Supporting Information

# Ni-Catalyzed Asymmetric Reductive Allylation of Aldehydes with Allylic Carbonates

Zhuozhen Tan, Xiaolong Wan, Zhenhua Zang, Qun Qian,* Wei Deng,* and Hegui Gong*

*Department of Chemistry, Innovative Drug Research Center and School of Materials Science and Engineering, Shanghai University, 99 Shang-Da Road, Shanghai 200444, China*

Hegui_gong@shu.edu.cn

## Table of Contents



**General Methods**

All reactions were carried out under an atmosphere of nitrogen unless otherwise indicated. Anhydrous THF was distilled from sodium/benzophenone ketyl prior to use. All other solvents were technical grade unless noted. Anhydrous DMF (Acros) and other commercially available reagents were used without further purification unless noted. Column chromatography was performed using silica gel 300-400 mesh (purchased from Qingdao-Haiyang Co. China) as the solid support. All NMR spectra were recorded on Bruker Avance 500 MHz spectrometer at STP. $^{1}$H NMR and $^{13}$C NMR chemical shifts are reported in δ units, parts per million (ppm) relative to the chemical shift of residual solvent. Reference peaks for chloroform in $^{1}$H NMR and $^{13}$C NMR spectra were set at 7.26 ppm and 77.0 ppm, respectively. High-resolution mass spectra (HRMS) were obtained using Waters Micromass GCT Premier. Melting point was recorded on a micro melting point apparatus (X-4, YUHUA Co., Ltd, Gongyi, China). Enantiomer ratios were determined by chiral HPLC analysis in comparison with authentic racemic materials. Optical rotations were taken on Autopol IV-T.

# (1) Typical Nickel-Catalyzed Carbonyl Allylation Procedure

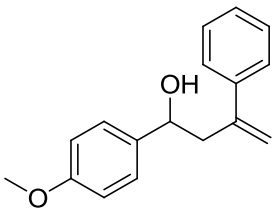
*General Procedure A*: To a flame-dried Schlenk tube equipped with a magnetic stir bar was loaded (*S*)-$^t$Bu-Pybox (**2c**) (7.40 mg, 0.023 mmol, 15.0 mol%) and zinc powder (29.3 mg, 0.450 mmol, 300 mol%). The tube was moved into a dry glove box, at which point $Ni(ClO_4)_2$ $6H_2O$ (5.50 mg, 0.015 mmol, 10.0 mol%) was added. The tube was capped with a rubber septum before being moved out of the glove box. DMF (1.0 mL), aldehyde (0.150 mmol, 100 mol%) and allylic carbonate (0.225 mmol, 150 mol%) were added via syringe subsequently. The solution was stirred at room temperature overnight. The reaction mixture was directly purified by flash-column chromatography on silica gel with petroleum ether and EtOAc as eluents to give pure products. The enantioselectivity was determined by HPLC. The ratio of anti/syn were determined by $^1$H NMR.

*General Procedure B*: To a flame-dried Schlenk tube equipped with a magnetic stir bar was loaded (*S*)-$^t$Bu-Pybox (**2c**) (7.40 mg, 0.023 mmol, 15.0 mol%) and zinc powder (29.3 mg, 0.450 mmol, 300 mol%). The tube was moved into a dry glove box, at which point $Ni(ClO_4)_2$ $6H_2O$ (5.50 mg, 0.015 mmol, 10.0 mol%) and CsI (19.5 mg, 0.075 mmol, 50.0 mol%) was added. The tube was capped with a rubber septum before being moved out of the glove box. DMF (1.0 mL), aldehyde (0.150 mmol, 100 mol%) and allylic carbonate (0.225 mmol, 150 mol%) were added via syringe subsequently. The reaction mixture was allowed to stir 12 hours under $N_2$ atmosphere at -15 ℃/-25 ℃.

*Procedure for preparing compound 5:* To a flame-dried Schlenk tube equipped with a magnetic stir bar was loaded (*S*)-$^t$Bu-Pybox (**2c**) (7.40 mg, 0.023 mmol, 15.0 mol%) and zinc powder (29.3 mg, 0.450 mmol, 300 mol%). The tube was moved into a dry glove box, at which point $Ni(COD)_2$ (4.20 mg, 0.015 mmol, 10.0 mol%) and CuI (14.3mg, 0.075 mmol, 50.0 mol%) was added. The tube was capped with a rubber septum, and it was moved out of the glove box. DMF (1.0 mL). 4-Anisaldehyde (22.4 mg, 0.150 mmol, 100 mol%) and allyl methyl carbonate (26.1 mg, 0.225 mmol, 150 mol%) were added via syringe subsequently. After the reaction mixture was allowed to stir 12 hours under $N_2$ atmosphere at 0 ℃ , it was directly loaded onto a silica column without work-up. Flash column chromatography ($SiO_2$: 8% ethyl acetate in petroleum ether) gave **5** as a colorless oil.

# (2) Analytical Data for Homoallylic Alcohols

**(+)-1-(4-Methoxyphenyl)-3-phenylbut-3-en-1-ol (1)**

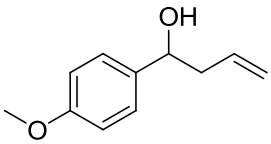



Colorless oil, 95% yield (36.2 mg), 91% ee; $[\alpha]_D^{22}$ = +34.3 (*c* = 1.00, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.06 (s, 1H), 2.90 (dd, *J* = 8.9, 14.3 Hz, 1H), 3.00 (ddd, *J* = 0.9, 4.5, 14.3 Hz, 1H), 3.83 (s, 3H), 4.72 (m, 1H), 5.18 (d, *J* = 0.8 Hz, 1H), 5.43 (d, *J* = 1.3 Hz, 1H), 6.93-6.88 (m, 2H), 7.27-7.50 (m, 7H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 45.9, 55.3, 71.7, 113.8, 115.7, 126.3, 127.1, 127.8, 128.5, 136.1,

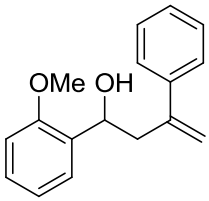
145.2, 159.1. HRMS (EI) calcd for $C_{17}H_{18}O_2$: 254.1307, found 254.1304. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 85/15, flow rate 0.8 mL/min, UV 214 nm, $t_R$ = 9.7 min (minor), $t_R$ = 11.5 min (major).

**(*S*)-(-)-1-(4-Methoxyphenyl)but-3-en-1-ol (5)[1]**



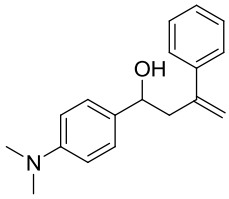

Colorless oil, 90% yield (24.0 mg), 66% ee; $[\alpha]_D^{23}$ = -38.5 (*c* = 0.40, $CHCl_3$).
$^1$H NMR (500 MHz, $CDCl_3$): δ 2.10 (s, 1H), 2.49 (t, *J* = 6.8 Hz, 2H), 3.80 (s, 3H), 4.67 (t, *J* = 6.5 Hz, 1H 2H), 5.10-5.18 (m, 2H), 5.82-5.73 (m, 1H), 6.86-6.90 (m, 2H), 7.326-7.29 (m, 2H). HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 92/8, flow rate 0.6 mL/min, UV 220 nm, $t_R$ = 15.4 min (minor), $t_R$ = 16.8 min (major).

**(+)-1-(2-Methoxyphenyl)-3-phenylbut-3-en-1-ol (6)**



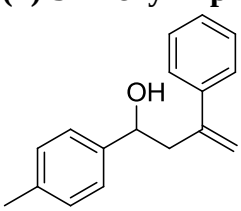

Colorless oil, 96% yield (36.6 mg), 88% ee; $[\alpha]_D^{26}$ = +24.8 (*c* = 1.00, $CHCl_3$). $^1$H NMR (500 MHz, $CDCl_3$): δ 2.48 (d, *J* = 4.8 Hz, 1H), 2.77 (dd, *J* = 9.0, 14.3 Hz, 1H), 3.17 (ddd, *J* = 0.9, 4.5, 14.3 Hz, 1H), 3.86 (s, 3H), 5.00 (m, 1H), 5.18 (s, 1H), 5.44 (d, *J* = 1.2 Hz, 1H), 6.86-6.90 (m, 1H), 6.94-6.99 (m, 1H), 7.22-7.27 (m, 1H), 7.28-7.32 (m, 1H), 7.34-7.39 (m, 3H), 7.51-7.55 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 43.9, 55.2, 68.5, 110.3, 115.1, 120.7, 126.3, 126.6, 127.6, 128.2, 128.3, 132.0, 140.3, 145.3, 156.2. HRMS (EI) calcd for $C_{17}H_{18}O_2$: 254.1307, found 254.1305. HPLC condition: Chiralcel OD-H, *n*-hexane/2-propanol 80/20, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 7.4 min (major), $t_R$ = 7.9 min (minor).

**(+)-1-(4-(Dimethylamino)phenyl)-3-phenylbut-3-en-1-ol (7)**




Colorless oil, 95% yield (38.1 mg), 85% ee; $[\alpha]_D^{22}$ = +41.6 (*c* = 1.03, $CHCl_3$).$^1$H NMR (500 MHz, $CDCl_3$): δ 1.99 (s, 1H), 2.91 (dd, *J* = 8.9, 14.3 Hz, 1H), 2.96 (s, 6H), 2.98 (dd, *J* = 4.5, 14.3 Hz, 1H), 4.67 (m, 1H), 5.18 (s, 1H), 5.41 (d, *J* = 1.2 Hz, 1H), 6.71-6.76 (m, 2H), 7.21-7.26 (m, 2H), 7.29-7.34 (m, 1H), 7.35-7.40 (m, 2H), 7.44-7.49 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 40.7, 45.6, 71.9, 112.6, 115.4, 126.4, 126.9, 127.7, 128.5, 131.9, 140.6, 145.4, 150.3. HRMS calcd for $C_{18}H_{21}NO$ (EI): 267.1623, found 267.1622. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 85/15, flow rate 0.8 mL/min, UV 214 nm, $t_R$ = 13.2 min (minor), $t_R$ = 16.8 min (major).

**(+)-3-Phenyl-1-p-tolylbut-3-en-1-ol (8)**

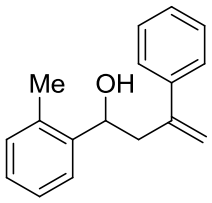



Colorless oil, 95% yield (33.9 mg), 88% ee; $[\alpha]_D^{24}$ = +33.4 (*c* = 0.98, $CHCl_3$).
$^1$H NMR (500 MHz, $CDCl_3$): δ 2.07 (s, 1H), 2.39(s, 3H), 2.90 (dd, *J* = 9.0, 14.3 Hz, 1H), 3.02 (dd, *J* = 3.9, 14.3 Hz, 1H), 4.74

[1] V. De Sio, A. Massa, A. Scettri, *Org. Biomol. Chem.* **2010,** *8*, 3055-3059.

(m, 1H), 5.20 (s, 1H), 5.44 (s, 1H), 7.16-7.22 (m, 2H), 7.26-7.30 (m, 2H), 7.32-7.38 (m, 1H), 7.38-7.42 (m, 2H), 7.44-7.51 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 21.1, 45.9, 71.9, 115.7, 125.8, 126.3, 127.8, 128.5, 129.1, 137.2, 140.4, 141.0, 145.2. HRMS (EI) calcd for $C_{17}H_{18}O$: 238.1358, found 238.1356. HPLC condition: Chiralcel AD-H, *n*-hexane/ 2-propanol 92/8, flow rate 0.6 mL/min, UV 214 nm, $t_R$ = 16.3 min (minor), $t_R$ = 20.0 min (major).

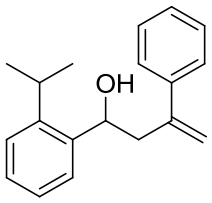
**(-)-3-phenyl-1-o-tolylbut-3-en-1-ol (9)**




Colorless oil, 85% yield (30.3 mg), 86% ee; $[\alpha]_D^{13}$ = -4.4 (*c* = 0.98, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.01 (s, 1H), 2.25(s, 3H), 2.77 (dd, *J* = 9.5, 14.4 Hz, 1H), 3.02 (ddd, *J* =0.9, 3.3, 14.5 Hz, 1H), 4.95 (m, 1H), 5.24 (s, 1H), 5.45 (d, *J* = 1.2 Hz, 1H), 7.11-7.14 (m, 1H), 7.15-7.20 (m, 1H), 7.22-7.27 (m, 1H), 7.30-7.34 (m, 1H), 7.35-7.40 (m, 2H), 7.45-7.49 (m, 2H), 7.54-7.57 (m, 1H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 19.0, 44.7, 68.4, 115.7, 125.3, 126.3, 127.2, 127.8, 128.4, 130.3, 134.3, 140.3, 141.9, 145.4. HRMS (EI) calcd for $C_{17}H_{18}O$: 238.1358, found 238.1362. HPLC condition: Chiralpak ID-3, *n*-hexane/ 2-propanol 90/10, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 5.0 min (minor), $t_R$ = 5.7 min (major).

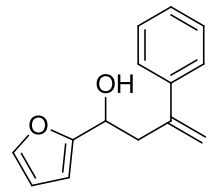
**(+)-1-(2-isopropylphenyl)-3-phenylbut-3-en-1-ol (10)**




Colorless oil, 48% yield (19.1 mg), 85% ee; $[\alpha]_D^{15}$ = +2.8 (*c* = 0.98, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 1.18 (d, *J* = 6.7 Hz, 3H), 1.25 (d, *J* = 6.7 Hz, 3H), 2.04 (s, 1H), 2.85 (dd, *J* = 9.5 , 14.5 Hz, 1H), 3.02 (ddd, *J* =1.1, 3.4, 14.5 Hz, 1H), 3.10 (m, 1H), 5.09 (dd, *J* = 2.7, 9.54 Hz, 1H), 5.26 (d, *J* = 0.5 Hz, 1H), 5.45 (d, *J* = 1.3, 1H), 7.23-7.36 (m, 4H), 7.36-7.42 (m, 2H), 7.46-7.49 (m, 2H), 7.55-7.59 (m, 1H), $^{13}$C NMR (125 MHz, $CDCl_3$): δ 23.8, 24.4, 27.9, 45.6, 67.8, 115.6, 125.2, 125.5, 126.0, 126.3, 127.6, 127.8, 128.4, 140.4, 145.4, 145.8. HRMS (EI) calcd for $C_{19}H_{22}O$: 238.1671, found 238.1669. HPLC condition: Lux Amylose-2, *n*-hexane/ 2-propanol 90/10, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 7.0 min (major), $t_R$ = 7.5 min (minor).

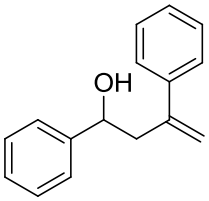
**(+)-1-(Furan-2-yl)-3-phenylbut-3-en-1-ol (11)**




Colorless oil, 95% yield (30.5 mg), 80% ee; $[\alpha]_D^{26}$ = +26.2 (*c* = 1.03, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.09 (s, 1H), 3.00 (dd, *J* = 8.8, 14.3 Hz, 1H), 3.15 (dd, *J* = 4.9, 14.3 Hz, 1H), 4.77 (m ,1H), 5.20 (s, 1H), 5.41 (d, *J* = 1.0 Hz, 1H), 6.22 (d, *J* = 3.0 Hz, 1H), 6.32 (dd, *J* = 1.8, 3.0 Hz, 1H), 7.27-7.32 (m, 1H), 7.32-7.39 (m,3H), 7.40-7.45 (m, 2H). $^{13}$C NMR (125MHz, $CDCl_3$): δ 41.9, 65.9, 106.3, 110.1, 115.9, 126.3, 127.8, 128.5, 140.2, 142.0, 144.4, 155.8. HRMS (EI) calcd for $C_{14}H_{14}O_2$: 214.0994, found 214.0995. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm), $t_R$ = 15.2 min (minor), $t_R$ = 17.0 min (major).

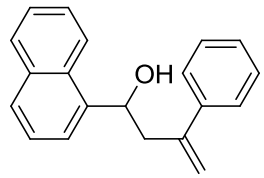
**(*S*)-(+)-1,3-Diphenylbut-3-en-1-ol (12)**[2]




Colorless oil, 95% yield (32.0 mg), 87% ee; $[\alpha]_D^{23}$ = +28.5 (*c* = 1.09, $CHCl_3$).

$^1$H NMR (500MHz, $CDCl_3$): δ 2.09 (s, 1H), 2.88 (dd, *J* = 9.2, 14.3 Hz, 1H), 3.02 (dd, *J* = 3.6, 14.3 Hz, 1H), 4.73 (m, 1H), 5.18 (s, 1H), 5.43 (s, 1H), 7.29-7.47 (m, 10H). HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/ min, UV 214 nm, $t_R$ = 12.9 min (minor), $t_R$ = 14.4 min (major). (lit: $t_R$ = 34.1 min (*R*)-isomer, $t_R$ = 38.2 min (*S*)-isomer (Daicel Chiralpak AD-H, flow rate 0.5 mL/min, *n*-hexane/2-propanol 30/1)).

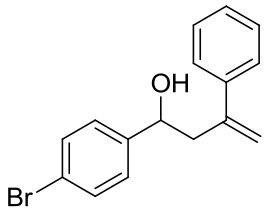
**(-)-1-(naphthalen-2-yl)-3-phenylbut-3-en-1-ol (13)**




Colorless oil, 95% yield (39.0 mg), 73% ee; $[\alpha]_D^{26}$ = -0.9 (*c* = 1.05, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.21 (d, *J* = 1.9 Hz,1H), 2.91 (dd, *J* = 9.6, 14.6 Hz, 1H), 3.26 (ddd, *J* = 1.0, 3.2, 14.6 Hz, 1H) ,5.28 (d, *J* = 0.5 Hz, 1H), 5.45-5.51 (m, 2H), 7.23-7.37 (m, 1H), 7.38-7.44 (m, 2H), 7.46-7.53 (m, 5H), 7.71 (d, *J* = 7.2 Hz, 1H), 7.78 (d, *J* = 8.2 Hz, 1H), 7.85-7.92 (m, 1H), 7.95-8.00 (m, 1H). $^{13}$C NMR (125MHz, $CDCl_3$): δ 45.2, 68.9, 115.8, 122.9, 123.0 125.4, 125.5, 126.5, 127.8, 127.9, 128.5, 128.9, 130.3, 133.8, 139.6, 140.5, 145.7. HRMS (EI) calcd for $C_{20}H_{18}O$: 274.1358, found 274.1362. HPLC condition: Lux Amylose-2, *n*-hexane/2-propanol 70/30, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 6.8 min (major), $t_R$ = 7.4 min (minor).

**(+)-1-(4-Bromophenyl)-3-phenylbut-3-en-1-ol (14)**



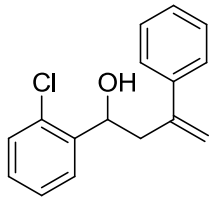

This compound was prepared according to the *General Procedure A at* 25 ℃. Colorless oil, 95% yield (43.2 mg), 77% ee; $[\alpha]_D^{27}$ = +36.8 (*c* = 1.05, $CHCl_3$).

This compound was also prepared according to the *General Procedure B at* -25 ℃. 77% yield (34.8 mg), 85% ee; $[\alpha]_D^{25}$ = +42.0 (*c* = 1.00, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.11 (s, 1H), 2.82 (ddd, *J* = 0.6, 8.9, 14.2 Hz, 1H), 2.96 (ddd, *J* = 1.1, 4.4, 14.2 Hz, 1H), 4.68 (q, *J* = 4.3 Hz, 1H), 5.14 (d, *J* = 1.0 Hz, 1H), 5.41 (d, *J* = 1.3 Hz), 7.19-7.23 (m, 2H), 7.30-7.34 (m, 1H), 7.35-7.39 (m, 2H), 7.40-7.48 (m, 4H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 46.0, 71.4, 116.1, 121.2, 126.2, 127.5, 127.9, 128.6, 131.4, 140.0, 142.8, 144.6. HRMS (EI) calcd for $C_{16}H_{15}OBr$: 302.0306, found 302.0307. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm), $t_R$ = 15.2 min (minor), $t_R$ = 17.1 min (major).

[2] S. Kotani, S. Hashimotob, M. Nakajima, *Tetrahedron*, **2007**, *63*, 3122–3132.

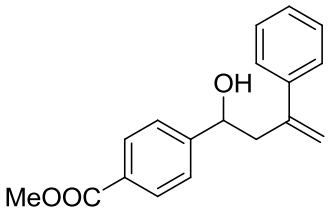
**(-)-1-(2-Chlorophenyl)-3-phenylbut-3-en-1-ol (15)**




Colorless solid, M.p: 56-58 ℃, 94% yield (36.5 mg), 77% ee; $[\alpha]_D^{27}$ = -12.6 (*c* = 1.05, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.28 (s, 1H), 2.84 (ddd, *J* = 0.4, 9.8, 14.3 Hz, 1H), 3.00 (ddd, *J* = 1.2, 3.1, 14.3 Hz, 1H), 5.14 (m, 1H), 5.26 (s, 1H), 5.51 (s, 1H), 7.18-7.24 (td, *J* = 1.7, 7.7 Hz, 1H), 7.27-7.35 (m, 3H), 7.35-7.40 (m, 2H), 7.52-7.56 (m, 2H), 7.62-7.62 (dd, *J* = 1.5, 7.8 Hz, 1H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 44.01, 68.6, 116.0, 126.3, 127.0, 127.1, 127.9, 128.3, 128.4, 129.3, 131.4, 139.8, 141.3, 144.9. HRMS (EI) calcd for $C_{16}H_{15}OCl$: 258.0811, found 258.0804. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 11.0 min (minor), $t_R$ = 11.7 min (major).

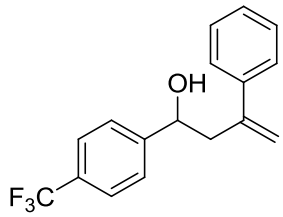
**(+)-Methyl-4-(1-hydroxy-3-phenylbut-3-enyl)benzoate (16)**




Colorless oil, 95% yield (40.2 mg), 71% ee; $[\alpha]_D^{27}$ = +40.6 (*c* = 1.02, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.28 (s, 1H), 2.84 (dd, *J* = 9.0, 14.3 Hz, 1H), 3.00 (dd, *J* = 4.4, 14.3 Hz, 1H), 3.91 (s, 3H), 4.77 (m, 1H), 5.14 (s, 1H), 5.41 (s, 1H), 7.29-7.34 (m, 1H), 7.34-7.41 (m, 4H), 7.42-7.46 (m, 2H), 7.97-8.02 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 45.9, 52.0, 71.6, 116.1, 125.7, 126.2, 127.9, 128.6, 129.2, 129.7, 140.0, 144.5, 149.0, 166.9. HRMS (EI) calcd for $C_{18}H_{18}O_3$: 282.1256, found 282.1255. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm, $t_R$ = 20.3 min (minor), $t_R$ = 23.4 min (major).

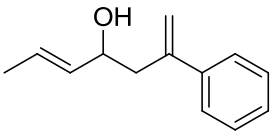
**(+)-3-Phenyl-1-(4-(trifluoromethyl)phenyl)but-3-en-1-ol (17)**




Colorless oil, 95% yield (41.6 mg), 69% ee; $[\alpha]_D^{23}$ = +16.6 (*c* = 1.05, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.28 (s, 1H), 2.84 (dd, *J* = 9.1, 14.3 Hz, 1H), 3.00 (ddd, *J* = 0.9, 4.5, 14.3 Hz, 1H), 4.77 (m, 1H), 5.16 (d, *J* = 0.7 Hz, 1H), 5.43 (d, *J* = 1.1 Hz, 1H), 7.31-7.36 (m, 1H), 7.36-7.41 (m, 2H), 7.42-7.45 (m, 4H), 7.57-7.62 (d, *J* = 8.1 Hz, 2H). $^{13}$C NMR (125MHz, $CDCl_3$): δ 46.0, 71.4, 116.2, 124.1 (q, *J* = 272.4 Hz, $CF_3$), 125.3 (q, *J* = 3.8 Hz), 126.1, 126.2, 127.9, 128.6, 129.7 (q, *J* = 32.2 Hz), 140.0, 144.5, 147.8. HRMS (EI) calcd for $C_{17}H_{15}F_3O$: 292.1075, found 292.1080. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm, $t_R$ = 11.1 min (minor), $t_R$ = 12.1 min (major).

**(+)-(*E*)-2-Phenylhepta-1,5-dien-4-ol (18)**

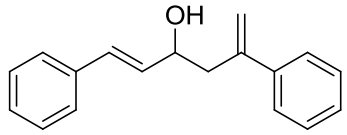



Colorless oil, 91% yield (26.5 mg), 85% ee; $[\alpha]_D^{25}$ = +90.3 (*c* = +0.40, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 1.67-1.68 (m, 4 H), 2.66 (dd, *J* = 4.6, 14.1 Hz, 1H), 2.92 (dd, *J* = 5.0, 14.1 Hz, 1H), 4.12 (m,

1H), 5.17 (s, 1H), 5.40 (d, *J* = 1.1 Hz, 1H), 5.50 (ddd, *J* = 1.3, 6.8, 15.6 Hz, 1H), 6.55 (dq, *J* = 6.4, 15.6 Hz, 1H), 7.24-7.31 (m, 1H), 7.31-7.37 (m, 2H), 7.38-7.44 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 17.6, 43.8, 70.6, 115.4, 126.3, 127.0, 127.7, 128.4, 133.2, 140.6, 145.0. HRMS (EI) calcd for $C_{13}H_{16}O$: 188.1201, found 188.1201. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm), $t_R$ = 10.3 min (minor), $t_R$ = 11.1 min (major).

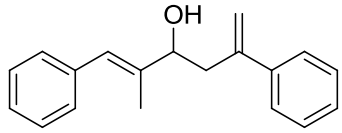
**(+)-(*E*)-1,5-Diphenylhexa-1,5-dien-3-ol (19)[3]**




Colorless oil, 94% yield (35.3 mg), 85% ee; $[\alpha]_D^{25}$ = +24.6 (*c* = 1.00, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 1.90 (s, 1H), 2.81 (dd , *J* = 8.3, 14.1 Hz, 1H), 2.92 (dd, *J* = 5.0, 14.1 Hz, 1H), 4.37 (m, 1H), 5.23 (s, 1H), 5.44 (d, *J* = 1.2 Hz, 1H), 6.22 (dd, *J* = 6.4, 15.9 Hz, 1H), 6.55 (d, *J* = 15.9 Hz, 1H), 7.22-7.27 (m, 1H), 7.28-7.40 (m, 7H), 7.43-7.48 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 43.9, 70.6, 115.8, 126.3, 126.4, 127.6, 127.7, 128.4, 128.5, 130.2, 131.5, 136.7, 140.5, 144.7. HRMS (EI) calcd for $C_{18}H_{18}O$: 250.1358, found 250.1357. HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm, $t_R$ = 19.5 min (minor), $t_R$ = 22.4 min (major).

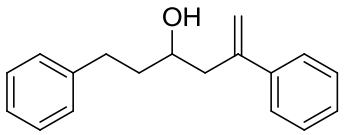
**(+)-(E)-2-methyl-1,5-diphenylhexa-1,5-dien-3-ol (20)**




Colorless oil, 87% yield (35.3 mg), 91% ee; $[\alpha]_D^{16}$ = +78.5 (*c* = 1.01, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 1.87 (d, *J* = 2.5 Hz, 1H), 1.90 (d, *J* = 1.5 Hz, 3H), 2.79 (ddd , *J* =1.0, 8.3, 14.2 Hz, 1H), 2.96 (ddd, *J* = 1.0, 4.8, 14.2 Hz, 1H), 4.25 (m, 1H), 5.23 (d, *J* = 0.9 Hz,, 1H), 5.42 (d, *J* = 1.4 Hz, 1H), 6.43 (s, 1H), 7.20-7.23 (m, 3H), 7.23-7.32 (m, 5H), 7.32-7.35 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 13.4, 42.0, 75.6, 115.6, 126.0, 126.4, 126.5, 127.7, 128.1, 128.5, 129.0, 137.5, 139.3, 140.6, 145.3. HRMS (EI) calcd for $C_{19}H_{20}O$: 264.1508, found 264.1510. HPLC condition: Chiralpak ID-3, *n*-hexane/2-propanol 95/5, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 6.9 min (major), $t_R$ = 7.9 min (minor).

**(+)-1,5-Diphenylhex-5-en-3-ol (21)[4]**




This compound was prepared according to the *General Procedure A at* 25 ℃. Colorless oil, 95% yield (35.9 mg), 68% ee; $[\alpha]_D^{27}$ = +41.4 (*c* = 0.98, $CHCl_3$).

This compound was also prepared according to the *General Procedure B at* -25 ℃. 52% yield (19.5 mg), 80% ee; $[\alpha]_D^{25}$ = +48.0 (*c* = 1.00, $CHCl_3$).

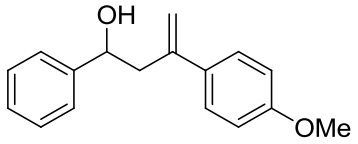
$^1$H NMR (500 MHz, $CDCl_3$): δ 1.76 (s, 1H), 1.80-1.88 (m, 2H), 2.60 (dd, *J* = 8.8, 14.2

[3] T. Kamei, K, Fujita, K, Itami, J.-I .Yoshida, *Org. Lett.* **2005**, *7*, 4725-4728.

[4] S.-F. Zhu, X.-C. Qiao, Y.-Z. Zhang, L.-X. Wang, Q.-L. Zhou, *Chem. Sci.* **2011,** *2*, 1135-1140.

Hz, 1H), 2.79-2.87 (m, 2H), 3.73 (m, 1H), 5.19 (s, 1H), 5.43 (d, *J* = 1.2 Hz, 1H), 7.16-7.23 (m, 3H), 7.27-7.33 (m, 3H), 7.33-7.38 (m, 2H), 7.39-7.44 (m, 2H). HPLC condition: Chiralcel AD-H, *n*-hexane/2-propanol 90/10, flow rate 0.6 mL/min, UV 214 nm, $t_R$ = 12.0 min (minor), $t_R$ = 13.6 min (major).

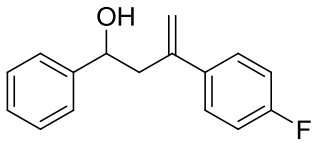
**(+)-3-(4-Methoxyphenyl)-1-phenylbut-3-en-1-ol (22)**




This compound was prepared according to the *General Procedure A at* 25 ℃. Colorless oil, 95% yield (36.1 mg), 72% ee; $[\alpha]_D^{27}$ = +37.3 (*c* = 1.00, $CHCl_3$). This compound was also prepared according to the *General Procedure B at* -15 ℃. 60% yield (22.8 mg), 81% ee; $[\alpha]_D^{25}$ = +41.0 (*c* = 1.00, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.18 (d, *J* = 2.2 Hz, 1H), 2.81 (dd, *J* = 9.2, 14.3 Hz, 1H), 2.99 (ddd, *J* = 0.9, 4.2, 14.3 Hz, 1H), 3.83 (s, 3H), 4.72 (dq, *J* = 2.2, 9.2 Hz, 1H), 5.09 (d, *J* = 0.7 Hz, 1H), 5.36 (d, *J* = 1.3 Hz, 1H), 6.88-6.93 (m, 2H),7.27-7.32 (m, 1H), 7.33-7.38 (m, 4H), 7.39-7.43 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 46.0, 55.2, 71.9, 113.8, 114.1, 125.7, 127.3, 127.4, 128.3, 132.5, 143.9, 144.2, 159.3. HRMS (EI) calcd for $C_{17}H_{18}O_2$: 254.1307, found 254.2310. HPLC condition: Lux Amylose-2, *n*-hexane/2-propanol 90/10, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 14.4 min (major), $t_R$ = 15.4 min (minor).

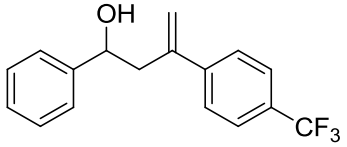
**(+)-3-(4-fluorophenyl)-1-phenylbut-3-en-1-ol (23)**




Colorless oil, 60% yield (21.8 mg), 81% ee; $[\alpha]_D^{25}$ = +7.8 (*c* = 1.10, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.08 (s, 1H), 2.86 (dd, *J* = 8.9, 14.3 Hz, 1H), 2.99 (dd, *J* = 4.3, 14.3 Hz, 1H), 4.71 (m, 1H), 5.15 (s, 1H), 5.36 (s, 1H), 7.02-7.07 (m, 2H),7.25-7.30 (m, 1H), 7.32-7.37 (m, 4H), 7.38-7.42 (m, 2H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 45.9, 72.1, 115.2, 115.3, 115.6, 125.7, 127.6, 127.8, 127.9, 128.7, 136.4 (d, *J* = 3.4 Hz), 143.8 (d, *J* = 29.4 Hz), 162.4 (d, *J* = 246.9 Hz). HRMS (EI) calcd for $C_{16}H_{15}FO$: 242.1107, found 242.1104. HPLC condition: Lux Amylose-2, *n*-hexane/2-propanol 80/20, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 6.6 min (minor), $t_R$ = 7.0 min (major).

**(+)-1-phenyl-3-(4-(trifluoromethyl)phenyl)but-3-en-1-ol (24)**

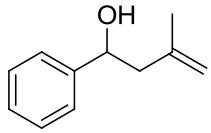



Colorless oil, 90% yield (39.4 mg), 82% ee; $[\alpha]_D^{16}$ = +17.0 (*c* = 1.00, $CHCl_3$).

