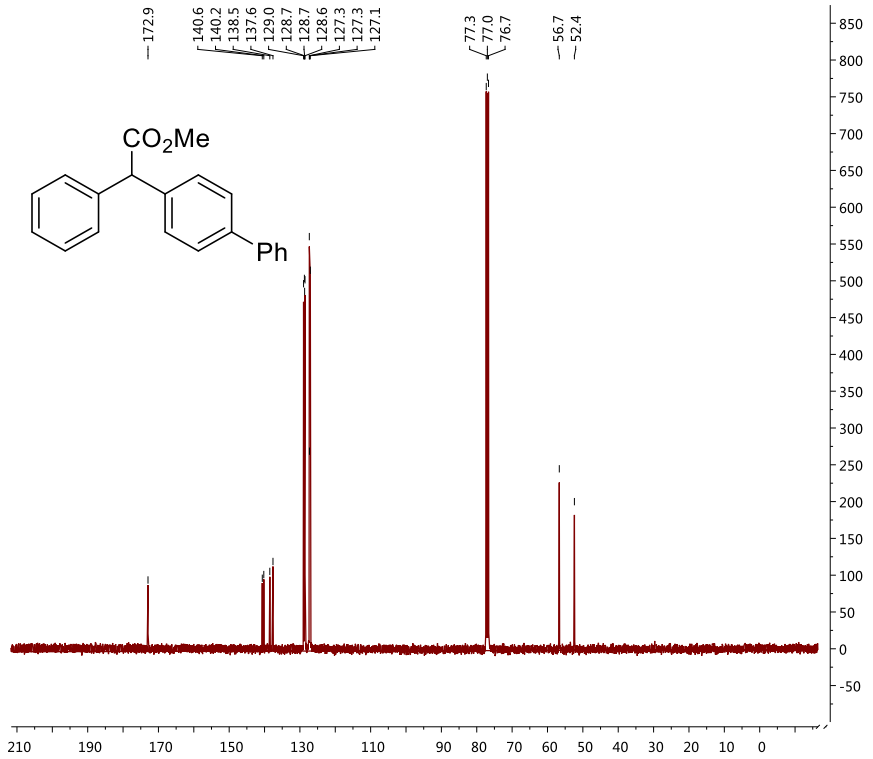
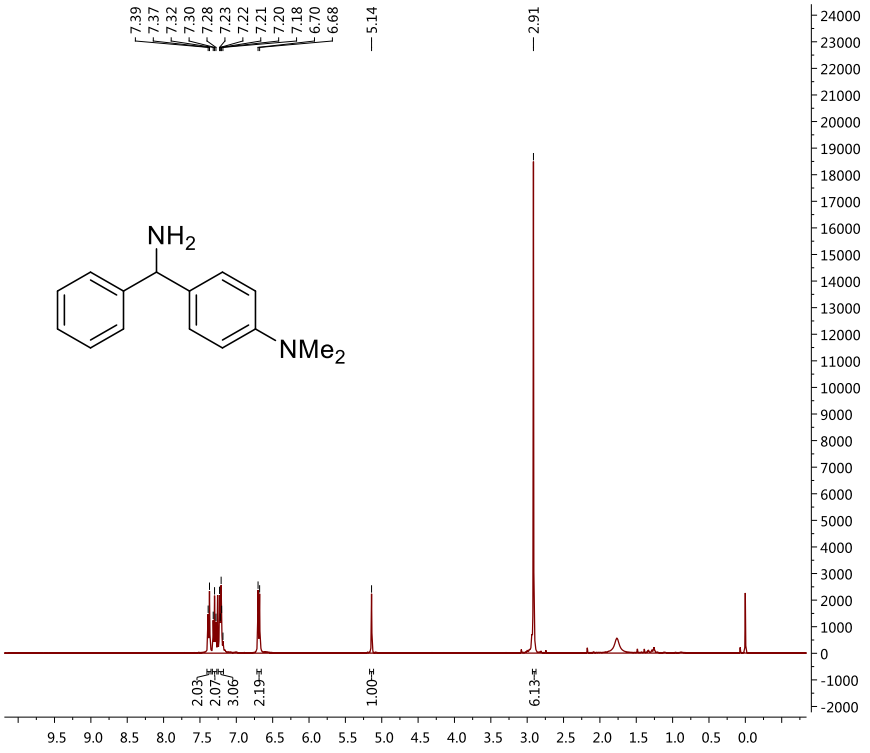
2	Title	yjm-2-37s
3	Comment	
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.3
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	102
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	1.9999
18	Acquisition Date	2014-11-18T09:21:32
19	Modification Date	2014-11-18T09:21:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8012.8
22	Lowest Frequency	-2125.8
23	Nucleus	1H
24	Acquired Size	16025
25	Spectral Size	32768

