# *N,N*-Dimethylaminobenzoates Enable Highly Enantioselective Sharpless Dihydroxylations of 1,1-Disubstituted Alkenes

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## 1. General Information

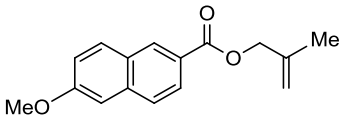
All reactions were carried out under a nitrogen atmosphere with dry solvents under anhydrous conditions, unless otherwise noted. All the chemicals were purchased commercially, and used without further purification. Anhydrous THF and toluene were distilled from sodium-benzophenone, and dichloromethane, and acetonitrile were distilled from calcium hydride. Thin-layer chromatography (TLC) was conducted with 0.25 mm Tsingdao silica gel plates (60F-254) and visualized by exposure to UV light (254 nm) or stained with potassium permanganate. Flash column chromatography was performed using Tsingdao silica gel (60, particle size 0.040–0.063 mm). Reagents were purchased at the highest commercial quality and used without further purification, unless otherwise stated. The 2-methylprop-2-en-1-ol was purchased from Adamas. Other alcohols were synthesized from literature[1], unless otherwise stated. $^{1}$H NMR spectra were recorded on Brueker spectrometers (at 300, 400 or 500 MHz) and are reported relative to deuterated solvent signals. Data for $^{1}$H NMR spectra are reported as follows: chemical shift (δ ppm), multiplicity, coupling constant (Hz) and integration. $^{13}$C NMR spectrawere recorded on Brueker Spectrometers (at 75, 100 or 125 MHz). Data for $^{13}$C NMR spectra are reported in terms of chemical shift. Mass spectrometric data were obtained using Bruker Apex IV RTMS. The following abbreviations were used to explain the multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad.

(1) Erkkila, A.; Pihko, P. M. *J. Org. Chem.* **2006**, *71*, 2538.

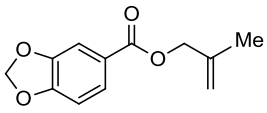
## 2. General Procedure for the Preparation of the Olefin Substrate

A solution of the *N*,*N*-dimethyl amino benzoic acid (1.5 equiv.), 4-(dimethylamino) pyridine (DMAP) (0.5 equiv.) in dried methylene chloride (0.1 M) was treated with EDC·HCl (1.5 equiv.) and $Et_3N$ (1.5 equiv.) at 23 ℃ under nitrogen atmosphere. The resulting mixture was stirred for 30 min and then was treated with the corresponding alcohol. After completion (monitored by TLC analysis), the reaction mixture was quenched with saturated $NaHCO_3$ (aq.), and extracted with methylene chloride. The combined organic layer was washed with brine, dried over $Na_2SO_4$, and concentrated *in vacuo* to give crude product, which was purified by flash chromatography to afford the indicated yield of product.

## 3. $^1$H NMR and $^{13}$C NMR spectra data of compounds 1a-1f, 3a-19a

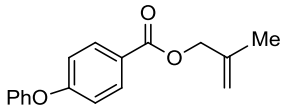



**2-methylallyl 6-methoxy-2-naphthoate (1a):** Following the general procedure, 2-methylprop-2-en-1-ol (104 mg, 1.21 mmol) and the corresponding acid afforded the olefin **1a** (248 mg, 80% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 8.56 (s, 1H), 8.06 (dd, *J* = 8.8, 2.4 Hz, 1H), 7.84 (d, *J* = 8.8 Hz, 1H), 7.76 (d, *J* = 8.8 Hz, 1H), 7.20 (dd, *J* = 2.4, 8.8 Hz, 2H), 7.15 (d, *J* = 2.4 Hz, 1H), 5.13 (s , 1H), 5.02 (s , 1H), 4.81 (s, 2H), 3.94 (s , 3H), 1.88 (s, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 159.5, 140.1, 137.2, 130.9, 130.8, 127.9, 126.8, 125.9, 125.2, 119.6, 112.9, 105.6, 68.1, 55.3, 19.6; HRMS calculated for $C_{16}H_{17}O_3$ ($M + H^+$): 257.1172, found: 257.1175.

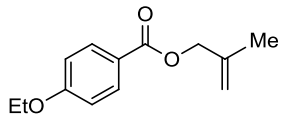



**2-methylallyl benzo[d][1,3]dioxole-5-carboxylate (1b):** Following the general procedure, 2-methylprop-2-en-1-ol (104 mg, 1.21 mmol) and the corresponding acid afforded the olefin **1b** (223 mg, 79% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.69 (dd, *J* = 8.4, 1.6 Hz, 1H), 7.49 (d, *J* = 1.6 Hz, 1H), 6.84 (d, *J* = 8.4Hz, 1H), 6.04 (s , 2H),

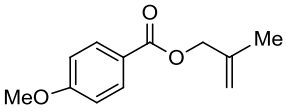
5.05 (s, 1H), 4.97 (s, 1H), 4.70 (s, 2H), 1.82 (s, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 151.6, 147.7, 140.0, 125.4, 124.1, 109.5, 107.9, 101.7, 68.0, 19.5; HRMS calculated for $C_{12}H_{13}O_4$ ($M + H^+$): 221.0808, found: 221.0809.




**2-methylallyl 4-phenoxybenzoate (1c):** Following the general procedure, 2-methylprop-2-en-1-ol (104 mg, 1.21 mmol) and the corresponding acid afforded the olefin **1c** (269 mg, 83% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 8.8 Hz, 2H), 7.41-7.37 (m, 2H), 7.19 (t, *J* = 7.2 Hz, 1H), 7.07 (dd, *J* = 1.2, 8.8 Hz, 2H), 7.00 (d, *J* = 8.8 Hz, 2H), 5.07 (s, 1H), 4.98 (s, 1H), 4.73 (s, 2H), 1.83 (s, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 165.7, 161.8, 155.6, 140.0, 131.7, 130.0, 124.5, 124.4, 120.0, 117.3, 112.8, 67.9, 19.5; HRMS calculated for $C_{17}H_{17}O_3$ ($M + H^+$): 269.1172, found: 269.1173.

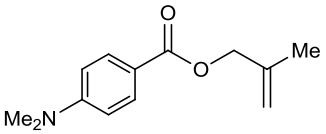



**2-methylallyl 4-ethoxybenzoate (1d):** Following the general procedure, 2-methylprop-2-en-1-ol (104 mg, 1.21 mmol) and the corresponding acid afforded the olefin **1d** (200 mg, 75% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 8.8 Hz, 2H), 6.90 (d, *J* = 8.8 Hz , 2H), 5.06 (s , 1H), 4.96 (s, 1H), 4.71 (s, 2H), 4.08 (q, *J* = 7.2 Hz, 2H), 1.83 (s, 3H), 1.43 (t, *J* = 7.2 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.0, 162.8, 140.2, 131.6, 122.3, 114.0, 112.6, 67.7, 63.6, 19.5, 14.6; HRMS calculated for $C_{13}H_{17}O_3$ ($M + H^+$): 221.1172, found: 221.1173.

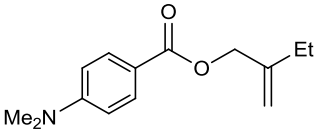



**2-methylallyl 4-methoxybenzoate (1e):** Following the general procedure, 2-methylprop-2-en-1-ol (104 mg, 1.21 mmol) and the corresponding acid afforded the

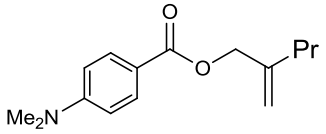
olefin **1e** (220 mg, 88% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) δ 8.03 (d, *J* = 8.8 Hz, 2H), 6.92 (d, *J* = 8.8 Hz, 2H), 5.06 (s , 1H), 4.97 (s, 1H), 4.72 (s, 2H), 3.86 (s, 3H), 1.83 (s, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 165.9, 163.4, 140.2, 131.6, 122.6, 113.6, 112.6, 67.8, 55.4, 19.5; HRMS calculated for $C_{12}H_{15}O_3$ (M + $H^+$): 207.1016, found: 207.1012.



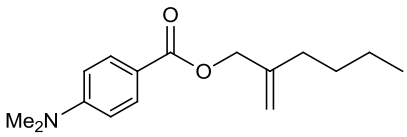

**2-methylallyl 4-(dimethylamino)benzoate (1f):** Following the general procedure, 2-methylprop-2-en-1-ol (113mg, 1.57 mmol) and the corresponding acid afforded the olefin **1f** (258 mg, 75% yield). $^{1}$H NMR (300 MHz, $CDCl_3$) δ 7.95 (d, *J* = 9.0 Hz, 2H), 6.65 (d, *J* = 9.0 Hz, 2H), 5.06 (s, 1H), 4.95 (s, 1H), 4.70 (s, 2H), 3.01 (s, 6H), 1.83 (s, 3H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.6, 153.3, 140.6, 131.3, 116.9, 112.2, 110.7, 67.3, 40.0, 19.6; HRMS calculated for $C_{13}H_{18}NO_2$ (M + $H^+$): 220.1332, found: 220.1335.



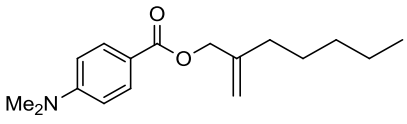

**2-methylenebutyl 4-(dimethylamino)benzoate (3a):** Following the general procedure, the alcohol[1] (91 mg, 1.05 mmol) and the corresponding acid afforded the olefin **3a** (163 mg, 70% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 9.2 Hz, 2H), 6.64 (d, *J* = 9.2 Hz, 2H), 5.10 (s, 1H), 4.96 (s, 1H), 4.74 (s, 2H), 3.03 (s, 6H), 2.16 (q, *J* = 7.2 Hz, 2H), 1.11 (t, *J* = 7.2 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.3, 146.2, 131.3, 116.9, 110.7, 110.4, 66.6, 40.0, 26.1, 12.0; HRMS calculated for $C_{14}H_{20}NO_2$ (M + $H^+$): 234.1489, found: 234.1488.



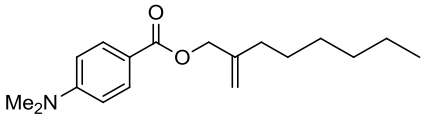
**2-methylenepentyl 4-(dimethylamino)benzoate (4a):** Following the general procedure, the alcohol[1] (150 mg, 1.50 mmol) and the corresponding acid afforded the olefin **5a** (203 mg, 55% yield). $^{1}$H NMR (300 MHz, $CDCl_3$) δ 7.94 (d, *J* = 9.0 Hz, 2H), 6.65 (d, *J* = 9.0 Hz, 2H), 5.11 (s, 1H), 4.96 (s, 1H), 4.72 (s, 2H), 3.04 (s, 6H), 2.12 (q, *J* = 7.2 Hz, 2H), 1.60-1.47 (m, 2H), 0.94 (t, *J* = 7.2 Hz, 3H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.6, 153.3, 144.6, 131.3, 116.9, 111.6, 110.7, 66.5, 40.0, 35.5, 20.7, 13.8; HRMS calculated for $C_{15}H_{22}NO_2$ ($M + H^+$): 248.1645, found: 248.1646.



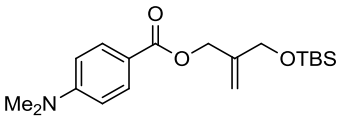

**2-methylenehexyl 4-(dimethylamino)benzoate (5a):** Following the general procedure, the alcohol[1] (114 mg, 1.00 mmol) and the corresponding acid afforded the olefin **5a** (144 mg, 55% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.8 Hz, 2H), 6.64 (d, *J* =8.8 Hz, 2H), 5.10 (s, 1H), 4.95 (s, 1H), 4.73 (s, 2H), 3.04 (s, 6H), 2.14 (t, *J* = 7.2 Hz, 2H), 1.51-1.45 (m, 2H), 1.38-1.33 (m, 2H), 0.92 (t, *J* = 7.2 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.3, 144.7, 131.3, 117.0, 111.4, 110.7, 66.5, 40.0, 33.0, 29.7, 22.4, 13.9; HRMS calculated for $C_{16}H_{24}NO_2$ ($M + H^+$): 262.1802, found: 262.1802.



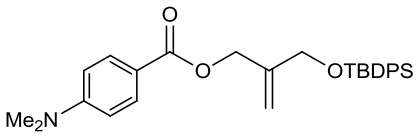

**2-methyleneheptyl 4-(dimethylamino)benzoate (6a):** Following the general procedure, the alcohol[1] (200 mg, 1.58 mmol) and the corresponding acid afforded the olefin **6a** (259 mg, 60% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.8 Hz, 2H), 6.65 (d, *J* = 8.8 Hz, 2H), 5.10 (d, *J* = 1.2 Hz, 1H), 4.95 (d, *J* = 1.2 Hz, 1H), 4.72 (s, 2H), 3.04 (s, 6H), 2.13 (t, *J* = 8.0 Hz , 2H), 1.51-1.47 (m, 2H), 1.34 -1.29 (m, 4H), 0.90 (t, *J* = 6.8 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.3, 144.7, 131.3, 117.0, 111.4, 110.7, 66.5, 40.0, 33.3, 31.5, 27.2, 22.5, 14.0; HRMS calculated for $C_{17}H_{26}NO_2$ ($M + H^+$): 276.1958, found: 276.1957.



**2-methyleneoctyl 4-(dimethylamino)benzoate (7a):** Following the general procedure, the alcohol[1] (195 mg, 1.50 mmol) and the corresponding acid afforded the olefin **7a** (340 mg, 82% yield). $^{1}$H NMR (500 MHz, $CDCl_3$) δ 7.94 (d, *J* = 8.8 Hz, 2H), 6.65 (d, *J* = 8.8 Hz, 2H), 5.10 (s, 1H), 4.95 (s, 1H), 4.72 (s, 2H), 3.04 (s, 6H), 2.13 (t, *J* = 8.0 Hz, 2H), 1.54-1.46 (m, 2H), 1.35-1.26 (m, 6H), 0.89 (t, *J* = 6.8 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.3, 144.7, 131.3, 117.0, 111.4, 110.7, 66.5, 40.0, 33.4, 31.7, 29.0, 27.5, 22.6, 14.0; HRMS calculated for $C_{18}H_{28}NO_2$ (M + $H^+$): 290.2120, found: 290.2123.

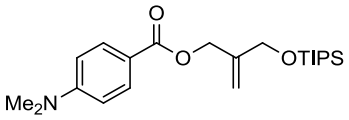


**2-(((tert-butyldimethylsilyl)oxy)methyl)allyl 4-(dimethylamino)benzoate (8a):** Following the general procedure, the alcohol[1] (244 mg, 1.20 mmol) and the corresponding acid afforded the olefin **8a** (267mg, 62% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J* = 8.8 Hz, 2H), 6.65 (d, *J* = 8.8 Hz, 2H), 5.10 (t, *J* = 0.8 Hz, 1H), 4.95 (d, *J* = 1.2 Hz, 1H), 4.79 (s, 2H), 4.25 (s, 2H), 3.04 (s, 6H), 0.91 (d, *J* = 2.8 Hz, 9H), 0.08 (t, *J* = 2.8 Hz, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.3, 143,8, 131.3, 116.9, 112.3, 110.7, 64.4, 63.9, 40.0, 25.9, 18.4, 5.4; HRMS calculated for $C_{19}H_{32}NO_3Si$ (M + $H^+$): 350.2146, found: 350.2142.

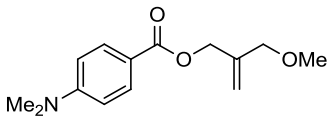


**2-(((tert-butyldiphenylsilyl)oxy)methyl)allyl 4-(dimethylamino)benzoate (9a):** Following the general procedure, the alcohol[1] (200 mg, 0.61 mmol) and the corresponding acid afforded the olefin **9a** (284 mg, 60% yield). $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 9.2 Hz, 2H), 7.72-7.66 (m, 4H), 7.46-7.36 (m, 6H), 6.64 (d, *J* = 9.2 Hz, 2H), 5.37 (s, 1H), 5.27 (s, 1H), 4.81 (s, 2H), 4.31 (s, 2H), 3.05 (s, 6H), 1.09 (s,

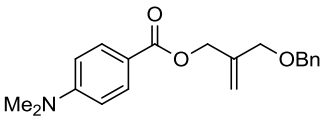
9H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 153.3, 143.4, 135.5, 133.4, 131.3, 129.6, 127.7, 116.9, 112.5, 110.6, 64.6, 64.4, 40.0, 26.8, 19.2; HRMS calculated for $C_{29}H_{36}NO_3Si$ (M + $H^+$): 474.2459, found: 474.2455.




**2-(((triisopropylsilyl)oxy)methyl)allyl 4-(dimethylamino)benzoate (10a):** Following the general procedure, the alcohol[1] (243 mg, 1.00 mmol) and the corresponding acid afforded the olefin **10a** (300 mg, 77% yield). $^1$H NMR (300 MHz, $CDCl_3$) δ 7.92 (d, *J* = 8.8 Hz, 2H), 6.65 (d, *J* = 8.8 Hz, 2H), 5.32 (s, 1H), 5.22 (s, 1H), 4.80 (s, 2H), 4.34 (s, 2H), 3.04 (s, 6H), 1.16-1.11 (m, 3H), 1.09 (s, 12H), 1.07 (s, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.3, 143.9, 131.3, 116.9, 111.9, 110.7, 64.5, 64.1, 40.0, 18.0, 12.0; HRMS calculated for $C_{22}H_{38}NO_3Si$ (M + $H^+$): 392.6215, found: 392.6212.

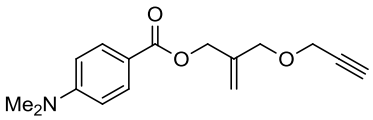



**2-(methoxymethyl)allyl 4-(dimethylamino)benzoate (11a):** Following the general procedure, the alcohol[1] (153 mg, 1.50 mmol) and the corresponding acid afforded the olefin **11a** (224 mg, 60% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J* = 9.2 Hz, 2H), 6.65 (d, *J* = 9.2 Hz, 2H), 5.29 (s, 1H), 5.25 (s, 1H), 4.80 (s, 2H), 4.01 (s, 2H), 3.35 (s, 3H), 3.04 (s, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 153.4, 141.2, 131.3, 116.8, 114.4, 110.7, 73.3, 64.3, 58.0, 40.0; HRMS calculated for $C_{14}H_{20}NO_3$ (M + $H^+$): 250.1438, found: 250.1435.

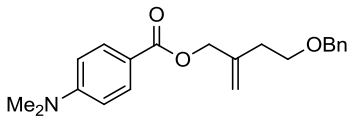



**2-((benzyloxy)methyl)allyl 4-(dimethylamino)benzoate (12a):** Following the general procedure, the alcohol[1] (216 mg, 1.20 mmol) and the corresponding acid afforded the olefin **12a** (213 mg, 65% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J*

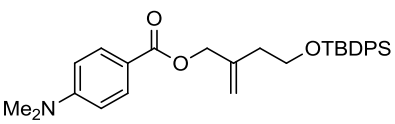
= 8.8 Hz, 2H), 7.36-7.28 (m, 5H), 6.65 (d, *J* = 8.8 Hz, 2H), 5.33 (s, 1H), 5.30 (s, 1H), 4.85 (s, 2H), 4.55 (s, 2H), 4.13 (s, 2H), 3.04 (s, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 153.4, 141.3, 138.1, 131.3, 128.4, 127.7, 127.6, 116.8, 114.7, 110.7, 72.2, 70.9, 64.4, 40.0; HRMS calculated for $C_{20}H_{24}NO_3$ ($M + H^+$): 326.1751, found: 326.1752.




**2-((prop-2-yn-1-yloxy)methyl)allyl 4-(dimethylamino)benzoate (13a):** Following the general procedure, the alcohol[1] (254 mg, 2.00 mmol) and the corresponding acid afforded the olefin **13a** (431 mg, 78% yield). $^1$H NMR (300 MHz, $CDCl_3$) δ7.93 (d, *J* = 9.0 Hz, 2H), 6.65 (d, *J* = 9.0 Hz, 2H), 5.33 (s, 1H), 5.29 (s, 1H), 4.18-4.17 (overlapped, 4H), 3.04 (s, 6H), 2.42 (s, 1H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.5, 153.4, 140.5, 131.3, 116.7, 115.5, 110.7, 79.5, 74.6, 70.2, 64.2, 57.2, 40.0; HRMS calculated for $C_{16}H_{20}NO_3$ ($M + H^+$): 274.1438, found: 274.1440.

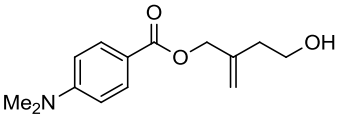



**4-(benzyloxy)-2-methylenebutyl 4-(dimethylamino)benzoate (14a):** Following the general procedure, the alcohol[1] (384 mg, 2.00 mmol) and the corresponding acid afforded the olefin **14a** (427 mg, 63% yield). $^1$H NMR (300 MHz, $CDCl_3$) δ 7.94 (dd, *J*= 3.3, 8.6 Hz, 2H), 7.36-7.28 (overlapped, 5H), 6.65 (d, *J*= 8.6 Hz, 2H), 5.20 (s, 1H), 5.06 (s, 1H), 4.77 (s, 2H), 4.54 (d, *J*= 1.8 Hz, 2H), 3.66 (td, *J*= 1.8, 6.6 Hz, 2H), 3.04 (s, 6H), 2.50 (t, *J*= 6.6 Hz, 2H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.5, 153.3, 141.7, 138.3, 131.3, 128.4, 127.6, 127.5, 116.8, 113.4, 110.7, 73.0, 68.7, 66.6, 40.0, 33.7; HRMS calculated for $C_{21}H_{26}NO_3$ ($M + H^+$): 340.1907, found: 340.1911.

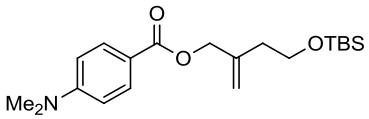



**4-((tert-butyldiphenylsilyl)oxy)-2-methylenebutyl 4-(dimethylamino)benzoate**

**(15a):** Following the general procedure, the alcohol[1] (1702 mg, 5.00 mmol) and the corresponding acid afforded the olefin **15a** (1485 mg, 60% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.95-7.92 (m, 2H), 7.70-7.68 (overlapped, 4H), 7.44-7.40 (overlapped, 6H), 6.65 (dd, *J*= 1.6, 8.8 Hz, 2H), 5.18 (s, 1H), 5.00 (s, 1H), 4.72 (s, 2H), 3.88-3.84 (m, 2H), 3.04 (s, 6H), 2.42 (t, *J*= 6.4 Hz, 2H), 1.08 (d, *J*= 3.2 Hz, 9H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 153.3, 141.7, 135.6, 133.8, 131.3, 129.6, 127.6, 117.0, 113.7, 110.7, 66.6, 62.7, 40.0, 36.6, 26.8, 19.2; HRMS calculated for $C_{30}H_{38}NO_3Si$ ($M + H^+$): 488.2615, found: 488.2615.

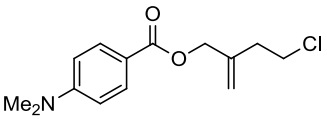



**4-hydroxy-2-methylenebutyl 4-(dimethylamino)benzoate (S15):** To a solution of **15a** (2.26 g, 4.65 mmol) in acetonitrile at 0℃, HF aqueous solution (4.65 mL) was added dropwise. Then the mixture was allowed elevated to room temperature. After completion (monitored by TLC analysis), the reaction was quenched by satureated aqueous $NaHCO_3$, diluted with $Et_2O$, washed with brine, and dried over $Na_2SO_4$. Concentration in reduced pressure afforded the crude product. Purification by flash column chromatograpy to deliver the hydroxy product **S15** (1.1g, 95% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J*= 9.2 Hz, 2H), 6.64 (d, *J*= 9.2 Hz, 2H), 5.22 (s, 1H), 5.06 (s, 1H), 4.75 (s, 2H), 3.79 (t, *J*= 5.6 Hz, 2H), 3.03 (s, 6H), 2.41 (t, *J*= 5.6 Hz, 2H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.7, 153.4, 141.3, 131.3, 116.6, 114.3, 110.7, 66.2, 60.8, 40.0, 36.7; HRMS calculated for $C_{14}H_{20}NO_3$ ($M + H^+$): 250.1438, found: 250.1442.

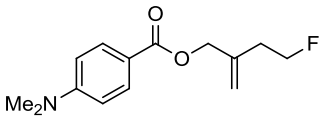



**4-((tert-butyldimethylsilyl)oxy)-2-methylenebutyl 4-(dimethylamino)benzoate (16a):** To a solution of **S15** (114 mg, 0.45 mmol) in dried DCM (5 mL) was added $Et_3N$ (90 mg, 0.90 mmol) and DMAP (18 mg, 0.15 mmol) at 0℃. Subsequently, TBSCl (135 mg, 0.90 mmol) was added as one portion. The resulting mixture was

allowed to reach room temperature. After completion (monitored by TLC analysis), the reaction was quenched with saturated aqueous $NH_4Cl$, extracted with DCM. The combined organic phase was washed with brine, dried over $Na_2SO_4$, filtered and concentrated to afford the crude product. Purification via flash column chromatography gave **16a** (142 mg, 87% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J*= 9.2 Hz, 2H), 6.64 (d, *J*= 9.2 Hz, 2H), 5.16 (d, *J*= 1.2 Hz, 1H), 5.00 (d, *J*= 1.2 Hz, 1H), 4.74 (s, 2H), 3.78 (t, *J*= 6.8 Hz, 2H), 3.04 (s, 6H), 2.37 (t, *J*= 6.8 Hz, 2H), 0.89 (s, 9H), 0.06 (s, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 153.3, 141.9, 131.3, 116.9, 113.4, 110.7, 66.7, 62.1, 40.0, 36.9, 25.9, 25.6, 18.3; HRMS calculated for $C_{20}H_{34}NO_3Si$ (M + $H^+$): 364.2302, found: 364.2303.

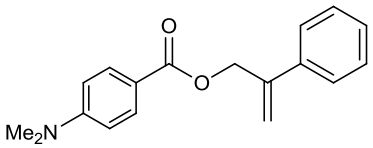



**4-chloro-2-methylenebutyl 4-(dimethylamino)benzoate (17a):** To a stirred solution of **S15** (80 mg, 0.32 mmol) and $PPh_3$ (168 mg, 0.64 mmol) in dried DCM (6 mL) was added hexachloroacetone (169 mg, 0.64 mmol) at room temperature. The resulting mixture was maintained at this temperature for 2h. The reaction was quenched with cold water, extracted with DCM. The combined organic phase was washed with brine, dried over $Na_2SO_4$, filtered and concentrated to afford the crude product. Purification via flash column chromatography afforded **17a** (80 mg, 93% yield). $^1$H NMR (300 MHz, $CDCl_3$) δ 7.92 (d, *J*= 9.0 Hz, 2H), 6.65 (d, *J*= 9.0 Hz, 2H), 5.27 (s, 1H), 5.09 (s, 1H), 4.75 (s, 2H), 3.69 (t, *J*= 7.2 Hz, 2H), 3.04 (s, 6H), 2.63 (t, *J*= 7.2 Hz, 2H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.5, 153.4, 140.7, 131.3, 116.5, 115.3, 110.7, 66.2, 42.4, 40.0, 36.5; HRMS calculated for $C_{14}H_{19}NO_2Cl$ (M + $H^+$): 268.1099, found: 268.1094.




**4-fluoro-2-methylenebutyl 4-(dimethylamino)benzoate (18a):** To a solution of **S15** (80 mg, 0.32 mmol) in dried DCM (6 mL) was added DAST (128 mg, 0.8 mmol) at

-78℃. The resulting mixture was maintained at this temperature until completion (monitored by TLC analysis). The reaction was quenched with saturated aqueous $NaHCO_3$, extracted with DCM. The combined organic phase was washed with brine, dried over $Na_2SO_4$, filtered and concentrated to afford the crude product. Purification via flash column chromatography afforded **18a** (37 mg, 46% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, *J*= 8.8 Hz, 2H), 6.65 (d, *J*= 8.8 Hz, 2H), 5.25 (s, 1H), 5.10 (s, 1H), 4.77 (s, 2H), 4.67 (t, *J*= 6.0 Hz, 1H), 4.55 (t, *J*= 6.0 Hz, 1H), 3.04 (s, 6H), 2.58 (t, *J*= 6.0 Hz, 1H), 2.52 (t, *J*= 6.0 Hz, 1H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.5, 153.4, 140.0, 140.0, 131.3, 116.6, 114.8, 110.7, 82.9, 81.3, 66.4, 40.0, 34.3, 34.1; HRMS calculated for $C_{14}H_{19}NO_2F$ ($M + H^+$): 252.1394, found: 252.1393.



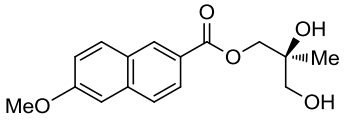

**2-phenylallyl 4-(dimethylamino)benzoate (19a):** Following the general procedure, the alcohol (134 mg, 1.00 mmol) prepared from oxidation of prop-1-en-2-ylbenzene via $SeO_2$ and the corresponding acid afforded the olefin **19a** (166 mg, 60% yield). $^1$H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, *J* = 9.2 Hz, 2H), 7.50 (d, *J* = 7.2 Hz, 2H), 7.38-7.30 (m, 3H), 6.63 (d, *J* = 9.2 Hz, 2H), 5.58 (s, 1H), 5.45 (s, 1H), 5.17 (s, 2H), 3.03 (s, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 153.4, 143.0, 138.4, 131.4, 131.2, 128.4, 127.9, 126.0, 116.8, 114.6, 110.7, 65.4, 40.0; HRMS calculated for $C_{18}H_{20}NO_2$ ($M + H^+$): 282.1489, found: 282.1490.

## 4. General Procedure for the Asymmetric Dihydroxylation

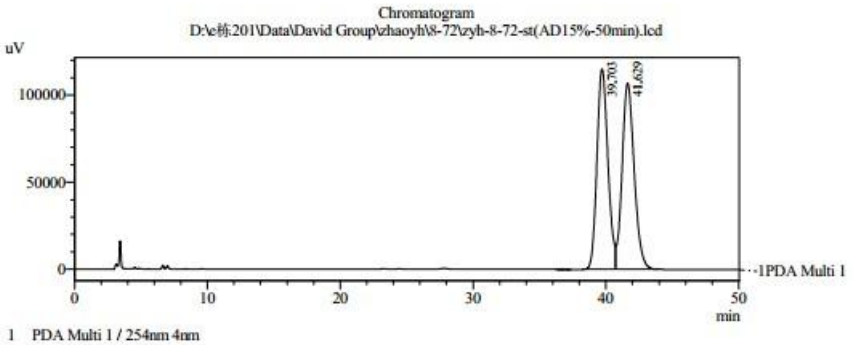
A suspension of AD-mix-β in $^t$BuOH/$H_2O$ (0.1M, 1:1) was cooled to 0℃, and treated with the corresponding olefin (0.1 mmol). The resulting mixture was stirred vigorously and maintained at 0℃ until the starting material disappeared by TLC analysis. After completion, the reaction mixture was quenched with saturated $Na_2SO_3$ (aq.), stirred for 10 min, and warmed to room temperature. Then the mixture was diluted with EtOAc and minimal water, extracted with EtOAc. The combined organic

layer was washed with brine, dried over $Na_2SO_4$, and concentrated *in vacuo* to give crude product, which was purified by flash chromatography to afford the indicated yield of product.

## 5. $^1$H NMR and $^{13}$C NMR spectra data of compounds 2a-2f, 3b-20b




**(*S*)-2,3-dihydroxy-2-methylpropyl 6-methoxy-2-naphthoate (2a):** Compound **2a** was obtained via the general procedure in 68% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 85:15 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 39.7 min., $t_R$ (*S*)-enantiomer (major) = 41.6 min.; 29:71 er. $^1$H NMR (500 MHz, $CDCl_3$) δ 8.49 (s, 1H), 7.98 (dd, *J* = 7.5, 1.5 Hz, 1H), 7.81 (d, *J* = 8.5 Hz, 1H), 7.72 (d, *J* = 8.5 Hz, 1H), 7.18 (dd, *J* = 2.5, 8.5 Hz, 2H), 7.12 (d, *J* = 2.5 Hz , 1H), 4.44 (d, *J* = 11.5 Hz, 1H), 4.29 (d, *J* = 11.5 Hz, 1H), 3.92 (s, 3H), 3.63 (d, *J* = 11.5 Hz, 1H), 3.52 (d, *J* = 11.5 Hz, 1H), 1.31 (s, 3H); $^{13}$C NMR (125 MHz, $CDCl_3$) δ 167.4, 159.8 137.4, 131.2, 130.9, 127.8, 127.0, 125.8, 124.5, 119.8, 105.7, 72.2, 68.4, 67.0, 55.4, 21.4; HRMS calculated for $C_{16}H_{18}O_5Na$ (M + $Na^+$): 313.1046, found: 313.4048.




PeakTable

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| 2 | 41.629 | 6766373 | 106847 | 50.629 | 48.135 |
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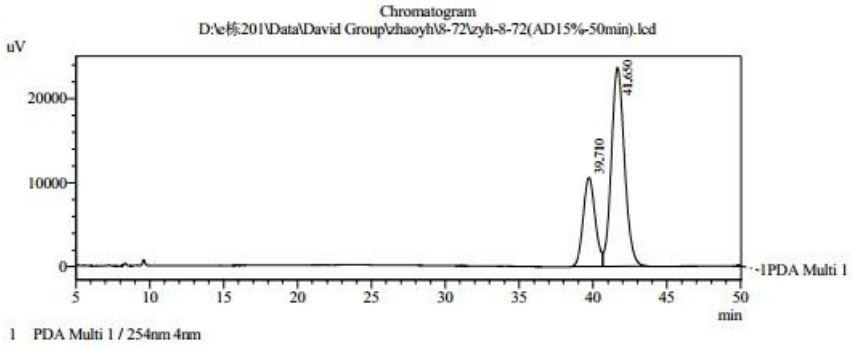


PeakTable

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| 2 | 41.650 | 1457868 | 23656 | 70.960 | 69.069 |
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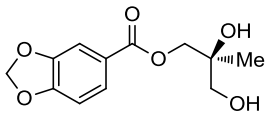
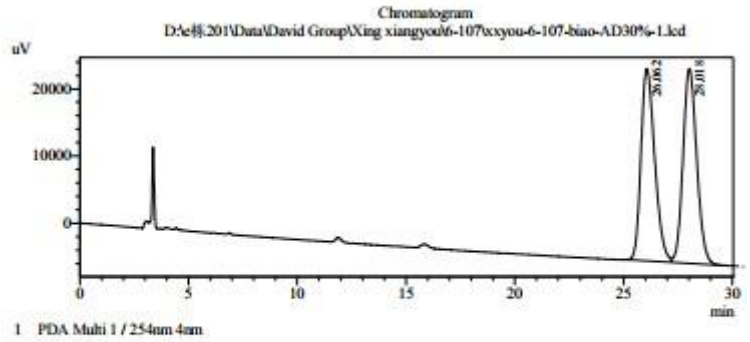



**(*S*)-2,3-dihydroxy-2-methylpropyl benzo[d][1,3]dioxole-5-carboxylate (2b):** Compound **2b** was obtained via the general procedure in 67% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 70:30 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 25.7 min., $t_R$ (*S*)-enantiomer (major) = 27.3 min.; 15:85 er. $^1$H NMR (300 MHz, $CDCl_3$) δ 7.62 (dd, *J* = 8.1, 1.5 Hz, 1H), 7.42 (d, *J* = 1.5 Hz, 1H), 6.81 (d, *J* = 8.1Hz, 1H), 4.14 (d, *J* = 11.2 Hz, 1H), 6.02 (s, 2H), 4.32 (d, *J* = 11.4 Hz , 1H), 4.37 (d, *J* = 11.4 Hz, 1H), 4.36 (d, *J* = 11.4 Hz, 1H), 3.45 (d, *J* = 11.4 Hz, 1H), 1.24 (s, 3H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.4, 151.9, 147.7, 125.6, 123.4, 109.5, 108.0, 101.9, 72.1, 68.2, 66.9, 21.3; HRMS calculated for $C_{12}H_{14}O_6Na$ (M + $Na^+$): 277.0683, found: 277.0687.




PeakTable

PDA Ch1 254nm 4nm

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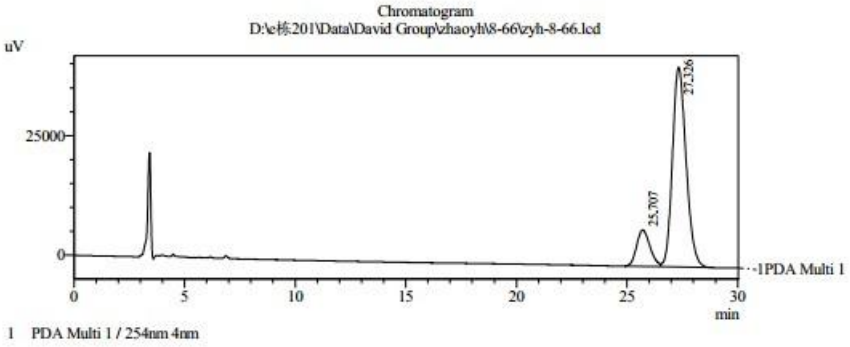


PeakTable

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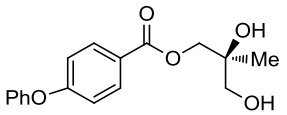
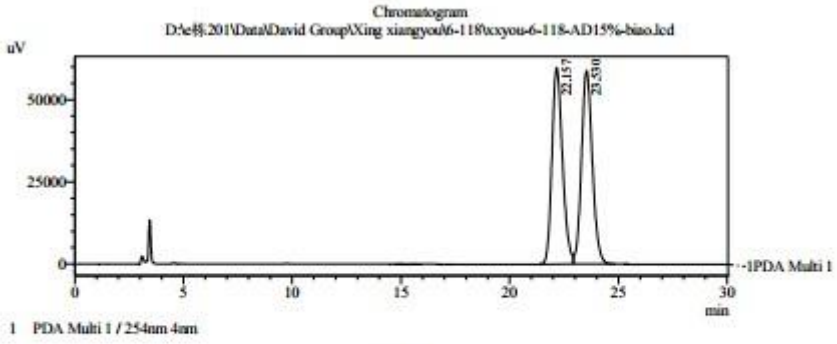
| 1 | 25.707 | 321739 | 7625 | 15.193 | 15.428 |
| 2 | 27.326 | 1795902 | 41796 | 84.807 | 84.572 |
| Total | | 2117641 | 49420 | 100.000 | 100.000 |




**(*S*)-2,3-dihydroxy-2-methylpropyl 4-phenoxybenzoate (2c):** Compound **2c** was obtained via the general procedure in 83% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 85:15 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 23.1 min., $t_R$ (*S*)-enantiomer (major) = 21.7 min.; 18:82 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 8.8 Hz, 2H), 7.41-7.37 (m, 2H), 7.19 (t, *J* = 7.2 Hz, 1H), 7.05 (dd, *J* = 1.2, 8.8 Hz, 2H), 6.98 (d, *J* = 8.8 Hz, 2H), 4.37 (d, *J* = 11.2 Hz, 1H), 4.21 (d, *J* = 11.2 Hz, 1H), 3.57 (d, *J* = 11.2 Hz, 1H), 3.47 (d, *J* = 11.2 Hz , 1H), 1.26 (s, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.6, 162.2, 155.3, 131.8, 130.0, 124.6, 123.6, 120.1, 117.3, 72.1, 68.1, 66.8, 21.3; HRMS calculated for

$C_{17}H_{18}O_5Na$ (M + $Na^+$): 325.1046, found: 325.1043.




PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
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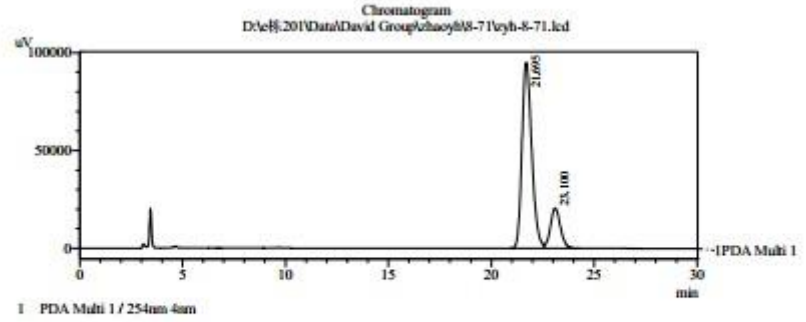
| 2 | 23.530 | 2036103 | 58809 | 50.230 | 49.592 |
| Total | | 4053577 | 118584 | 100.000 | 100.000 |




PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
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| 1 | 21.695 | 3141247 | 95164 | 81.841 | 82.186 |
| 2 | 25.100 | 696995 | 20627 | 18.159 | 17.814 |
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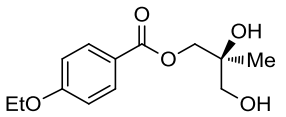
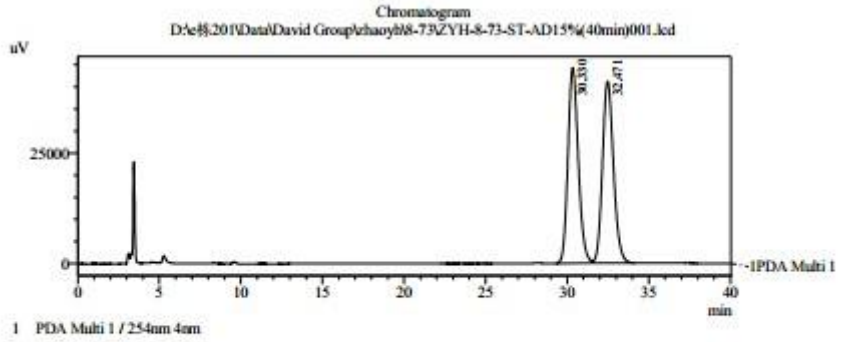



**(*S*)-2,3-dihydroxy-2-methylpropyl 4-ethoxybenzoate (2d):** Compound **2d** was obtained via the general procedure in 76% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 85:15 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 32.4 min., $t_R$ (*S*)-enantiomer (major) = 30.2 min.; 16:84 er. $^1$H NMR (300 MHz, $CDCl_3$) δ 7.96 (d, *J* = 9.0 Hz, 2H), 6.89 (d, *J* = 9.0 Hz, 2H), 4.35 (d, *J* = 11.4 Hz, 1H), 4.18 (d, *J* = 11.4 Hz, 1H), 4.06 (d, *J* = 7.2 Hz, 2H), 3.56 (d, *J* = 11.4 Hz, 1H), 3.45 (d, *J* = 11.4 Hz, 1H), 1.42 (d, *J* = 7.2 Hz, 1H), 1.25 (s, 3H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 166.9, 163.1, 131.8, 121.5, 114.1, 72.2, 68.0, 66.8, 21.3, 14.6; HRMS calculated for $C_{13}H_{18}O_5Na$ (M + $Na^+$): 277.1046, found: 277.1046.




PeakTable

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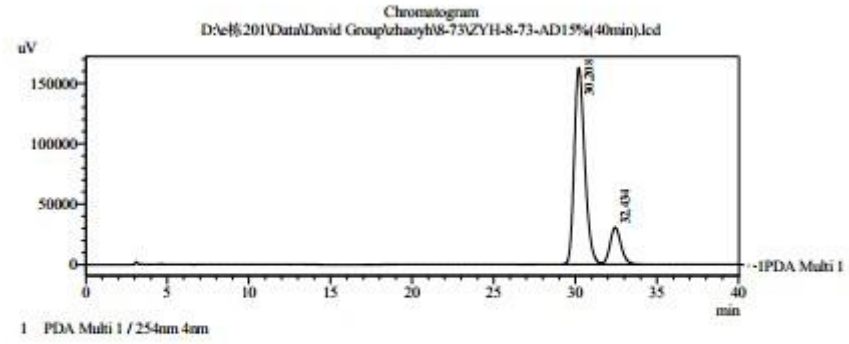
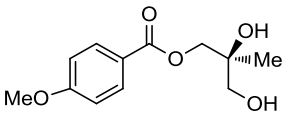
| 2 | 32.471 | 1923634 | 41123 | 49.728 | 48.180 |
| Total | | 3868312 | 85352 | 100.000 | 100.000 |



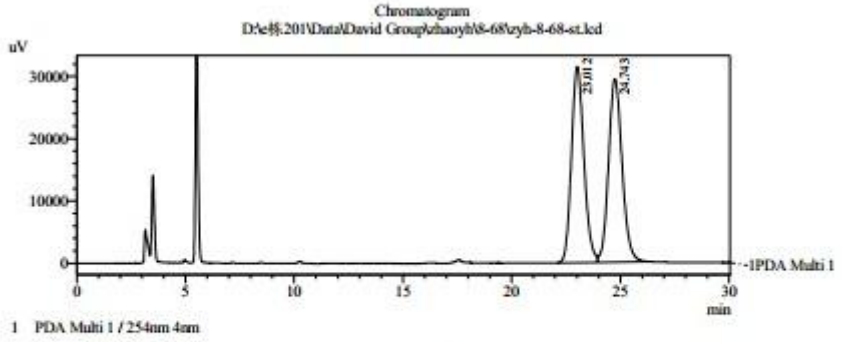

PeakTable

PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 30.208 | 7294827 | 162808 | 83.540 | 84.173 |
| 2 | 32.434 | 1437289 | 30612 | 16.460 | 15.827 |
| Total | | 8732116 | 193420 | 100.000 | 100.000 |



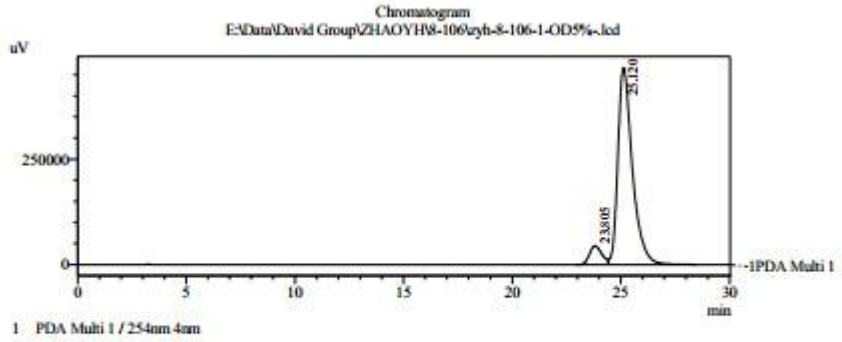

**(*S*)-2,3-dihydroxy-2-methylpropyl 4-methoxybenzoate (2e):** Compound **2e** was obtained via the general procedure in 88% yield. Chiral HPLC analysis (CHIRALCEL OD-H column), 95:5 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 23.8 min., $t_R$ (*S*)-enantiomer (major) = 25.1 min.; 7:93 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 8.8 Hz, 2H), 6.90 (d, *J* = 8.8 Hz, 2H), 4.35 (d, *J* = 11.2 Hz, 1H), 4.19 (d, *J* = 11.2 Hz, 1H), 3.84 (s, 3H), 3.56 (d, *J* = 11.6 Hz, 1H), 3.45 (d, *J* = 11.6 Hz, 1H), 1.25 (s, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 166.8, 163.7, 131.8, 121.8, 113.7, 72.1, 68.0, 66.8, 55.4, 21.3; HRMS calculated for $C_{12}H_{16}O_5Na$ ($M + Na^+$): 263.0890, found: 263.0893.