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.14 (s, 1H), 2.93 (ddd, *J* = 0.8, 8.5, 14.6 Hz, 1H), 2.98 (ddd, *J* = 1.1, 5.1, 14.6 Hz, 1H), 4.71 (dd, *J* = 5.1, 8.3 Hz, 1H), 5.25 (d, *J* = 1.0, Hz, 1H), 5.45 (d, *J* = 0.8 Hz, 1H), 7.25-7.37 (m, 5H), 7.50-7.54 (m, 2H), 7.60-7.63 (m, 2H) . $^{13}$C NMR (125 MHz, $CDCl_3$): δ 45.4, 72.3, 117.5, 124.1 (q, *J* = 272.1 Hz), 125.3 (q, *J* = 3.8 Hz), 125.8, 127.7, 128.4, 129.6 (q, *J* = 32.5 Hz), 143.6, 143.9, 144.2. HRMS (EI) calcd for $C_{17}H_{15}F_3O$: 292.1075, found 292.1073. HPLC condition:

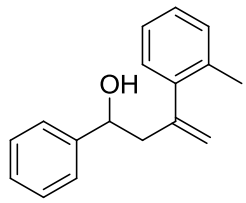
Chiralpak ID-3, *n*-hexane/2-propanol 95/5, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 5.0 min (minor), $t_R$ = 5.3 min (major).

**(*S*)-3-Methyl-1-phenylbut-3-en-1-ol (25)[5]**



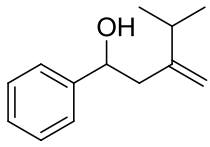

Colorless oil, 96% yield (23.3 mg), 60% ee; $[\alpha]_D^{27}$ = -36.8 (*c* = 1.00, $CHCl_3$).
$^1$H NMR (500 MHz, $CDCl_3$): δ 1.81 (s, 3H), 2.14 (d, *J* = 1.8 Hz, 1H), 2.43 (d, *J* = 7.1 Hz, 2H), 4.83 (t, *J* = 6.5 Hz, 1H), 4.86 (d, *J* = 0.9 Hz, 1H), 4.93 (m, 1H), 7.25-7.31 (m, 1H), 7.32-7.42 (m, 4H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 22.4, 48.4, 71.4, 114.1, 125.7, 127.5, 128.4, 142.4, 144.1. HPLC condition: Lux Amylose-2, *n*-hexane/2-propanol 90/10, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 6.9 min (major), $t_R$ = 7.5 min (minor).

**(+)-1-phenyl-3-o-tolylbut-3-en-1-ol (26)**



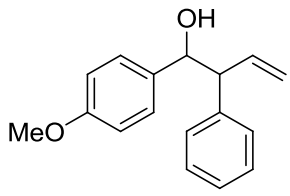

Colorless oil, 53% yield (18.9 mg), 41% ee; $[\alpha]_D^{13}$ = +5.4 (*c* = 0.95, $CHCl_3$).
$^1$H NMR (500 MHz, $CDCl_3$): δ 2.14 (d, *J* = 1.7 Hz, 1H), 2.33(s, 3H), 2.77 (dd, *J* = 9.5, 14.4 Hz, 1H), 2.83 (ddd, *J* = 0.7, 4.4, 14.4 Hz, 1H), 4.62 (m, 1H), 5.07 (s, 1H), 5.36 (d, *J* = 0.6 Hz, 1H), 7.13-7.16 (m, 1H), 7.16-7.23 (m, 3H), 7.25-7.30 (m, 1H), 7.30-7.36 (m, 4H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 19.9, 47.9, 71.6, 117.5, 125.6, 125.8, 127.1, 127.5, 128.3, 128.4, 130.3, 134.9, 141.7, 143.8, 146.6. HRMS (EI) calcd for $C_{17}H_{18}O$: 238.1358, found 238.1357. HPLC condition: Lux Amylose-2, *n*-hexane/ 2-propanol 80/20, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 6.3 min (minor), $t_R$ = 6.8 min (major).

**(-)-4-methyl-3-methylene-1-phenylpentan-1-ol (27)**




Colorless oil, 45% yield (12.9 mg), 51% ee; $[\alpha]_D^{14}$ = -35.4 (*c* = 0.90, $CHCl_3$).
$^1$H NMR (500 MHz, $CDCl_3$): δ 1.06 (d, *J* = 6.9 Hz, 3H), 1.08 (d, *J* = 6.9 Hz, 3H), 2.20 (d, *J* = 2.2 Hz, 3H), 2.29 (m, 1H), 2.39 (ddd, *J* = 0.5, 9.7, 14.5 Hz, 1H), 2.43 (ddd, *J* = 1.0, 3.8, 14..5 Hz, 1H), 4.81 (m, 1H), 4.90 (d, *J* = 0.9 Hz, 1H), 4.93 (m, 1H), 7.25-7.30 (m, 1H), 7.33-7.41 (m, 4H). HRMS (EI) calcd for $C_{13}H_{18}O$: 190.1358, found 90.1359. $^{13}$C NMR (125 MHz, $CDCl_3$): δ 21.5, 21.9, 45.4, 71.8, 110.2, 125.7, 127.4, 128.4, 144.1, 152.5. HPLC condition: Lux Amylose-2, *n*-hexane/2-propanol 80/20, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 5.3 min (major), $t_R$ = 5.6 min (minor).

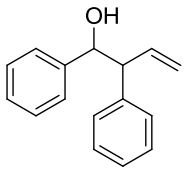
***anti*-1-(4-Methoxyphenyl)-2-phenylbut-3-en-1-ol (28)[2]**




Colorless oil, 95% yield (36.2 mg), *anti*:*syn* = 99:1, 64% ee; $[\alpha]_D^{26}$ = -3.2 (*c* = 1.00, $CHCl_3$).
$^1$H NMR (500 MHz, $CDCl_3$): δ 2.30 (d, *J* = 2.1 Hz, 1H), 3.53 (t, *J* = 8.4 Hz, 1H), 3.75 (s, 3H), 4.80 (dd, *J* = 1.2, 8.3 Hz, 1H), 5.21-5.29 (m, 2H), 6.25 (ddd, *J* = 7.9, 10.2, 18.1 Hz, 1H), 6.72-6.76 (m, 2H), 7.03-7.08 (m, 4H), 7.12-7.16 (m, 1H), 7.18-7.23 (m, 2H).

HPLC condition: Lux Amylose-2, *n*-hexane/2-propanol 90/10, flow rate 0.7 mL/min, UV 214 nm, $t_R$ = 14.1 min (major), $t_R$ = 16.0 min (minor).

**(1S,2R)-(-)-1,2-Diphenylbut-3-en-1-ol (29)[5]**

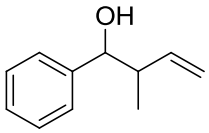



Colorless oil, 95% yield (32.0 mg), *anti*:*syn* = 97:3, 50% ee; $[\alpha]_D^{26}$ = -6.7 (*c* = 1.10, $CHCl_3$).

This compound was prepared according to the *General Procedure A at* -25 ℃. 67% yield (21.9 mg), *anti*:*syn* = 97:3, 64% ee;

$^1$H NMR (500 MHz, $CDCl_3$): δ 2.34 (d, *J* = 1.3, 1H), 3.56 (t, *J* = 8.3 Hz, 1H), 4.85 (d, *J* = 7.7 Hz, 1H), 5.21-5.29 (m, 2H), 6.26 (ddd, *J* = 8.7, 10.2, 16.8 Hz, 1H), 7.04-7.09 (m, 2H), 7.13-7.24 (m, 8H). $^{13}$C NMR (125 MHz, $CDCl_3$): δ 59.1, 77.2, 118.4, 126.5, 126.6, 127.4, 127.9, 128.2, 128.3, 137.8, 140.6, 141.8. HPLC chiral condition: Chiralcel AD-H, *n*-hexane/2-propanol 98/2, flow rate 0.9 mL/min, UV 214 nm, $t_R$ = 24.0 min (major), $t_R$ = 26.2 min (minor).

**2-Methyl-1-phenylbut-3-en-1-ol (30)[5]**



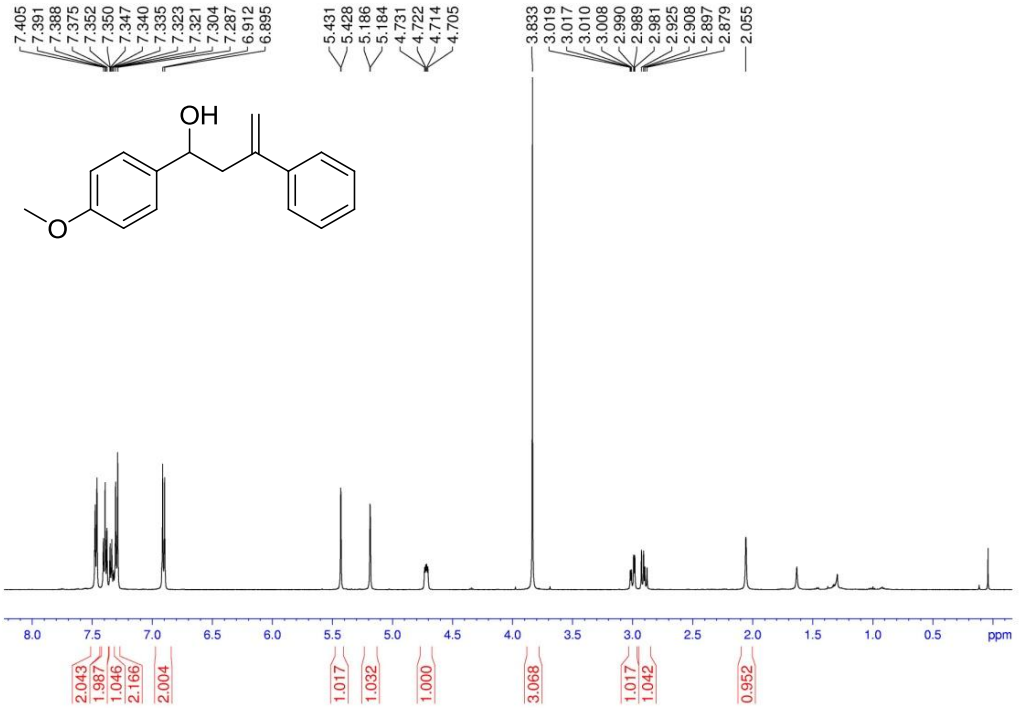

Colorless oil obtained from table 3, entry 4: 95% yield (23.1 mg), *anti*:*syn* = 59:41; 60% ee (for *anti*), 60% ee (for syn); $[\alpha]_D^{27}$ = -49.1 (*c* = 1.00, $CHCl_3$); colorless oil obtained from table 3, entry 5: 95% yield (23.3 mg), *anti*:*syn* = 59:41, 66% ee (for *anti*), 66% ee (for syn); $[\alpha]_D^{27}$ = - 55.0 (*c* = 1.01, $CHCl_3$).

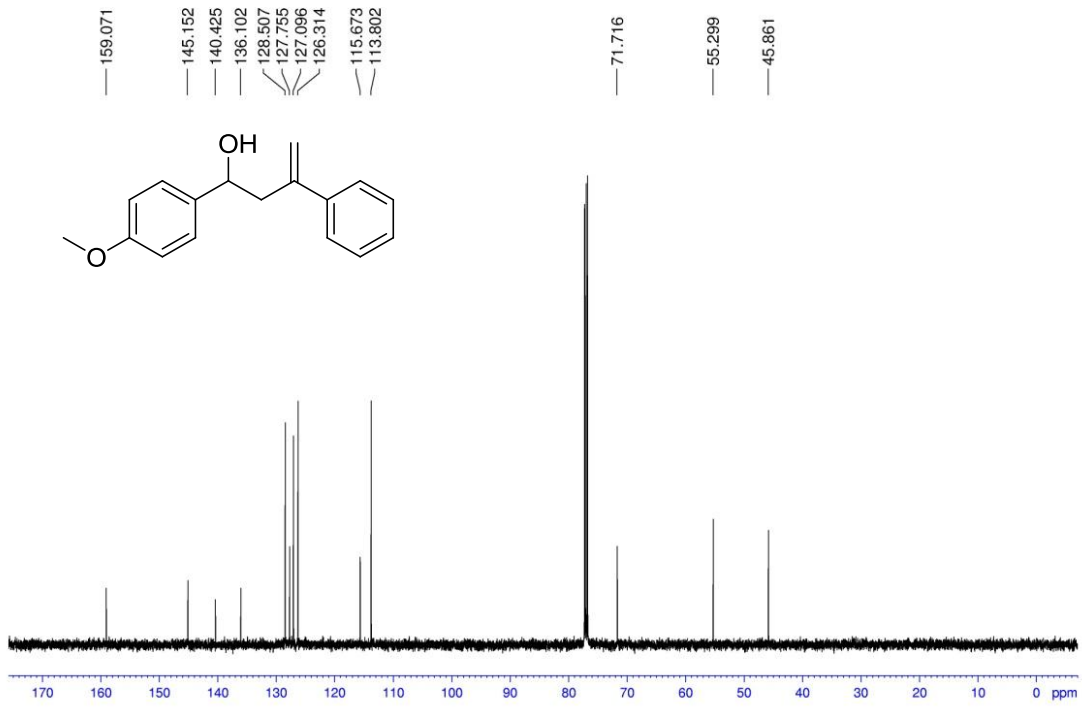
$^1$H NMR (500 MHz, $CDCl_3$): (a) *anti*-isomer: δ 0.88 (d, *J* = 6.8 Hz, 3H), 2.16 (d, *J* = 2.3 Hz, 1H), 2.49 (dq, *J* = 7.3, 15.3 Hz, 1H), 4.36 (dd, *J* = 1.4, 7.9 Hz, 1H), 5.16-5.24 (m, 2H), 5.81 (ddd, *J* = 7.6, 10.3, 17.2 Hz, 1H), 7.24-7.38 (m, 5H); (b) *syn*-isomer: δ 1.02 (d, *J* = 6.8 Hz, 3H), 1.96 (d, *J* = 2.3 Hz, 1H), 2.59 (m, 1H), 4.61 (m, 1H), 5.04 (m, 1H) , 5.07 (m, 1H), 5.76 (m, 1H), 7.24-7.38 (m, 5H). HPLC condition: Chiralcel IC, *n*-hexane/2-propanol 98/2, flow rate 0.7 mL/min, UV 214 nm, *syn*: $t_R$ = 10.2 min (minor)(*1S,2R*), $t_R$ = 11.2 min (major) (*1R,2S*); *anti*: $t_R$ = 11.9 min (minor) (*1R,2R*), $t_R$ = 12.9 min (major) (*1S,2S*).

[5] J.-Z. Chen, D.-L. Liu, D.-Y. Fan, Y.-G. Liu, W.-B. Zhang, *Tetrahedron*, **2013**, *69*, 8161–8168.

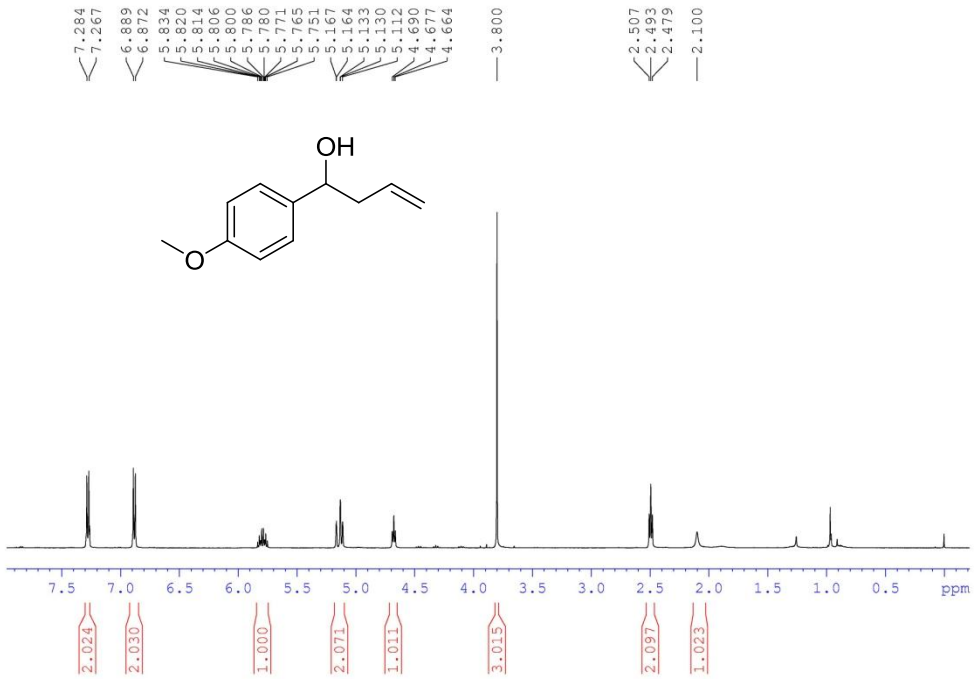
# (3) NMR Spectra for Homoallylic Alcohols