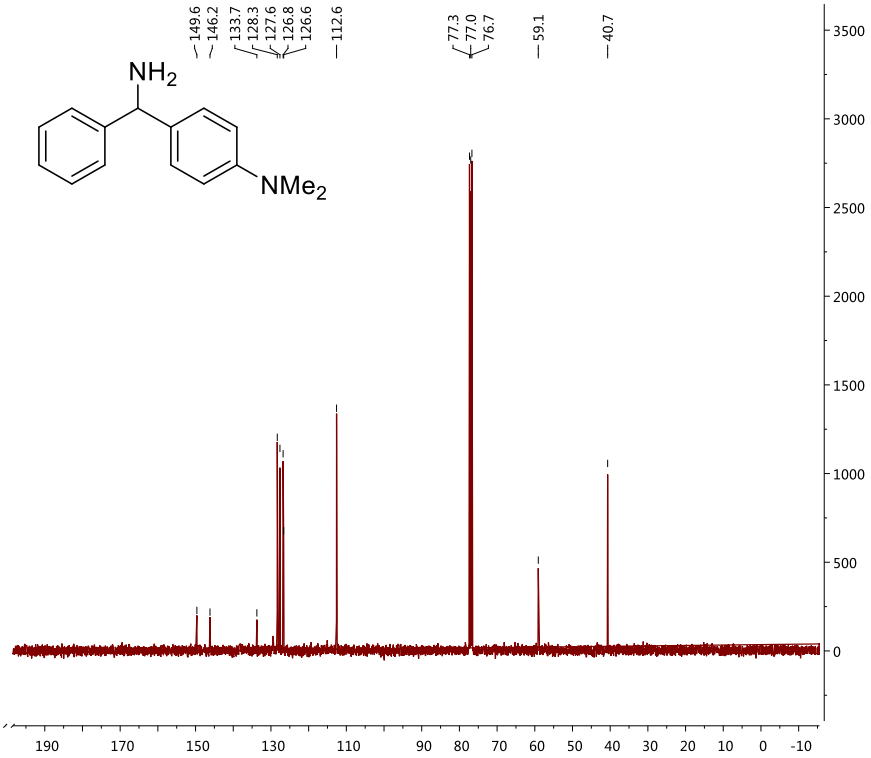


	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014年/ 2014-11/ yjm-2-37p/ 2/ fid
2	Title	yjm-2-37p
3	Comment	test
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	294.2
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	731
14	Receiver Gain	46
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	0.8039
18	Acquisition Date	2014-11-18T21:58:08
19	Modification Date	2014-11-18T22:02:00
20	Spectrometer Frequency	100.61
21	Spectral Width	40760.9
22	Lowest Frequency	-10320.1
23	Nucleus	13C
24	Acquired Size	32768
25	Spectral Size	65536

4-(Amino(phenyl)methyl)-*N*,*N*-dimethylaniline (7)