PeakTable

PDA Ch1 254nm 4nm

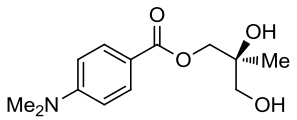
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 23.012 | 1258638 | 31483 | 49.706 | 51.663 |
| 2 | 24.743 | 1273544 | 29456 | 50.294 | 48.337 |
| Total | | 2532182 | 60940 | 100.000 | 100.000 |




PeakTable

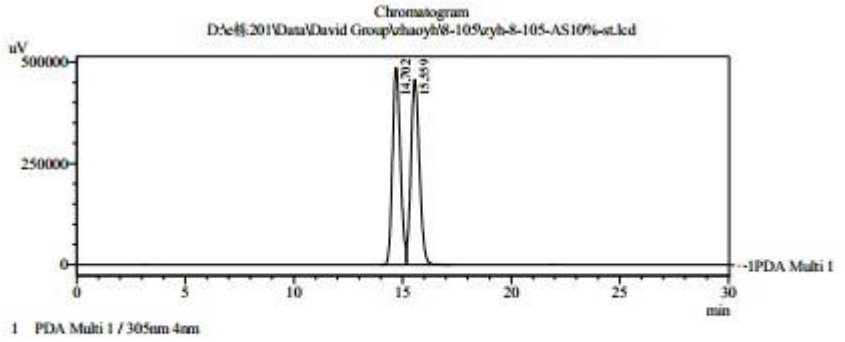
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 23.805 | 1782329 | 44750 | 7.596 | 8.752 |
| 2 | 25.120 | 21682205 | 466554 | 92.404 | 91.248 |
| Total | | 23464534 | 511304 | 100.000 | 100.000 |




**(*S*)-2,3-dihydroxy-2-methylpropyl 4-(dimethylamino)benzoate (2f):** Compound **2f** was obtained via the general procedure in 92% yield. Chiral HPLC analysis (CHIRALCEL AS-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 14.8 min., $t_R$ (*S*)-enantiomer (major) = 15.6 min.; 2:98 er. AD-mix-α: Chiral HPLC analysis (CHIRALCEL AS-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; tR (S)-enantiomer (minor) = 14.8 min., tR (R)-enantiomer (major) = 15.6 min.; 3:97 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 9.2 Hz, 2H), 6.61 (d, *J* = 9.2 Hz, 2H), 4.34 (d, *J* = 11.2 Hz, 1H), 4.14 (d, *J* = 11.2 Hz , 1H), 3.53 (d, *J* = 11.2 Hz, 1H), 3.42 (d, *J* = 11.2 Hz, 1H), 3.02 (s, 6H), 1.24 (s,

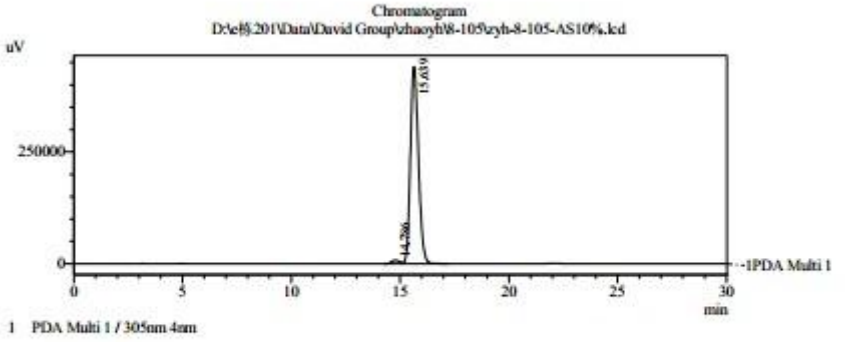
3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.6, 153.6, 131.5, 115.8, 110.7, 72.2, 67.6, 66.8, 40.0, 21.3; HRMS calculated for $C_{13}H_{19}NO_4Na$ (M + $Na^+$): 276.1206, found: 276.1027.




PeakTable

PDA Ch1 305nm 4nm

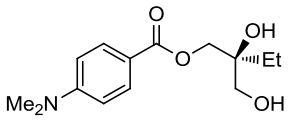
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 14.702 | 12204378 | 486222 | 49.587 | 51.565 |
| 2 | 15.559 | 12407691 | 456709 | 50.413 | 48.435 |
| Total | | 24612070 | 942950 | 100.000 | 100.000 |




PeakTable

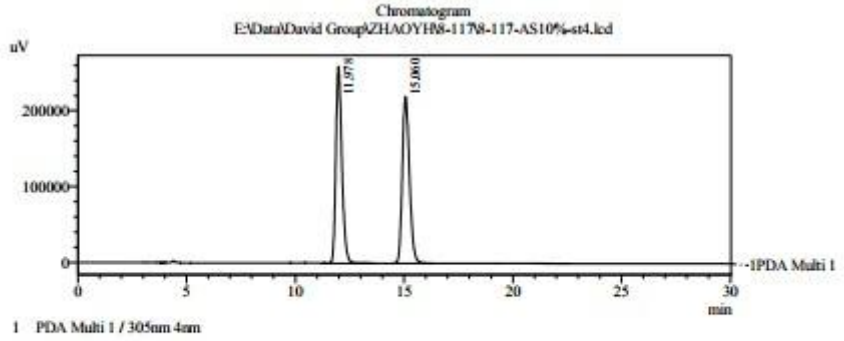
PDA Ch1 305nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 14.786 | 183016 | 7925 | 1.589 | 1.767 |
| 2 | 15.639 | 11331518 | 440678 | 98.411 | 98.233 |
| Total | | 11514534 | 448604 | 100.000 | 100.000 |




**(*S*)-2-hydroxy-2-(hydroxymethyl)butyl 4-(dimethylamino)benzoate (3b):** Compound **3b** was obtained via the general procedure in 85% yield. Chiral HPLC analysis (CHIRALCEL AS-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 12.0 min., $t_R$ (*S*)-enantiomer (major) = 14.8 min.; 5:95 er. $^1$H NMR (300 MHz, $CDCl_3$) δ 7.89 (d, *J* = 9.0 Hz, 2H), 6.64 (d, *J* =9.0 Hz, 2H), 4.40

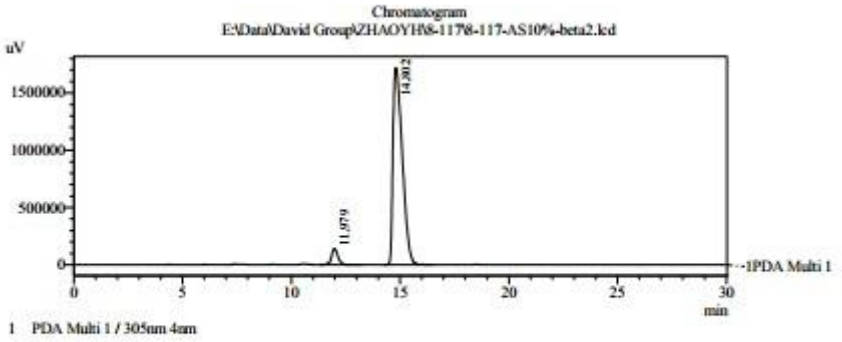
(d, *J* = 11.4 Hz, 1H), 4.17 (d, *J* = 11.4 Hz, 1H), 3.53 (d, *J* = 11.4 Hz, 1H), 3.43 (d, *J* = 11.4 Hz, 1H), 3.05 (s, 6H), 1.61 (q, *J* = 7.8 Hz, 2H), 0.99 (t, *J* = 7.8 Hz, 3H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 167.7, 153.6, 131.5, 115.8, 110.7, 73.9, 66.6, 65.2, 40.0, 27.0, 7.1; HRMS calculated for $C_{14}H_{21}NO_4Na$ ($M + Na^+$): 290.1363, found: 290.1360.




PeakTable

PDA Ch1 305nm 4nm

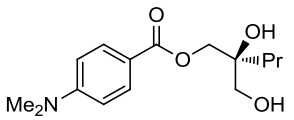
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.978 | 5017447 | 259159 | 49.909 | 54.151 |
| 2 | 15.060 | 5035833 | 219426 | 50.091 | 45.849 |
| Total | | 10053280 | 478585 | 100.000 | 100.000 |




PeakTable

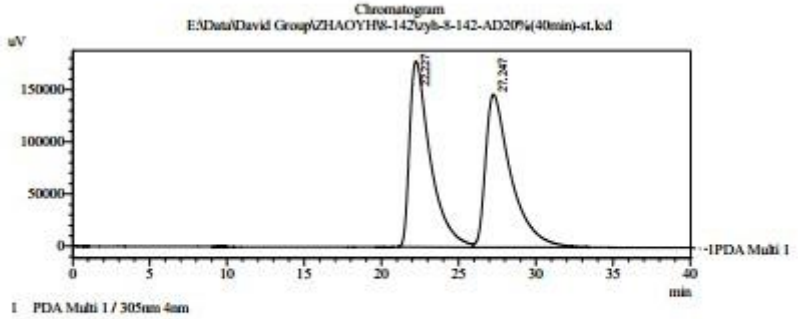
PDA Ch1 305nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.979 | 2928973 | 142558 | 5.387 | 7.648 |
| 2 | 14.802 | 51440296 | 1721407 | 94.613 | 92.352 |
| Total | | 54369270 | 1863965 | 100.000 | 100.000 |




**(*S*)-2-hydroxy-2-(hydroxymethyl)pentyl 4-(dimethylamino)benzoate (4b):** Compound **4b** was obtained via the general procedure in 84% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 80:20 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 27.1 min., $t_R$ (*S*)-enantiomer (major) = 22.0 min.; 5:95 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 9.2 Hz, 2H), 6.63 (d, *J* = 9.2 Hz, 2H), 4.37 (d, *J* = 11.2 Hz, 1H), 4.17 (d, *J* = 11.2 Hz, 1H), 3.53 (dd, *J* = 11.6, 4.0 Hz,

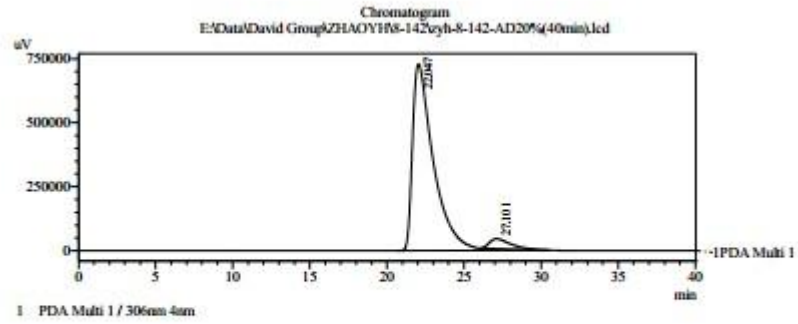
1H), 3.44 (dd, *J* = 11.6, 5.6 Hz, 1H), 3.04 (s, 6H), 2.99 (s, 1H), 2.84 (s, 1H), 1.57-1.42 (m, 4H), 0.94 (t, *J* = 6.8 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.6, 153.6, 131.5, 116.9, 115.9, 110.7, 73.8, 66.0, 65.4, 40.0, 36.8, 16.0, 14.7; HRMS calculated for $C_{15}H_{23}NO_4Na$ ($M + Na^+$): 304.1519, found: 304.1519.




PeakTable

PDA Ch1 305nm 4nm

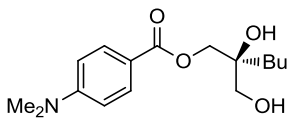
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 22.227 | 16604717 | 178011 | 49.775 | 54.927 |
| 2 | 27.247 | 16754598 | 146077 | 50.225 | 45.073 |
| Total | | 33359315 | 324088 | 100.000 | 100.000 |




PeakTable

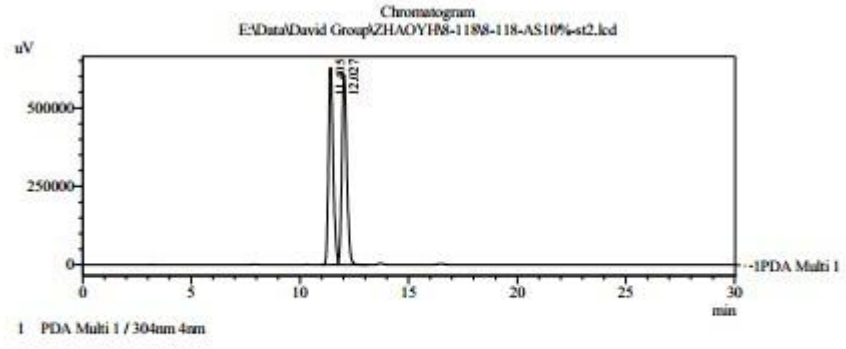
PDA Ch1 306nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 22.047 | 69442752 | 728668 | 94.824 | 94.950 |
| 2 | 27.101 | 3790603 | 38757 | 5.176 | 5.050 |
| Total | | 73233356 | 767425 | 100.000 | 100.000 |




**(*S*)-2-hydroxy-2-(hydroxymethyl)hexyl 4-(dimethylamino)benzoate (5b):** Compound **4b** was obtained via the general procedure in 90% yield. Chiral HPLC analysis (CHIRALCEL AS-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 9.7 min., $t_R$ (*S*)-enantiomer (major) = 10.3 min.; 8:92 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J* = 9.2 Hz, 2H), 6.64 (d, *J* =9.2 Hz, 2H), 4.38 (d, *J* = 11.6 Hz, 1H), 4.17 (d, *J* = 11.6 Hz, 1H), 3.53 (d, *J* = 11.6 Hz, 1H), 3.44 (d, *J* =

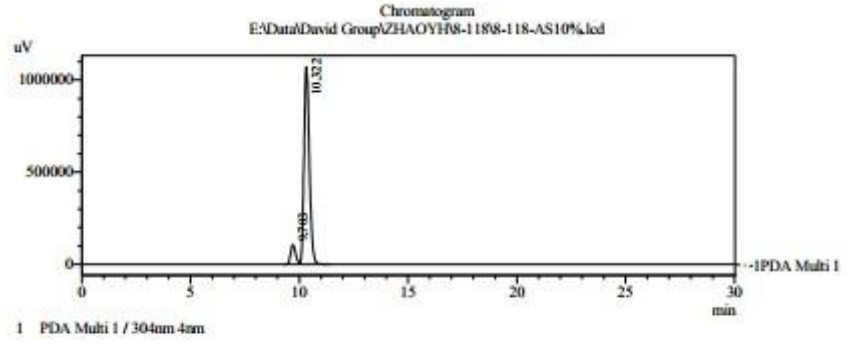
11.4 Hz, 1H), 3.04 (s, 6H), 1.57-1.44 (m, 2H), 1.42-1.36 (m, 4H), 0.92 (t, $J$ = 7.2 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.6, 153.6, 131.5, 115.9, 110.7, 73.8, 65.9, 65.5, 40.0, 34.1, 24.8, 23.3, 14.0; HRMS calculated for $C_{16}H_{25}NO_4Na$ (M + $H^+$): 318.1676, found: 318.1674.




PeakTable

PDA Ch1 304nm 4nm

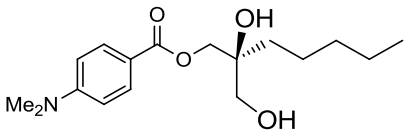
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.405 | 9410879 | 627413 | 49.630 | 50.896 |
| 2 | 12.027 | 9551263 | 605315 | 50.370 | 49.104 |
| Total | | 18962143 | 1232728 | 100.000 | 100.000 |




PeakTable

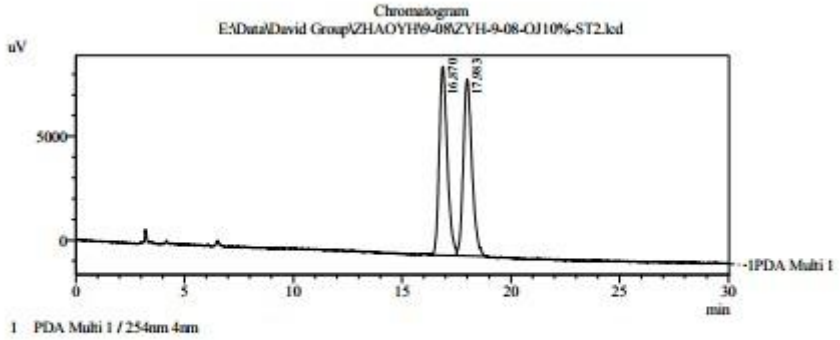
PDA Ch1 304nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.703 | 1703265 | 107016 | 8.482 | 9.079 |
| 2 | 10.322 | 18377106 | 1071672 | 91.518 | 90.921 |
| Total | | 20080371 | 1178688 | 100.000 | 100.000 |




**(*S*)-2-hydroxy-2-(hydroxymethyl)heptyl 4-(dimethylamino)benzoate (6b):** Compound **6b** was obtained via the general procedure in 85% yield. Chiral HPLC analysis (CHIRALCEL OJ-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 16.8 min., $t_R$ (*S*)-enantiomer (major) = 17.9 min.; 8:92 er.

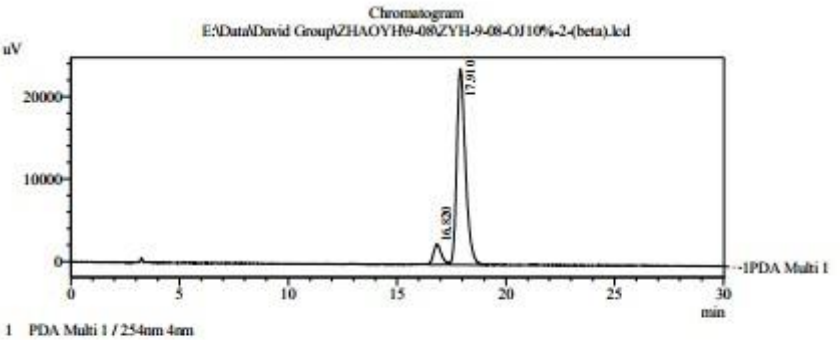
$^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 8.8 Hz, 2H), 6.63 (d, *J* = 8.8 Hz, 2H), 4.38 (d, *J* = 11.6 Hz, 1H), 4.17 (d, *J* = 11.6 Hz, 1H), 3.54-3.51 (m, 1H), 3.46-3.41 (m, 1H), 3.04 (s, 6H), 2.95 (s, 1H), 2.81 (s, 1H), 1.58-1.53 (m, 2H), 1.45-1.41 (m, 2H), 1.34 -1.25 (m, 4H), 0.89 (t, *J* = 6.8 Hz, 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.6, 153.6, 131.5, 115.9, 110.7, 73.8, 65.9, 65.5, 40.0, 34.4, 32.4, 22.5, 22.3, 14.0; HRMS calculated for $C_{17}H_{27}NO_4Na$ ($M + Na^+$): 332.1832, found: 332.1832.




PeakTable

PDA Ch1 254nm 4nm

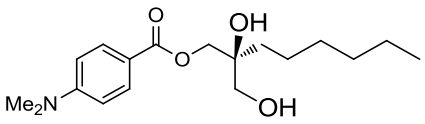
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 16.870 | 234568 | 9090 | 49.879 | 51.651 |
| 2 | 17.983 | 235706 | 8509 | 50.121 | 48.349 |
| Total | | 470274 | 17599 | 100.000 | 100.000 |




PeakTable

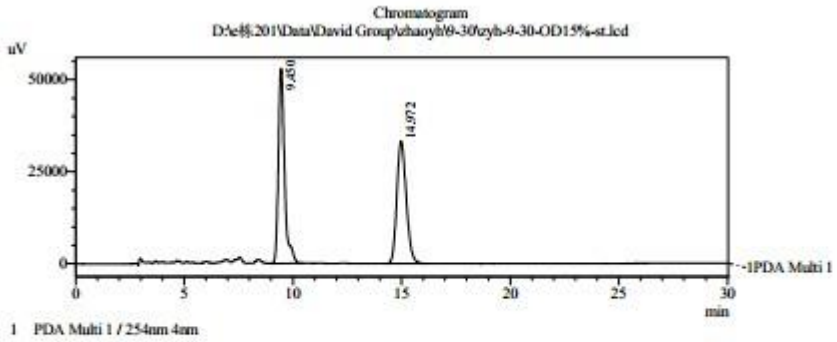
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 16.820 | 60942 | 2433 | 8.463 | 9.303 |
| 2 | 17.910 | 659151 | 23718 | 91.537 | 90.697 |
| Total | | 720093 | 26151 | 100.000 | 100.000 |




**(*S*)-2-hydroxy-2-(hydroxymethyl)octyl 4-(dimethylamino)benzoate (7b):** Compound **7b** was obtained via the general procedure in 70% yield. Chiral HPLC analysis (CHIRALCEL OD-H column), 85:15 hexane/ethanol at 1.0 mL/min flow rate;

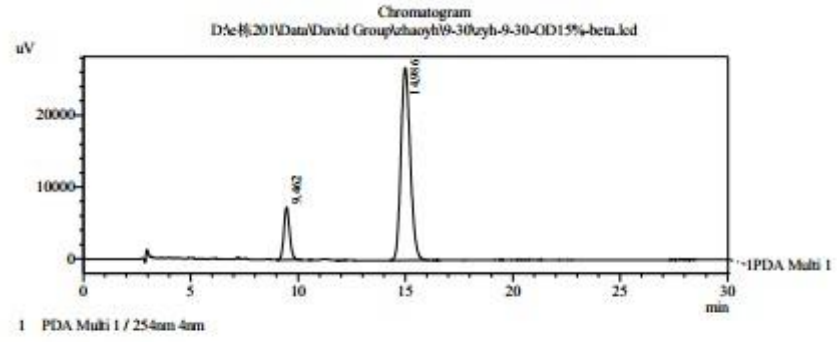
$t_R$ (*R*)-enantiomer (minor) = 9.5 min., $t_R$ (*S*)-enantiomer (major) = 15.0 min.; 14:86 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J* = 8.8 Hz, 2H), 6.64 (d, *J* = 8.8 Hz, 2H), 4.39 (d, *J* = 11.6 Hz, 1H), 4.16 (d, *J* = 11.6 Hz, 1H), 3.54-3.50 (m, 1H), 3.46-3.41 (m, 1H), 3.05 (s, 6H), 2.92 (t, *J* = 6.4 Hz, 1H), 2.77 (s, 1H), 1.58-1.54 (m, 2H), 1.44-1.41 (m, 2H), 1.32-1.25 (m, 6H), 0.88 (t, *J* = 6.8 Hz , 3H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.7, 153.6, 131.5, 115.8, 110.7, 73.8, 65.9, 65.5, 40.0, 34.4, 31.7, 29.8, 22.6, 22.5, 14.0; HRMS calculated for $C_{18}H_{29}NO_4Na$ (M + $Na^+$): 346.1989, found: 346.1992.




PeakTable

PDA Ch1 254nm 4nm

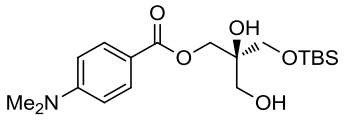
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.450 | 1049838 | 52909 | 51.034 | 61.415 |
| 2 | 14.972 | 1007310 | 33241 | 48.966 | 38.585 |
| Total | | 2057148 | 86150 | 100.000 | 100.000 |




PeakTable

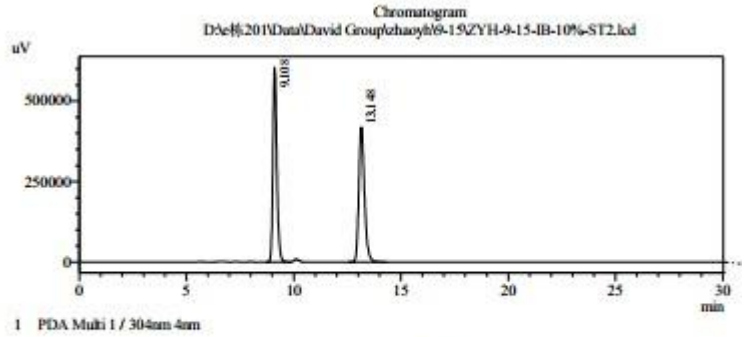
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.462 | 135905 | 7348 | 14.400 | 21.506 |
| 2 | 14.986 | 807858 | 26820 | 85.600 | 78.494 |
| Total | | 943763 | 34168 | 100.000 | 100.000 |




**(*S*)-3-((tert-butyldimethylsilyl)oxy)-2-hydroxy-2-(hydroxymethyl)propyl 4-(dimethylamino)benzoate (8b):** Compound **8b** was obtained via the general

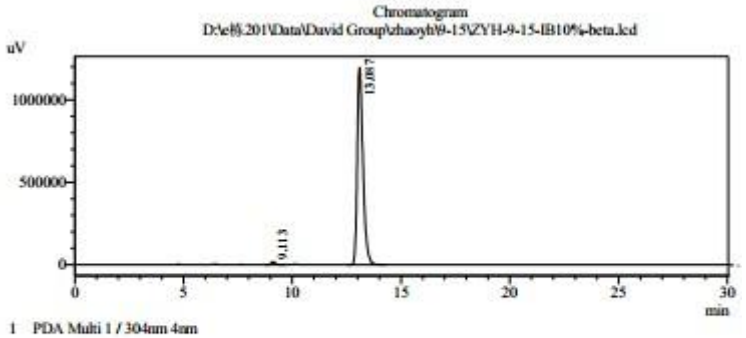
procedure in 90% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 9.1 min., $t_R$ (*S*)-enantiomer (major) = 13.1 min.; 1:99 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 9.2 Hz, 2H), 6.65 (d, *J* = 9.2 Hz, 2H), 4.35 (d, *J* = 11.2 Hz, 1H), 4.30 (d, *J* = 11.2 Hz, 1H), 3.70 (s, 2H), 3.62 (d, *J* = 6.4 Hz, 2H), 3.17 (s, 1H), 3.03 (s, 6H), 3.72 (t, *J* = 6.8 Hz, 1H), 0.90 (s , 9H), 0.08 (s, 6H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.4, 153.5, 131.4, 116.0, 110.7, 73.9, 64.7, 64.4, 64.1, 39.9, 25.8, 18.2, 5.6; HRMS calculated for $C_{19}H_{33}NO_5NaSi$ ($M + Na^+$): 406.2020, found: 406.2022.




PeakTable

PDA Ch1 304nm 4nm

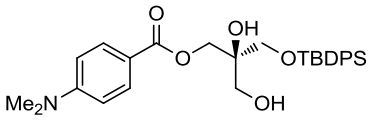
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.108 | 7638534 | 604214 | 50.009 | 59.079 |
| 2 | 13.148 | 7635633 | 418502 | 49.991 | 40.921 |
| Total | | 15274168 | 1022716 | 100.000 | 100.000 |




PeakTable

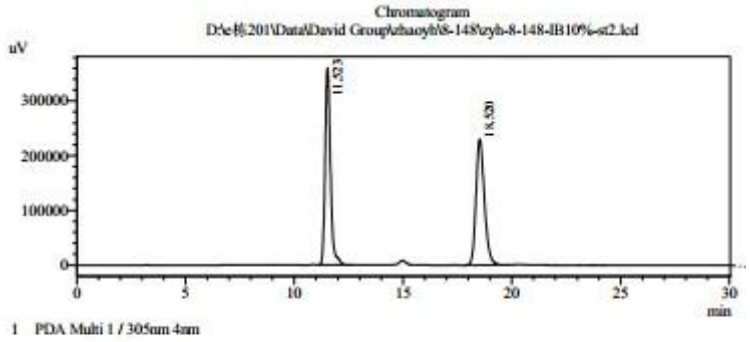
PDA Ch1 304nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.113 | 228903 | 18105 | 1.027 | 1.491 |
| 2 | 13.087 | 22065678 | 1195776 | 98.973 | 98.509 |
| Total | | 22294581 | 1213881 | 100.000 | 100.000 |




**(*S*)-3-((tert-butyldiphenylsilyl)oxy)-2-hydroxy-2-(hydroxymethyl)propyl 4-(dimethylamino)benzoate (9b):** Compound **9b** was obtained via the general

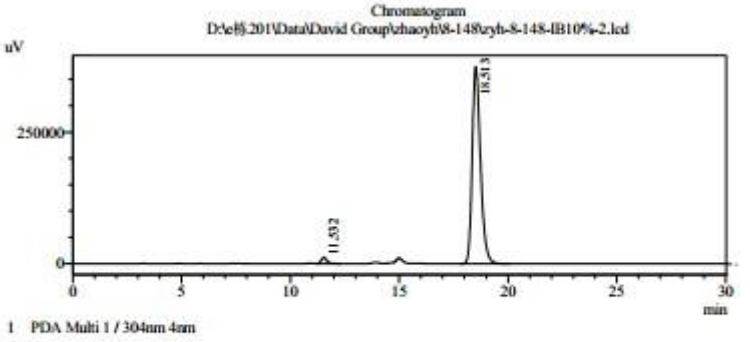
procedure in 70% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 11.5 min., $t_R$ (*S*)-enantiomer (major) = 18.5 min.; 2:98 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, *J* = 9.2 Hz, 2H), 7.68-7.66 (m, 4H), 7.43-7.34 (m, 6H), 6.63 (d, *J* = 9.2 Hz, 2H), 4.42-4.42 (m, 2H), 3.75 (s, 2H), 3.66 (d, *J* = 6.4 Hz, 2H), 3.04 (s, 6H), 2.50 (t, *J* = 6.4 Hz , 2H), 1.08 (s, 9H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.4, 153.5, 135.5, 132.7, 132.6, 131.5, 129.8, 127.8, 116.0, 110.6, 74.3, 64.8, 64.6, 64.1, 40.0, 26.8, 19.2; HRMS calculated for $C_{29}H_{37}NO_5NaSi$ ($M + Na^+$): 530.2333, found: 530.2332.




PeakTable

PDA Ch1 305nm 4nm

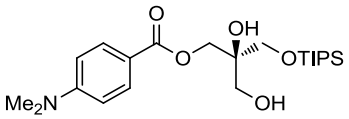
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.523 | 6211095 | 360520 | 50.029 | 61.060 |
| 2 | 18.520 | 6203940 | 229917 | 49.971 | 38.940 |
| Total | | 12415035 | 590437 | 100.000 | 100.000 |




PeakTable

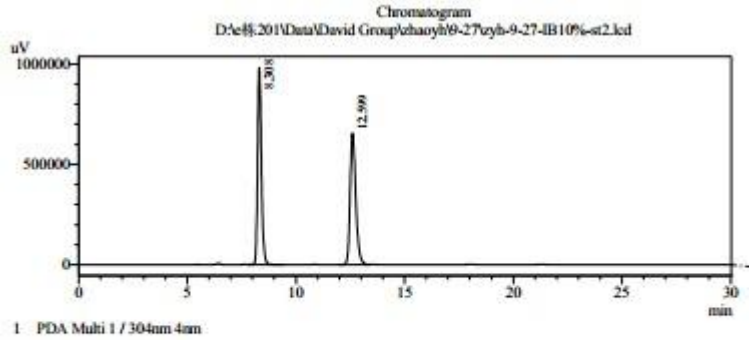
PDA Ch1 304nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.532 | 197843 | 12074 | 1.949 | 3.120 |
| 2 | 18.513 | 9952225 | 374886 | 98.051 | 96.880 |
| Total | | 10150068 | 386960 | 100.000 | 100.000 |




**(*S*)-2,3-dihydroxy-2-(((triisopropylsilyl)oxy)methyl)propyl 4-(dimethylamino)benzoate (10b):** Compound **10b** was obtained via the general

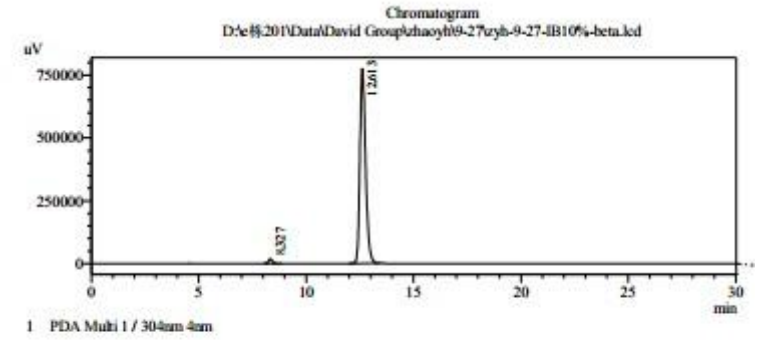
procedure in 83% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 8.3 min., $t_R$ (*S*)-enantiomer (major) = 12.6 min.; 2:98 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J* = 9.2 Hz, 2H), 6.63 (d, *J* = 9.2 Hz , 2H), 4.39 (d, *J* = 11.6 Hz, 1H), 4.33 (d, *J* = 11.6 Hz, 1H), 3.80 (s, 2H), 3.65 (d, *J* = 6.8 Hz, 2H), 3.22 (s, 1H), 3.01 (s, 6H), 3.69 (t, *J* = 6.8 Hz, 1H), 1.17-1.10 (m , 3H), 1.09-1.06 (overlapped, 18H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.4, 153.5, 131.5, 116.0, 110.6, 74.0, 64.7, 64.2, 40.0, 17.9, 11.8; HRMS calculated for $C_{22}H_{39}NO_5NaSi$ ($M + Na^+$): 448.2490, found: 448.2488.




PeakTable

PDA Ch1 304nm 4nm

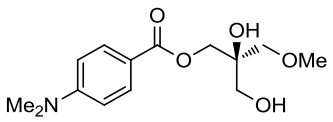
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 8.308 | 11932853 | 982401 | 50.199 | 59.991 |
| 2 | 12.599 | 11838233 | 655168 | 49.801 | 40.009 |
| Total | | 23771086 | 1637569 | 100.000 | 100.000 |




PeakTable

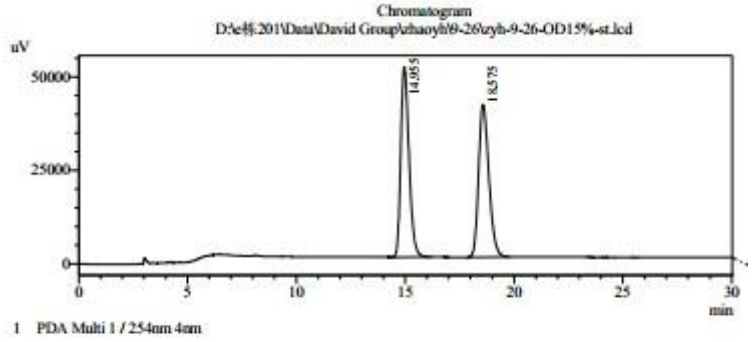
PDA Ch1 304nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 8.327 | 221887 | 18695 | 1.532 | 2.354 |
| 2 | 12.613 | 14262964 | 775636 | 98.468 | 97.646 |
| Total | | 14484851 | 794331 | 100.000 | 100.000 |




**(*R*)-2,3-dihydroxy-2-(methoxymethyl)propyl 4-(dimethylamino)benzoate (11b):** Compound **11b** was obtained via the general procedure in 81% yield. Chiral HPLC

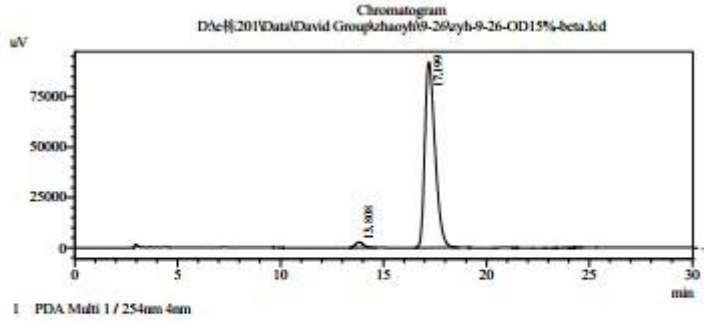
analysis (CHIRALCEL OD-H column), 85:15 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*S*)-enantiomer (minor) = 13.8 min., $t_R$ (*R*)-enantiomer (major) = 17.2 min.; 2:98 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, *J* = 12.0 Hz, 2H), 6.64 (d, *J* = 12.0 Hz, 2H), 4.34 (s, 2H), 3.64 (dd, *J* = 8.8, 2.0 Hz, 2H), 3.50 (s, 2H), 3.40 (s, 3H), 3.17 (s, 1H), 3.04 (s, 6H), 2.75 (t, *J* = 8.8 Hz, 1H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.4, 153.6, 131.5, 115.9, 110.7, 74.2, 73.6, 64.9, 64.2, 59.6, 40.0; HRMS calculated for $C_{14}H_{21}NO_5Na$ (M + $Na^+$): 306.1312, found: 306.1310.




PeakTable

PDA Ch1 254nm 4nm

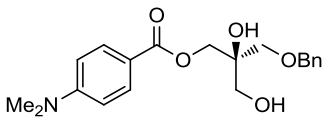
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 14.955 | 1338950 | 50888 | 50.029 | 55.514 |
| 2 | 18.575 | 1337398 | 40780 | 49.971 | 44.486 |
| Total | | 2676348 | 91668 | 100.000 | 100.000 |




PeakTable

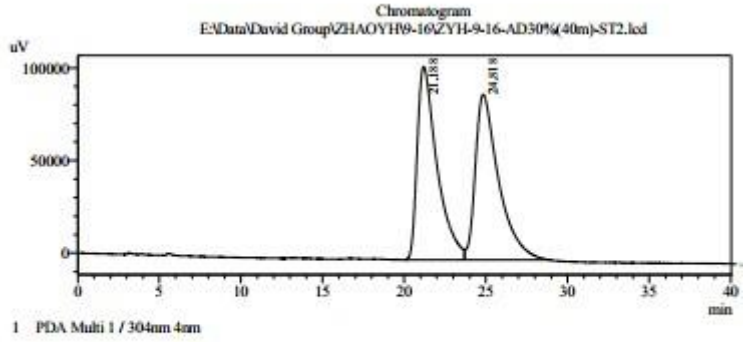
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 13.808 | 75045 | 2849 | 2.304 | 2.995 |
| 2 | 17.199 | 3182651 | 92254 | 97.696 | 97.005 |
| Total | | 3257696 | 95102 | 100.000 | 100.000 |




**(*R*)-3-(benzyloxy)-2-hydroxy-2-(hydroxymethyl)propyl 4-(dimethylamino)benzoate (12b):** Compound **4b** was obtained via the general procedure in 78% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 70:30

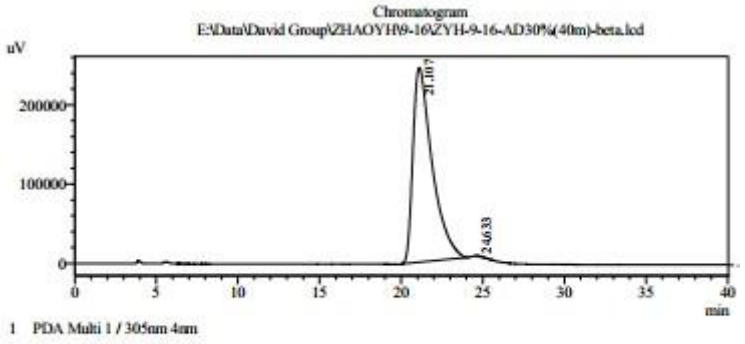
hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*S*)-enantiomer (minor) = 24.7 min., $t_R$ (*R*)-enantiomer (major) = 21.1 min.; >1:99 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.86 (d, *J* = 8.8 Hz, 2H), 7.34-7.30 (m, 5H), 6.62 (d, *J* = 8.8 Hz, 2H), 4.58 (d, *J* = 1.2 Hz , 2H), 4.38 (d, *J* = 1.2 Hz, 2H), 3.64 (dd, *J* = 6.8, 2.4 Hz, 2H), 3.59 (s, 2H), 3.17 (s, 1H), 3.04 (s, 6H), 2.68 (t, *J* = 6.8 Hz, 1H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.4, 153.5, 137.7, 131.5, 128.4, 127.8, 127.7, 116.0, 110.7, 73.8, 73.7, 71.5, 64.9, 64.3, 40.0; HRMS calculated for $C_{20}H_{25}NO_5Na$ ($M + Na^+$): 382.1625, found: 382.1628.




PeakTable

PDA Ch1 304nm 4nm

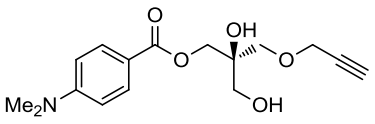
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 21.188 | 8796035 | 104334 | 49.751 | 53.881 |
| 2 | 24.818 | 8884152 | 89304 | 50.249 | 46.119 |
| Total | | 17680187 | 193638 | 100.000 | 100.000 |




PeakTable

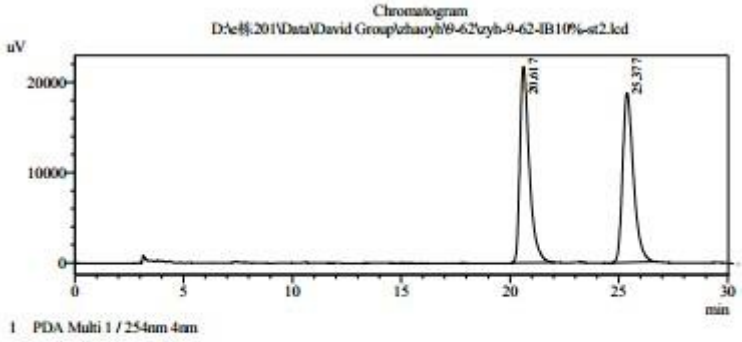
PDA Ch1 305nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 21.107 | 20193528 | 245748 | 99.837 | 99.831 |
| 2 | 24.633 | 33065 | 416 | 0.163 | 0.169 |
| Total | | 20226593 | 246164 | 100.000 | 100.000 |




**(*R*)-2,3-dihydroxy-2-((prop-2-yn-1-yloxy)methyl)propyl 4-(dimethylamino)benzoate (13b):** Compound **13b** was obtained via the general procedure in 77% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10

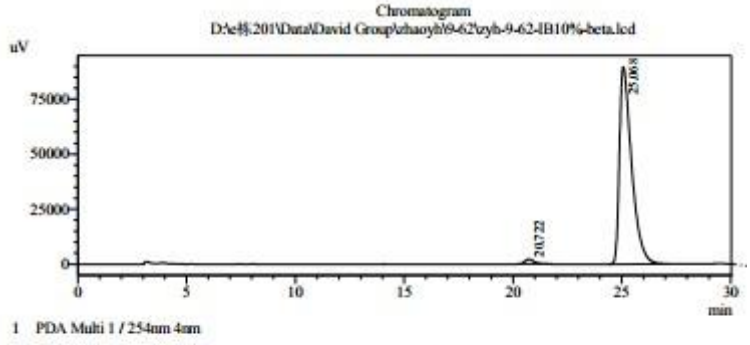
hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*S*)-enantiomer (minor) = 20.7 min., $t_R$ (*R*)-enantiomer (major) = 25.1 min.; 2:98 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J*= 8.8 Hz, 2H), 6.63 (d, *J*= 8.8 Hz, 2H), 4.36 (s, 2H), 4.21 (d, *J*= 2.4 Hz, 2H), 3.65-3.63 (overlapped, 4H), 3.19 (s, 1H), 3.04 (s, 6H), 2.73 (s, 1H), 2.43 (d, *J*= 2.4 Hz, 1H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.4, 153.6, 131.5, 115.9, 110.7, 79.2, 75.0, 71.0, 64.8, 64.0, 58.8, 40.0; HRMS calculated for $C_{16}H_{21}NO_5Na$ ($M + Na^+$): 330.1312, found: 330.1312.




PeakTable

PDA Ch1 254nm 4nm

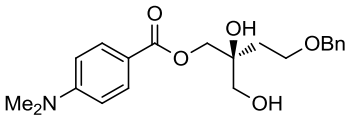
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 20.617 | 653063 | 21734 | 49.991 | 53.650 |
| 2 | 25.377 | 653294 | 18776 | 50.009 | 46.350 |
| Total | | 1306357 | 40510 | 100.000 | 100.000 |




PeakTable

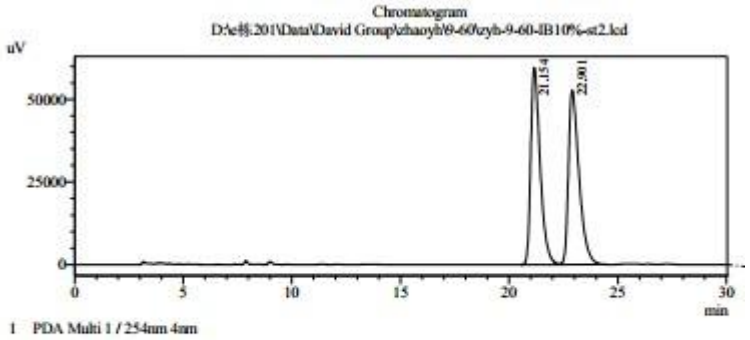
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 20.722 | 65523 | 2192 | 1.848 | 2.384 |
| 2 | 25.068 | 3480657 | 89735 | 98.152 | 97.616 |
| Total | | 3546181 | 91927 | 100.000 | 100.000 |




**(*S*)-4-(benzyloxy)-2-hydroxy-2-(hydroxymethyl)butyl 4-(dimethylamino)benzoate (14b):** Compound 1**4b** was obtained via the general procedure in 80% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 21.3 min., $t_R$ (*S*)-enantiomer (major) = 22.8

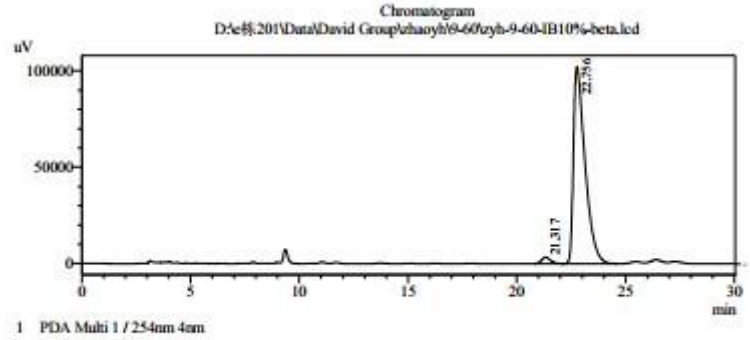
min.; 2:98 er. $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J*= 8.8 Hz, 2H), 7.37-7.26 (overlapped, 5H), 6.63 (d, *J*= 8.8 Hz, 2H), 4.55 (d, *J*= 11.6 Hz, 1H), 4.31 (s, 2H), 3.83-3.78 (m, 2H), 3.75-3.71 (m, 2H), 3.57 (d, *J*= 6.4 Hz, 2H), 3.04 (s, 6H), 2.03-1.97 (m, 1H), 1.91-1.85 (m, 1H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.2, 153.5, 137.4, 131.4, 128.5, 127.9, 127.7, 116.0, 110.6, 73.7, 73.4, 66.4, 66.3, 65.8, 39.9, 33.5; HRMS calculated for $C_{21}H_{27}NO_5Na$ (M + $Na^+$): 396.1781, found: 396.1779.