## 1-(4-Methoxyphenyl)-3-phenylbut-3-en-1-ol (1)

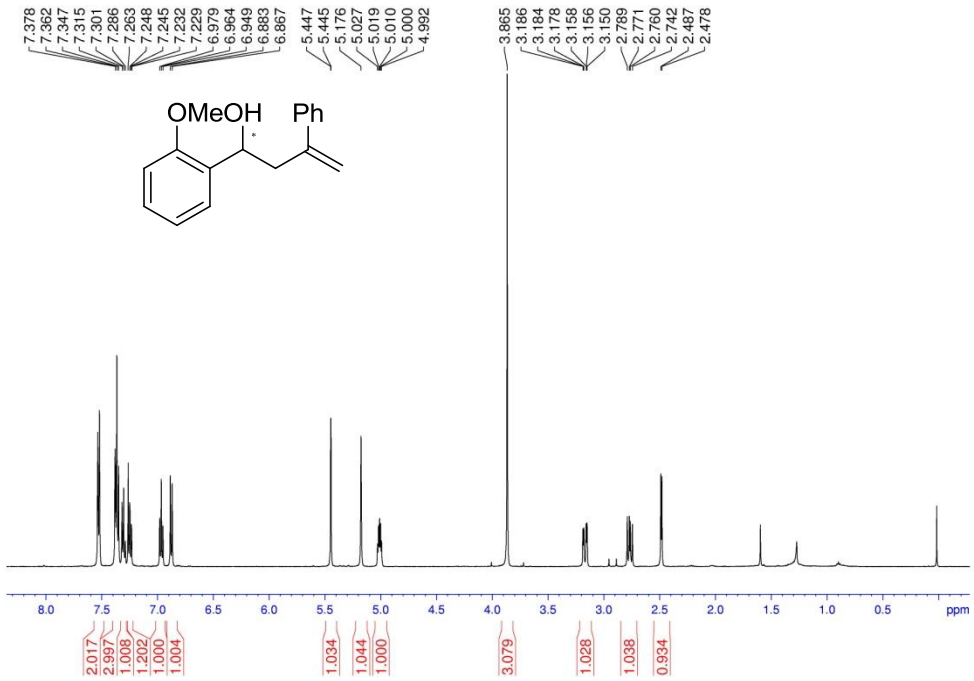


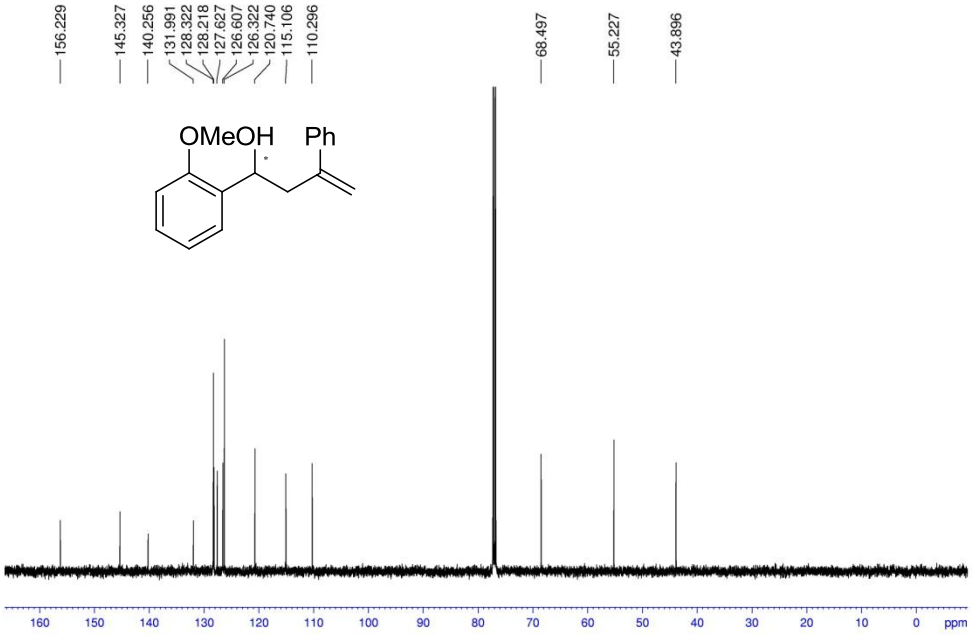



## 1-(4-Methoxyphenyl)but-3-en-1-ol (5)

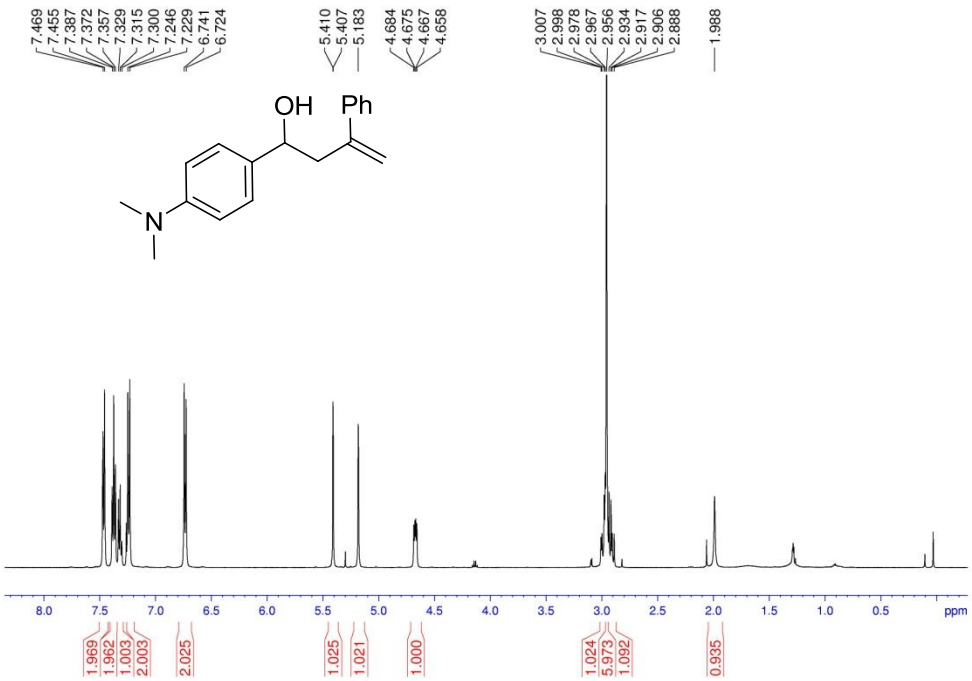


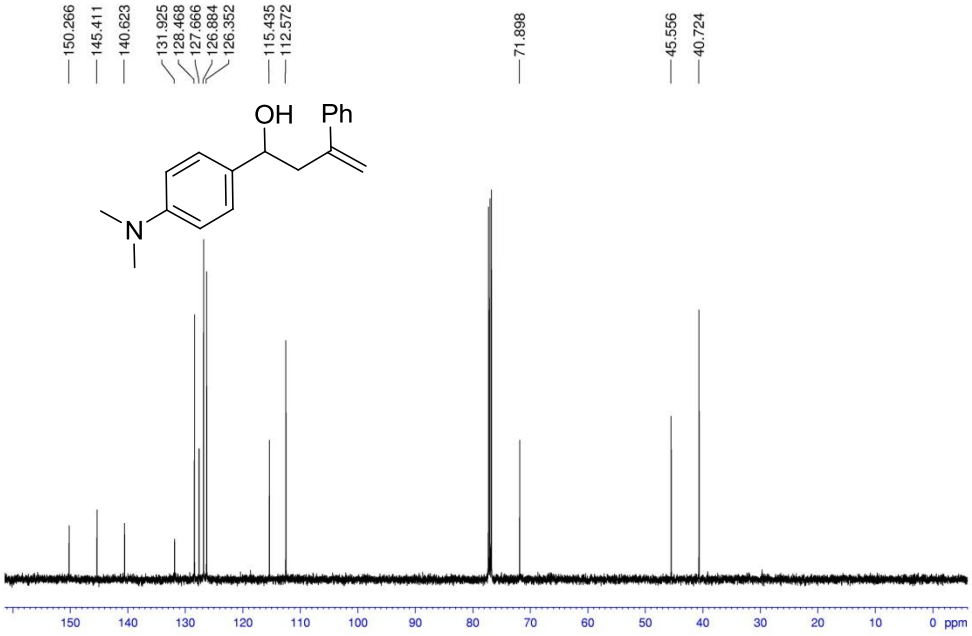

## 1-(2-Methoxyphenyl)-3-phenylbut-3-en-1-ol (6)



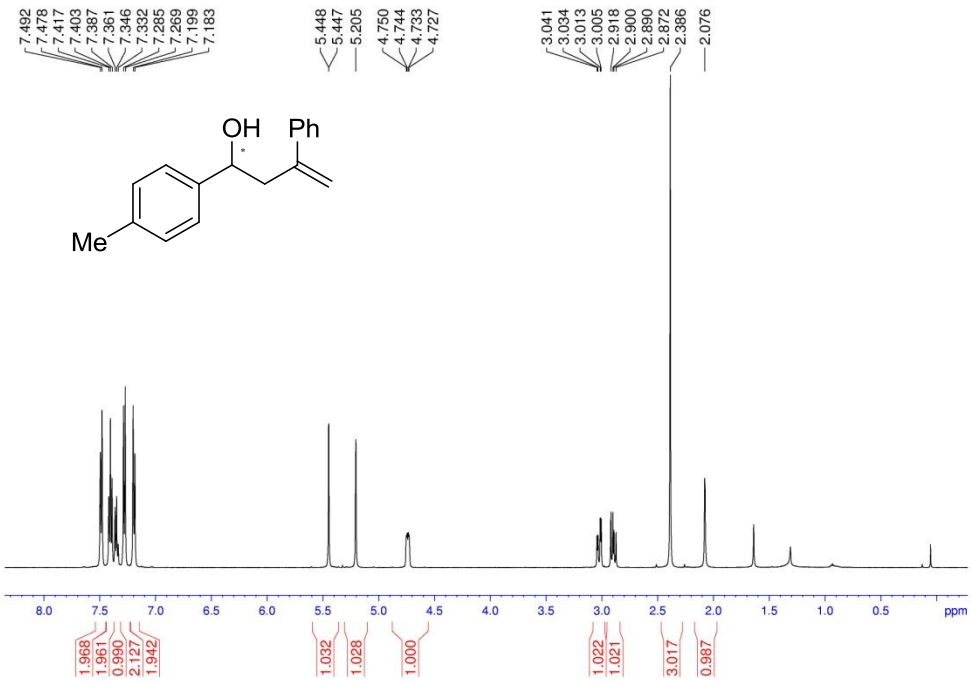


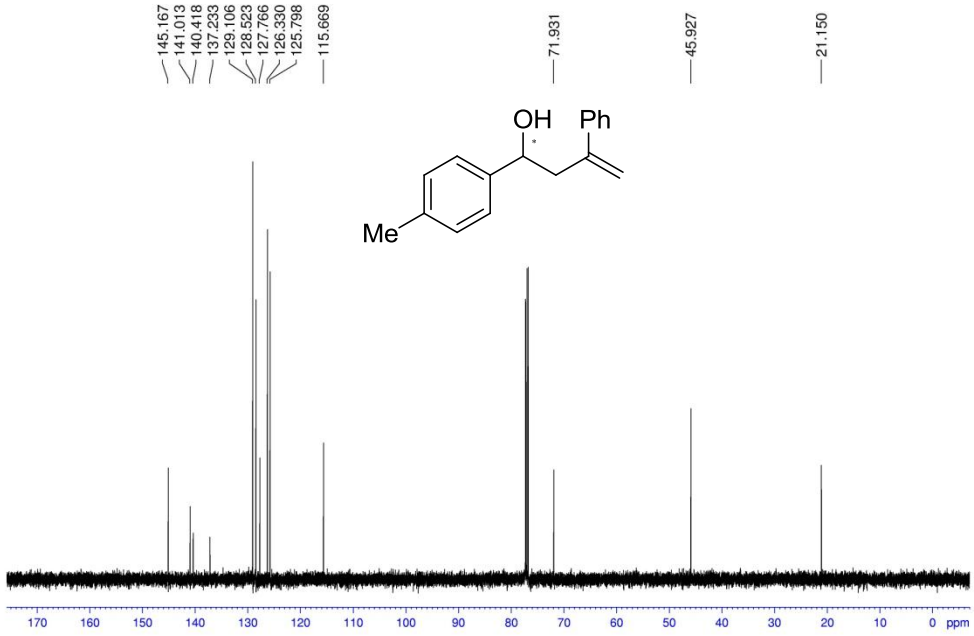

## 1-(4-(Dimethylamino)phenyl)-3-phenylbut-3-en-1-ol (7)



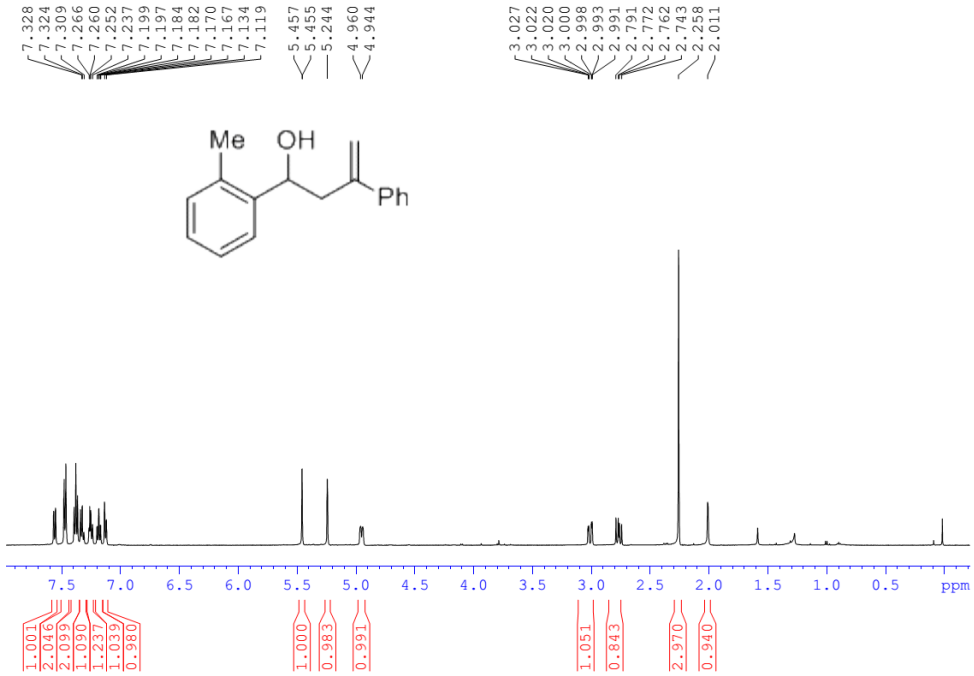


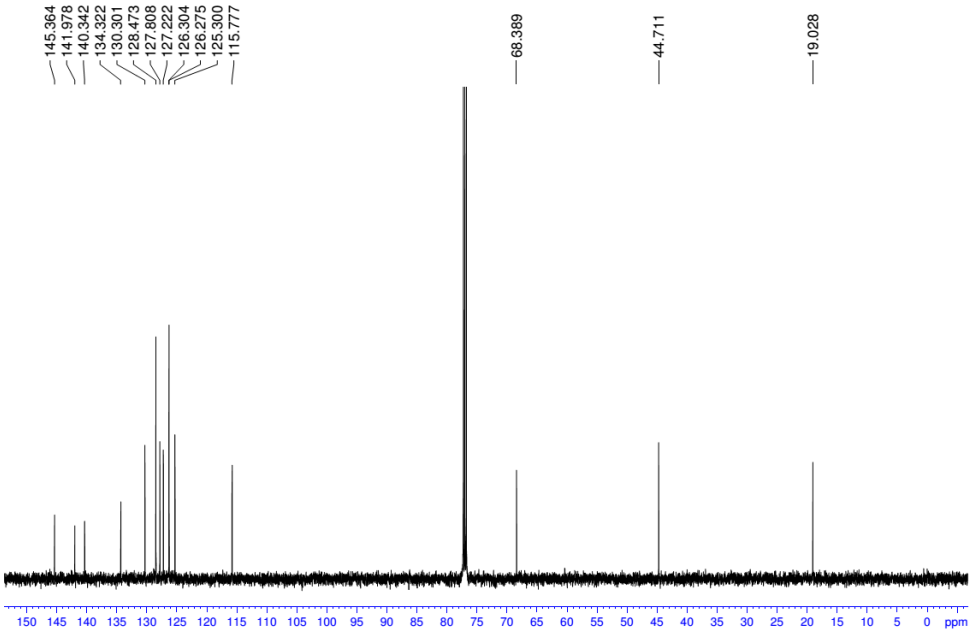

## 3-Phenyl-1-p-tolylbut-3-en-1-ol (8)



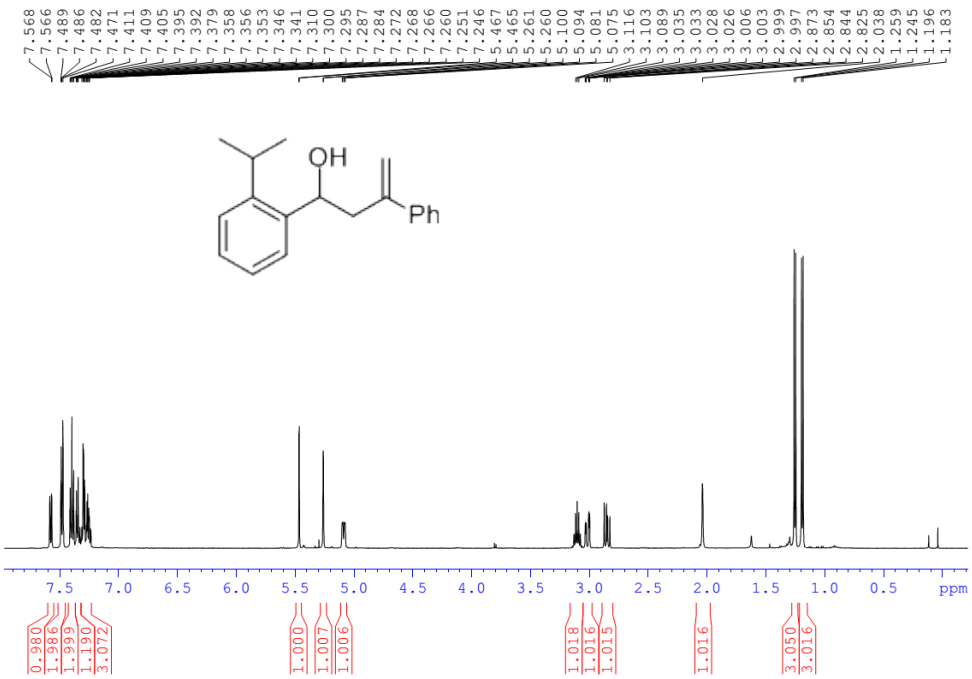


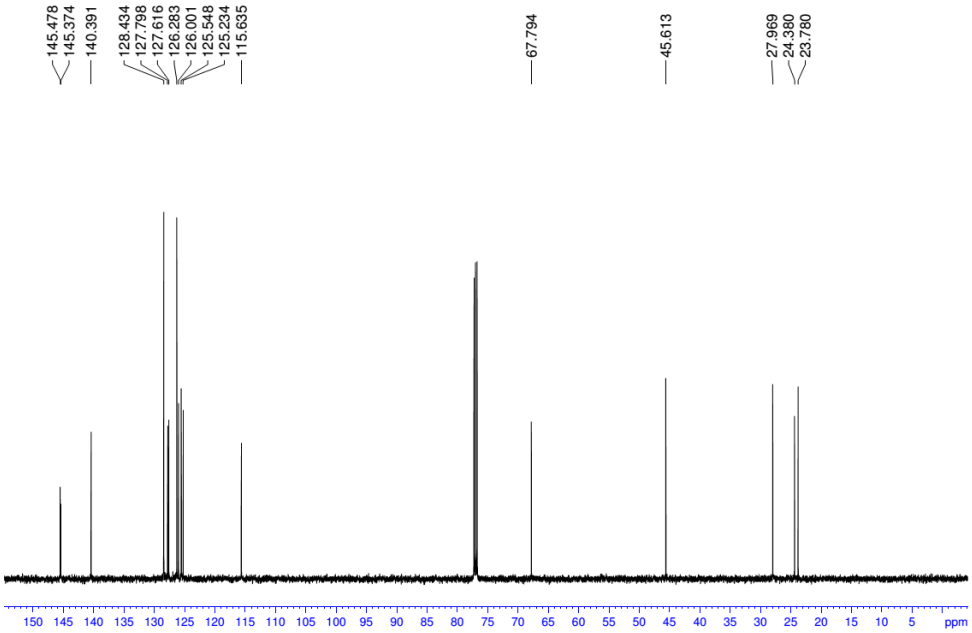

## 3-phenyl-1-o-tolylbut-3-en-1-ol (9)



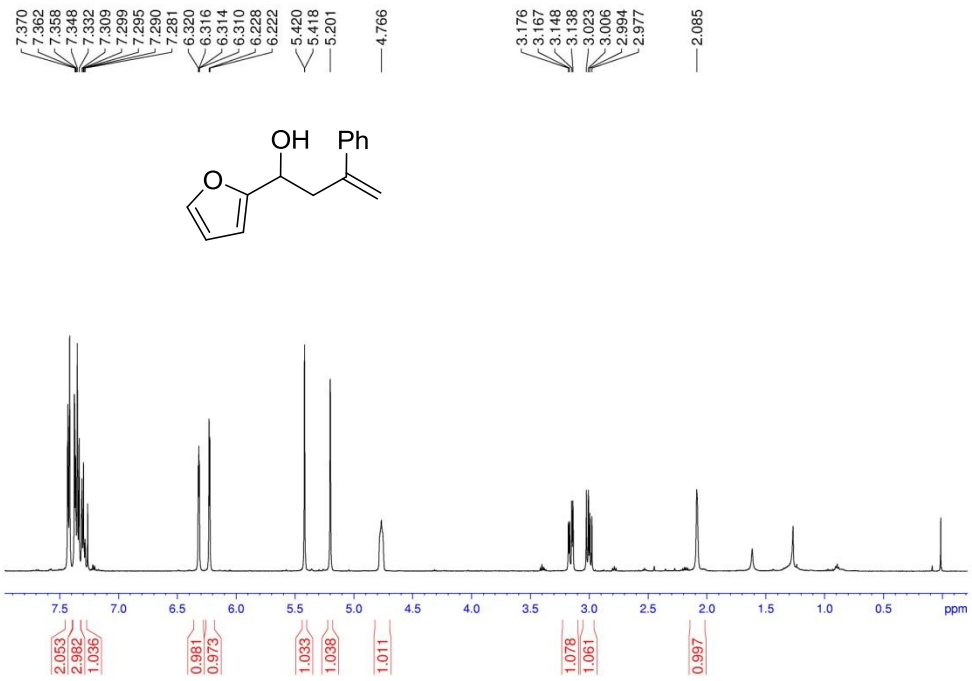


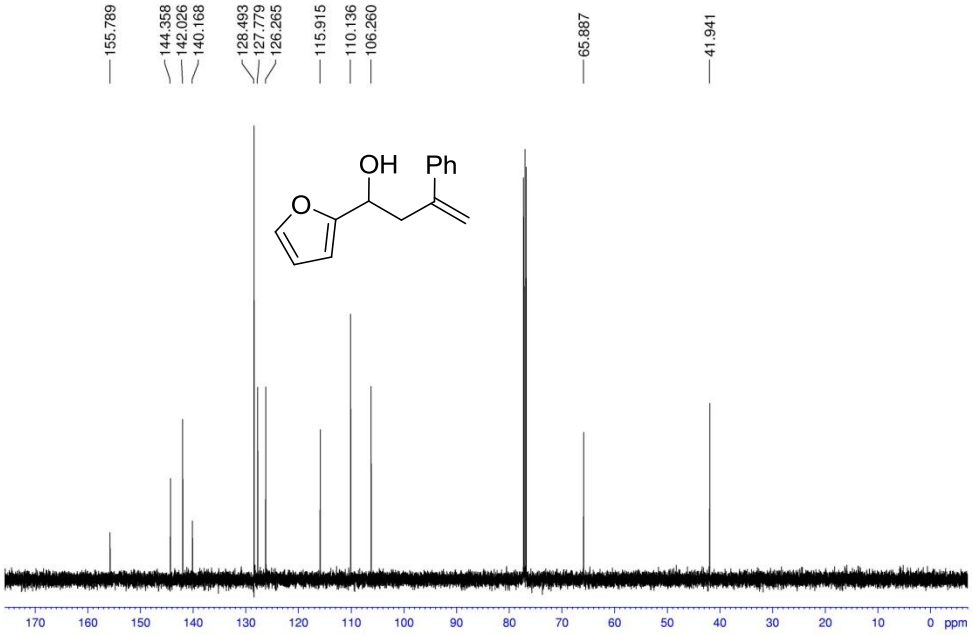

## 1-(2-isopropylphenyl)-3-phenylbut-3-en-1-ol (10)



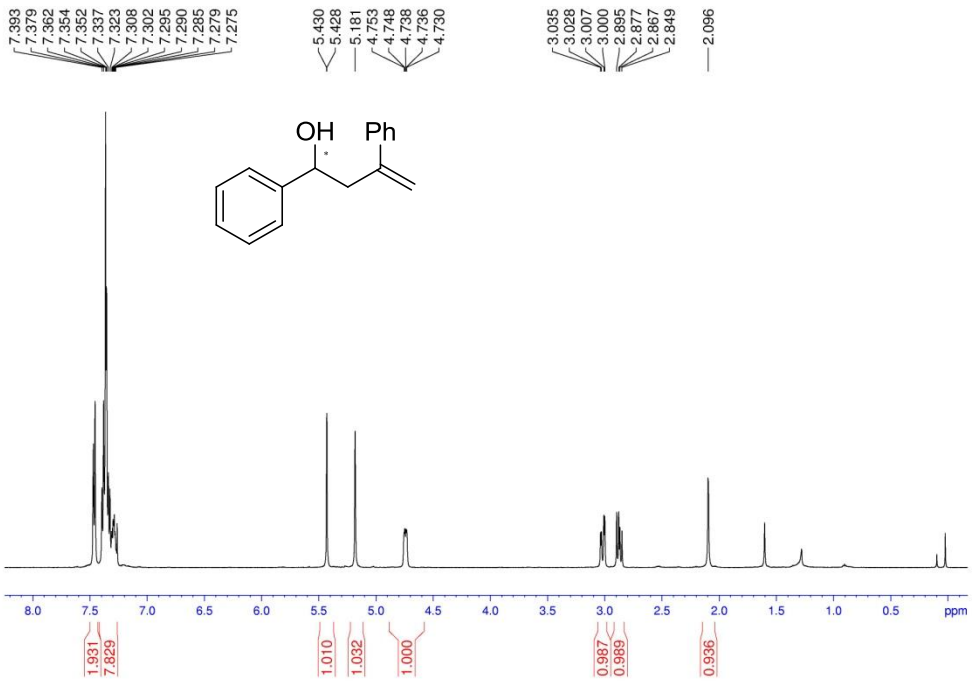



## 1-(Fura*n*-2-yl)-3-phenylbut-3-en-1-ol (11)

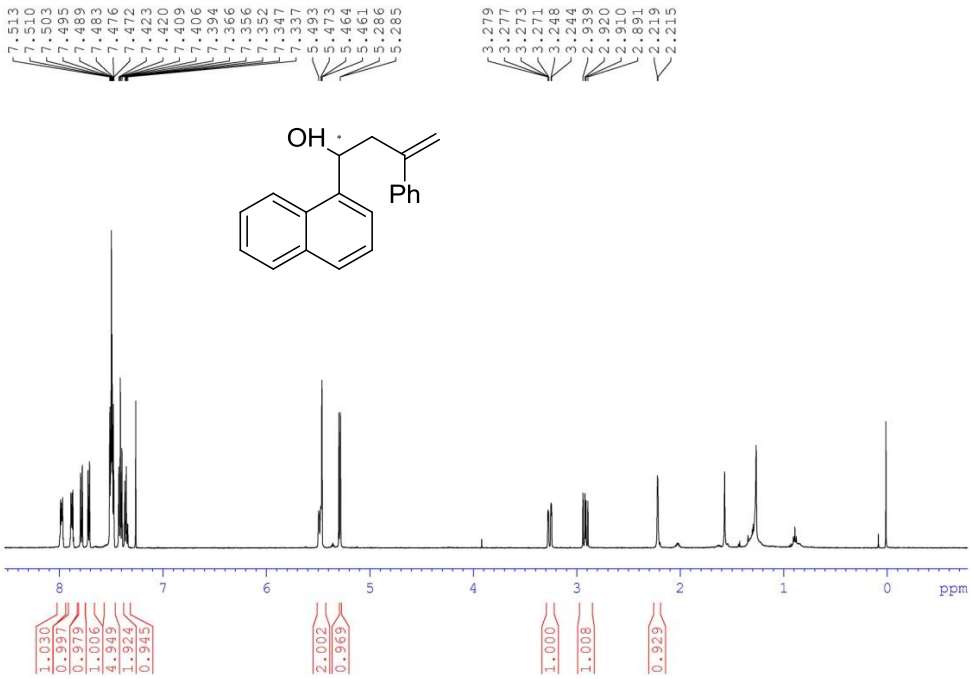


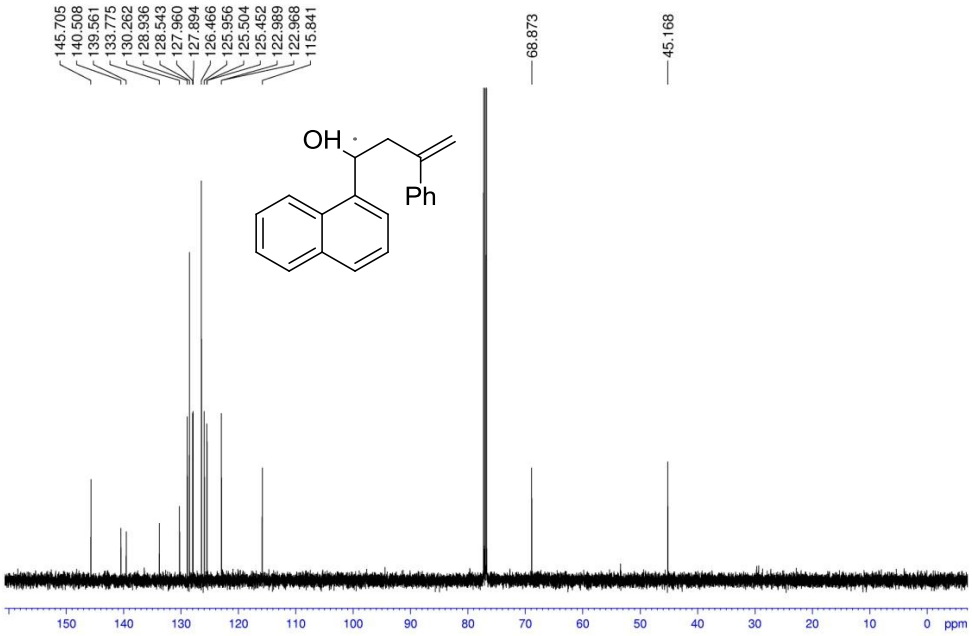



## (+)-1,3-Diphenylbut-3-en-1-ol (12)

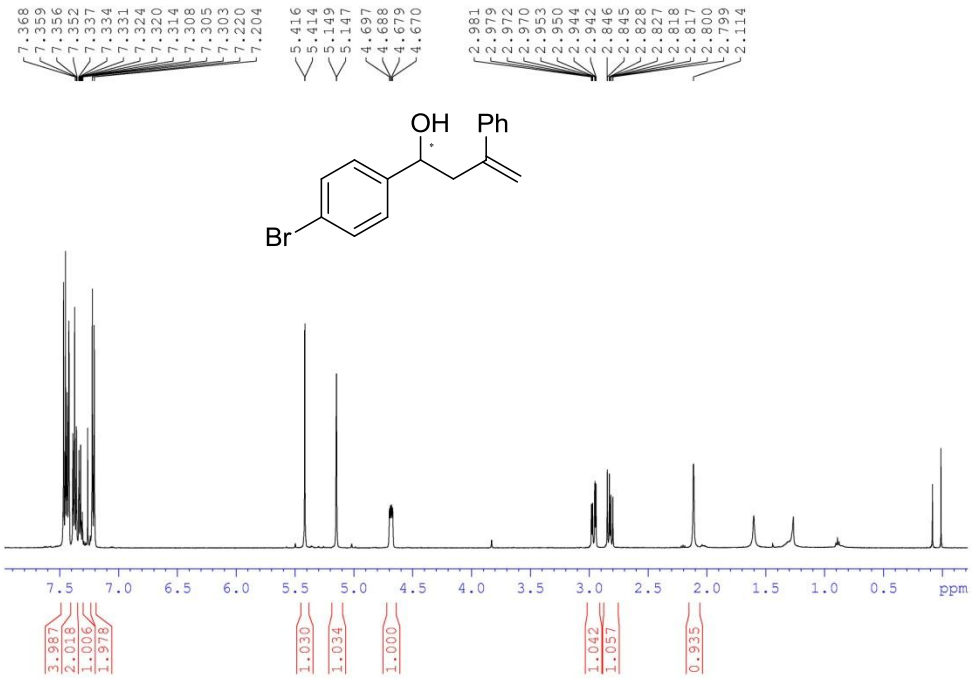


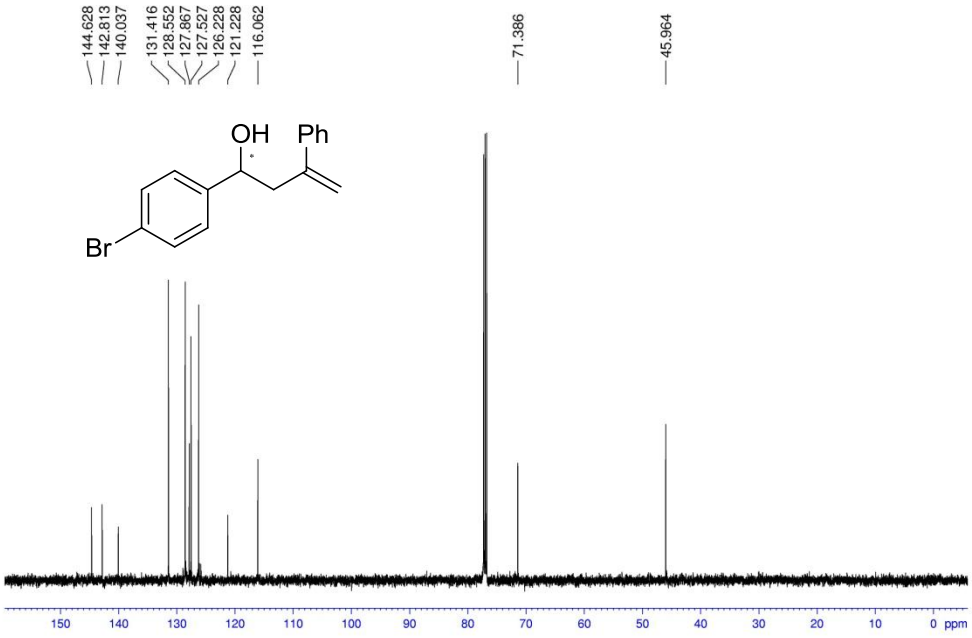
## 1-(Naphthalen-2-yl)-3-phenylbut-3-en-1-ol (13)



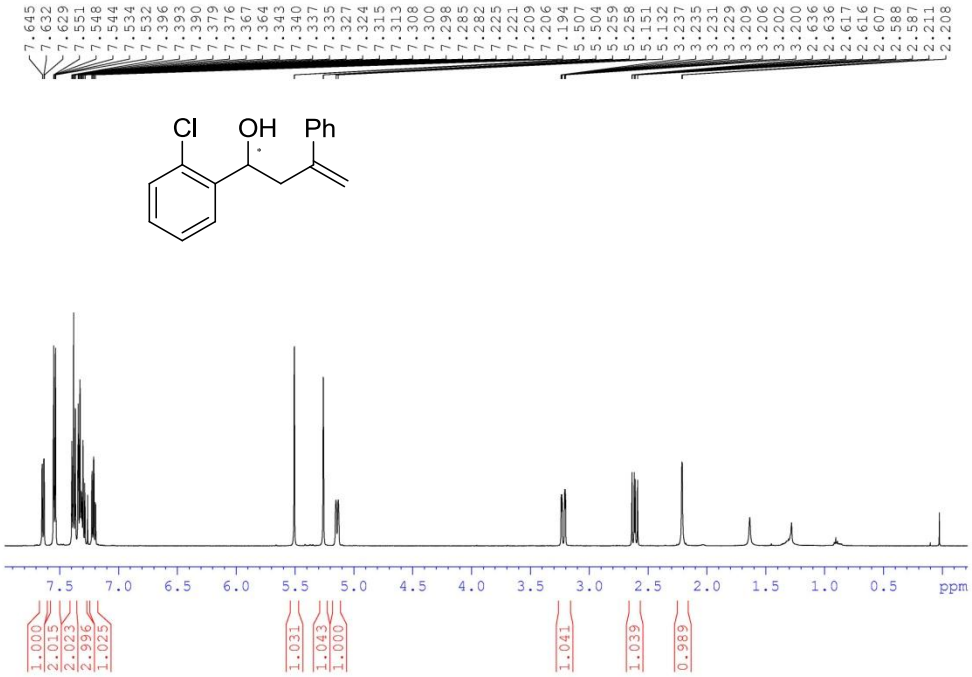



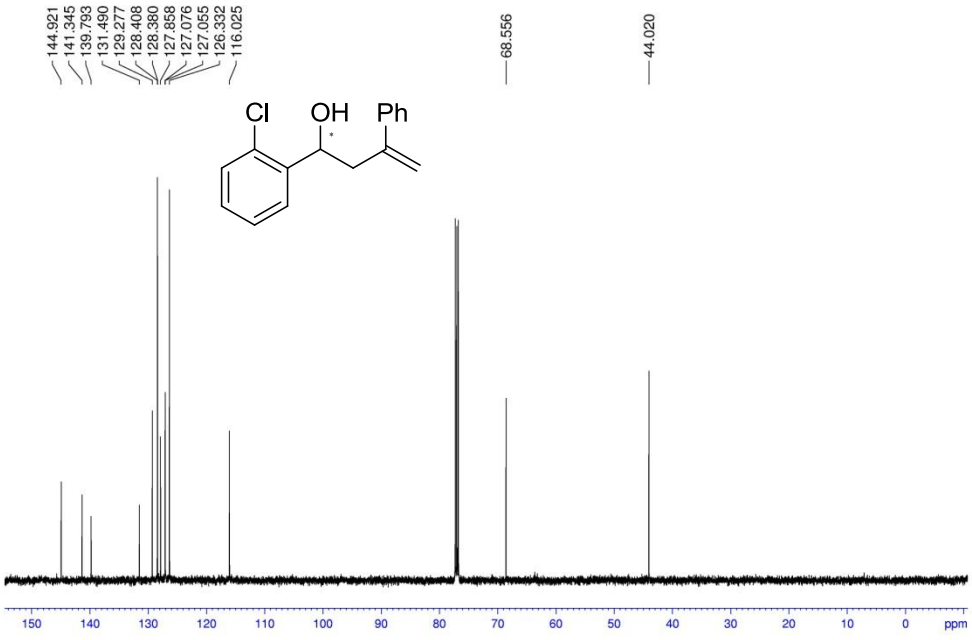
## (+)-1-(4-Bromophenyl)-3-phenylbut-3-en-1-ol (14)



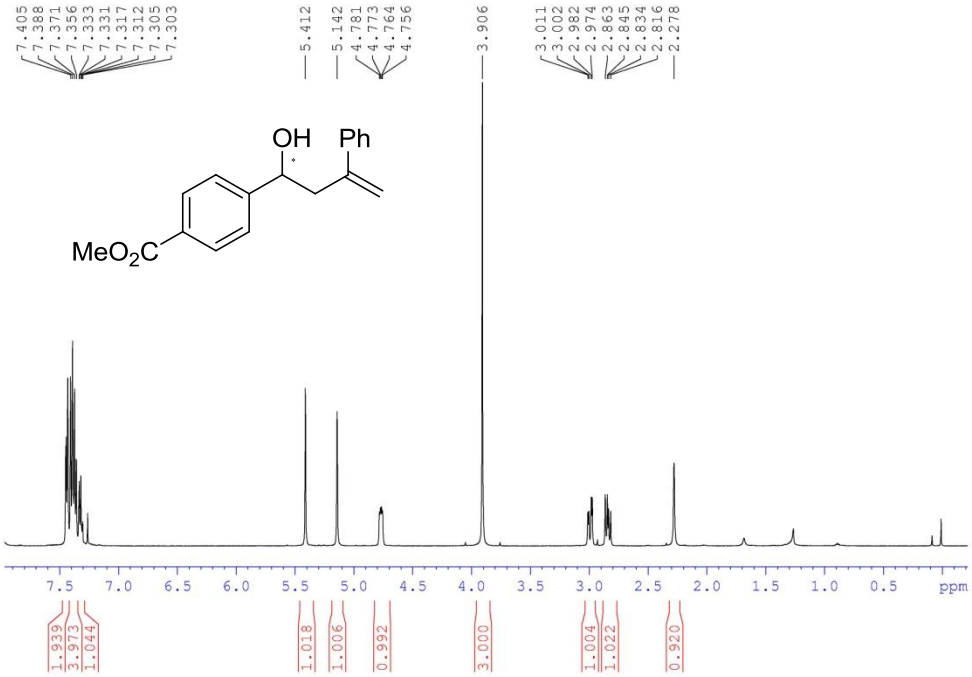



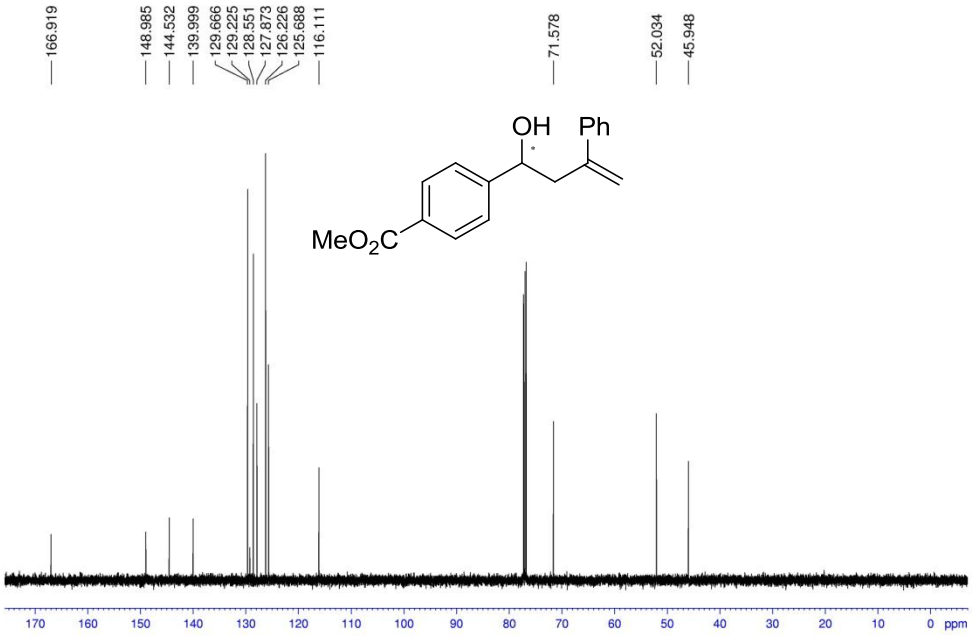
## (-)-1-(2-Chlorophenyl)-3-phenylbut-3-en-1-ol (15)



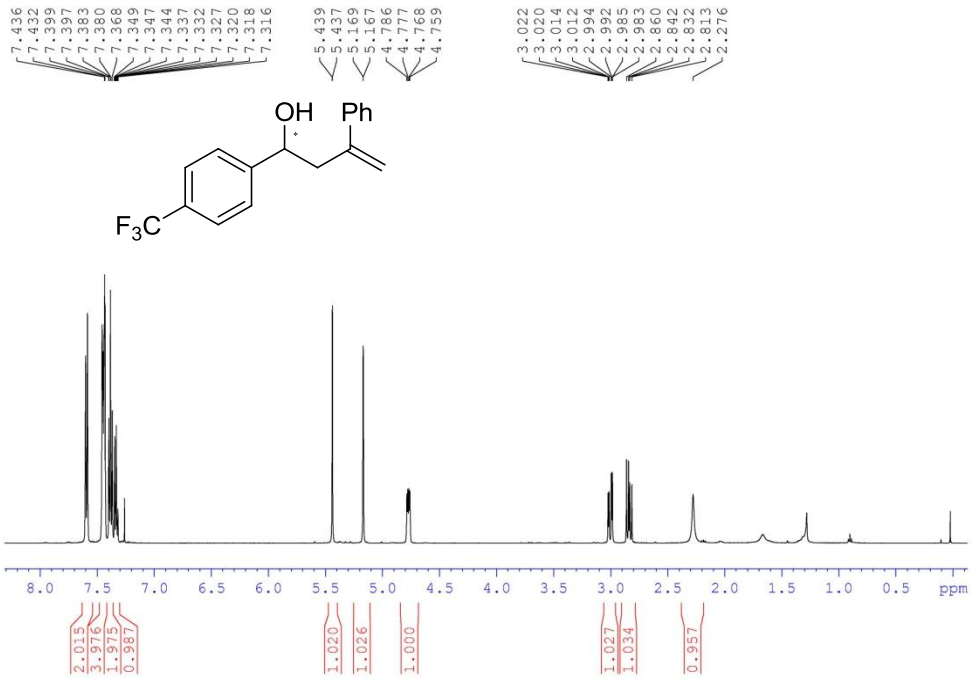



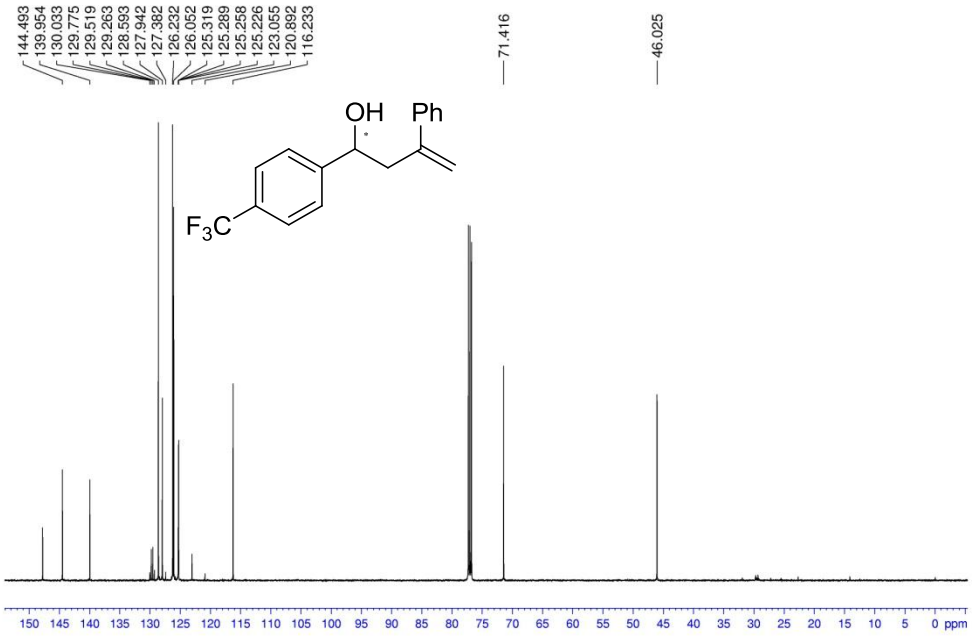
## Methyl-4-(1-hydroxy-3-phenylbut-3-enyl)benzoate (16)