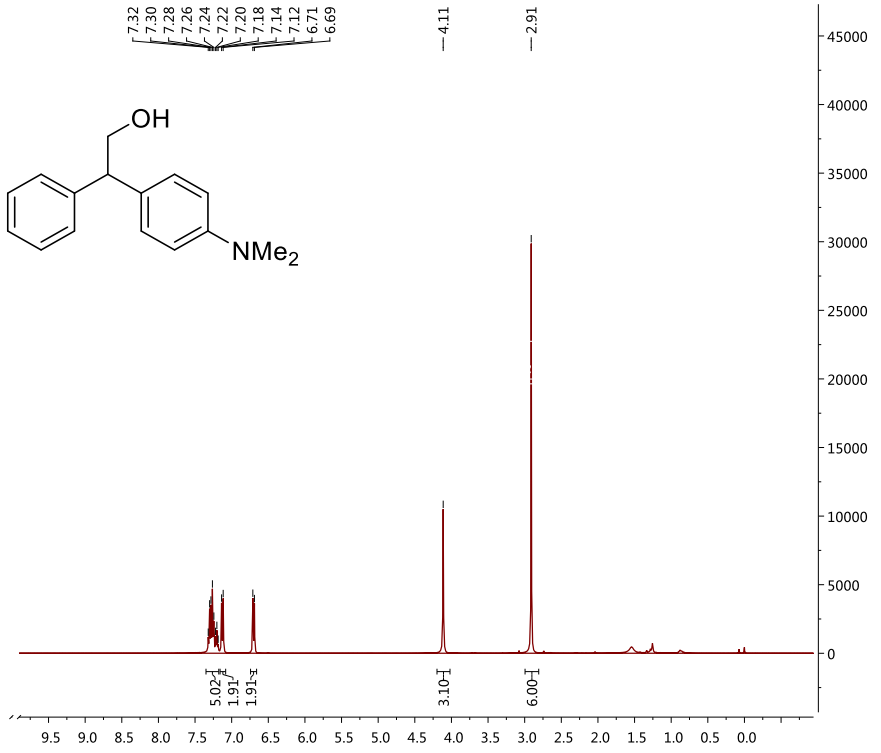


	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014-11/ yjm-2-66-H/ 1/ fid
2	Title	yjm-2-66-H
3	Comment	test
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.6
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	194
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	1.9999
18	Acquisition Date	2014-11-25T14:58:03
19	Modification Date	2014-11-25T14:58:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8012.8
22	Lowest Frequency	-1535.4
23	Nucleus	1H
24	Acquired Size	16025
25	Spectral Size	32768



	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014-10/ yjm-2-66-C/ 1/ fid
2	Title	yjm-2-66-C
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	1505.6
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	434
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.0000
17	Acquisition Time	0.4588
18	Acquisition Date	2014-10-15T21:48:00
19	Modification Date	2014-10-16T05:54:00
20	Spectrometer Frequency	100.61
21	Spectral Width	35714.3
22	Lowest Frequency	-7796.3
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