PeakTable

PDA Ch1 254nm 4nm

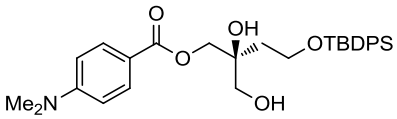
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 21.154 | 1784350 | 59567 | 49.940 | 53.091 |
| 2 | 22.901 | 1788652 | 52631 | 50.060 | 46.909 |
| Total | | 3573002 | 112198 | 100.000 | 100.000 |




PeakTable

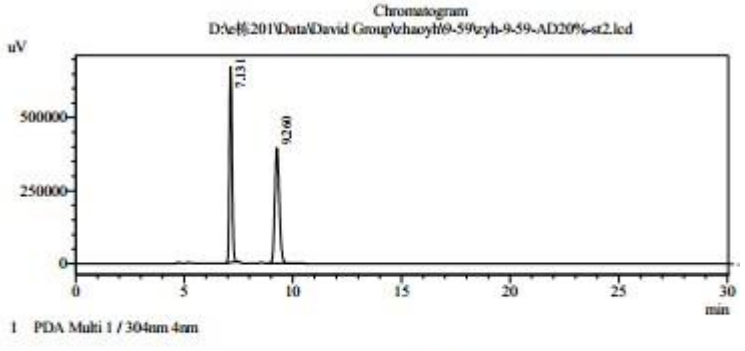
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 21.317 | 95649 | 3424 | 2.461 | 3.239 |
| 2 | 22.756 | 3791560 | 102268 | 97.539 | 96.761 |
| Total | | 3887210 | 105692 | 100.000 | 100.000 |




**(*S*)-4-((tert-butyldiphenylsilyl)oxy)-2-hydroxy-2-(hydroxymethyl)butyl 4-(dimethylamino)benzoate (15b):** Compound **15b** was obtained via the general procedure in 69% yield. Chiral HPLC analysis (CHIRALCEL AD-H column), 80:20 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 9.3 min., $t_R$

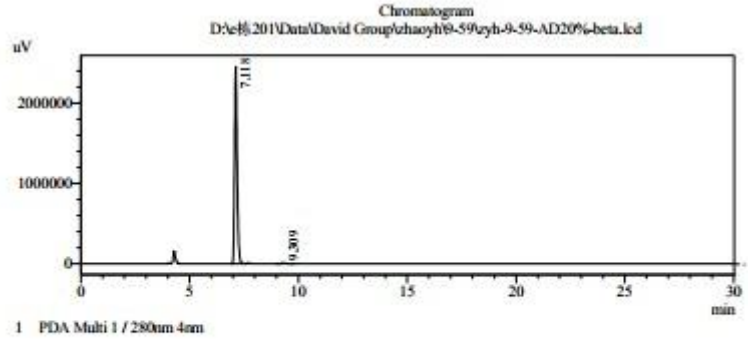
(*S*)-enantiomer (major) = 7.1 min.; >1:99 er. $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J*= 8.8 Hz, 2H), 7.70-7.67 (overlapped, 4H), 7.45-7.39 (overlapped, 6H), 6.62 (d, *J*= 8.8 Hz, 2H), 4.39 (d, *J*= 11.2 Hz, 1H), 4.35 (d, *J*= 11.2 Hz, 1H), 4.07 (s, 1H), 4.03-3.99 (m, 1H), 3.95-3.91 (m, 1H), 3.62 (d, *J*= 6.8 Hz, 2H), 3.04 (s, 6H), 1.99-1.93 (m, 1H), 1.87-1.77 (m, 1H), 1.07 (s, 9H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.2, 153.5, 135.5, 132.6, 131.5, 130.0, 127.9, 127.9, 116.1, 110.7, 74.0, 66.4, 66.0, 60.7, 40.0, 35.3, 26.8, 19.0; HRMS calculated for $C_{30}H_{39}NO_5NaSi$ ($M + Na^+$): 544.2490, found: 544.2488.




PeakTable

PDA Ch1 304nm 4nm

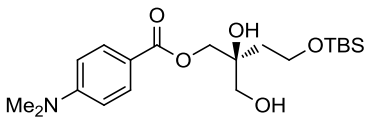
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 7.131 | 5630045 | 671416 | 49.683 | 62.926 |
| 2 | 9.260 | 5701835 | 395580 | 50.317 | 37.074 |
| Total | | 11331880 | 1066996 | 100.000 | 100.000 |




PeakTable

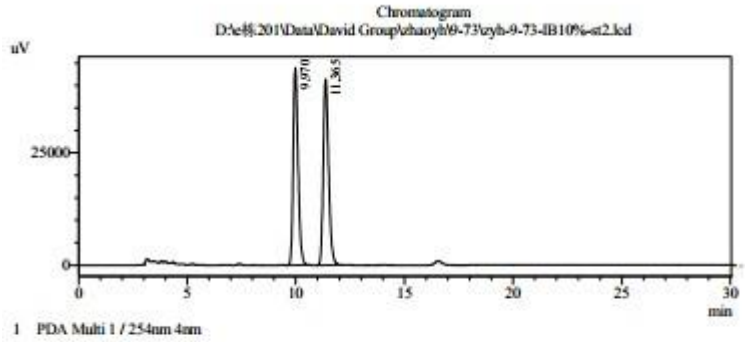
PDA Ch1 280nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 7.118 | 19418783 | 2451444 | 99.232 | 99.582 |
| 2 | 9.309 | 150203 | 10295 | 0.768 | 0.418 |
| Total | | 19568986 | 2461739 | 100.000 | 100.000 |




**(*S*)-4-((tert-butyldimethylsilyl)oxy)-2-hydroxy-2-(hydroxymethyl)butyl 4-(dimethylamino)benzoate (16b):** Compound **16b** was obtained via the general

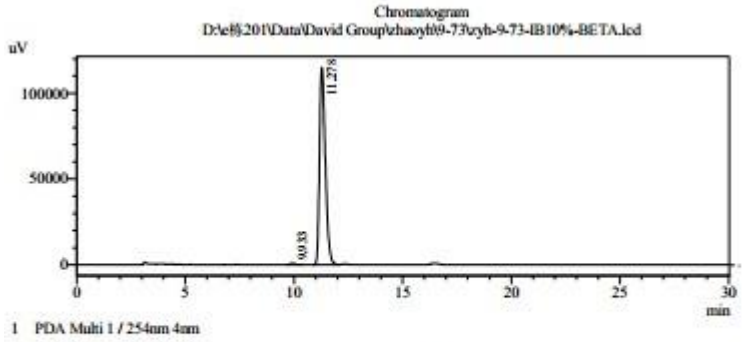
procedure in 88% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 9.9 min., $t_R$ (*S*)-enantiomer (major) = 11.3 min.; >1:99 er. $^1$H NMR (300 MHz, $CDCl_3$) δ 7.90 (d, *J*= 9.0 Hz, 2H), 6.62 (d, *J*= 9.0 Hz, 2H), 4.35 (d, *J*= 11.4 Hz, 1H), 4.26 (d, *J*= 11.4 Hz, 1H), 4.12 (s, 1H), 4.01-3.94 (m, 1H), 3.92-3.85 (m, 1H), 3.57 (d, *J*= 5.4 Hz, 1H), 3.10 (t, *J*= 6.0 Hz, 1H), 3.03 (s, 6H), 2.03-1.87 (m, 1H), 1.82-1.74 (m, 1H), 0.90 (s, 9H), 0.09 (d, *J*= 2.1 Hz, 6H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 167.2, 153.5, 131.5, 116.1, 110.6, 74.0, 66.3, 65.9, 59.7, 40.0, 35.1, 25.8, 18.0, 5.6; HRMS calculated for $C_{20}H_{36}NO_5Si$ ($M + H^+$): 398.2357, found: 398.2357.




PeakTable

PDA Ch1 254nm 4nm

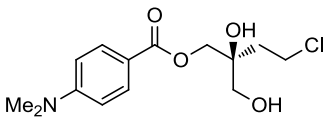
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.970 | 686192 | 43896 | 49.196 | 51.497 |
| 2 | 11.365 | 708612 | 41344 | 50.804 | 48.503 |
| Total | | 1394804 | 85240 | 100.000 | 100.000 |




PeakTable

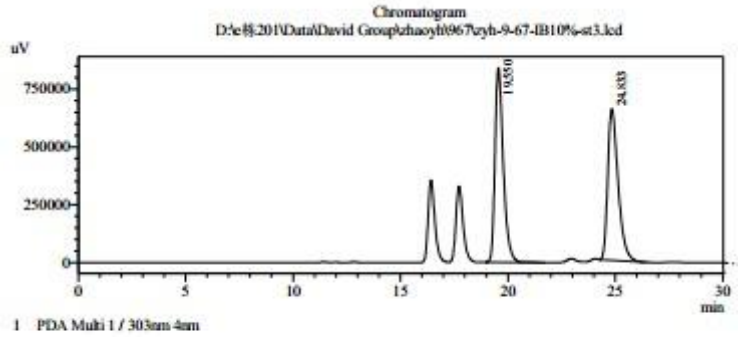
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.933 | 12496 | 769 | 0.581 | 0.665 |
| 2 | 11.278 | 2136831 | 114854 | 99.419 | 99.335 |
| Total | | 2149327 | 115623 | 100.000 | 100.000 |




**(*S*)-4-chloro-2-hydroxy-2-(hydroxymethyl)butyl 4-(dimethylamino)benzoate**

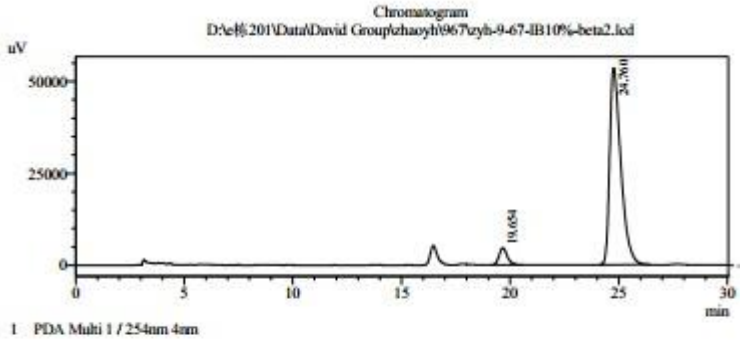
**(17b):** Compound **17b** was obtained via the general procedure in 70% yield. Chiral HPLC analysis (CHIRALCEL IB-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 19.7 min., $t_R$ (*S*)-enantiomer (major) = 24.8 min.; 6:94 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, *J*= 9.2 Hz, 2H), 6.64 (d, *J*= 9.2 Hz, 2H), 4.41 (d, *J*= 11.6 Hz, 1H), 4.17 (d, *J*= 11.6 Hz, 1H), 3.76-3.71 (m, 2H), 3.57-3.53 (m, 1H), 3.49-3.44 (m, 1H), 309 (s, 1H), 3.04 (s, 6H), 2.22-2.04 (m, 2H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.7, 153.7, 131.6, 115.4, 110.7, 73.5, 65.7, 65.1, 40.0, 39.4, 35.6; HRMS calculated for $C_{14}H_{20}NO_4NaCl$ ($M + Na^+$): 324.0973, found: 324.0976.




PeakTable

PDA Ch1 303nm 4nm

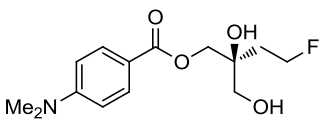
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 19.550 | 22651933 | 842106 | 50.652 | 56.222 |
| 2 | 24.833 | 22069035 | 655722 | 49.348 | 43.778 |
| Total | | 44720968 | 1497828 | 100.000 | 100.000 |




PeakTable

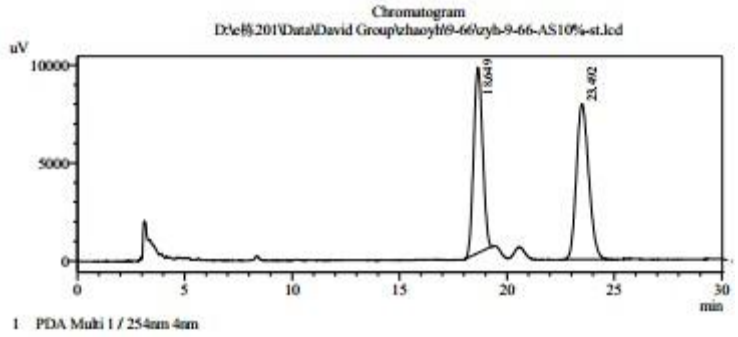
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 19.654 | 123582 | 4667 | 6.078 | 8.013 |
| 2 | 24.760 | 1909750 | 53574 | 93.922 | 91.987 |
| Total | | 2033332 | 58240 | 100.000 | 100.000 |




**(*S*)-4-fluoro-2-hydroxy-2-(hydroxymethyl)butyl 4-(dimethylamino)benzoate**

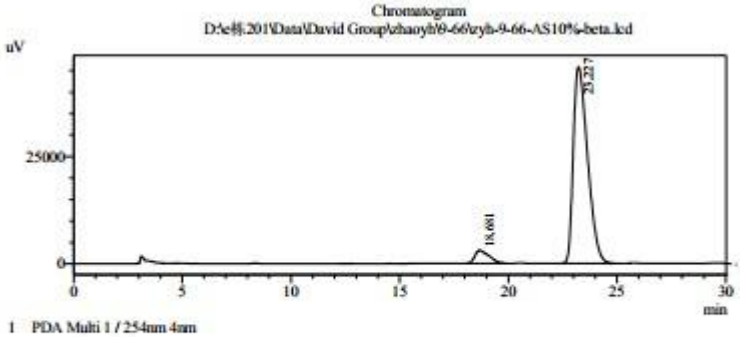
**(18b):** Compound **18b** was obtained via the general procedure in 73% yield. Chiral HPLC analysis (CHIRALCEL AS-H column), 90:10 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ (*R*)-enantiomer (minor) = 18.7 min., $t_R$ (*S*)-enantiomer (major) = 23.2 min.; 6:94 er. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J*= 9.2 Hz, 2H), 6.64 (d, *J*= 9.2 Hz, 2H), 4.79 (t, *J*= 6.4 Hz, 1H), 4.67 (t, *J*= 6.4 Hz, 1H), 4.45 (d, *J*= 11.6 Hz, 1H), 4.22 (d, *J*= 11.6 Hz, 1H), 3.54 (q, *J*= 11.6 Hz, 1H), 3.04 (s, 6H), 2.04 (t, *J*= 6.0 Hz, 1H), 1.97 (t, *J*= 6.0 Hz, 1H); $^{13}$C NMR (100 MHz, $CDCl_3$) δ 167.7, 153.7, 131.6, 115.5, 110.7, 81.0, 79.4, 73.1, 66.3, 66.4, 40.0, 35.1, 34.9; HRMS calculated for $C_{14}H_{21}NO_4F$ ($M + H^+$): 286.1449, found: 286.1451.




PeakTable

PDA Ch1 254nm 4nm

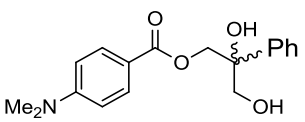
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 18.649 | 276769 | 9492 | 46.585 | 54.494 |
| 2 | 23.492 | 317344 | 7927 | 53.415 | 45.506 |
| Total | | 594112 | 17419 | 100.000 | 100.000 |




PeakTable

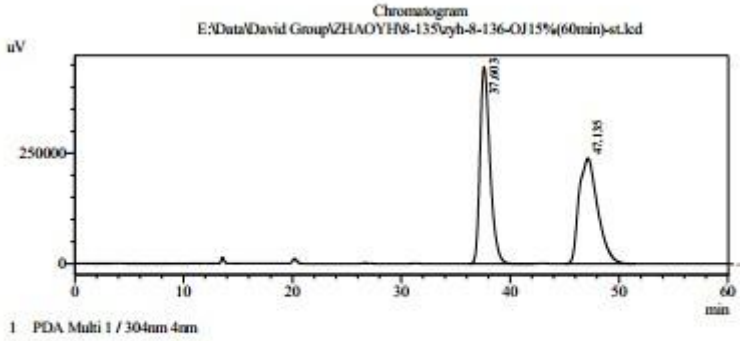
PDA Ch1 254nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 18.681 | 134946 | 3064 | 6.069 | 6.266 |
| 2 | 23.227 | 2088480 | 45832 | 93.931 | 93.734 |
| Total | | 2223427 | 48896 | 100.000 | 100.000 |




**2,3-dihydroxy-2-phenylpropyl 4-(dimethylamino)benzoate (19b):** Compound **19b**

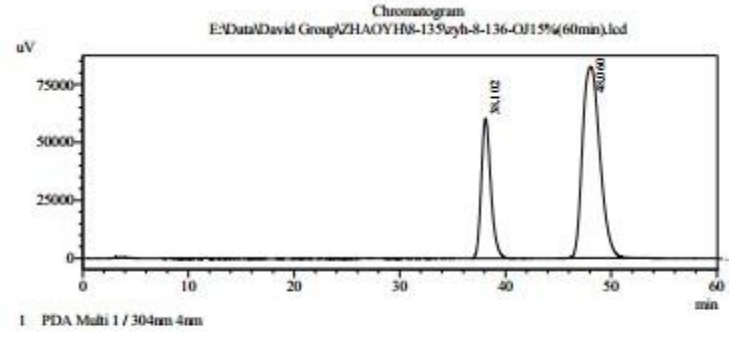
was obtained via the general procedure in 65% yield. Chiral HPLC analysis (CHIRALCEL OJ-H column), 85:15 hexane/ethanol at 1.0 mL/min flow rate; $t_R$ minor-enantiomer = 38.1 min., $t_R$ major-enantiomer = 48.1 min.; 29:72 er. $^1$H NMR (300 MHz, $CDCl_3$) δ 7.84 (d, *J* = 9.0 Hz, 2H), 7.54 (d, *J* = 6.9 Hz, 2H), 7.39-7.29 (m, 3H), 6.60 (d, *J* = 9.0 Hz, 2H), 4.62 (d, *J* = 11.7 Hz, 1H), 4.50 (d, *J* = 11.7 Hz, 1H), 3.88 (d, *J* = 11.7 Hz, 1H), 3.74 (d, *J* = 8.1 Hz, 2H), 3.13 (s, 1H), 3.01 (s, 6H); $^{13}$C NMR (75 MHz, $CDCl_3$) δ 167.6, 153.6, 141.2, 131.2, 128.3, 127.6, 125.6, 115.8, 110.7, 76.0, 68.0, 67.1, 40.0; HRMS calculated for $C_{18}H_{21}NO_4Na$ (M + $Na^+$): 338.1368, found: 338.1362.




PeakTable

PDA Ch1 304nm 4nm

| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 37.603 | 28476112 | 446819 | 49.942 | 65.122 |
| 2 | 47.135 | 28542324 | 239305 | 50.058 | 34.878 |
| Total | | 57018436 | 686124 | 100.000 | 100.000 |

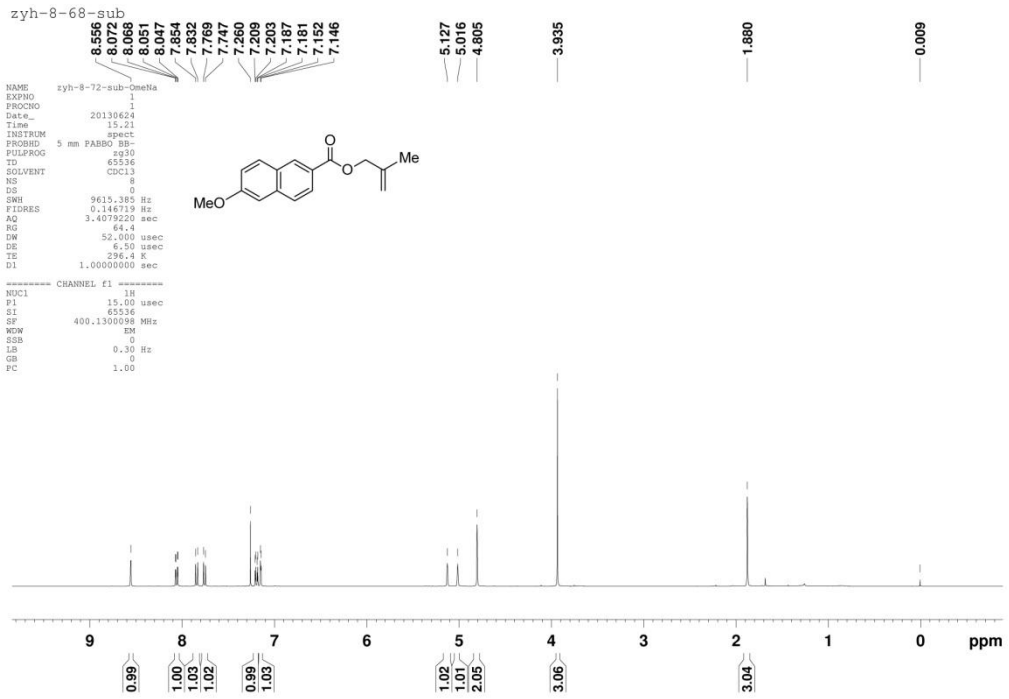


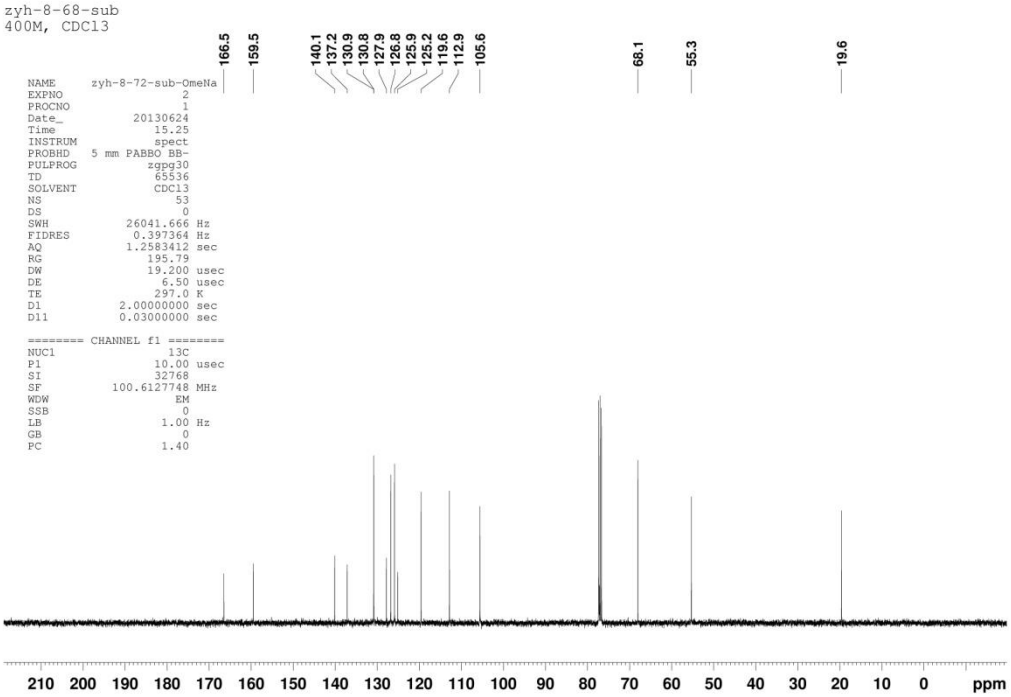

PeakTable

PDA Ch1 304nm 4nm

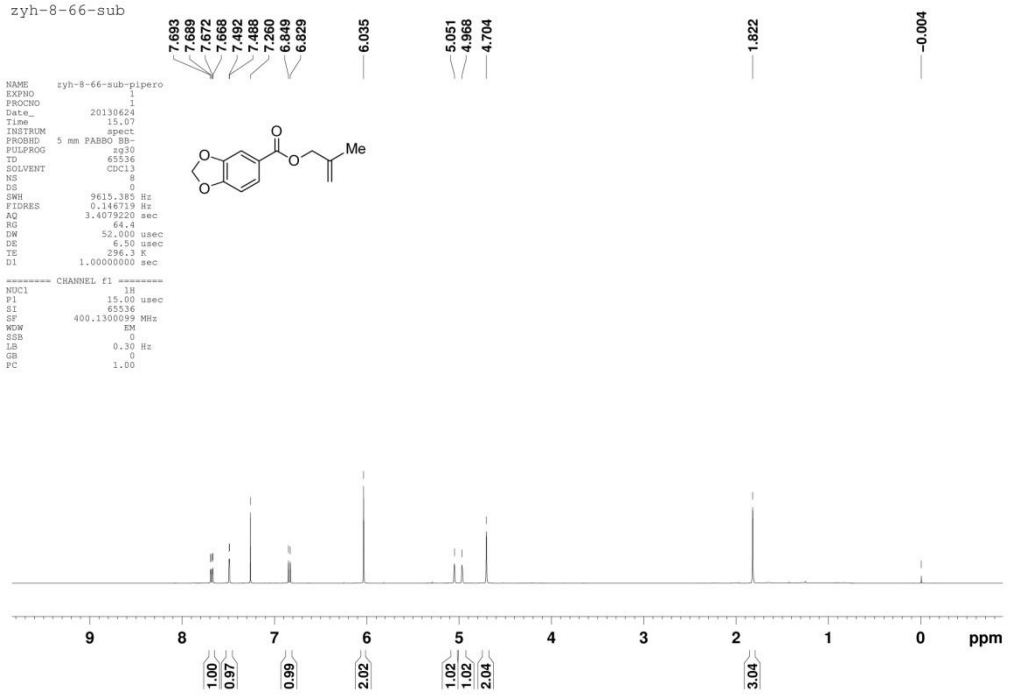
| Peak# | Ret. Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 38.102 | 3783071 | 60366 | 28.633 | 42.231 |
| 2 | 48.060 | 9429343 | 82576 | 71.367 | 57.769 |
| Total | | 13212414 | 142943 | 100.000 | 100.000 |

# 6. Copies of $^{1}$H NMR and $^{13}$C NMR Spectra



zyh-8-66-sub




```
NAME          zyh-8-66-sub-pipero
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PROCNO                          1
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Time                        15.07
INSTRUM                     spect
PROBHD   5 mm PABBO BB-
PULPROG                     zg30
TD                         65536
SOLVENT                    CDCl3
NS                             8
DS                             0
SWH                     9615.385 Hz
FIDRES                  0.146719 Hz
AQ                      3.4079220 sec
RG                          64.4
DW                        52.000 usec
DE                         6.50 usec
TE                        296.3 K
D1                     1.00000000 sec

======== CHANNEL f1 ========
NUC1                          1H
P1                         15.00 usec
SI                         65536
SF                  400.1300099 MHz
WDW                           EM
SSB                            0
LB                          0.30 Hz
GB                             0
PC                          1.00
```
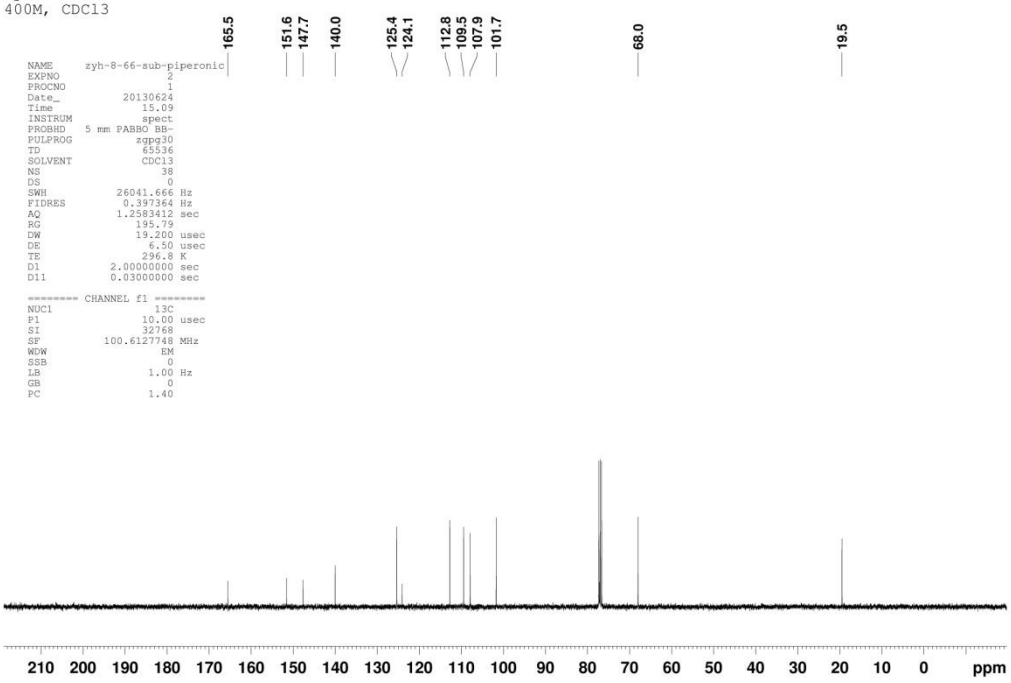

zyh-8-66-sub
400M, CDCl3

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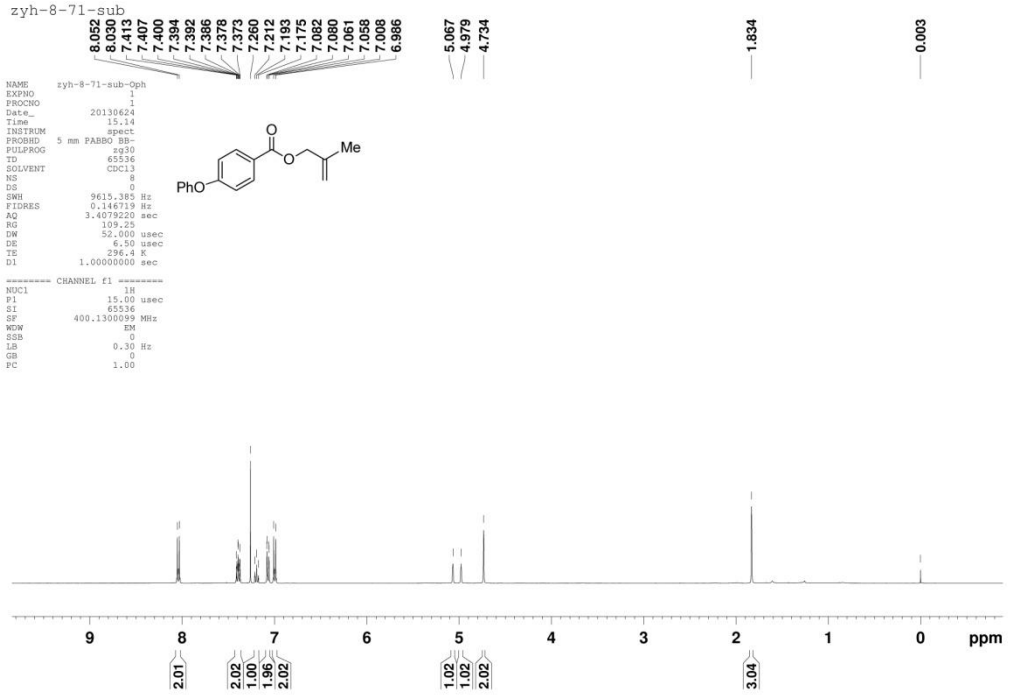
EXPNO                           2
PROCNO                          1
Date_                    20130624
Time                        15.09
INSTRUM                     spect
PROBHD   5 mm PABBO BB-
PULPROG                   zgpg30
TD                         65536
SOLVENT                    CDCl3
NS                            38
DS                             0
SWH                    26041.666 Hz
FIDRES                  0.397364 Hz
AQ                      1.2583412 sec
RG                         195.79
DW                         19.200 usec
DE                          6.50 usec
TE                        296.8 K
D1                     2.00000000 sec
D11                    0.03000000 sec

======== CHANNEL f1 ========
NUC1                          13C
P1                         10.00 usec
SI                         32768
SF                  100.6127748 MHz
WDW                           EM
SSB                            0
LB                          1.00 Hz
GB                             0
PC                          1.40
```


zyh-8-71-sub
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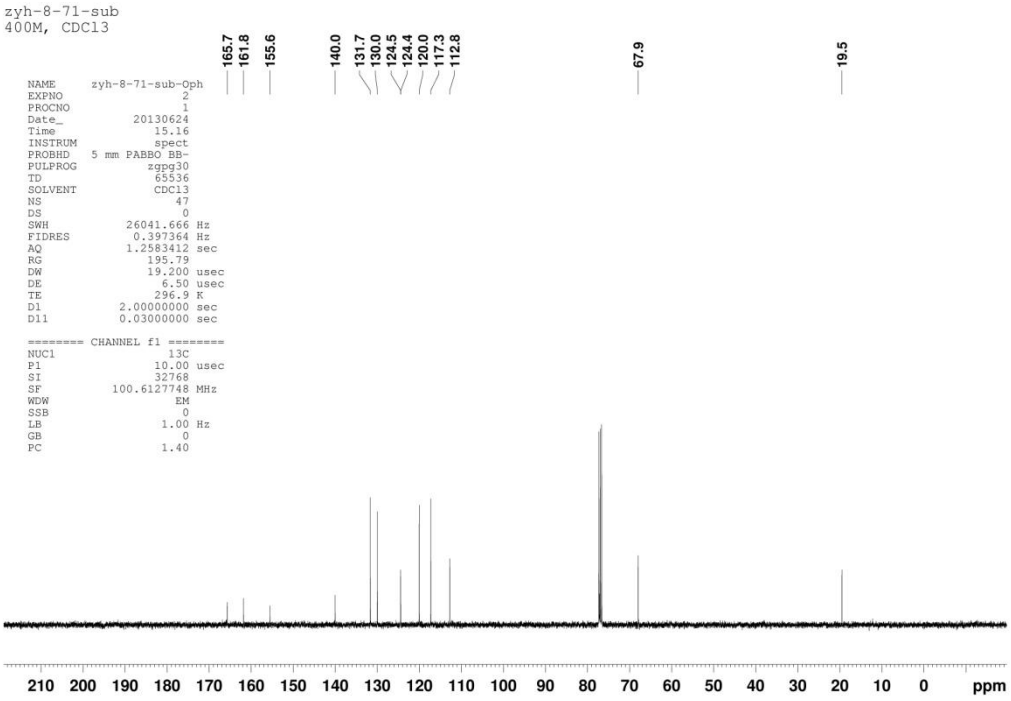
8.030
7.413
7.407
7.400
7.394
7.392
7.386
7.378
7.373
7.260
7.212
7.193
7.175
7.082
7.080
7.061
7.058
7.008
6.986
5.067
4.979
4.734
1.834
0.003
NAME zyh-8-71-sub-Oph
EXPNO 1
PROCNO 1
Date_ 20130624
Time 15.14
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 109.25
DW 52.000 usec
DE 6.50 usec
TE 296.4 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
Me
PhO
9
8
7
6
5
4
3
2
1
0
ppm
2.01
2.02
1.00
1.96
2.02
1.02
1.02
2.02
3.04


zyh-8-71-sub
400M, CDCl3
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161.8
155.6
140.0
131.7
130.0
124.5
124.4
120.0
117.3
112.8
67.9
19.5
NAME zyh-8-71-sub-Oph
EXPNO 2
PROCNO 1
Date_ 20130624
Time 15.16
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 47
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 296.9 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
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150
140
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110
100
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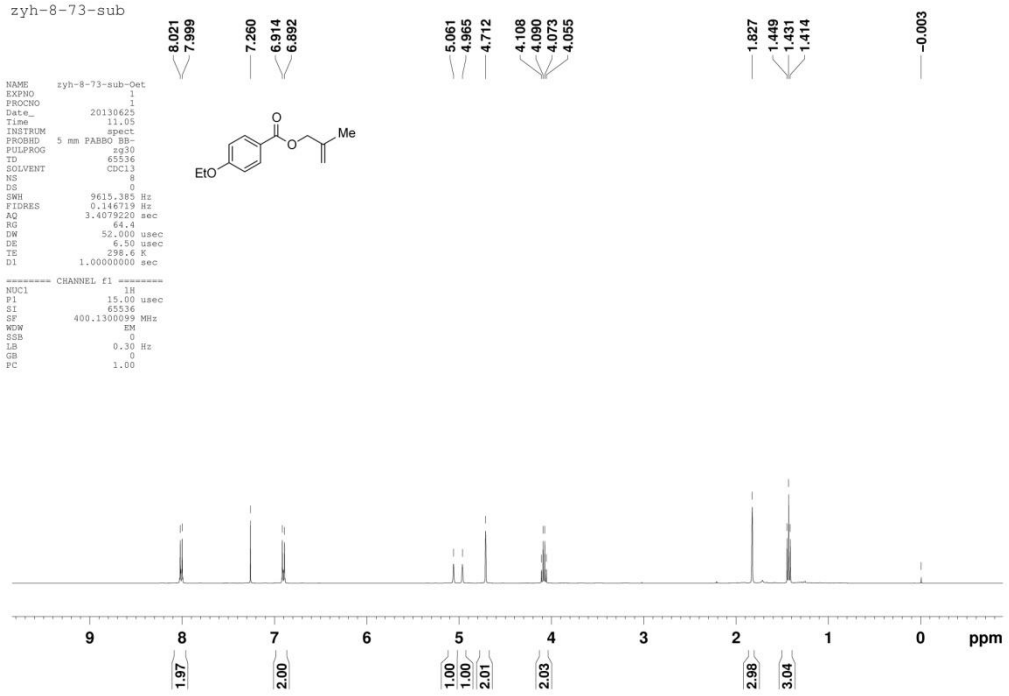
70
60
50
40
30
20
10
0
ppm


zyh-8-73-sub
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6.914
6.892
5.061
4.965
4.712
4.108
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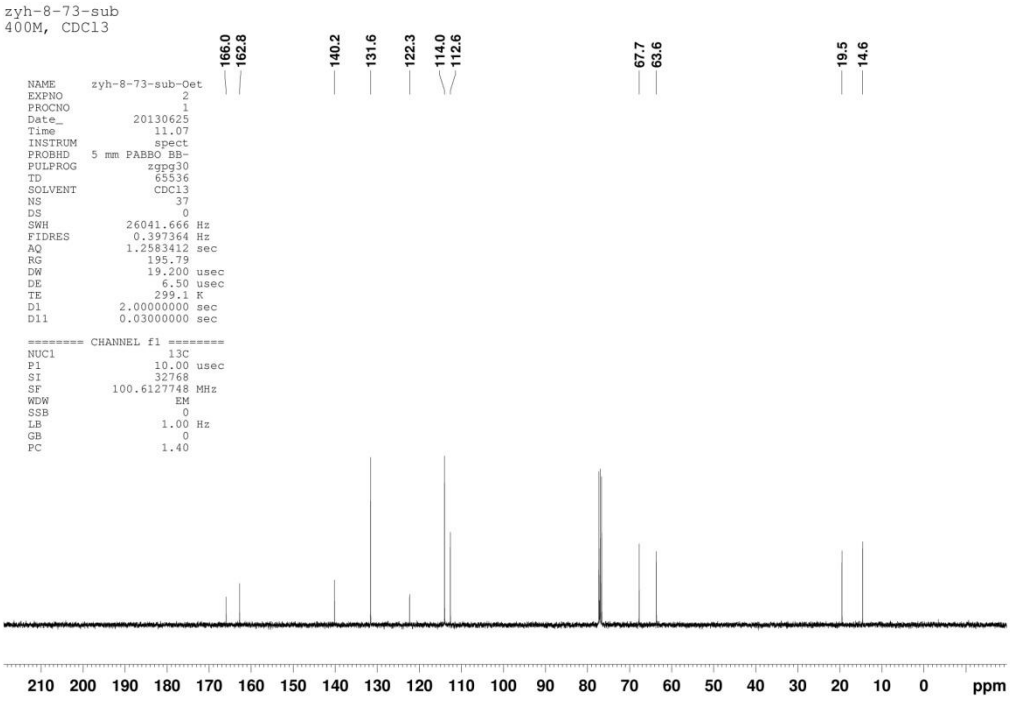
4.073
4.055
1.827
1.449
1.431
1.414
-0.003
NAME zyh-8-73-sub-Oet
EXPNO 1
PROCNO 1
Date_ 20130625
Time 11.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 64.4
DW 52.000 usec
DE 6.50 usec
TE 298.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
Me
EtO
9
8
7
6
5
4
3
2
1
0
ppm
1.97
2.00
1.00
1.00
2.01
2.03
2.98
3.04


zyh-8-73-sub
400M, CDCl3
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162.8
140.2
131.6
122.3
114.0
112.6
67.7
63.6
19.5
14.6
NAME zyh-8-73-sub-Oet
EXPNO 2
PROCNO 1
Date_ 20130625
Time 11.07
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 37
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 299.1 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
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140
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110
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90
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70
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50
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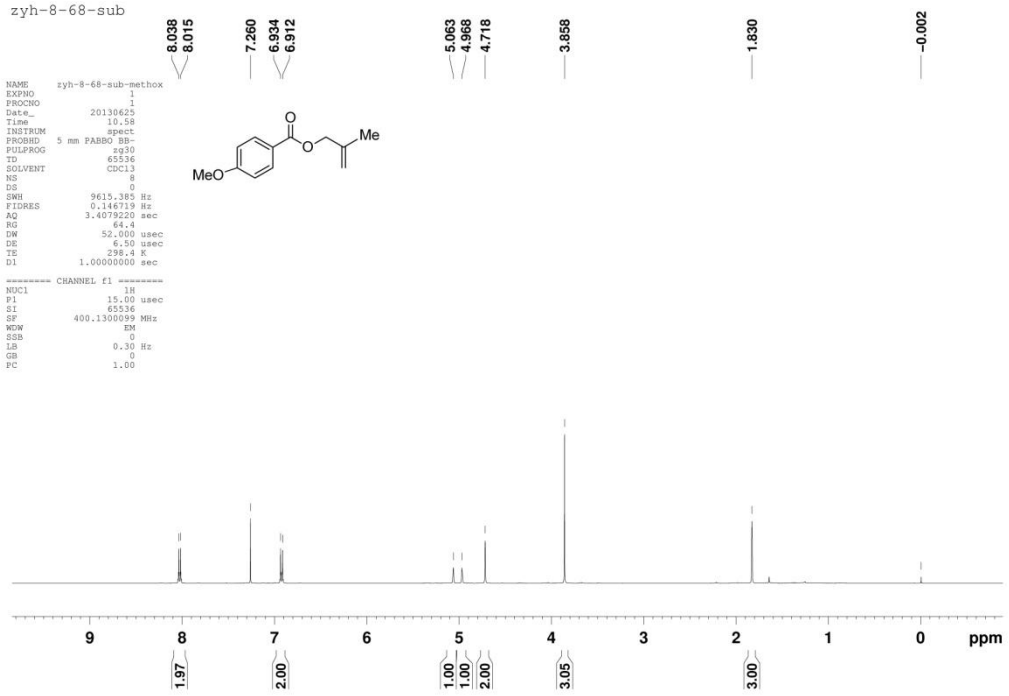
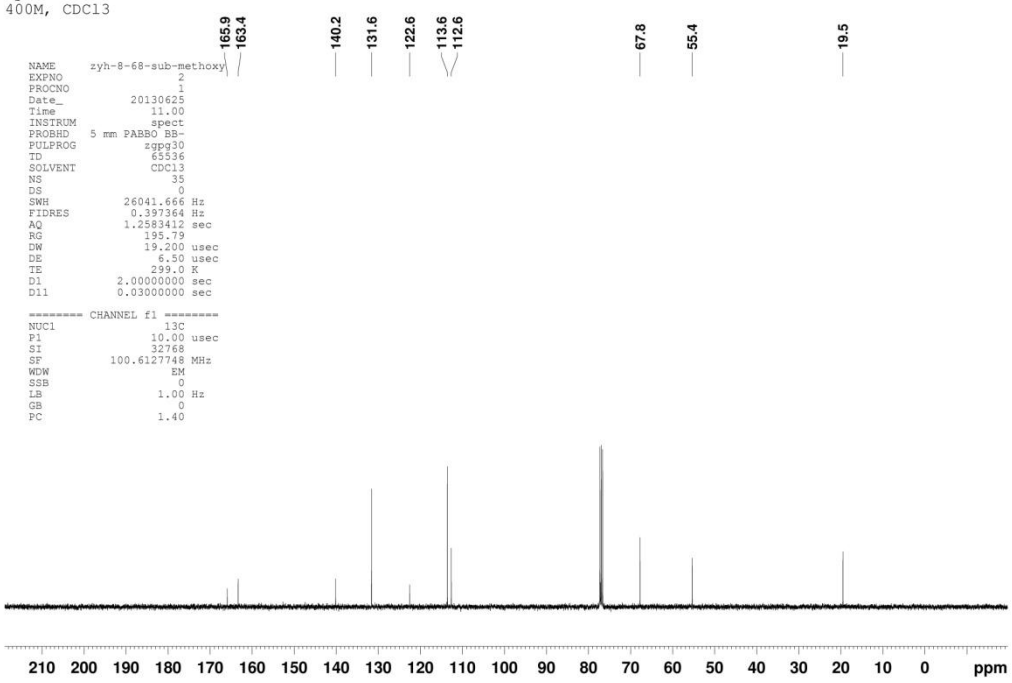
30
20
10
0
ppm

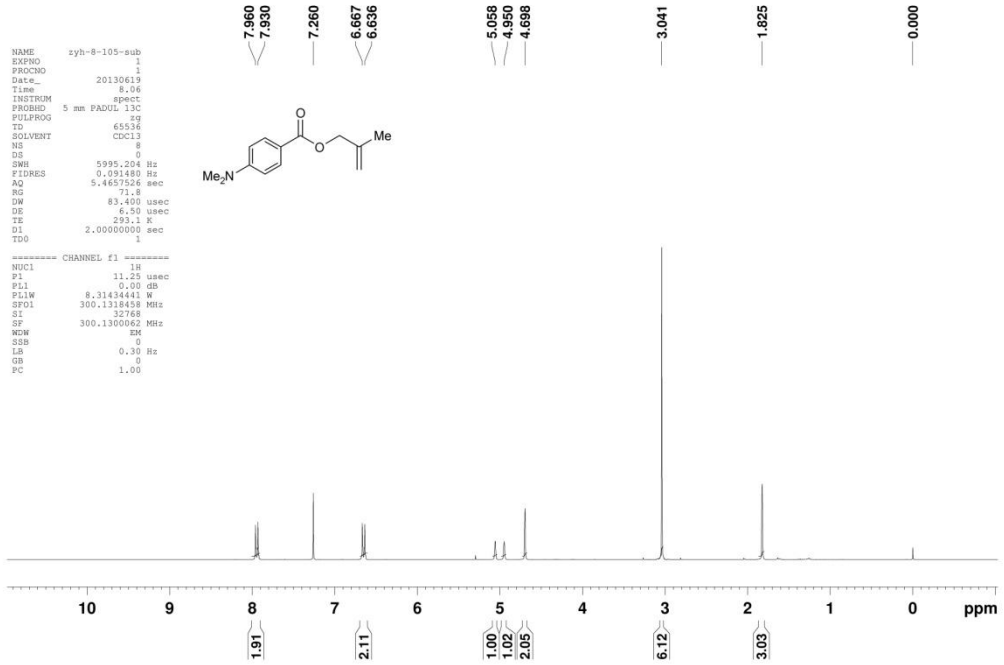
zyh-8-68-sub




zyh-8-68-sub
400M, CDCl3



zyh-8-101

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PROCNO                    1
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PULPROG                zg
TD                    65536
SOLVENT               CDCl3
NS                        8
DS                        0
SWH                5995.204 Hz
FIDRES             0.091480 Hz
AQ                 5.4657526 sec
RG                      71.8
DW                    83.400 usec
DE                     6.50 usec
TE                   293.1 K
D1                 2.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                      1H
P1                    11.25 usec
PL1                    0.00 dB
PL1W               8.31434441 W
SFO1             300.1318458 MHz
SI                      32768
SF               300.1300062 MHz
WDW                        EM
SSB                        0
LB                     0.30 Hz
GB                         0
PC                     1.00
```
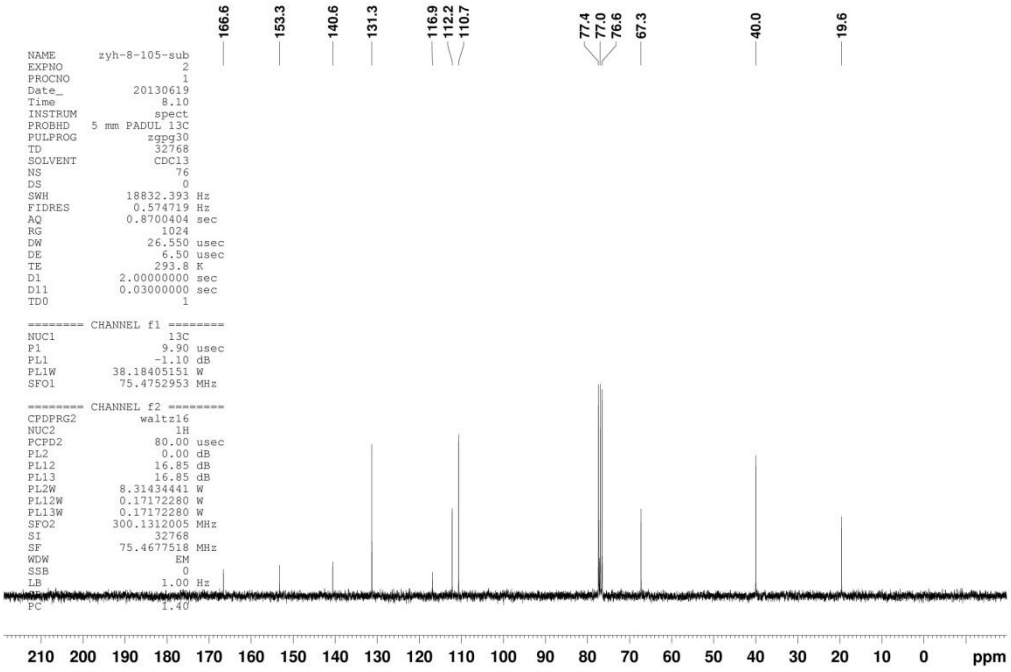
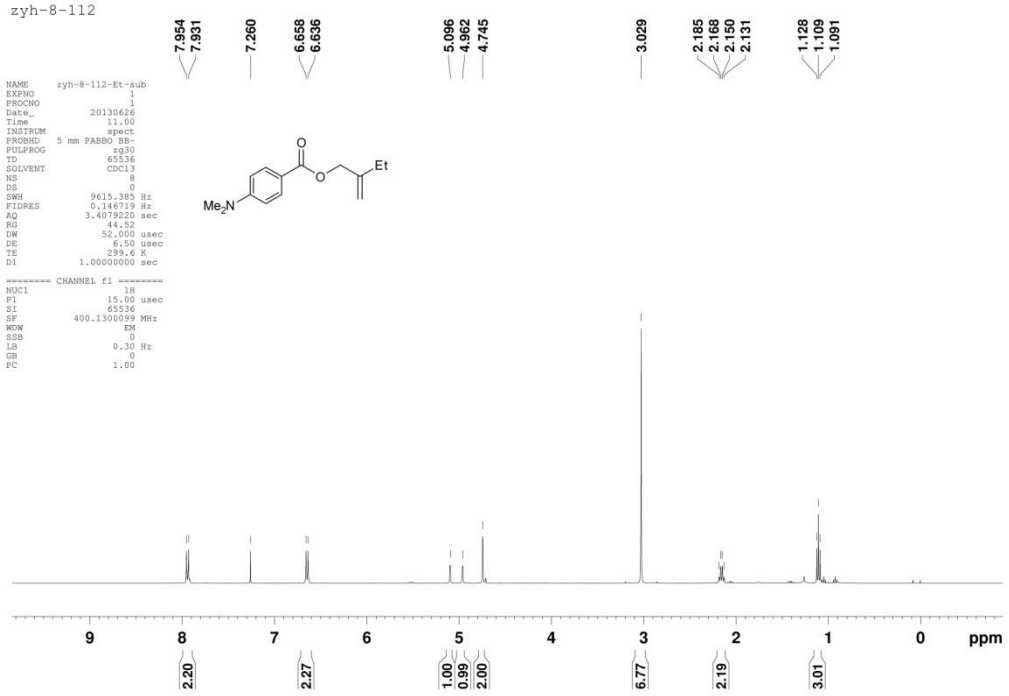
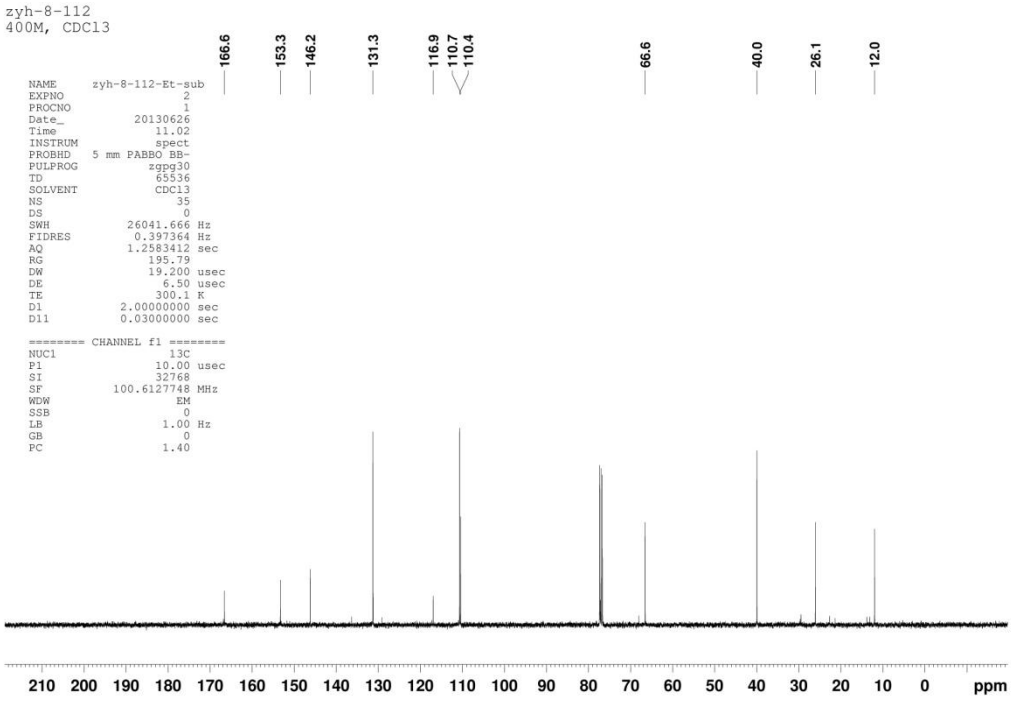