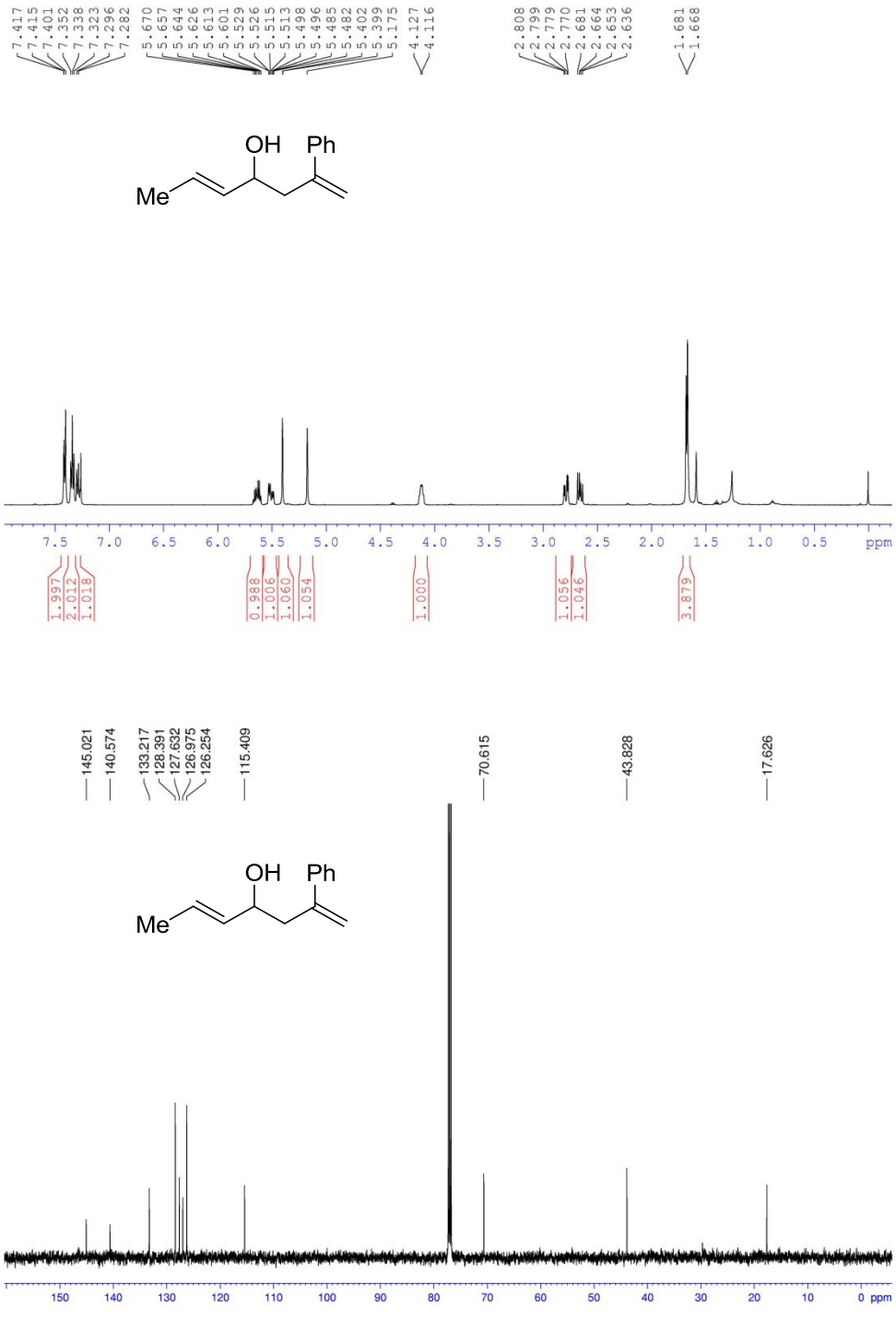



## 3-Phenyl-1-(4-(trifluoromethyl)phenyl)but-3-en-1-ol (17)

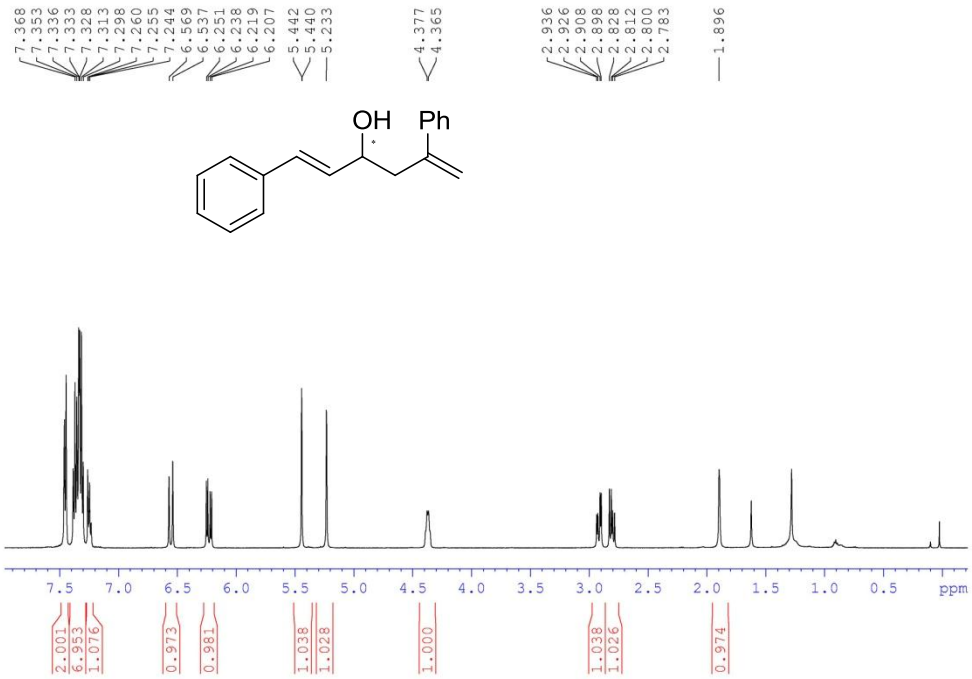


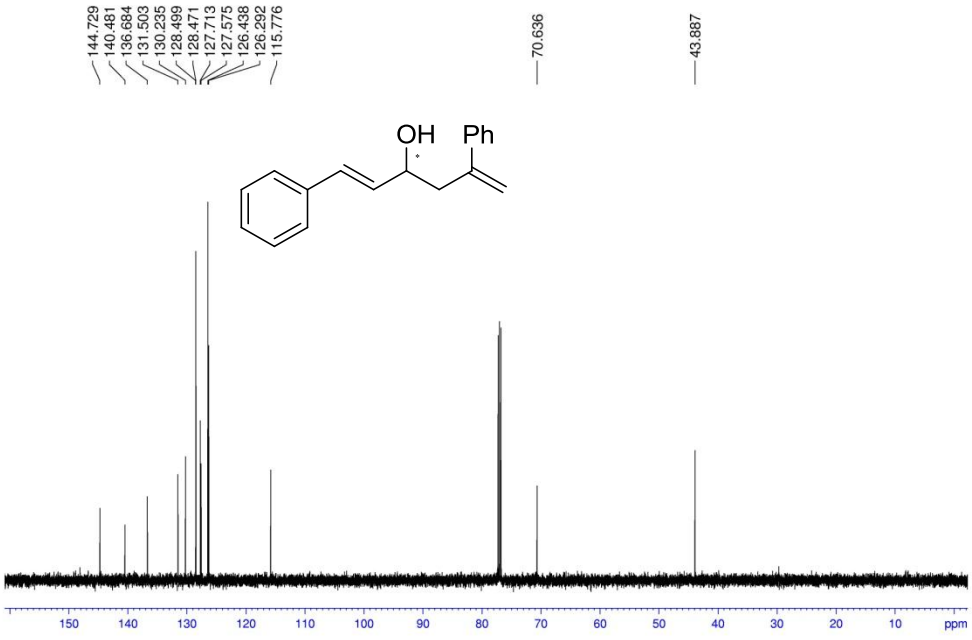



## (*E*)-2-Phenylhepta-1,5-dien-4-ol (18)

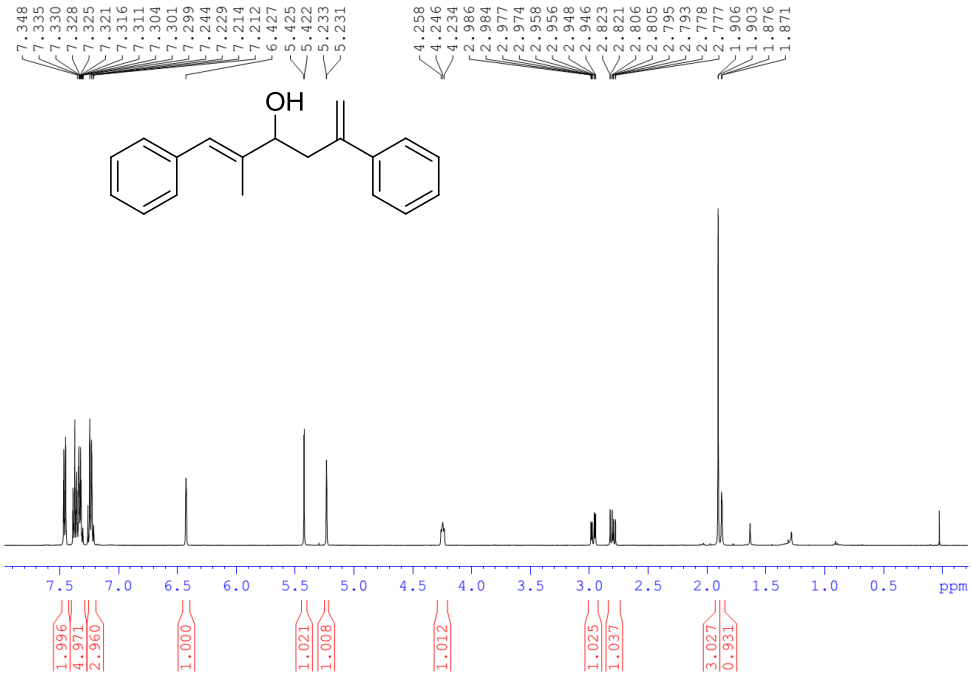


## (*E*)-1,5-Diphenylhexa-1,5-dien-3-ol (19)

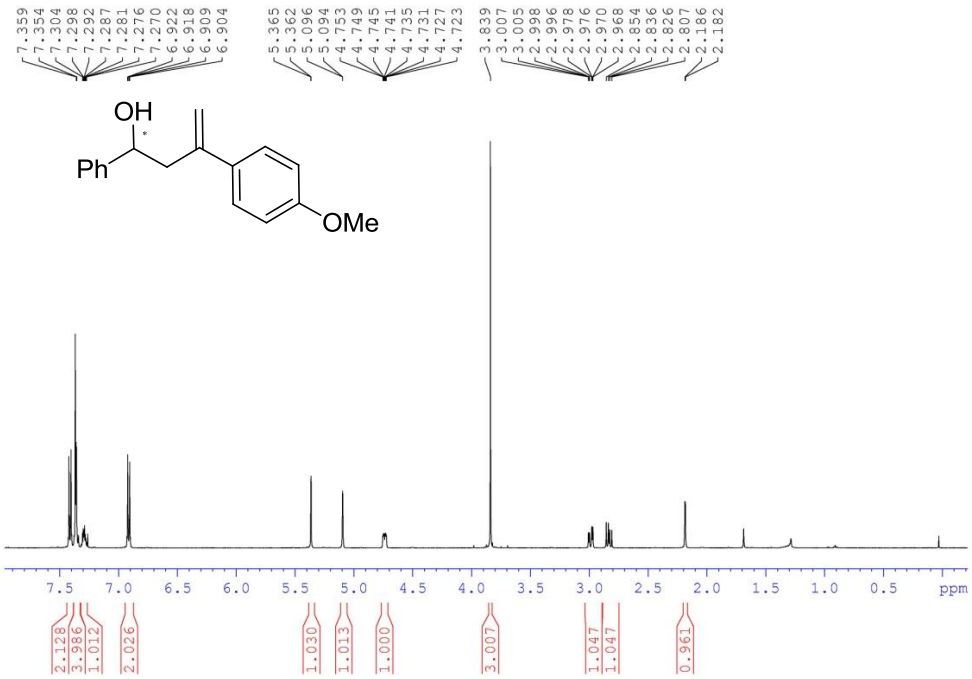


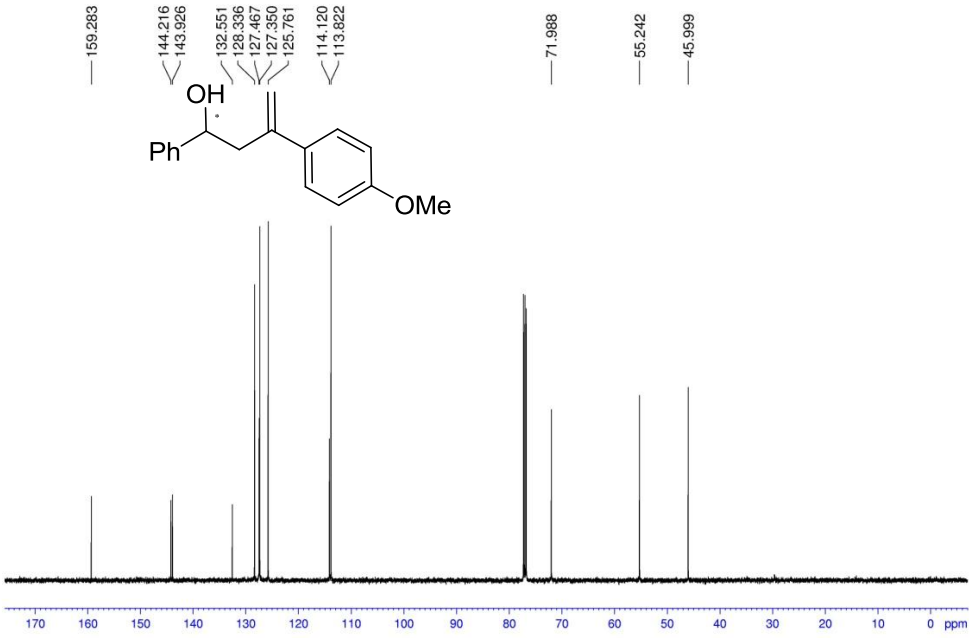



## (E)-2-methyl-1,5-diphenylhexa-1,5-dien-3-ol (20)

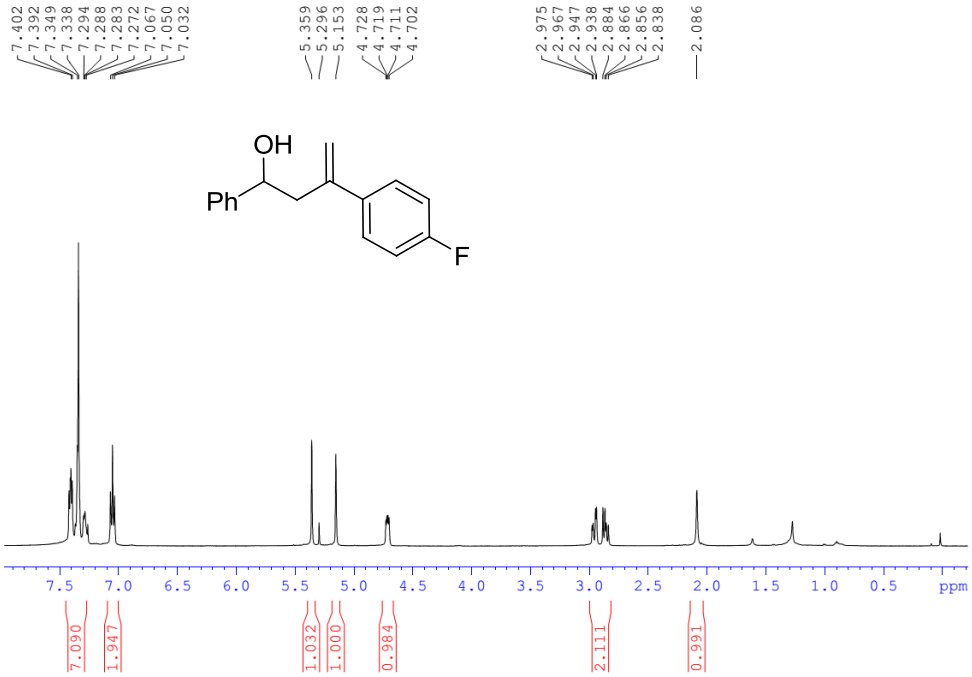


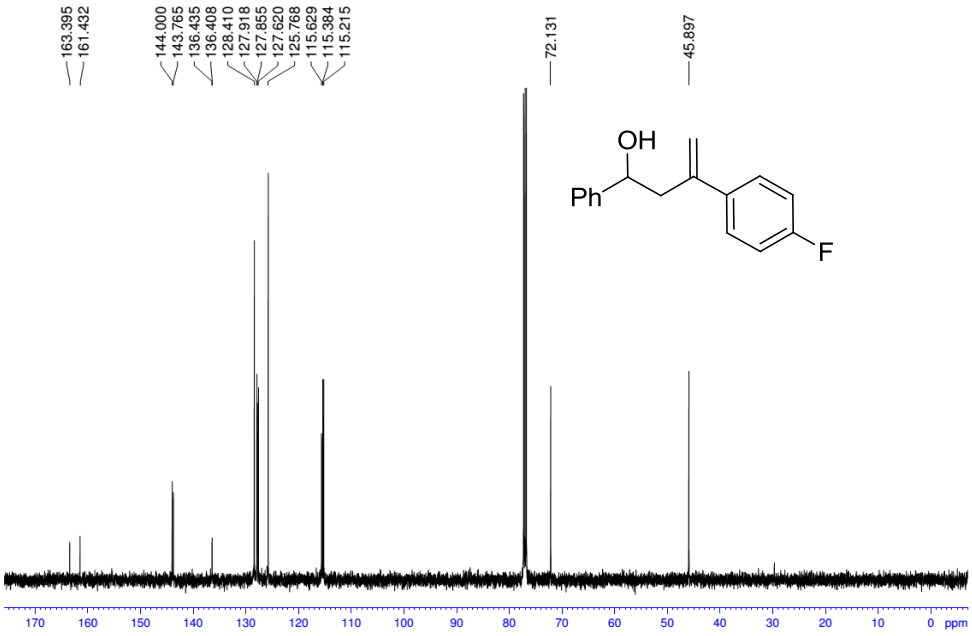

## 3-(4-Methoxyphenyl)-1-phenylbut-3-en-1-ol (22)



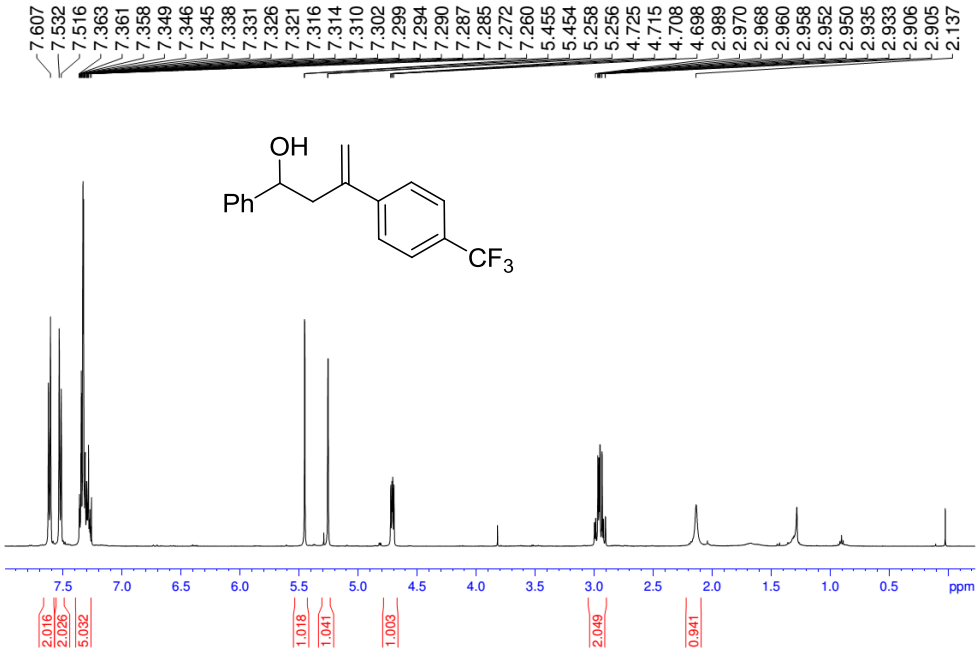



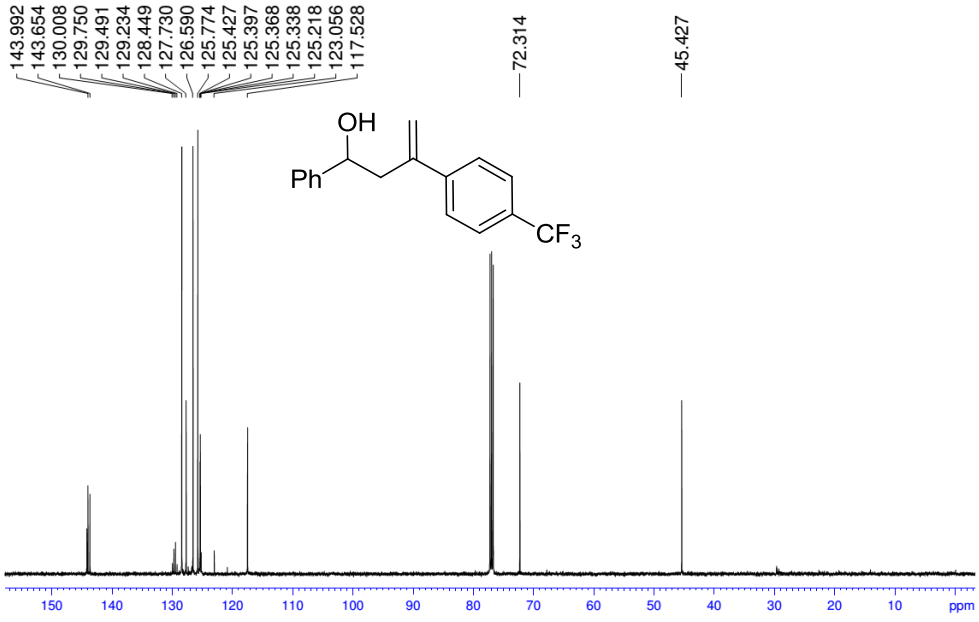
## 3-(4-fluorophenyl)-1-phenylbut-3-en-1-ol (23)



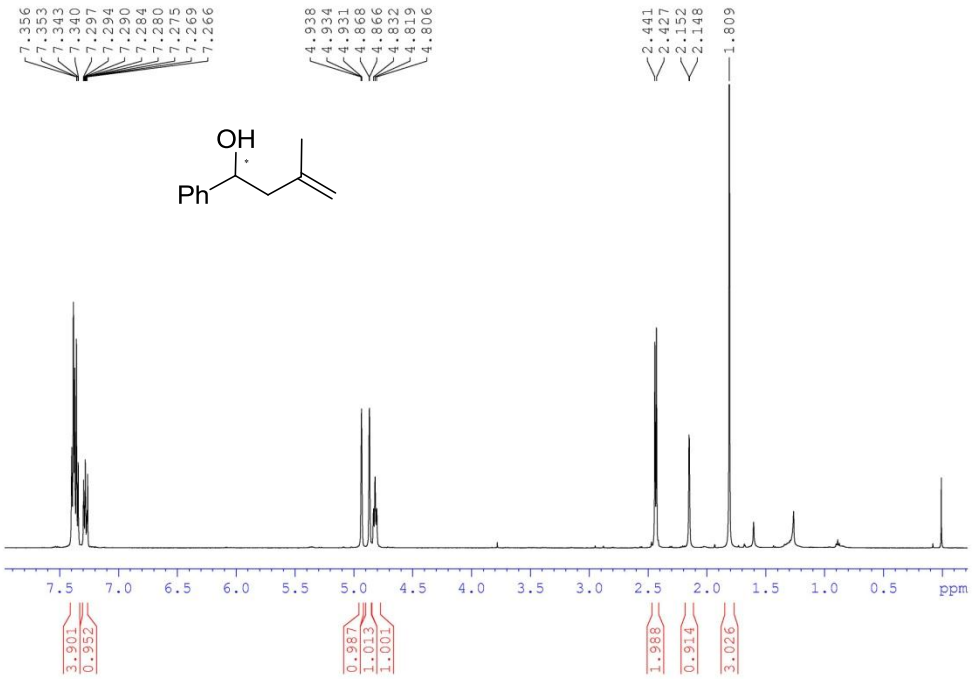



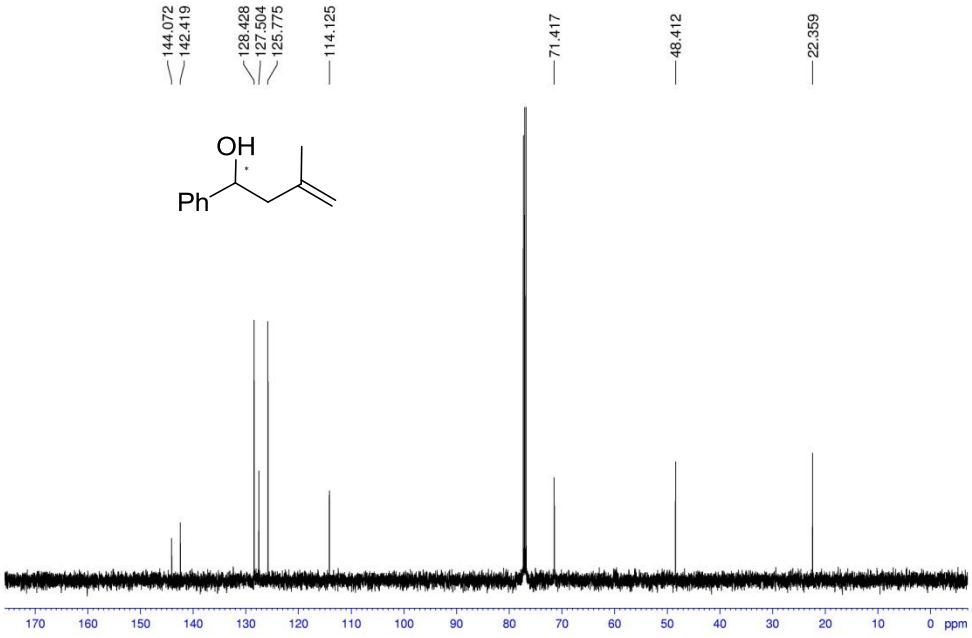
## 1-phenyl-3-(4-(trifluoromethyl)phenyl)but-3-en-1-ol (24)



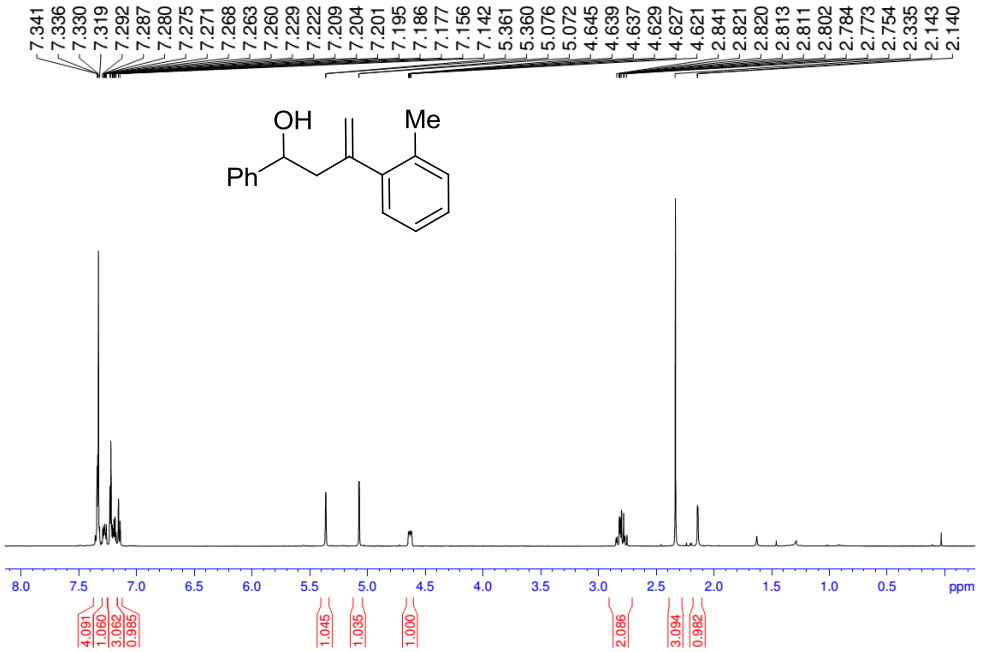



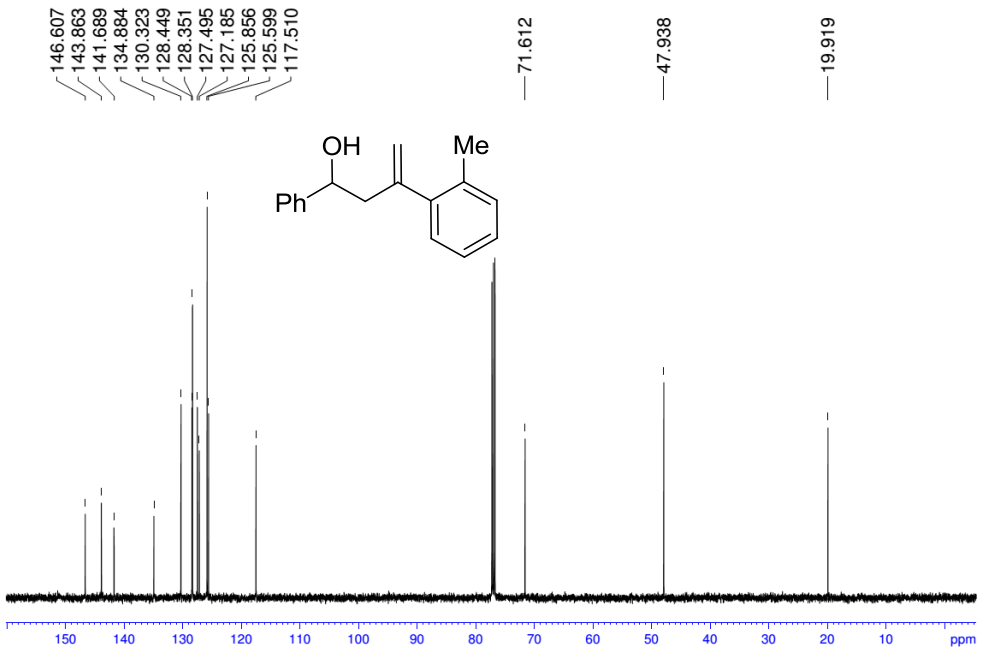
## (*S*)-3-Methyl-1-phenylbut-3-en-1-ol (25)



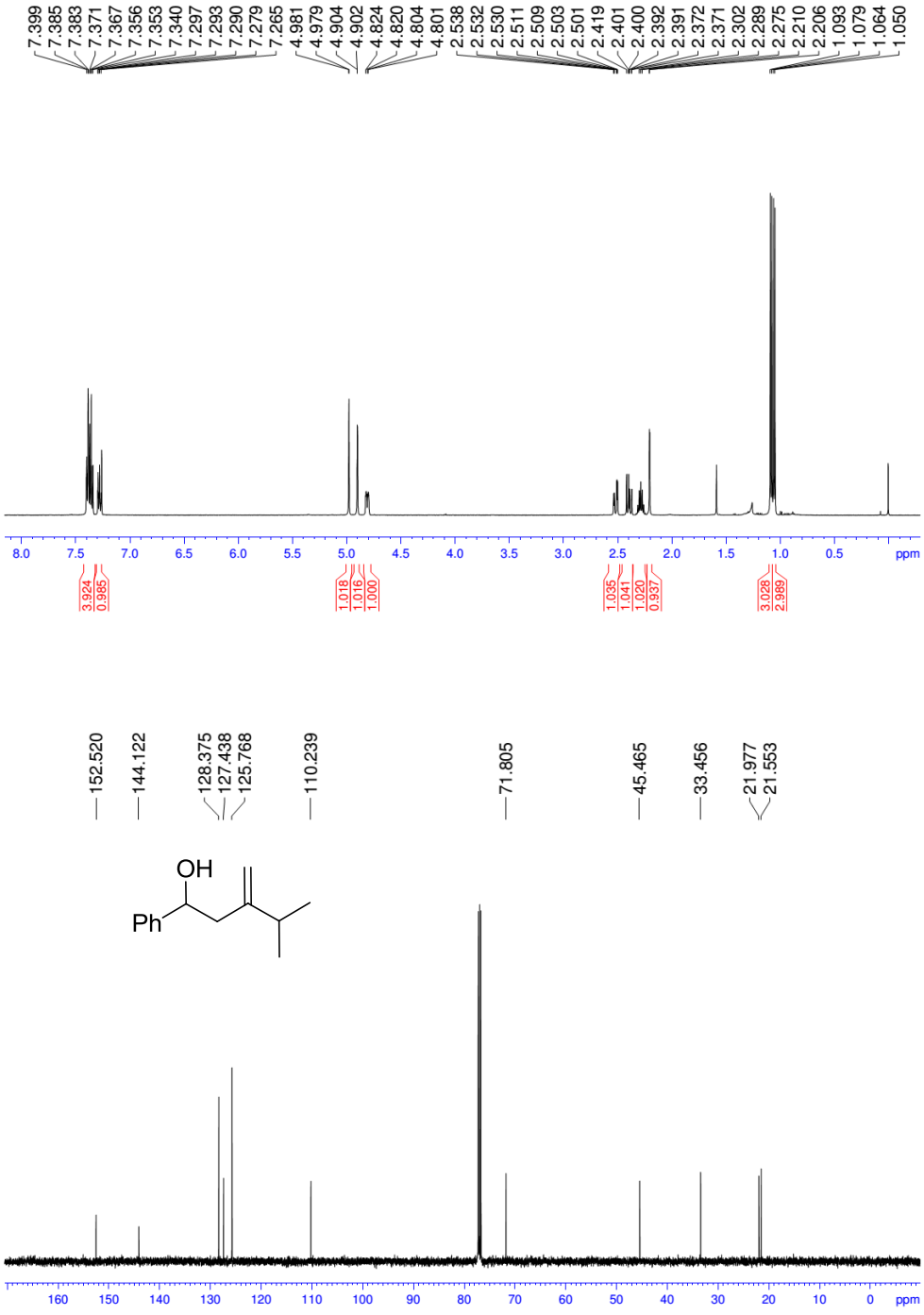



## 1-phenyl-3-o-tolylbut-3-en-1-ol (26)

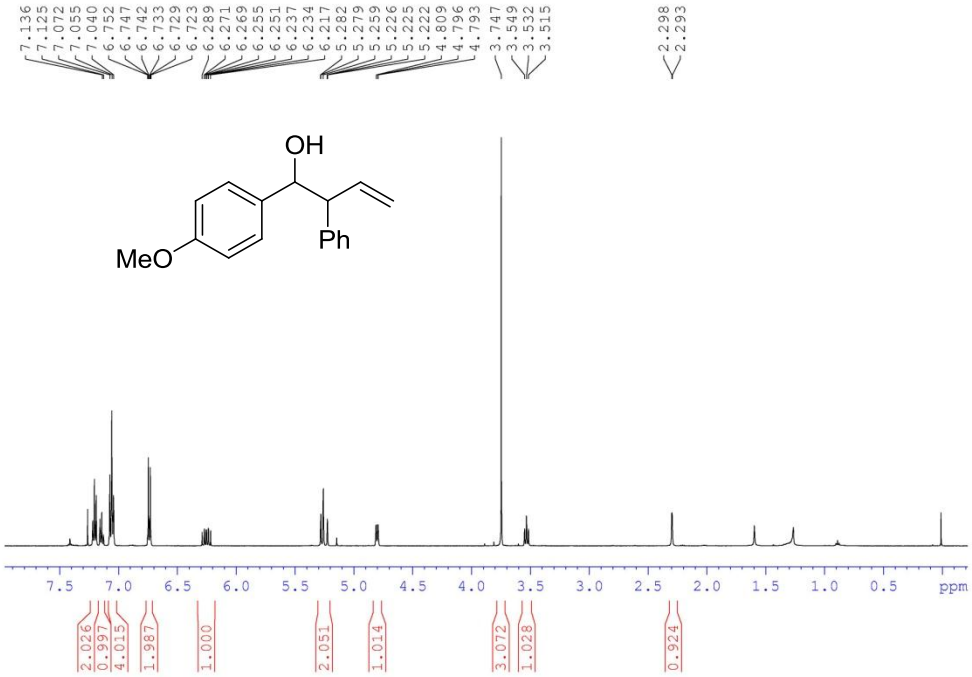


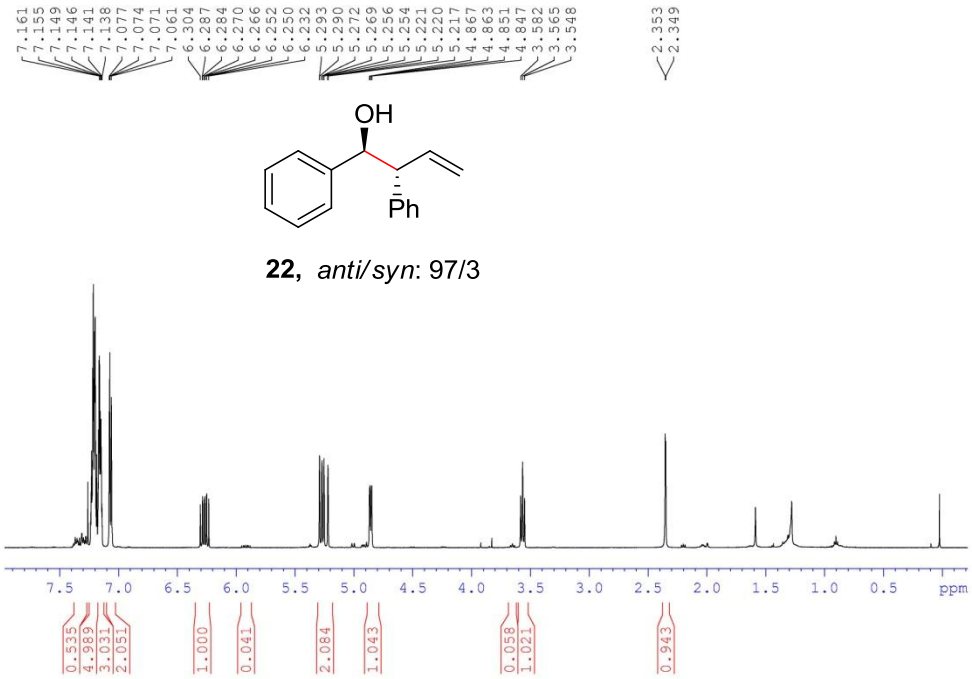
## 4-methyl-3-methylene-1-phenylpentan-1-ol (27)