2-(4-(Dimethylamino)phenyl)-2-phenylethan-1-ol



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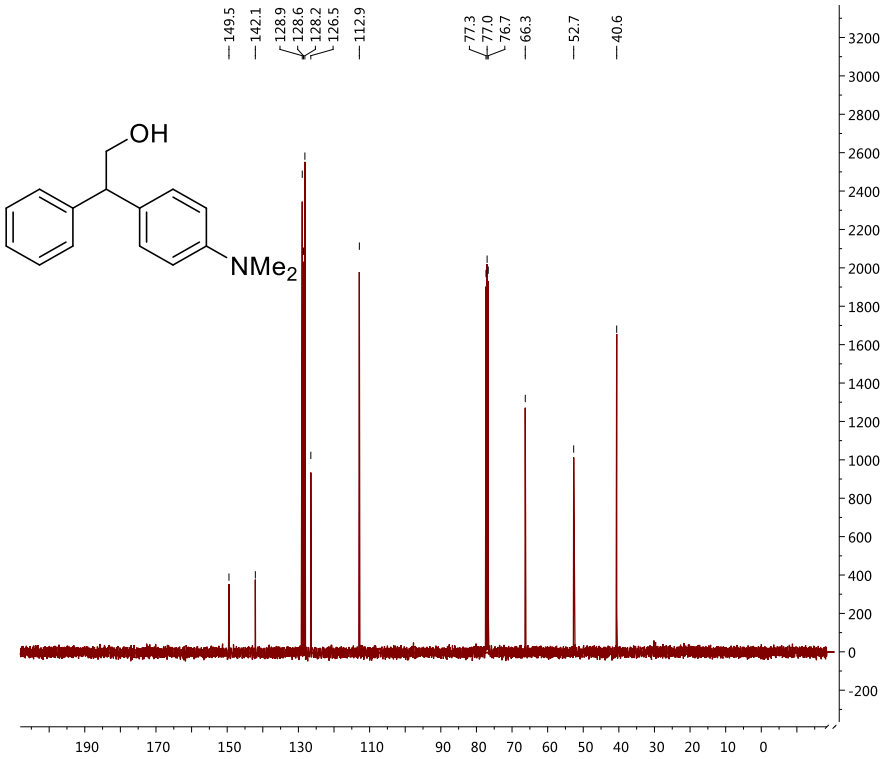
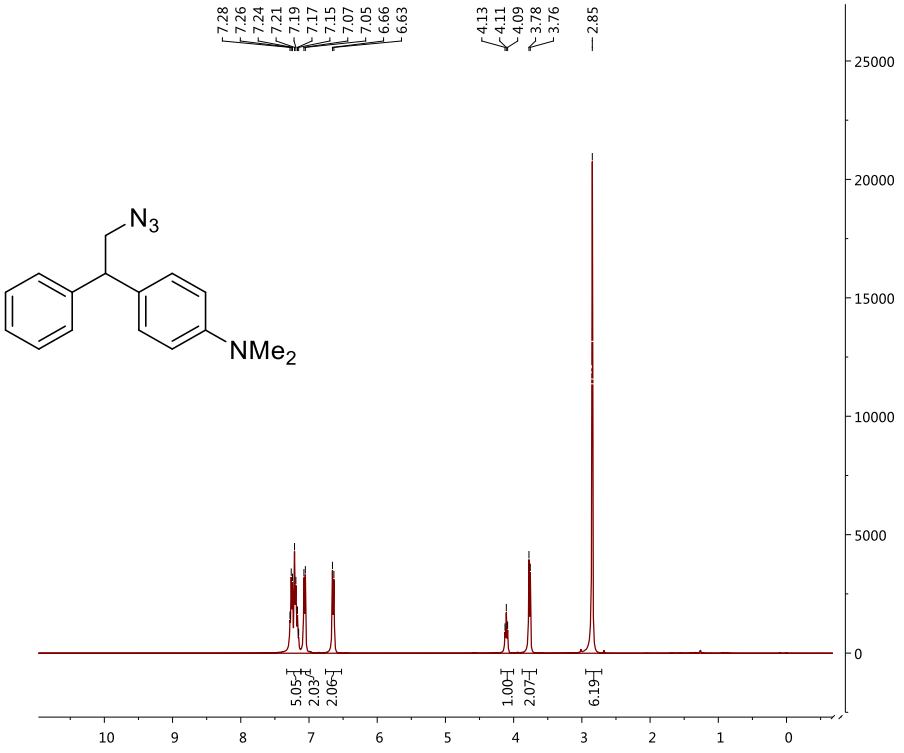
1	Data File Name	Z:/ Data/ NMR/ 2014-12/ cy-25-38/ 1/ fid
2	Title	cy-25-38
3	Comment	
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.2
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	58
15	Relaxation Delay	1.0000
16	Pulse Width	9.8000
17	Acquisition Time	1.9999
18	Acquisition Date	2014-12-15T20:51:54
19	Modification Date	2014-12-15T20:51:00
20	Spectrometer Frequency	400.13
21	Spectral Width	8012.8
22	Lowest Frequency	-2125.8
23	Nucleus	1H
24	Acquired Size	16025
25	Spectral Size	32768