zyh-8-101

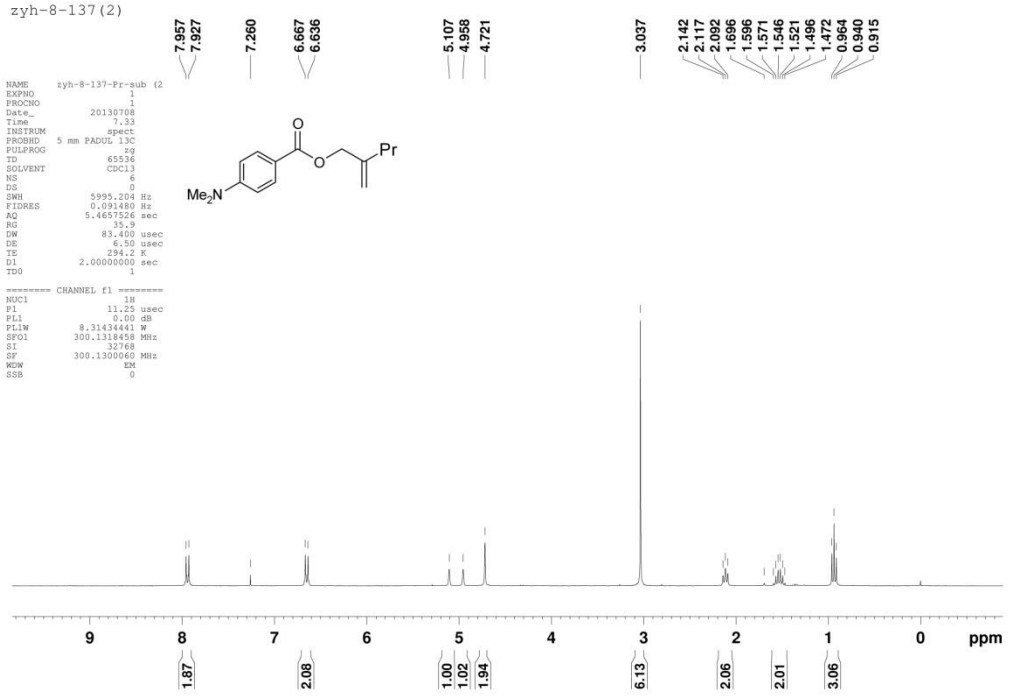



```
NAME          zyh-8-105-sub
EXPNO                     2
PROCNO                    1
Date_              20130619
Time                   8.10
INSTRUM               spect
PROBHD   5 mm PADUL 13C
PULPROG             zgpg30
TD                    32768
SOLVENT               CDCl3
NS                       76
DS                        0
SWH               18832.393 Hz
FIDRES             0.574719 Hz
AQ                 0.8700404 sec
RG                     1024
DW                    26.550 usec
DE                     6.50 usec
TE                   293.8 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     13C
P1                     9.90 usec
PL1                   -1.10 dB
PL1W              38.18405151 W
SFO1              75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                      1H
PCPD2                 80.00 usec
PL2                    0.00 dB
PL12                  16.85 dB
PL13                  16.85 dB
PL2W               8.31434441 W
PL12W              0.17172280 W
PL13W              0.17172280 W
SFO2             300.1312005 MHz
SI                      32768
SF               75.4677518 MHz
WDW                        EM
SSB                        0
LB                     1.00 Hz
GB                         0
PC                     1.40
```


zyh-8-112
7.954
7.931
7.260
6.658
6.636
5.096
4.962
4.745
3.029
2.185
2.168
2.150
2.131
1.128
1.109
1.091
NAME zyh-8-112-Et-sub
EXPNO 1
PROCNO 1
Date_ 20130626
Time 11.00
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 44.52
DW 52.000 usec
DE 6.50 usec
TE 299.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
Et
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.20
2.27
1.00
0.99
2.00
6.77
2.19
3.01

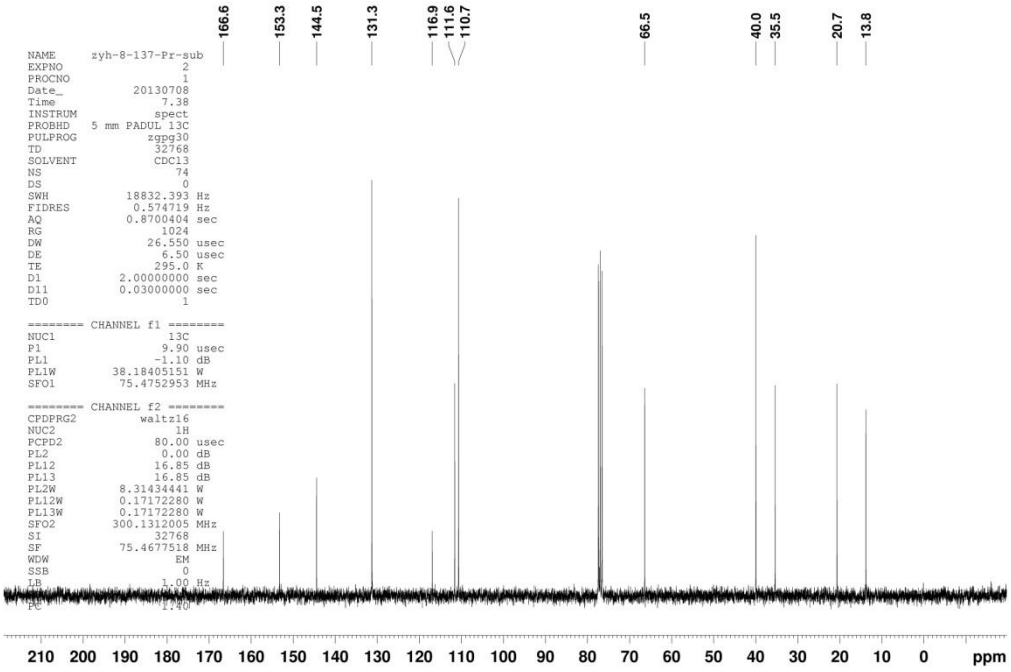

zyh-8-112
400M, CDCl3
166.6
153.3
146.2
131.3
116.9
110.7
110.4
66.6
40.0
26.1
12.0
NAME zyh-8-112-Et-sub
EXPNO 2
PROCNO 1
Date_ 20130626
Time 11.02
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 35
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 300.1 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

zyh-8-137(2)

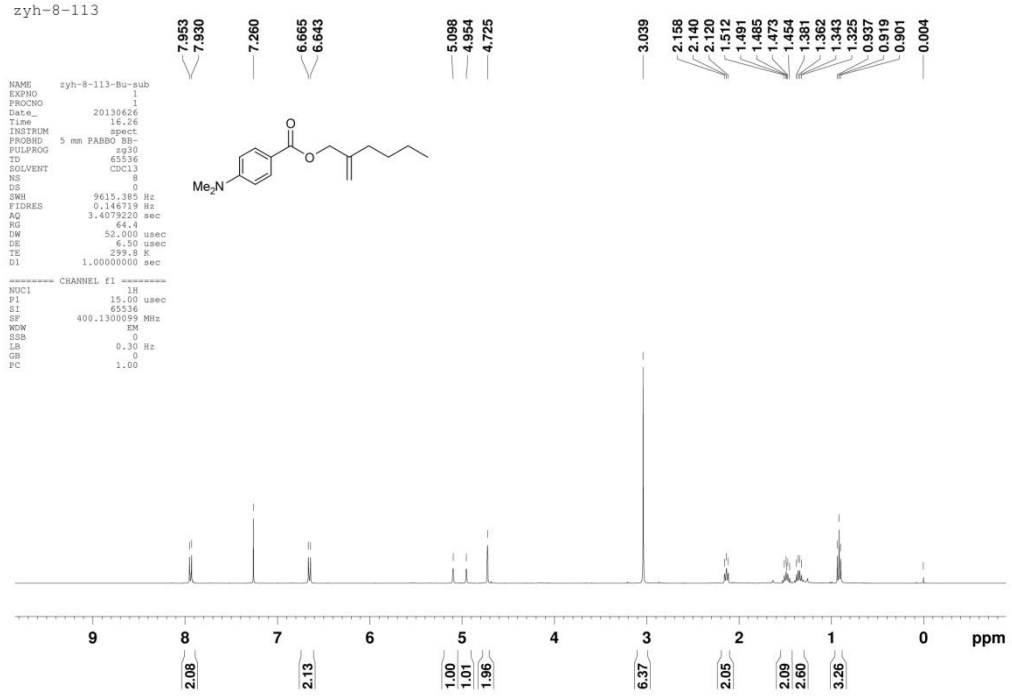


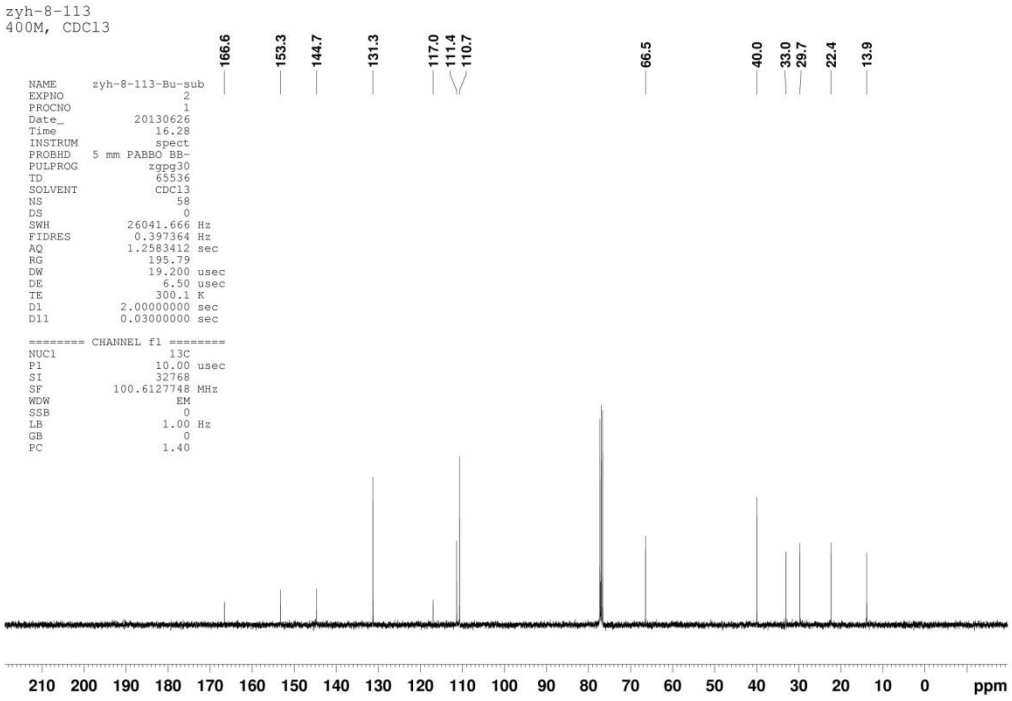

```
NAME      zyh-8-137-Pr-sub (2
EXPNO                     1
PROCNO                    1
Date_              20130708
Time                   7.33
INSTRUM               spect
PROBHD   5 mm PADUL 13C
PULPROG                zg
TD                    65536
SOLVENT               CDCl3
NS                        6
DS                        0
SWH                5995.204 Hz
FIDRES             0.091480 Hz
AQ                 5.4657526 sec
RG                      35.9
DW                   83.400 usec
DE                    6.50 usec
TE                   294.2 K
D1                 2.00000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                      1H
P1                     11.25 usec
PL1                     0.00 dB
PL1W             8.31434441 W
SFO1            300.1318458 MHz
SI                      32768
SF              300.1300060 MHz
WDW                      EM
SSB                       0
```

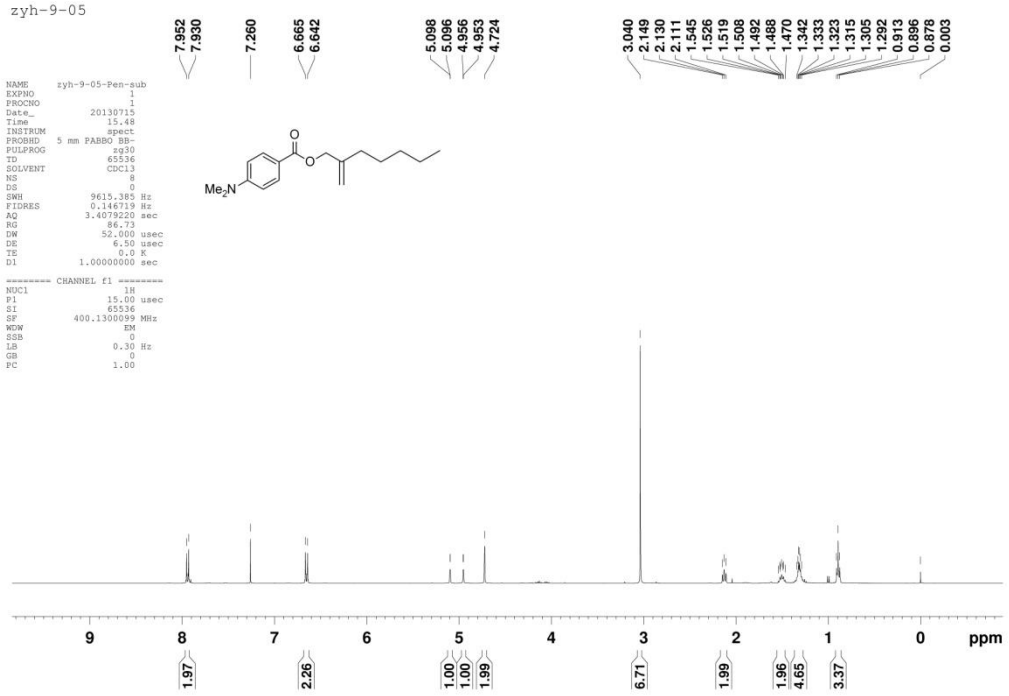
zyh-8-137

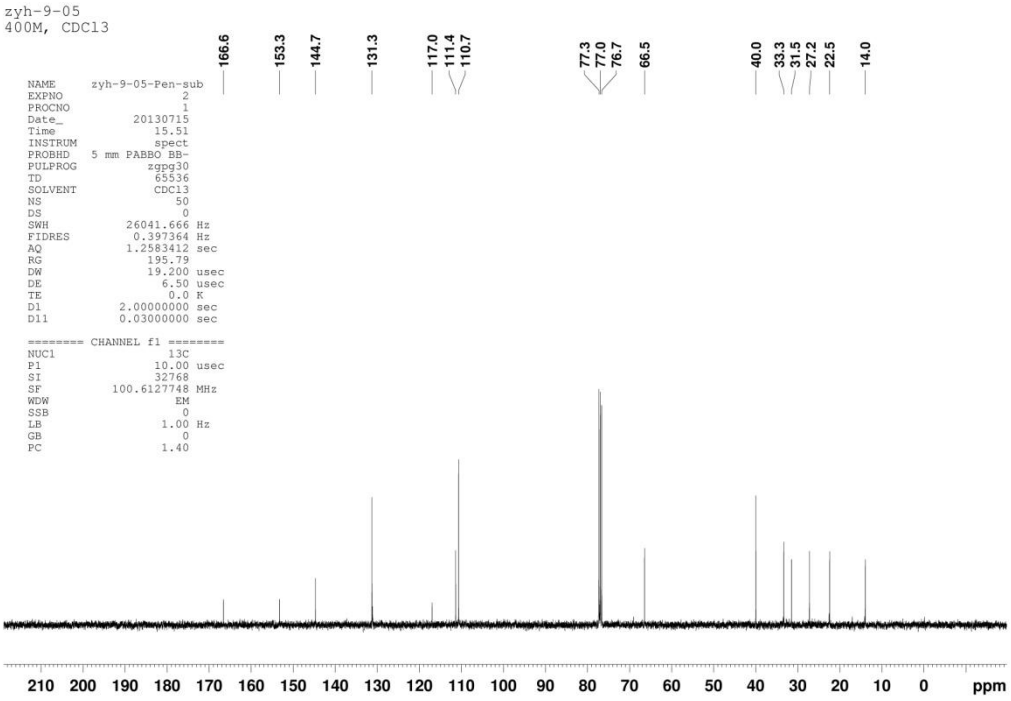


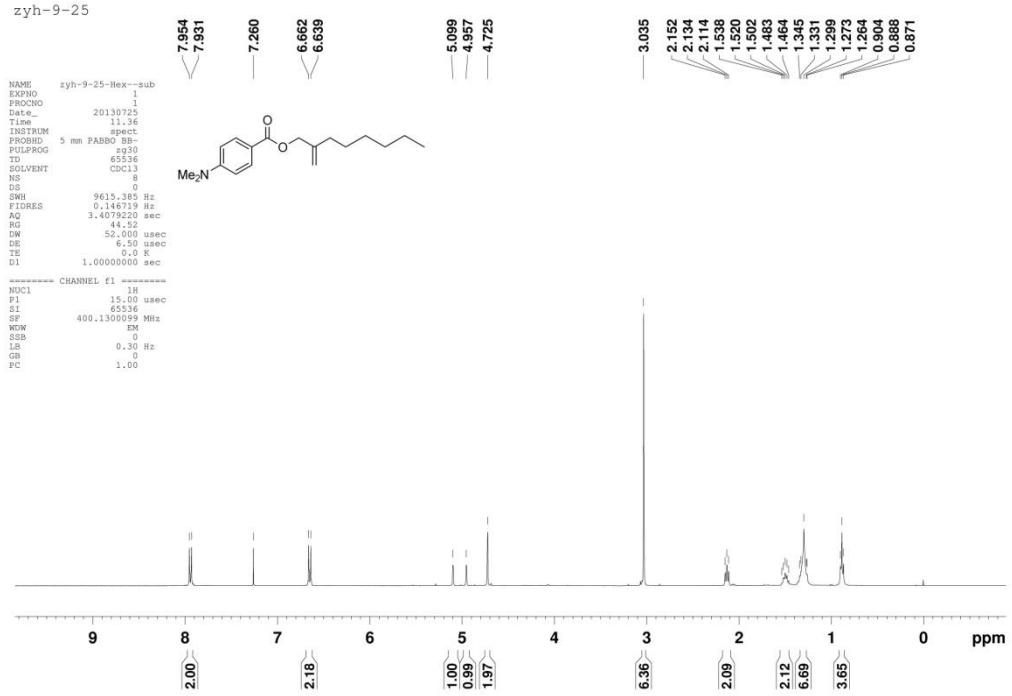

```
NAME      zyh-8-137-Pr-sub
EXPNO                     2
PROCNO                    1
Date_              20130708
Time                   7.38
INSTRUM               spect
PROBHD   5 mm PADUL 13C
PULPROG             zgpg30
TD                    32768
SOLVENT               CDCl3
NS                       74
DS                        0
SWH              18832.393 Hz
FIDRES             0.574719 Hz
AQ                 0.8700404 sec
RG                     1024
DW                   26.550 usec
DE                    6.50 usec
TE                   295.0 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     13C
P1                     9.90 usec
PL1                   -1.10 dB
PL1W            38.18405151 W
SFO1            75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2             waltz16
NUC2                     1H
PCPD2                80.00 usec
PL2                   0.00 dB
PL12                 16.85 dB
PL13                 16.85 dB
PL2W             8.31434441 W
PL12W            0.17172280 W
PL13W            0.17172280 W
SFO2            300.1312005 MHz
SI                    32768
SF              75.4677518 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40
```

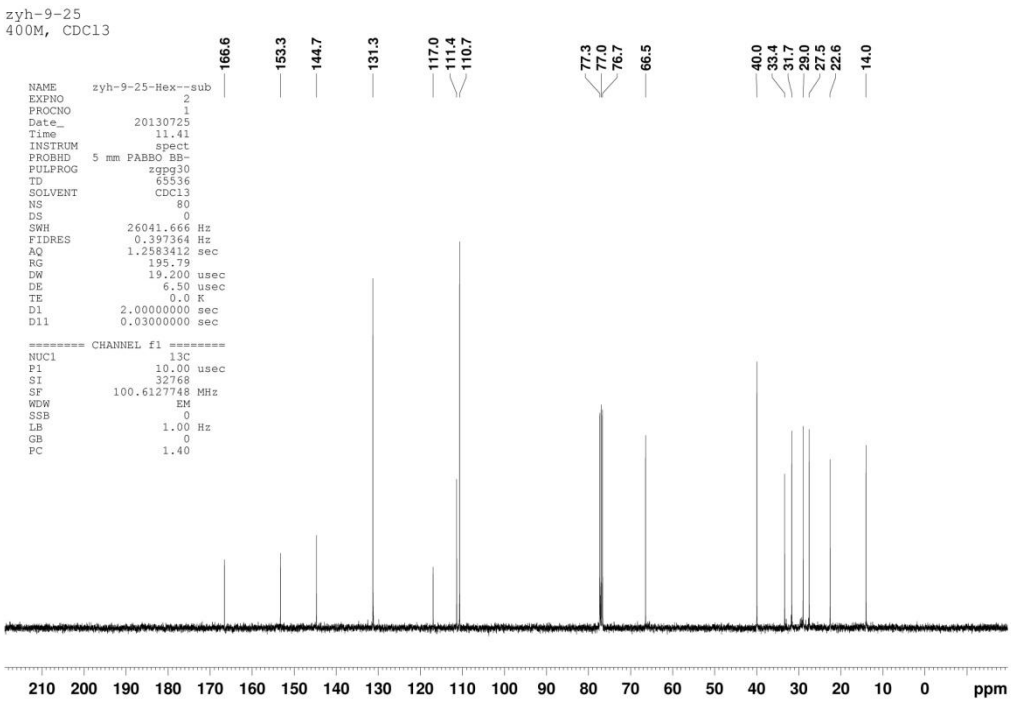

zyh-8-113
7.953
7.930
7.260
6.665
6.643
5.098
4.954
4.725
3.039
2.158
2.140
2.120
1.512
1.491
1.485
1.473
1.454
1.381
1.362
1.343
1.325
0.937
0.919
0.901
0.004
NAME zyh-8-113-Bu-sub
EXPNO 1
PROCNO 1
Date_ 20130626
Time 16.26
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 64.4
DW 52.000 usec
DE 6.50 usec
TE 299.8 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.08
2.13
1.00
1.01
1.96
6.37
2.05
2.09
2.60
3.26

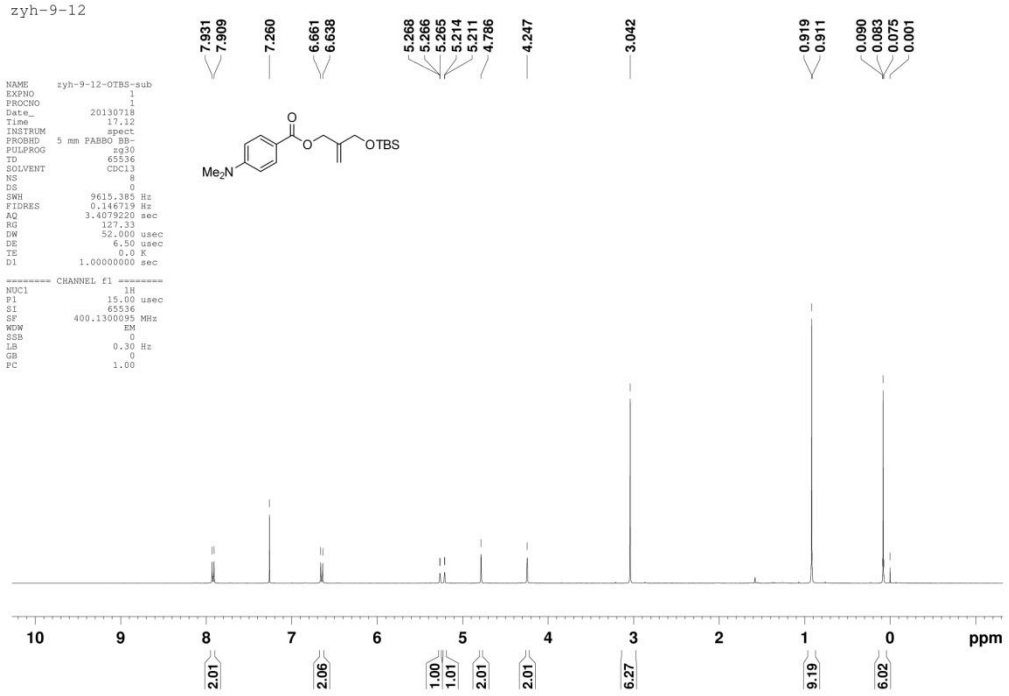

zyh-8-113
400M, CDCl3
166.6
153.3
144.7
131.3
117.0
111.4
110.7
66.5
40.0
33.0
29.7
22.4
13.9
NAME zyh-8-113-Bu-sub
EXPNO 2
PROCNO 1
Date_ 20130626
Time 16.28
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 58
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 300.1 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

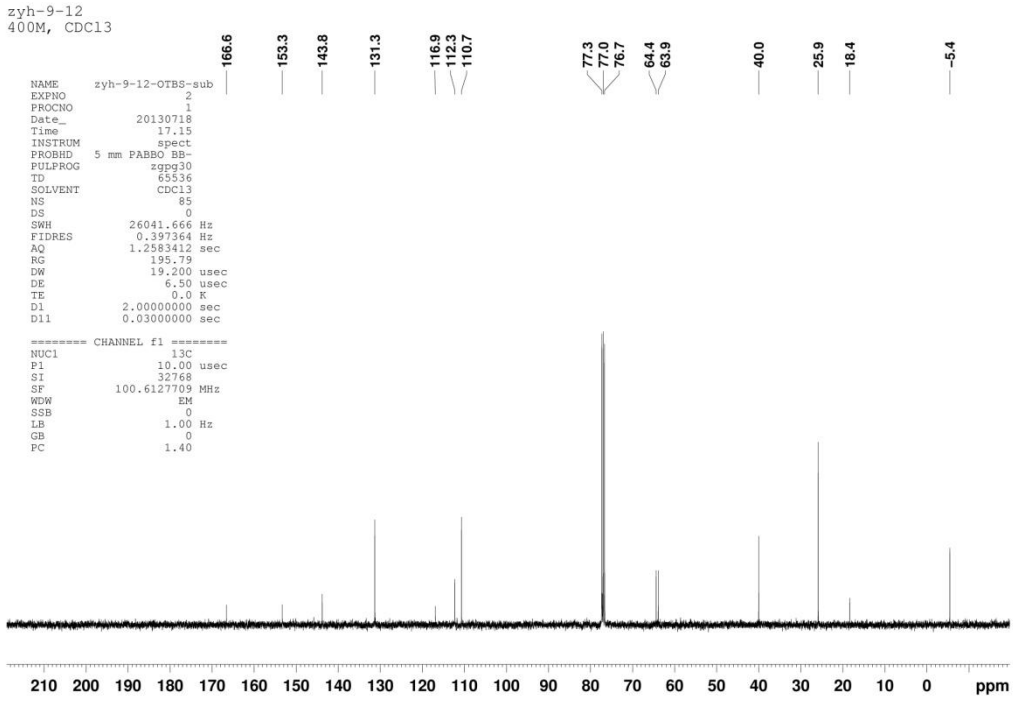

zyh-9-05
7.952
7.930
7.260
6.665
6.642
5.098
5.096
4.956
4.953
4.724
3.040
2.149
2.130
2.111
1.545
1.526
1.519
1.508
1.492
1.488
1.470
1.342
1.333
1.323
1.315
1.305
1.292
0.913
0.896
0.878
0.003
NAME zyh-9-05-Pen-sub
EXPNO 1
PROCNO 1
Date_ 20130715
Time 15.48
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 86.73
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
1.97
2.26
1.00
1.00
1.99
6.71
1.99
1.96
4.65
3.37

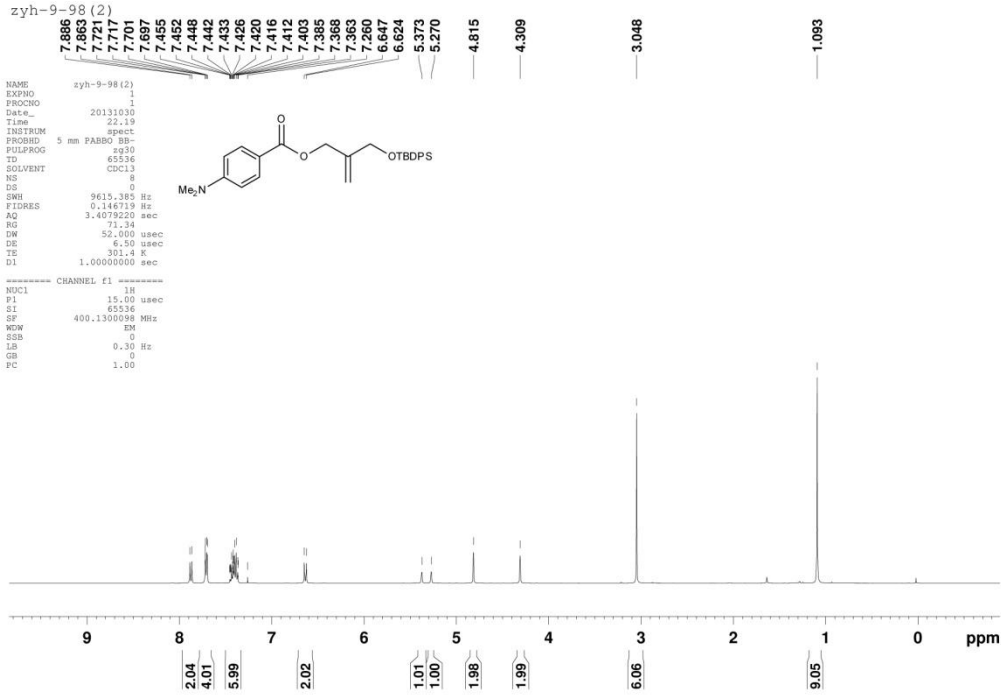

zyh-9-05
400M, CDCl3
166.6
153.3
144.7
131.3
117.0
111.4
110.7
77.3
77.0
76.7
66.5
40.0
33.3
31.5
27.2
22.5
14.0
NAME zyh-9-05-Pen-sub
EXPNO 2
PROCNO 1
Date_ 20130715
Time 15.51
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 50
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

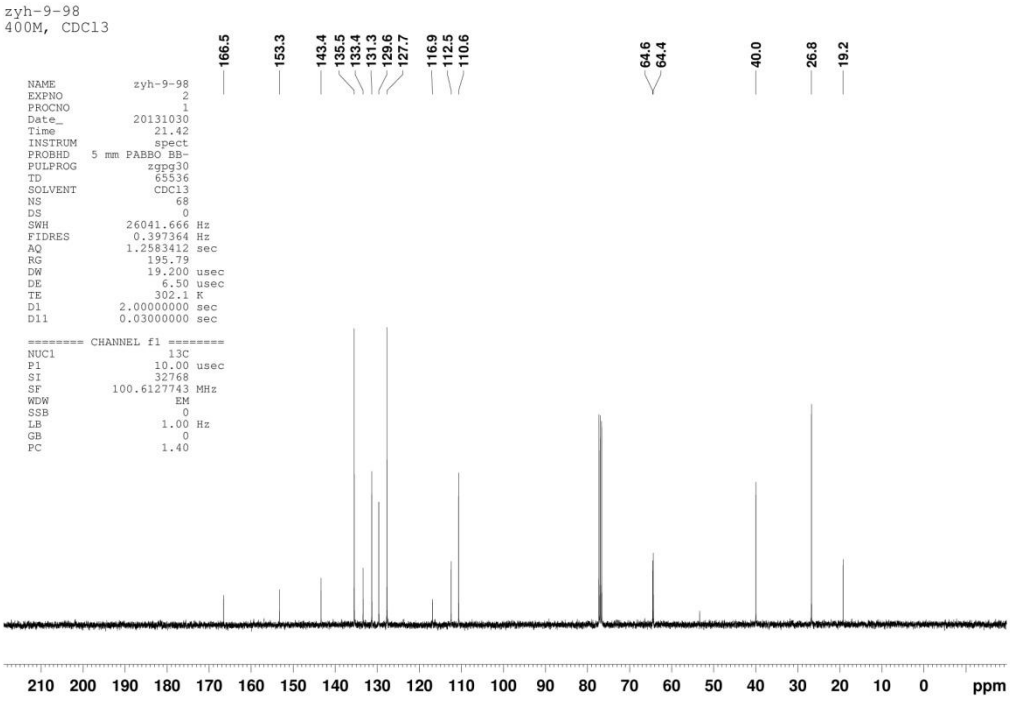

zyh-9-25
7.954
7.931
7.260
6.662
6.639
5.099
4.957
4.725
3.035
2.152
2.134
2.114
1.538
1.520
1.502
1.483
1.464
1.345
1.331
1.299
1.273
1.264
0.904
0.888
0.871
NAME zyh-9-25-Hex--sub
EXPNO 1
PROCNO 1
Date_ 20130725
Time 11.36
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 44.52
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.00
2.18
1.00
0.99
1.97
6.36
2.09
2.12
6.69
3.65

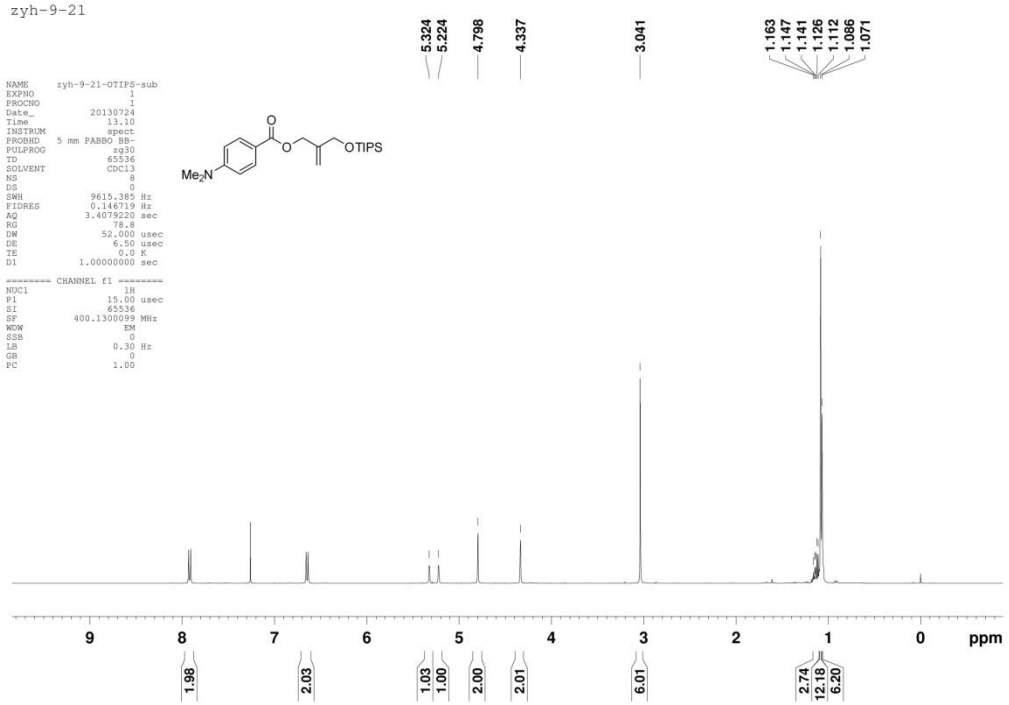

zyh-9-25
400M, CDCl3
166.6
153.3
144.7
131.3
117.0
111.4
110.7
77.3
77.0
76.7
66.5
40.0
33.4
31.7
29.0
27.5
22.6
14.0
NAME zyh-9-25-Hex--sub
EXPNO 2
PROCNO 1
Date_ 20130725
Time 11.41
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 80
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

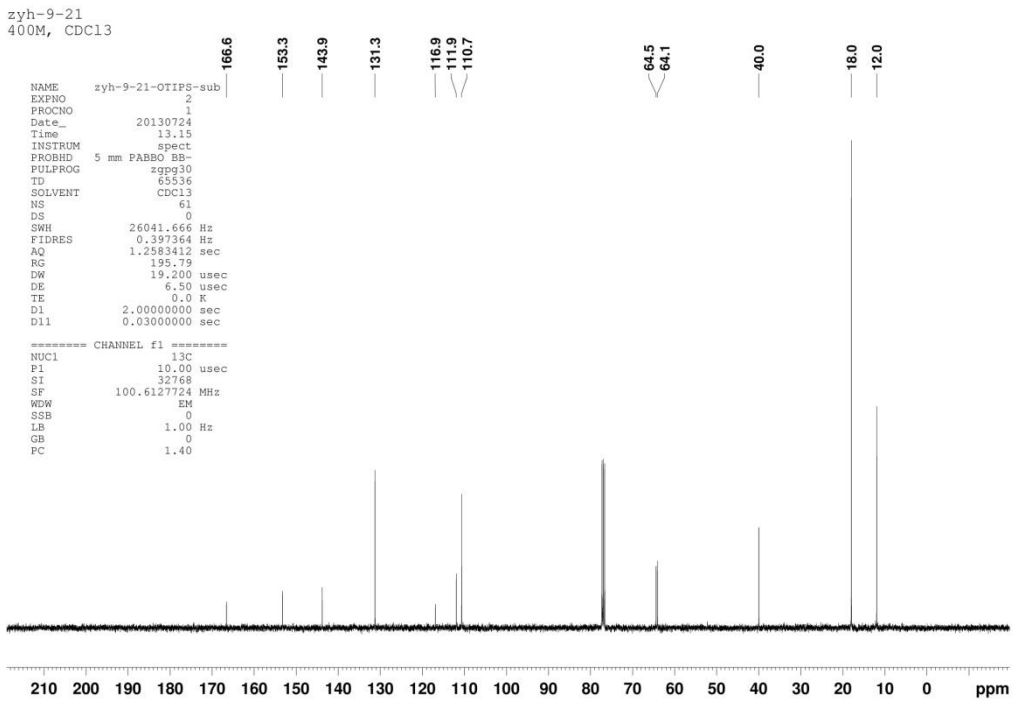

zyh-9-12
7.931
7.909
7.260
6.661
6.638
5.268
5.266
5.265
5.214
5.211
4.786
4.247
3.042
0.919
0.911
0.090
0.083
0.075
0.001
OTBS
Me2N
NAME zyh-9-12-OTBS-sub
EXPNO 1
PROCNO 1
Date_ 20130718
Time 17.12
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 127.33
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
10 9 8 7 6 5 4 3 2 1 0 ppm
2.01 2.06 1.00 1.01 2.01 2.01 6.27 9.19 6.02