## *anti*-1-(4-Methoxyphenyl)-2-phenylbut-3-en-1-ol (28)

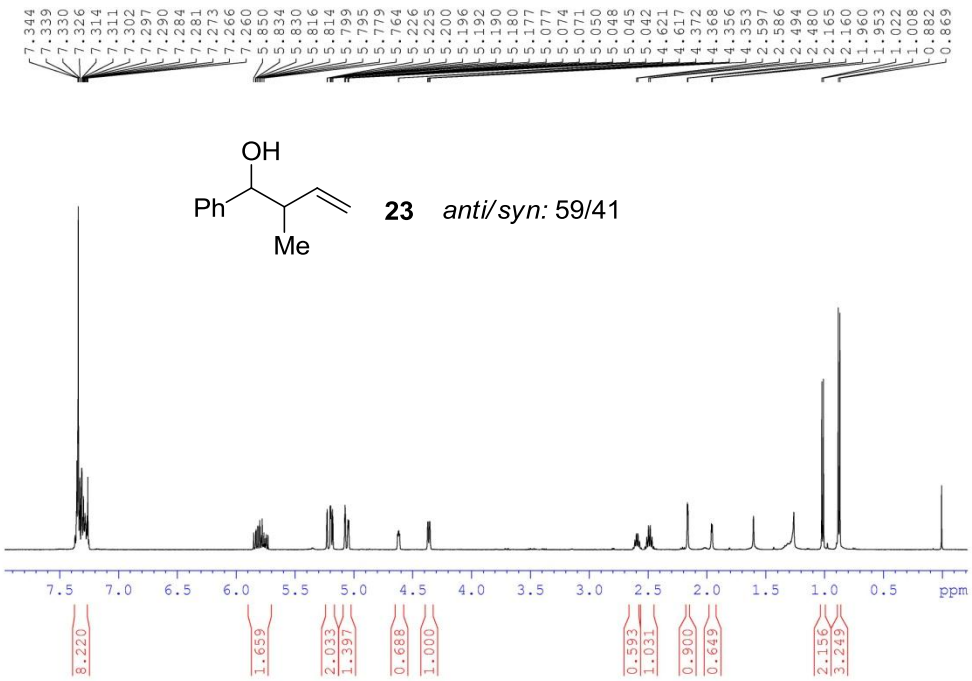



## (1S,2R)-(-)-1,2-Diphenylbut-3-en-1-ol (29)

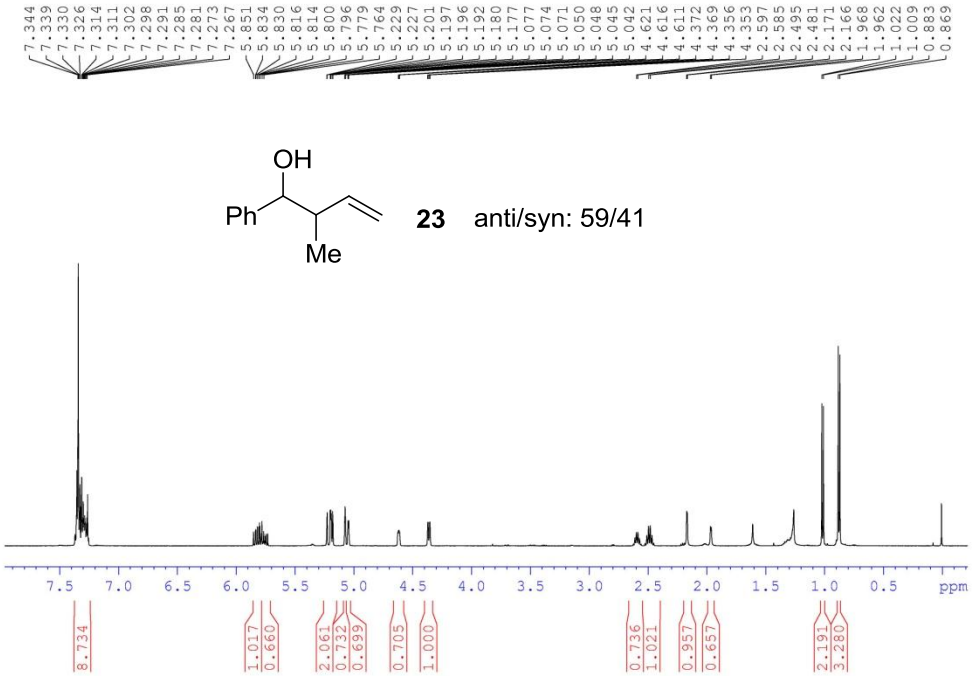



**22**, *anti*/*syn*: 97/3

**2-Methyl-1-phenylbut-3-en-1-ol (30)**
**For (table 3, entry 4)**




**For (table 3, entry 5)**

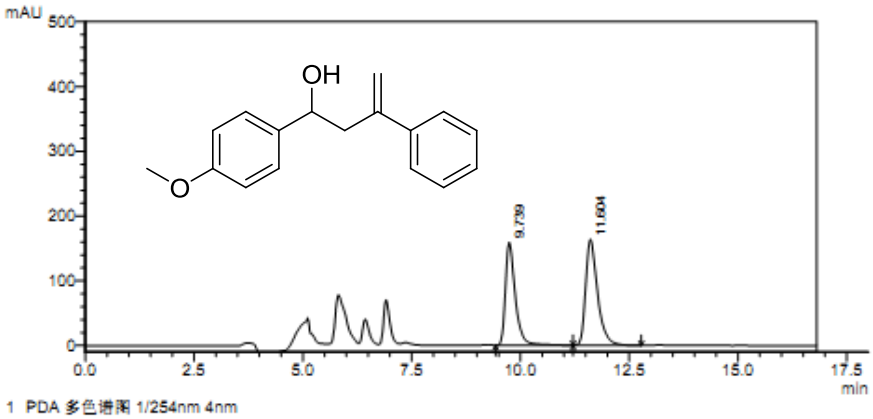


# (4) HPLC Charts for Homoallylic Alcohols

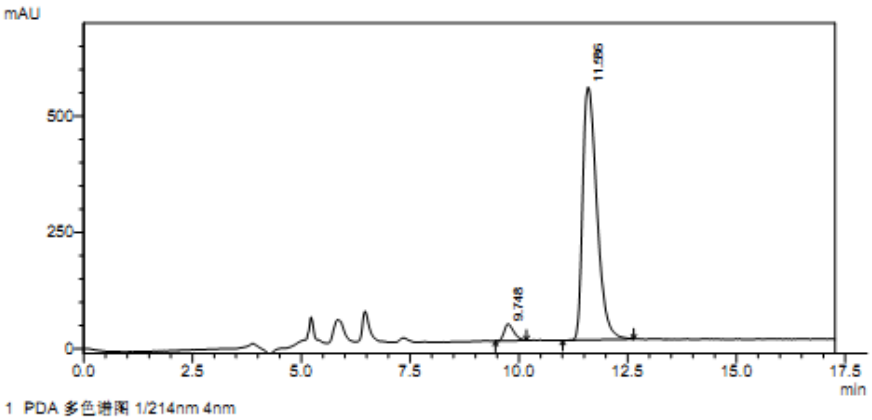
## (+)-1-(4-Methoxyphenyl)-3-phenylbut-3-en-1-ol (1)

2013-10-13 15:09:51 1 / 1

**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/254nm 4nm



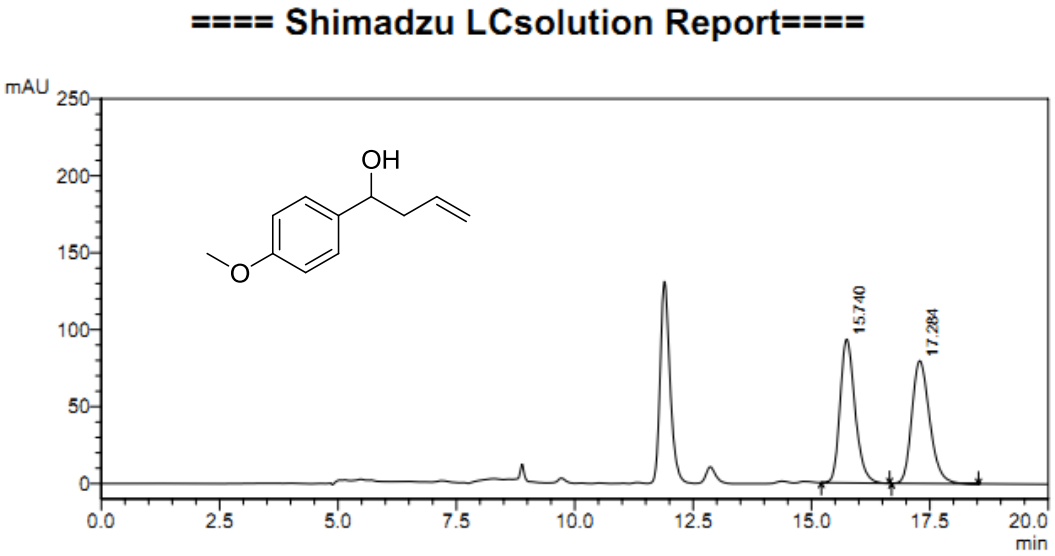

1 PDA 多色谱图 1/214nm 4nm

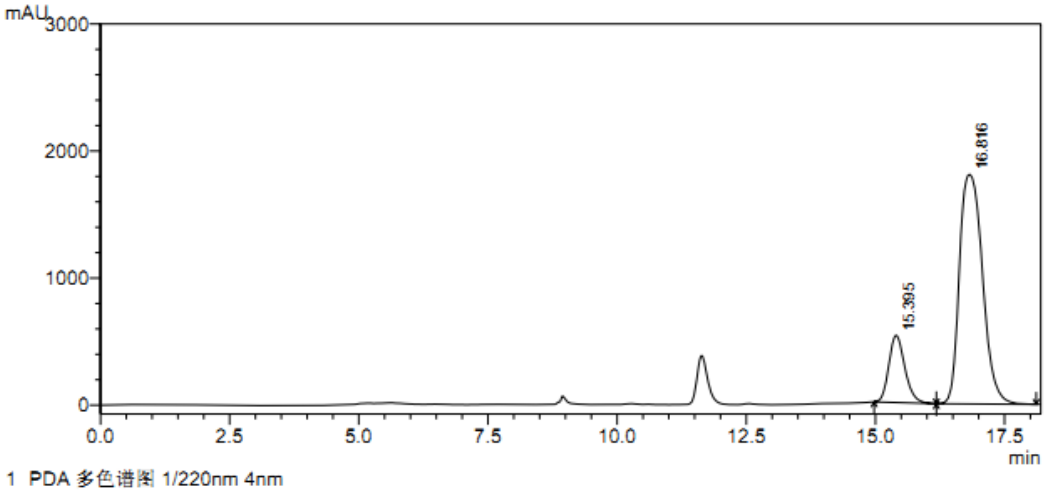
PDA Ch1 214nm 4nm

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 9.748 | 552331 | 36456 | 4.275 | 6.290 |
| 2 | 11.586 | 12369144 | 543121 | 95.725 | 93.710 |
| 总计 | | 12921475 | 579577 | 100.000 | 100.000 |

C:\LabSolutions\Data\tzz\数据\茴香醛72.lcd

**(S)-1-(4-Methoxyphenyl)but-3-en-1-ol (5)**



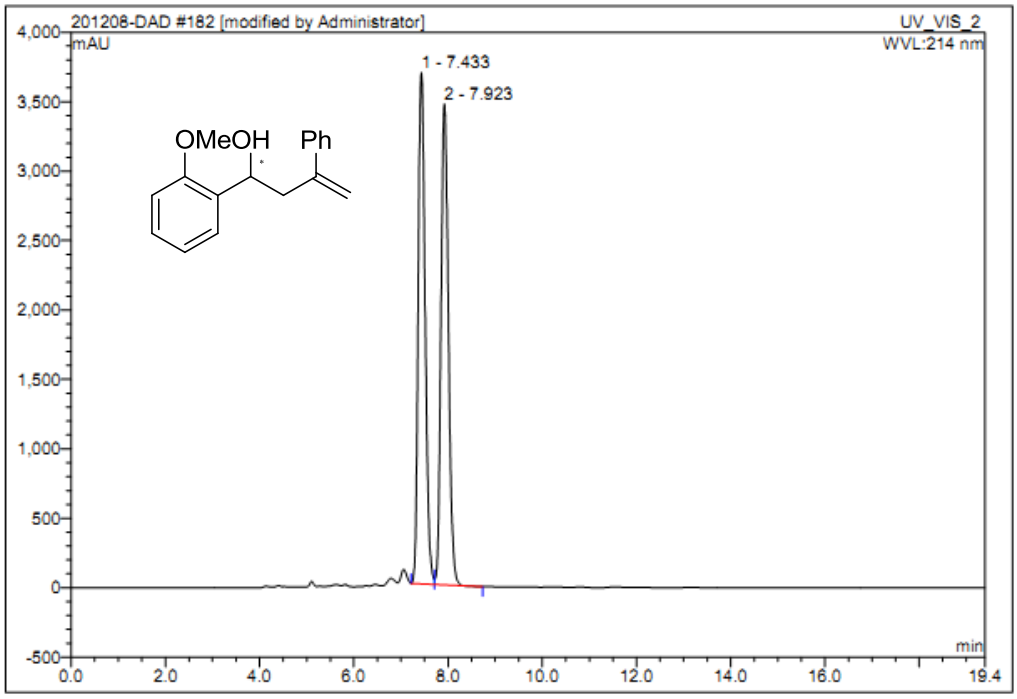




1 PDA 多色谱图 1/220nm 4nm

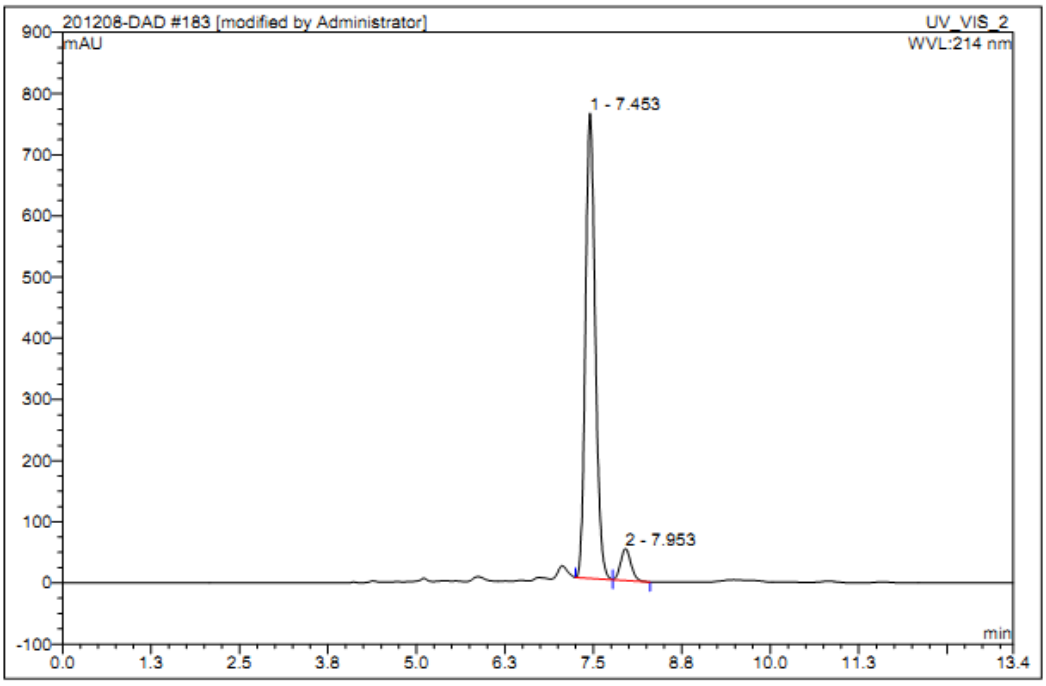
PDA Ch1 220nm 4nm

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 15.395 | 11346787 | 527809 | 16.845 | 22.613 |
| 2 | 16.816 | 56012294 | 1806253 | 83.155 | 77.387 |
| 总计 | | 67359081 | 2334062 | 100.000 | 100.000 |

## (+)-1-(2-Methoxyphenyl)-3-phenylbut-3-en-1-ol (6)




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 7.43 | n.a. | 3683.258 | 630.886 | 49.94 | n.a. | BM * |
| 2 | 7.92 | n.a. | 3466.734 | 632.403 | 50.06 | n.a. | MB* |
| Total: | | | 7149.992 | 1263.289 | 100.00 | 0.000 | |

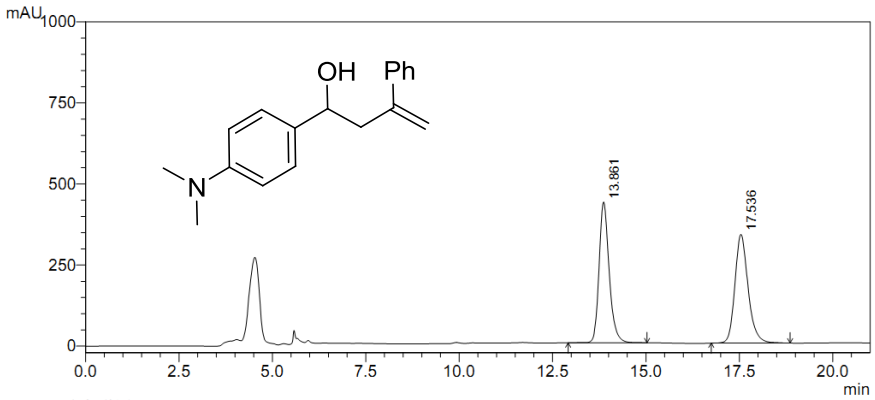



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 7.45 | n.a. | 760.628 | 121.461 | 93.25 | n.a. | BM * |
| 2 | 7.95 | n.a. | 51.723 | 8.796 | 6.75 | n.a. | MB* |
| Total: | | | 812.351 | 130.256 | 100.00 | 0.000 | |

## (+)-1-(4-(Dimethylamino)phenyl)-3-phenylbut-3-en-1-ol (7)



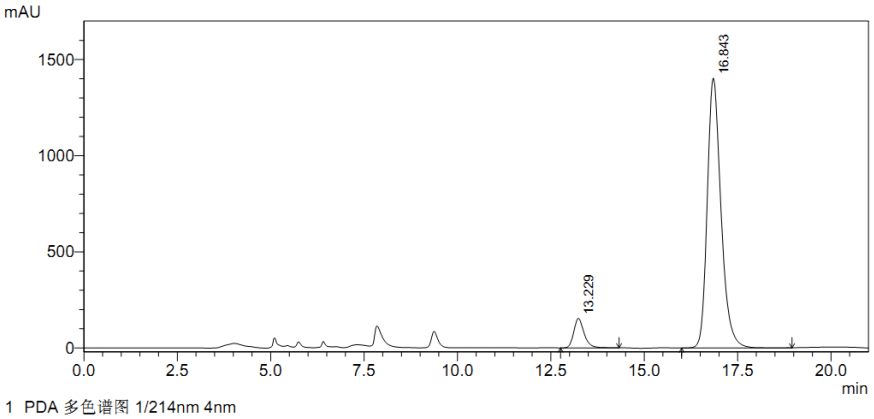
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 13.861 | 8170530 | 434380 | 49.898 | 56.463 |
| 2 | 17.536 | 8204019 | 334941 | 50.102 | 43.537 |
| 总计 | | 16374549 | 769321 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 13.229 | 2967293 | 153486 | 7.631 | 9.860 |
| 2 | 16.843 | 35916152 | 1403177 | 92.369 | 90.140 |
| 总计 | | 38883445 | 1556663 | 100.000 | 100.000 |

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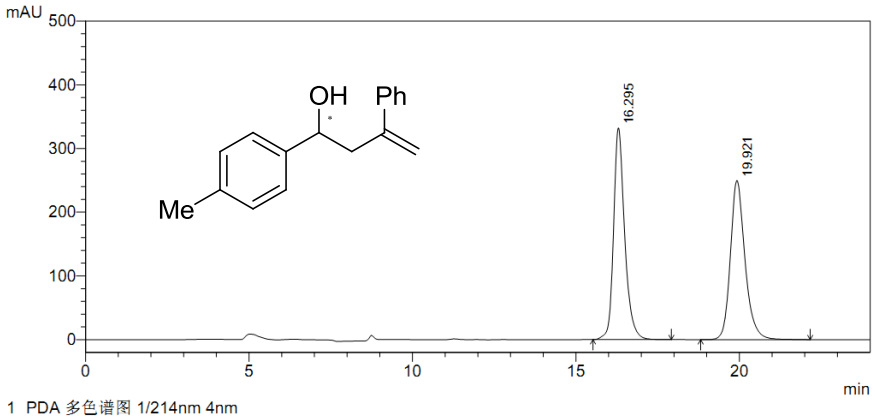
## (+)-3-Phenyl-1-p-tolylbut-3-en-1-ol (8)



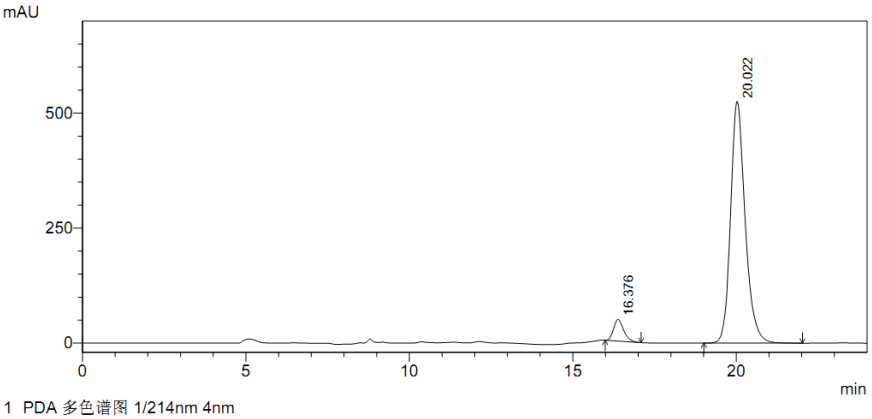
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 16.295 | 7832214 | 332353 | 50.163 | 57.080 |
| 2 | 19.921 | 7781255 | 249904 | 49.837 | 42.920 |
| 总计 | | 15613469 | 582256 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 16.376 | 1008733 | 47047 | 5.822 | 8.220 |
| 2 | 20.022 | 16316561 | 525274 | 94.178 | 91.780 |
| 总计 | | 17325294 | 572321 | 100.000 | 100.000 |

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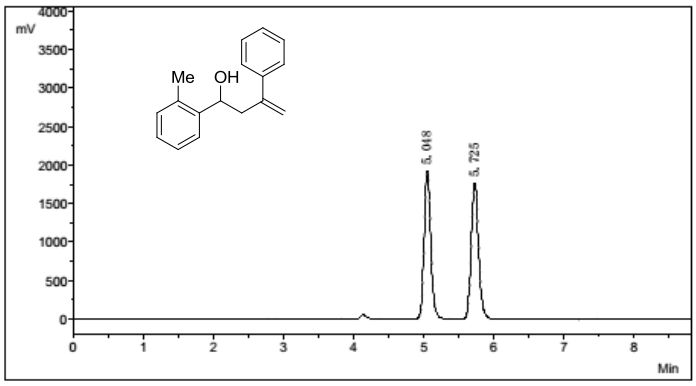
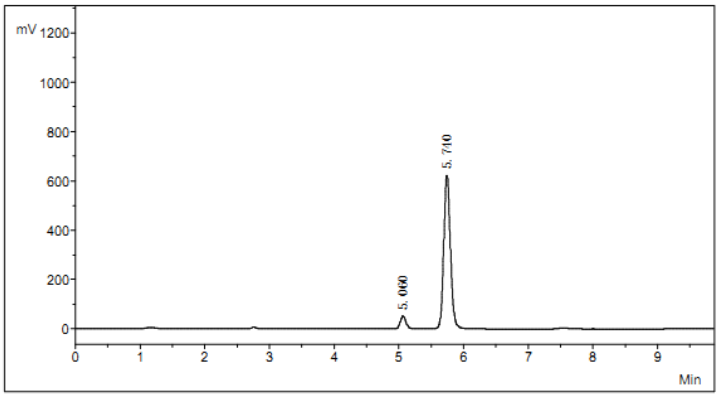
## (-)-3-phenyl-1-o-tolylbut-3-en-1-ol (9)

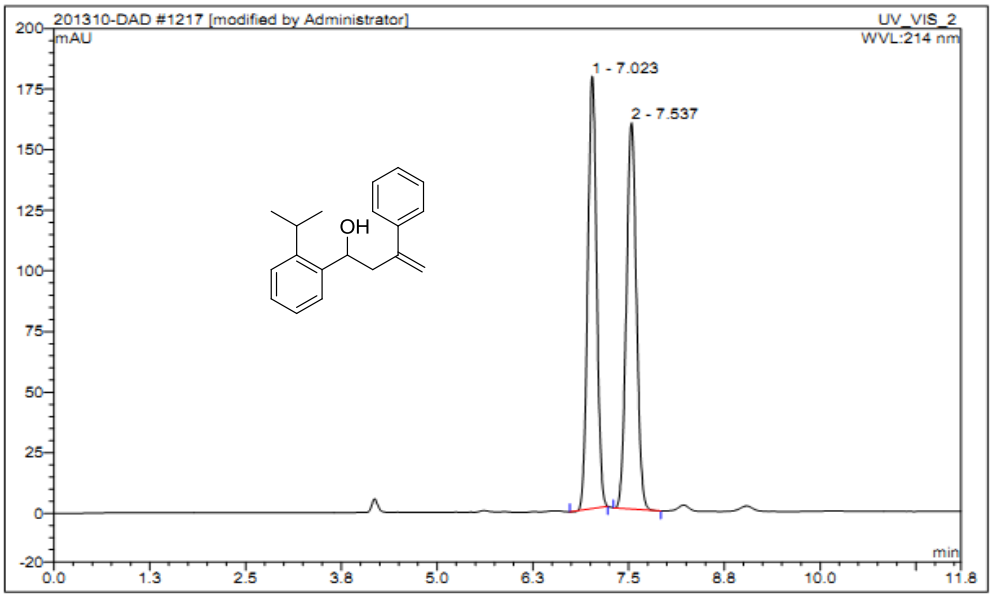



| No. | PeakNo | ID.Name | R.Time | PeakHeight | PeakArea | PerCent |
|---|---|---|---|---|---|---|
| 1 | 1 | | 5.048 | 1923843.3 | 12669561.1 | 49.5999 |
| 2 | 2 | | 5.725 | 1766288.1 | 12873952.8 | 50.4001 |
| Total | | | | 3690131.4 | 25543513.9 | 100.0000 |

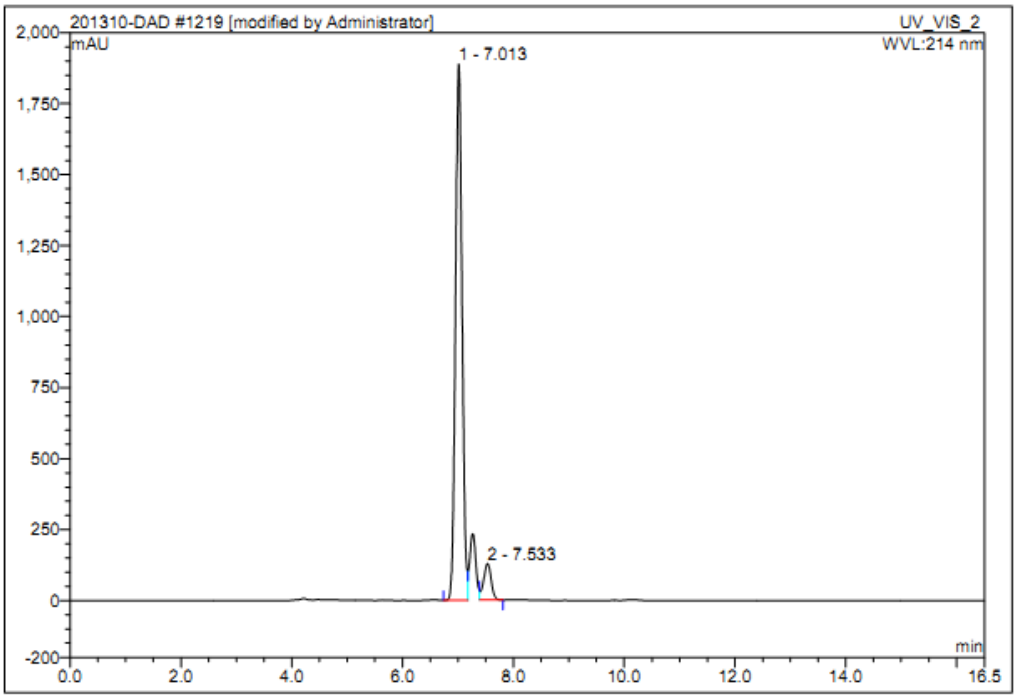



| No. | PeakNo | ID.Name | R.Time | PeakHeight | PeakArea | PerCent |
|---|---|---|---|---|---|---|
| 1 | 1 | | 5.060 | 51758.4 | 330863.6 | 6.8633 |
| 2 | 2 | | 5.740 | 613868.4 | 4489893.7 | 93.1367 |
| Total | | | | 665626.8 | 4820757.3 | 100.0000 |

## (+)-1-(2-isopropylphenyl)-3-phenylbut-3-en-1-ol (10)




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 7.02 | n.a. | 178.394 | 23.918 | 49.61 | n.a. | BMB* |
| 2 | 7.54 | n.a. | 159.435 | 24.292 | 50.39 | n.a. | BMB* |
| Total: | | | 337.829 | 48.210 | 100.00 | 0.000 | |

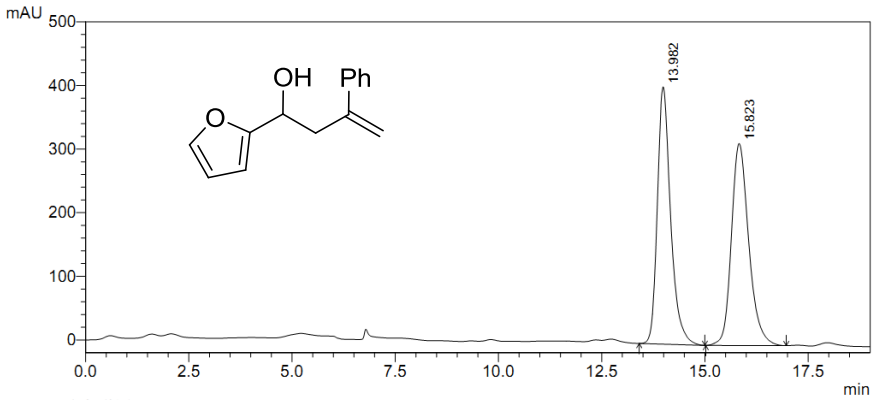



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 7.01 | n.a. | 1888.505 | 261.852 | 92.67 | n.a. | BM * |
| 2 | 7.53 | n.a. | 128.936 | 20.727 | 7.33 | n.a. | MB* |
| Total: | | | 2017.441 | 282.579 | 100.00 | 0.000 | |