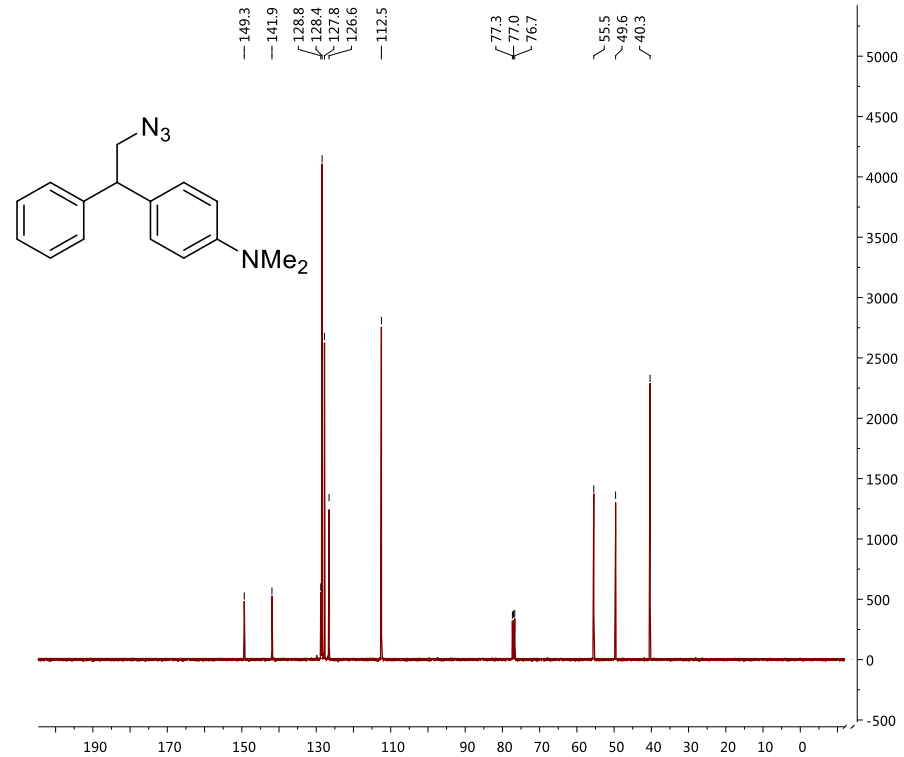


	Parameter	Value
1	Data File Name	Z:/ Data/ NMR/ 2014-12/ cy-25-38/ 2/ fid
2	Title	cy-25-38
3	Comment	13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	nmr
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	293.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	408
14	Receiver Gain	205
15	Relaxation Delay	1.0000
16	Pulse Width	9.3000
17	Acquisition Time	0.8039
18	Acquisition Date	2014-12-15T20:55:33
19	Modification Date	2014-12-15T21:06:00
20	Spectrometer Frequency	100.61
21	Spectral Width	40760.9
22	Lowest Frequency	-15349.8
23	Nucleus	13C
24	Acquired Size	32768
25	Spectral Size	65536

4-(2-Azido-1-phenylethyl)-*N, N*-dimethylaniline (8)



	Parameter	Value
1	Data File Name	F:/ asymm/ cy-25-41/ 1/ fid
2	Title	cy-25-41
3	Comment	PROTON
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	289.0
11	Pulse Sequence	zg30
12	Experiment	1D
13	Number of Scans	8
14	Receiver Gain	28
15	Relaxation Delay	1.0000
16	Pulse Width	13.5000
17	Acquisition Time	1.9923
18	Acquisition Date	2011-05-06T18:25:00
19	Modification Date	2011-05-06T18:26:00
20	Spectrometer Frequency	400.23
21	Spectral Width	8223.7
22	Lowest Frequency	-1640.3
23	Nucleus	1H
24	Acquired Size	16384
25	Spectral Size	32768



	Parameter	Value
1	Data File Name	F:/ asymm/ cy-25-41/ 2/ fid
2	Title	cy-25-41
3	Comment	C13CPD
4	Origin	Bruker BioSpin GmbH
5	Owner	common
6	Site	
7	Spectrometer	spect
8	Author	
9	Solvent	CDCl3
10	Temperature	289.4
11	Pulse Sequence	zgpg30
12	Experiment	1D
13	Number of Scans	87
14	Receiver Gain	203
15	Relaxation Delay	1.0000
16	Pulse Width	12.0000
17	Acquisition Time	0.5506
18	Acquisition Date	2011-05-06T18:27:00
19	Modification Date	2011-05-06T18:29:00
20	Spectrometer Frequency	100.64
21	Spectral Width	29761.9
22	Lowest Frequency	-4817.6
23	Nucleus	13C
24	Acquired Size	16384
25	Spectral Size	32768

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