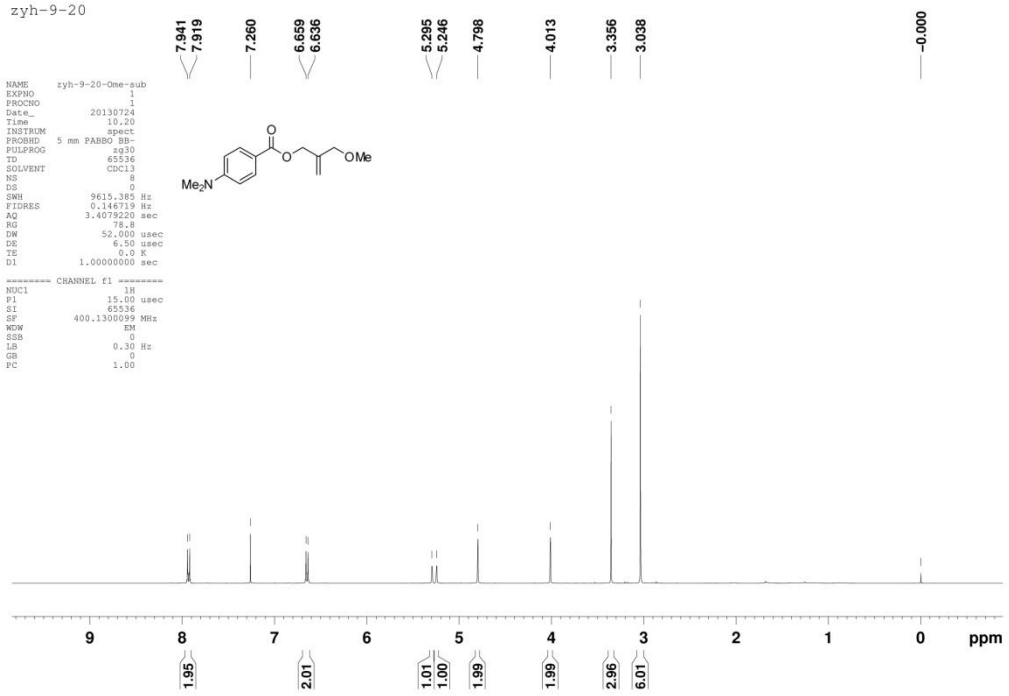

zyh-9-12
400M, CDCl3
166.6
153.3
143.8
131.3
116.9
112.3
110.7
77.3
77.0
76.7
64.4
63.9
40.0
25.9
18.4
-5.4
NAME zyh-9-12-OTBS-sub
EXPNO 2
PROCNO 1
Date_ 20130718
Time 17.15
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 85
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127709 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

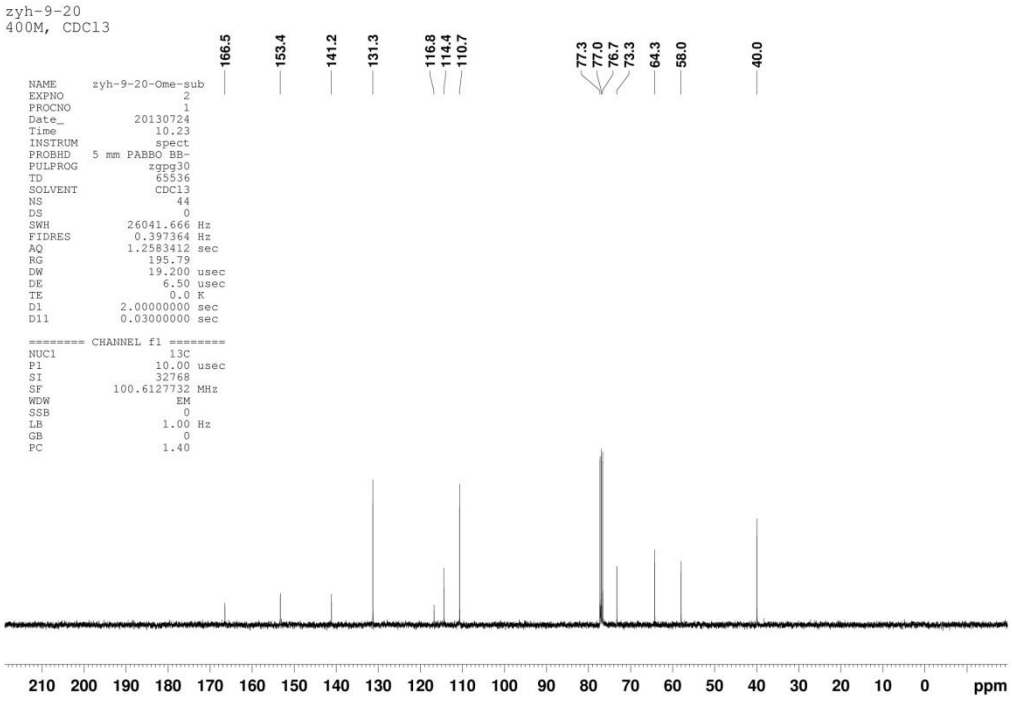

zyh-9-98(2)
7.886
7.863
7.721
7.717
7.701
7.697
7.455
7.452
7.448
7.442
7.433
7.426
7.420
7.416
7.412
7.403
7.385
7.368
7.363
7.260
6.647
6.624
5.373
5.270
4.815
4.309
3.048
1.093
NAME zyh-9-98(2)
EXPNO 1
PROCNO 1
Date_ 20131030
Time 22.19
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 71.34
DW 52.000 usec
DE 6.50 usec
TE 301.4 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OTBDPS
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.04
4.01
5.99
2.02
1.01
1.00
1.98
1.99
6.06
9.05

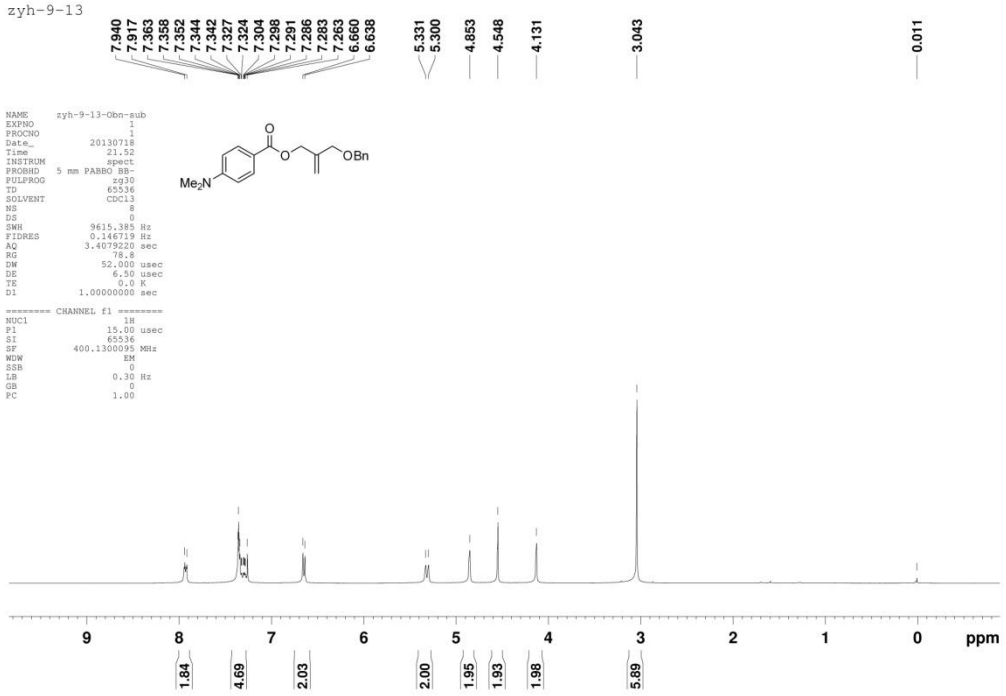

zyh-9-98
400M, CDCl3
166.5
153.3
143.4
135.5
133.4
131.3
129.6
127.7
116.9
112.5
110.6
64.6
64.4
40.0
26.8
19.2
NAME zyh-9-98
EXPNO 2
PROCNO 1
Date_ 20131030
Time 21.42
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 68
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 302.1 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127743 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

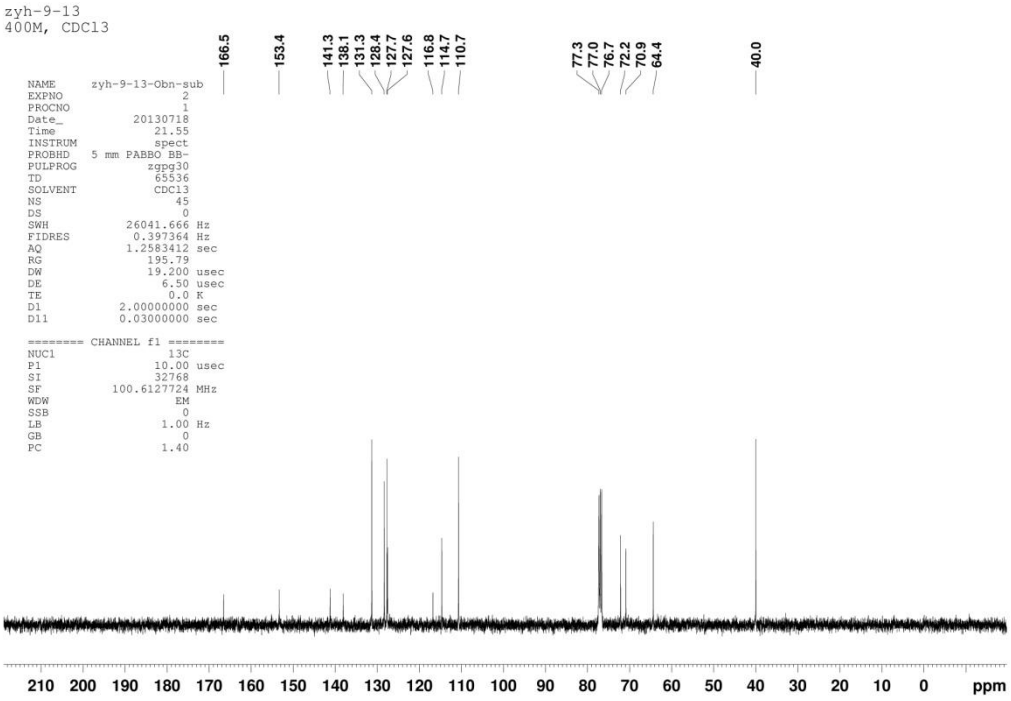

zyh-9-21
5.324
5.224
4.798
4.337
3.041
1.163
1.147
1.141
1.126
1.112
1.086
1.071
NAME zyh-9-21-OTIPS-sub
EXPNO 1
PROCNO 1
Date_ 20130724
Time 13.10
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 78.8
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
O
OTIPS
9 8 7 6 5 4 3 2 1 0 ppm
1.98
2.03
1.03
1.00
2.00
2.01
6.01
2.74
12.18
6.20

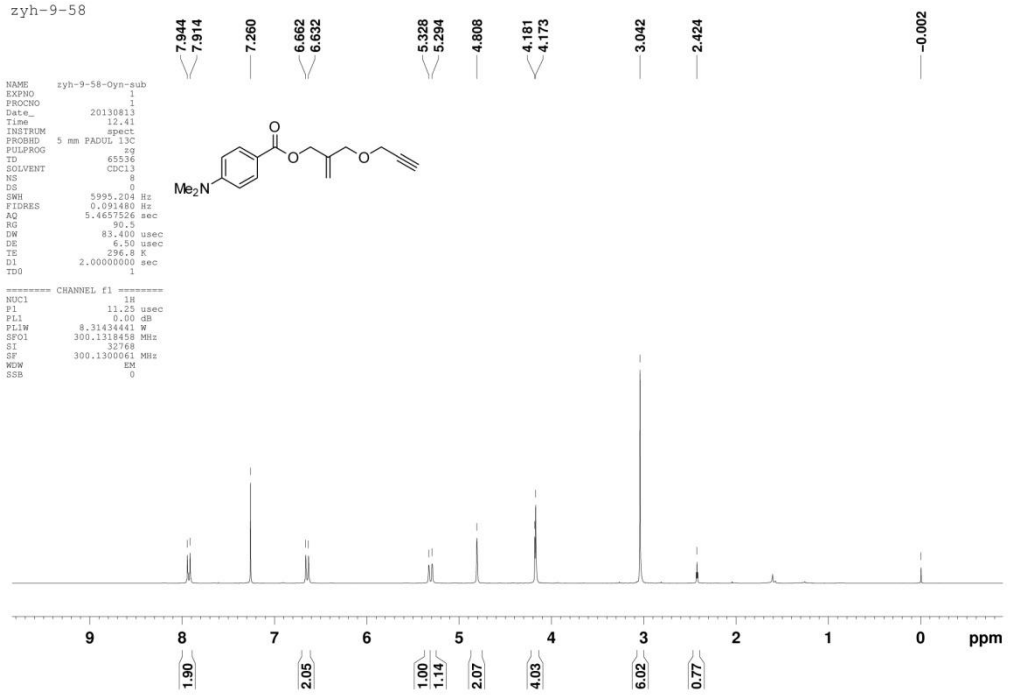

zyh-9-21
400M, CDCl3
166.6
153.3
143.9
131.3
116.9
111.9
110.7
64.5
64.1
40.0
18.0
12.0
NAME zyh-9-21-OTIPS-sub
EXPNO 2
PROCNO 1
Date_ 20130724
Time 13.15
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 61
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127724 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

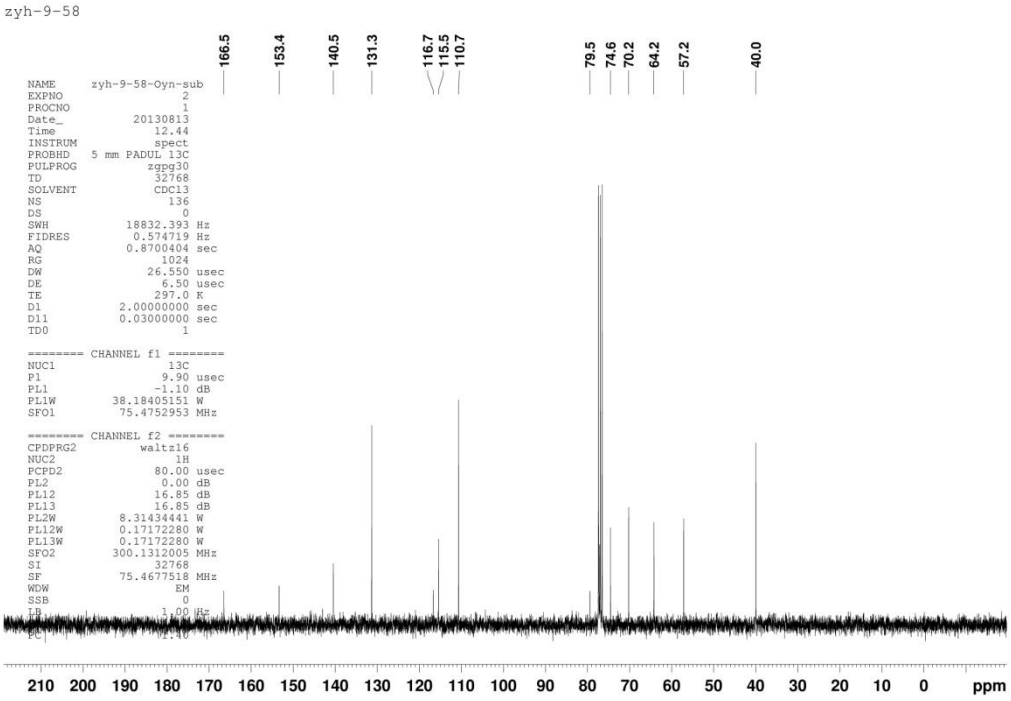

zyh-9-20
7.941
7.919
7.260
6.659
6.636
5.295
5.246
4.798
4.013
3.356
3.038
-0.000
NAME zyh-9-20-Ome-sub
EXPNO 1
PROCNO 1
Date_ 20130724
Time 10.20
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 78.8
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
OMe
9
8
7
6
5
4
3
2
1
0
ppm
1.95
2.01
1.01
1.00
1.99
1.99
2.96
6.01

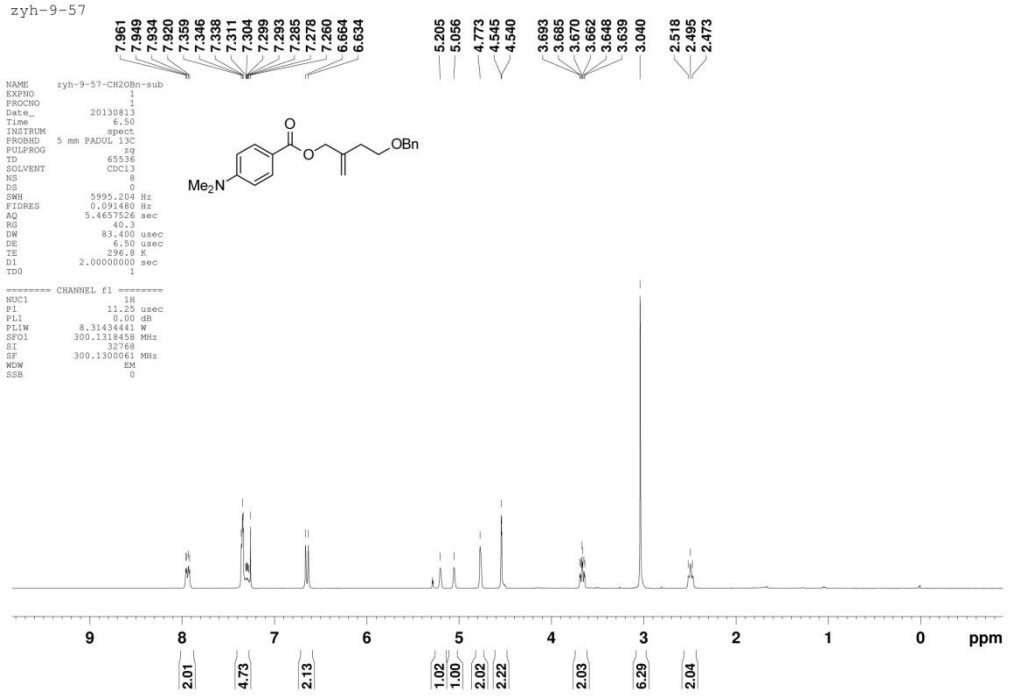

zyh-9-20
400M, CDCl3
166.5
153.4
141.2
131.3
116.8
114.4
110.7
77.3
77.0
76.7
73.3
64.3
58.0
40.0
NAME zyh-9-20-Ome-sub
EXPNO 2
PROCNO 1
Date_ 20130724
Time 10.23
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 44
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

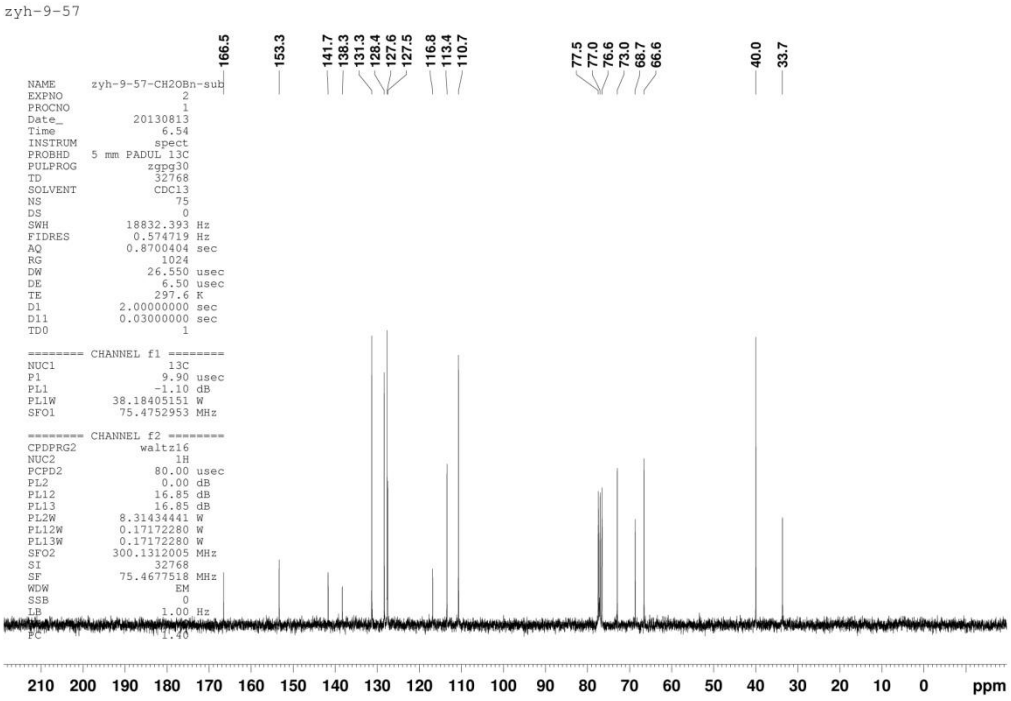

zyh-9-13
7.940
7.917
7.363
7.358
7.352
7.344
7.342
7.327
7.324
7.304
7.298
7.291
7.286
7.283
7.263
6.660
6.638
5.331
5.300
4.853
4.548
4.131
3.043
0.011
NAME zyh-9-13-Obn-sub
EXPNO 1
PROCNO 1
Date_ 20130718
Time 21.52
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 78.8
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
OBn
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
1.84
4.69
2.03
2.00
1.95
1.93
1.98
5.89

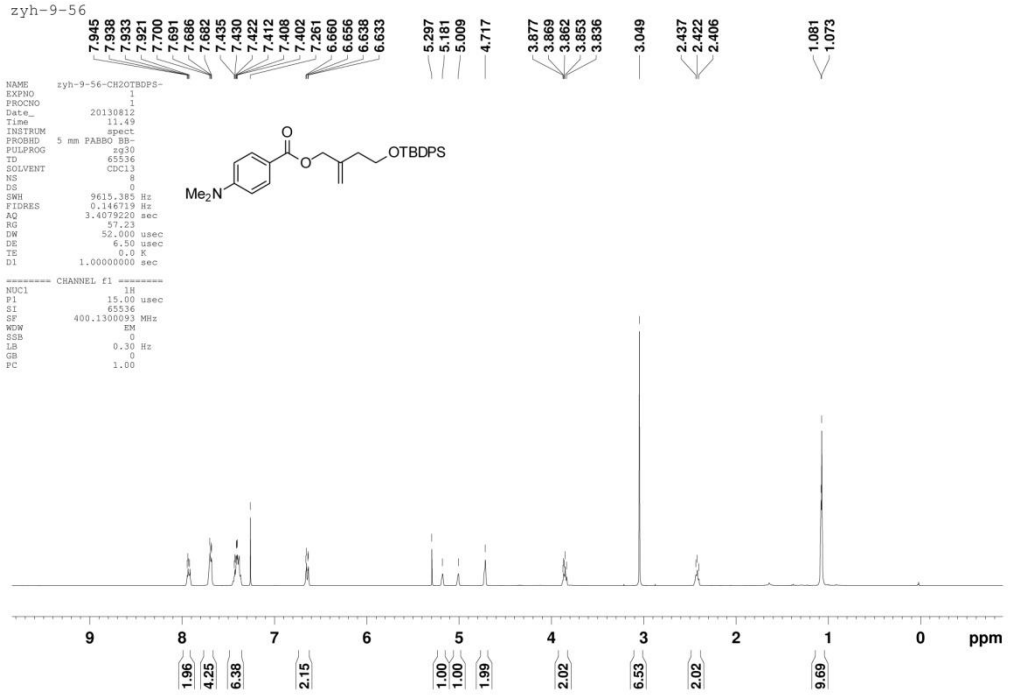

zyh-9-13
400M, CDCl3
166.5
153.4
141.3
138.1
131.3
128.4
127.7
127.6
116.8
114.7
110.7
77.3
77.0
76.7
72.2
70.9
64.4
40.0
NAME zyh-9-13-Obn-sub
EXPNO 2
PROCNO 1
Date_ 20130718
Time 21.55
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 45
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127724 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

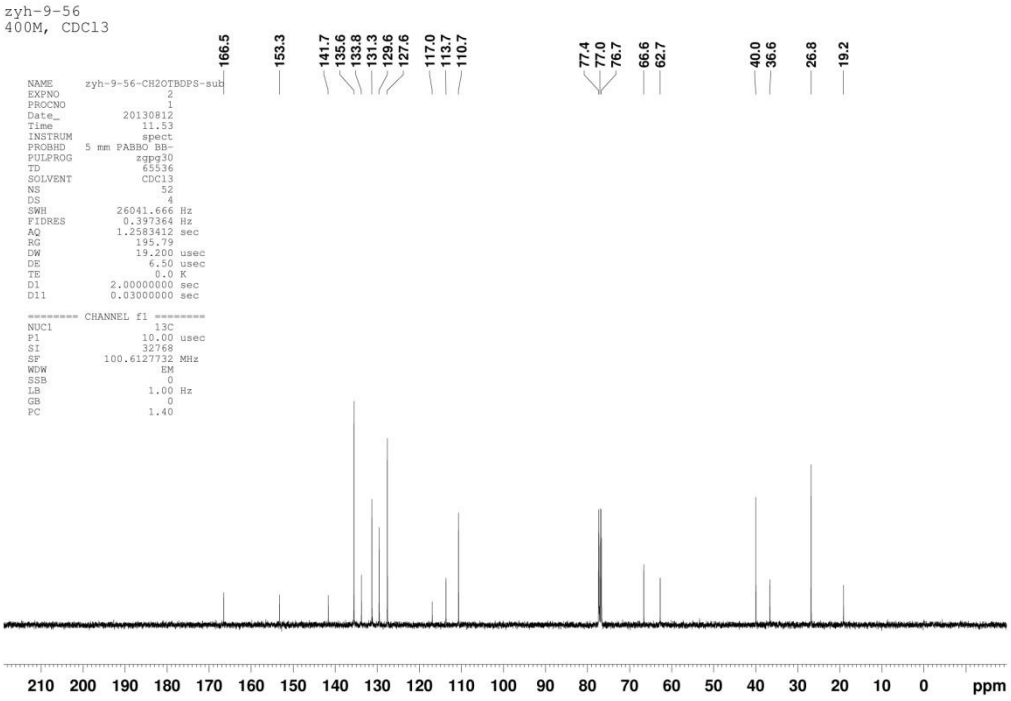

zyh-9-58
7.944
7.914
7.260
6.662
6.632
5.328
5.294
4.808
4.181
4.173
3.042
2.424
-0.002
NAME zyh-9-58-Oyn-sub
EXPNO 1
PROCNO 1
Date_ 20130813
Time 12.41
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.091480 Hz
AQ 5.4657526 sec
RG 90.5
DW 83.400 usec
DE 6.50 usec
TE 296.8 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 11.25 usec
PL1 0.00 dB
PL1W 8.31434441 W
SFO1 300.1318458 MHz
SI 32768
SF 300.1300061 MHz
WDW EM
SSB 0
Me2N
O
O
O
9
8
7
6
5
4
3
2
1
0
ppm
1.90
2.05
1.00
1.14
2.07
4.03
6.02
0.77

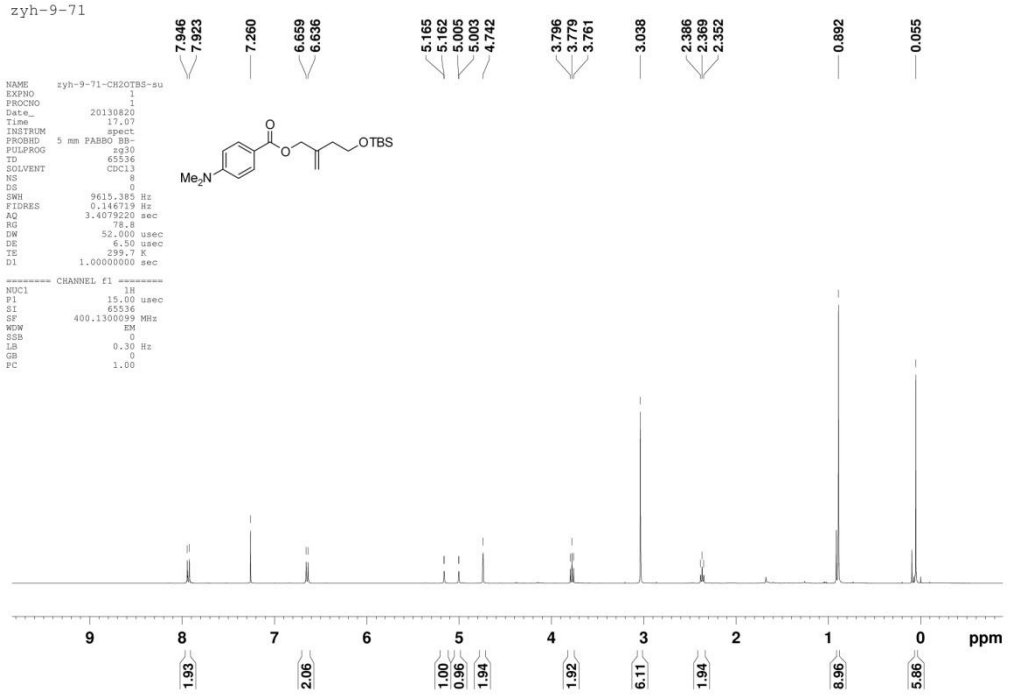

zyh-9-58
166.5
153.4
140.5
131.3
116.7
115.5
110.7
79.5
74.6
70.2
64.2
57.2
40.0
NAME zyh-9-58-Oyn-sub
EXPNO 2
PROCNO 1
Date_ 20130813
Time 12.44
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 136
DS 0
SWH 18832.393 Hz
FIDRES 0.574719 Hz
AQ 0.8700404 sec
RG 1024
DW 26.550 usec
DE 6.50 usec
TE 297.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.90 usec
PL1 -1.10 dB
PL1W 38.18405151 W
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 16.85 dB
PL13 16.85 dB
PL2W 8.31434441 W
PL12W 0.17172280 W
PL13W 0.17172280 W
SFO2 300.1312005 MHz
SI 32768
SF 75.4677518 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

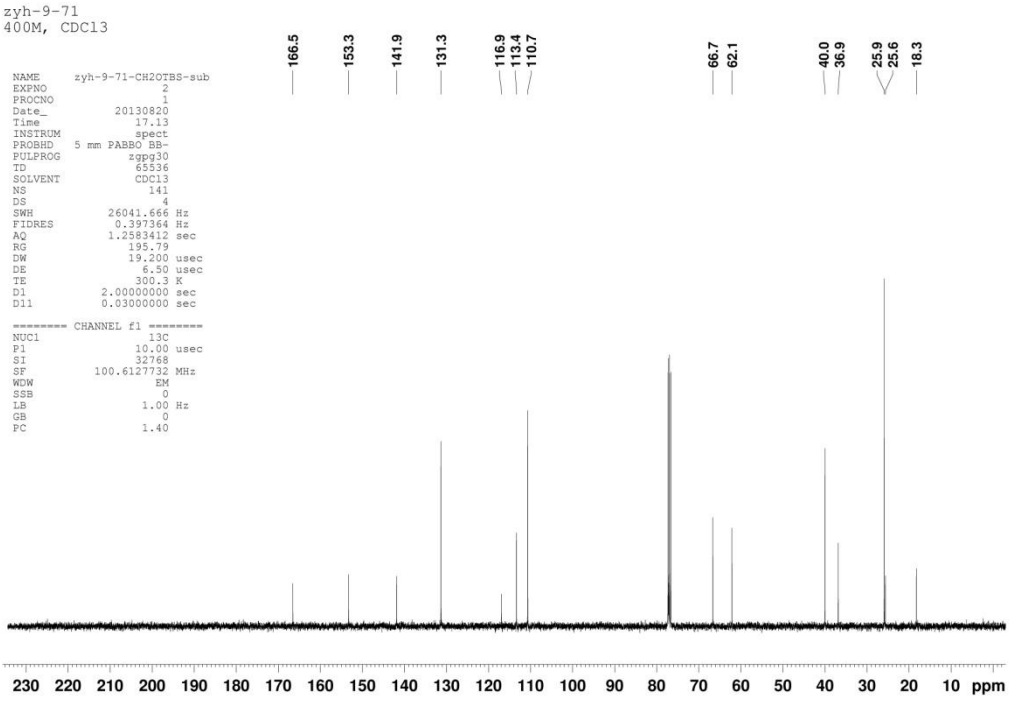

zyh-9-57
7.961 7.949 7.934 7.920 7.359 7.346 7.338 7.311 7.304 7.299 7.293 7.285 7.278 7.260 6.664 6.634
5.205 5.056 4.773 4.545 4.540
3.693 3.685 3.670 3.662 3.648 3.639 3.040
2.518 2.495 2.473
NAME zyh-9-57-CH2OBn-sub
EXPNO 1
PROCNO 1
Date_ 20130813
Time 6.50
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.091480 Hz
AQ 5.4657526 sec
RG 40.3
DW 83.400 usec
DE 6.50 usec
TE 296.8 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 11.25 usec
PL1 0.00 dB
PL1W 8.31434441 W
SFO1 300.1318458 MHz
SI 32768
SF 300.1300061 MHz
WDW EM
SSB 0
O
O
OBn
Me2N
9 8 7 6 5 4 3 2 1 0 ppm
2.01 4.73 2.13 1.02 1.00 2.02 2.22 2.03 6.29 2.04

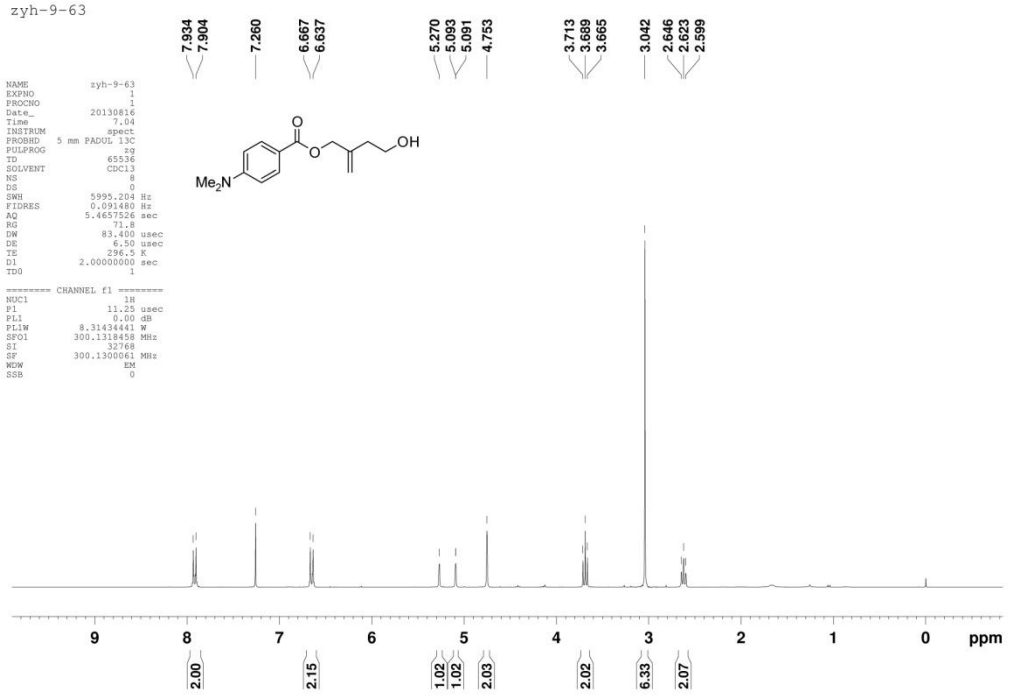

zyh-9-57
166.5 153.3 141.7 138.3 131.3 128.4 127.6 127.5 116.8 113.4 110.7
77.5 77.0 76.6 73.0 68.7 66.6
40.0 33.7
NAME zyh-9-57-CH2OBn-sub
EXPNO 2
PROCNO 1
Date_ 20130813
Time 6.54
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 75
DS 0
SWH 18832.393 Hz
FIDRES 0.574719 Hz
AQ 0.8700404 sec
RG 1024
DW 26.550 usec
DE 6.50 usec
TE 297.6 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.90 usec
PL1 -1.10 dB
PL1W 38.18405151 W
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 16.85 dB
PL13 16.85 dB
PL2W 8.31434441 W
PL12W 0.17172280 W
PL13W 0.17172280 W
SFO2 300.1312005 MHz
SI 32768
SF 75.4677518 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

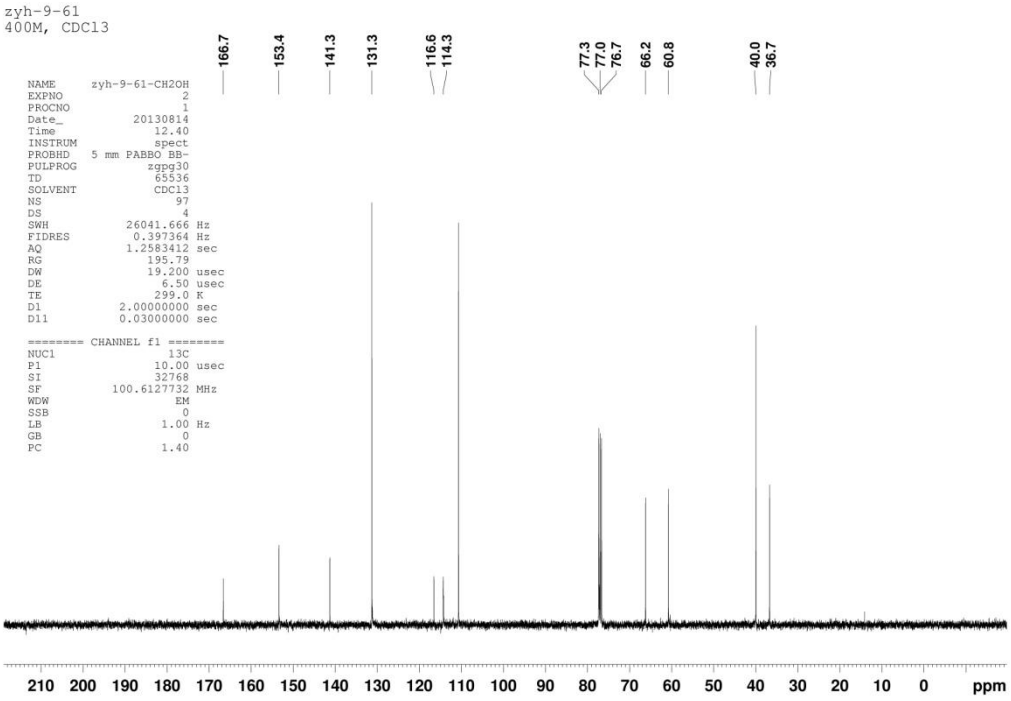

zyh-9-56
7.945 7.938 7.933 7.921 7.700 7.691 7.686 7.682 7.435 7.430 7.422 7.412 7.408 7.402 7.261 6.660 6.656 6.638 6.633
5.297 5.181 5.009 4.717
3.877 3.869 3.862 3.853 3.836
3.049
2.437 2.422 2.406
1.081 1.073
NAME zyh-9-56-CH2OTBDPS-
EXPNO 1
PROCNO 1
Date_ 20130812
Time 11.49
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 57.23
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OTBDPS
Me2N
9 8 7 6 5 4 3 2 1 0 ppm
1.96 4.25 6.38 2.15 1.00 1.00 1.99 2.02 6.53 2.02 9.69


zyh-9-56
400M, CDCl3
166.5 153.3 141.7 135.6 133.8 131.3 129.6 127.6 117.0 113.7 110.7
77.4 77.0 76.7
66.6 62.7
40.0 36.6
26.8 19.2
NAME zyh-9-56-CH2OTBDPS-sub
EXPNO 2
PROCNO 1
Date_ 20130812
Time 11.53
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 52
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

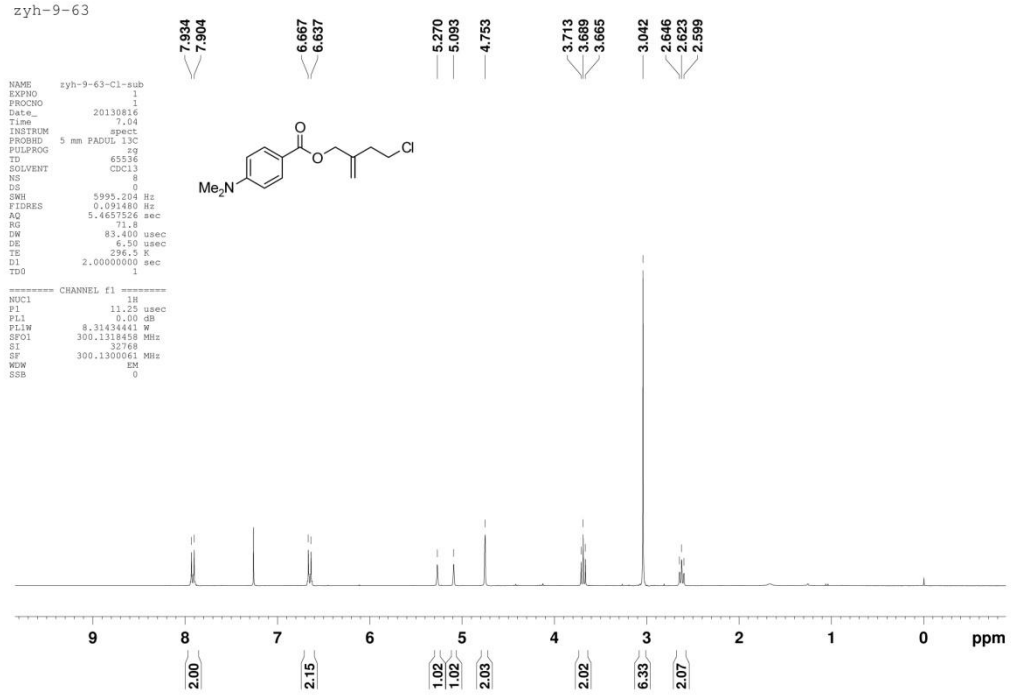

zyh-9-71
7.946
7.923
7.260
6.659
6.636
5.165
5.162
5.005
5.003
4.742
3.796
3.779
3.761
3.038
2.386
2.369
2.352
0.892
0.055
NAME zyh-9-71-CH2OTBS-su
EXPNO 1
PROCNO 1
Date_ 20130820
Time 17.07
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 78.8
DW 52.000 usec
DE 6.50 usec
TE 299.7 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OTBS
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
1.93
2.06
1.00
0.96
1.94
1.92
6.11
1.94
8.96
5.86


zyh-9-71
400M, CDCl3
166.5
153.3
141.9
131.3
116.9
113.4
110.7
66.7
62.1
40.0
36.9
25.9
25.6
18.3
NAME zyh-9-71-CH2OTBS-sub
EXPNO 2
PROCNO 1
Date_ 20130820
Time 17.13
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 141
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 300.3 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


zyh-9-63
7.934
7.904
7.260
6.667
6.637
5.270
5.093
5.091
4.753
3.713
3.689
3.665
3.042
2.646
2.623
2.599
NAME zyh-9-63
EXPNO 1
PROCNO 1
Date_ 20130816
Time 7.04
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.091480 Hz
AQ 5.4657526 sec
RG 71.8
DW 83.400 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 11.25 usec
PL1 0.00 dB
PLW 8.31434441 W
SFO1 300.1318458 MHz
SI 32768
SF 300.1300061 MHz
WDW EM
SSB 0
O
O
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.00
2.15
1.02
1.02
2.03
2.02
6.33
2.07