## (+)-1-(Furan-2-yl)-3-phenylbut-3-en-1-ol (11)



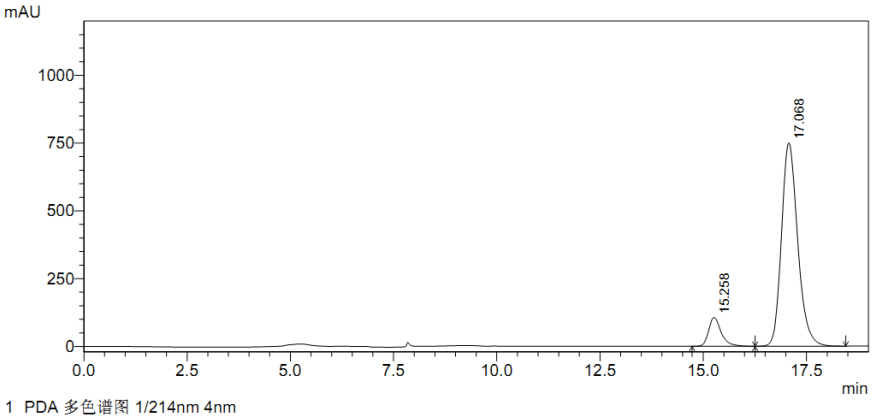
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 13.982 | 9031417 | 404626 | 49.356 | 56.020 |
| 2 | 15.823 | 9267121 | 317658 | 50.644 | 43.980 |
| 总计 | | 18298537 | 722283 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 15.258 | 2235000 | 106626 | 9.841 | 12.448 |
| 2 | 17.068 | 20475586 | 749943 | 90.159 | 87.552 |
| 总计 | | 22710586 | 856568 | 100.000 | 100.000 |

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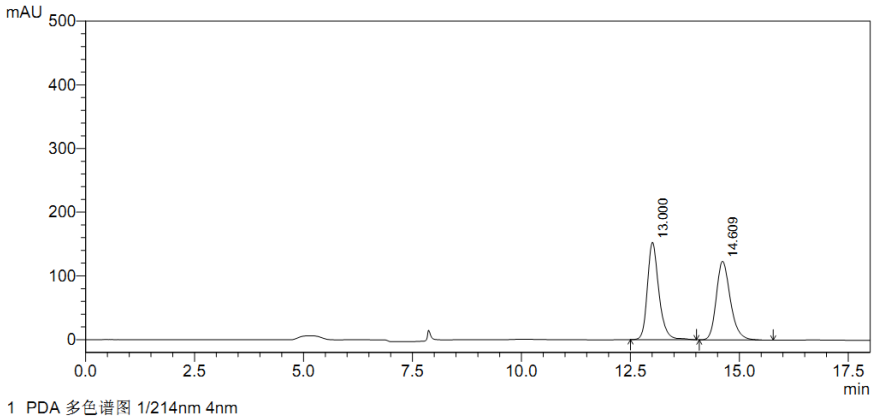
## (S)-(+)-1,3-Diphenylbut-3-en-1-ol (12)



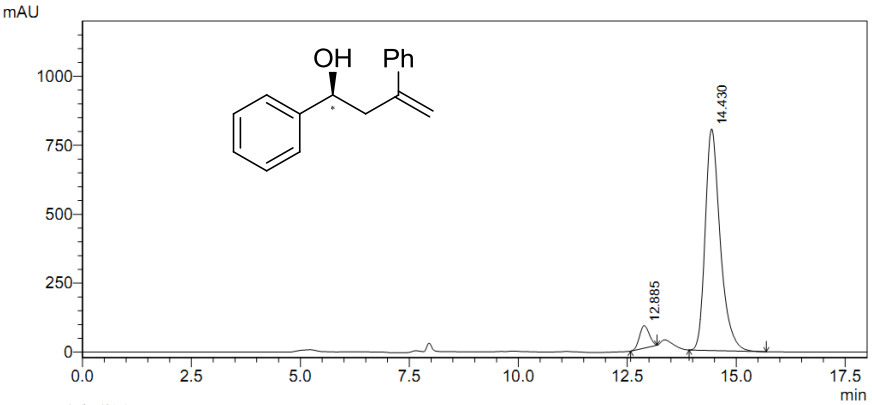
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 13.000 | 2796315 | 152937 | 50.247 | 55.322 |
| 2 | 14.609 | 2768824 | 123510 | 49.753 | 44.678 |
| 总计 | | 5565139 | 276447 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 12.885 | 1273583 | 81670 | 6.213 | 9.225 |
| 2 | 14.430 | 19226592 | 803680 | 93.787 | 90.775 |
| 总计 | | 20500176 | 885350 | 100.000 | 100.000 |

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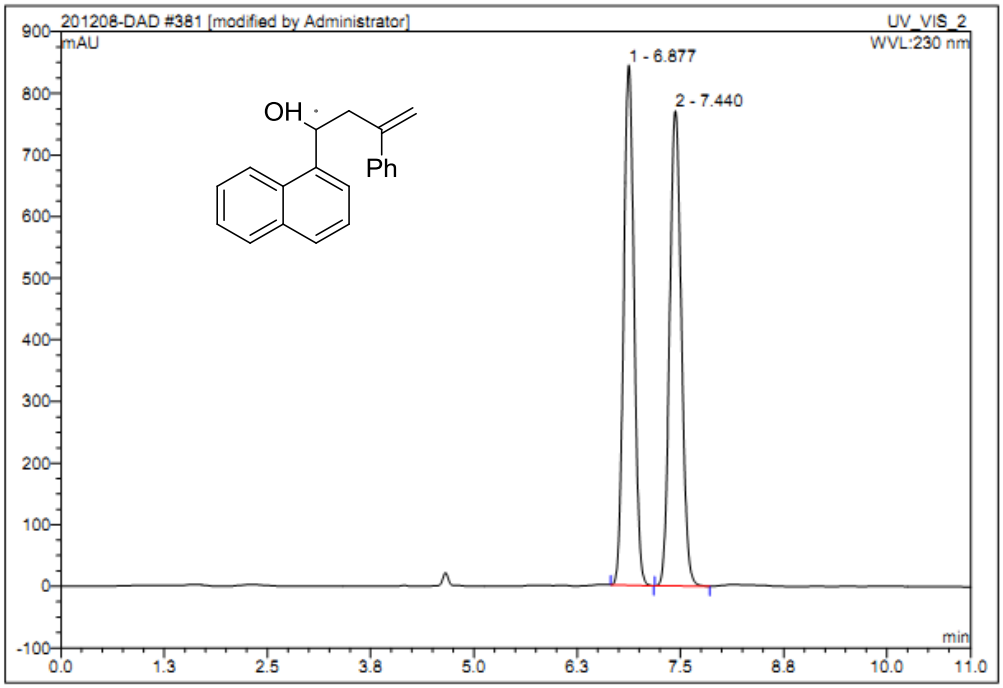
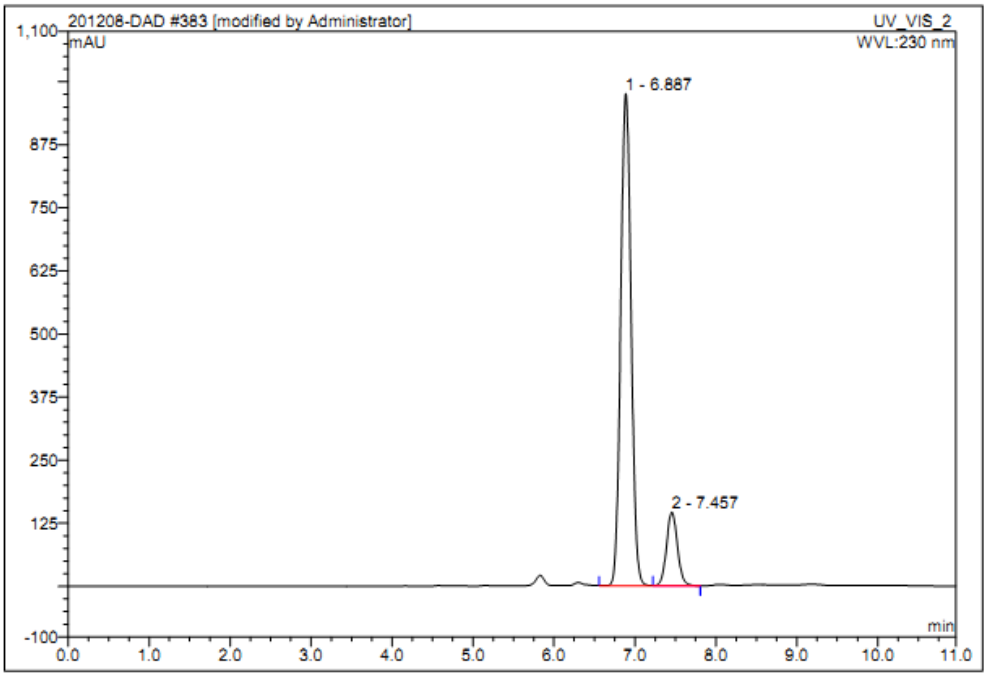
## (-)-1-(Naphthalen-2-yl)-3-phenylbut-3-en-1-ol (13)




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.88 | n.a. | 844.134 | 123.975 | 49.50 | n.a. | BMB |
| 2 | 7.44 | n.a. | 770.729 | 126.476 | 50.50 | n.a. | BMB |
| Total: | | | 1614.863 | 250.452 | 100.00 | 0.000 | |

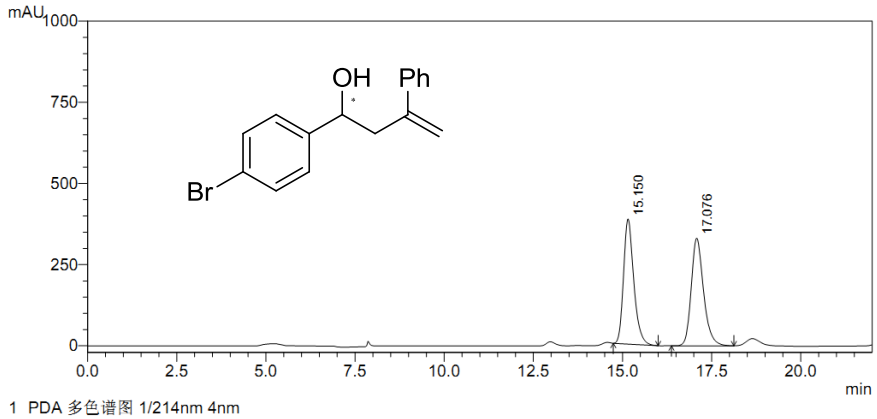



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.89 | n.a. | 975.580 | 145.048 | 86.36 | n.a. | BMB |
| 2 | 7.46 | n.a. | 145.911 | 22.915 | 13.64 | n.a. | Rd |
| Total: | | | 1121.491 | 167.963 | 100.00 | 0.000 | |

## (+)-1-(4-Bromophenyl)-3-phenylbut-3-en-1-ol (14)



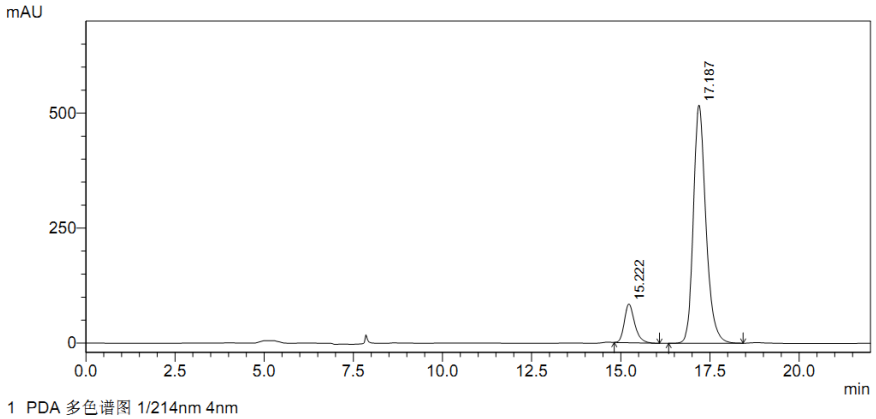
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 15.150 | 7677411 | 385580 | 49.041 | 53.764 |
| 2 | 17.076 | 7977672 | 331591 | 50.959 | 46.236 |
| 总计 | | 15655083 | 717171 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 15.222 | 1693613 | 84257 | 11.774 | 13.993 |
| 2 | 17.187 | 12691050 | 517877 | 88.226 | 86.007 |
| 总计 | | 14384663 | 602134 | 100.000 | 100.000 |

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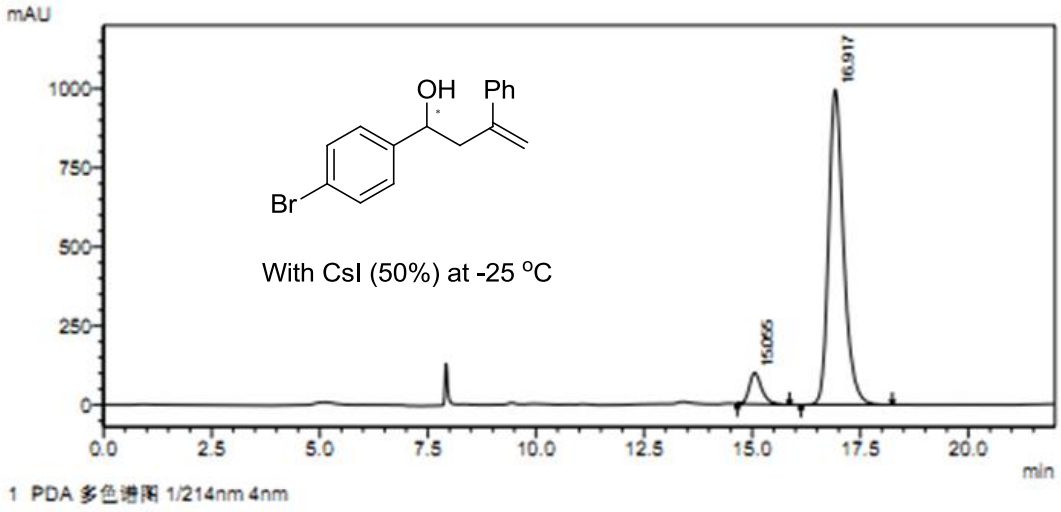
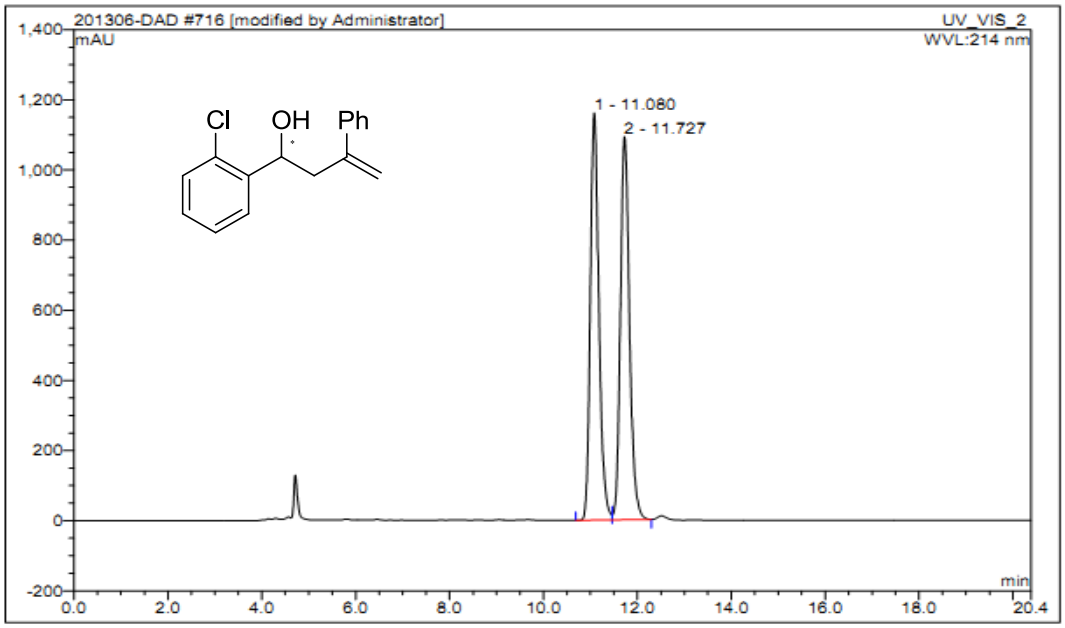


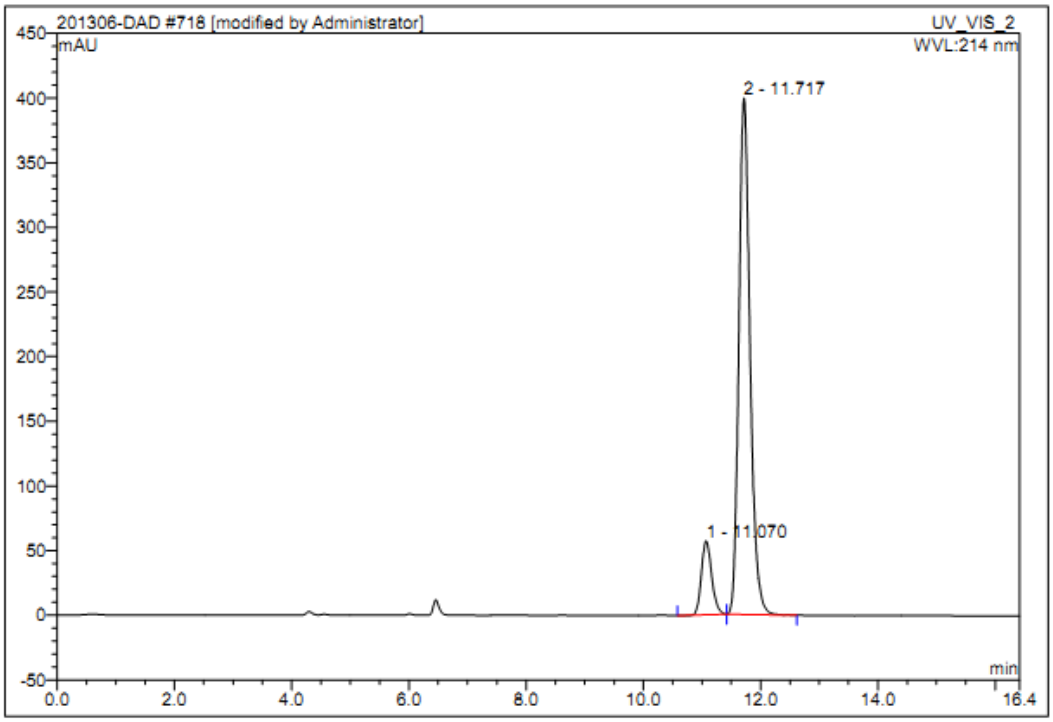

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 15.055 | 1957688 | 99268 | 7.564 | 9.054 |
| 2 | 16.917 | 23923433 | 997114 | 92.436 | 90.946 |
| 总计 | | 25881121 | 1096382 | 100.000 | 100.000 |

## (-)-1-(2-Chlorophenyl)-3-phenylbut-3-en-1-ol (15)

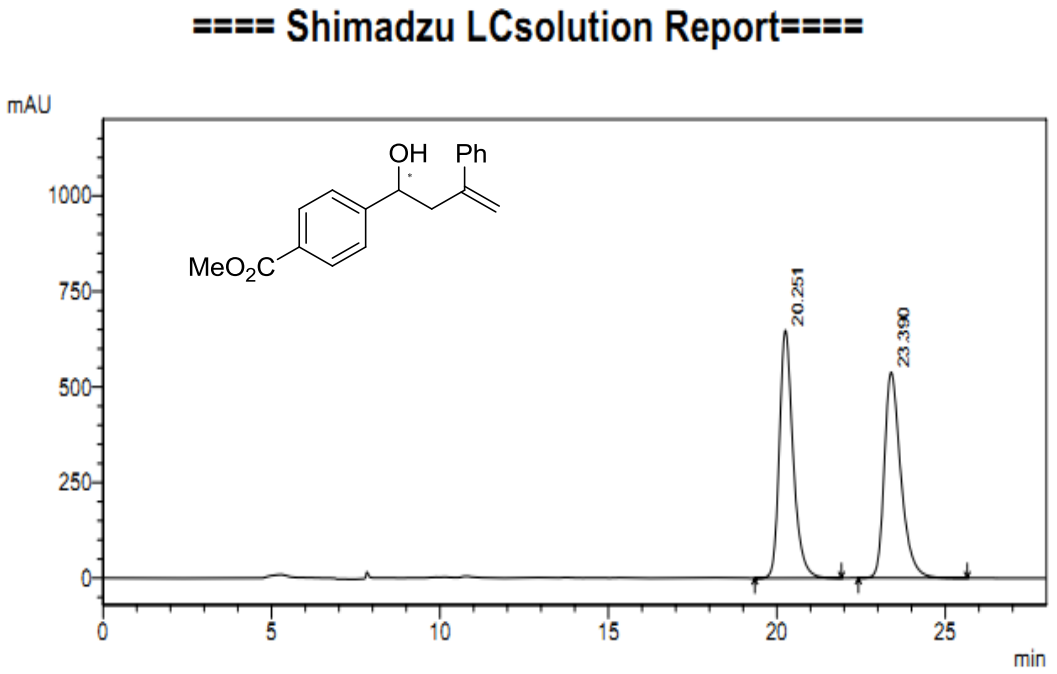


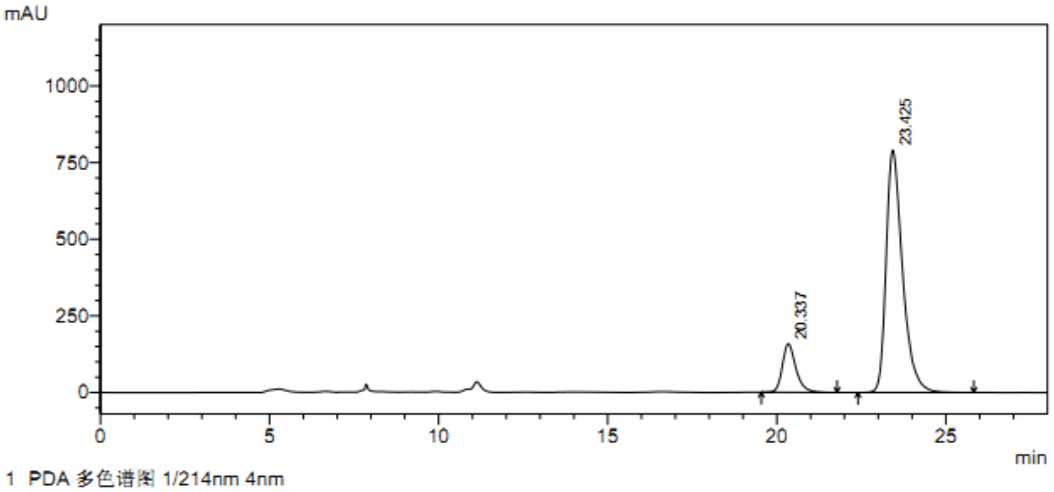

| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 11.08 | n.a. | 1161.416 | 246.889 | 50.09 | n.a. | BM * |
| 2 | 11.73 | n.a. | 1092.674 | 245.961 | 49.91 | n.a. | MB* |
| Total: | | | 2254.090 | 492.850 | 100.00 | 0.000 | |




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 11.07 | n.a. | 57.322 | 11.617 | 11.59 | n.a. | BMb* |
| 2 | 11.72 | n.a. | 399.575 | 88.615 | 88.41 | n.a. | bMB* |
| Total: | | | 456.897 | 100.231 | 100.00 | 0.000 | |

**(+)-Methyl-4-(1-hydroxy-3-phenylbut-3-enyl)benzoate (16)**






1 PDA 多色谱图 1/214nm 4nm

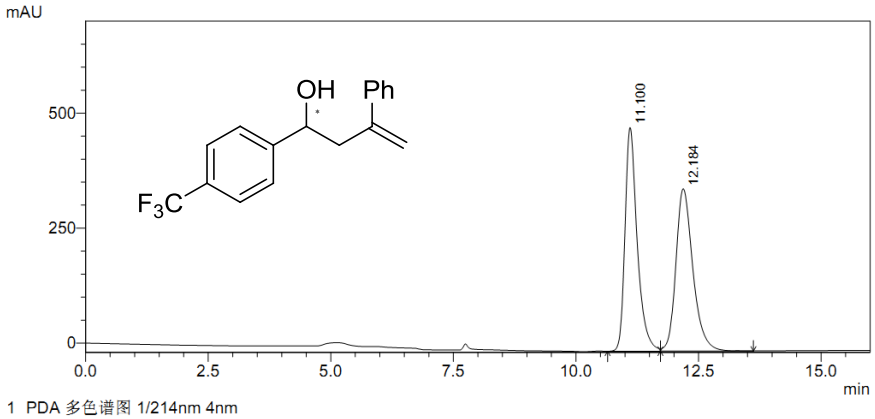
**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 20.337 | 4407872 | 158499 | 14.196 | 16.703 |
| 2 | 23.425 | 26642303 | 790406 | 85.804 | 83.297 |
| 总计 | | 31050176 | 948904 | 100.000 | 100.000 |

## (+)-3-Phenyl-1-(4-(trifluoromethyl)phenyl)but-3-en-1-ol (17)



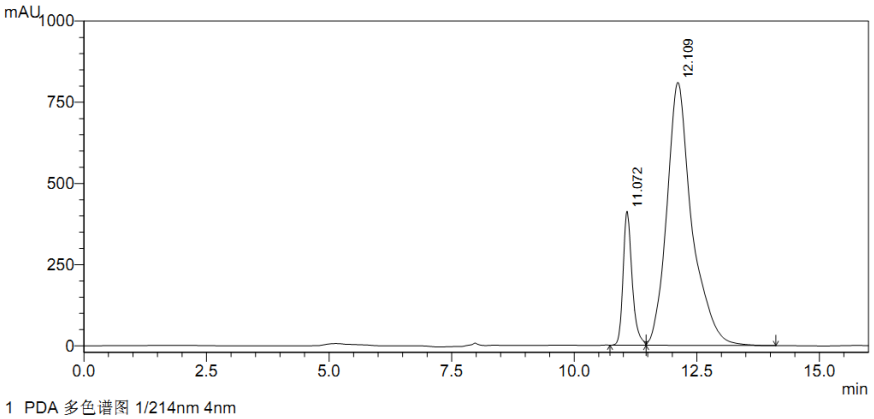
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.100 | 8395465 | 486622 | 49.717 | 57.956 |
| 2 | 12.184 | 8491182 | 353023 | 50.283 | 42.044 |
| 总计 | | 16886646 | 839646 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.072 | 5275339 | 412584 | 15.495 | 33.753 |
| 2 | 12.109 | 28770701 | 809790 | 84.505 | 66.247 |
| 总计 | | 34046039 | 1222374 | 100.000 | 100.000 |

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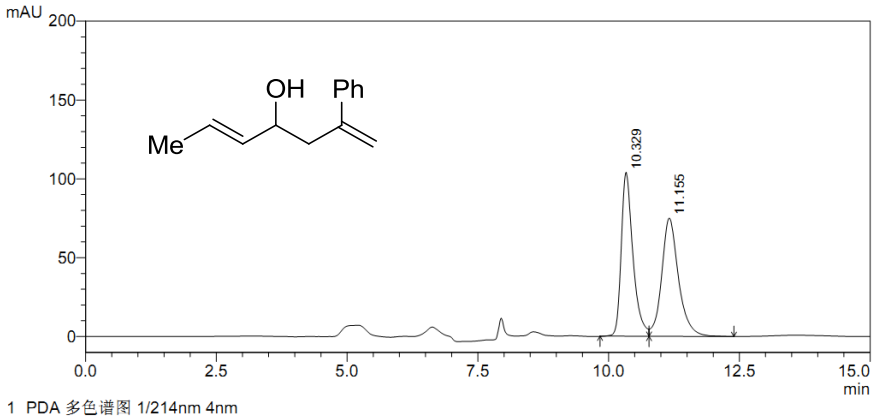
## (+)-(*E*)-2-Phenylhepta-1,5-dien-4-ol (18)



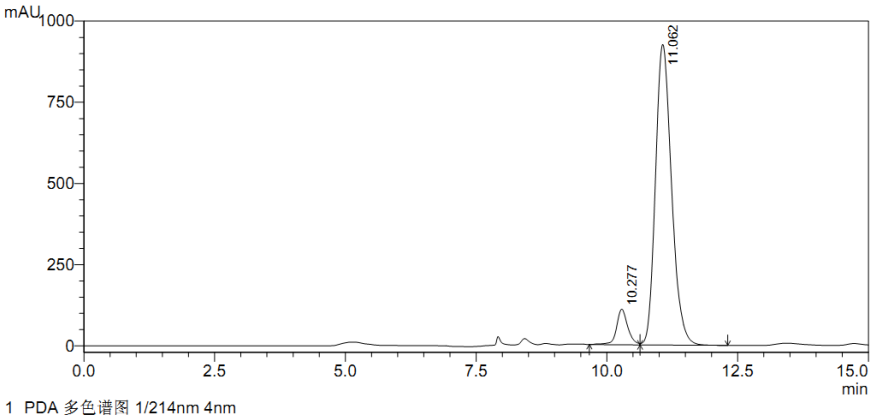
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 10.329 | 1623358 | 104004 | 49.260 | 58.117 |
| 2 | 11.155 | 1672129 | 74951 | 50.740 | 41.883 |
| 总计 | | 3295487 | 178956 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 10.277 | 1641517 | 109735 | 7.660 | 10.598 |
| 2 | 11.062 | 19788754 | 925731 | 92.340 | 89.402 |
| 总计 | | 21430271 | 1035466 | 100.000 | 100.000 |

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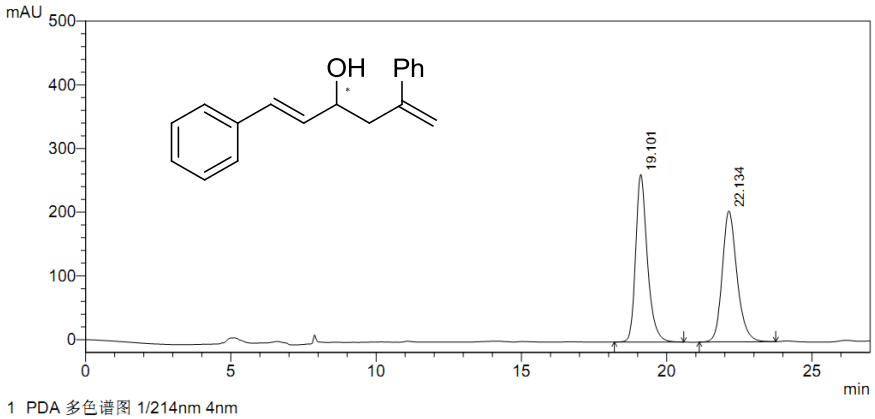
## (+)-(*E*)-1,5-Diphenylhexa-1,5-dien-3-ol (19)



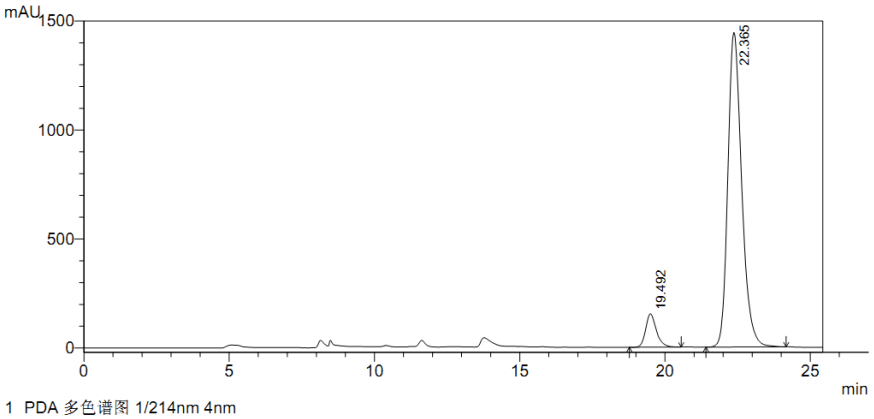
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 19.101 | 7339174 | 263096 | 50.275 | 56.142 |
| 2 | 22.134 | 7258777 | 205527 | 49.725 | 43.858 |
| 总计 | | 14597950 | 468623 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 19.492 | 3910126 | 153269 | 7.570 | 9.593 |
| 2 | 22.365 | 47743356 | 1444413 | 92.430 | 90.407 |
| 总计 | | 51653482 | 1597682 | 100.000 | 100.000 |