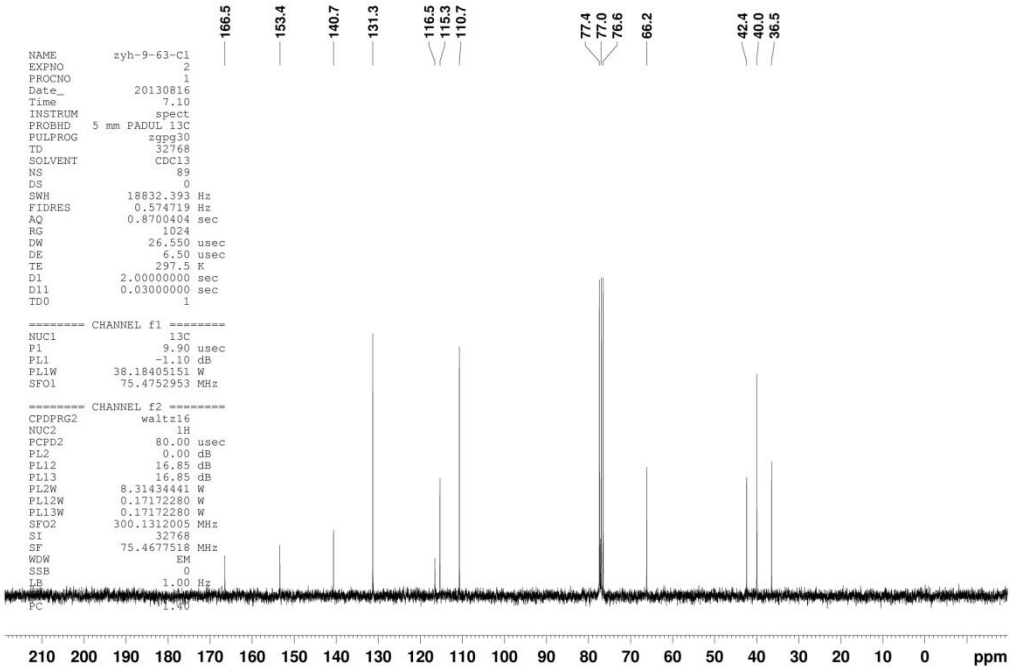

zyh-9-61
400M, CDCl3
166.7
153.4
141.3
131.3
116.6
114.3
77.3
77.0
76.7
66.2
60.8
40.0
36.7
NAME zyh-9-61-CH2OH
EXPNO 2
PROCNO 1
Date_ 20130814
Time 12.40
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 97
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 299.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

zyh-9-63

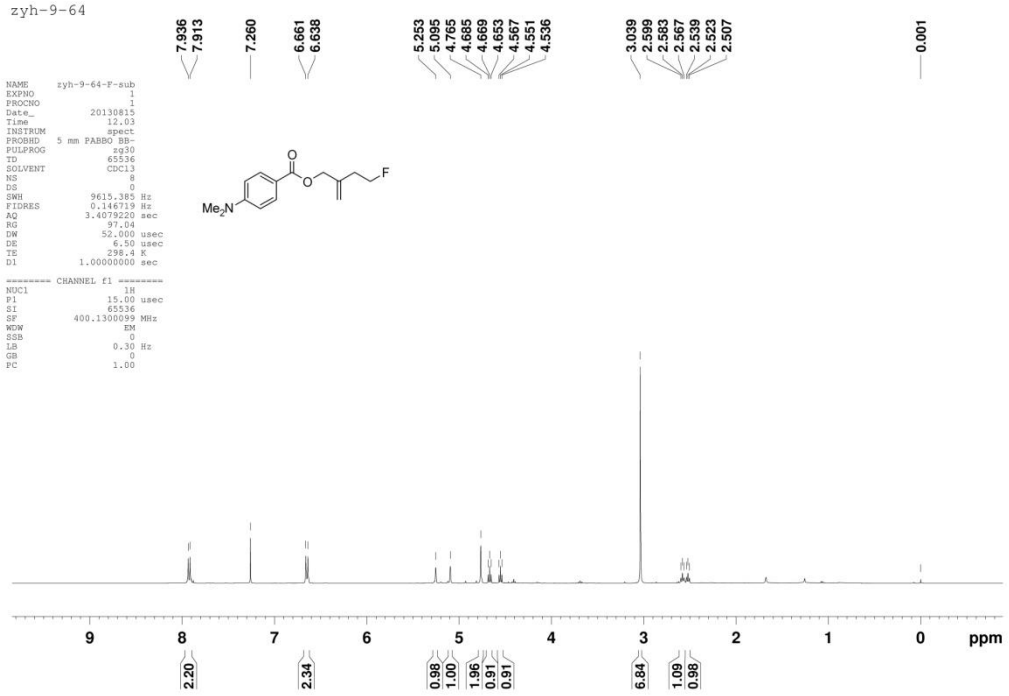


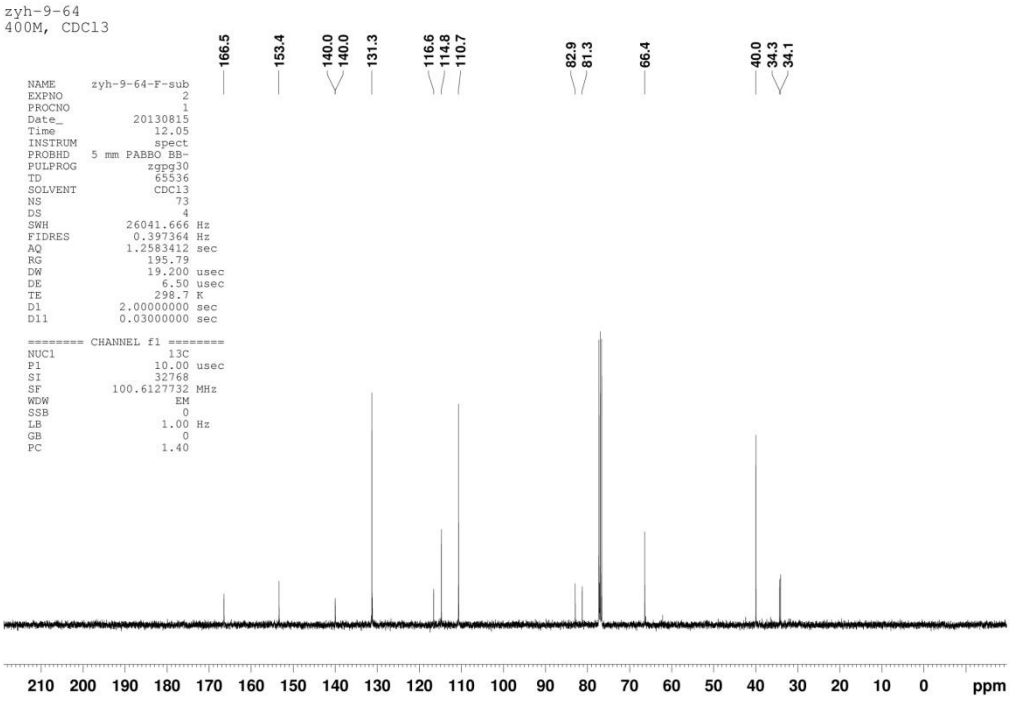

```
NAME      zyh-9-63-Cl-sub
EXPNO                   1
PROCNO                  1
Date_            20130816
Time                 7.04
INSTRUM             spect
PROBHD   5 mm PADUL 13C
PULPROG                zg
TD                  65536
SOLVENT             CDCl3
NS                      8
DS                      0
SWH              5995.204 Hz
FIDRES           0.091480 Hz
AQ               5.4657526 sec
RG                   71.8
DW                83.400 usec
DE                 6.50 usec
TE                296.5 K
D1             2.00000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                   1H
P1                 11.25 usec
PL1                 0.00 dB
PL1W          8.31434441 W
SFO1         300.1318458 MHz
SI                  32768
SF           300.1300061 MHz
WDW                    EM
SSB                     0
```

zyh-9-63-c

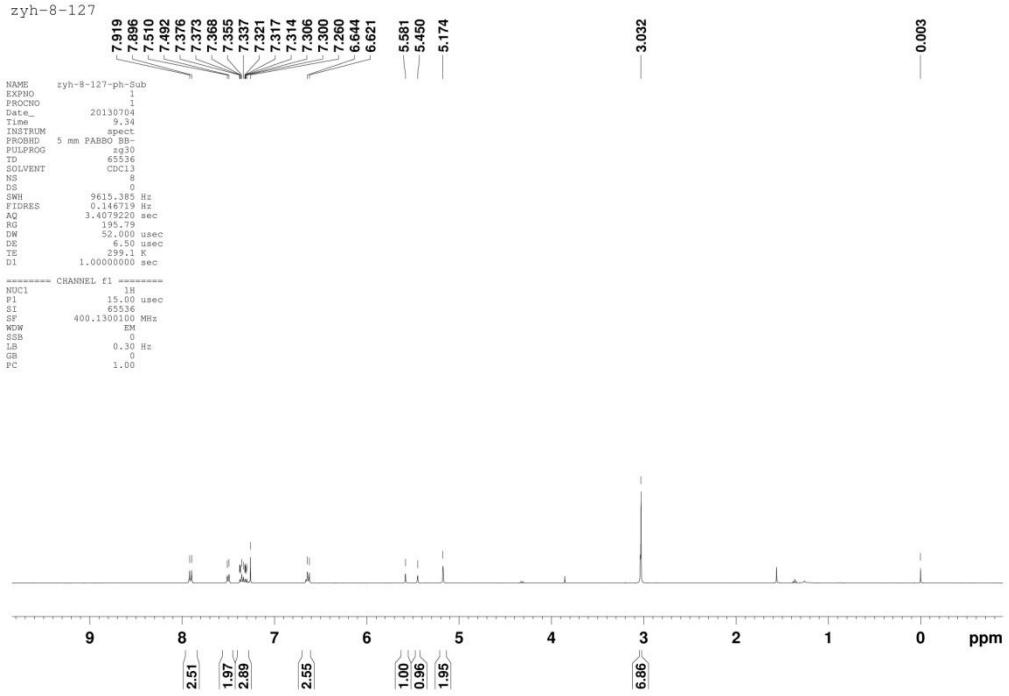



```
NAME          zyh-9-63-Cl
EXPNO                   2
PROCNO                  1
Date_            20130816
Time                 7.10
INSTRUM             spect
PROBHD   5 mm PADUL 13C
PULPROG            zgpg30
TD                  32768
SOLVENT             CDCl3
NS                     89
DS                      0
SWH             18832.393 Hz
FIDRES           0.574719 Hz
AQ               0.8700404 sec
RG                   1024
DW                26.550 usec
DE                 6.50 usec
TE                297.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1

======== CHANNEL f1 ========
NUC1                  13C
P1                  9.90 usec
PL1                -1.10 dB
PL1W         38.18405151 W
SFO1         75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2           waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2                 0.00 dB
PL12               16.85 dB
PL13               16.85 dB
PL2W          8.31434441 W
PL12W         0.17172280 W
PL13W         0.17172280 W
SFO2         300.1312005 MHz
SI                  32768
SF           75.4677518 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```

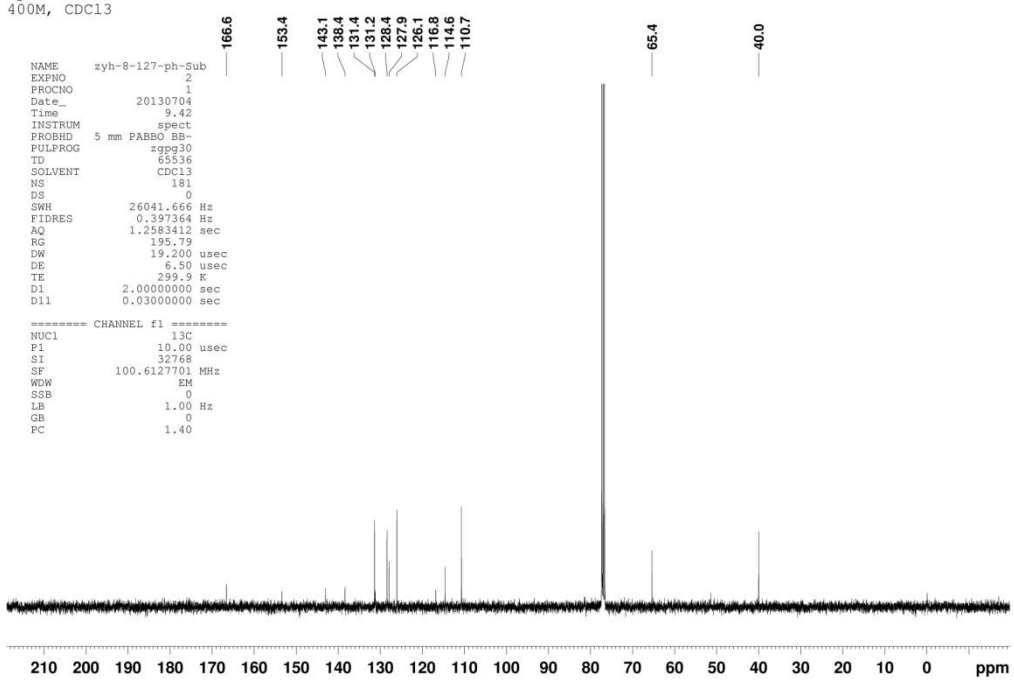

zyh-9-64
7.936
7.913
7.260
6.661
6.638
5.253
5.095
4.765
4.685
4.669
4.653
4.567
4.551
4.536
3.039
2.599
2.583
2.567
2.539
2.523
2.507
0.001
NAME zyh-9-64-F-sub
EXPNO 1
PROCNO 1
Date_ 20130815
Time 12.03
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 97.04
DW 52.000 usec
DE 6.50 usec
TE 298.4 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
F
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.20
2.34
0.98
1.00
1.96
0.91
0.91
6.84
1.09
0.98

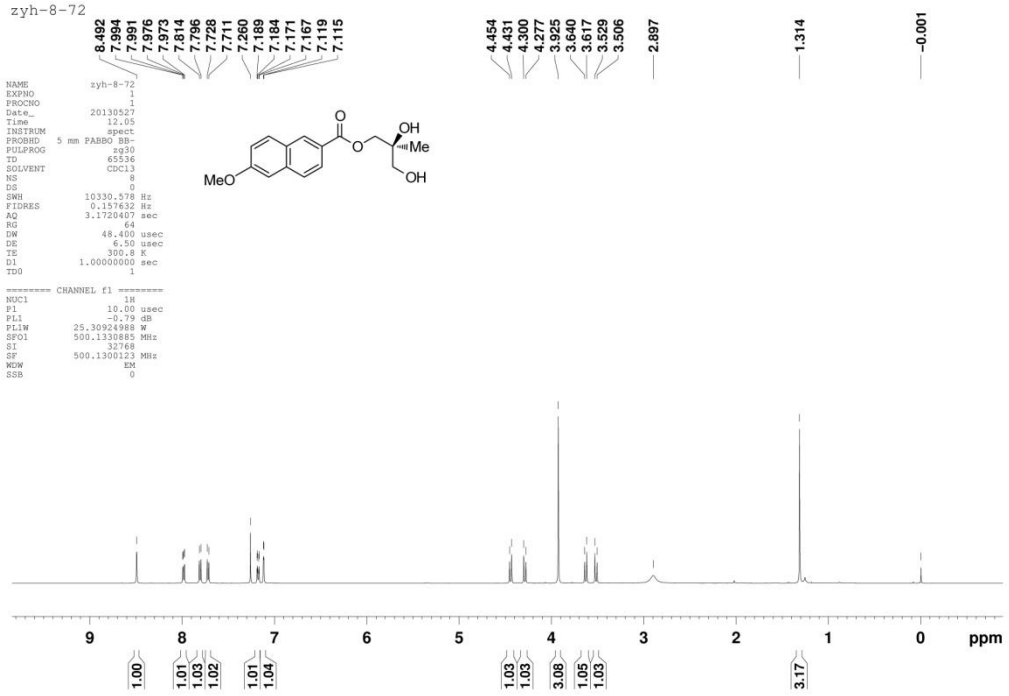

zyh-9-64
400M, CDCl3
166.5
153.4
140.0
140.0
131.3
116.6
114.8
110.7
82.9
81.3
66.4
40.0
34.3
34.1
NAME zyh-9-64-F-sub
EXPNO 2
PROCNO 1
Date_ 20130815
Time 12.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 73
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 298.7 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

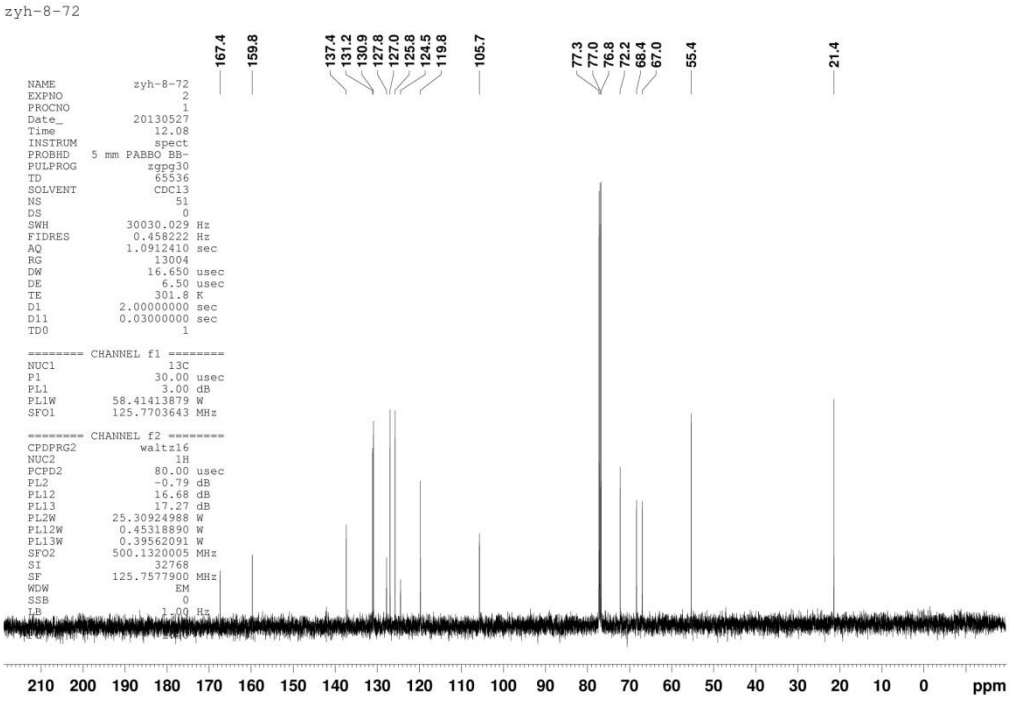
zyh-8-127



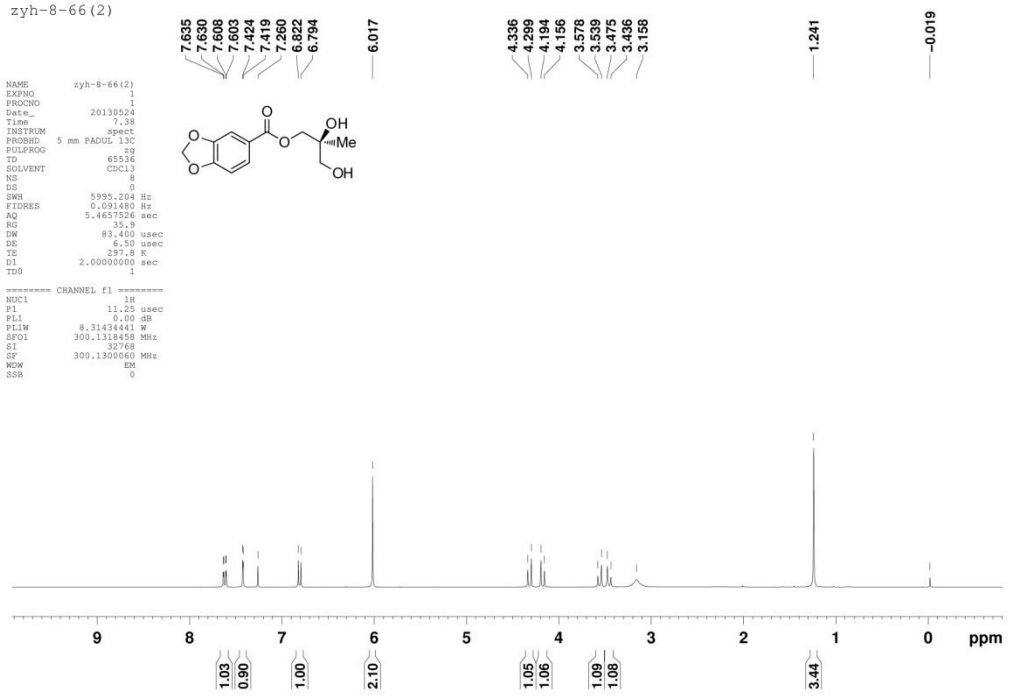

zyh-8-127
400M, CDCl3




zyh-8-72
8.492
7.994
7.991
7.976
7.973
7.814
7.796
7.728
7.711
7.260
7.189
7.184
7.171
7.167
7.119
7.115
4.454
4.431
4.300
4.277
3.925
3.640
3.617
3.529
3.506
2.897
1.314
-0.001
NAME zyh-8-72
EXPNO 1
PROCNO 1
Date_ 20130527
Time 12.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1720407 sec
RG 64
DW 48.400 usec
DE 6.50 usec
TE 300.8 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 10.00 usec
PL1 -0.79 dB
PL1W 25.30924988 W
SFO1 500.1330885 MHz
SI 32768
SF 500.1300123 MHz
WDW EM
SSB 0
OH
Me
OH
MeO
O
O
9
8
7
6
5
4
3
2
1
0
ppm
1.00
1.01
1.03
1.02
1.01
1.04
1.03
1.03
3.08
1.05
1.03
3.17

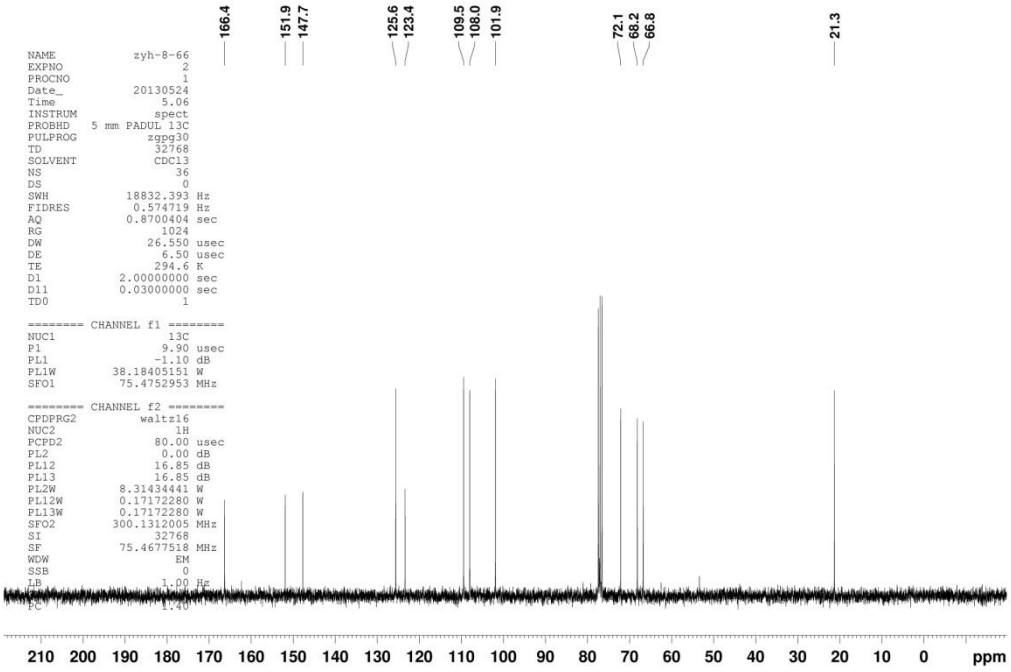

zyh-8-72
167.4
159.8
137.4
131.2
130.9
127.8
127.0
125.8
124.5
119.8
105.7
77.3
77.0
76.8
72.2
68.4
67.0
55.4
21.4
NAME zyh-8-72
EXPNO 2
PROCNO 1
Date_ 20130527
Time 12.08
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 51
DS 0
SWH 30030.029 Hz
FIDRES 0.458222 Hz
AQ 1.0912410 sec
RG 13004
DW 16.650 usec
DE 6.50 usec
TE 301.8 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 30.00 usec
PL1 3.00 dB
PL1W 58.41413879 W
SFO1 125.7703643 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -0.79 dB
PL12 16.68 dB
PL13 17.27 dB
PL2W 25.30924988 W
PL12W 0.45318890 W
PL13W 0.39562091 W
SFO2 500.1320005 MHz
SI 32768
SF 125.7577900 MHz
WDW EM
SSB 0
LB 1.00 Hz
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

zyh-8-66(2)

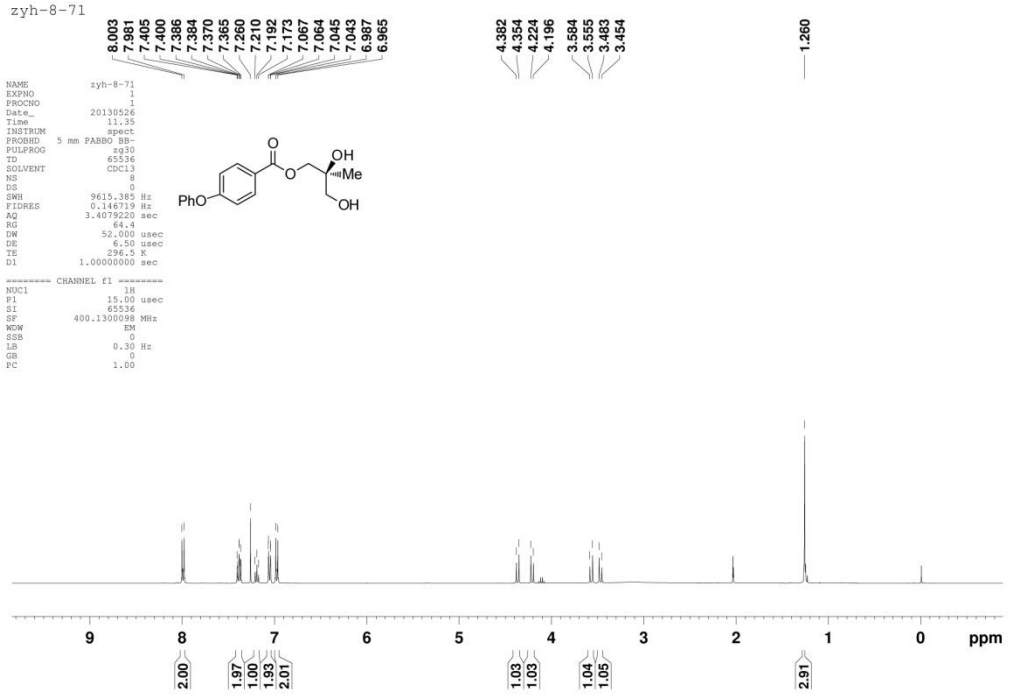


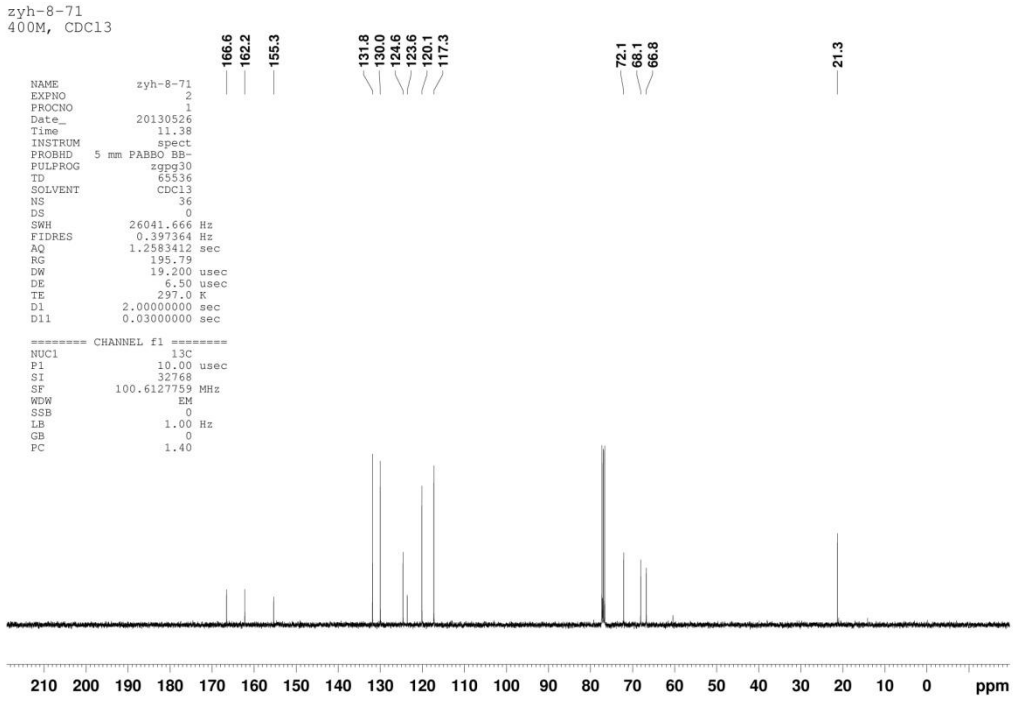

```
NAME            zyh-8-66(2)
EXPNO                    1
PROCNO                   1
Date_             20130524
Time                 7.38
INSTRUM              spect
PROBHD    5 mm PADUL 13C
PULPROG                zg
TD                   65536
SOLVENT              CDCl3
NS                       8
DS                       0
SWH               5995.204 Hz
FIDRES            0.091480 Hz
AQ                5.4657526 sec
RG                    35.9
DW                  83.400 usec
DE                   6.50 usec
TE                  297.8 K
D1                2.00000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                    1H
P1                   11.25 usec
PL1                   0.00 dB
PL1W           8.31434441 W
SFO1          300.1318458 MHz
SI                   32768
SF            300.1300060 MHz
WDW                     EM
SSB                      0
```

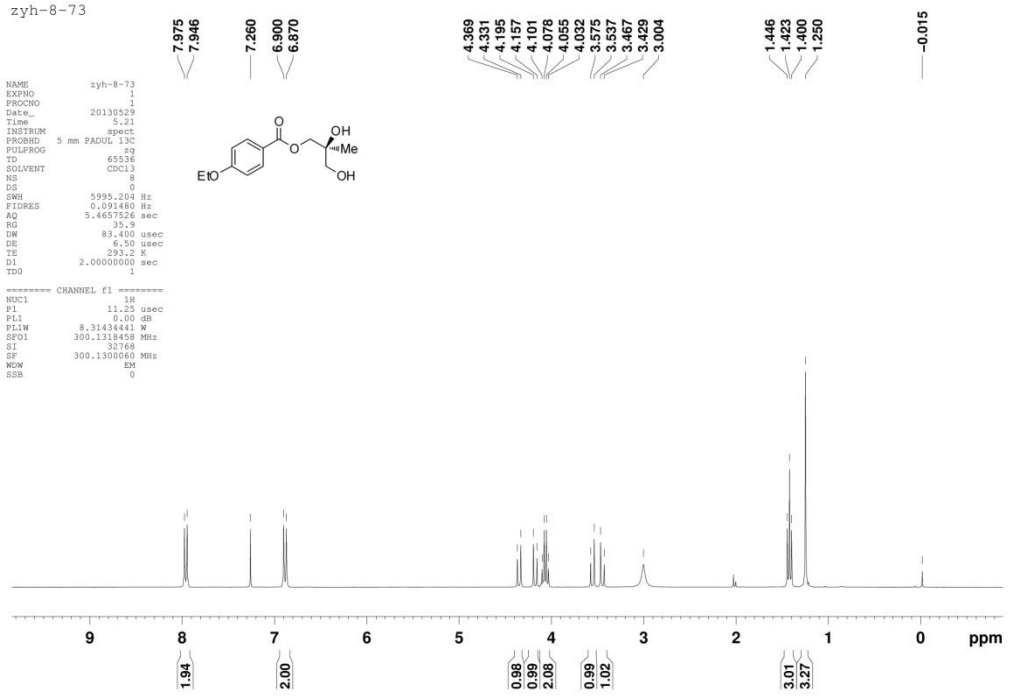
zyh-8-66

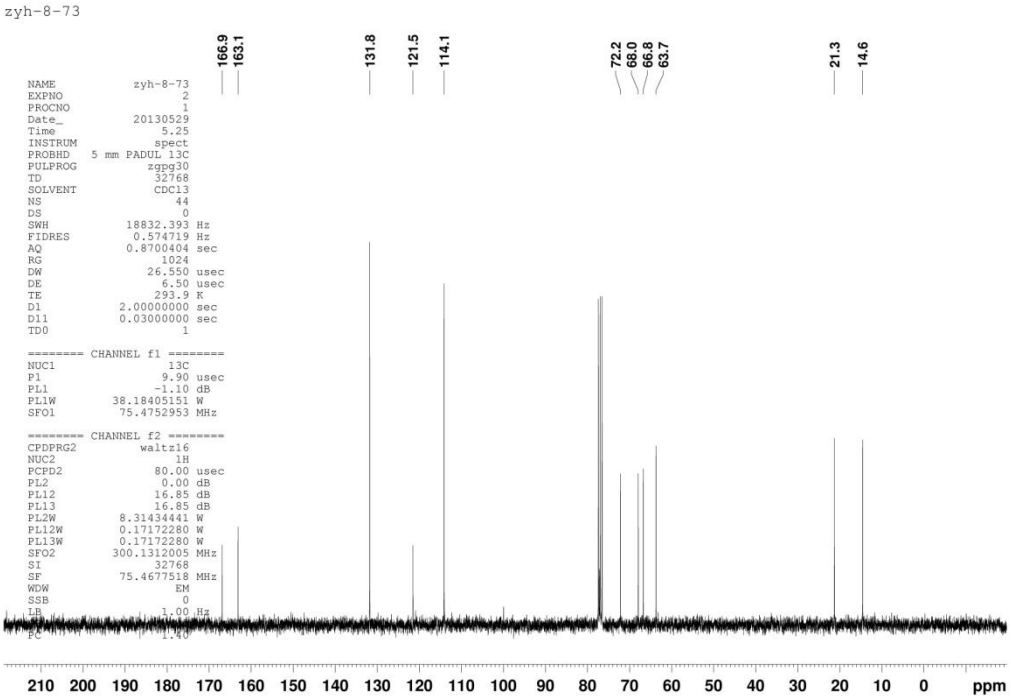


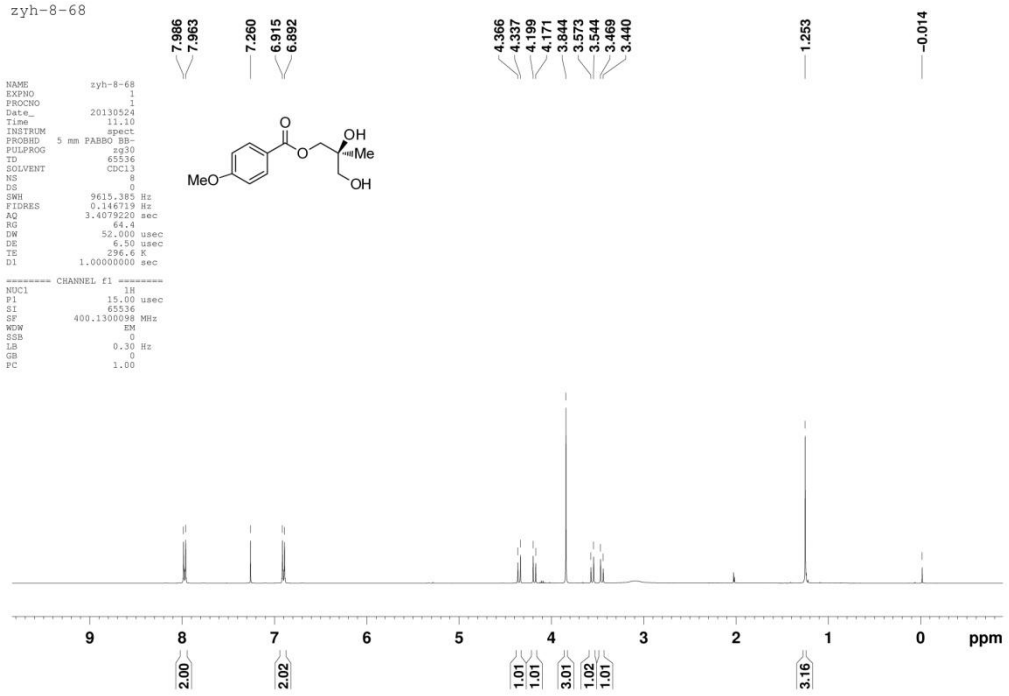

```
NAME            zyh-8-66
EXPNO                    2
PROCNO                   1
Date_             20130524
Time                 5.06
INSTRUM              spect
PROBHD    5 mm PADUL 13C
PULPROG           zgpg30
TD                   32768
SOLVENT              CDCl3
NS                      36
DS                       0
SWH              18832.393 Hz
FIDRES            0.574719 Hz
AQ                0.8700404 sec
RG                    1024
DW                  26.550 usec
DE                   6.50 usec
TE                  294.6 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
NUC1                    13C
P1                    9.90 usec
PL1                  -1.10 dB
PL1W          38.18405151 W
SFO1          75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2           waltz16
NUC2                    1H
PCPD2                80.00 usec
PL2                   0.00 dB
PL12                 16.85 dB
PL13                 16.85 dB
PL2W           8.31434441 W
PL12W          0.17172280 W
PL13W          0.17172280 W
SFO2          300.1312005 MHz
SI                   32768
SF            75.4677518 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

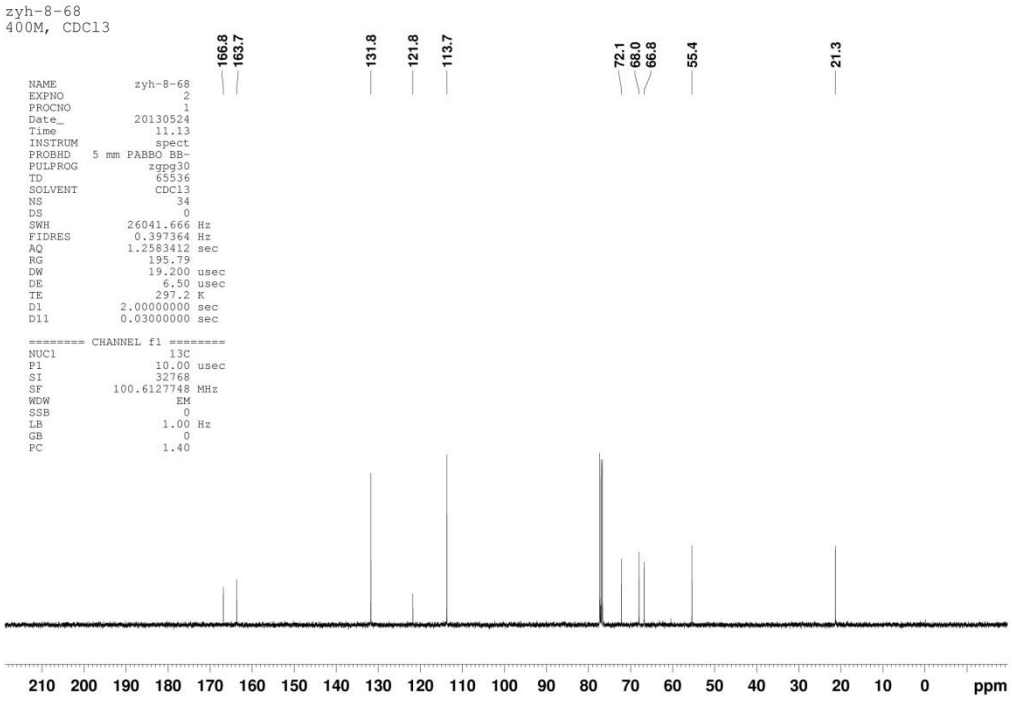

zyh-8-71
8.003
7.981
7.405
7.400
7.386
7.384
7.370
7.365
7.260
7.210
7.192
7.173
7.067
7.064
7.045
7.043
6.987
6.965
4.382
4.354
4.224
4.196
3.584
3.555
3.483
3.454
1.260
NAME zyh-8-71
EXPNO 1
PROCNO 1
Date_ 20130526
Time 11.35
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 64.4
DW 52.000 usec
DE 6.50 usec
TE 296.5 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
O
OH
Me
OH
PhO
9
8
7
6
5
4
3
2
1
0
ppm
2.00
1.97
1.00
1.93
2.01
1.03
1.03
1.04
1.05
2.91

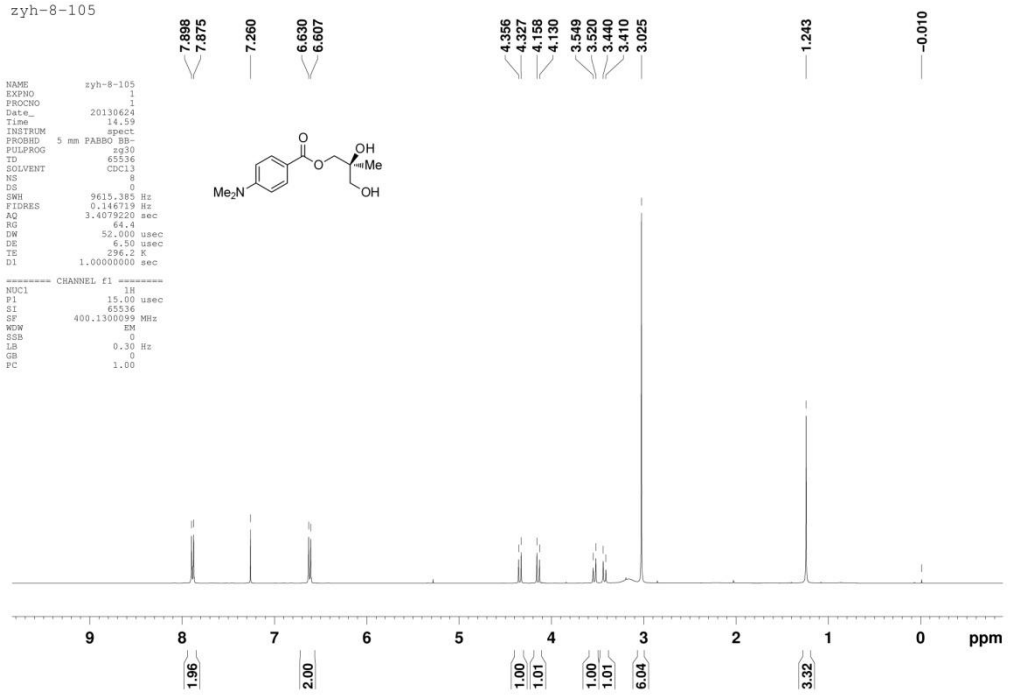

zyh-8-71
400M, CDCl3
166.6
162.2
155.3
131.8
130.0
124.6
123.6
120.1
117.3
72.1
68.1
66.8
21.3
NAME zyh-8-71
EXPNO 2
PROCNO 1
Date_ 20130526
Time 11.38
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 36
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 297.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127759 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

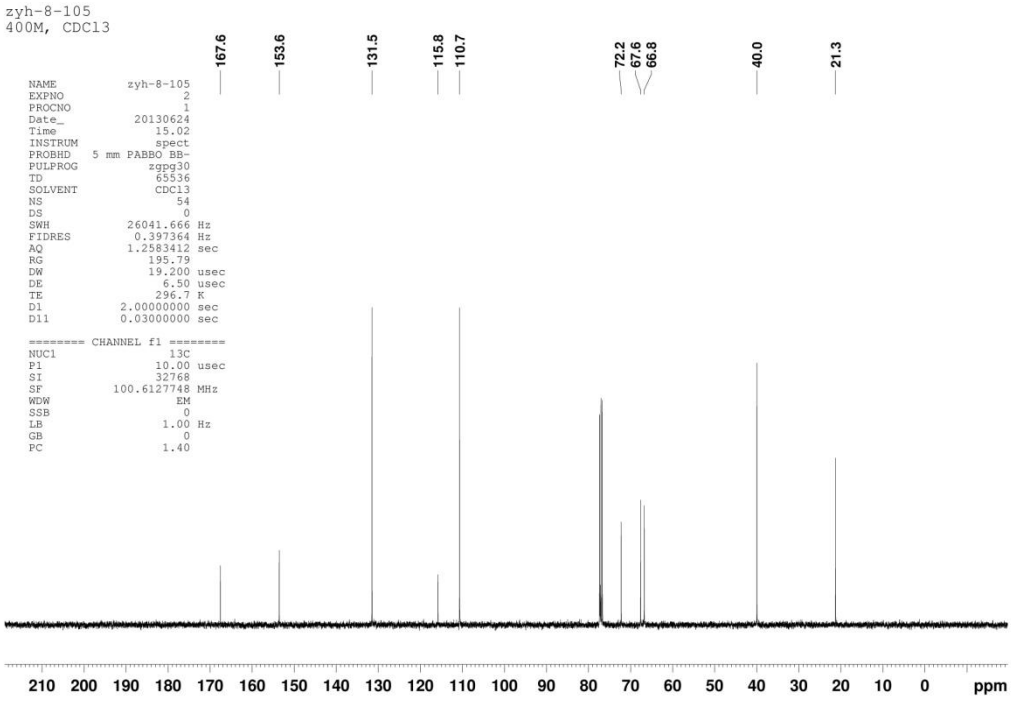

zyh-8-73
7.975
7.946
7.260
6.900
6.870
4.369
4.331
4.195
4.157
4.101
4.078
4.055
4.032
3.575
3.537
3.467
3.429
3.004
1.446
1.423
1.400
1.250
-0.015
NAME zyh-8-73
EXPNO 1
PROCNO 1
Date_ 20130529
Time 5.21
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.091480 Hz
AQ 5.4657526 sec
RG 35.9
DW 83.400 usec
DE 6.50 usec
TE 293.2 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 11.25 usec
PL1 0.00 dB
PL1W 8.31434441 W
SFO1 300.1318458 MHz
SI 32768
SF 300.1300060 MHz
WDW EM
SSB 0
EtO
OH
Me
OH
9
8
7
6
5
4
3
2
1
0
ppm
1.94
2.00
0.98
0.99
2.08
0.99
1.02
3.01
3.27


zyh-8-73
166.9
163.1
131.8
121.5
114.1
72.2
68.0
66.8
63.7
21.3
14.6
NAME zyh-8-73
EXPNO 2
PROCNO 1
Date_ 20130529
Time 5.25
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 44
DS 0
SWH 18832.393 Hz
FIDRES 0.574719 Hz
AQ 0.8700404 sec
RG 1024
DW 26.550 usec
DE 6.50 usec
TE 293.9 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.90 usec
PL1 -1.10 dB
PL1W 38.18405151 W
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 16.85 dB
PL13 16.85 dB
PL2W 8.31434441 W
PL12W 0.17172280 W
PL13W 0.17172280 W
SFO2 300.1312005 MHz
SI 32768
SF 75.4677518 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

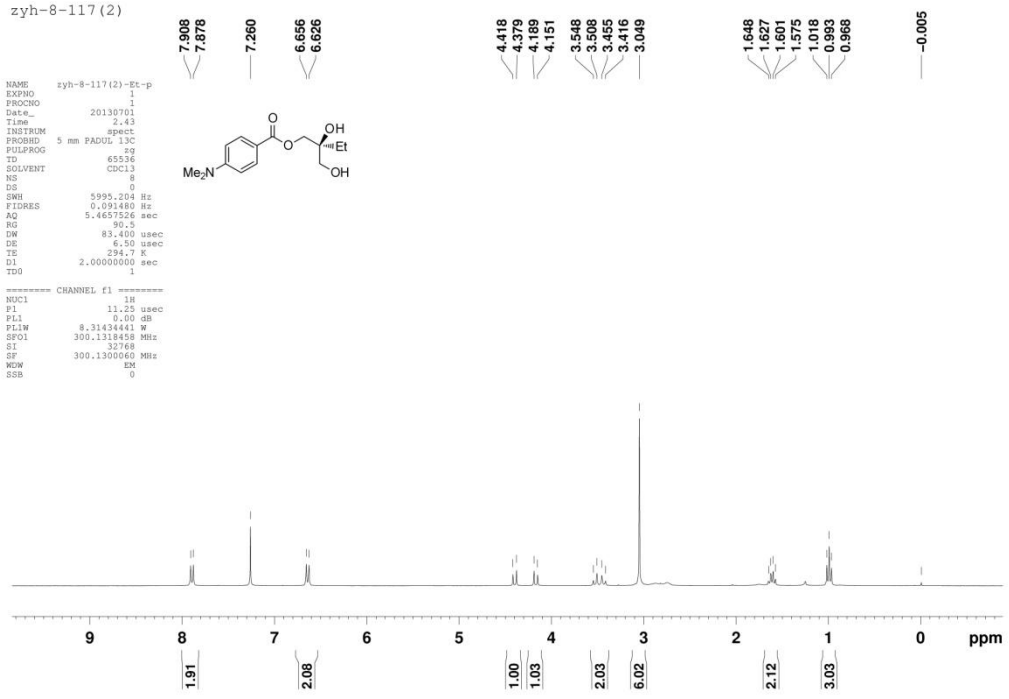

zyh-8-68
7.986
7.963
7.260
6.915
6.892
4.366
4.337
4.199
4.171
3.844
3.573
3.544
3.469
3.440
1.253
-0.014
NAME zyh-8-68
EXPNO 1
PROCNO 1
Date_ 20130524
Time 11.10
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 64.4
DW 52.000 usec
DE 6.50 usec
TE 296.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
OH
Me
MeO
OH
9
8
7
6
5
4
3
2
1
0
ppm
2.00
2.02
1.01
1.01
3.01
1.02
1.01
3.16


zyh-8-68
400M, CDCl3
166.8
163.7
131.8
121.8
113.7
72.1
68.0
66.8
55.4
21.3
NAME zyh-8-68
EXPNO 2
PROCNO 1
Date_ 20130524
Time 11.13
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 34
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

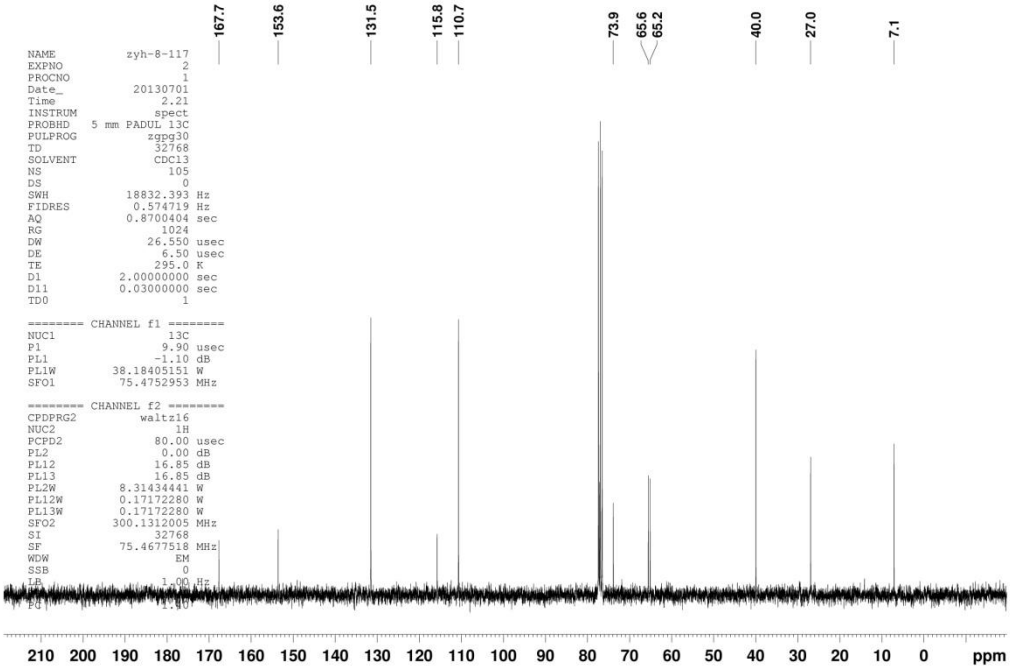

zyh-8-105
7.898
7.875
7.260
6.630
6.607
4.356
4.327
4.158
4.130
3.549
3.520
3.440
3.410
3.025
1.243
-0.010
NAME zyh-8-105
EXPNO 1
PROCNO 1
Date_ 20130624
Time 14.59
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 64.4
DW 52.000 usec
DE 6.50 usec
TE 296.2 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OH
Me
Me2N
OH
9
8
7
6
5
4
3
2
1
0
ppm
1.96
2.00
1.00
1.01
1.00
1.01
6.04
3.32


zyh-8-105
400M, CDCl3
167.6
153.6
131.5
115.8
110.7
72.2
67.6
66.8
40.0
21.3
NAME zyh-8-105
EXPNO 2
PROCNO 1
Date_ 20130624
Time 15.02
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 54
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 296.7 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

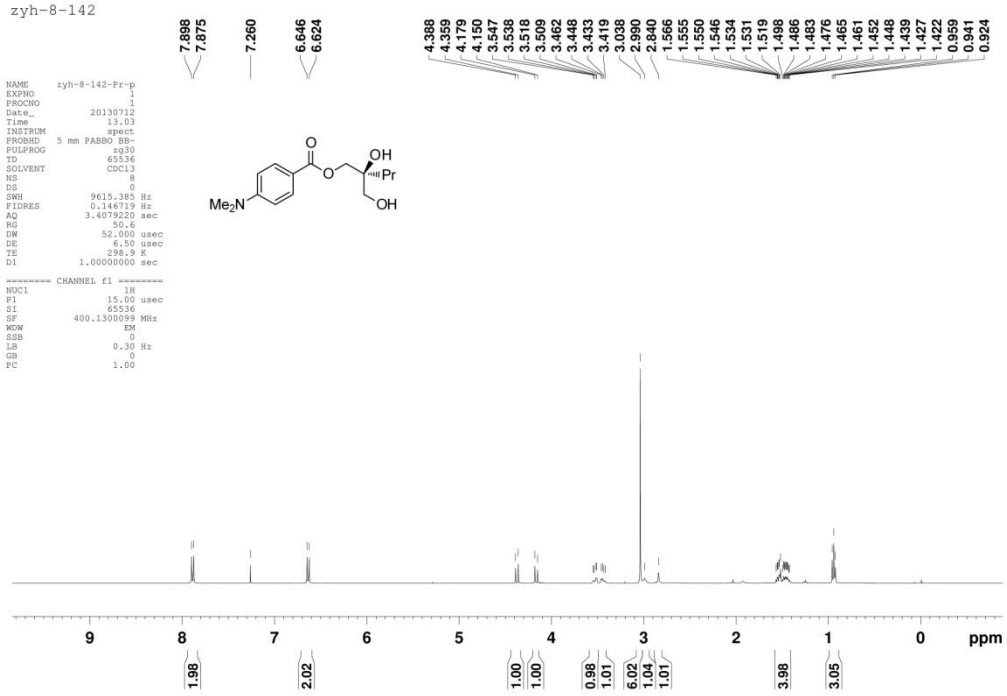
zyh-8-117(2)




zyh-8-117

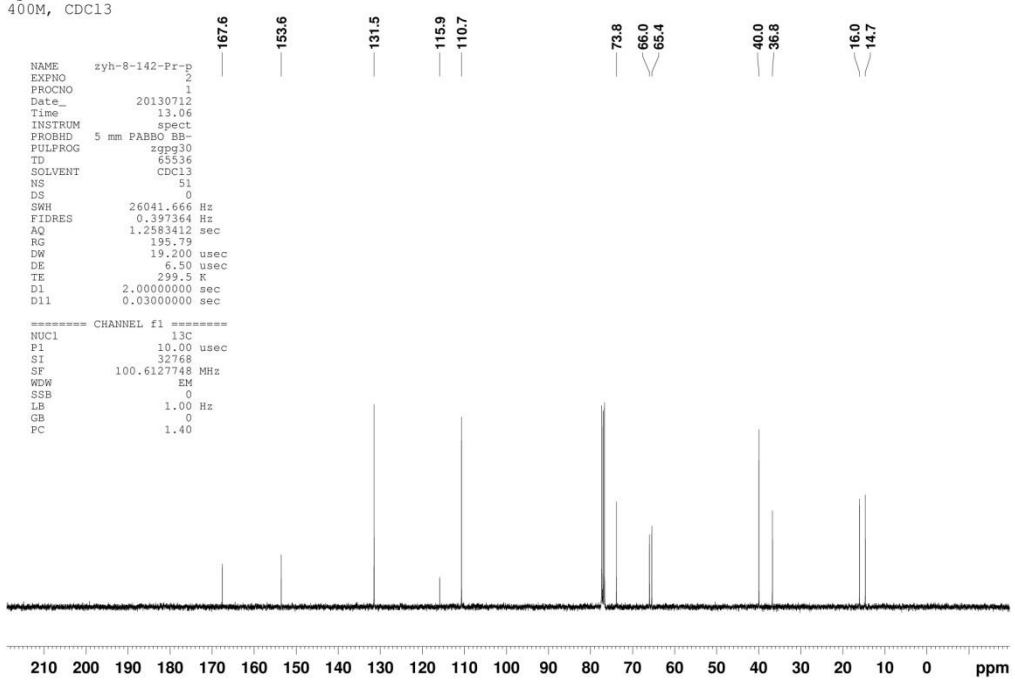


zyh-8-142

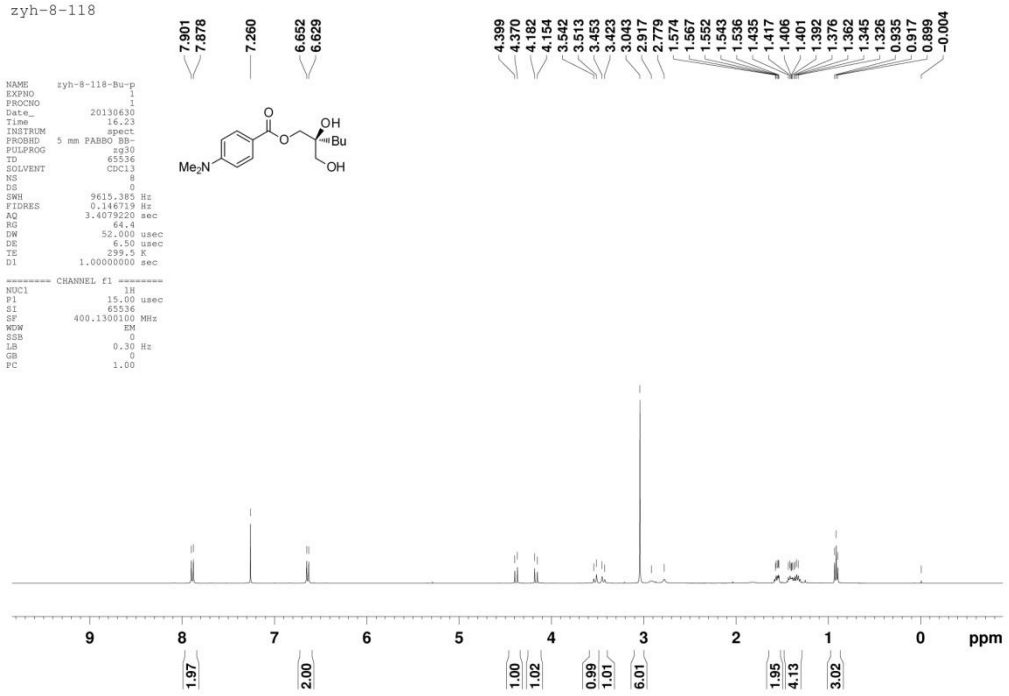


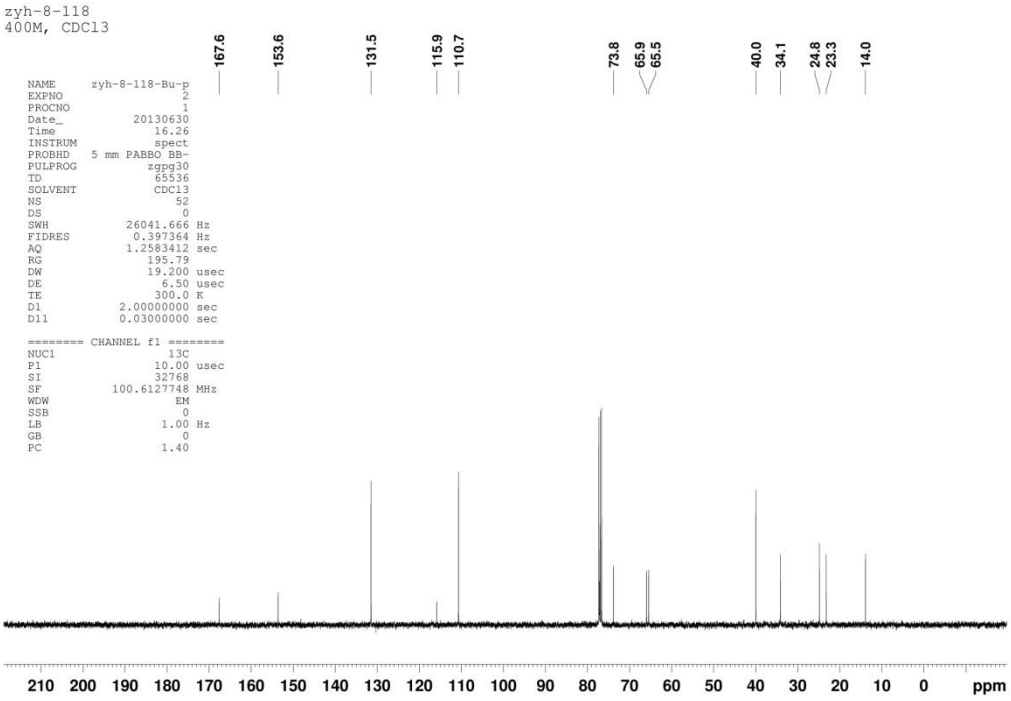

```
NAME        zyh-8-142-Pr-p
EXPNO                    1
PROCNO                   1
Date_             20130712
Time                 13.03
INSTRUM              spect
PROBHD   5 mm PABBO BB-
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                       8
DS                       0
SWH               9615.385 Hz
FIDRES            0.146719 Hz
AQ                3.4079220 sec
RG                     50.6
DW                52.000 usec
DE                 6.50 usec
TE                 298.9 K
D1                1.00000000 sec

======== CHANNEL f1 ========
NUC1                    1H
P1                 15.00 usec
SI                     65536
SF           400.1300099 MHz
WDW                      EM
SSB                       0
LB                 0.30 Hz
GB                        0
PC                     1.00
```

zyh-8-142
400M, CDCl3

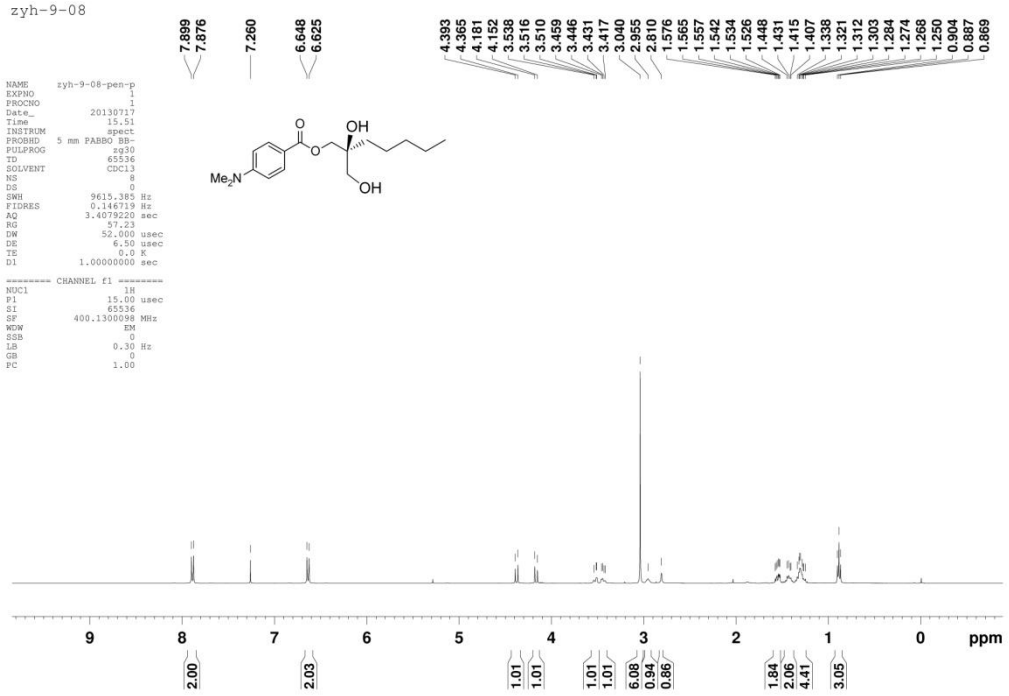



```
NAME        zyh-8-142-Pr-p
EXPNO                    2
PROCNO                   1
Date_             20130712
Time                 13.06
INSTRUM              spect
PROBHD   5 mm PABBO BB-
PULPROG           zgpg30
TD                   65536
SOLVENT              CDCl3
NS                      51
DS                       0
SWH              26041.666 Hz
FIDRES            0.397364 Hz
AQ                1.2583412 sec
RG                   195.79
DW                19.200 usec
DE                 6.50 usec
TE                 299.5 K
D1                2.00000000 sec
D11               0.03000000 sec

======== CHANNEL f1 ========
NUC1                    13C
P1                 10.00 usec
SI                     32768
SF           100.6127748 MHz
WDW                      EM
SSB                       0
LB                 1.00 Hz
GB                        0
PC                     1.40
```


zyh-8-118
7.901
7.878
7.260
6.652
6.629
4.399
4.370
4.182
4.154
3.542
3.513
3.453
3.423
3.043
2.917
2.779
1.574
1.567
1.552
1.543
1.536
1.435
1.417
1.406
1.401
1.392
1.376
1.362
1.345
1.326
0.935
0.917
0.899
−0.004
NAME zyh-8-118-Bu-p
EXPNO 1
PROCNO 1
Date_ 20130630
Time 16.23
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 64.4
DW 52.000 usec
DE 6.50 usec
TE 299.5 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300100 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
O
OH
Bu
OH
9
8
7
6
5
4
3
2
1
0
ppm
1.97
2.00
1.00
1.02
0.99
1.01
6.01
1.95
4.13
3.02

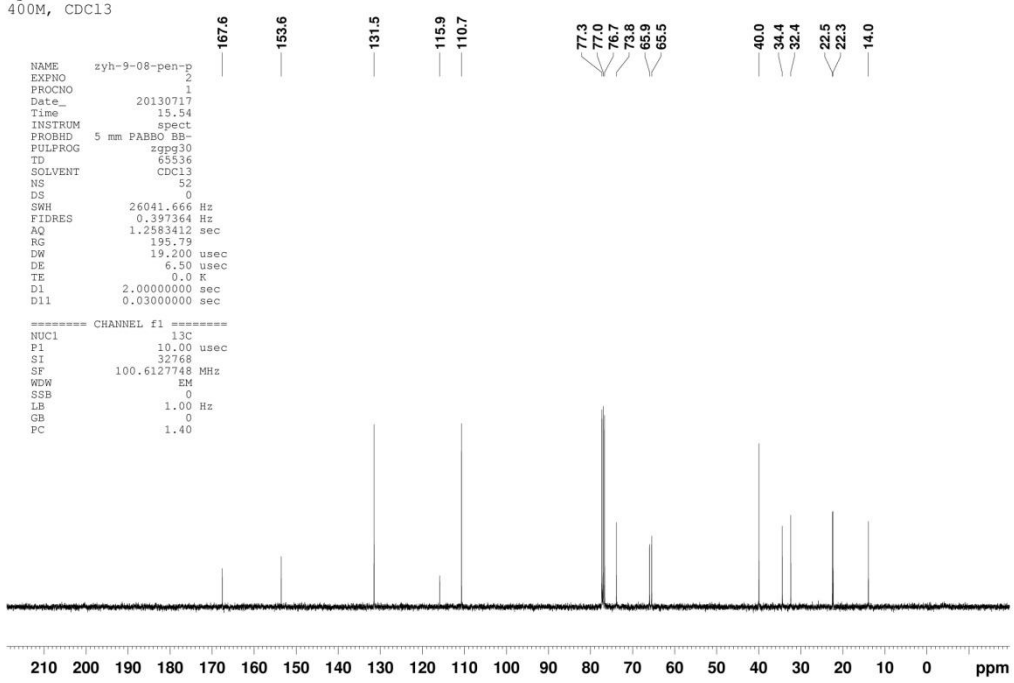

zyh-8-118
400M, CDCl3
167.6
153.6
131.5
115.9
110.7
73.8
65.9
65.5
40.0
34.1
24.8
23.3
14.0
NAME zyh-8-118-Bu-p
EXPNO 2
PROCNO 1
Date_ 20130630
Time 16.26
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 52
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

zyh-9-08

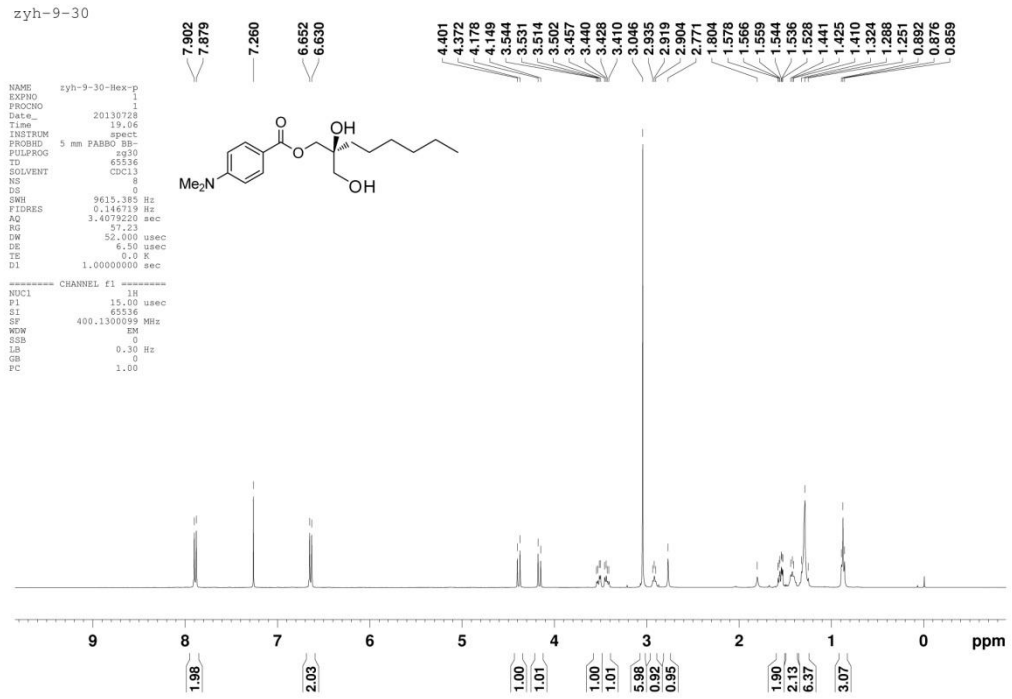


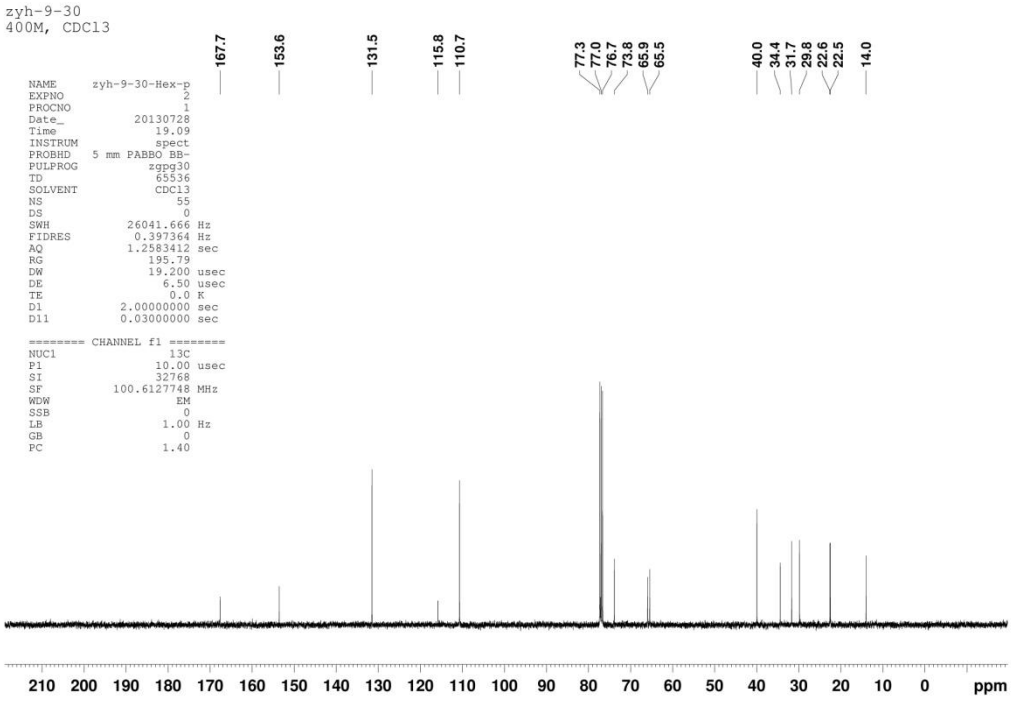

```
NAME      zyh-9-08-pen-p
EXPNO               1
PROCNO              1
Date_        20130717
Time            15.51
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT         CDCl3
NS                  8
DS                  0
SWH          9615.385 Hz
FIDRES       0.146719 Hz
AQ           3.4079220 sec
RG              57.23
DW             52.000 usec
DE              6.50 usec
TE               0.0 K
D1          1.00000000 sec

======== CHANNEL f1 ========
NUC1               1H
P1              15.00 usec
SI              65536
SF         400.1300098 MHz
WDW                EM
SSB                 0
LB              0.30 Hz
GB                  0
PC              1.00
```

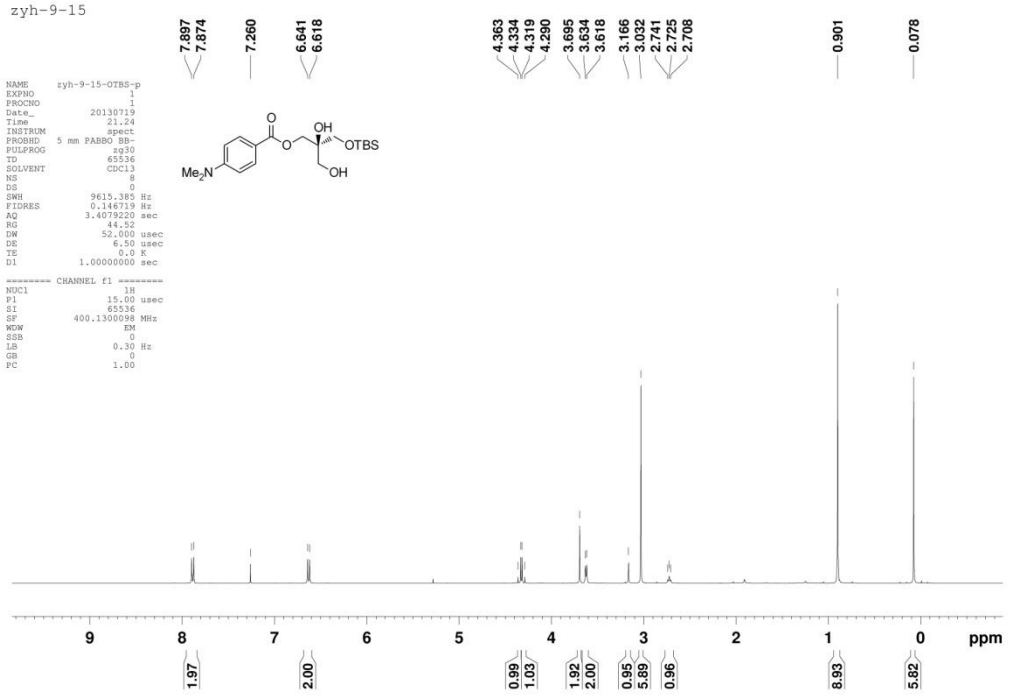
zyh-9-08
400M, CDCl3

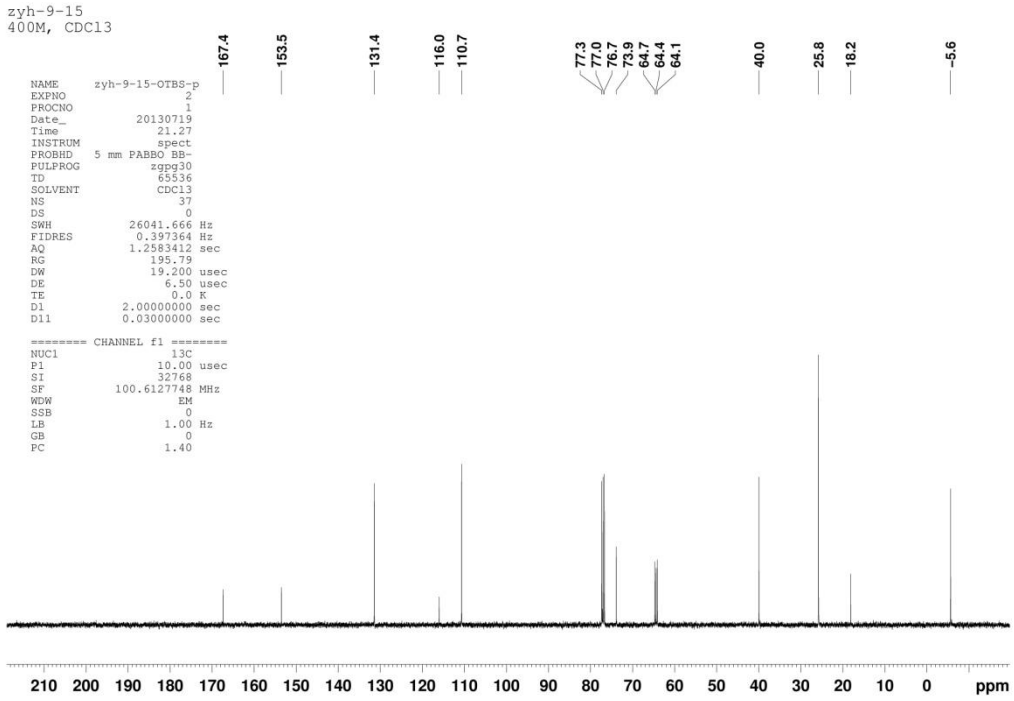


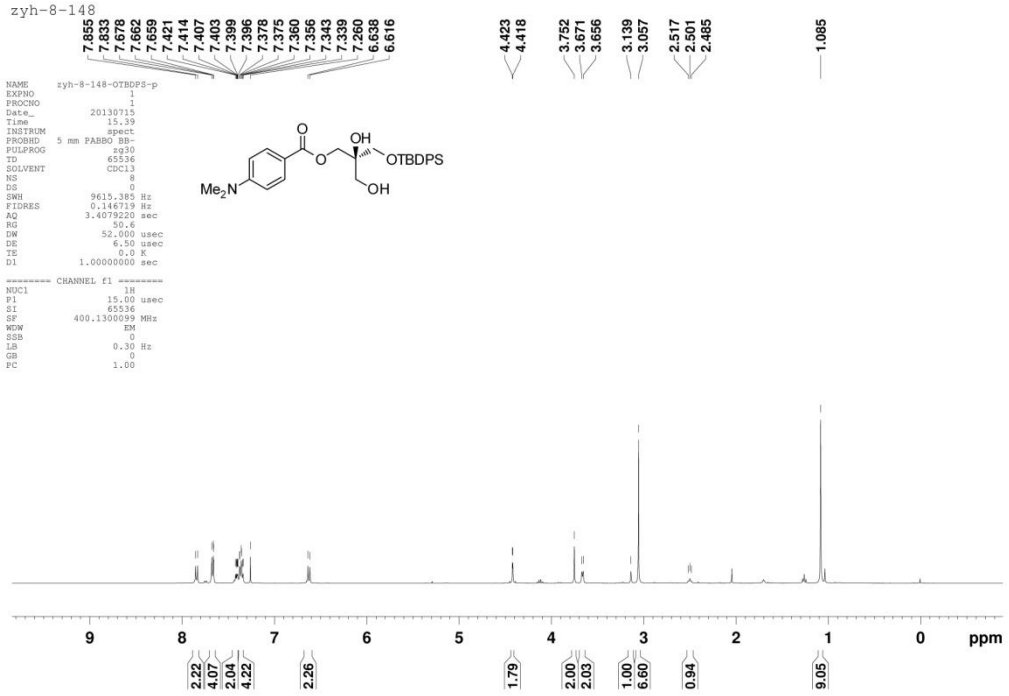

```
NAME      zyh-9-08-pen-p
EXPNO               2
PROCNO              1
Date_        20130717
Time            15.54
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD              65536
SOLVENT         CDCl3
NS                 52
DS                  0
SWH         26041.666 Hz
FIDRES       0.397364 Hz
AQ           1.2583412 sec
RG             195.79
DW             19.200 usec
DE              6.50 usec
TE               0.0 K
D1          2.00000000 sec
D11         0.03000000 sec

======== CHANNEL f1 ========
NUC1               13C
P1              10.00 usec
SI              32768
SF         100.6127748 MHz
WDW                EM
SSB                 0
LB              1.00 Hz
GB                  0
PC              1.40
```

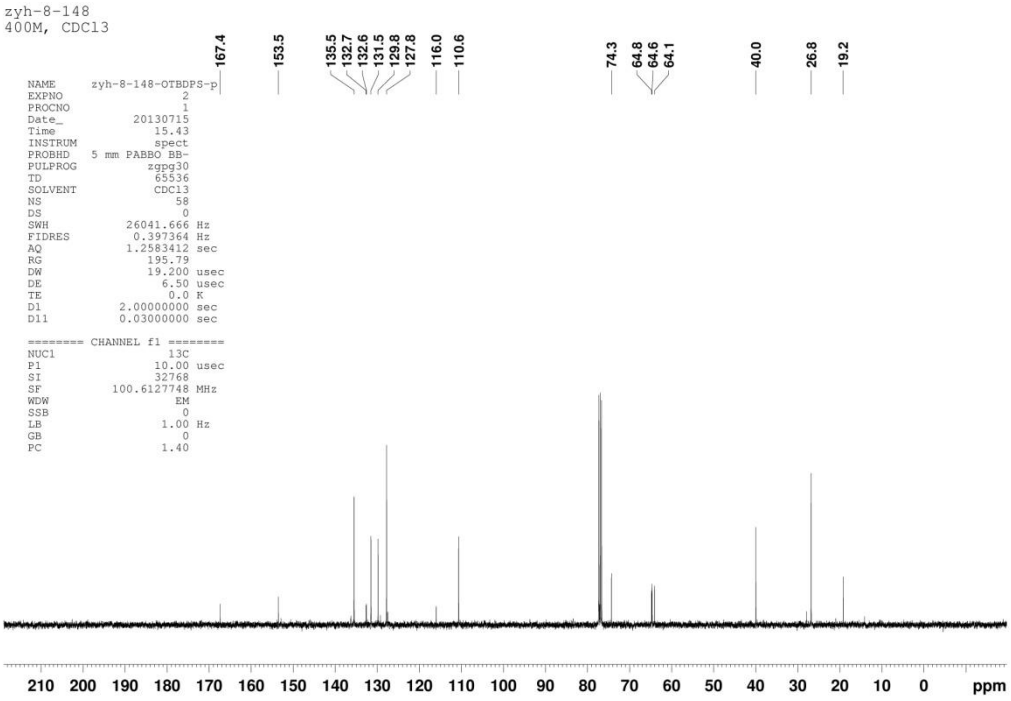

zyh-9-30
7.902
7.879
7.260
6.652
6.630
4.401
4.372
4.178
4.149
3.544
3.531
3.514
3.502
3.457
3.440
3.428
3.410
3.046
2.935
2.919
2.904
2.771
1.804
1.578
1.566
1.559
1.544
1.536
1.528
1.441
1.425
1.410
1.324
1.288
1.251
0.892
0.876
0.859
NAME zyh-9-30-Hex-p
EXPNO 1
PROCNO 1
Date_ 20130728
Time 19.06
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 57.23
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OH
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
1.98
2.03
1.00
1.01
1.00
1.01
5.98
0.92
0.95
1.90
2.13
6.37
3.07

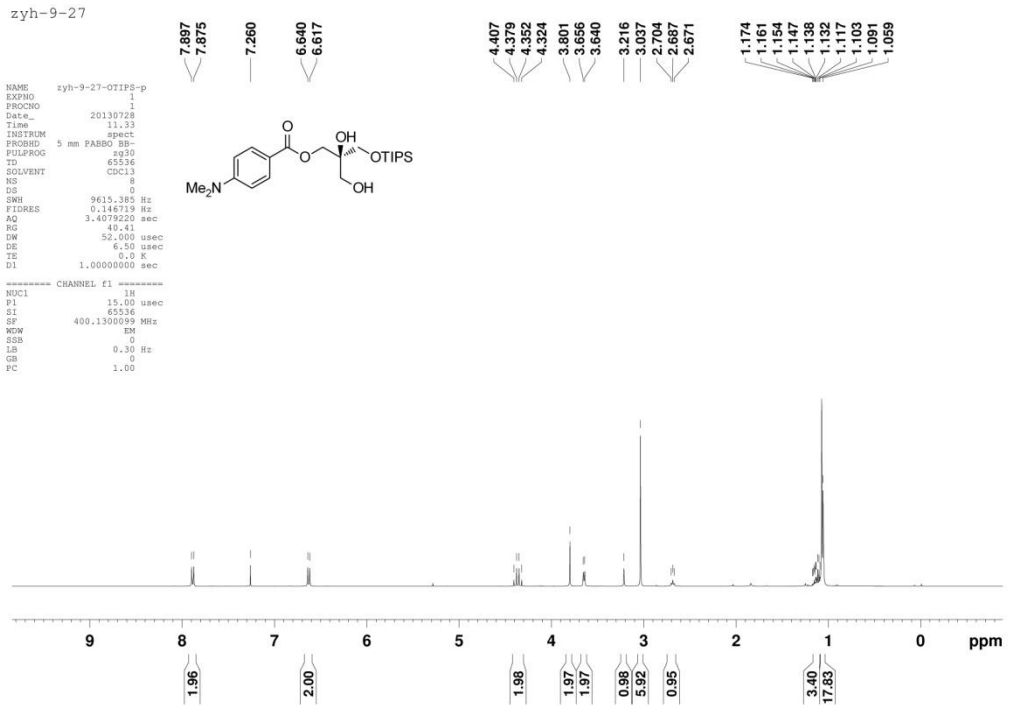

zyh-9-30
400M, CDCl3
167.7
153.6
131.5
115.8
110.7
77.3
77.0
76.7
73.8
65.9
65.5
40.0
34.4
31.7
29.8
22.6
22.5
14.0
NAME zyh-9-30-Hex-p
EXPNO 2
PROCNO 1
Date_ 20130728
Time 19.09
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 55
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

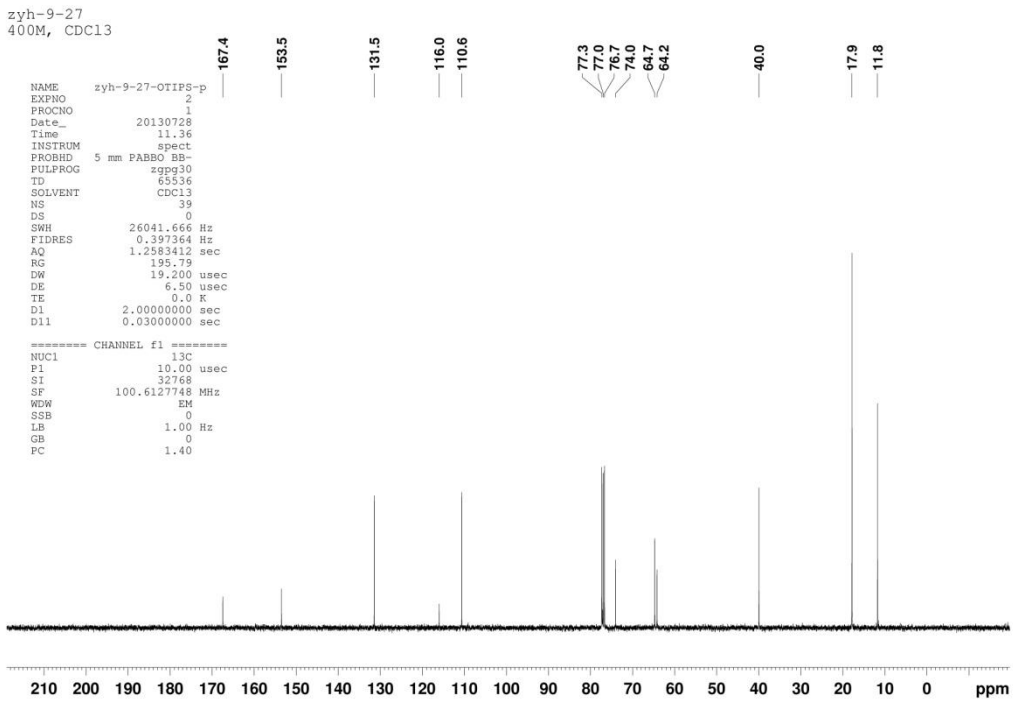

zyh-9-15
7.897
7.874
7.260
6.641
6.618
4.363
4.334
4.319
4.290
3.695
3.634
3.618
3.166
3.032
2.741
2.725
2.708
0.901
0.078
NAME zyh-9-15-OTBS-p
EXPNO 1
PROCNO 1
Date_ 20130719
Time 21.24
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 44.52
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OH
OTBS
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
1.97
2.00
0.99
1.03
1.92
2.00
0.95
5.89
0.96
8.93
5.82

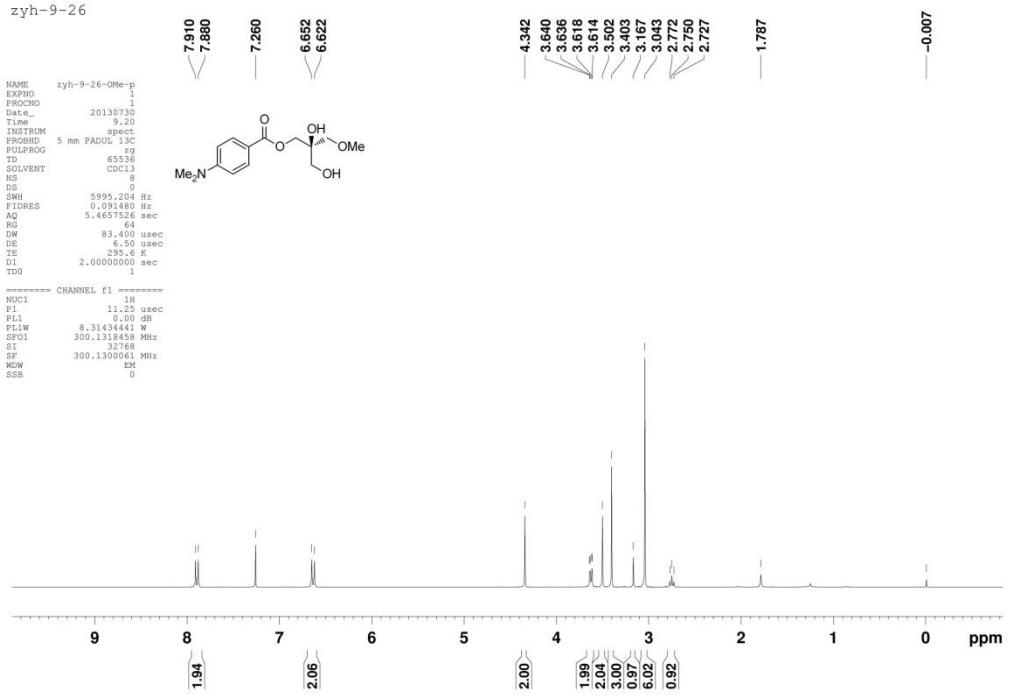

zyh-9-15
400M, CDCl3
167.4
153.5
131.4
116.0
110.7
77.3
77.0
76.7
73.9
64.7
64.4
64.1
40.0
25.8
18.2
-5.6
NAME zyh-9-15-OTBS-p
EXPNO 2
PROCNO 1
Date_ 20130719
Time 21.27
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 37
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

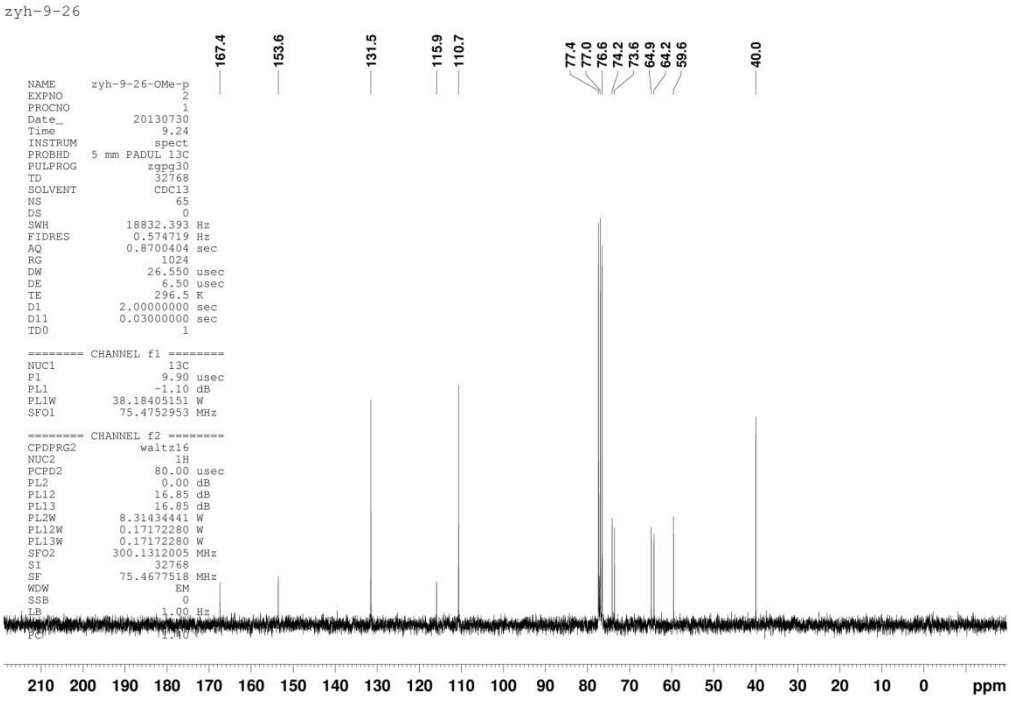

zyh-8-148
7.855
7.833
7.678
7.662
7.659
7.421
7.414
7.407
7.403
7.399
7.396
7.378
7.375
7.360
7.356
7.343
7.339
7.260
6.638
6.616
4.423
4.418
3.752
3.671
3.656
3.139
3.057
2.517
2.501
2.485
1.085
NAME zyh-8-148-OTBDPS-p
EXPNO 1
PROCNO 1
Date_ 20130715
Time 15.39
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 50.6
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OH
OTBDPS
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.22
4.07
2.04
4.22
2.26
1.79
2.00
2.03
1.00
6.60
0.94
9.05