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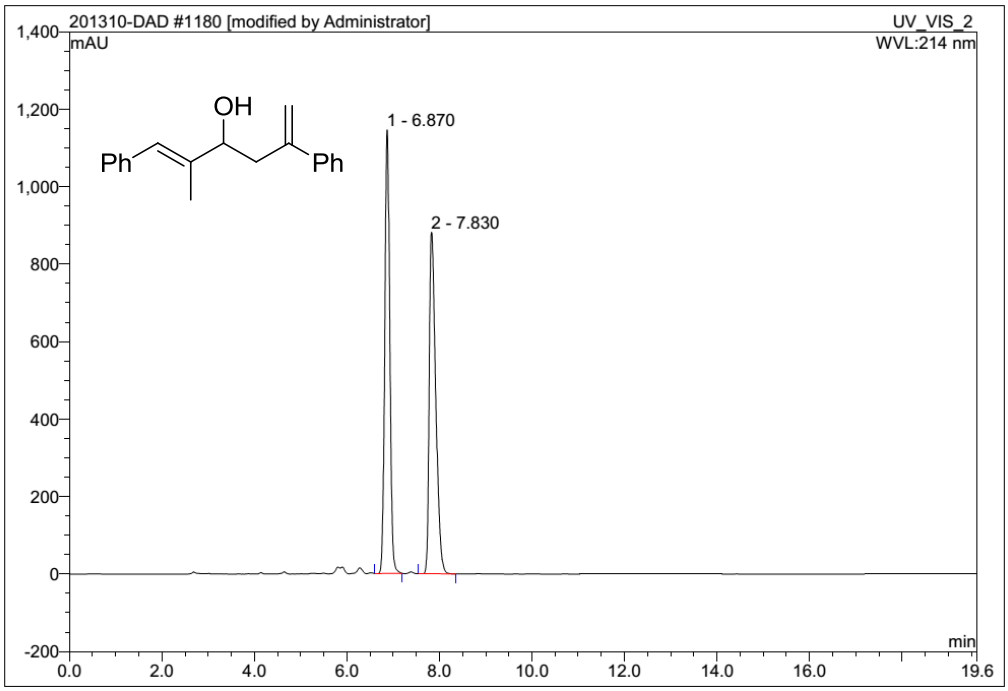
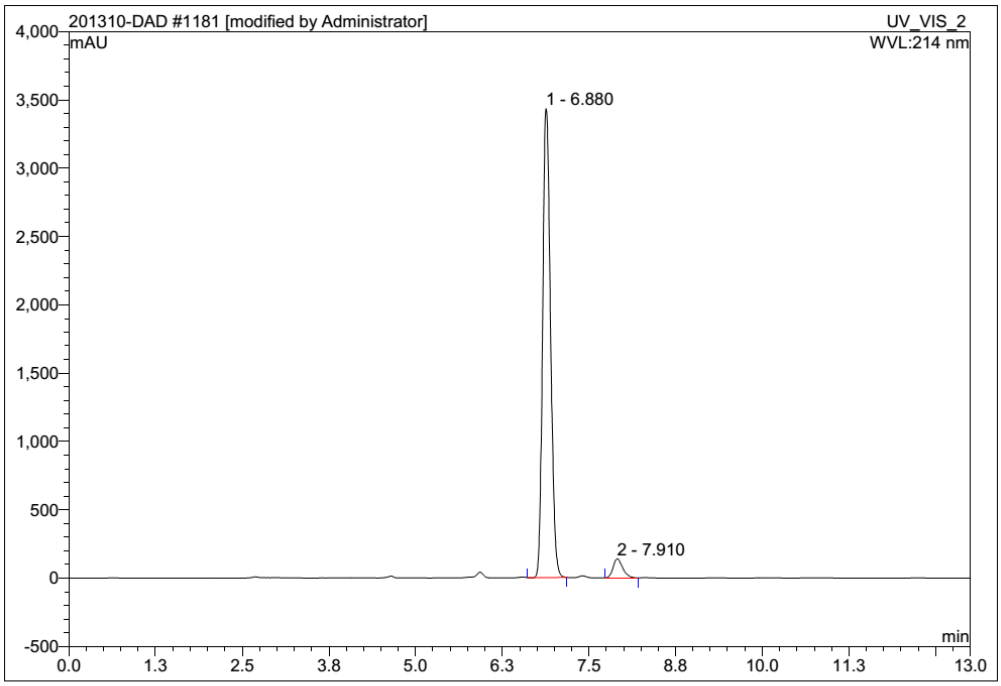
## (+)-(E)-2-methyl-1,5-diphenylhexa-1,5-dien-3-ol (20)




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.87 | n.a. | 1145.460 | 144.246 | 50.04 | n.a. | BMB* |
| 2 | 7.83 | n.a. | 881.695 | 144.028 | 49.96 | n.a. | BMB* |
| **Total:** | | | 2027.155 | 288.274 | 100.00 | 0.000 | |

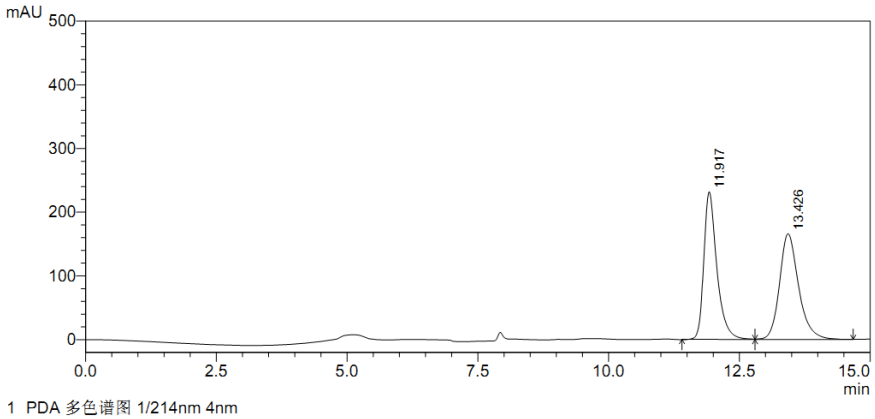



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.88 | n.a. | 3434.469 | 452.596 | 95.25 | n.a. | BMB* |
| 2 | 7.91 | n.a. | 140.001 | 22.551 | 4.75 | n.a. | BMB* |
| **Total:** | | | 3574.470 | 475.146 | 100.00 | 0.000 | |

## (+)-1,5-Diphenylhex-5-en-3-ol (21)



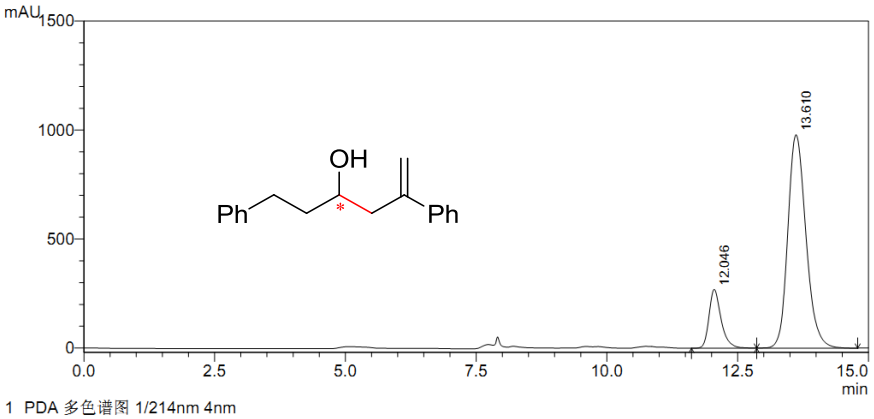
**==== Shimadzu LCsolution Report====**




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 11.917 | 4001984 | 231795 | 48.802 | 58.280 |
| 2 | 13.426 | 4198449 | 165928 | 51.198 | 41.720 |
| 总计 | | 8200433 | 397723 | 100.000 | 100.000 |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 12.046 | 4338400 | 270258 | 15.504 | 21.624 |
| 2 | 13.610 | 23643659 | 979539 | 84.496 | 78.376 |
| 总计 | | 27982059 | 1249797 | 100.000 | 100.000 |

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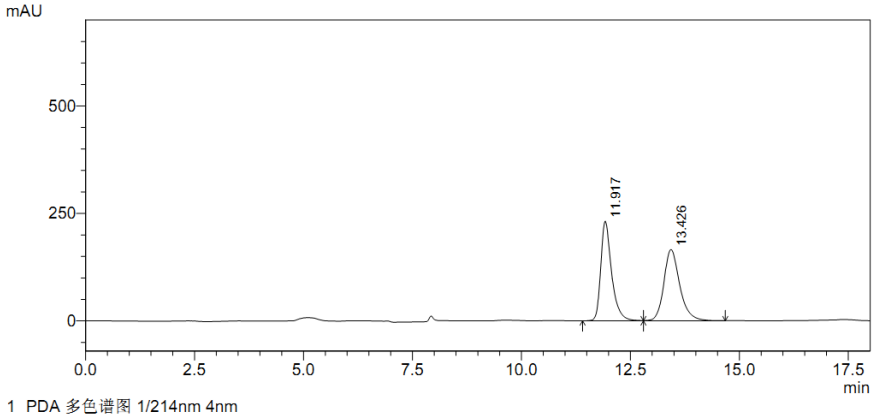
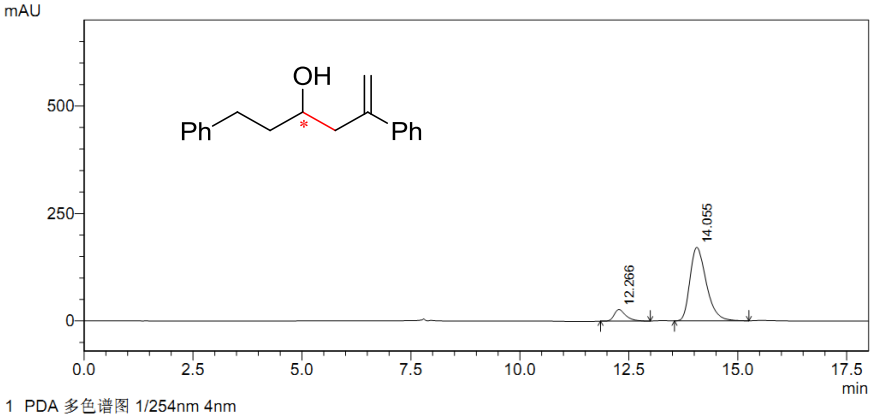
# ==== Shimadzu LCsolution Report====




1 PDA 多色谱图 1/214nm 4nm




1 PDA 多色谱图 1/254nm 4nm

**PDA Ch1 254nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 12.266 | 491310 | 26982 | 9.897 | 13.626 |
| 2 | 14.055 | 4472812 | 171032 | 90.103 | 86.374 |
| 总计 | | 4964122 | 198015 | 100.000 | 100.000 |

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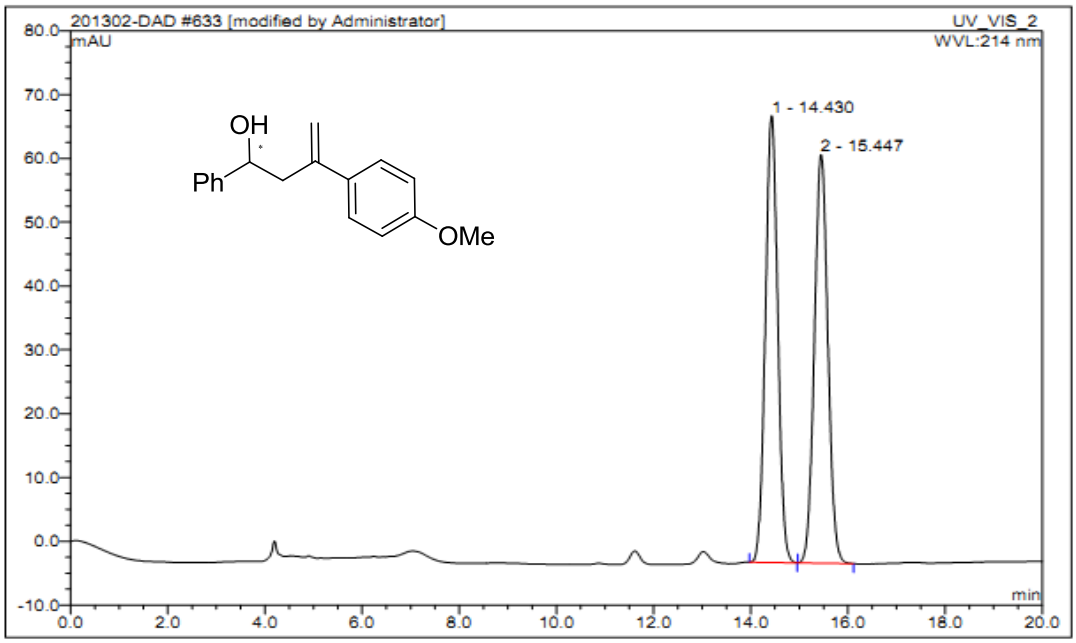
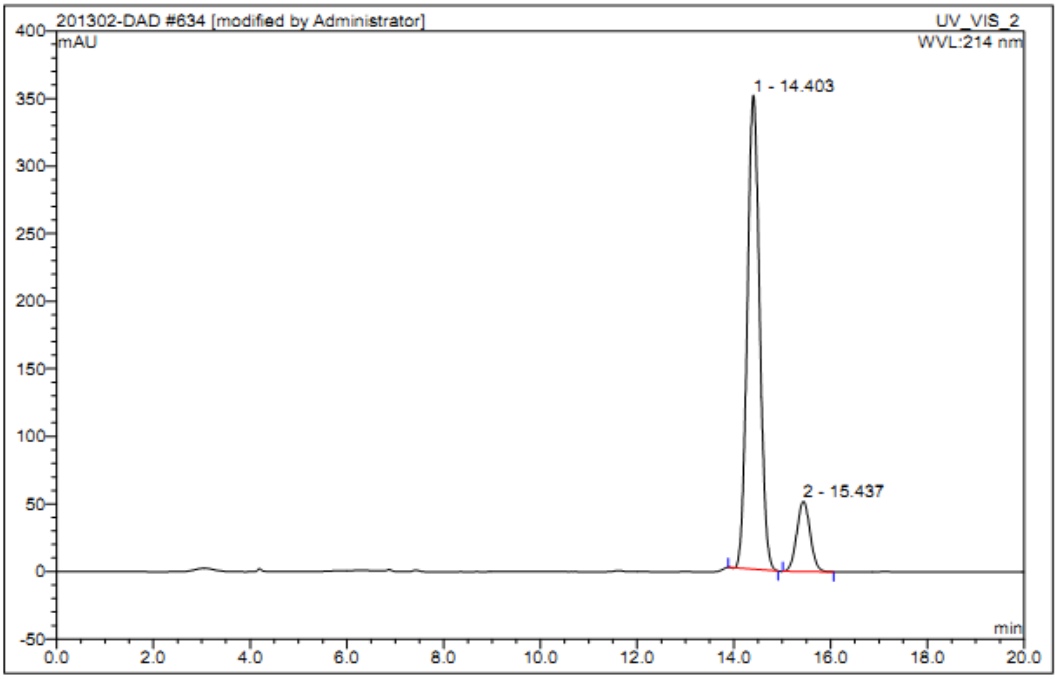
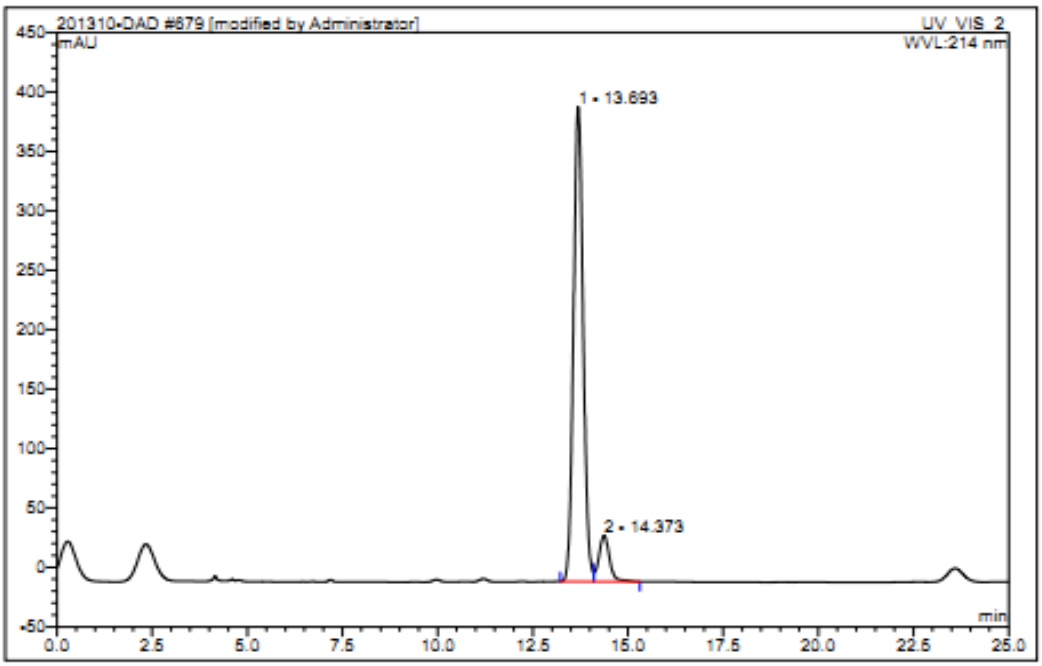
## (+)-3-(4-Methoxyphenyl)-1-phenylbut-3-en-1-ol (22)




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 14.43 | n.a. | 70.053 | 20.640 | 50.02 | n.a. | BMB |
| 2 | 15.45 | n.a. | 64.062 | 20.619 | 49.98 | n.a. | BMB |
| Total: | | | 134.115 | 41.259 | 100.00 | 0.000 | |

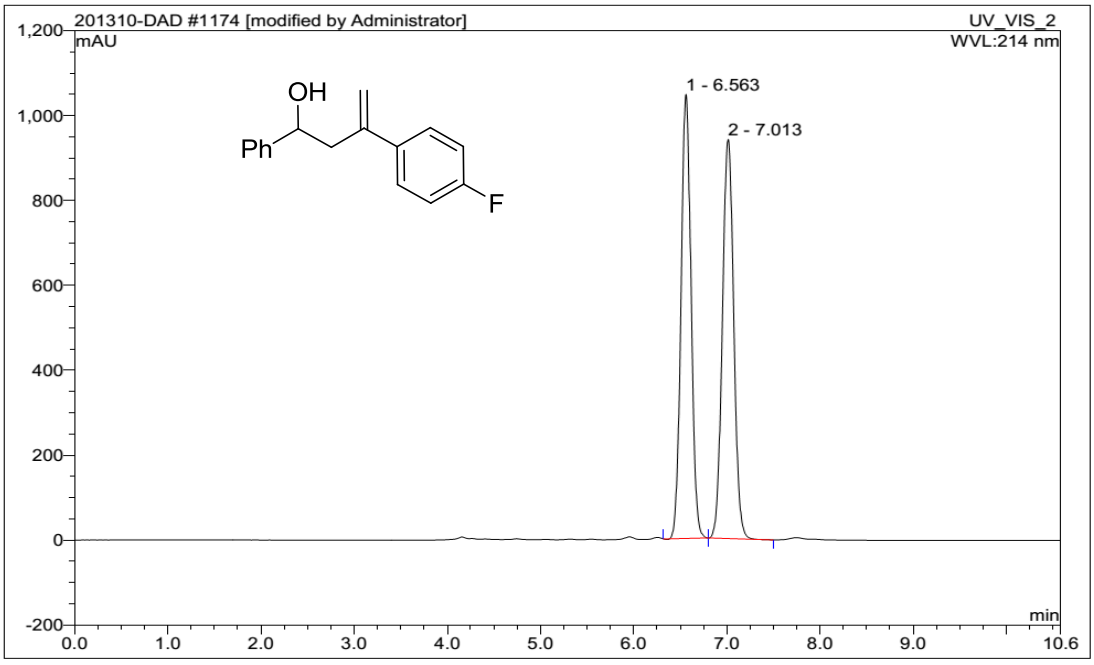



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 14.40 | n.a. | 350.868 | 103.261 | 86.09 | n.a. | BMB* |
| 2 | 15.44 | n.a. | 52.123 | 16.686 | 13.91 | n.a. | BMB* |
| Total: | | | 402.991 | 119.947 | 100.00 | 0.000 | |

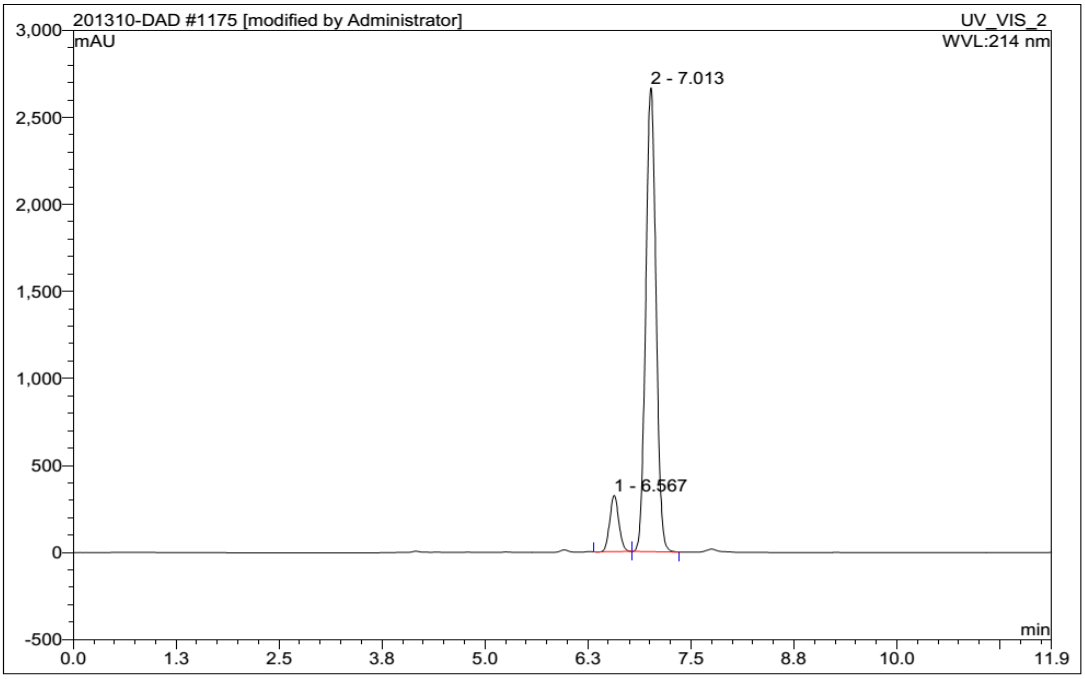



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 13.69 | n.a. | 399.649 | 117.478 | 90.35 | n.a. | BM |
| 2 | 14.37 | n.a. | 38.810 | 12.554 | 9.65 | n.a. | MB |
| Total: | | | 438.459 | 130.032 | 100.00 | 0.000 | |

## (+)-3-(4-fluorophenyl)-1-phenylbut-3-en-1-ol (23)

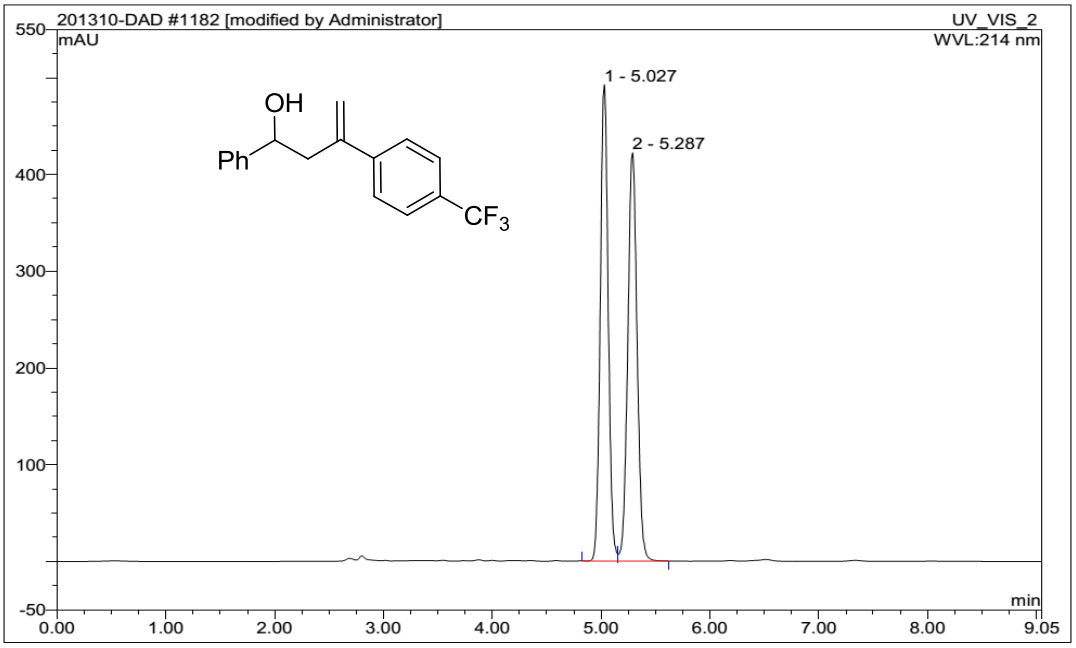



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.56 | n.a. | 1045.955 | 131.028 | 49.67 | n.a. | BMb* |
| 2 | 7.01 | n.a. | 940.762 | 132.752 | 50.33 | n.a. | bMB* |
| Total: | | | 1986.717 | 263.780 | 100.00 | 0.000 | |

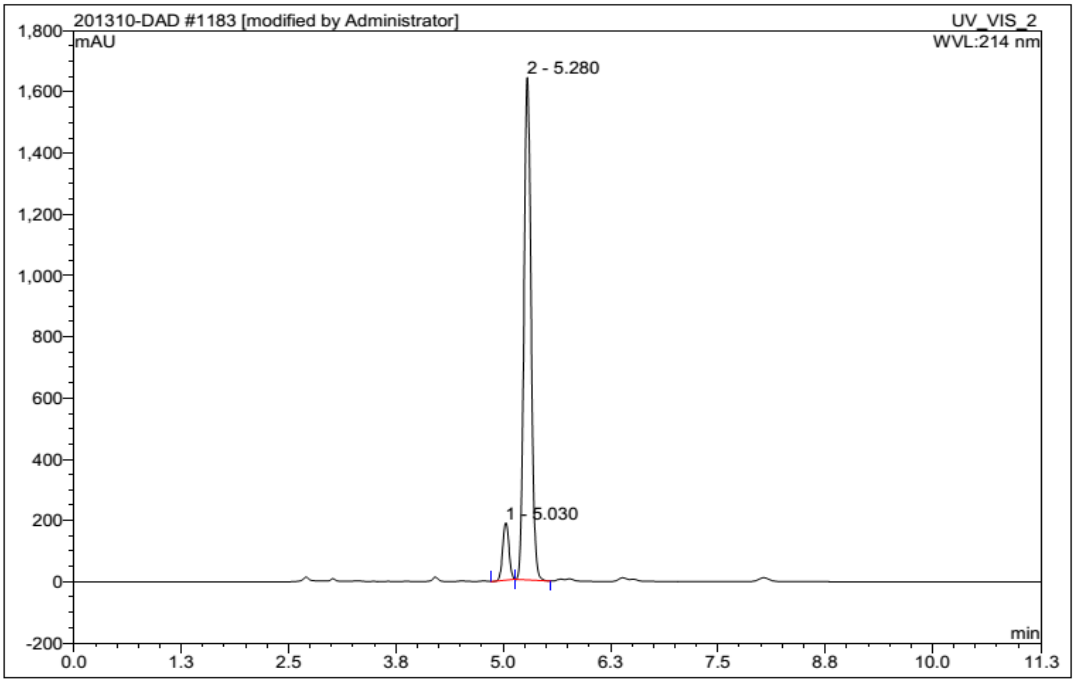



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.57 | n.a. | 324.151 | 41.182 | 9.65 | n.a. | BMb* |
| 2 | 7.01 | n.a. | 2666.026 | 385.444 | 90.35 | n.a. | bMB* |
| Total: | | | 2990.177 | 426.626 | 100.00 | 0.000 | |

## (+)-1-phenyl-3-(4-(trifluoromethyl)phenyl)but-3-en-1-ol (24)

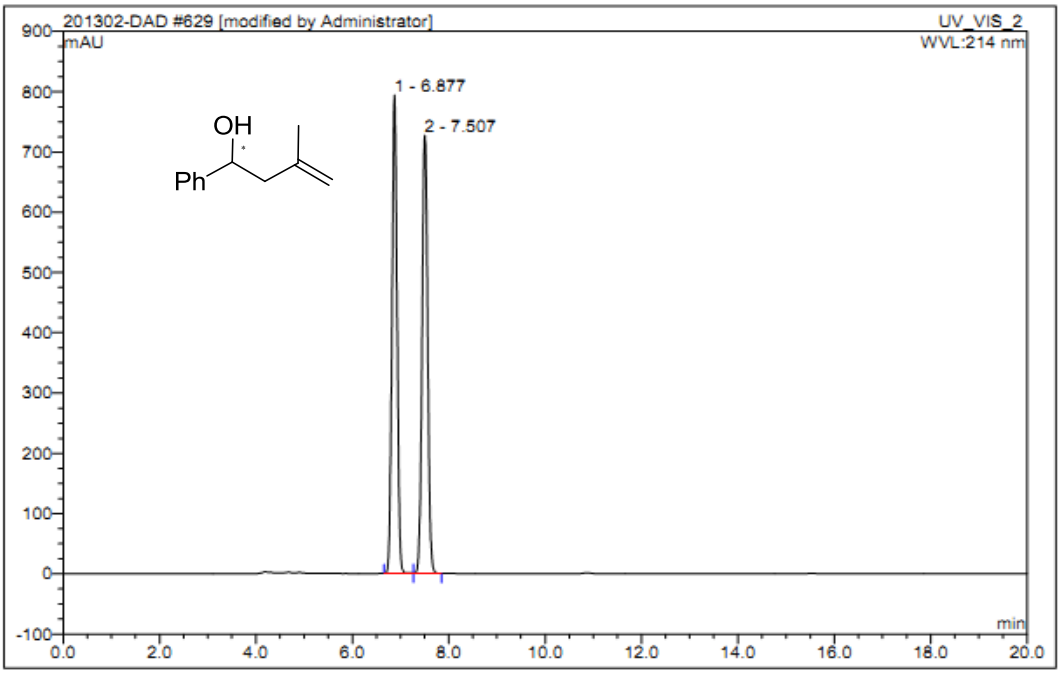



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 5.03 | n.a. | 492.522 | 41.575 | 49.71 | n.a. | BM * |
| 2 | 5.29 | n.a. | 422.321 | 42.053 | 50.29 | n.a. | MB* |
| Total: | | | 914.844 | 83.628 | 100.00 | 0.000 | |

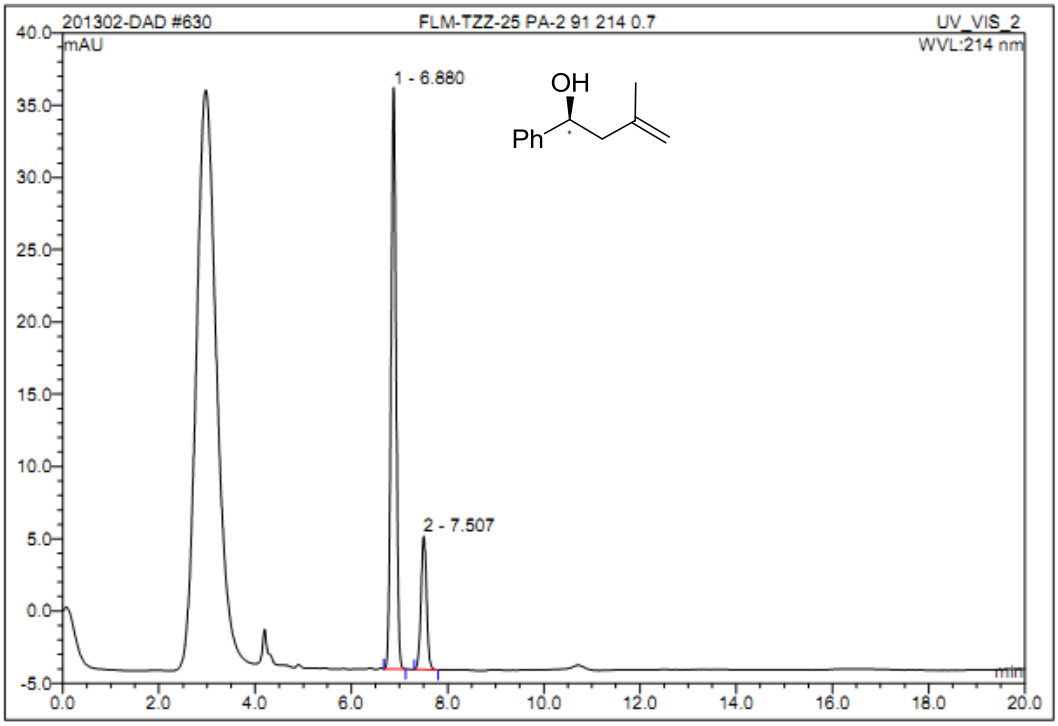



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 5.03 | n.a. | 186.836 | 15.710 | 9.08 | n.a. | BMb* |
| 2 | 5.28 | n.a. | 1641.379 | 157.310 | 90.92 | n.a. | bMB* |
| Total: | | | 1828.215 | 173.020 | 100.00 | 0.000 | |

## (*S*)-3-Methyl-1-phenylbut-3-en-1-ol (25)

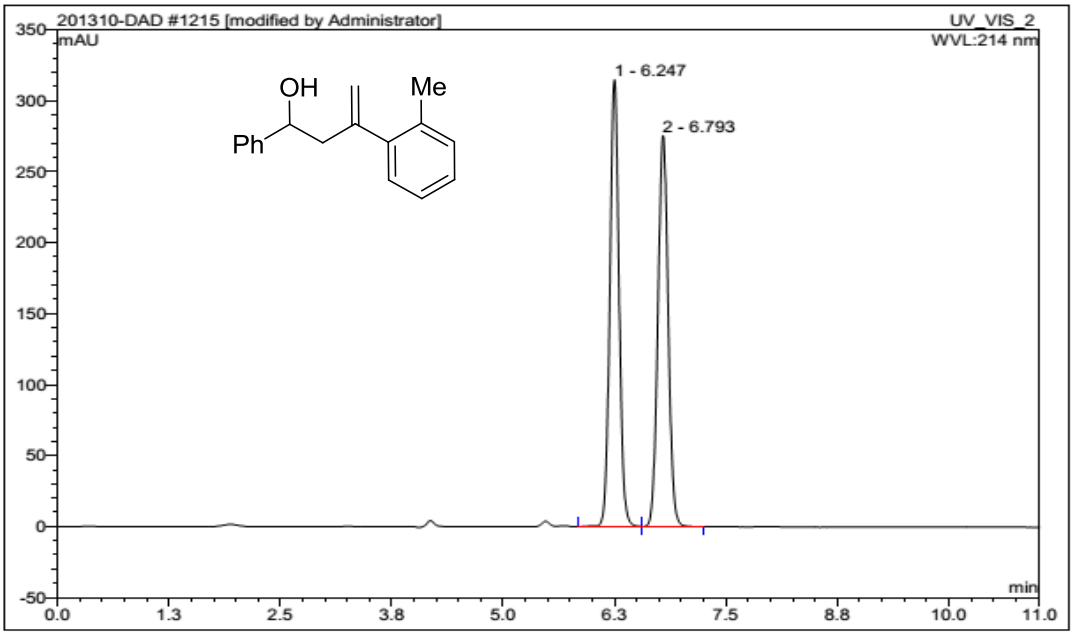



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.88 | n.a. | 793.794 | 97.261 | 49.95 | n.a. | BMb* |
| 2 | 7.51 | n.a. | 726.983 | 97.445 | 50.05 | n.a. | bMB |
| Total: | | | 1520.777 | 194.706 | 100.00 | 0.000 | |

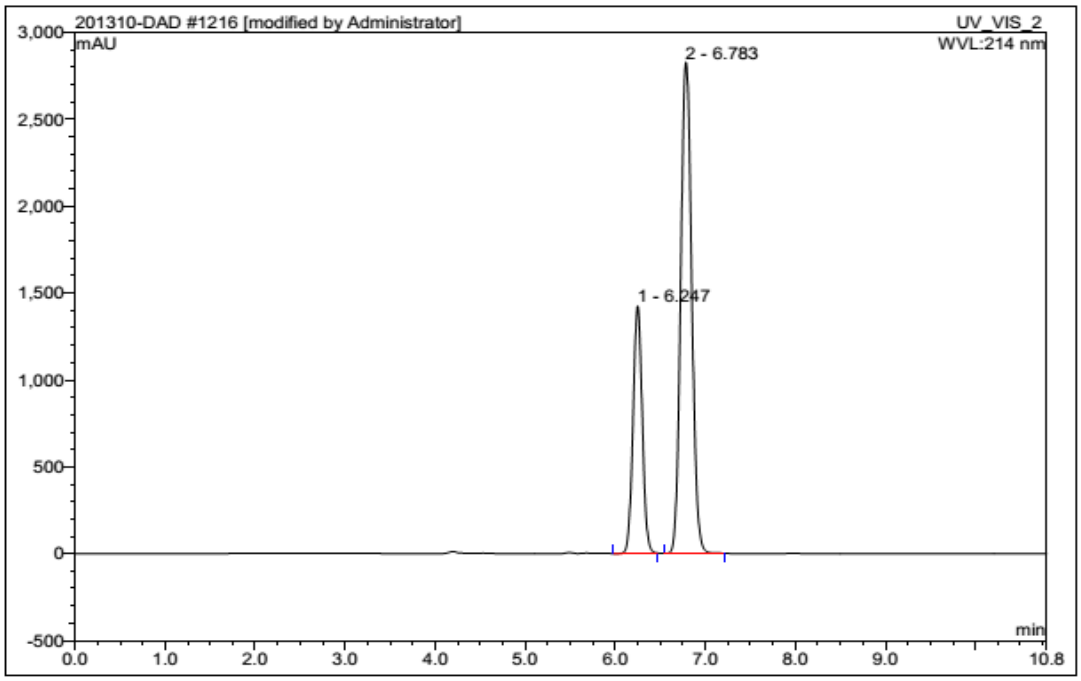



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.88 | n.a. | 40.260 | 4.890 | 79.75 | n.a. | BMB |
| 2 | 7.51 | n.a. | 9.242 | 1.242 | 20.25 | n.a. | BMB |
| Total: | | | 49.502 | 6.131 | 100.00 | 0.000 | |

**(+)-1-phenyl-3-o-tolylbut-3-en-1-ol (26)**

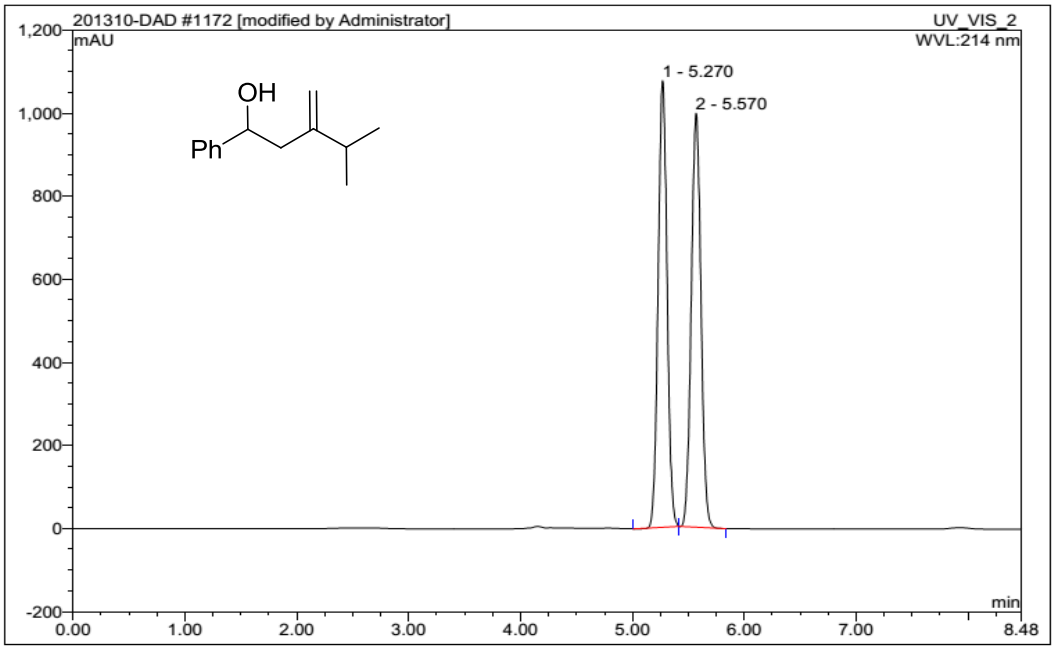



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.25 | n.a. | 314.888 | 37.695 | 50.60 | n.a. | BMb* |
| 2 | 6.79 | n.a. | 275.564 | 36.801 | 49.40 | n.a. | bMB* |
| Total: | | | 590.452 | 74.496 | 100.00 | 0.000 | |

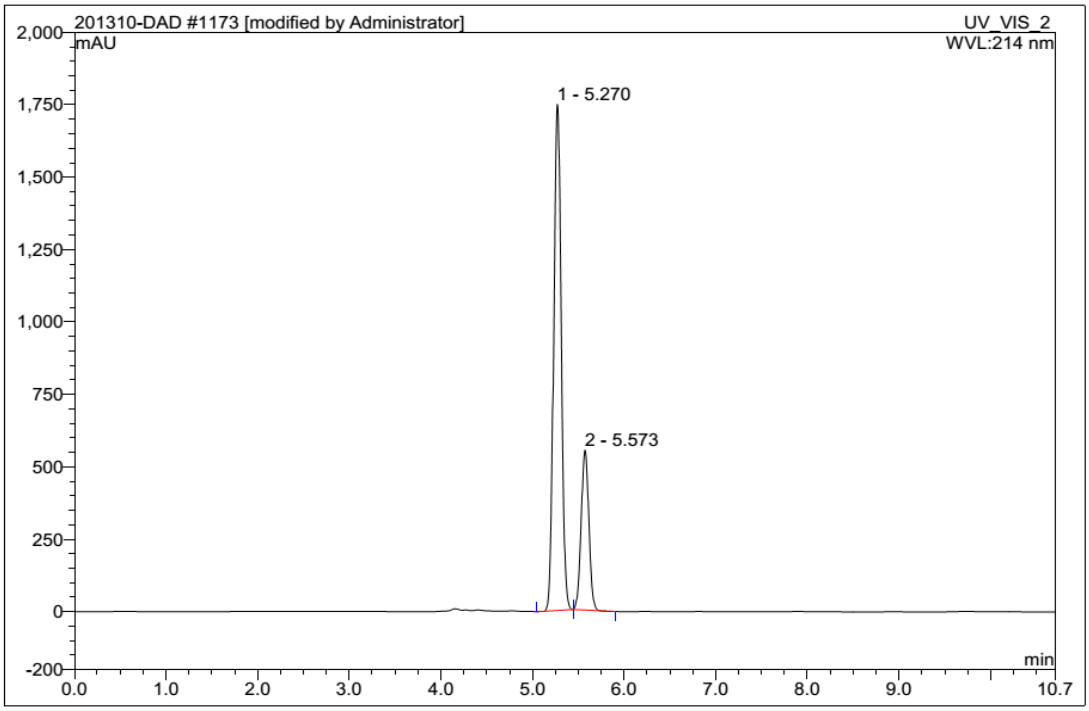



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 6.25 | n.a. | 1423.438 | 169.708 | 29.65 | n.a. | BMB* |
| 2 | 6.78 | n.a. | 2827.475 | 402.592 | 70.35 | n.a. | BMB* |
| Total: | | | 4250.913 | 572.300 | 100.00 | 0.000 | |

## (-)-4-methyl-3-methylene-1-phenylpentan-1-ol (27)

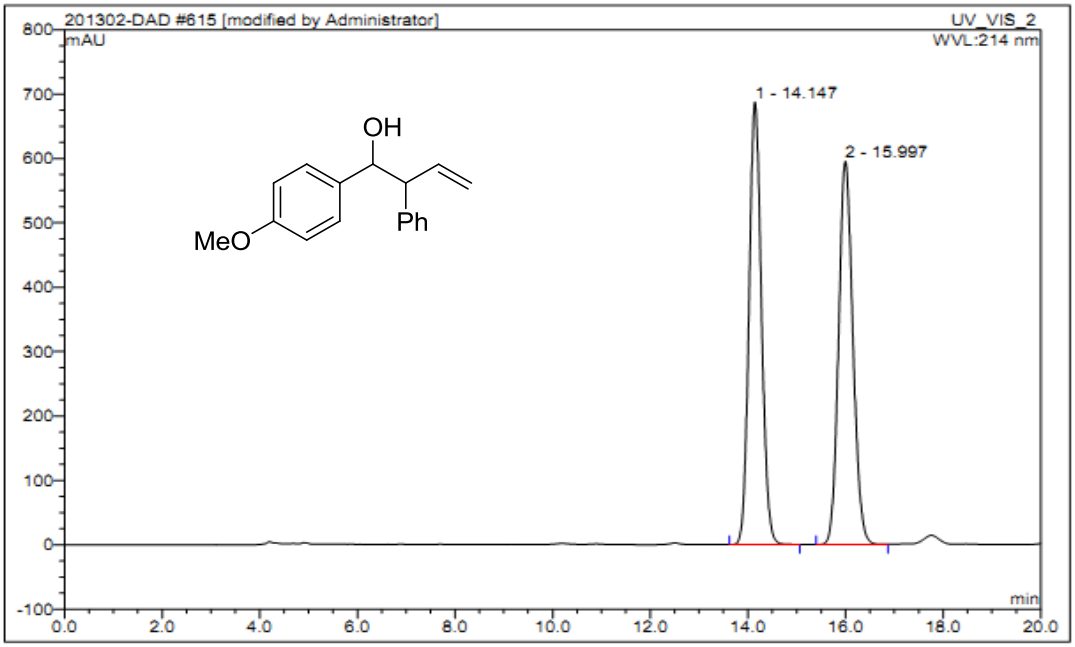



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 5.27 | n.a. | 1075.557 | 99.499 | 49.92 | n.a. | BMb* |
| 2 | 5.57 | n.a. | 997.549 | 99.823 | 50.08 | n.a. | bMB* |
| Total: | | | 2073.106 | 199.322 | 100.00 | 0.000 | |

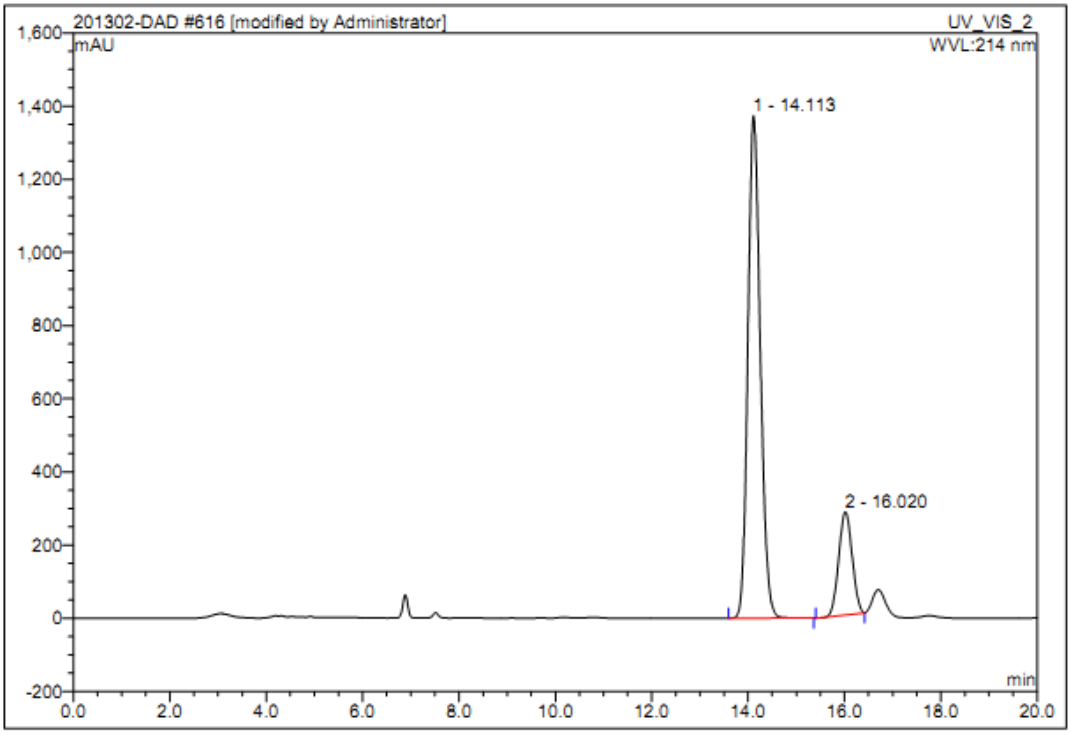



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 5.27 | n.a. | 1747.876 | 166.810 | 75.39 | n.a. | BMb* |
| 2 | 5.57 | n.a. | 552.778 | 54.457 | 24.61 | n.a. | bMB* |
| **Total:** | | | 2300.654 | 221.267 | 100.00 | 0.000 | |

## *anti*-1-(4-Methoxyphenyl)-2-phenylbut-3-en-1-ol (28)

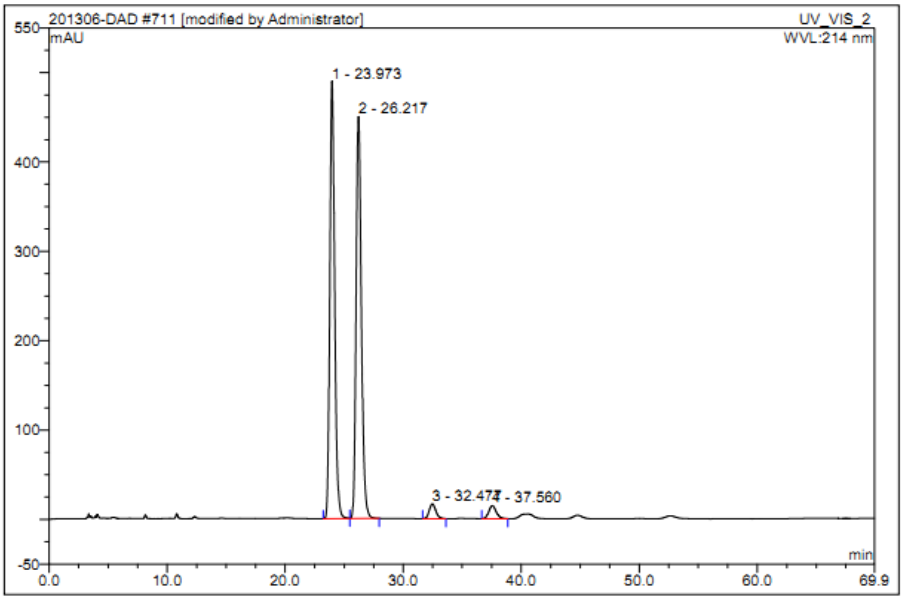



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 14.15 | n.a. | 687.538 | 202.371 | 50.03 | n.a. | BMB |
| 2 | 16.00 | n.a. | 595.411 | 202.159 | 49.97 | n.a. | BMB* |
| **Total:** | | | 1282.949 | 404.530 | 100.00 | 0.000 | |

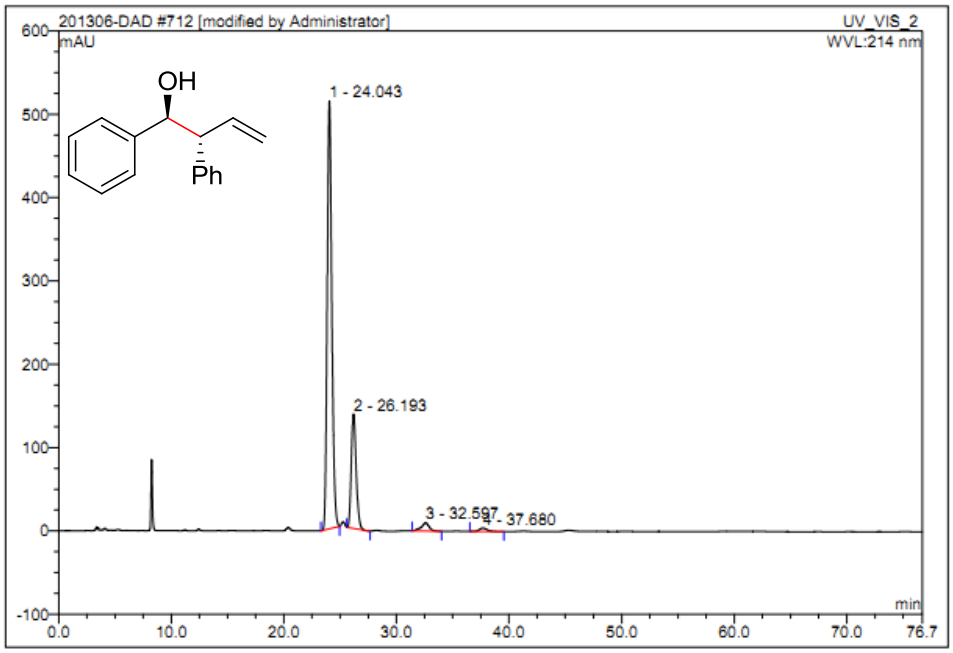



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 14.11 | n.a. | 1374.186 | 408.941 | 81.85 | n.a. | BMB |
| 2 | 16.02 | n.a. | 282.014 | 90.693 | 18.15 | n.a. | BMB* |
| Total: | | | 1656.200 | 499.635 | 100.00 | 0.000 | |

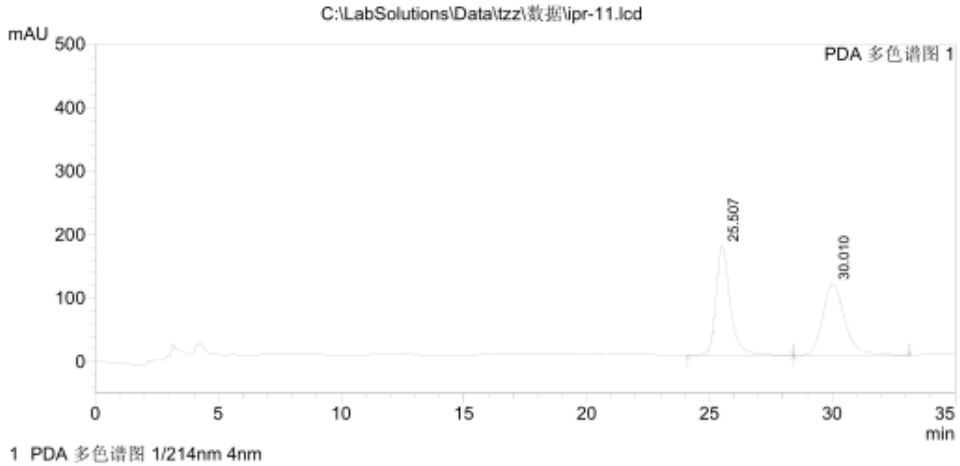
**(1S,2R)-(-)-1,2-Diphenylbut-3-en-1-ol (29)**




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 23.97 | n.a. | 489.449 | 233.362 | 47.81 | n.a. | BM |
| 2 | 26.22 | n.a. | 449.714 | 233.497 | 47.83 | n.a. | MB |
| 3 | 32.48 | n.a. | 16.715 | 10.662 | 2.18 | n.a. | BMB |
| 4 | 37.56 | n.a. | 14.452 | 10.616 | 2.17 | n.a. | BMB |
| Total: | | | 970.329 | 488.137 | 100.00 | 0.000 | |



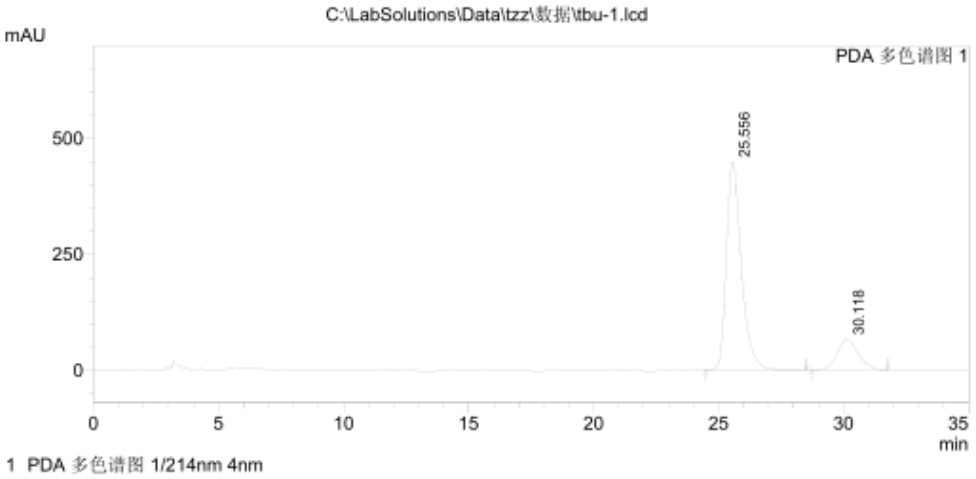

| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 24.04 | n.a. | 513.854 | 245.129 | 75.39 | n.a. | BMB* |
| 2 | 26.19 | n.a. | 137.104 | 68.880 | 21.18 | n.a. | BMB* |
| 3 | 32.60 | n.a. | 10.008 | 8.058 | 2.48 | n.a. | BMB* |
| 4 | 37.68 | n.a. | 4.050 | 3.077 | 0.95 | n.a. | BMB* |
| Total: | | | 665.016 | 325.143 | 100.00 | 0.000 | |




1 PDA 多色谱图 1/214nm 4nm

**PDA Ch1 214nm 4nm**

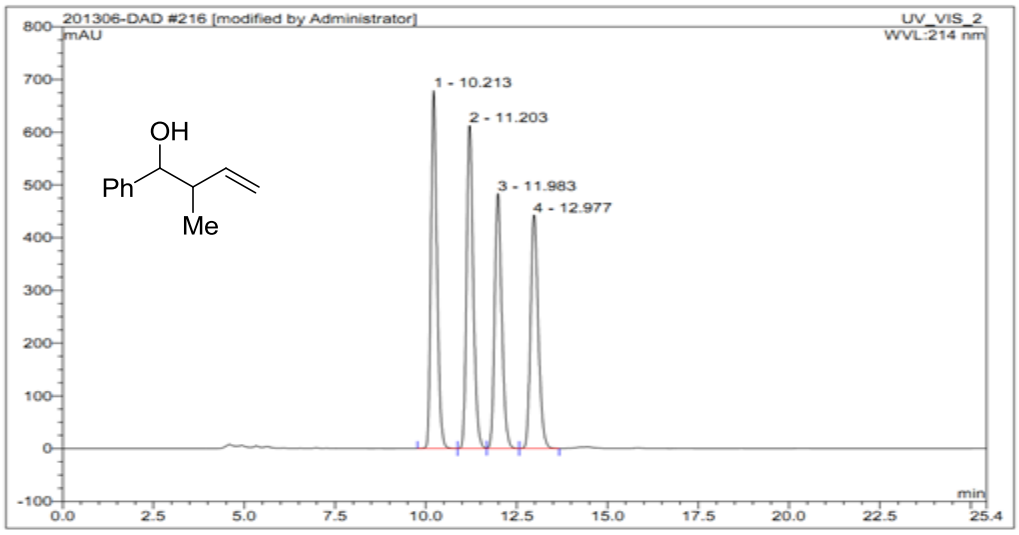
| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 25.507 | 7092318 | 172969 | 49.949 | 60.543 |
| 2 | 30.010 | 7106896 | 112729 | 50.051 | 39.457 |
| 总计 | | 14199215 | 285698 | 100.000 | 100.000 |



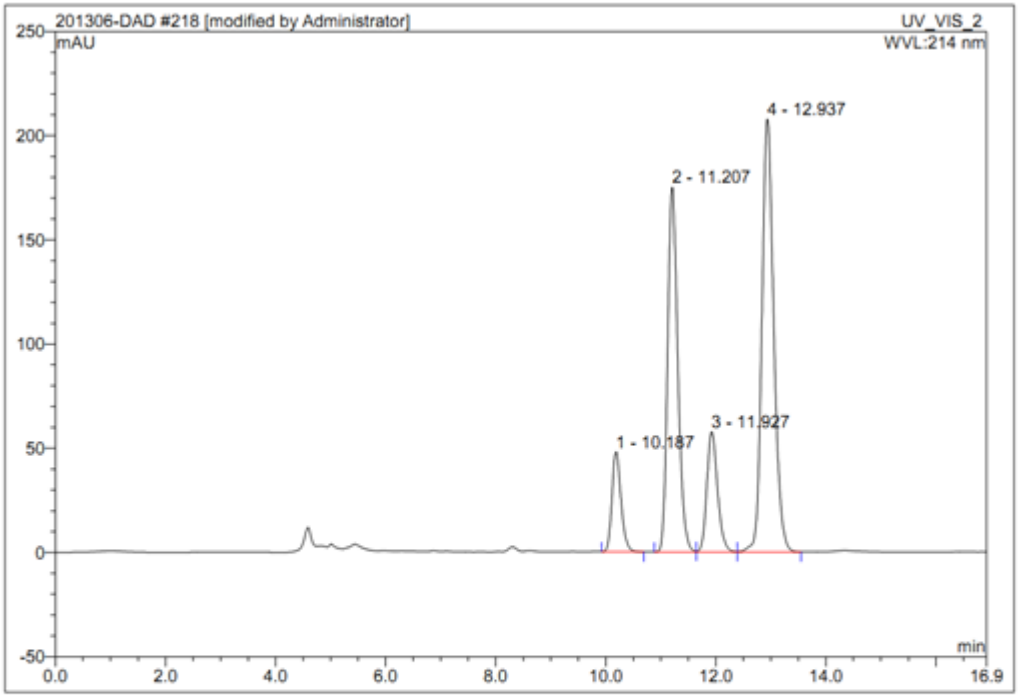

**PDA Ch1 214nm 4nm**

| Peak# | Resolution Time | Area | Height | Area % | Height % |
|---|---|---|---|---|---|
| 1 | 25.556 | 18627474 | 449591 | 82.615 | 87.123 |
| 2 | 30.118 | 3919789 | 66449 | 17.385 | 12.877 |
| 总计 | | 22547262 | 516040 | 100.000 | 100.000 |

## 2-Methyl-1-phenylbut-3-en-1-ol (30)
## For (Table 3, entry 4)

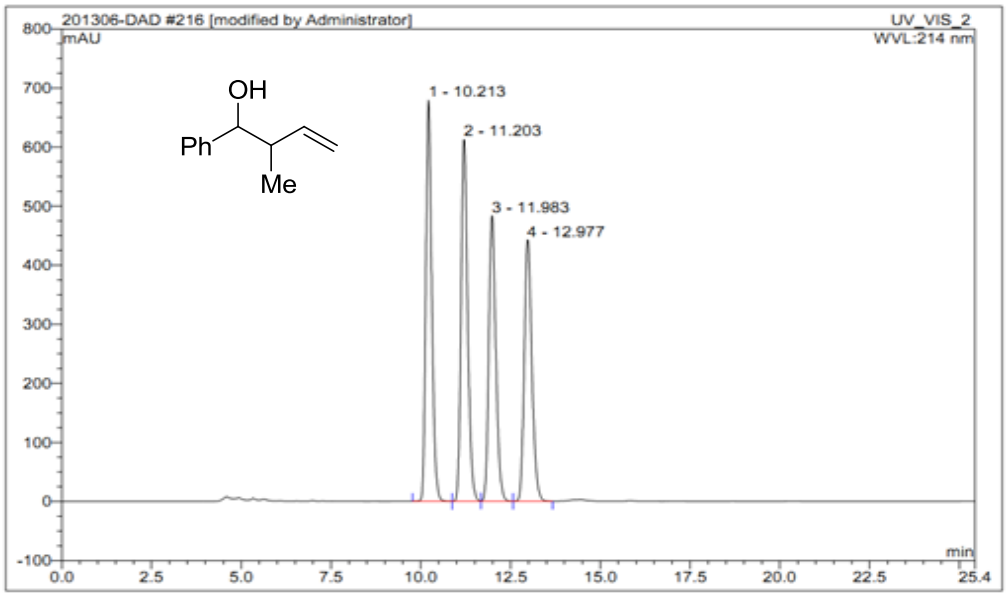



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 10.21 | n.a. | 679.166 | 130.605 | 27.18 | n.a. | BM * |
| 2 | 11.20 | n.a. | 612.951 | 130.737 | 27.21 | n.a. | M * |
| 3 | 11.98 | n.a. | 483.892 | 109.886 | 22.87 | n.a. | M * |
| 4 | 12.98 | n.a. | 442.822 | 109.313 | 22.75 | n.a. | MB* |
| Total: | | | 2218.831 | 480.540 | 100.00 | 0.000 | |

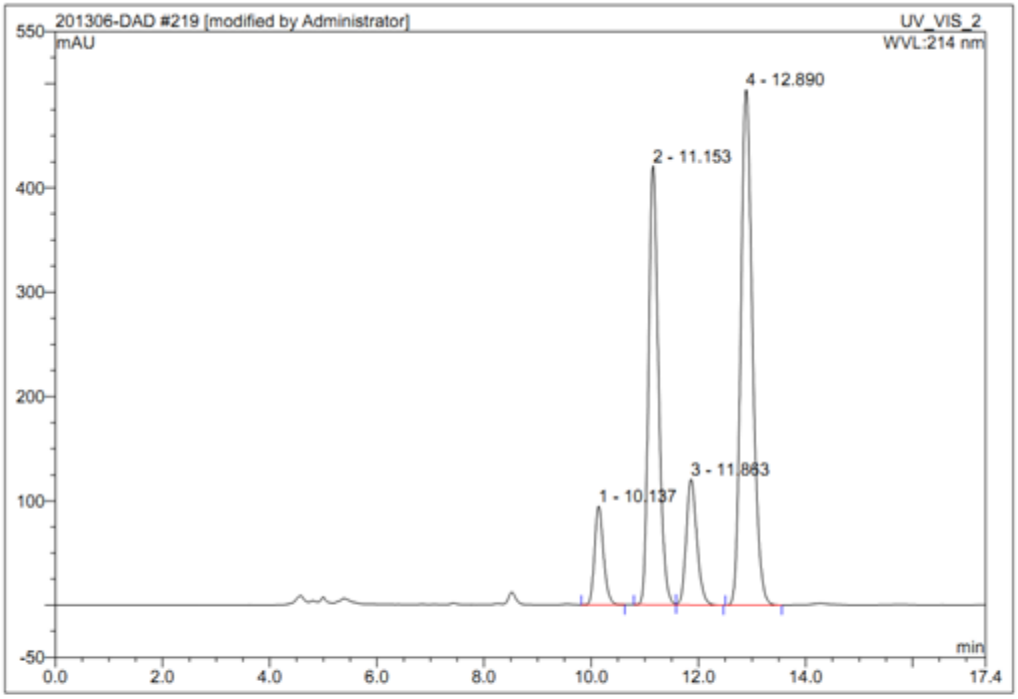



| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 10.19 | n.a. | 48.033 | 9.206 | 8.24 | n.a. | BMB |
| 2 | 11.21 | n.a. | 175.214 | 37.567 | 33.61 | n.a. | BM |
| 3 | 11.93 | n.a. | 57.838 | 13.051 | 11.68 | n.a. | M |
| 4 | 12.94 | n.a. | 207.803 | 51.955 | 46.48 | n.a. | MB |
| Total: | | | 488.889 | 111.779 | 100.00 | 0.000 | |

**For (Table 3, entry 5)**




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 10.21 | n.a. | 679.166 | 130.605 | 27.18 | n.a. | BM * |
| 2 | 11.20 | n.a. | 612.951 | 130.737 | 27.21 | n.a. | M * |
| 3 | 11.98 | n.a. | 483.892 | 109.886 | 22.87 | n.a. | M * |
| 4 | 12.98 | n.a. | 442.822 | 109.313 | 22.75 | n.a. | MB* |
| Total: | | | 2218.831 | 480.540 | 100.00 | 0.000 | |




| No. | Ret.Time min | Peak Name | Height mAU | Area mAU*min | Rel.Area % | Amount | Type |
|---|---|---|---|---|---|---|---|
| 1 | 10.14 | n.a. | 94.665 | 18.360 | 7.01 | n.a. | BMB |
| 2 | 11.15 | n.a. | 421.204 | 90.847 | 34.66 | n.a. | BM |
| 3 | 11.86 | n.a. | 120.681 | 27.846 | 10.62 | n.a. | MB |
| 4 | 12.89 | n.a. | 494.483 | 125.031 | 47.71 | n.a. | BMB |
| **Total:** | | | 1131.033 | 262.083 | 100.00 | 0.000 | |