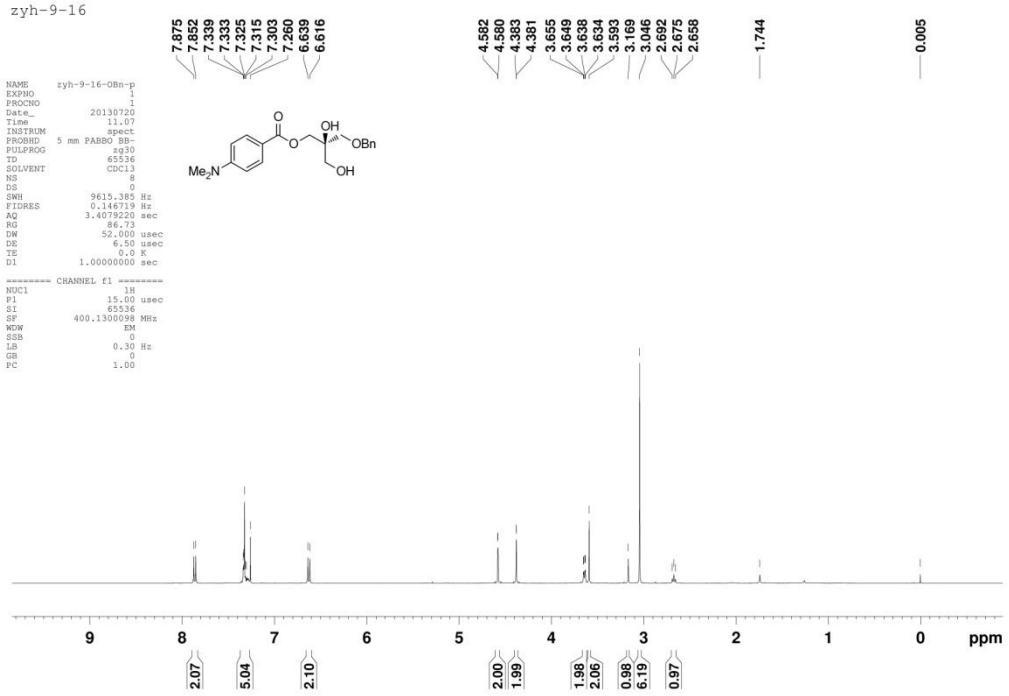

zyh-8-148
400M, CDCl3
167.4
153.5
135.5
132.7
132.6
131.5
129.8
127.8
116.0
110.6
74.3
64.8
64.6
64.1
40.0
26.8
19.2
NAME zyh-8-148-OTBDPS-p
EXPNO 2
PROCNO 1
Date_ 20130715
Time 15.43
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 58
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

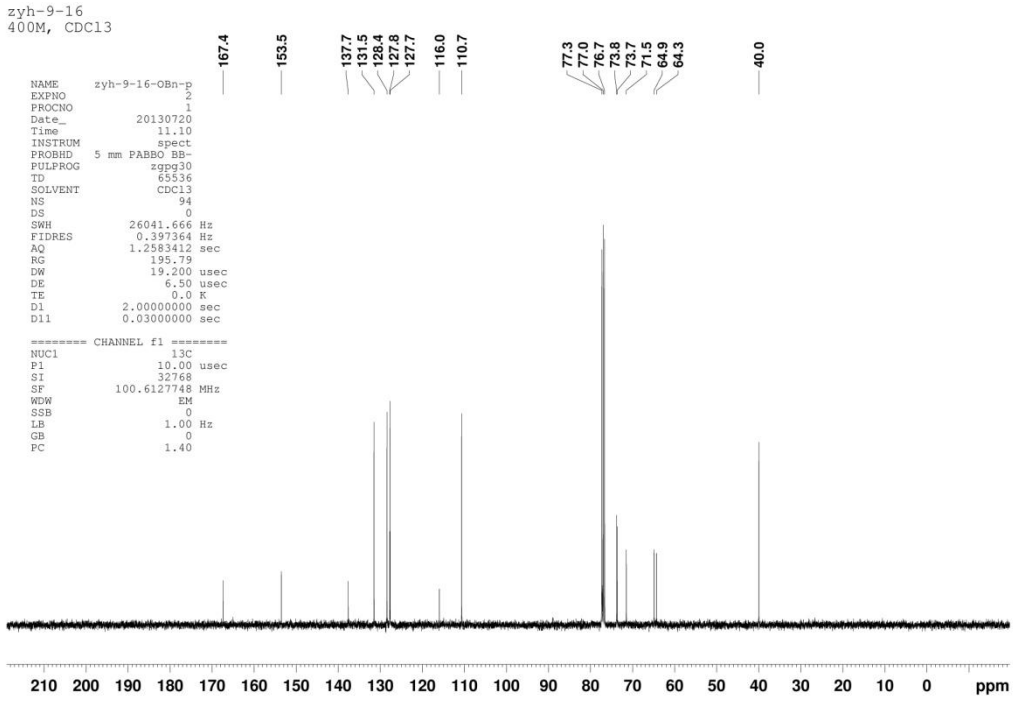

zyh-9-27
7.897
7.875
7.260
6.640
6.617
4.407
4.379
4.352
4.324
3.801
3.656
3.640
3.216
3.037
2.704
2.687
2.671
1.174
1.161
1.154
1.147
1.138
1.132
1.117
1.103
1.091
1.059
NAME zyh-9-27-OTIPS-p
EXPNO 1
PROCNO 1
Date_ 20130728
Time 11.33
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 40.41
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
OH
OTIPS
Me2N
OH
9
8
7
6
5
4
3
2
1
0
ppm
1.96
2.00
1.98
1.97
1.97
0.98
5.92
0.95
3.40
17.83

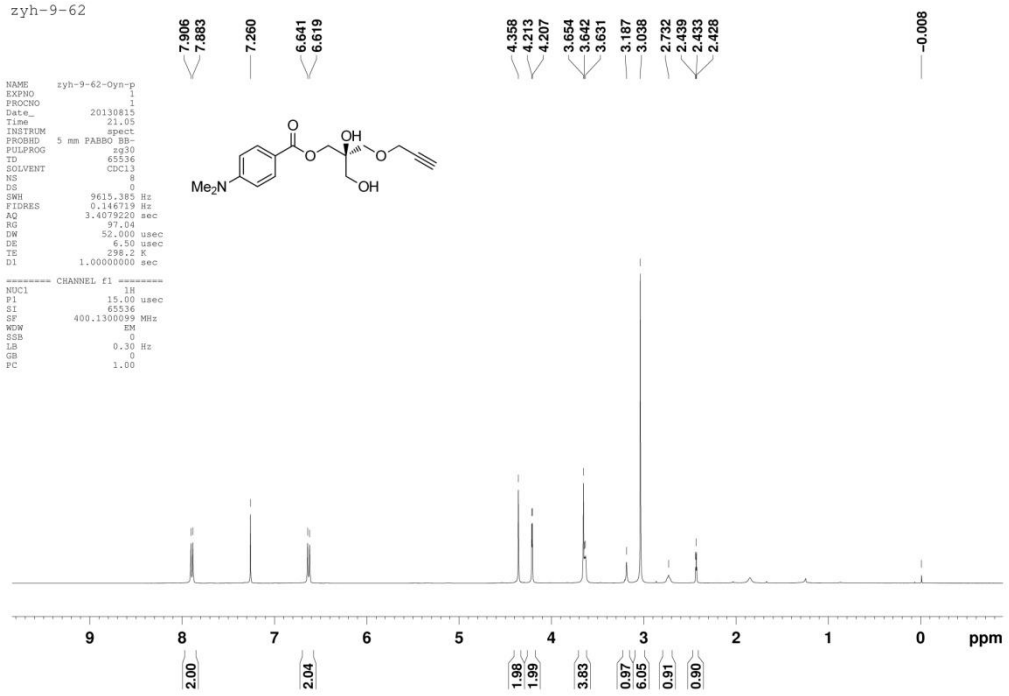

zyh-9-27
400M, CDCl3
167.4
153.5
131.5
116.0
110.6
77.3
77.0
76.7
74.0
64.7
64.2
40.0
17.9
11.8
NAME zyh-9-27-OTIPS-p
EXPNO 2
PROCNO 1
Date_ 20130728
Time 11.36
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 39
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

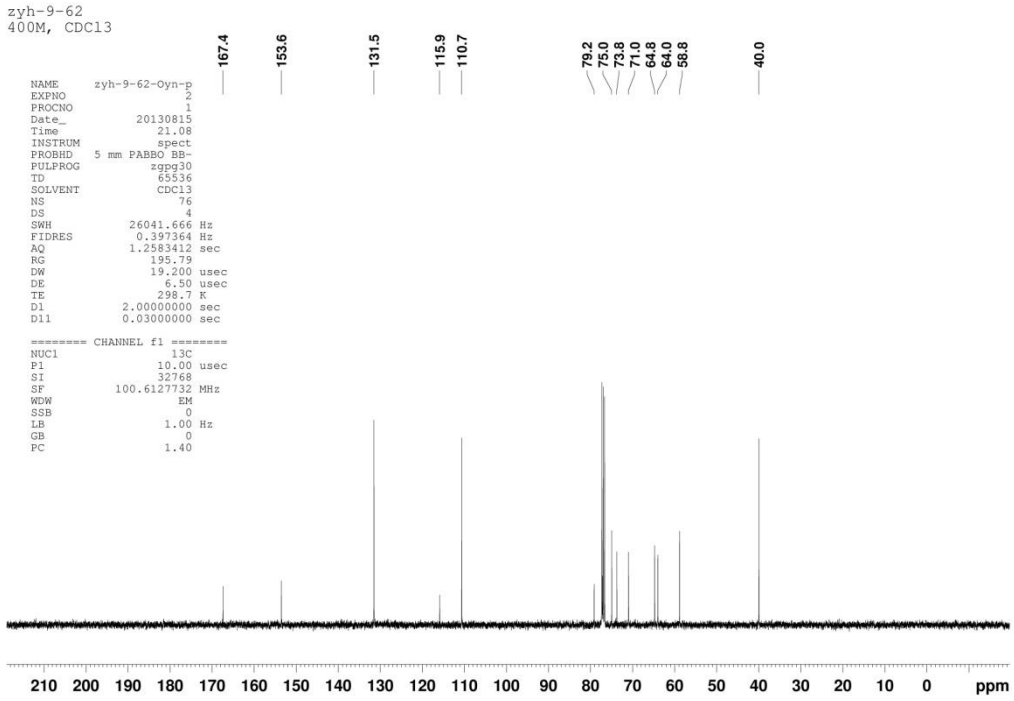

zyh-9-26
7.910
7.880
7.260
6.652
6.622
4.342
3.640
3.636
3.618
3.614
3.502
3.403
3.167
3.043
2.772
2.750
2.727
1.787
-0.007
NAME zyh-9-26-OMe-p
EXPNO 1
PROCNO 1
Date_ 20130730
Time 9.20
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.091480 Hz
AQ 5.4657526 sec
RG 64
DW 83.400 usec
DE 6.50 usec
TE 295.6 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 11.25 usec
PL1 0.00 dB
PL1W 8.31434441 W
SFO1 300.1318458 MHz
SI 32768
SF 300.1300061 MHz
WDW EM
SSB 0
OH
OMe
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
1.94
2.06
2.00
1.99
2.04
3.00
0.97
6.02
0.92

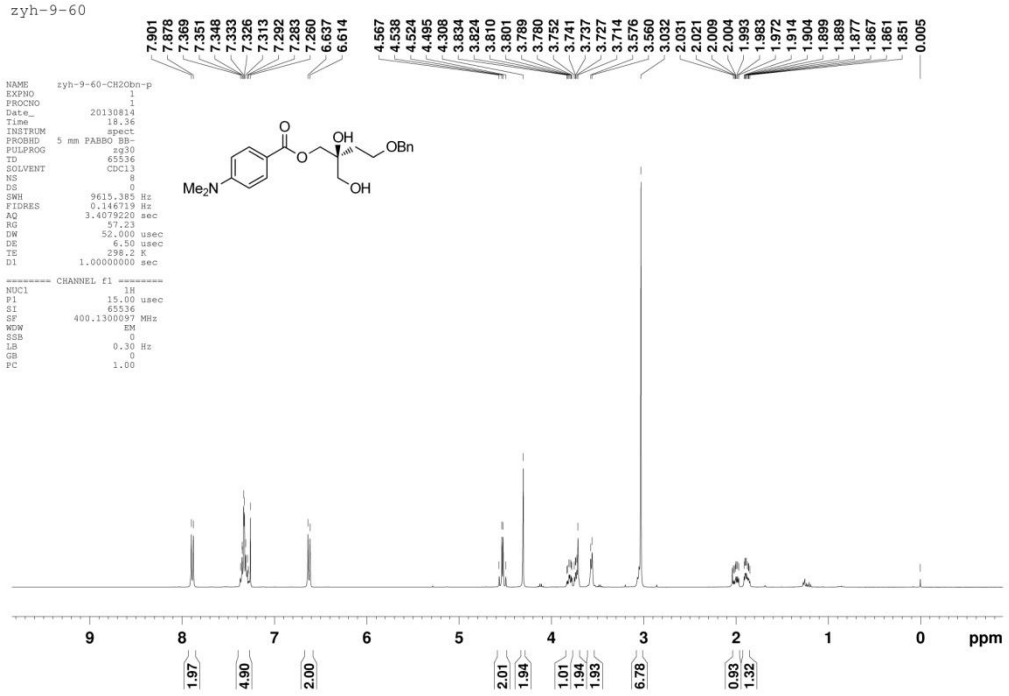

zyh-9-26
167.4
153.6
131.5
115.9
110.7
77.4
77.0
76.6
74.2
73.6
64.9
64.2
59.6
40.0
NAME zyh-9-26-OMe-p
EXPNO 2
PROCNO 1
Date_ 20130730
Time 9.24
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 65
DS 0
SWH 18832.393 Hz
FIDRES 0.574719 Hz
AQ 0.8700404 sec
RG 1024
DW 26.550 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.90 usec
PL1 -1.10 dB
PL1W 38.18405151 W
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 16.85 dB
PL13 16.85 dB
PL2W 8.31434441 W
PL12W 0.17172280 W
PL13W 0.17172280 W
SFO2 300.1312005 MHz
SI 32768
SF 75.4677518 MHz
WDW EM
SSB 0
LB 1.00 Hz
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

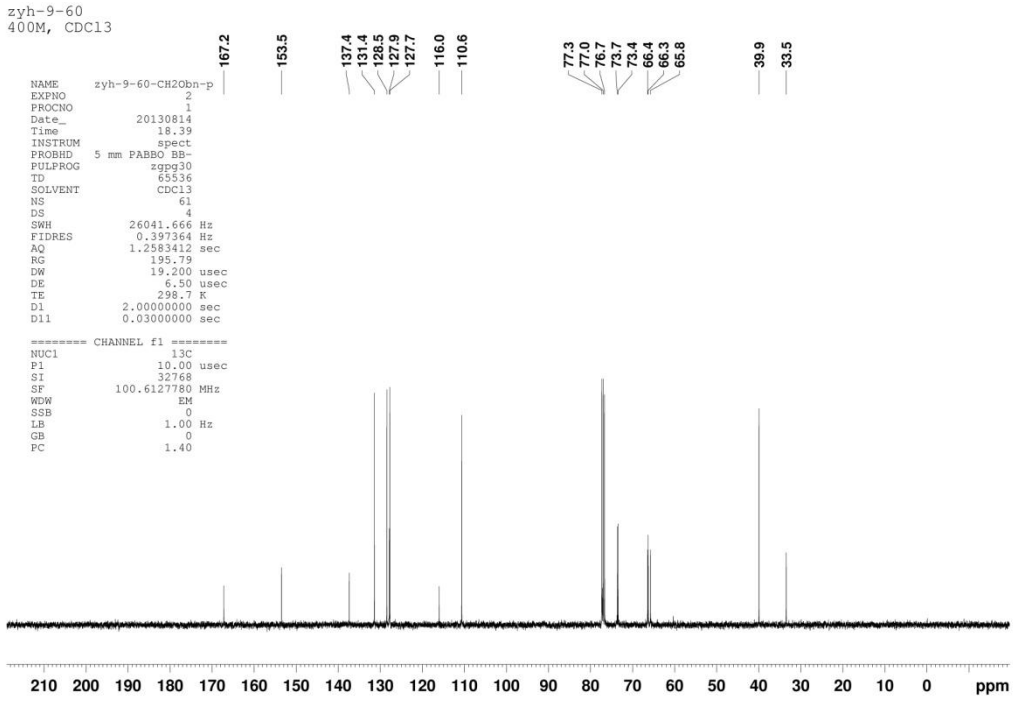

zyh-9-16
7.875
7.852
7.339
7.333
7.325
7.315
7.303
7.260
6.639
6.616
4.582
4.580
4.383
4.381
3.655
3.649
3.638
3.634
3.593
3.169
3.046
2.692
2.675
2.658
1.744
0.005
NAME zyh-9-16-OBn-p
EXPNO 1
PROCNO 1
Date_ 20130720
Time 11.07
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 86.73
DW 52.000 usec
DE 6.50 usec
TE 0.0 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300098 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OH
OBn
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.07
5.04
2.10
2.00
1.99
1.98
2.06
0.98
6.19
0.97

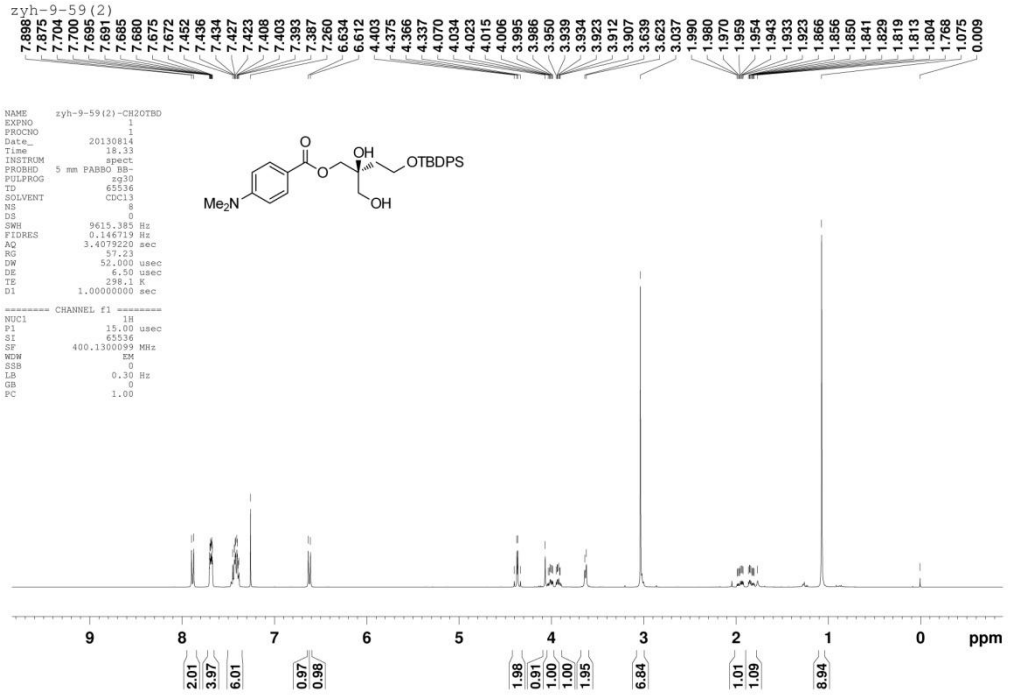

zyh-9-16
400M, CDCl3
167.4
153.5
137.7
131.5
128.4
127.8
127.7
116.0
110.7
77.3
77.0
76.7
73.8
73.7
71.5
64.9
64.3
40.0
NAME zyh-9-16-OBn-p
EXPNO 2
PROCNO 1
Date_ 20130720
Time 11.10
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 94
DS 0
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 0.0 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127748 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

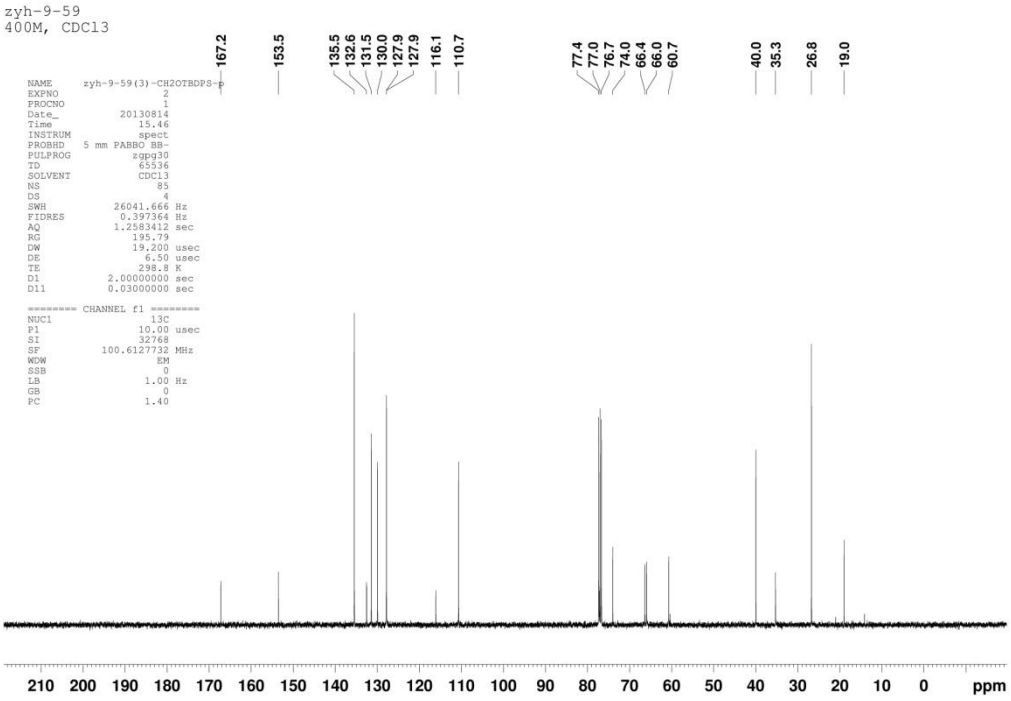

zyh-9-62
7.906
7.883
7.260
6.641
6.619
4.358
4.213
4.207
3.654
3.642
3.631
3.187
3.038
2.732
2.439
2.433
2.428
-0.008
NAME zyh-9-62-Oyn-p
EXPNO 1
PROCNO 1
Date_ 20130815
Time 21.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 97.04
DW 52.000 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
OH
OH
Me2N
9
8
7
6
5
4
3
2
1
0
ppm
2.00
2.04
1.98
1.99
3.83
0.97
6.05
0.91
0.90


zyh-9-62
400M, CDCl3
167.4
153.6
131.5
115.9
110.7
79.2
75.0
73.8
71.0
64.8
64.0
58.8
40.0
NAME zyh-9-62-Oyn-p
EXPNO 2
PROCNO 1
Date_ 20130815
Time 21.08
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 76
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 298.7 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm

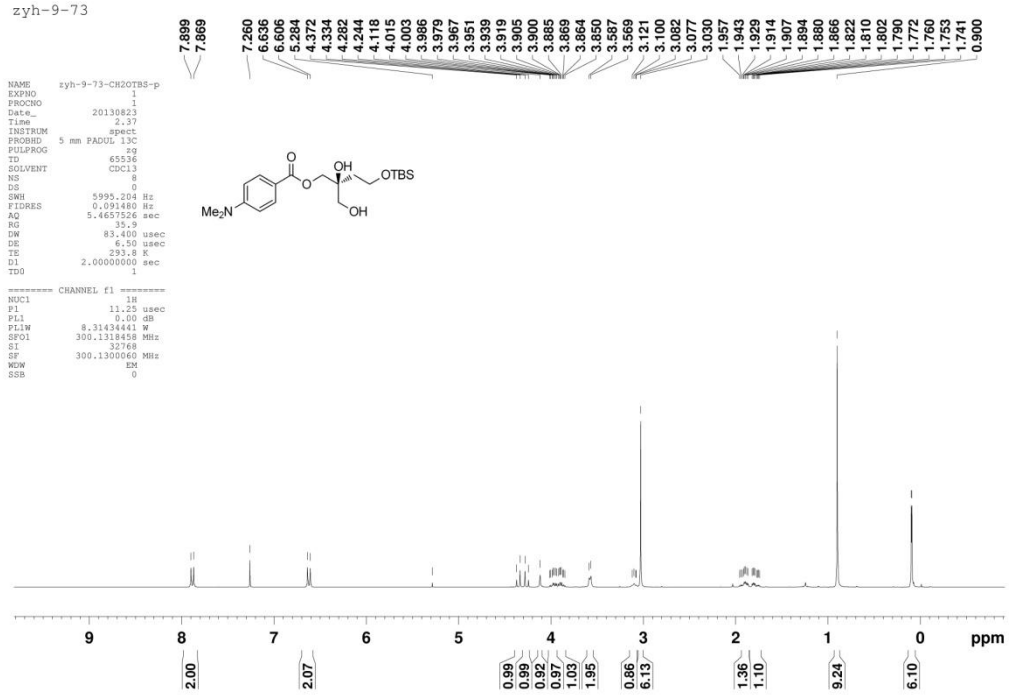

zyh-9-60
7.901 7.878 7.369 7.351 7.348 7.333 7.326 7.313 7.292 7.283 7.260 6.637 6.614
4.567 4.538 4.524 4.495 4.308 3.834 3.824 3.810 3.801 3.789 3.780 3.752 3.741 3.737 3.727 3.714 3.576 3.560 3.032 2.031 2.021 2.009 2.004 1.993 1.983 1.972 1.914 1.904 1.899 1.889 1.877 1.867 1.861 1.851 0.005
NAME zyh-9-60-CH2Obn-p
EXPNO 1
PROCNO 1
Date_ 20130814
Time 18.36
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 57.23
DW 52.000 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
OH
OBn
OH
9 8 7 6 5 4 3 2 1 0 ppm
1.97 4.90 2.00 2.01 1.94 1.01 1.94 1.93 6.78 0.93 1.32


zyh-9-60
400M, CDCl3
167.2 153.5 137.4 131.4 128.5 127.9 127.7 116.0 110.6 77.3 77.0 76.7 73.7 73.4 66.4 66.3 65.8 39.9 33.5
NAME zyh-9-60-CH2Obn-p
EXPNO 2
PROCNO 1
Date_ 20130814
Time 18.39
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 61
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 298.7 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127780 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

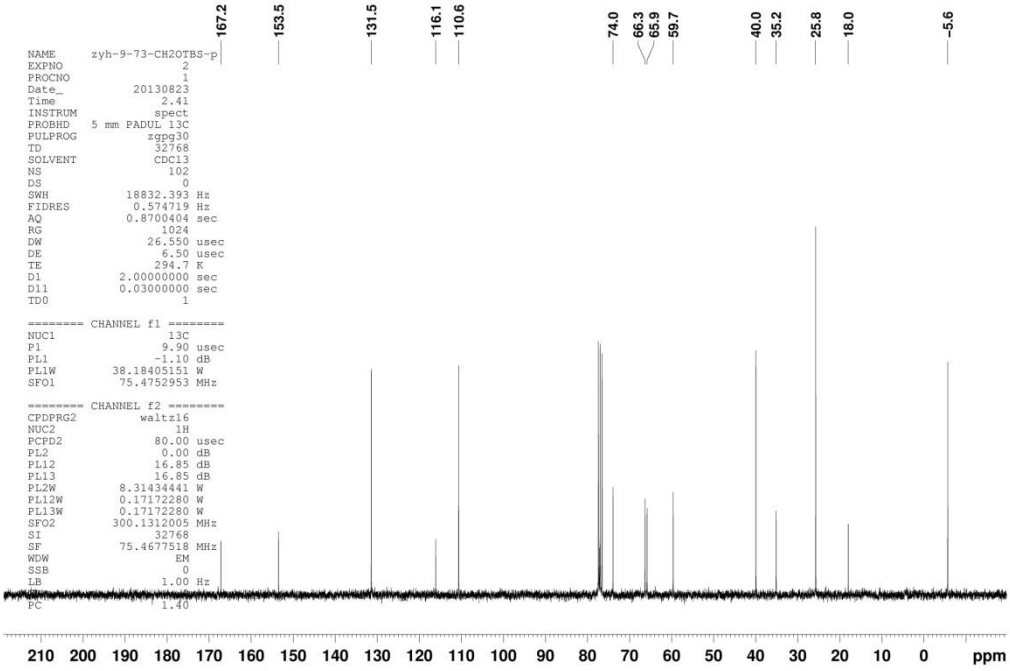

zyh-9-59(2)
7.898 7.875 7.704 7.700 7.695 7.691 7.685 7.680 7.675 7.672 7.452 7.436 7.434 7.427 7.423 7.408 7.403 7.393 7.387 7.260 6.612 4.403 4.375 4.366 4.337 4.070 4.034 4.023 4.015 4.006 3.995 3.986 3.950 3.939 3.934 3.923 3.912 3.907 3.639 3.623 3.037 1.990 1.980 1.970 1.959 1.954 1.943 1.933 1.923 1.866 1.856 1.850 1.841 1.829 1.819 1.813 1.804 1.768 1.075 0.009
NAME zyh-9-59(2)-CH2OTBD
EXPNO 1
PROCNO 1
Date_ 20130814
Time 18.33
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 57.23
DW 52.000 usec
DE 6.50 usec
TE 298.1 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300099 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
OH
OTBDPS
Me2N
OH
9 8 7 6 5 4 3 2 1 0 ppm
2.01 3.97 6.01 0.97 0.98 1.98 0.91 1.00 1.00 1.95 6.84 1.01 1.09 8.94

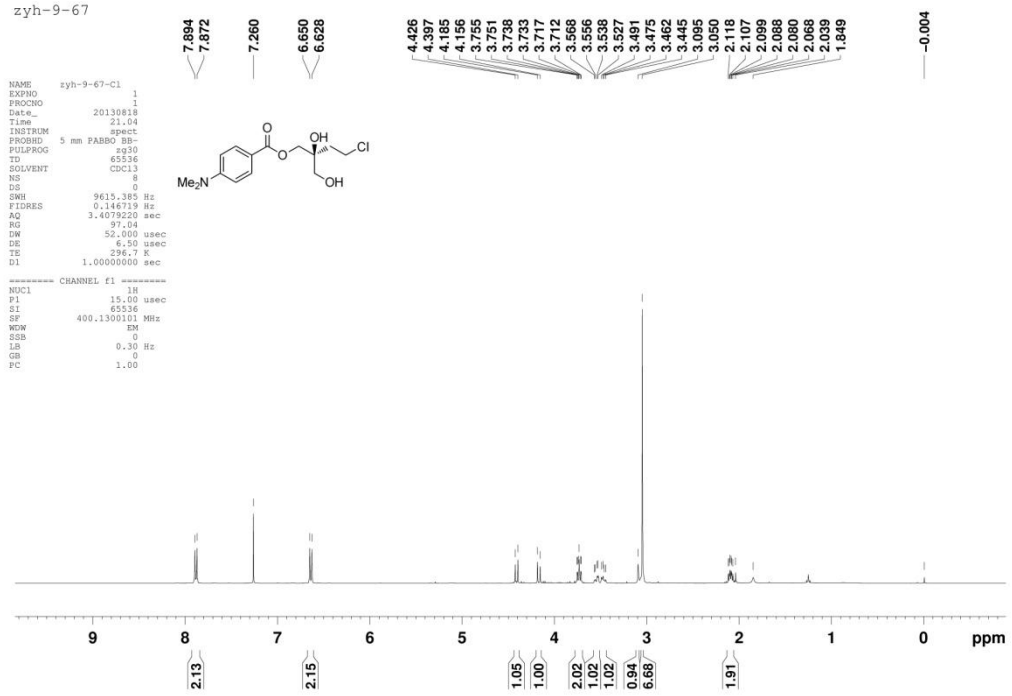

zyh-9-59
400M, CDCl3
167.2 153.5 135.5 132.6 131.5 130.0 127.9 127.9 116.1 110.7 77.4 77.0 76.7 74.0 66.4 66.0 60.7 40.0 35.3 26.8 19.0
NAME zyh-9-59(3)-CH2OTBDPS-p
EXPNO 2
PROCNO 1
Date_ 20130814
Time 15.46
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 85
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 298.8 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

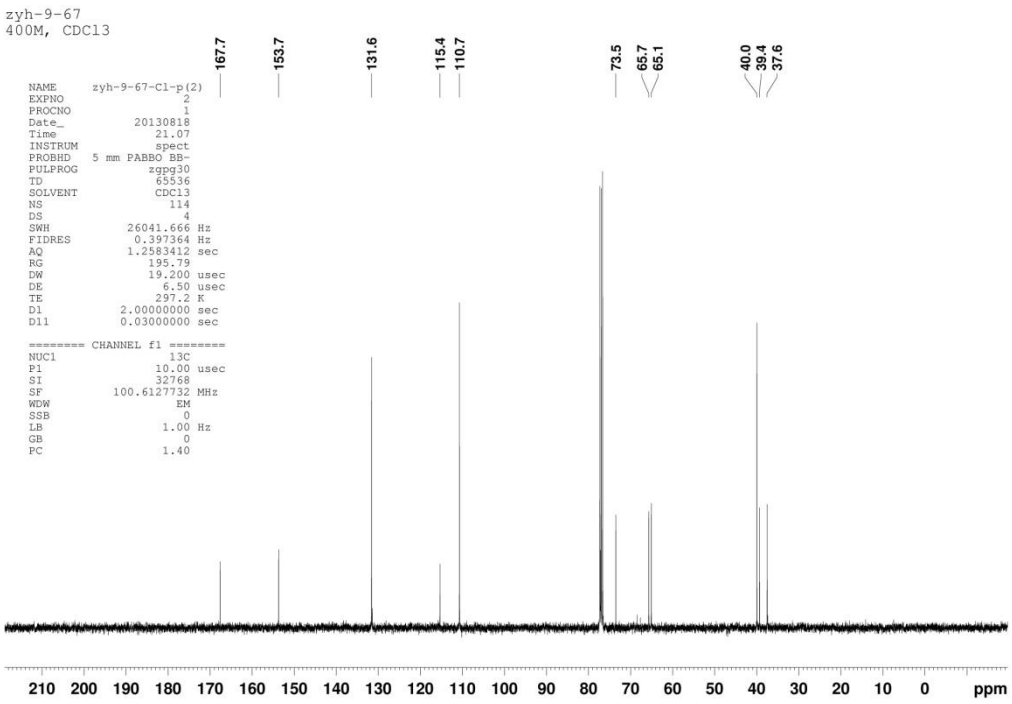
zyh-9-73

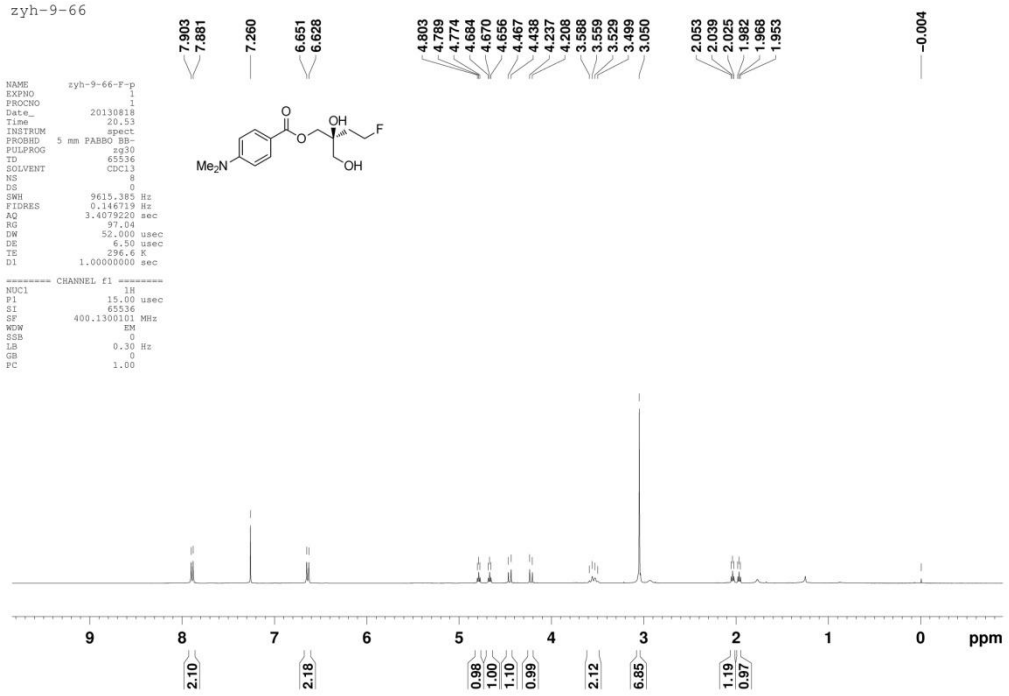


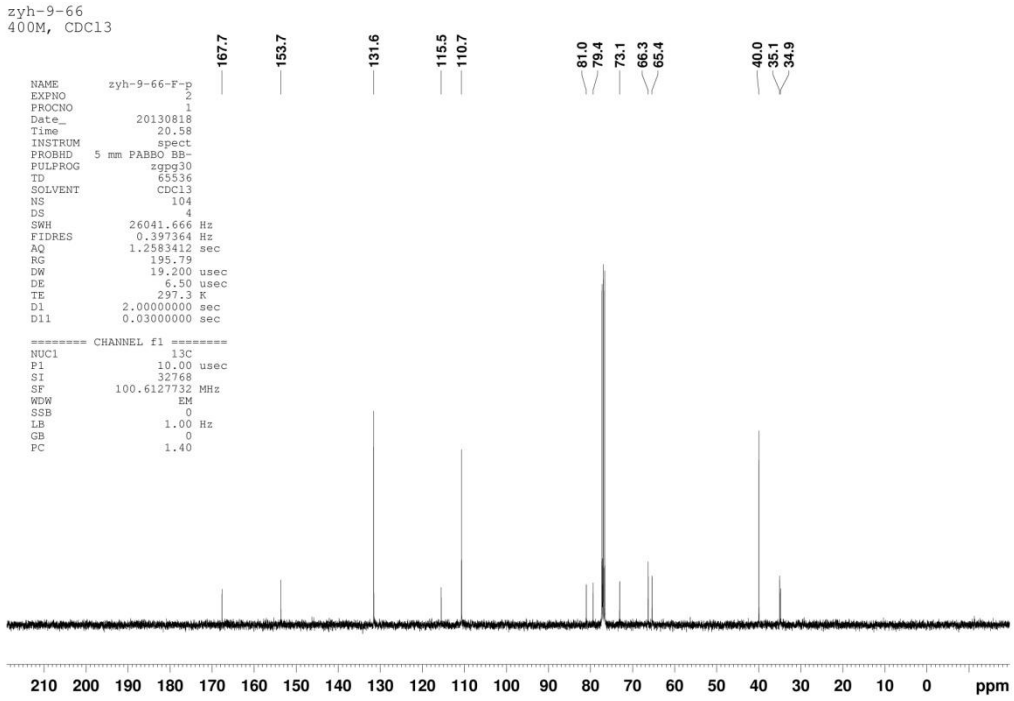

zyh-9-73

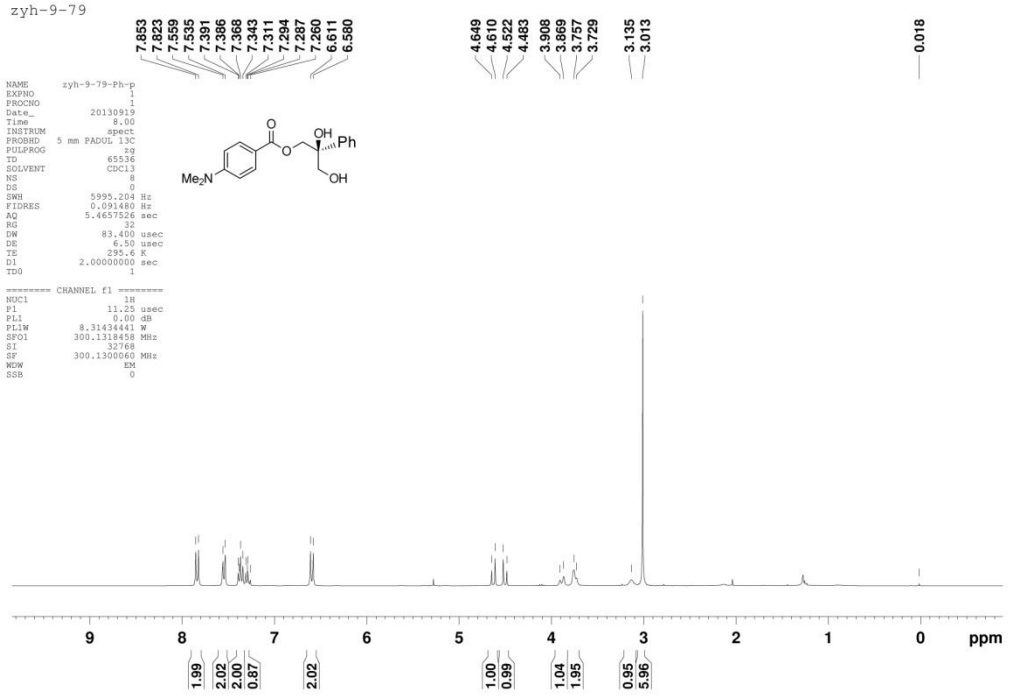


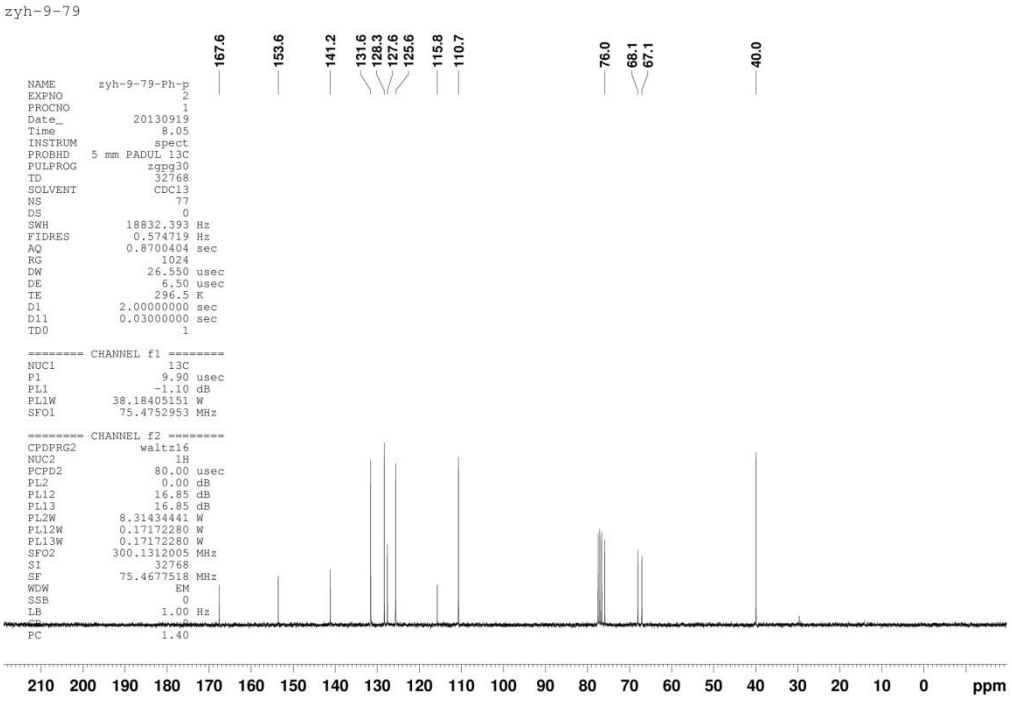

zyh-9-67
7.894
7.872
7.260
6.650
6.628
4.426
4.397
4.185
4.156
3.755
3.751
3.738
3.733
3.717
3.712
3.568
3.556
3.538
3.527
3.491
3.475
3.462
3.445
3.095
3.050
2.118
2.107
2.099
2.088
2.080
2.068
2.039
1.849
-0.004
NAME zyh-9-67-Cl
EXPNO 1
PROCNO 1
Date_ 20130818
Time 21.04
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 97.04
DW 52.000 usec
DE 6.50 usec
TE 296.7 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300101 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
Me2N
OH
Cl
OH
9
8
7
6
5
4
3
2
1
0
ppm
2.13
2.15
1.05
1.00
2.02
1.02
1.02
0.94
6.68
1.91


zyh-9-67
400M, CDCl3
167.7
153.7
131.6
115.4
110.7
73.5
65.7
65.1
40.0
39.4
37.6
NAME zyh-9-67-Cl-p(2)
EXPNO 2
PROCNO 1
Date_ 20130818
Time 21.07
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 114
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 297.2 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm


zyh-9-66
7.903
7.881
7.260
6.651
6.628
4.803
4.789
4.774
4.684
4.670
4.656
4.467
4.438
4.237
4.208
3.588
3.559
3.529
3.499
3.050
2.053
2.039
2.025
1.982
1.968
1.953
-0.004
NAME zyh-9-66-F-p
EXPNO 1
PROCNO 1
Date_ 20130818
Time 20.53
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 9615.385 Hz
FIDRES 0.146719 Hz
AQ 3.4079220 sec
RG 97.04
DW 52.000 usec
DE 6.50 usec
TE 296.6 K
D1 1.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 15.00 usec
SI 65536
SF 400.1300101 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
O
OH
F
O
Me2N
OH
9
8
7
6
5
4
3
2
1
0
ppm
2.10
2.18
0.98
1.00
1.10
0.99
2.12
6.85
1.19
0.97


zyh-9-66
400M, CDCl3
167.7
153.7
131.6
115.5
110.7
81.0
79.4
73.1
66.3
65.4
40.0
35.1
34.9
NAME zyh-9-66-F-p
EXPNO 2
PROCNO 1
Date_ 20130818
Time 20.58
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 104
DS 4
SWH 26041.666 Hz
FIDRES 0.397364 Hz
AQ 1.2583412 sec
RG 195.79
DW 19.200 usec
DE 6.50 usec
TE 297.3 K
D1 2.00000000 sec
D11 0.03000000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 10.00 usec
SI 32768
SF 100.6127732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm


zyh-9-79
7.853
7.823
7.559
7.535
7.391
7.386
7.368
7.343
7.311
7.294
7.287
7.260
6.611
6.580
4.649
4.610
4.522
4.483
3.908
3.869
3.757
3.729
3.135
3.013
0.018
NAME zyh-9-79-Ph-p
EXPNO 1
PROCNO 1
Date_ 20130919
Time 8.00
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 8
DS 0
SWH 5995.204 Hz
FIDRES 0.091480 Hz
AQ 5.4657526 sec
RG 32
DW 83.400 usec
DE 6.50 usec
TE 295.6 K
D1 2.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 11.25 usec
PL1 0.00 dB
PL1W 8.31434441 W
SFO1 300.1318458 MHz
SI 32768
SF 300.1300060 MHz
WDW EM
SSB 0
Me2N
OH
Ph
OH
9
8
7
6
5
4
3
2
1
0
ppm
1.99
2.02
2.00
0.87
2.02
1.00
0.99
1.04
1.95
0.95
5.96


zyh-9-79
167.6
153.6
141.2
131.6
128.3
127.6
125.6
115.8
110.7
76.0
68.1
67.1
40.0
NAME zyh-9-79-Ph-p
EXPNO 2
PROCNO 1
Date_ 20130919
Time 8.05
INSTRUM spect
PROBHD 5 mm PADUL 13C
PULPROG zgpg30
TD 32768
SOLVENT CDCl3
NS 77
DS 0
SWH 18832.393 Hz
FIDRES 0.574719 Hz
AQ 0.8700404 sec
RG 1024
DW 26.550 usec
DE 6.50 usec
TE 296.5 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 9.90 usec
PL1 -1.10 dB
PL1W 38.18405151 W
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 16.85 dB
PL13 16.85 dB
PL2W 8.31434441 W
PL12W 0.17172280 W
PL13W 0.17172280 W
SFO2 300.1312005 MHz
SI 32768
SF 75.4677518 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm