Electronic Supplementary Material (ESI) for RSC Advances.

Enantioselective Addition of $Ti(O^iPr)_3$ to Aldehydes Catalyzed by a Titanium Complex of an *N*-sulfonylated Amino Alcohol

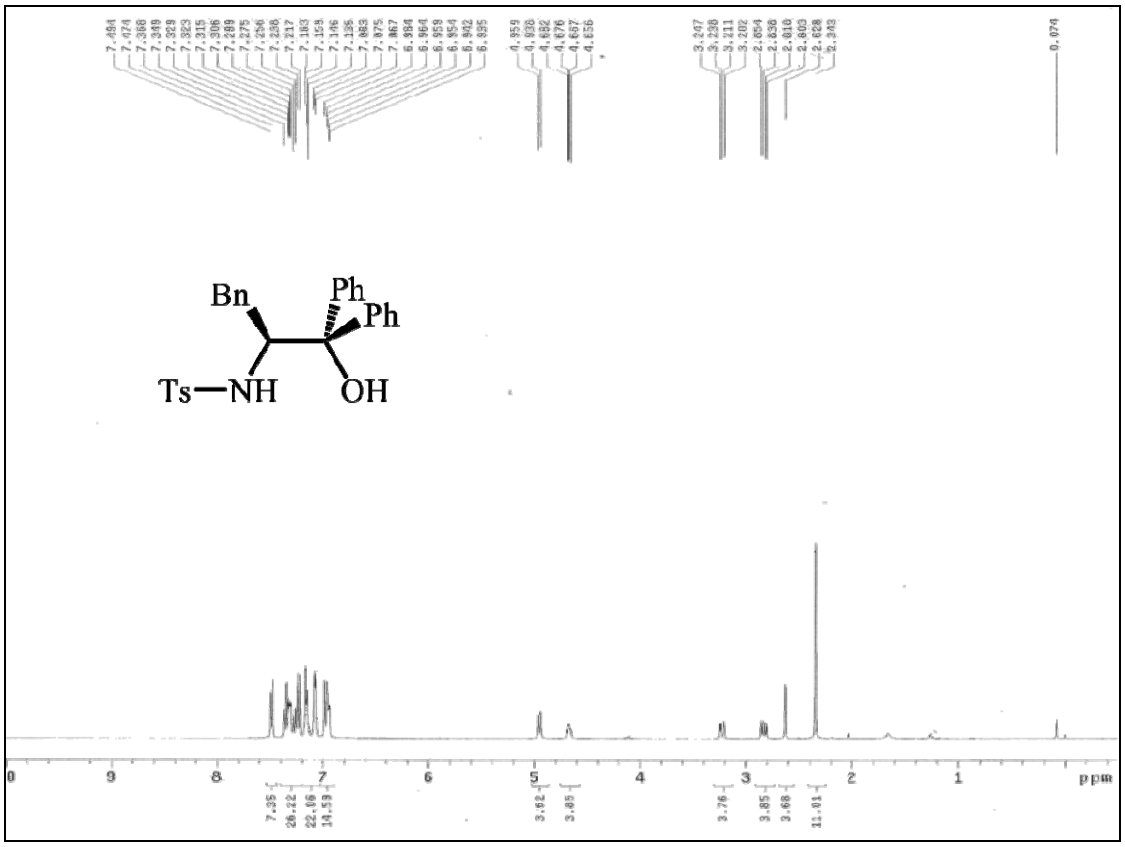
Shih-Ju Chang,[a] Shuangliu Zhou,*[,b] and Han-Mou Gau*[,a]

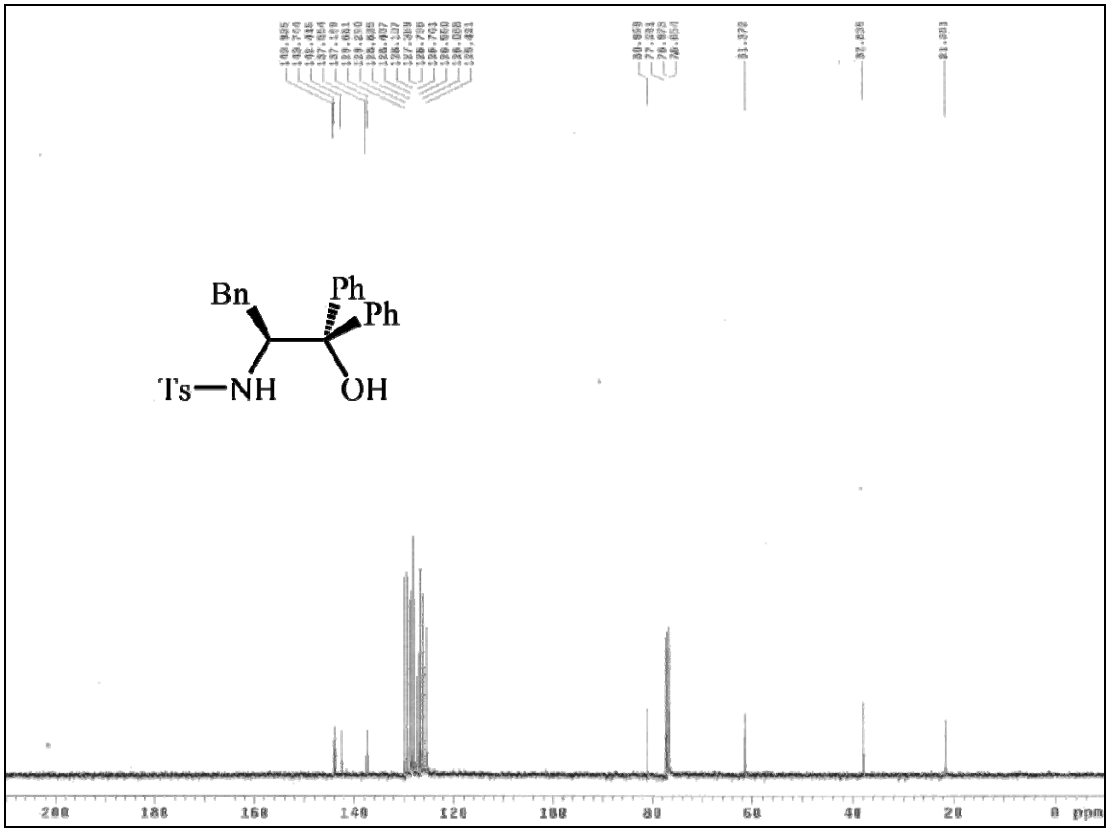
[a]*Department of Chemistry, National Chung Hsing University, Taichung 402, Taiwan*

[b]*Anhui Key Laboratory of Functional Molecular Solids, College of Chemistry and Materials Science, Anhui Normal University, Wuhu, Anhui 241000, China*

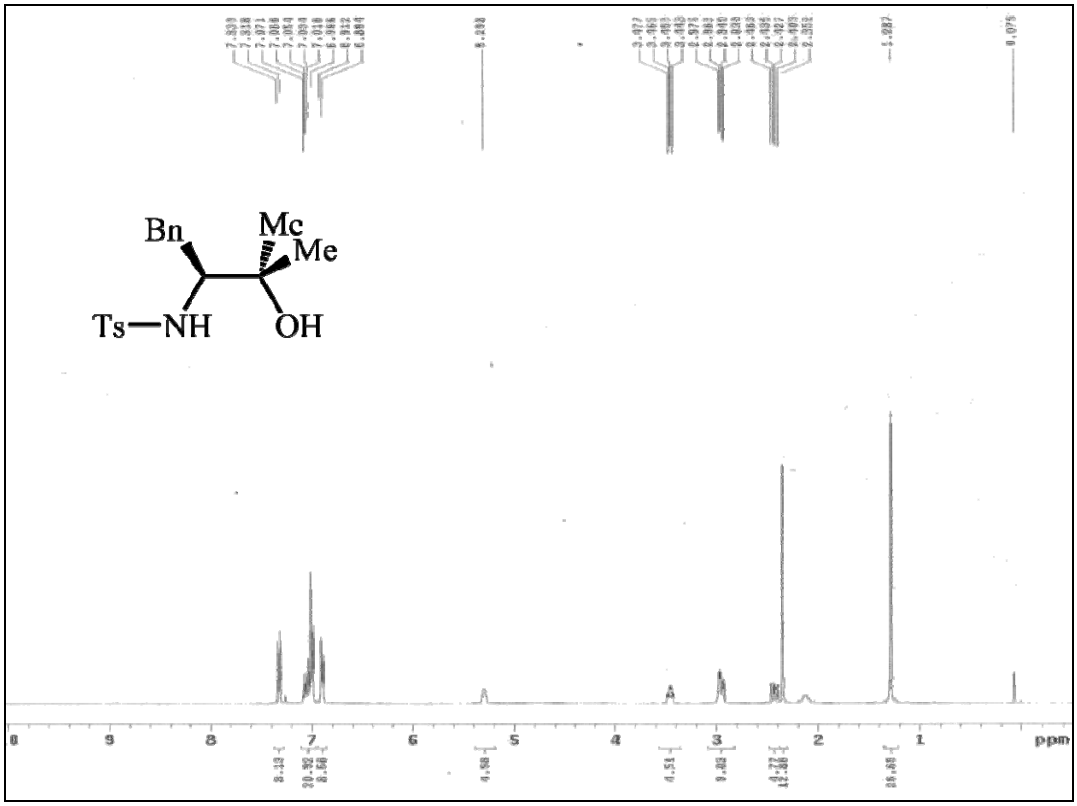
E-mail: slzhou@mail.ahnu.edu.cn; hmgau@dragon.nchu.edu.tw

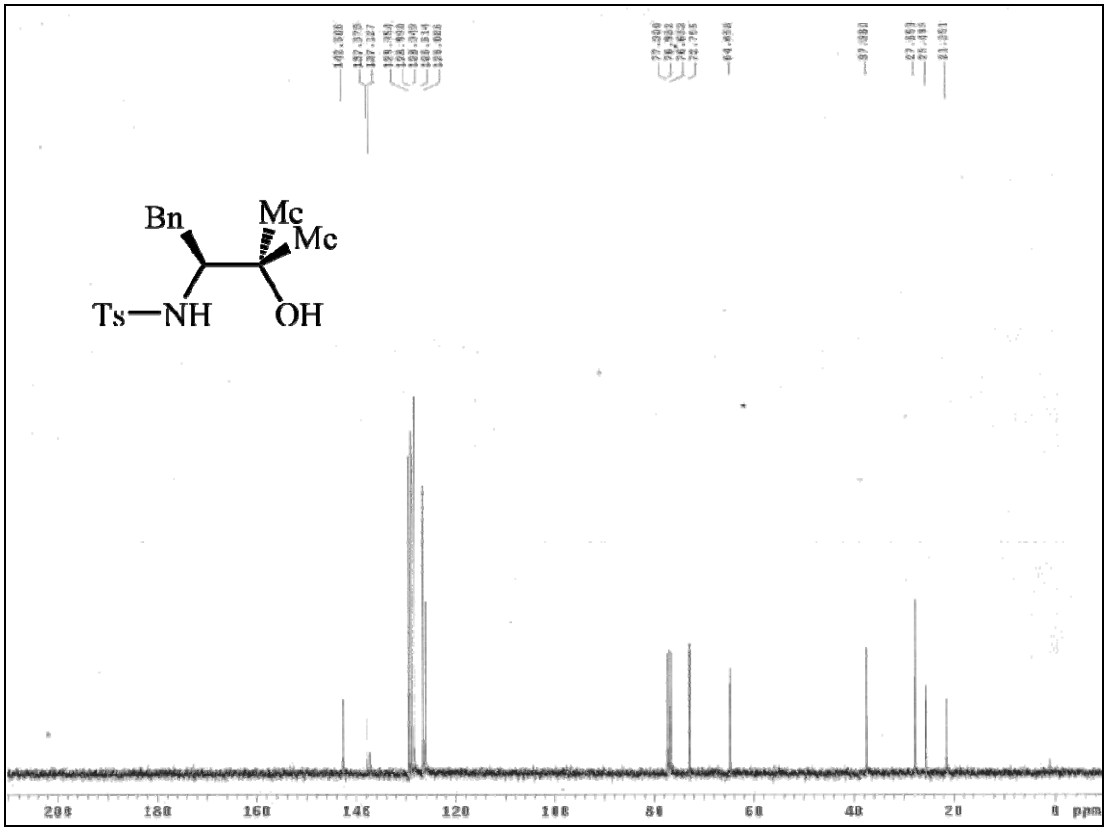
(*S*)-2-(*p*-Toluenesulfonylamino)-1,1,3-triphenyl-1-propanol (1a)



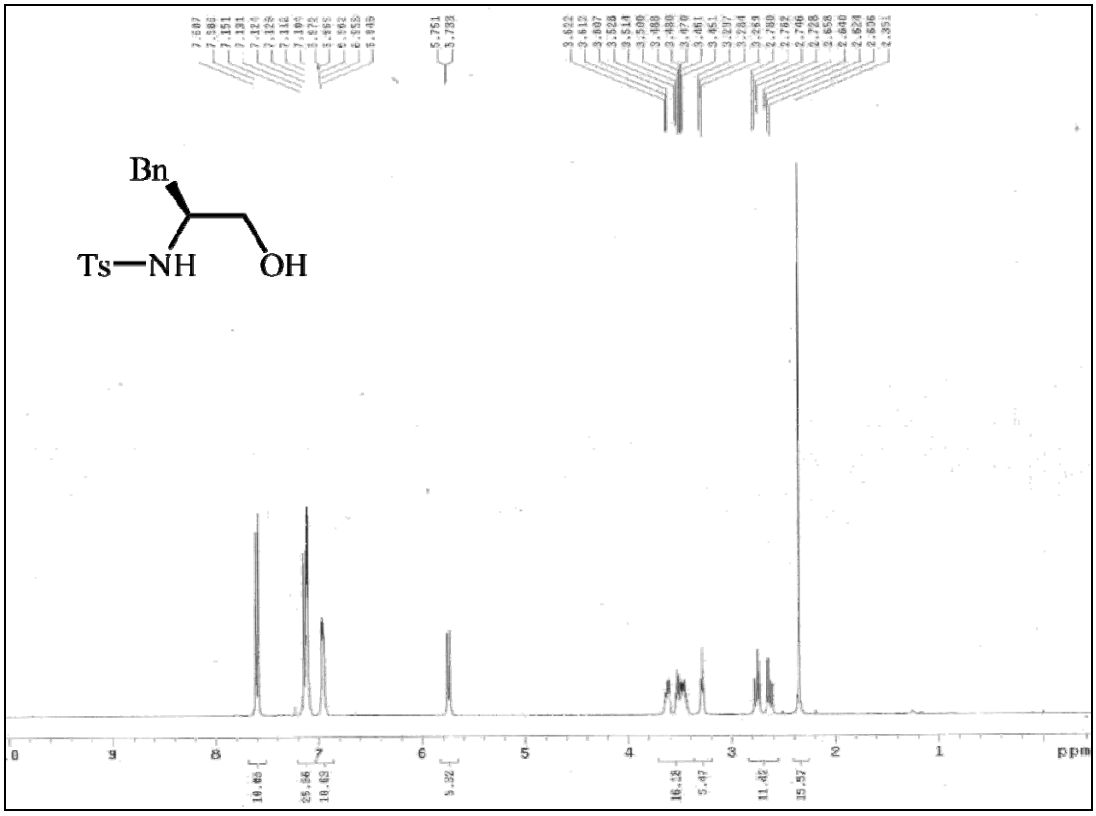


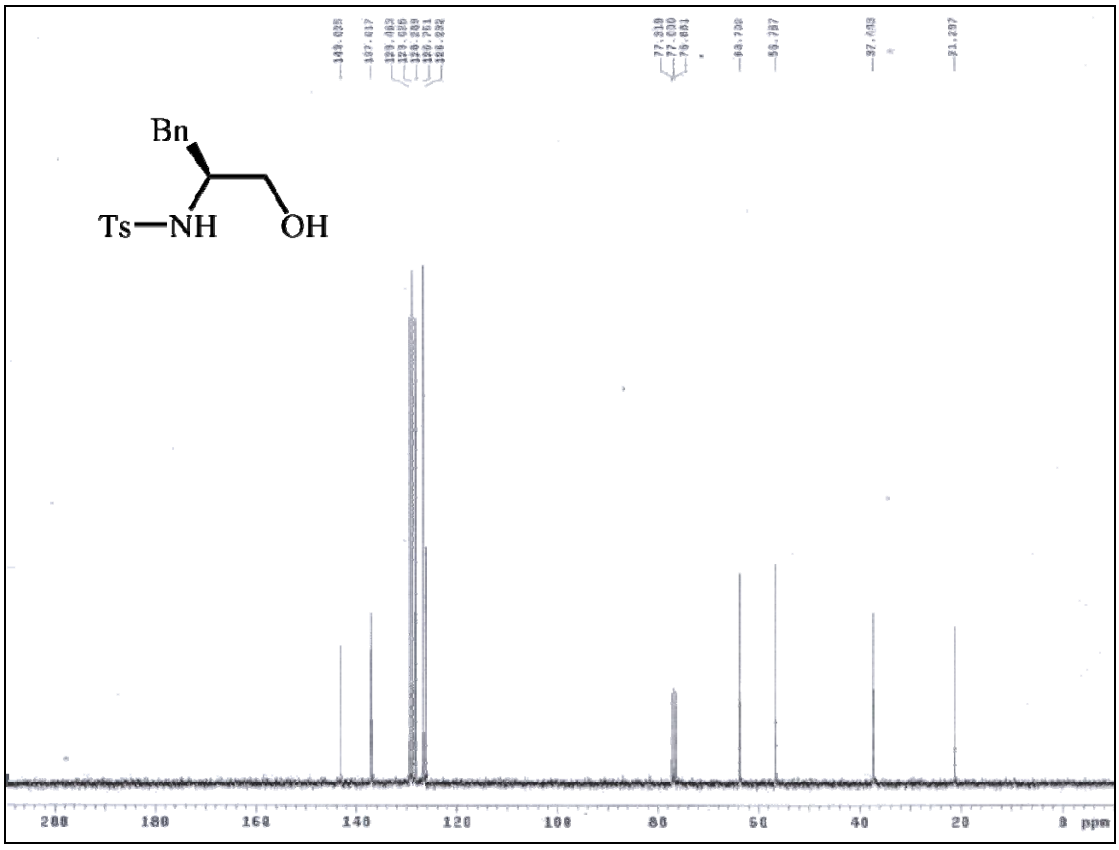
(*S*)-3-(*p*-Toluenesulfonylamino)-2-methyl-4-phenyl-2-butanol (1b).



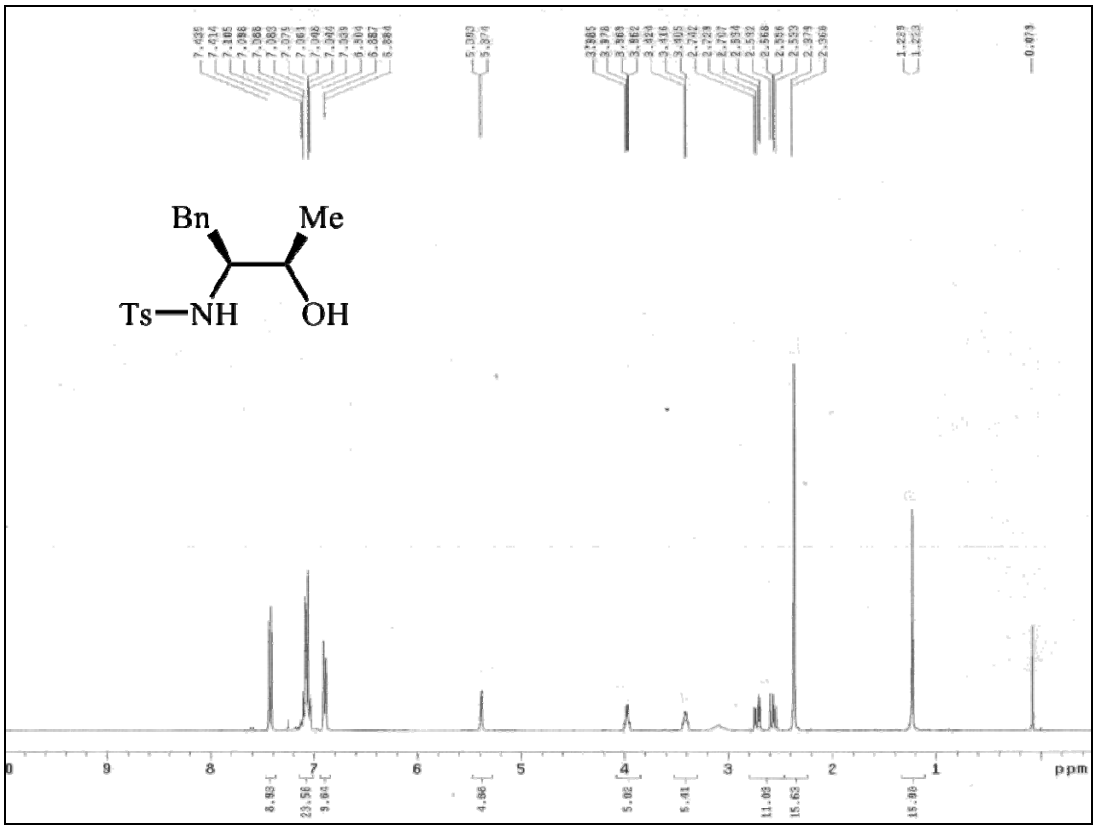


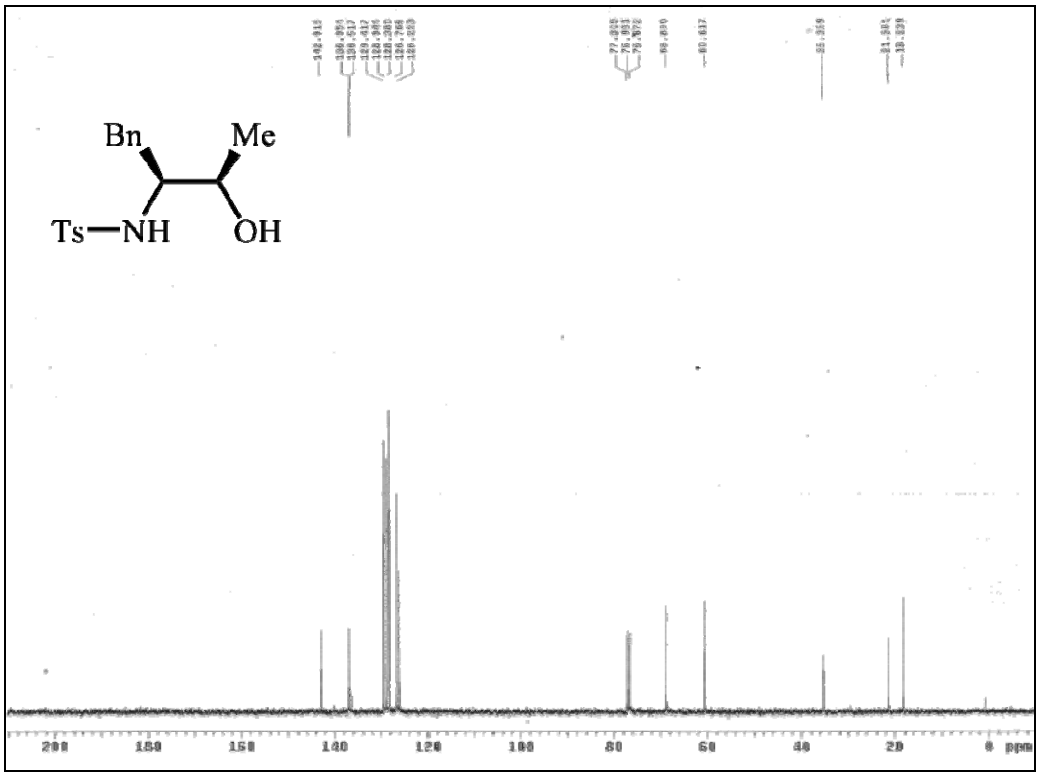
(*S*)-3-phenyl-2-(*p*-Toluenesulfonylamino)-1-propanol (1c).



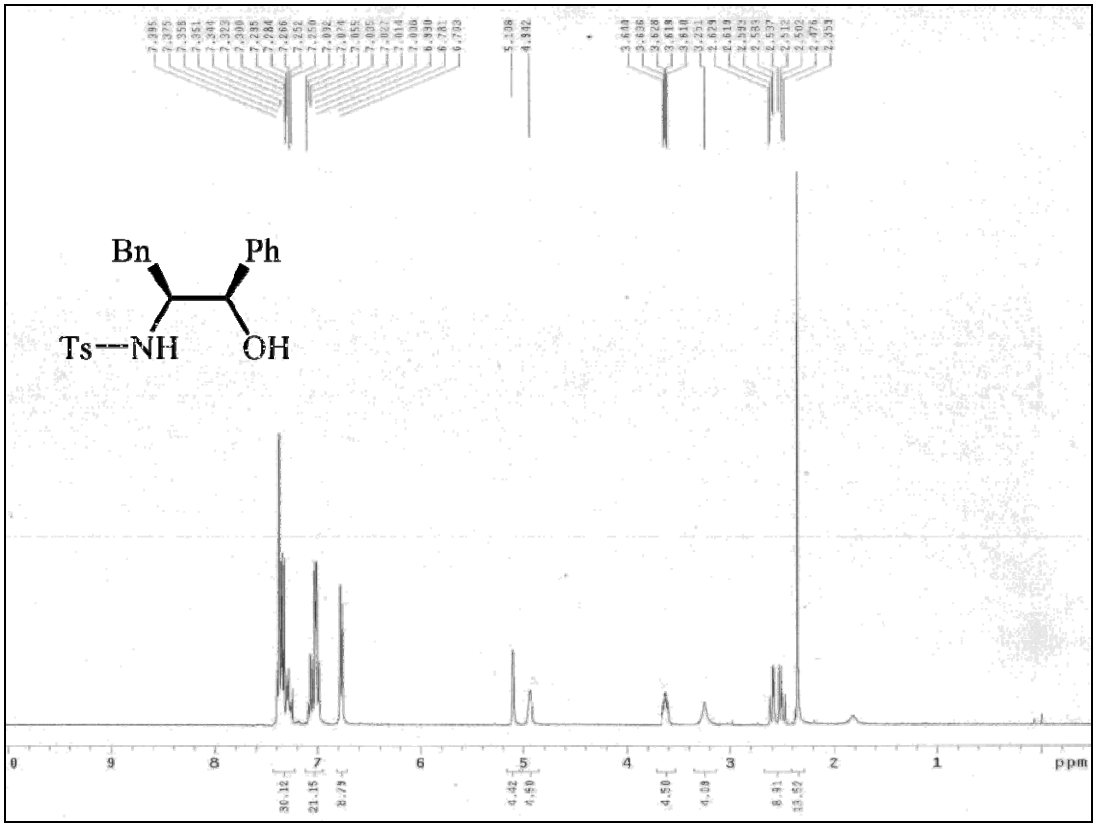


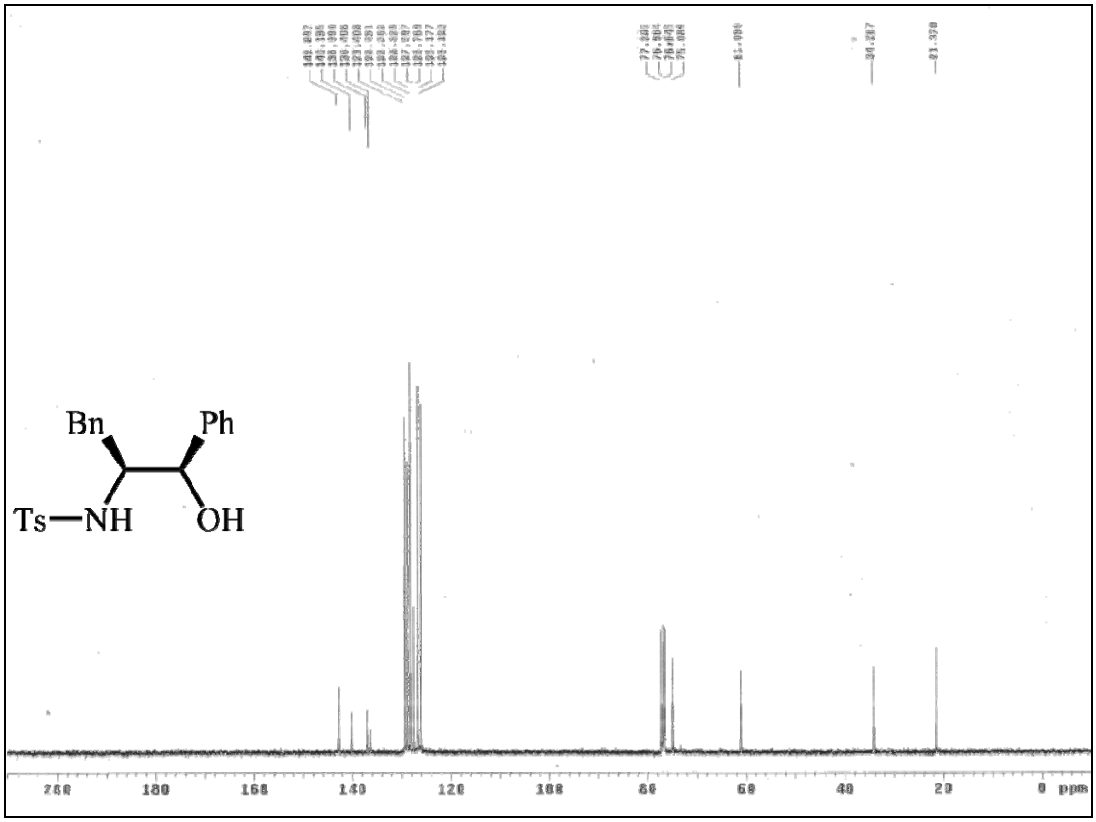
(2*R*,3*S*)-3-(*p*-Toluenesulfonylamino)-4-phenyl-2-butanol (**1d**).



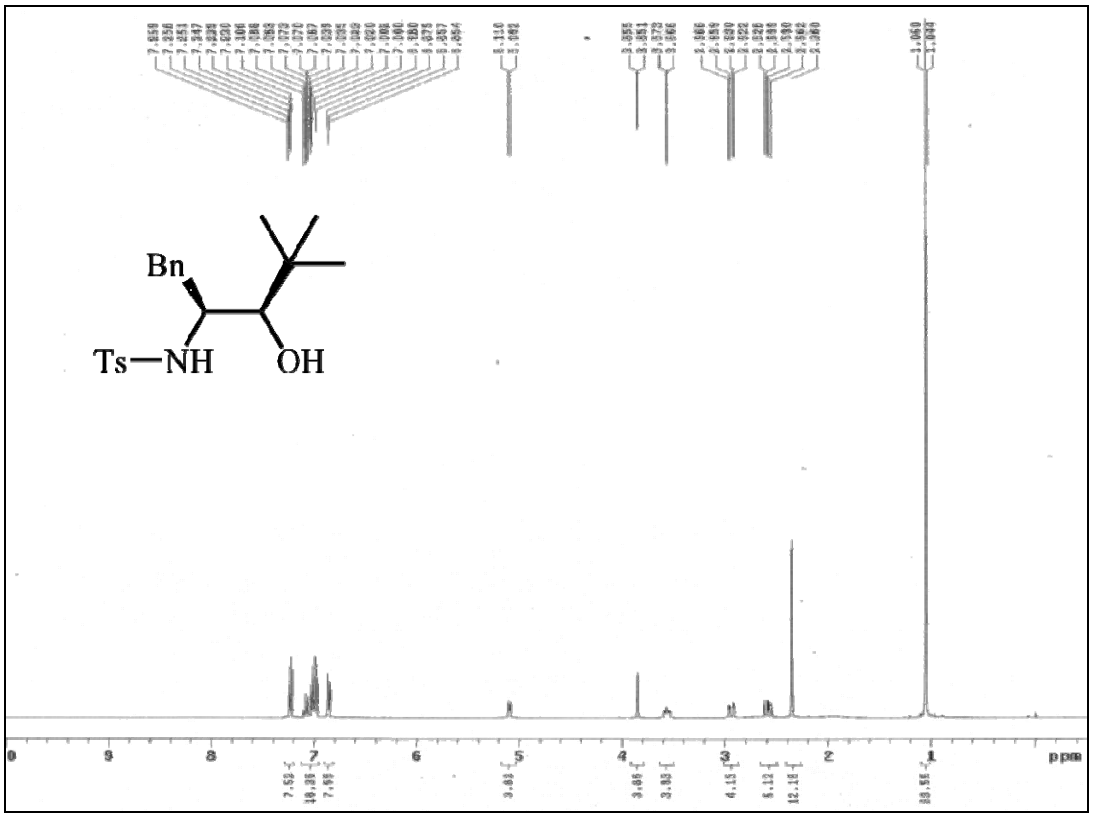


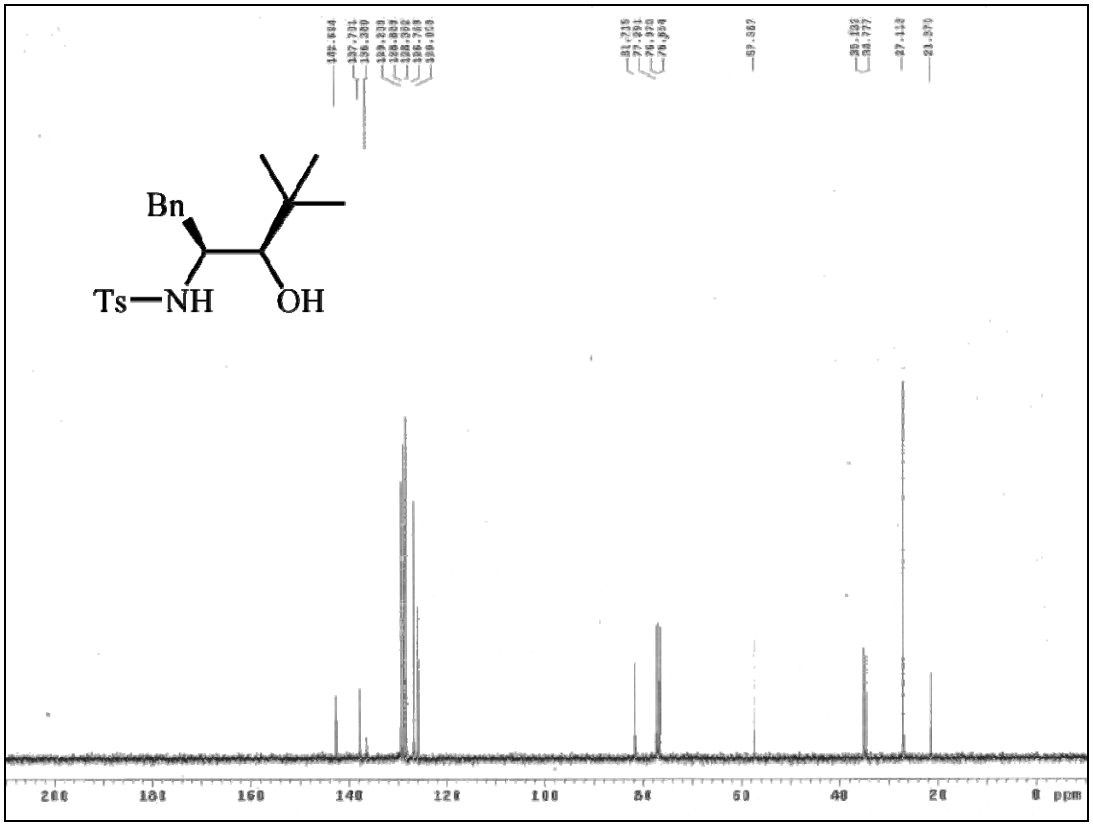
(1*R*,2*S*)-2-(*p*-Toluenesulfonylamino)-1,3-diphenyl-1-propanol (1e).



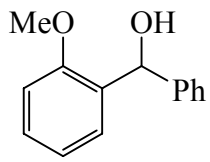


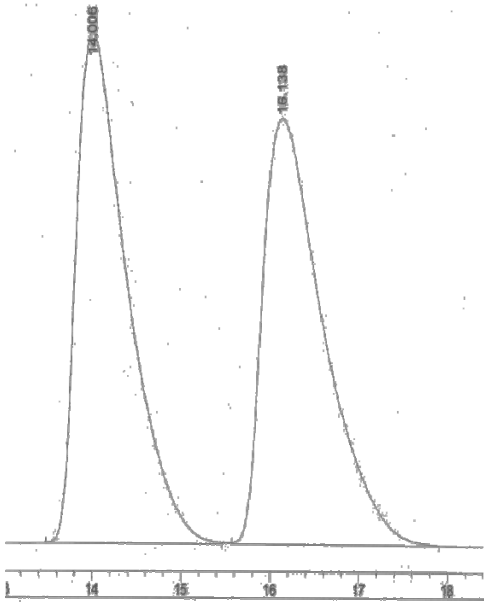
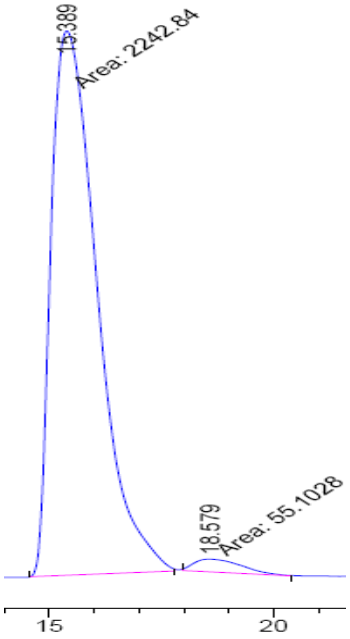
(3*R*,4*S*)-4-(*p*-Toluenesulfonylamino)-2,2-dimethyl-5-phenyl-3-pentanol (1f)





(2-Methoxy-phenyl)-phenyl-methanol (**4a)** (Table 2, entry 1; 95% ee)**.**

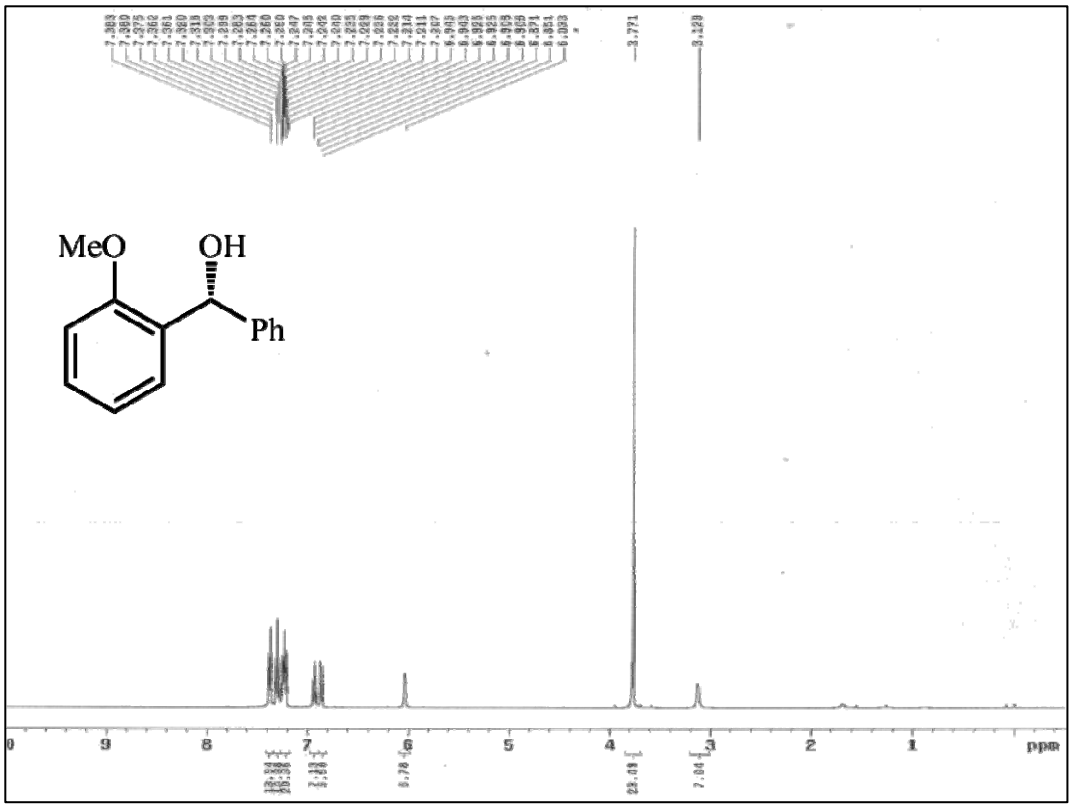
	Column:	Chiralcel OJ
	Eluent:	Hexane/IPA = 90/10
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	14.006 min (*R*), 16.138 min (*S*)

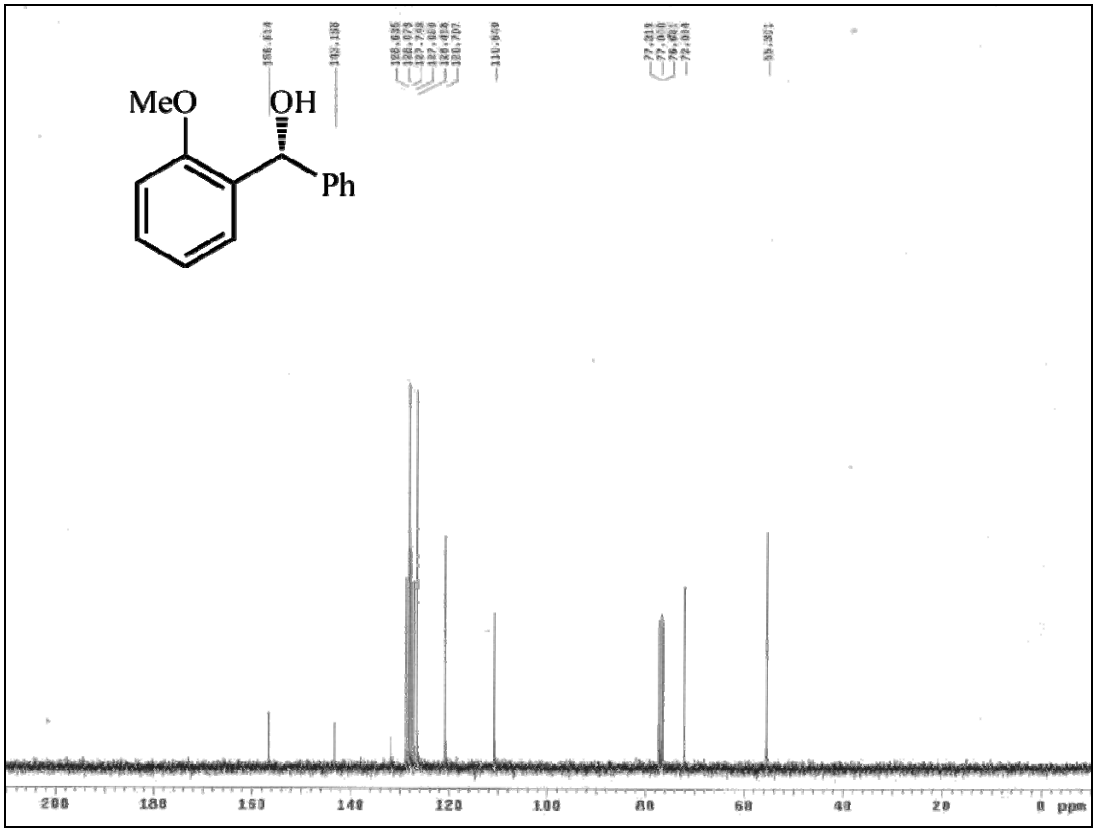
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	14.006	16.138	Time	15.389	18.579
Height(mAU)	62.690	52.299	Height(mAU)	31.450	7.39454e-1
Area(mAU-s)	2490.158	2469.972	Area(mAU-s)	2242.836	55.103
Area%	50.204	49.797	Area%	97.602	2.398

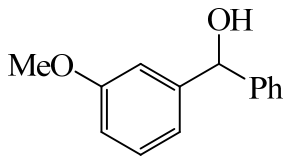
Spectrum Data:

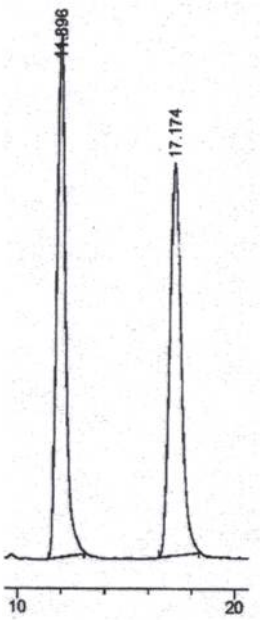
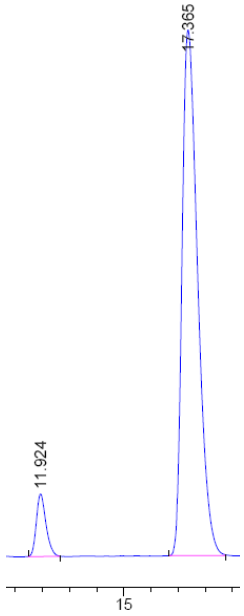
$[\alpha]^{25}_{D}$ = +47.84 (c 1.08, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.38-7.21 (m, 7H, *Ar*), 6.94-6.85 (m, 2H, *Ar*), 6.03 (s, 1H, C*H*O), 3.77 (s, 3H, OCH_3), 3.12 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 156.6, 143.2, 131.9, 128.6, 128.1, 127.7, 127.1, 126.5, 120.7, 110.6, 72.1, 55.3 ppm.


MeO
OH
Ph
ppm


MeO
OH
Ph
ppm

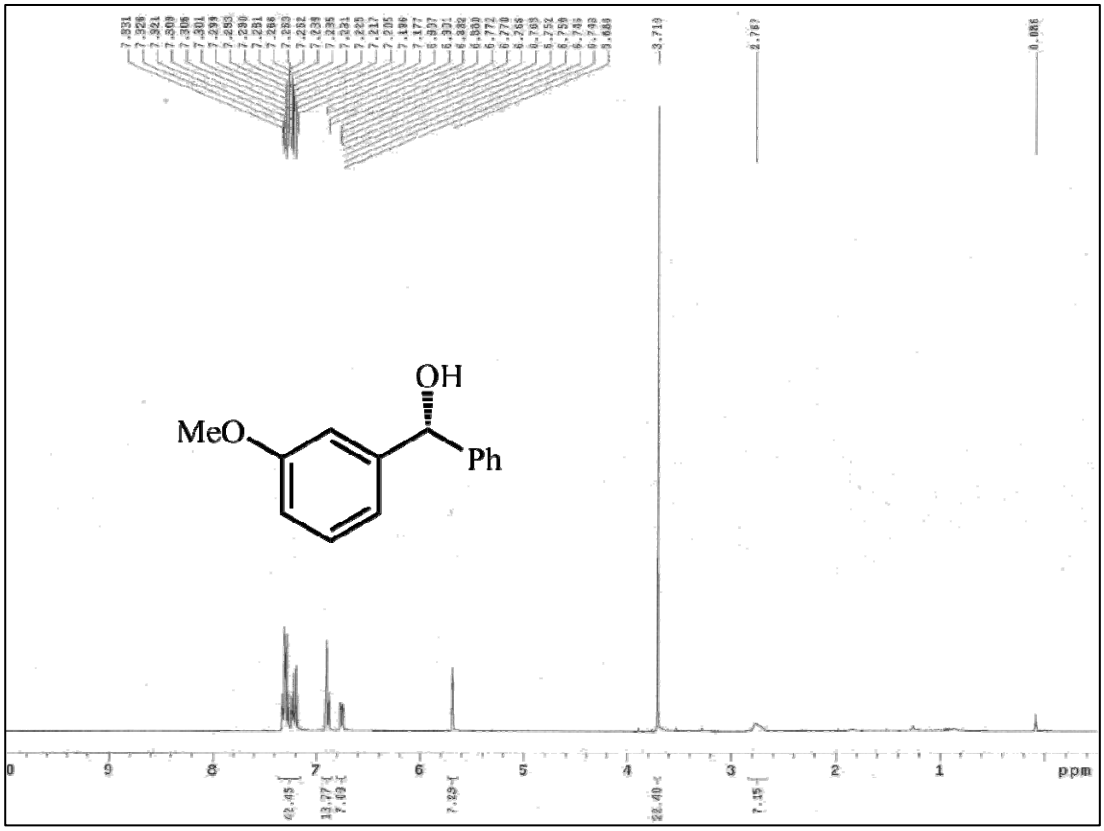
(3-Methoxy-phenyl)-phenyl-methanol (**4b**) (Table 2, entry 2; 86% ee).

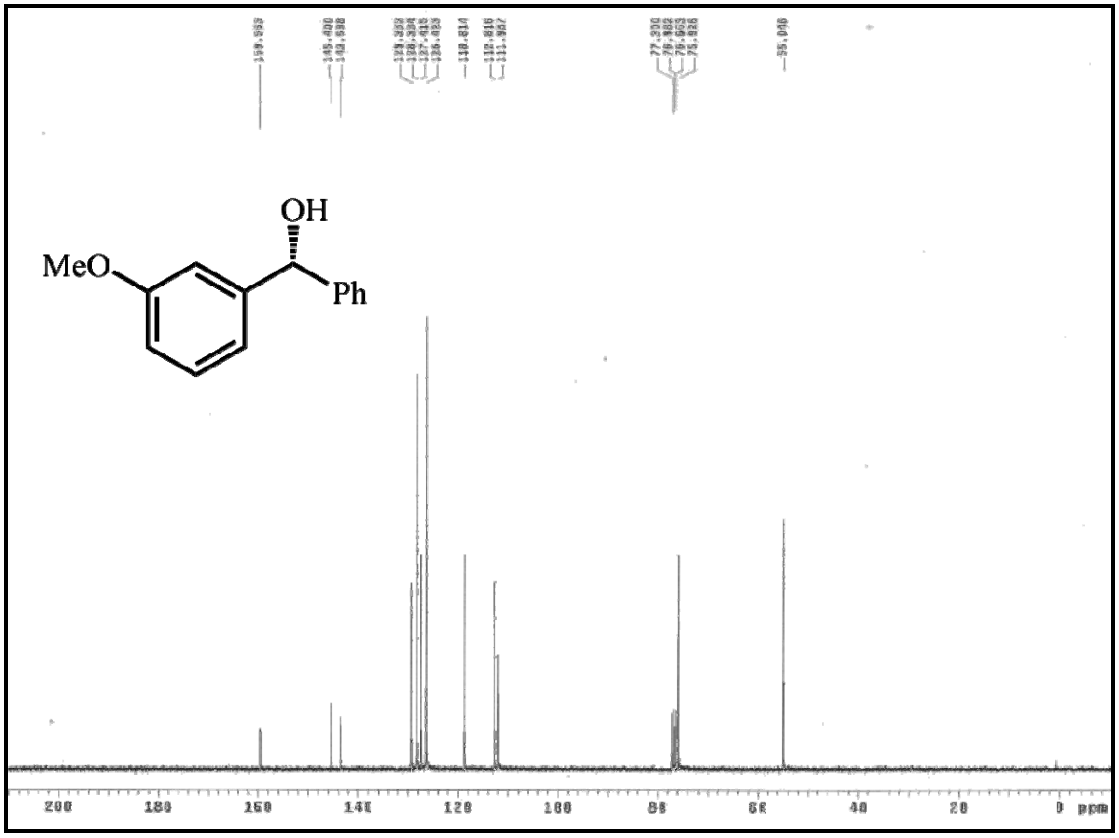
	Column:	Chiralcel OD
	Eluent:	Hexane/IPA = 90/10
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	11.896 min (*S*), 17.174 min (*R*)

Racemic standard			Catalytic Reaction Product		
					
Peak No.	1	2	Peak No.	1	2
Time	11.896	17.174	Time	11.924	17.365
Height(mAU)	19.375	14.599	Height(mAU)	5.658	47.466
Area(mAU-s)	539.127	537.623	Area(mAU-s)	140.367	1897.041
Area%	50.070	49.930	Area%	6.890	93.111

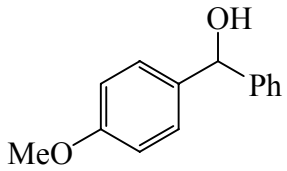
Spectrum Data:

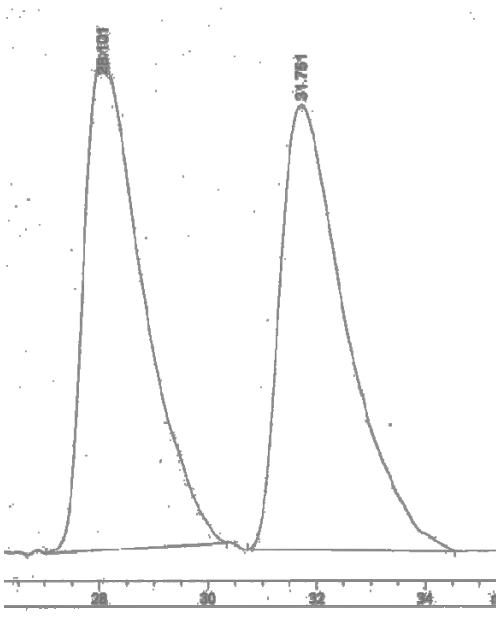
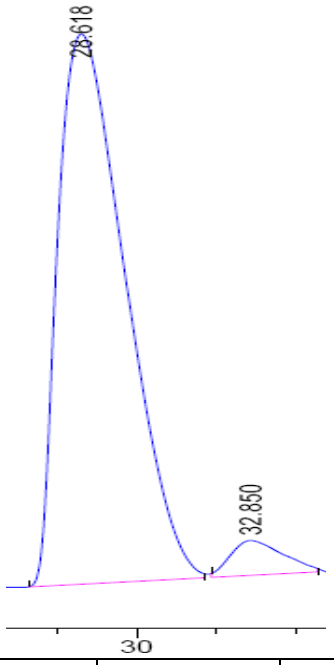
$[\alpha]^{25}_{D}$ = -15.23 (c 1.16, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.33-7.18 (m, 6H, *Ar*), 6.88-6.91 (m, 2H, *Ar*), 6.77-6.69 (m, 1H, *Ar*), 5.69 (s, 1H, C*H*O), 3.71 (s, 3H, OCH_3), 2.77 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 159.6, 145.4, 143.6, 129.4, 128.3, 127.4, 126.4, 118.8, 112.8, 112.0, 75.9, 55.0 ppm.


OH
MeO
Ph
ppm


OH
MeO
Ph
ppm

(4-Methoxy-phenyl)-phenyl-methanol (**4c**) (Table 2, entry 3, 92% ee).

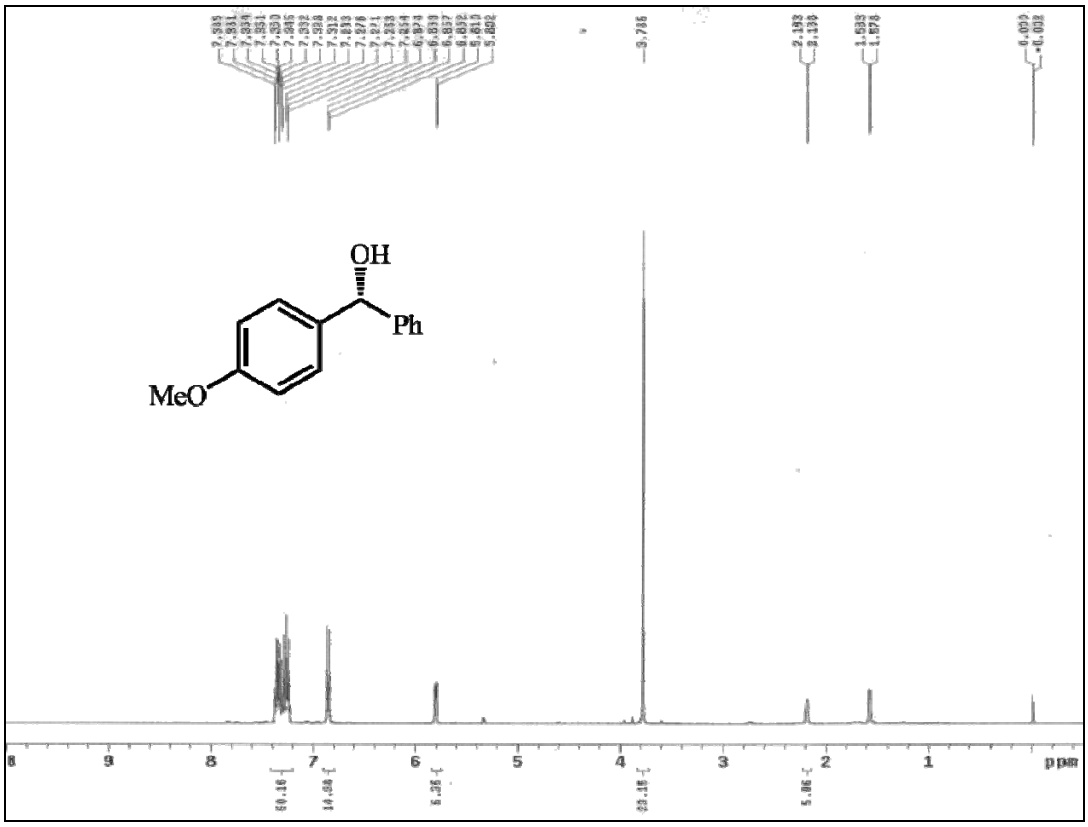
	Column:	Chiralcel OJ
	Eluent:	Hexane/IPA = 90/10
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	28.101 min (*R*), 31.751 min (*S*)

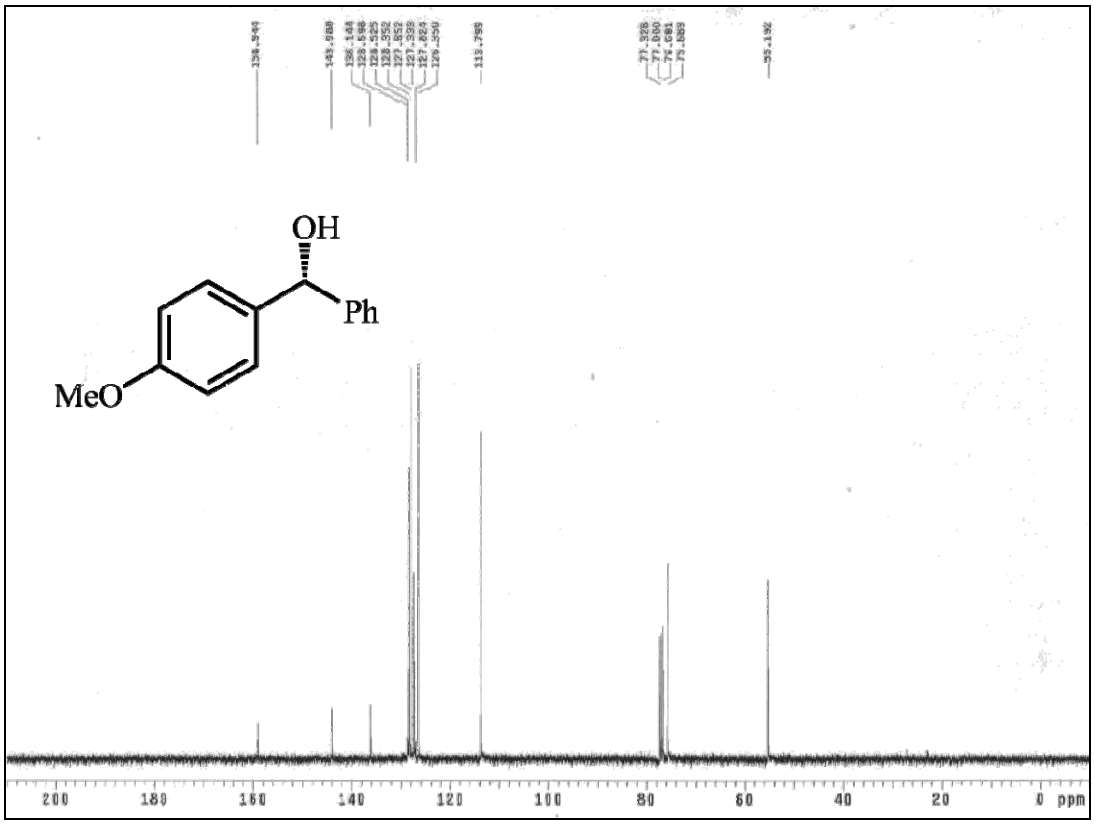
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	28.101	31.751	Time	28.618	32.850
Height(mAU)	20.899	18.678	Height(mAU)	26.105	1.662
Area(mAU-s)	1571.790	1584.489	Area(mAU-s)	3052.379	151.543
Area%	49.799	50.201	Area%	95.270	4.730

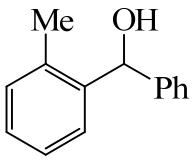
Spectrum Data:

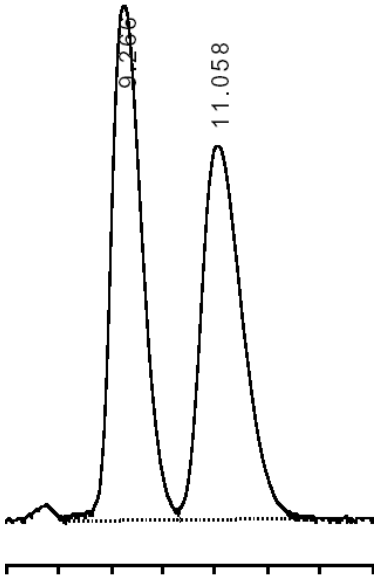
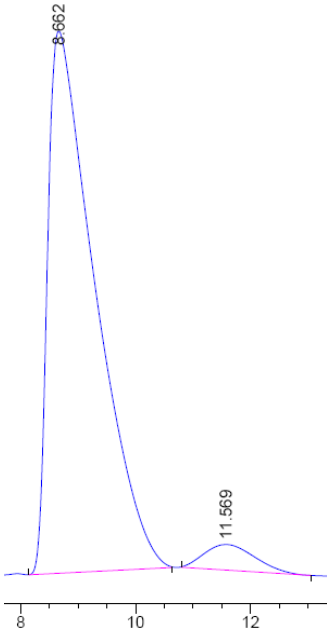
$[\alpha]^{25}_{D}$ = -0.93 (c 1.08, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.39-7.25 (m, 7H, *Ar*), 6.87-6.81 (m, 2H, *Ar*), 5.81 (d, *J* = 2.0 Hz, 1H, C*H*O), 3.79 (s, 3H, OCH_3), 2.19 (d, *J* = 3.2 Hz 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 158.9, 144.0, 136.1, 128.4, 127.8, 127.3, 126.3, 113.8, 75.7, 55.2. ppm.


OH
Ph
MeO
ppm


OH
Ph
MeO
ppm

(2-Methyl-phenyl)-phenyl-methanol (**4d**).(Table 2, entry 4, 91% ee).

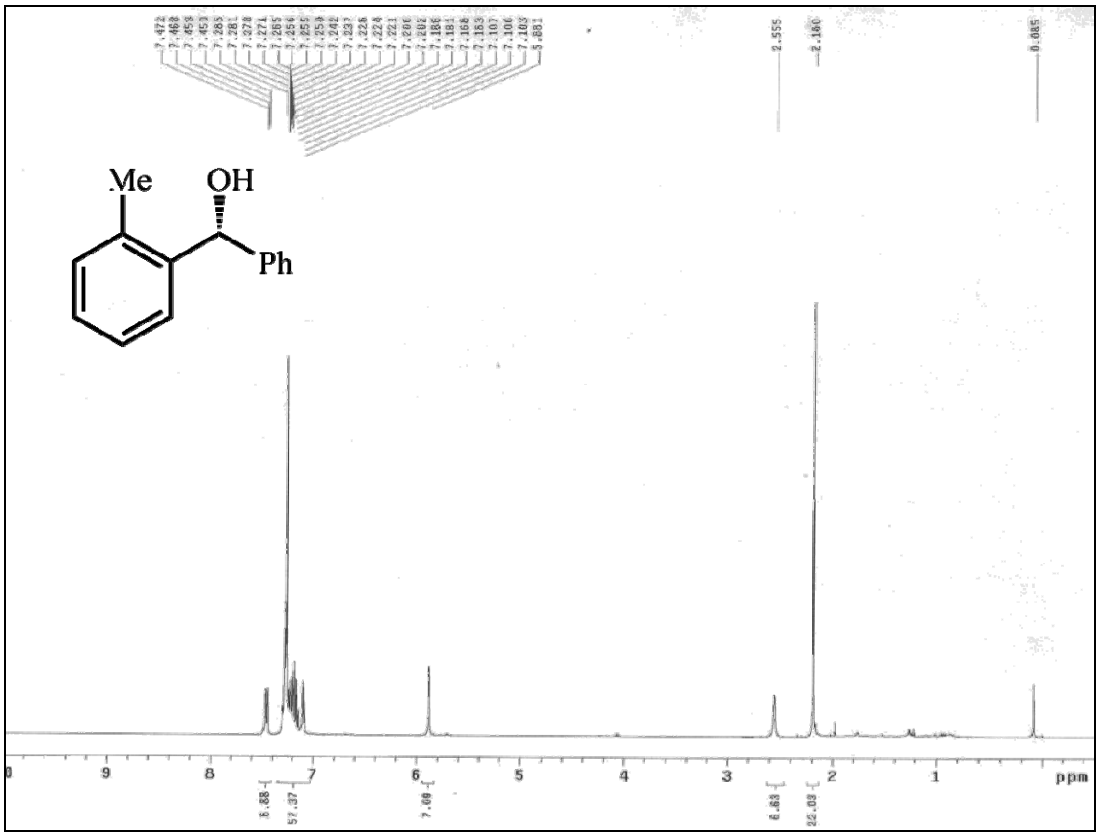
	Column: Chiralcel OB-H, Eluent: Hexane/IPA = 94/6 Flow rate: 1 mL/min Detector: UV, 254 nm Retention time: 9.266 min (*R*), 11.058 min (*S*)

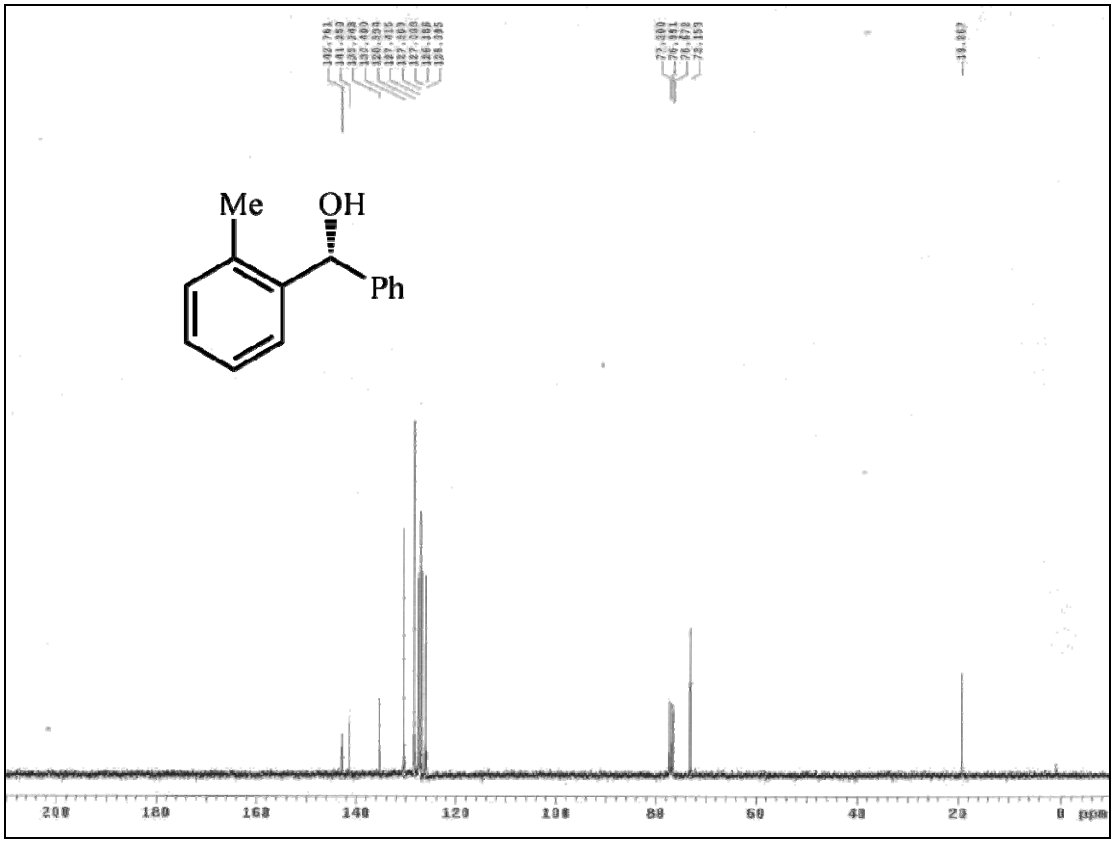
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	9.266	11.058	Time	8.662	11.569
Height(mAU)	45759	33122	Height(mAU)	147.384	6.972
Area(mAU-s)	1752158	1714148	Area(mAU-s)	8427.647	428.781
Area%	50.548	49.451	Area%	95.159	4.842

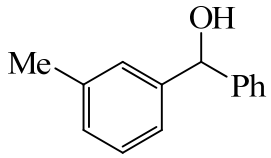
Spectrum Data:

$[\alpha]^{25}_{D}$ = -2.70 (c 1.11, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.47-7.45 (m, 1H, *Ar*), 7.32-7.10 (m, 8H, *Ar*), 5.88 (s, 1H, C*H*O), 2.55 (br, 1H, O*H*), 2.18 (s, 3H, CH_3) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 142.8, 141.4, 135.2, 130.4, 128.3, 127.4, 127.3, 127.0, 126.2, 126.0, 73.2, 19.3 ppm.

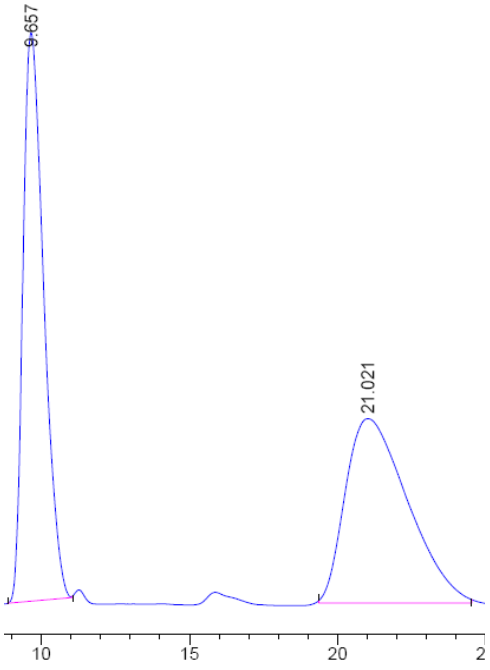
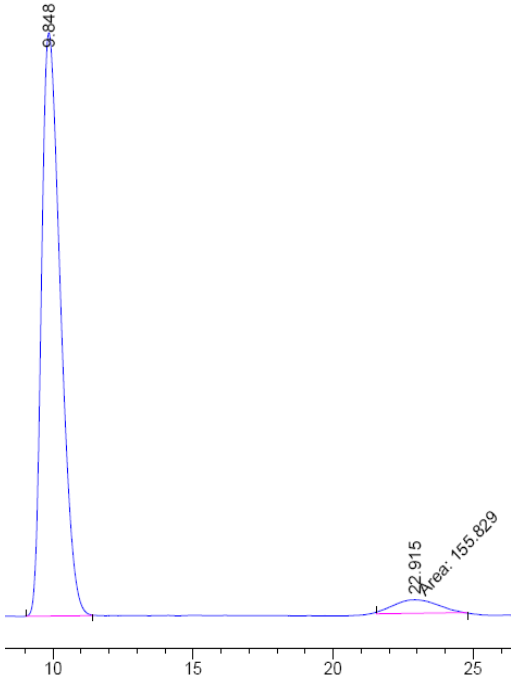

Me
OH
Ph
ppm


Me
OH
Ph
ppm

(3-Methyl-phenyl)-phenyl-methanol (**4e**). (Table 2, entry 5, 90% ee).



Column:	Chiralcel OB-H,
Eluent:	Hexane/IPA = 90/10
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	9.657 min (*R*), 21.021 min (*S*)

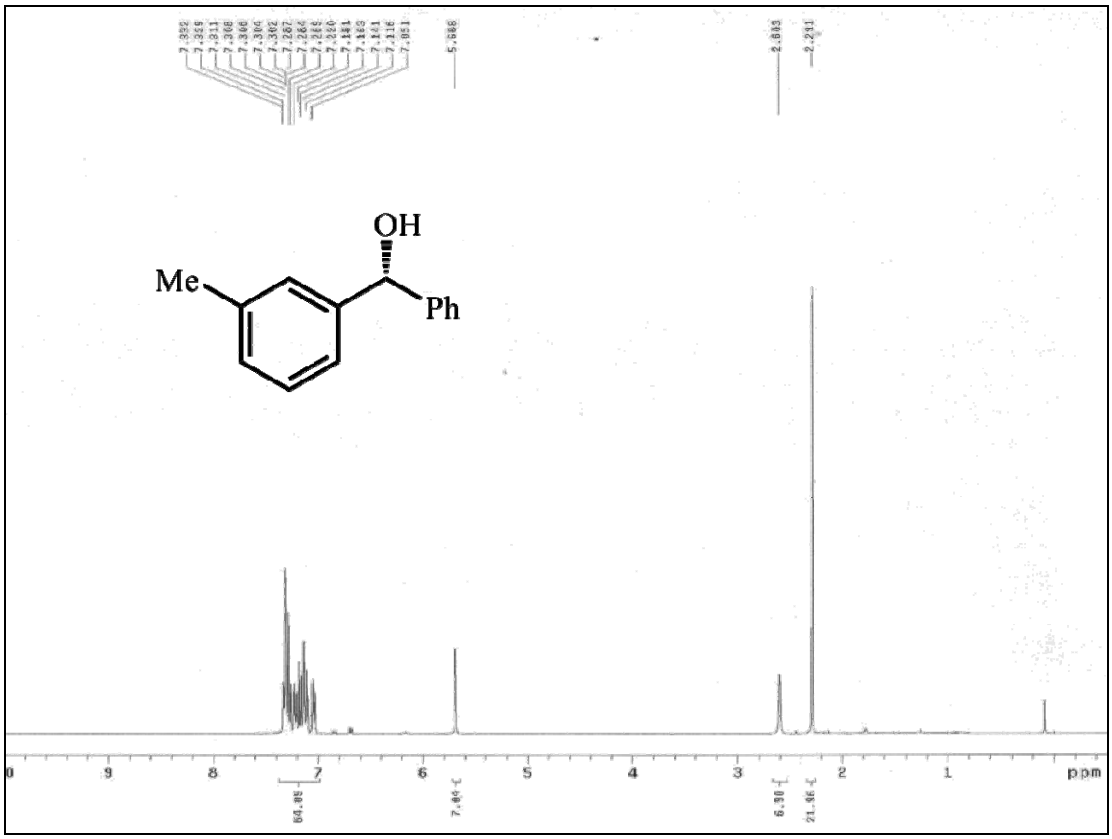
Racemic standard	Catalytic Reaction Product
	

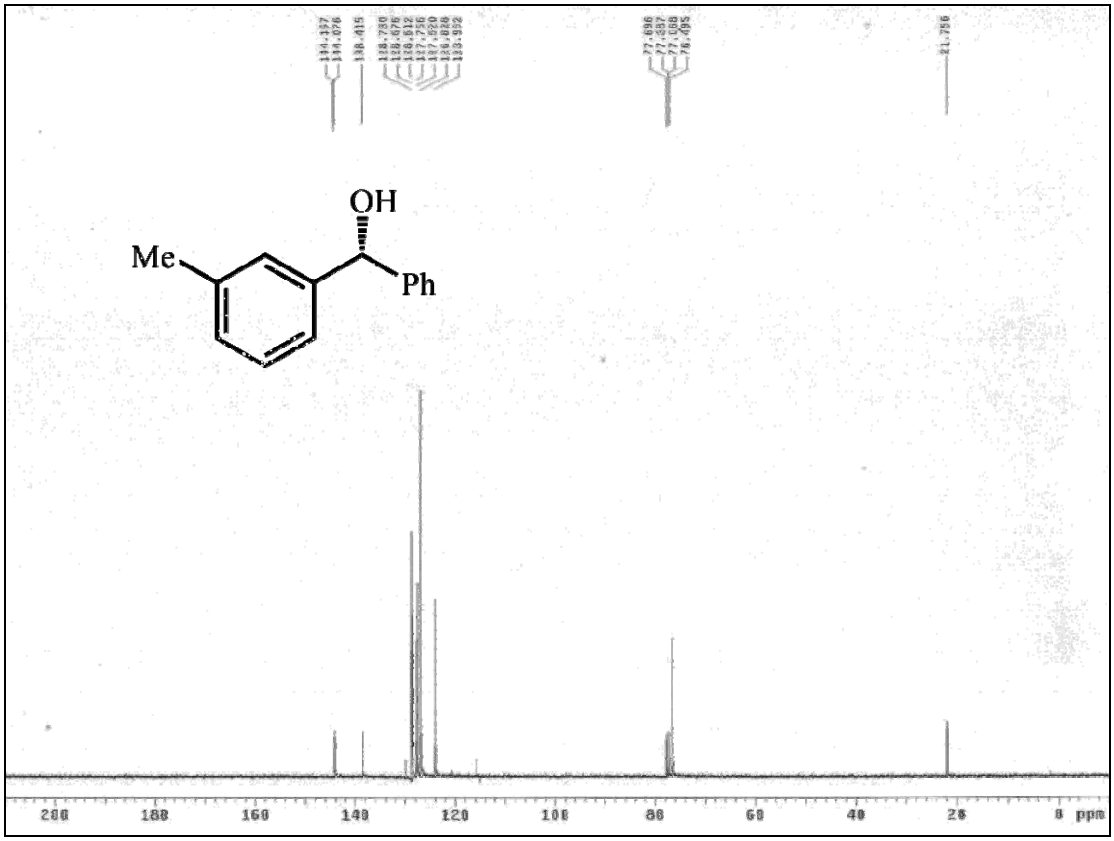
Peak No.	1	2
Time	9.657	21.021
Height(mAU)	66.011	21.414
Area(mAU-s)	3214.613	3135.107
Area%	50.626	49.374

Peak No.	1	2
Time	9.848	22.915
Height(mAU)	61.114	1.428
Area(mAU-s)	2885.948	155.829
Area%	94.877	5.123

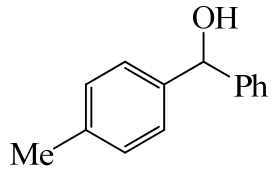
Spectrum Data:

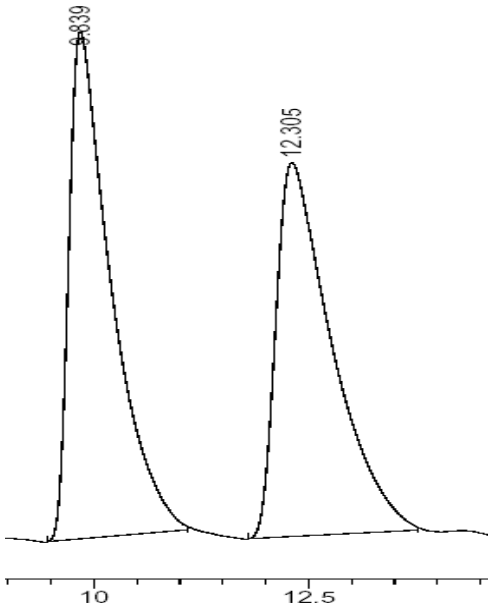
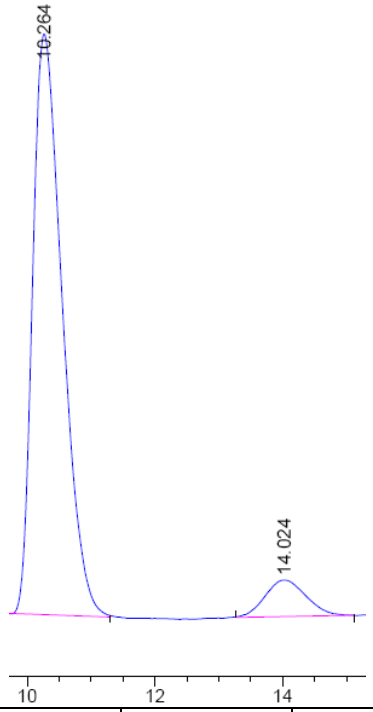
$[\alpha]^{25}_{D}$ = +2.63 (c 1.14, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.33-7.05 (m, 9H, *Ar*), 5.69 (s, 1H, C*H*O), 2.60 (br, 1H, O*H*), 2.29 (s, 3H, CH_3) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 144.2, 144.1, 138.4, 128.73, 128.68, 128.6, 127.8, 127.5, 126.8, 124.0, 76.5, 21.8 ppm.


OH
Me
Ph
ppm


OH
Me
Ph
ppm

(4-Methyl-phenyl)-phenyl-methanol (**4f**). (Table 2, entry 6, 84% ee).

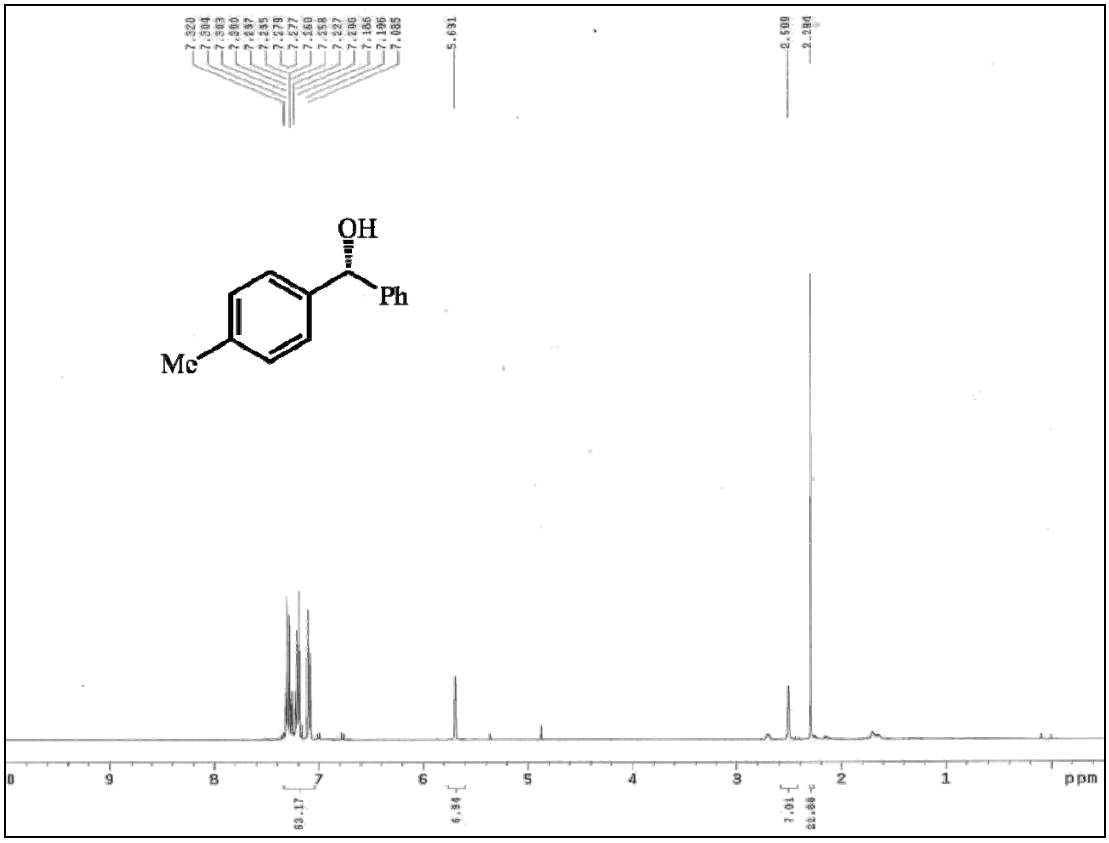
	Column:	Chiralcel OB-H,
	Eluent:	Hexane/IPA = 95/5
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	9.839 min (*R*), 12.305 min (*S*)

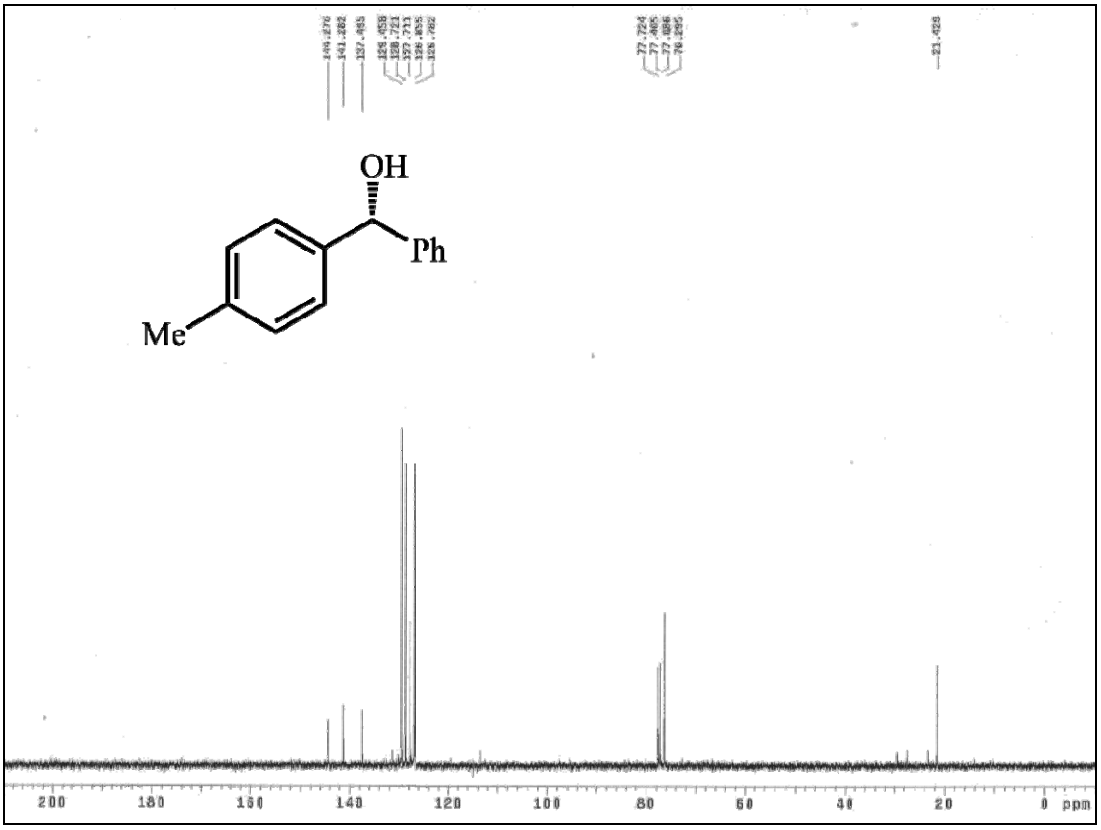
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	9.839	12.305	Time	10.264	14.024
Height(mAU)	33.884	24.974	Height(mAU)	13.416	8.46349e-1
Area(mAU-s)	1163.255	1124.632	Area(mAU-s)	431.671	37.710
Area%	50.844	49.156	Area%	91.966	8.034

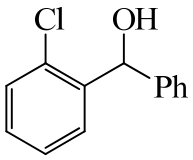
Spectrum Data:

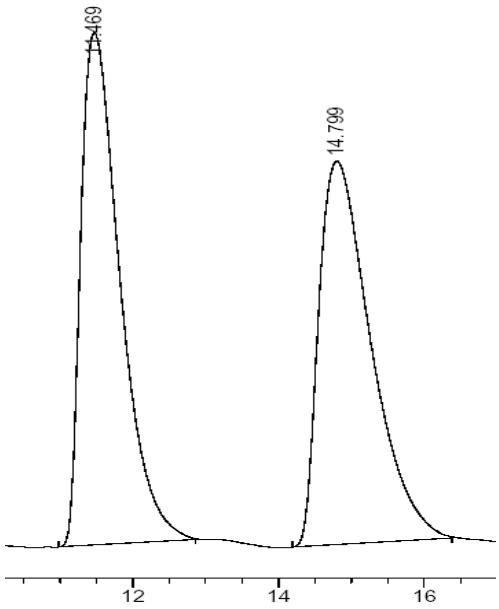
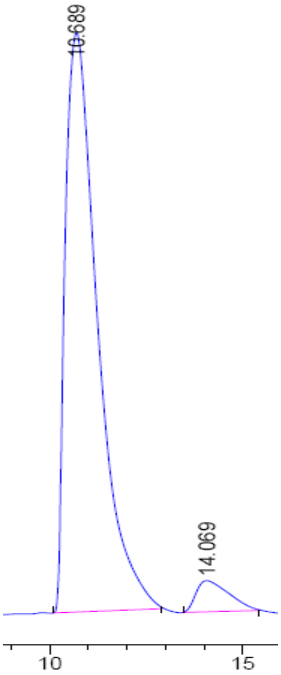
$[\alpha]^{25}_{D}$ = +16.35 (c 1.04, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32-7.09 (m, 9H, *Ar*), 5.69 (s, 1H, C*H*O), 2.51 (s, 1H, O*H*), 2.29 (s, 3H, CH_3) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 144.3, 141.3, 137.5, 129.5, 128.7, 127.7, 126.9, 126.8, 76.3, 21.4 ppm.


OH
Ph
Me
ppm


OH
Ph
Me
ppm

(2-Chloro-phenyl)-phenyl-methanol (**4g**) (Table 2, entry 7, 90% ee).

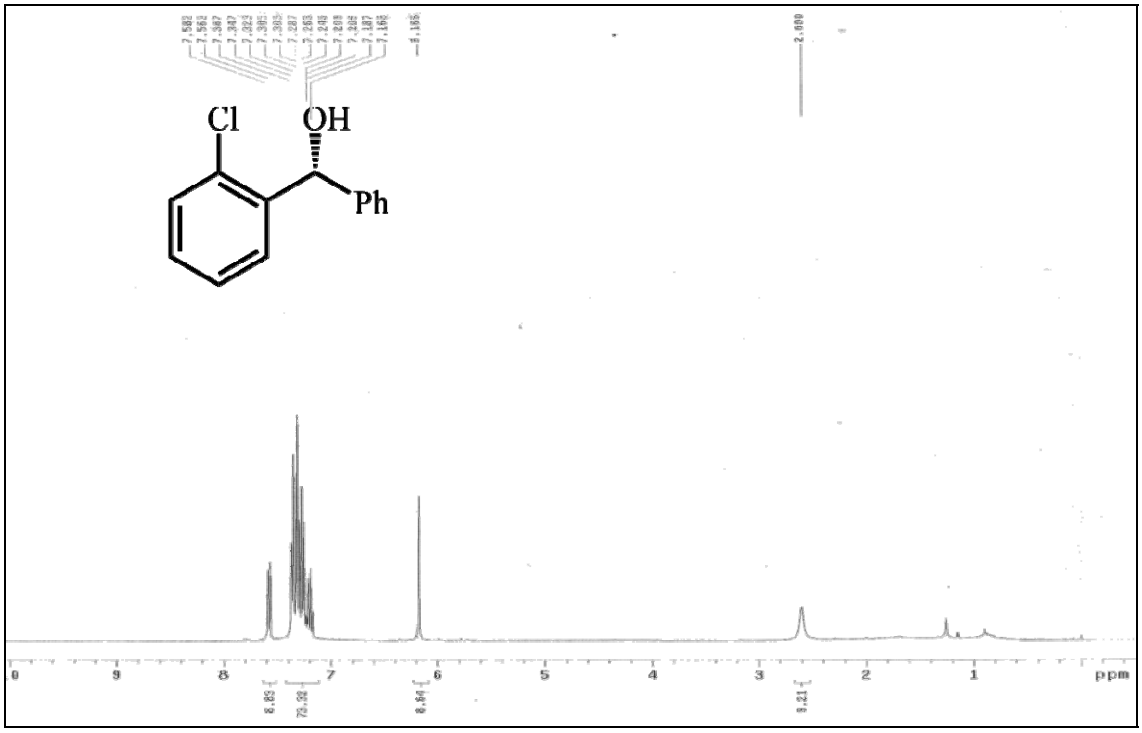
	Column:	Chiralcel OJ
	Eluent:	Hexane/IPA = 80/20
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	11.469 min (*R*), 14.799 min (*S*)

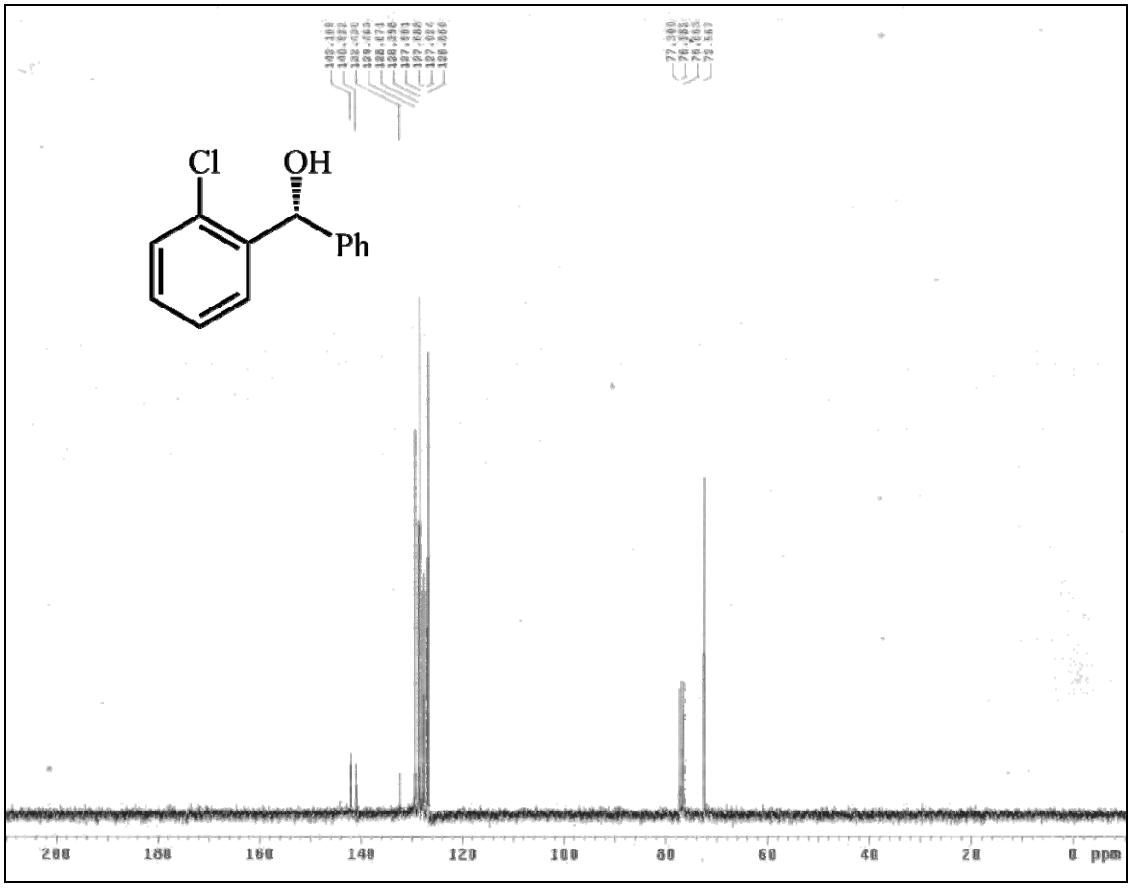
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	11.469	14.799	Time	10.689	14.069
Height(mAU)	32.271	24.132	Height(mAU)	44.883	2.419
Area(mAU-s)	1208.563	1197.088	Area(mAU-s)	1079.763	142.730
Area%	50.239	49.762	Area%	94.827	5.173

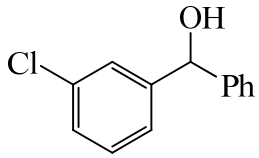
Spectrum Data:

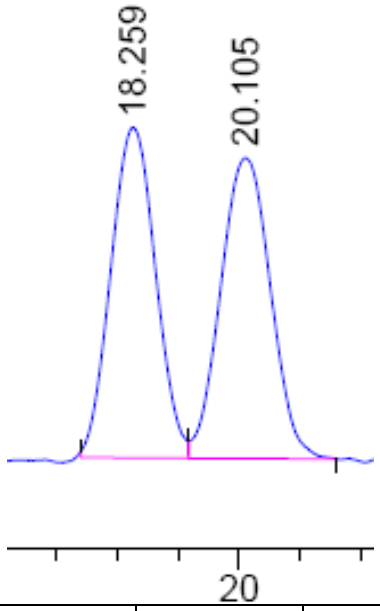
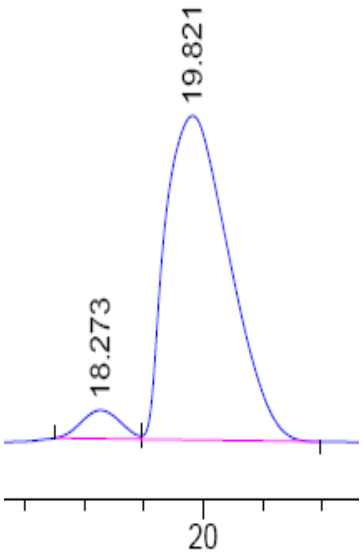
$[\alpha]^{25}_{D}$ = +15.26 (c 1.07, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.58-7.56 (m, 1H, *Ar*), 7.36-7.17 (m, 8H, *Ar*), 6.17 (s, 1H, C*H*O), 2.60 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 142.2, 140.9, 132.4, 129.5, 128.7, 128.4, 128.0, 127.7, 127.0, 126.9, 72.6 ppm.


Cl
OH
Ph
ppm


Cl
OH
Ph
ppm

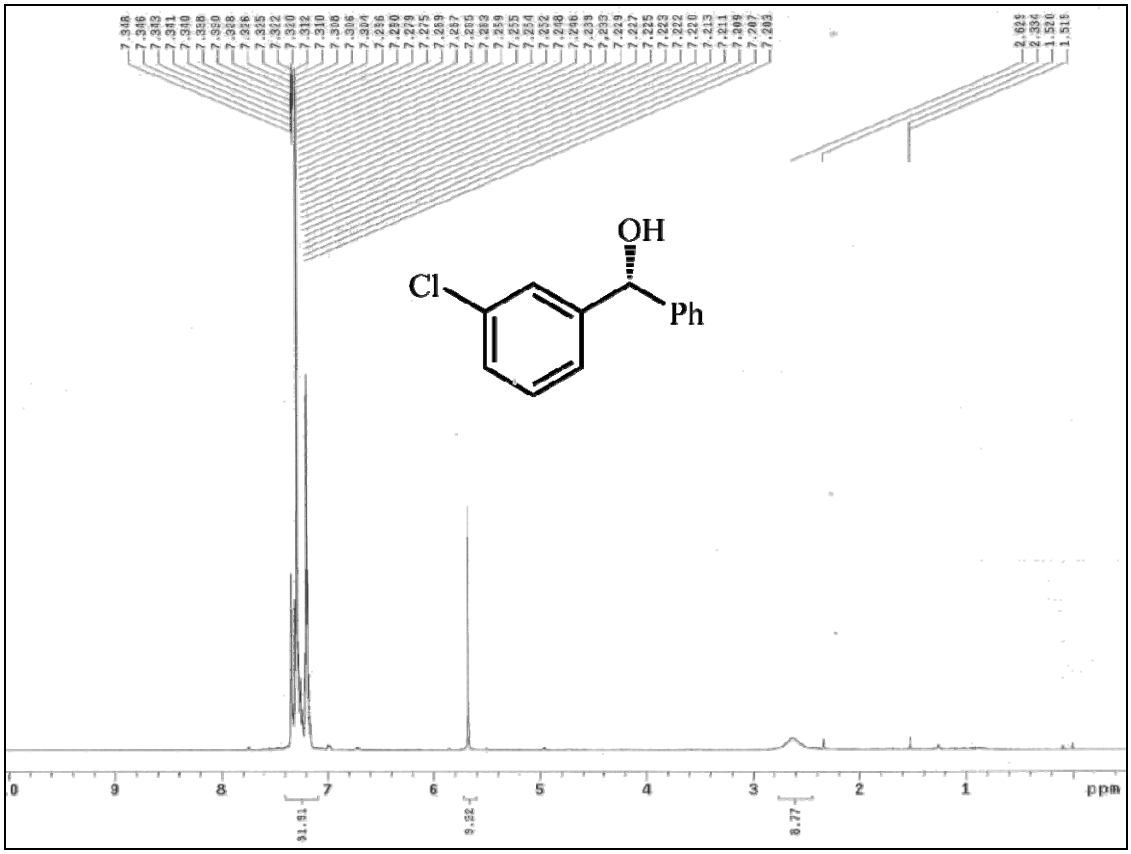
(3-Chloro-phenyl)-phenyl-methanol(**4h**) (Table 2, entry 8, 90% ee).

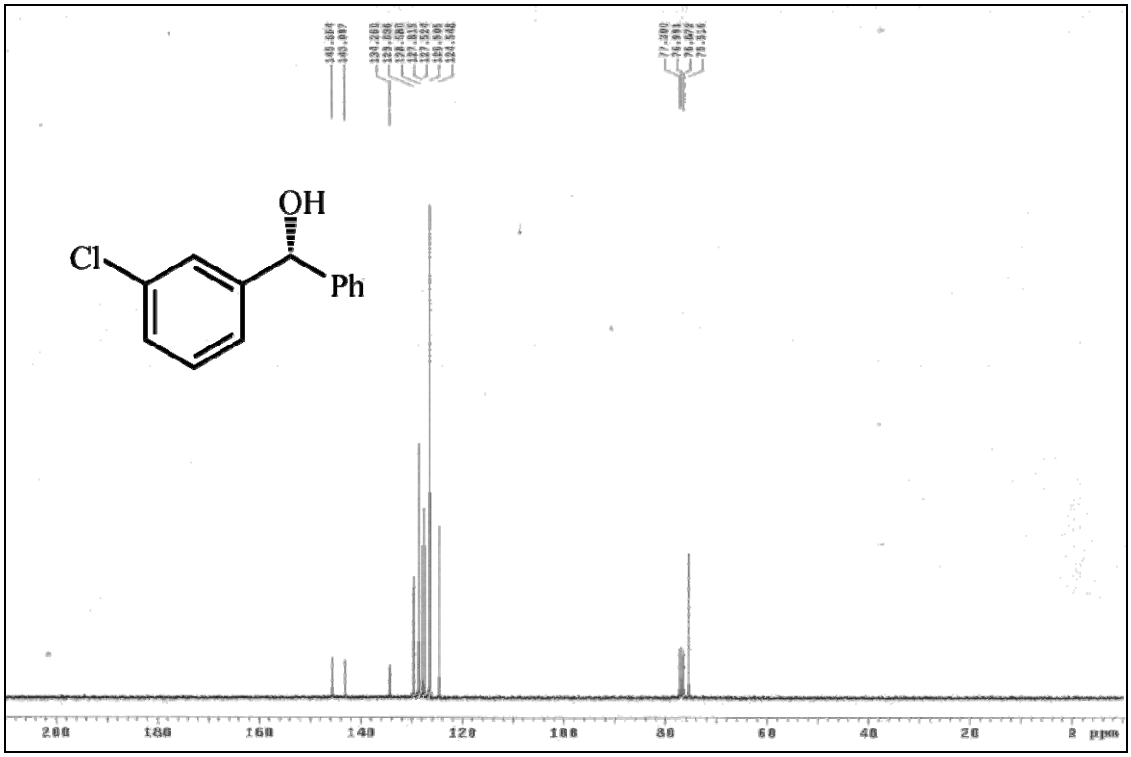
	Column:	Chiralcel OD-H
	Eluent:	Hexane/IPA = 98/2
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	18.259 min (*S*), 20.105 min (*R*)

Racemic standard			Catalytic Reaction Product		
					
Peak No.	1	2	Peak No.	1	2
Time	18.259	20.105	Time	18.273	19.821
Height(mAU)	7.271	6.611	Height(mAU)	8.849	100.391
Area(mAU-s)	370.991	376.603	Area(mAU-s)	403.391	7471.673
Area%	49.625	50.375	Area%	5.112	94.878

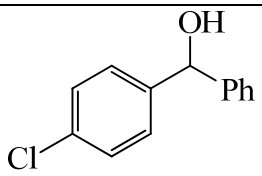
Spectrum Data:

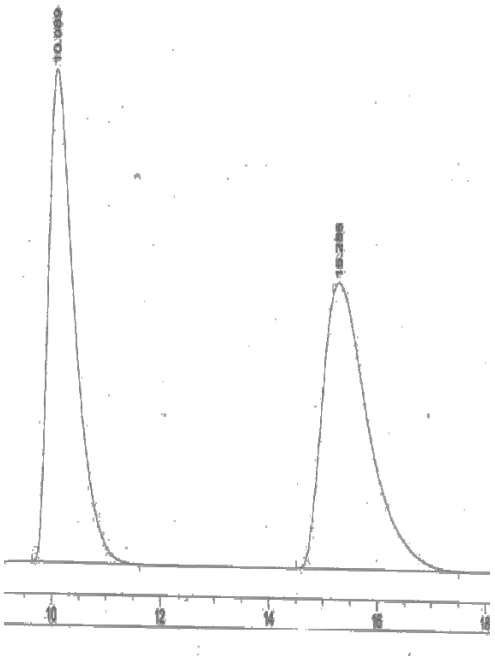
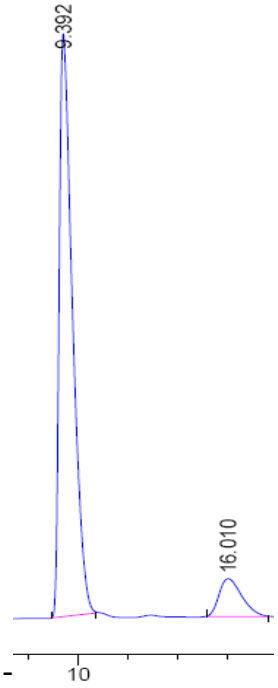
$[\alpha]^{25}_{D}$ = -29.36 (c 1.09, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.35-7.20 (m, 9H), 5.68 (s, 1H, C*H*O), 2.63 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 145.7, 143.1, 134.3, 129.6, 128.6, 127.8, 127.5, 126.5, 124.5, 75.5 ppm.


OH
Cl
Ph
ppm


OH
Cl
Ph
ppm

(4-Chloro-phenyl)-phenyl-methanol (**4i**) (Table 2, entry 9, 80% ee).

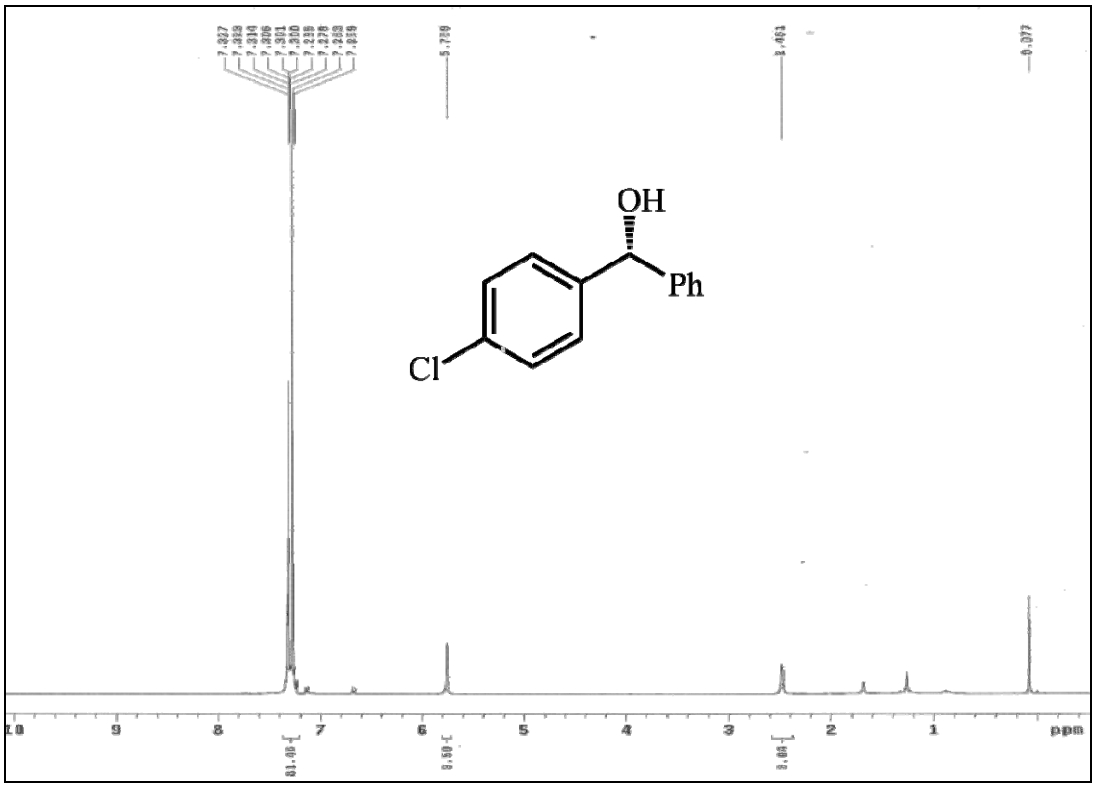
	Column:	Chiralcel OB-H,
	Eluent:	Hexane/IPA = 92/8
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	10.089 min (*R*), 15.286 min (*S*)

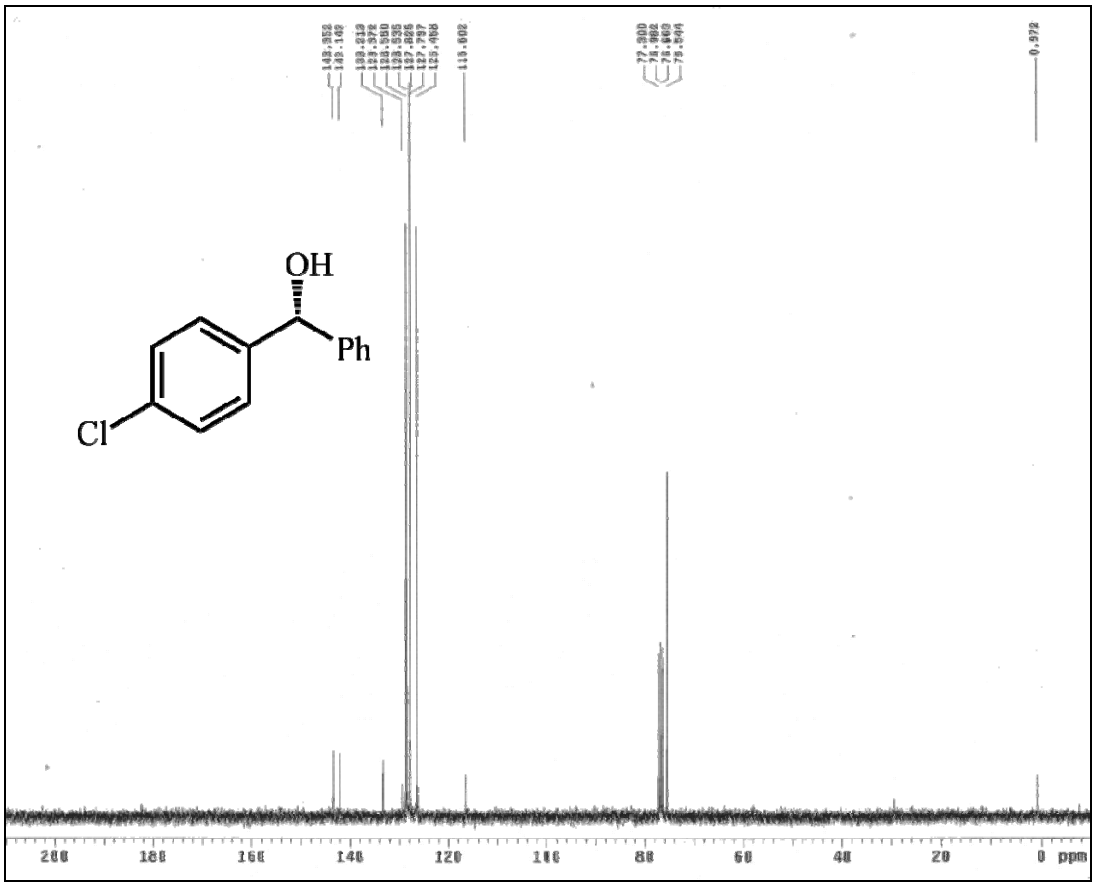
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	10.089	15.286	Time	9.392	16.010
Height(mAU)	160.592	92.939	Height(mAU)	104.268	6.812
Area(mAU-s)	5346.728	5440.219	Area(mAU-s)	3847.187	433.652
Area%	49.567	50.433	Area%	89.870	10.130

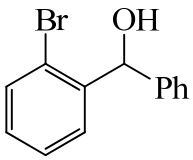
Spectrum Data:

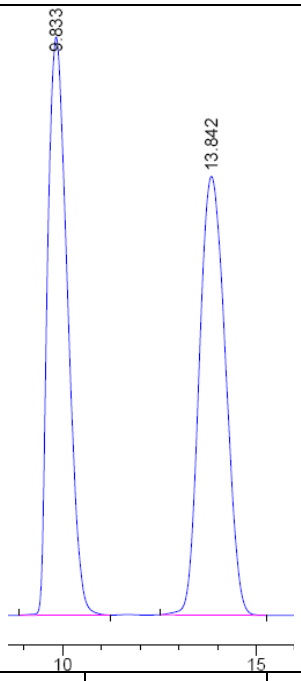
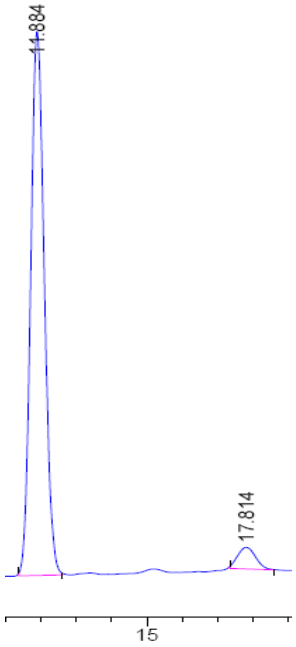
$[\alpha]^{25}_{D}$ = +12.50 (c 1.04, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.33-7.26 (m, 9H, *Ar*), 5.76 (s, 1H, C*H*O), 2.48 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 143.4, 142.1, 133.2, 129.3, 128.6, 127.8, 126.5, 116.6, 75.5 ppm.


OH
Ph
Cl
ppm


OH
Ph
Cl
ppm

(2-Bromo-phenyl)-phenyl-methanol (**4j**) (Table 2, entry 10, 90% ee).

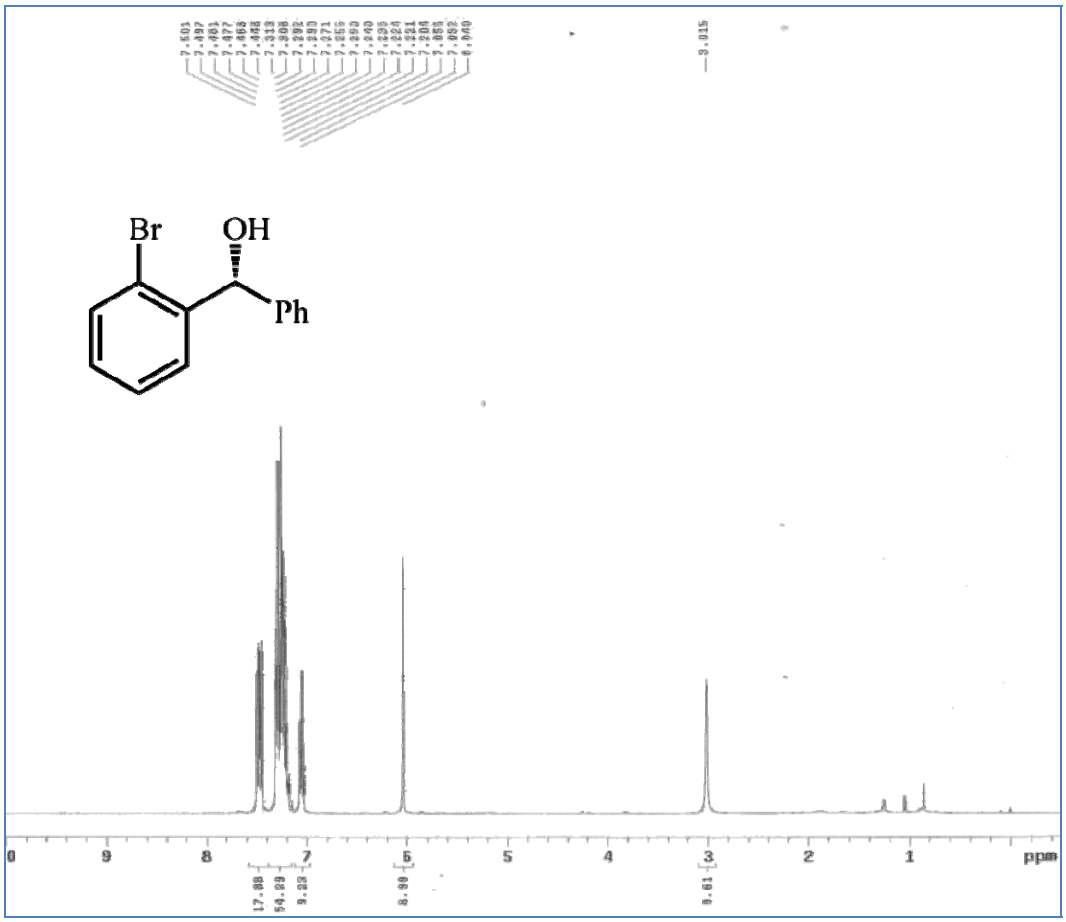
	Column:	Chiralcel OD-H
	Eluent:	Hexane/IPA = 97/3
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	9.833 min (*R*), 13.842 min (*S*)

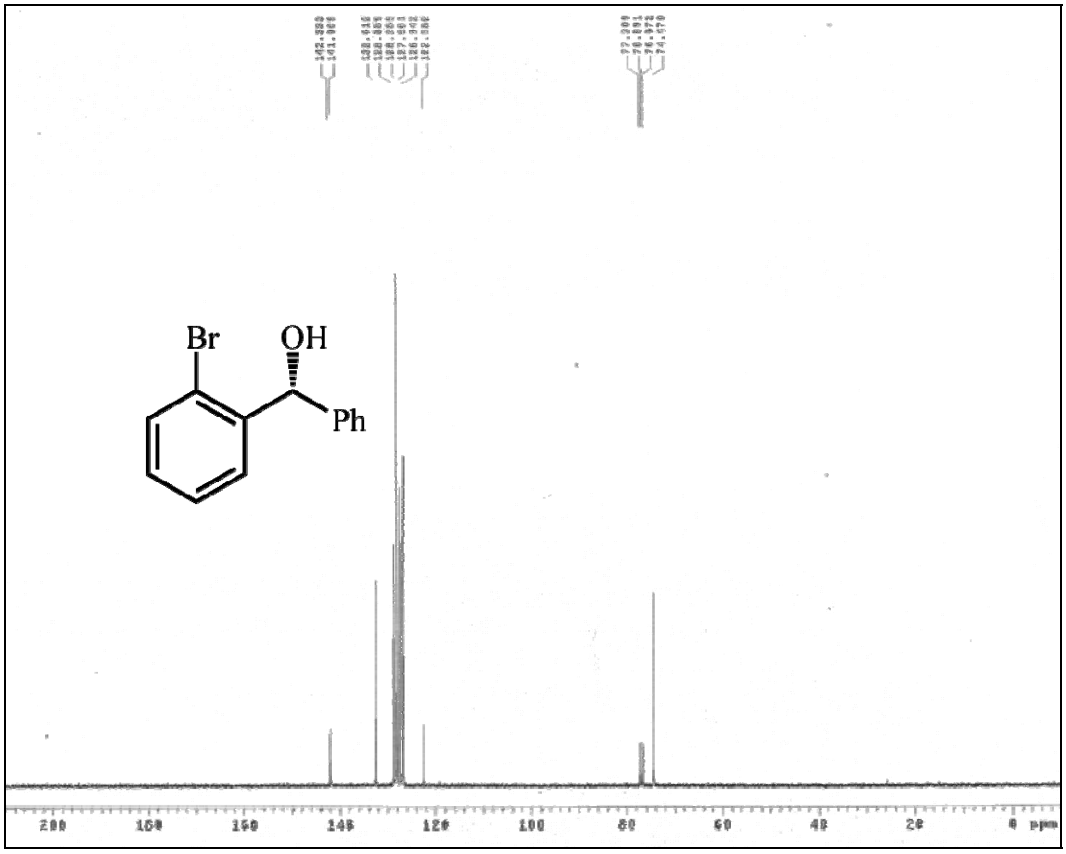
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	9.833	13.842	Time	11.884	17.814
Height(mAU)	272.885	207.100	Height(mAU)	30.665	1.222
Area(mAU-s)	9672.707	9682.203	Area(mAU-s)	820.513	43.646
Area%	49.976	50.025	Area%	94.950	5.050

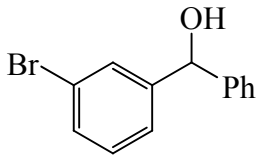
Spectrum Data:

$[\alpha]^{25}_{D}$ = 24.64 (c 2.34, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.50-7.48 (m, 2H, *Ar*), 7.31-7.20 (m, 7H, *Ar*), 7.08-7.05 (m, 1H, *Ar*), 6.04 (s, 1H, C*H*O), 3.02 (s, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 142.3, 142.0, 132.6, 128.9, 128.4, 128.3, 127.8, 127.6, 126.9, 122.6, 74.5 ppm.

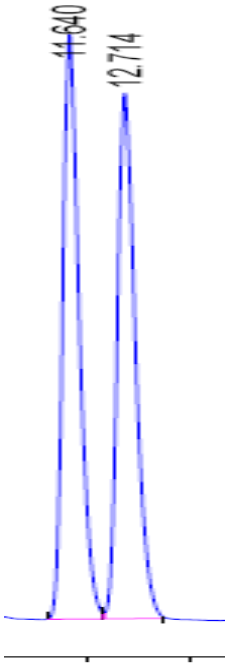

Br
OH
Ph
ppm


Br
OH
Ph
ppm

(3-Bromo-phenyl)-phenyl-methanol (**4k**) (Table 2, entry 11, 86% ee).



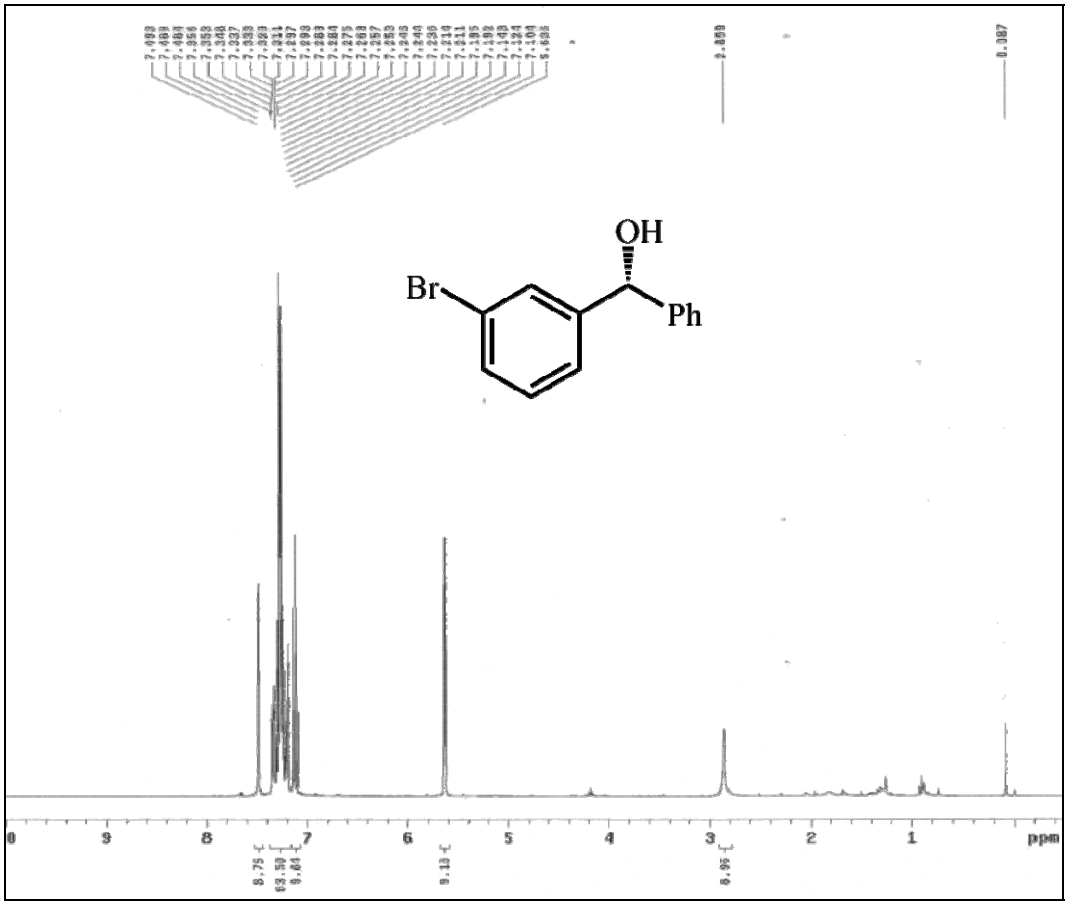
Column:	Chiralcel OD
Eluent:	Hexane/IPA = 90/10
Flow rate:	0.75 mL/min
Detector:	UV, 254 nm
Retention time:	11.640 min (*S*), 12.714 min (*R*)

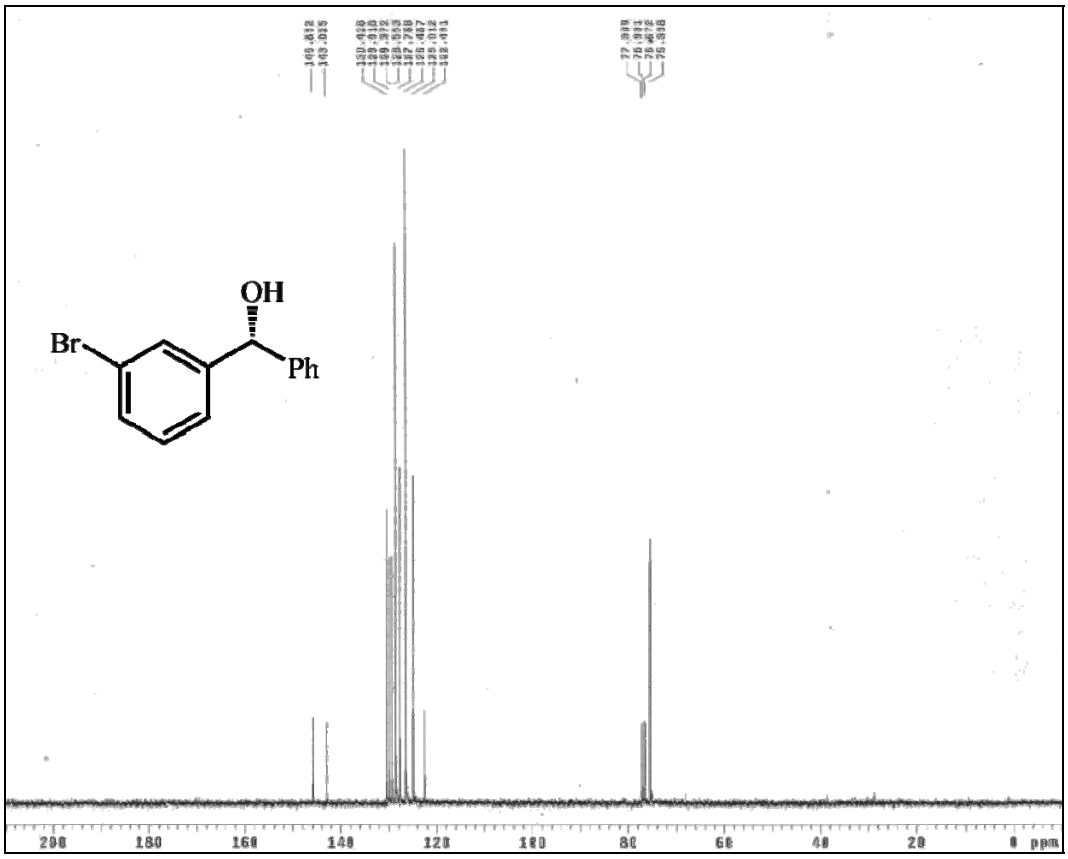
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	11.640	12.714	Time	12.593	13.683
Height(mAU)	32.909	29.579	Height(mAU)	30.024	347.276
Area(mAU-s)	729.054	717.845	Area(mAU-s)	791.220	1.05391e4
Area%	50.387	49.613	Area%	6.983	93.017

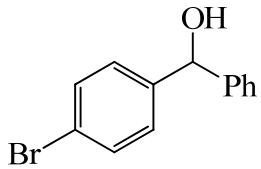
Spectrum Data:

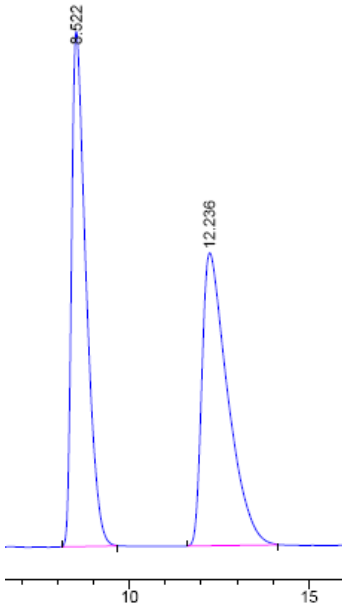
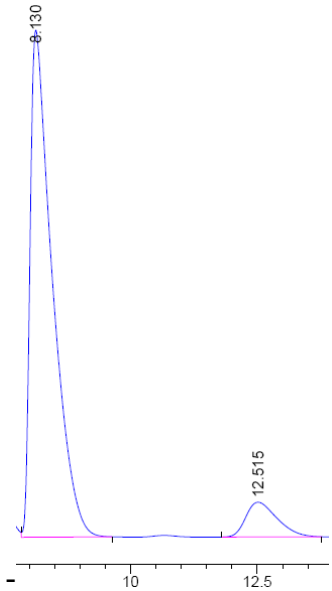
$[\alpha]^{25}_{D}$ = -29.70 (c 1.01, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.49-7.48 (m, 1H, *Ar*), 7.35-7.10 (m, 8H, *Ar*), 5.63 (s, 1H, C*H*O), 2.85 (d, *J* = 5.6 Hz, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 145.9, 143.0, 130.4, 129.9, 129.4, 128.6, 127.8, 126.5,125.0, 122.5, 75.4 ppm.


OH
Br
Ph
ppm


OH
Br
Ph
ppm

(4-Bromo-phenyl)-phenyl-methanol (**4l**) (Table 2, entry 12, 82% ee).

	Column: Chiralcel OB-H, Eluent: Hexane/IPA = 90/10 Flow rate: 1 mL/min Detector: UV, 254 nm Retention time: 8.522 min (*R*), 12.236 min (*S*)

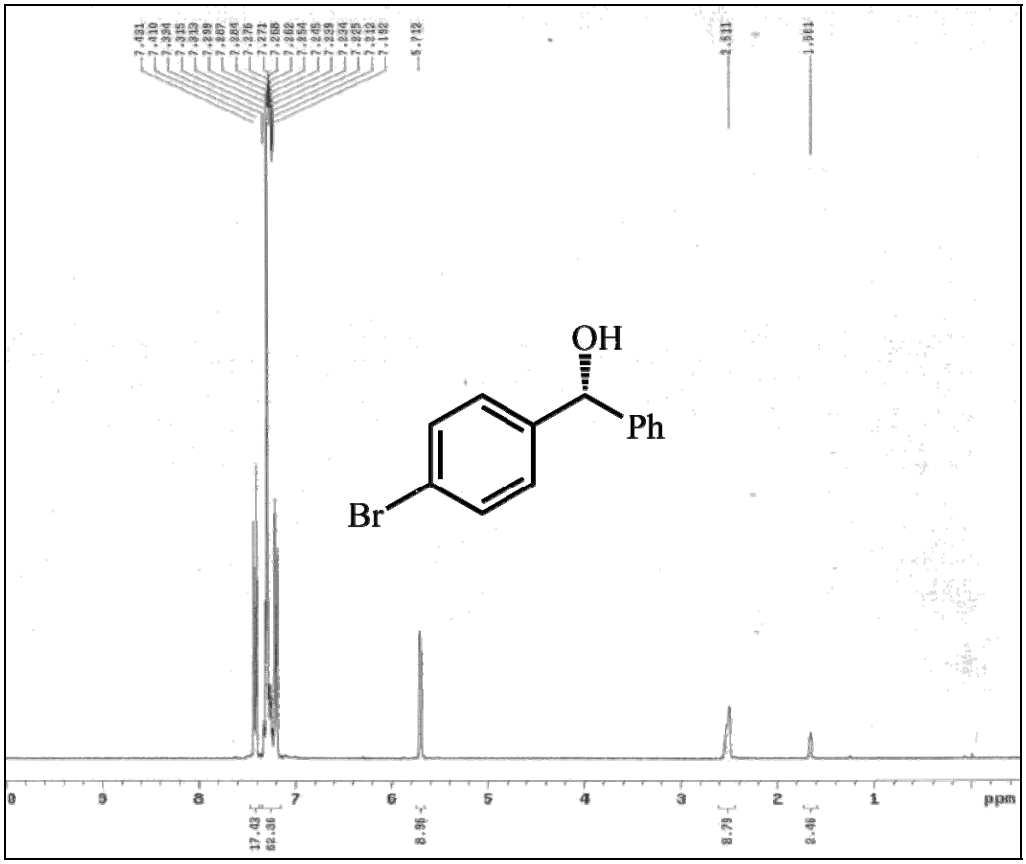
Racemic standard	Catalytic Reaction Product
	

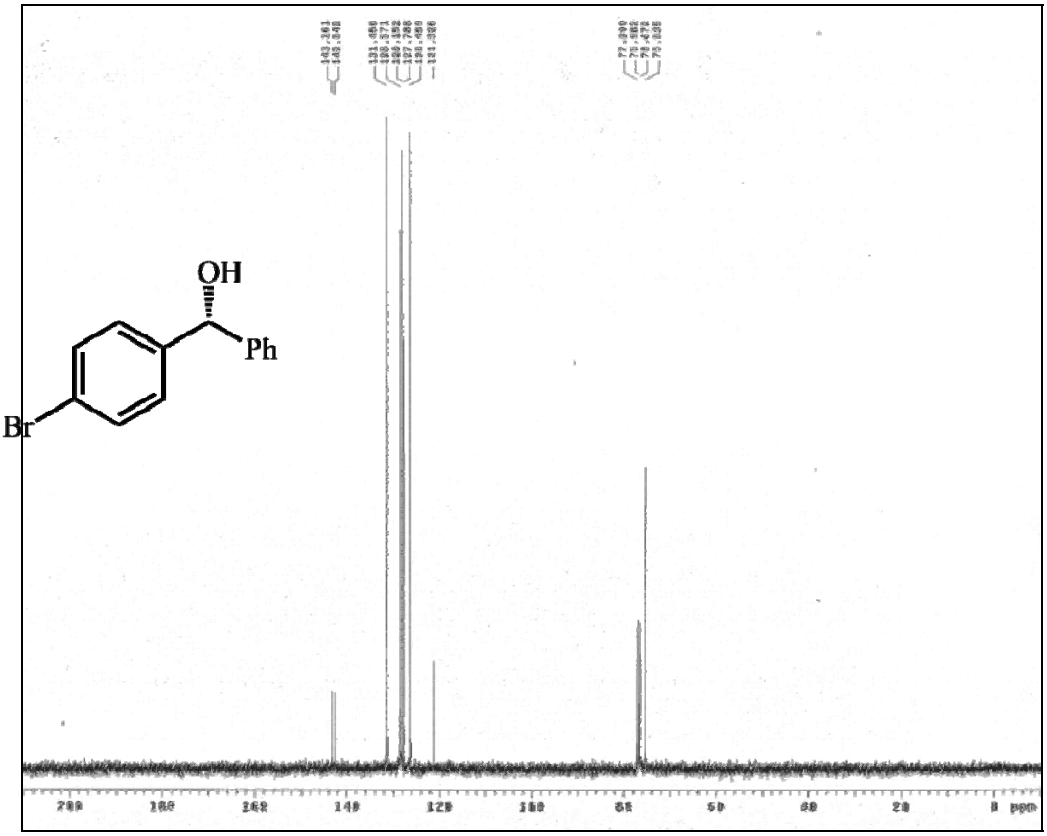
Peak No.	1	2
Time	8.522	12.236
Height(mAU)	86.501	49.183
Area(mAU-s)	2422.769	2452.798
Area%	49.692	50.308

Peak No.	1	2
Time	8.130	12.515
Height(mAU)	231.305	15.879
Area(mAU-s)	7047.423	681.640
Area%	91.181	8.819

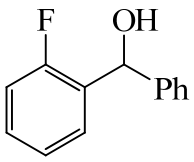
Spectrum Data:

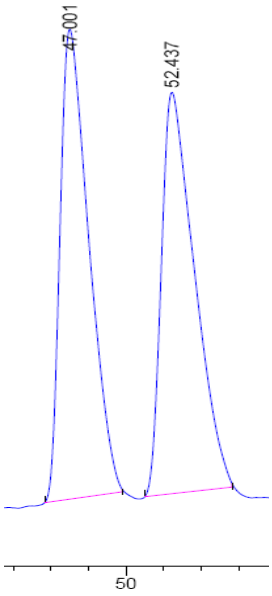
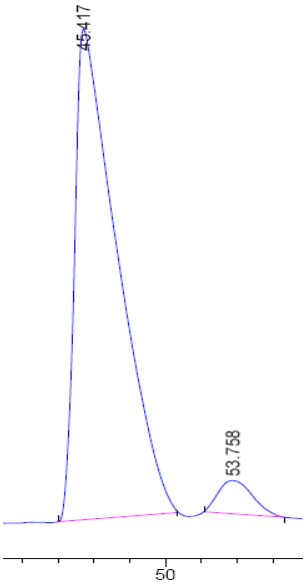
$[\alpha]^{25}_{D}$ = -15.45 (c 1.10, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.43-7.41 (m, 2H, *Ar*), 7.33-7.19 (m, 7H, *Ar*), 5.71 (s, 1H, C*H*O), 2.51 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$):δ 143.2, 142.6, 131.5, 128.6, 128.2, 127.8, 126.5, 121.3, 75.5 ppm.


OH
Ph
Br
ppm


OH
Ph
Br
ppm

(2-Fluoro-phenyl)-phenyl-methanol (**4m**) (Table 2, entry 13, 90% ee).

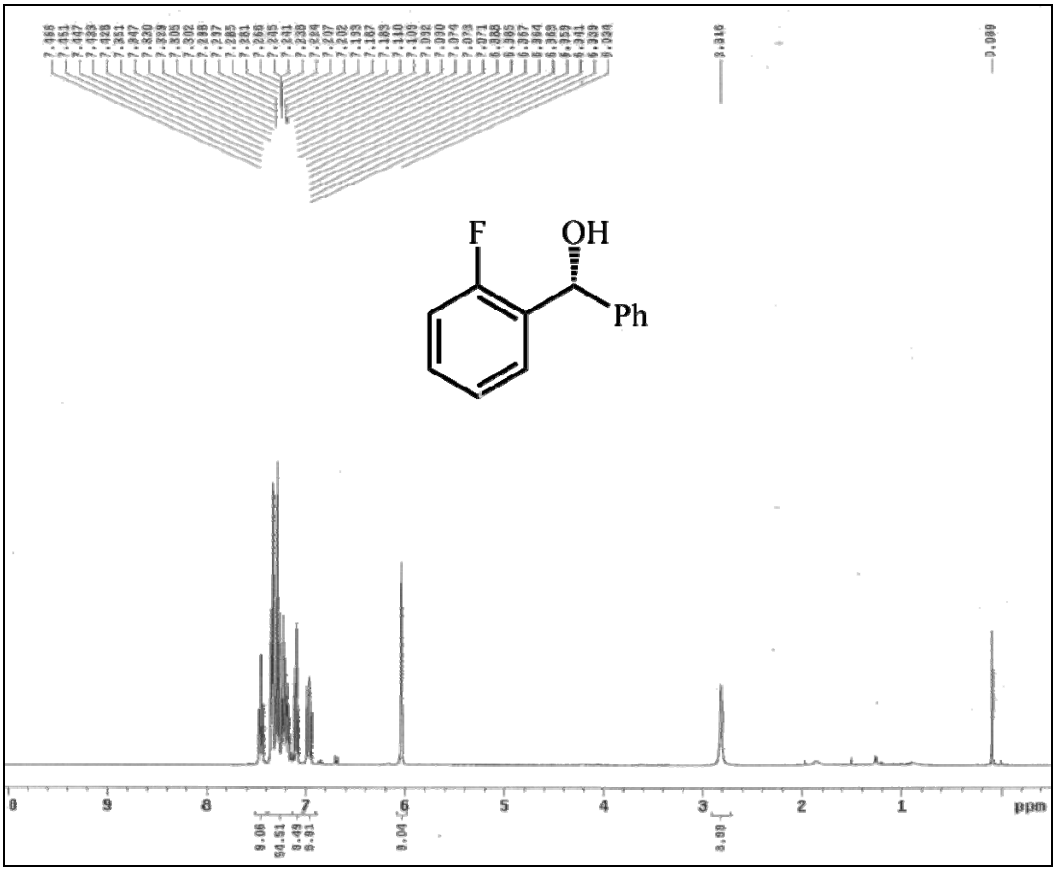
	Column:	Chiralcel OB-H
	Eluent:	Hexane/IPA = 98/2
	Flow rate:	0.5 mL/min
	Detector:	UV, 254 nm
	Retention time:	47.001 min (*R*), 52.437 min (*S*)

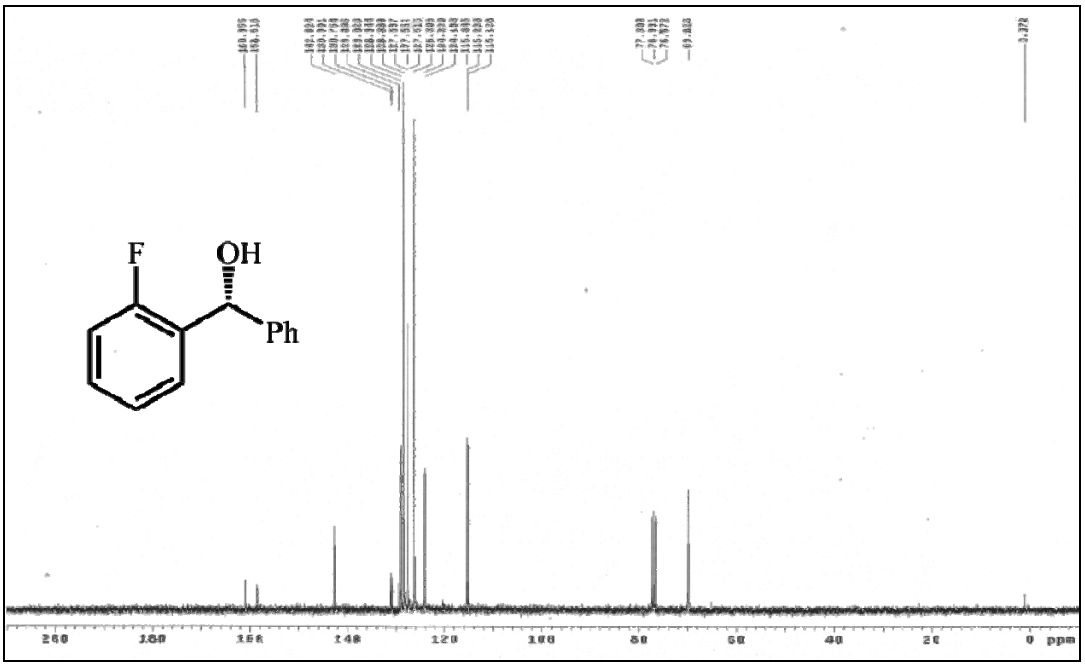
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	47.001	52.437	Time	45.417	53.758
Height(mAU)	20.038	17.166	Height(mAU)	52.196	3.541
Area(mAU-s)	2138.533	2121.905	Area(mAU-s)	8653.597	477.424
Area%	50.195	49.805	Area%	94.771	5.229

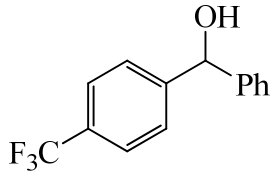
Spectrum Data:

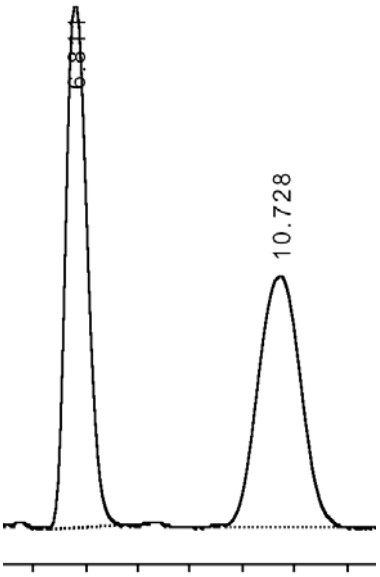
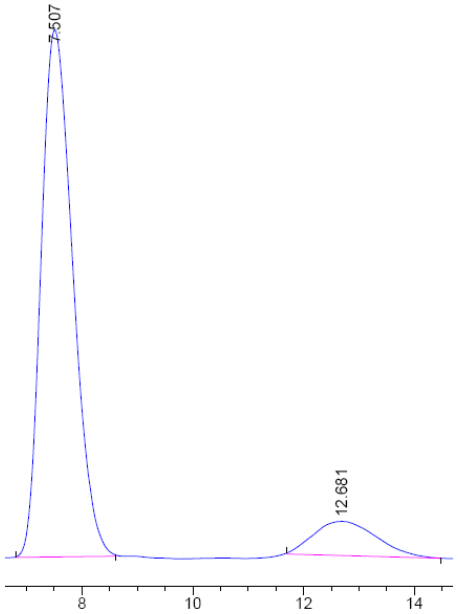
$[\alpha]^{25}_{D}$ = -9.82 (c 0.95, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.47-6.94 (m, 9H, *Ar*), 6.03 (s, 1H, C*H*O), 2.82 (s, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 161.0, 158.5, 142.6, 130.9, 130.8, 129.4, 129.0, 128.9, 128.4, 127.6, 127.5, 126.3, 124.2, 115.3, 115.2, 115.1, 69.8 ppm.


F
OH
Ph
ppm


F
OH
Ph
ppm

(4-Trifluoromethyl-phenyl)-phenyl-methanol (**4n**) (Table 2, entry 14, 77% ee).

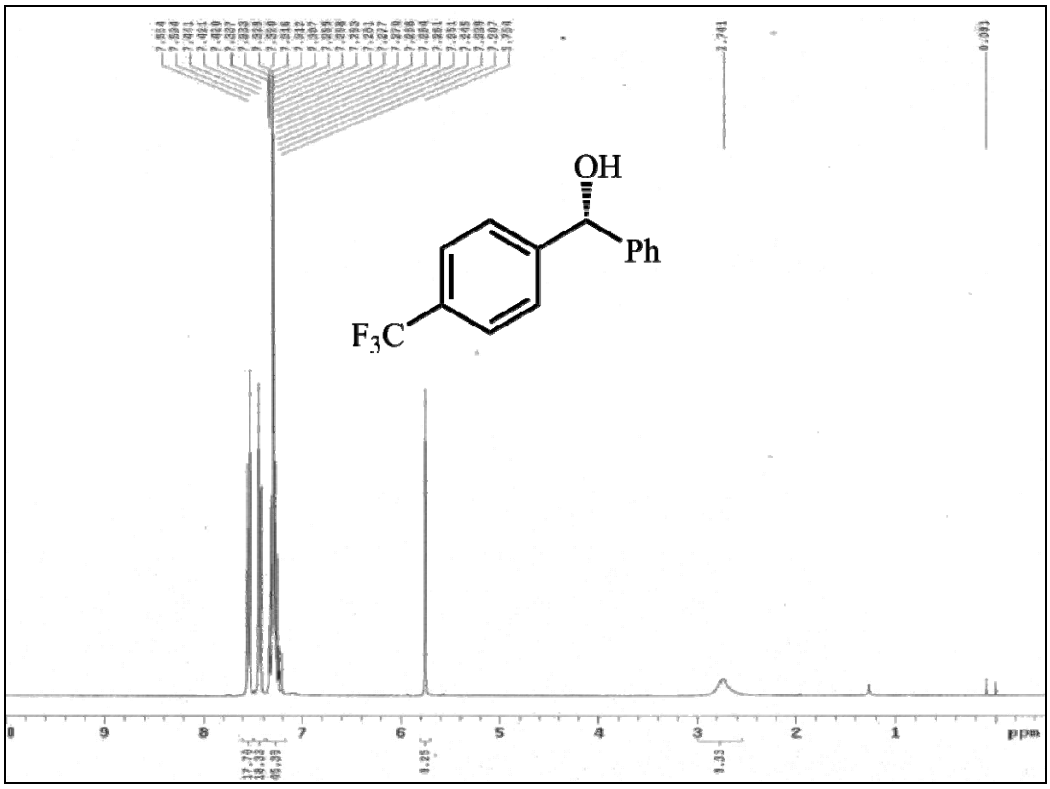
	Column:	Chiralcel OB-H,
	Eluent:	Hexane/IPA = 94/6
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	6.811 min (*R*), 10.728 min (*S*)

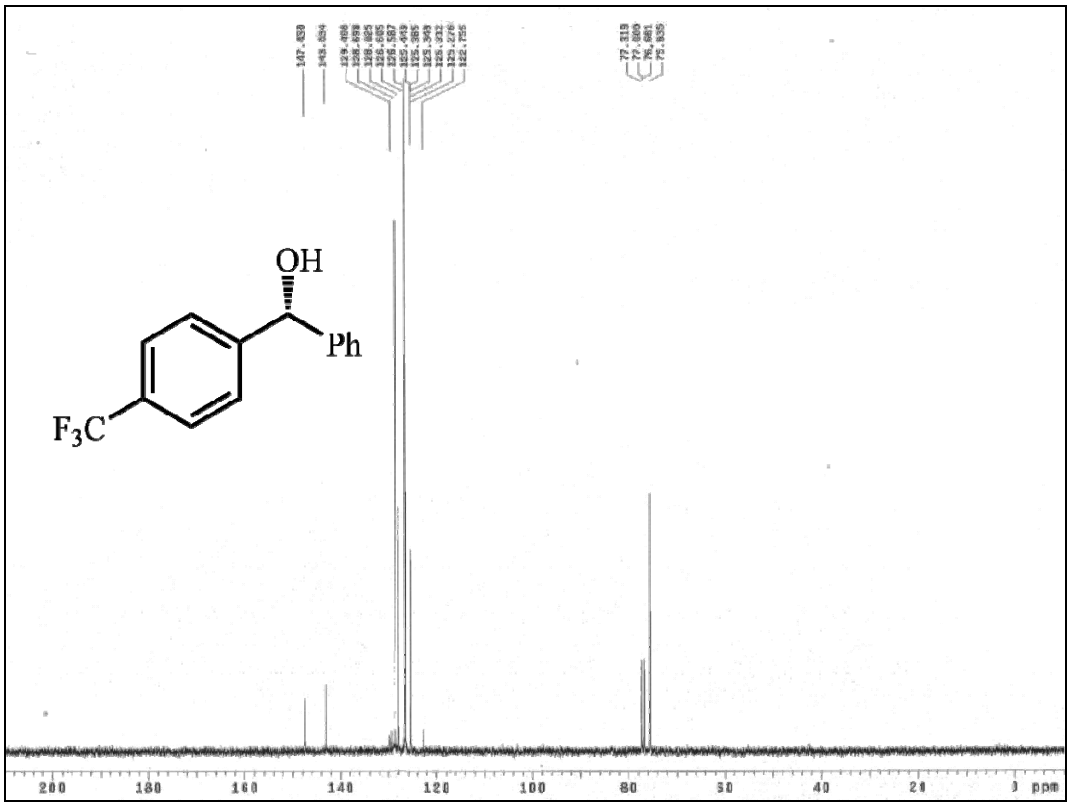
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	6.811	10.728	Time	7.507	12.681
Height(mAU)	367614	177379	Height(mAU)	56.108	3.640
Area(mAU-s)	9539451	9568137	Area(mAU-s)	2225.661	287.351
Area%	49.924	50.075	Area%	88.566	11.435

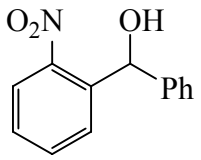
Spectrum Data:

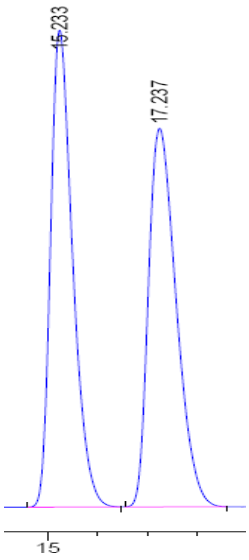
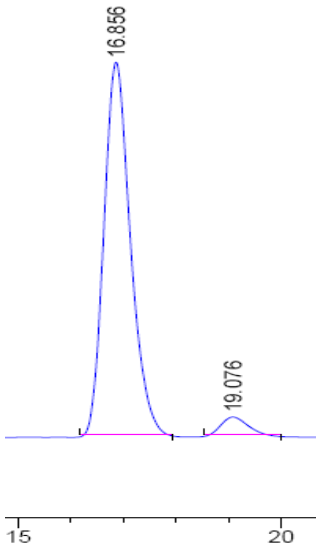
$[\alpha]^{25}_{D}$ = -26.30 (c 1.09, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.55-7.54 (m, 2H, *Ar*), 7.44-7.42 (m, 2H, *Ar*), 7.33-7.21 (m, 9H, *Ar*), 5.75 (s, 1H, C*H*O), 2.74 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 147.4, 143.0, 129.4, 128.7, 128.0, 126.61, 126.59, 125.45, 125.39, 125.35, 125.31, 125.28, 122.8, 75.6 ppm.


OH
Ph
F3C
ppm


OH
Ph
F3C
ppm

(2-Nitro-phenyl)-phenyl-methanol (**4o**) (Table 2, entry 15, 90% ee).

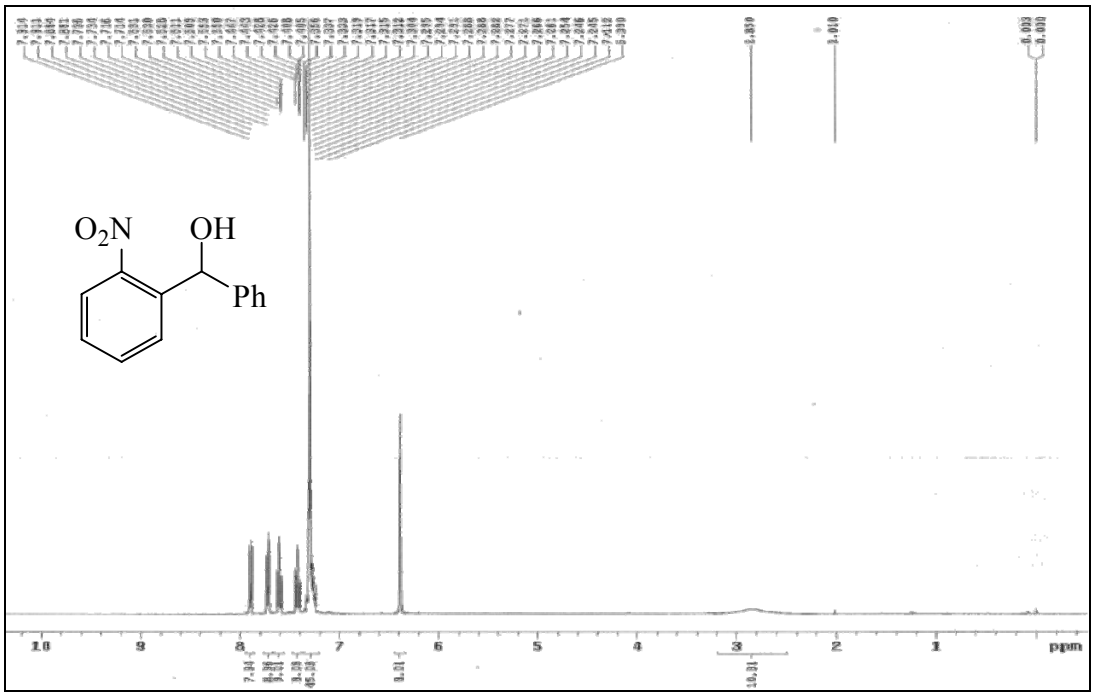
	Column:	Chiralcel OD
	Eluent:	Hexane/IPA = 95/5
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	15.233 min (*R*), 17.237 min (*S*)

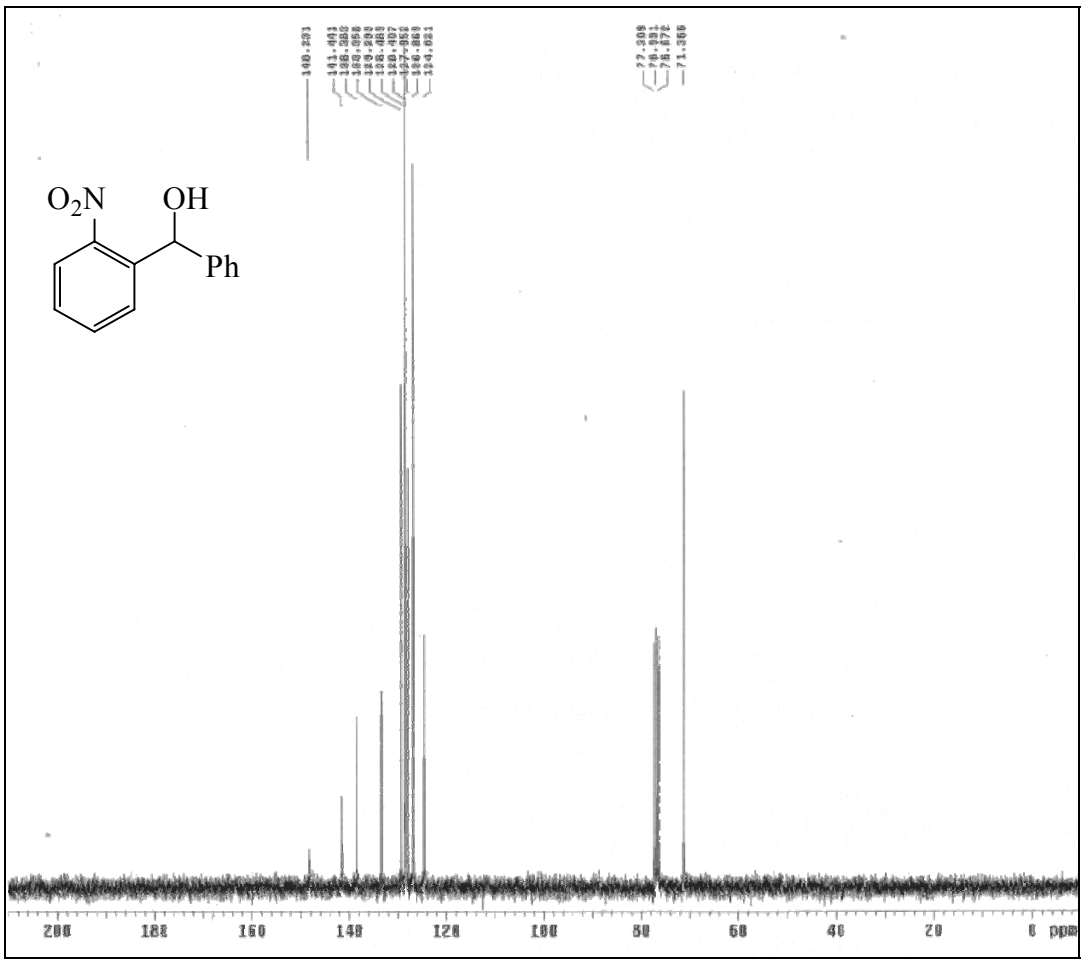
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	15.233	17.237	Time	16.856	19.076
Height(mAU)	288.257	228.820	Height(mAU)	174.229	9.040
Area(mAU-s)	8854.523	8850.021	Area(mAU-s)	6114.328	335.438
Area%	50.013	49.987	Area%	94.799	5.201

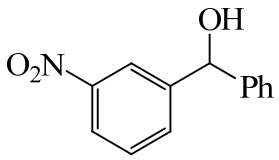
Spectrum Data:

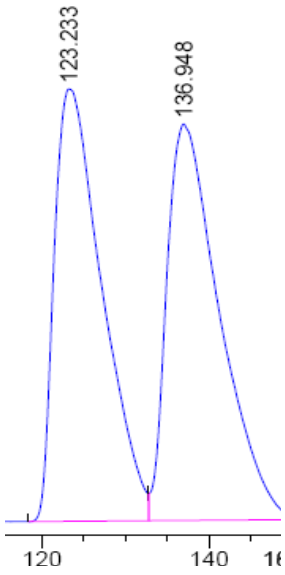
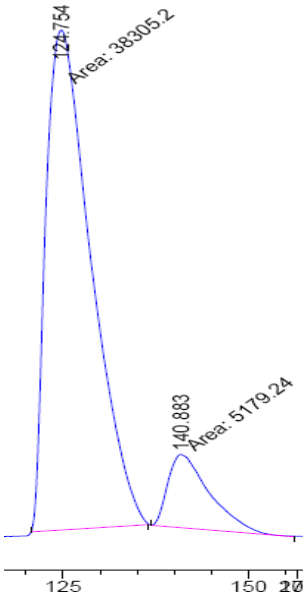
$[\alpha]^{25}_{D}$ = +82.24 (c 1.07, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.90 (dd, *J* = 8.0 Hz and 1.2 Hz, 1H, *Ar*), 7.72 (dd, *J* = 8.0 Hz and 0.8 Hz, 1H, *Ar*), 7.63-7.59 (m, 1H, *Ar*), 7.45-7.40 (m, 1H, *Ar*), 7.36-7.11 (m, 5H, *Ar*), 6.39 (s, 1H, C*H*O), 2.85 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 148.2, 141.4, 138.4, 133.4, 129.3, 128.5, 128.4, 128.0, 126.9, 124.6, 71.4 ppm.


O2N
OH
Ph
ppm


O2N
OH
Ph
ppm

(3-Nitro-phenyl)-phenyl-methanol (**4p**) (Table 2, entry 16, 76% ee).

	Column:	Chiralcel OJ
	Eluent:	Hexane/IPA = 96/4
	Flow rate:	0.7 mL/min
	Detector:	UV, 254 nm
	Retention time: (*S*)	123.233 min (*R*), 136.948 min

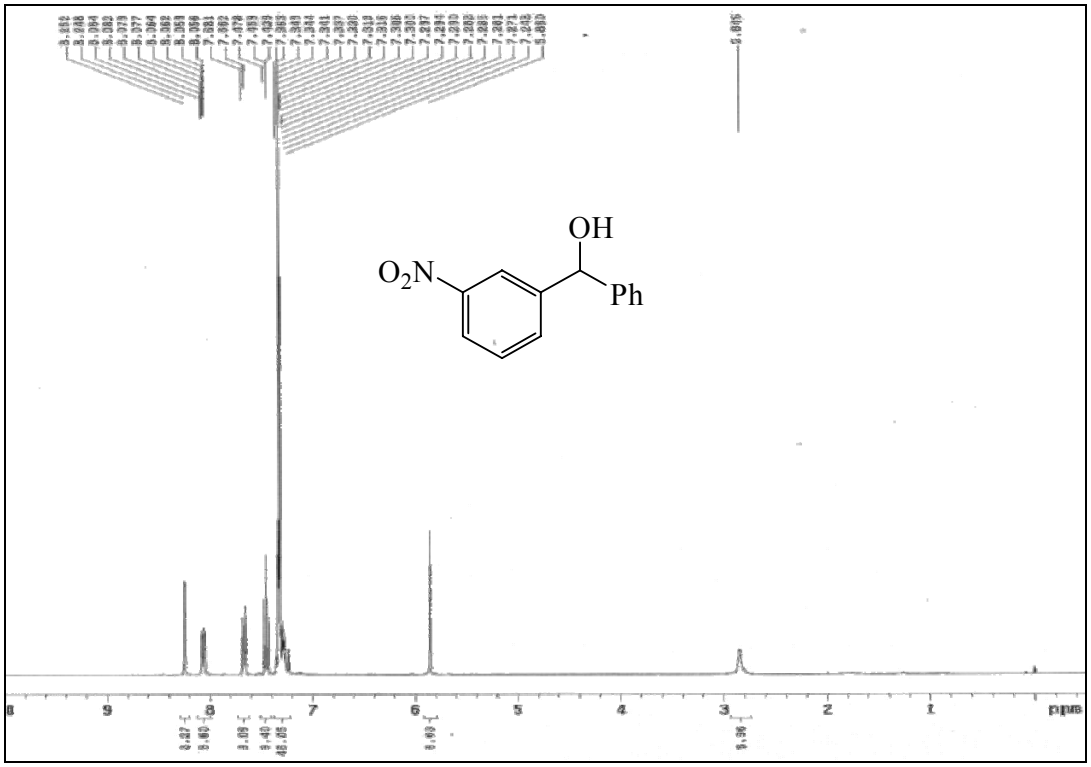
Racemic standard	Catalytic Reaction Product
	

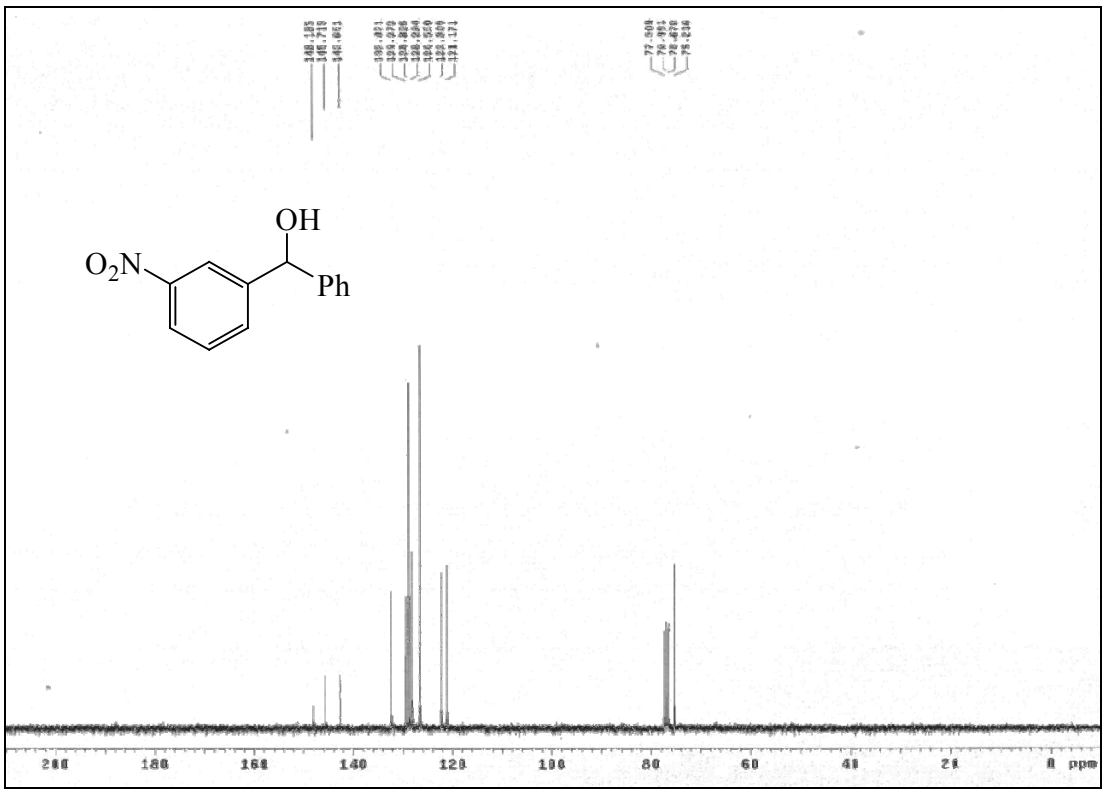
Peak No.	1	2
Time	123.233	136.948
Height(mAU)	55.666	51.053
Area(mAU-s)	2.216	2.242
Area%	49.701	50.299

Peak No.	1	2
Time	124.754	140.883
Height(mAU)	90.461	13.257
Area(mAU-s)	3.83052e4	5179.239
Area%	88.089	11.911

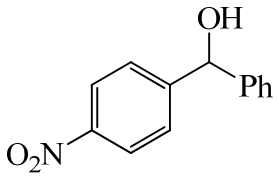
Spectrum Data:

$[\alpha]^{25}_{D}$ = = -42.31 (c 1.04, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.25-8.24 (m, 1H, *Ar*), 8.08-8.05 (m, 1H, *Ar*), 7.68-7.66 (m, 1H, *Ar*), 7.48-7.43 (m, 1H, *Ar*), 7.36-7.24 (m, 5H, *Ar*), 5.86 (s, 1H, C*H*O), 2.85 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 148.2, 145.7, 142.7, 132.4, 129.3, 128.8, 128.2, 126.6, 122.3, 121.2, 75.2 ppm.

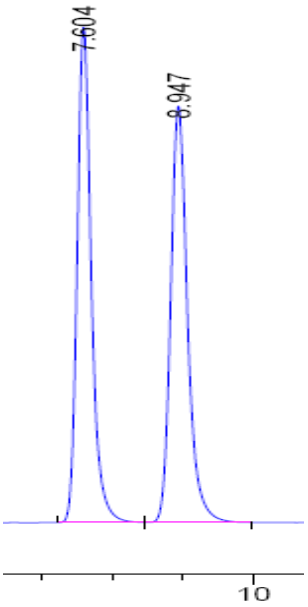
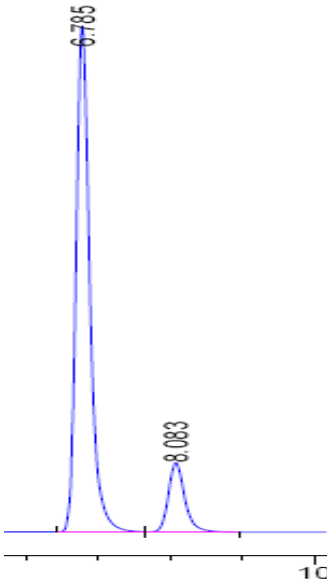

OH
O_2N
Ph
ppm


OH
O_2N
Ph
ppm

(4-Nitro-phenyl)-phenyl-methanol (**4q**) (Table 2, entry 17, 72% ee).



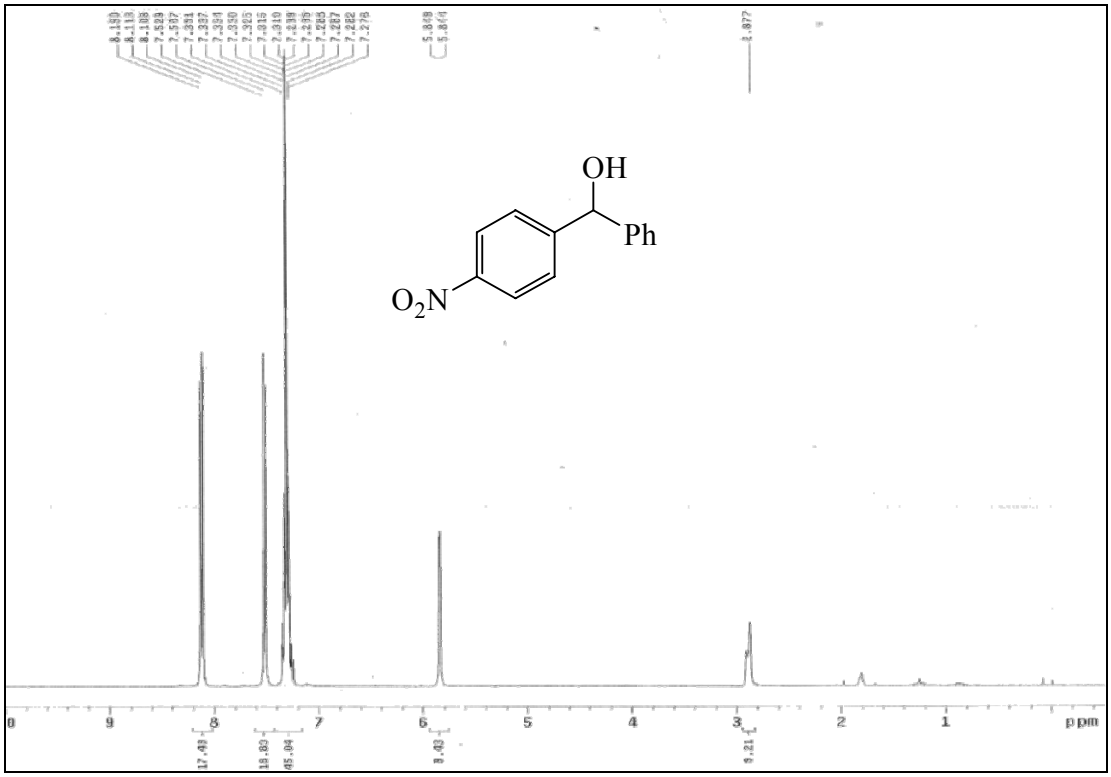
Column:	Chiralcel AD
Eluent:	Hexane/IPA = 84/16
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	7.604 min (*R*), 8.947 min (*S*)

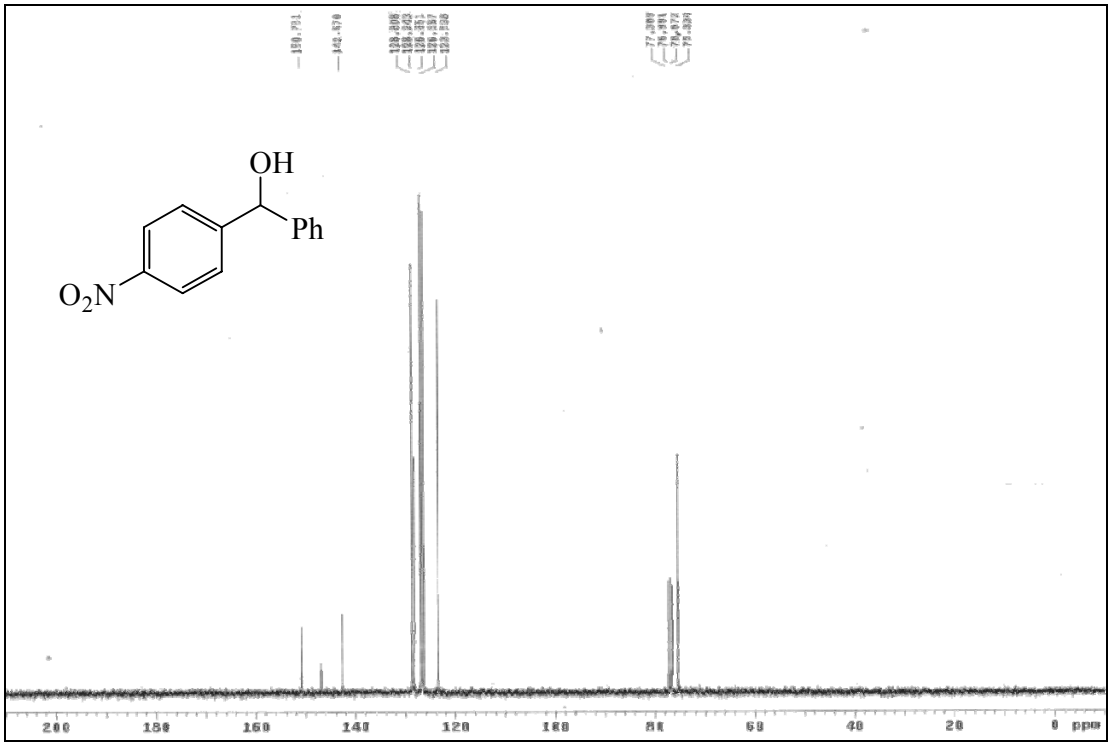
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	7.604	8.947	Time	6.785	8.083
Height(mAU)	449.674	385.078	Height(mAU)	1003.574	135.742
Area(mAU-s)	6656.467	6659.710	Area(mAU-s)	1.39950e4	2296.161
Area%	49.988	50.012	Area%	85.905	14.095

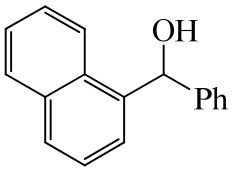
Spectrum Data:

$[\alpha]^{25}_{D}$ = -57.02 (c 1.14, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.13-8.10 (m, 2H, *Ar*), 7.52-7.50 (m, 2H, *Ar*), 7.35-7.28 (m, 5H, *Ar*), 5.85 (d, *J* = 2.0 Hz 1H, C*H*O), 2.88 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 150.8, 147.2, 142.8, 128.8, 128.2, 127.0, 126.6, 123.5, 75.3 ppm.

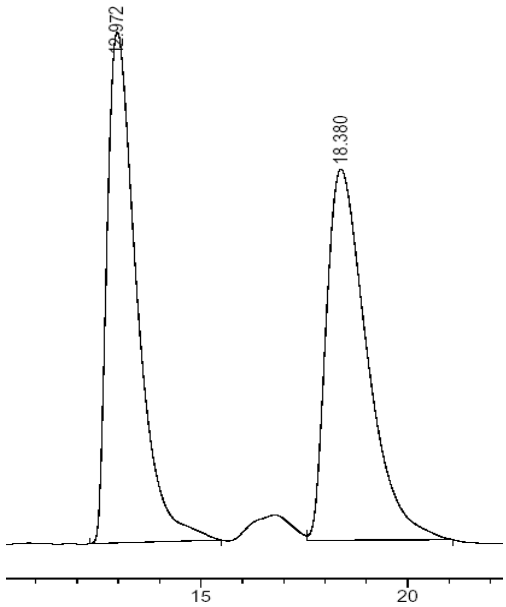
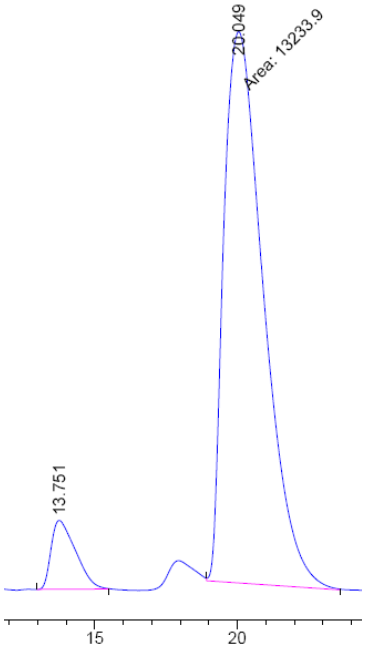

OH
Ph
O_2N
ppm


OH
Ph
O_2N
ppm

Naphthalen-1-yl-phenyl-methanol (**4r**) (Table 2, entry 18, 86% ee)



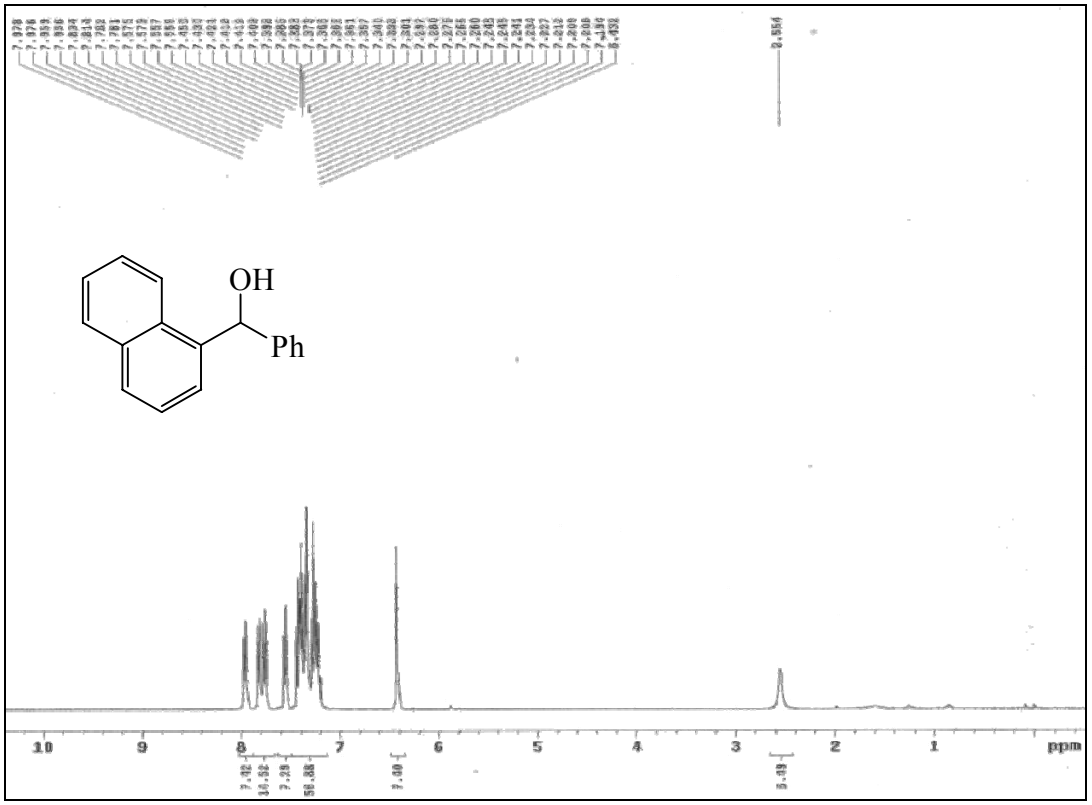
Column:	Chiralcel OJ
Eluent:	Hexane/IPA = 80/20
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	12.972 min (*S*), 18.380 min (*R*)

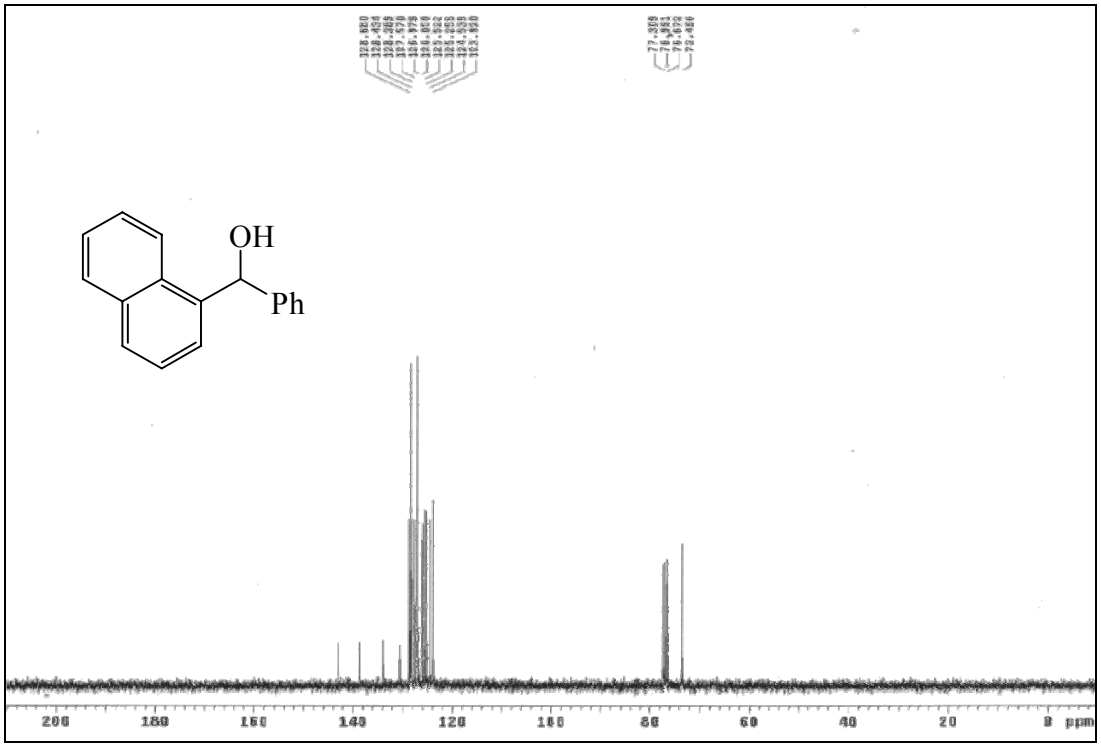
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	12.972	18.380	Time	13.751	20.049
Height(mAU)	280.200	203.455	Height(mAU)	17.046	136.270
Area(mAU-s)	14040000	13910000	Area(mAU-s)	1015.315	1.32339e4
Area%	50.244	49.756	Area%	7.125	92.875

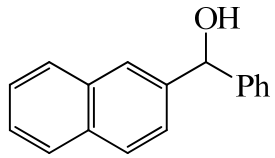
Spectrum Data:

$[\alpha]^{25}_{D}$ = +38.36 (c 1.06, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.98-7.95 (m, 1H, *Ar*), 7.83-7.76 (m, 2H, *Ar*), δ 7.57-7.55 (m, 1H, *Ar*), δ 7.45-7.19 (m, 8H, *Ar*), 6.43 (s, 1H, C*H*O), 2.55 (s, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 143.1, 138.7, 133.9, 130.6, 128.7, 128.43, 128.39, 127.6, 127.0, 126.1, 125.5, 125.3, 124.5, 123.9, 73.5 ppm.

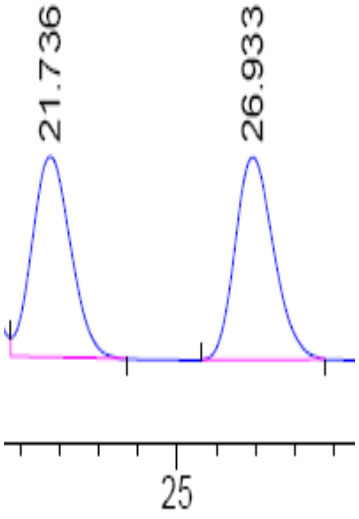
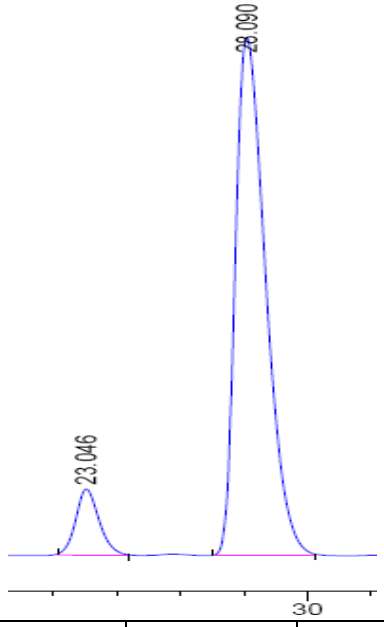

OH
Ph
10
9
8
7
6
5
4
3
2
1
ppm


OH
Ph
200
180
160
140
120
100
80
60
40
20
0
ppm

Naphthalen-2-yl-phenyl-methanol (**4s**) (Table 2, entry 19, 82% ee).



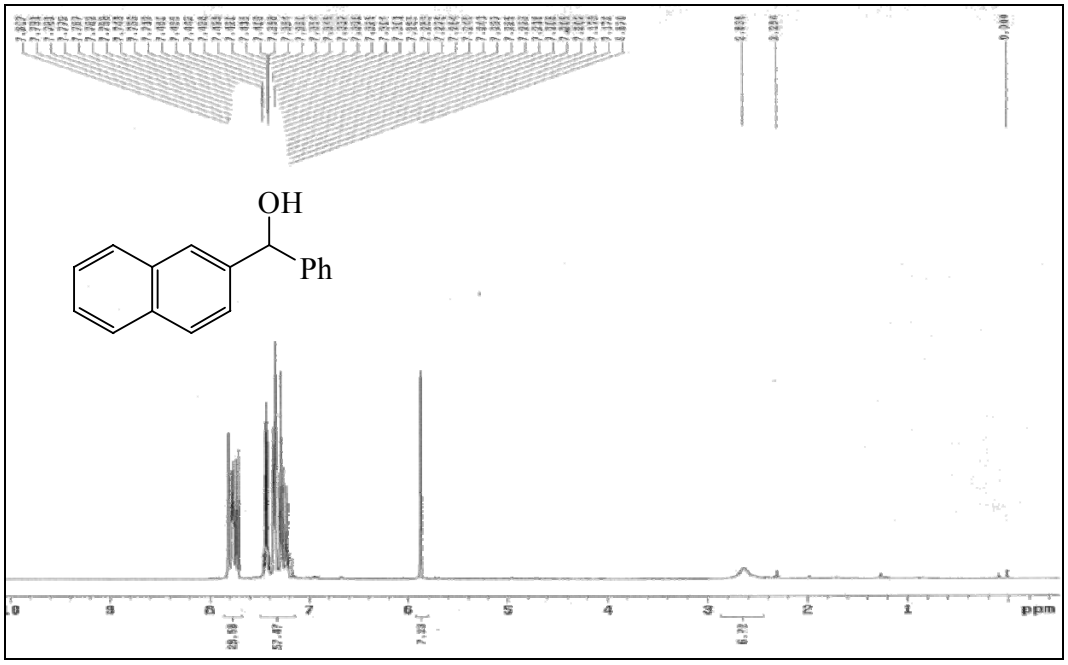
Column:	Chiralcel OD
Eluent:	Hexane/IPA = 95/5
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	21.736 min (*S*), 26.933 min (*R*)

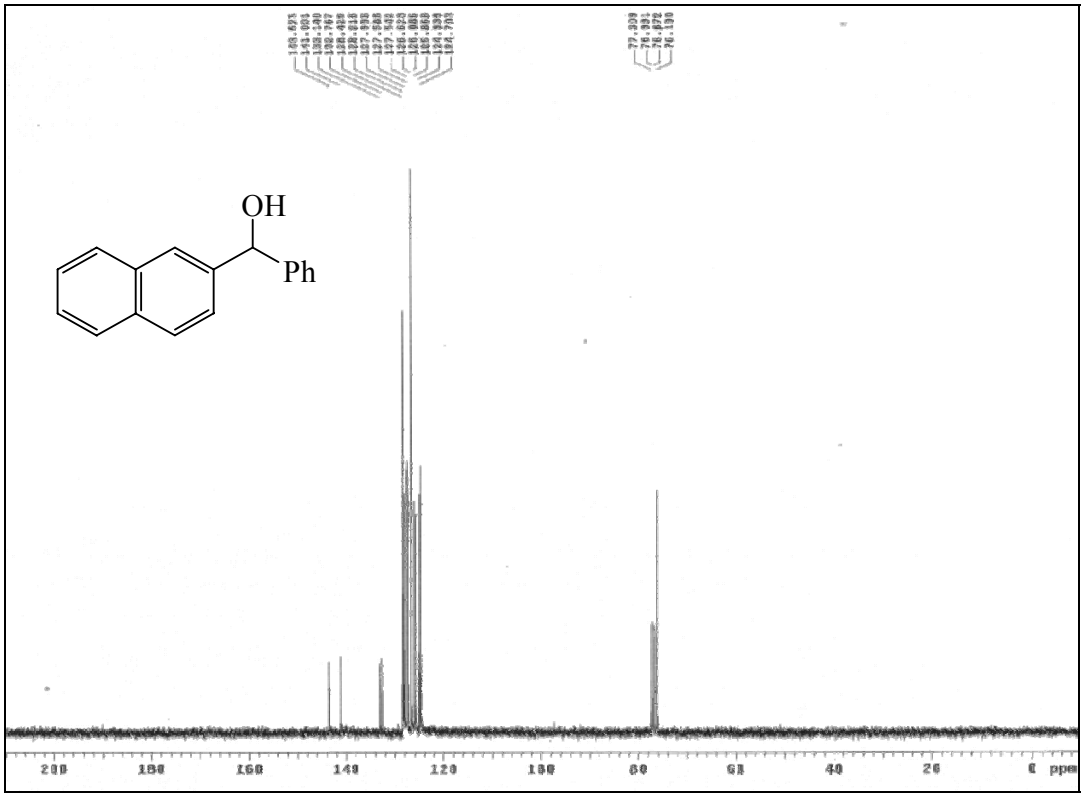
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	21.736	26.933	Time	23.046	28.090
Height(mAU)	25.452	25.723	Height(mAU)	24.005	187.791
Area(mAU-s)	1761.768	1780.118	Area(mAU-s)	1226.596	1.23693e4
Area%	49.741	50.259	Area%	9.022	90.978

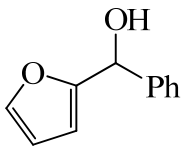
Spectrum Data:

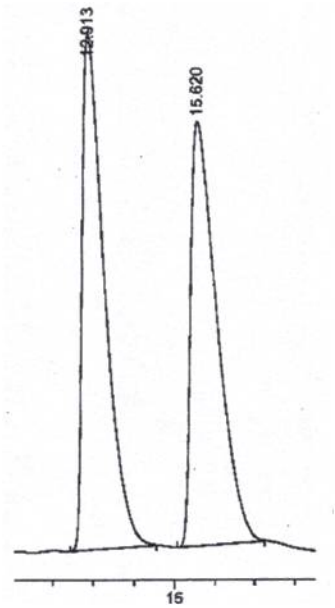
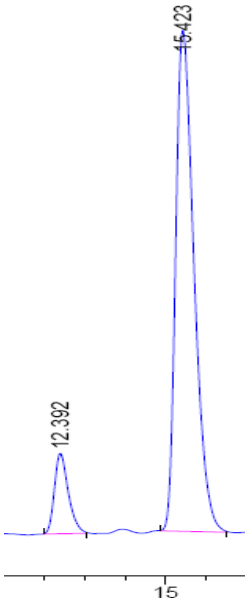
$[\alpha]^{25}_{D}$ = -9.90 (c 1.01, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.41-7.29 (m, 6H), 6.28 (dd, *J* = 2.0, 1.6 Hz, 1H), 6.07 (d, *J* = 1.6, 0.8 Hz) 5.75 (s, 1H), 2.79 (s, 1H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 155.9, 142.4, 140.7, 125.6, 128.3, 127.9, 126.5, 110.1, 107.3, 69.9 ppm.


OH
Ph
ppm


OH
Ph
ppm

Furan-2-yl-phenyl-methanol (**4t**) (Table 2, entry 20, 78% ee).

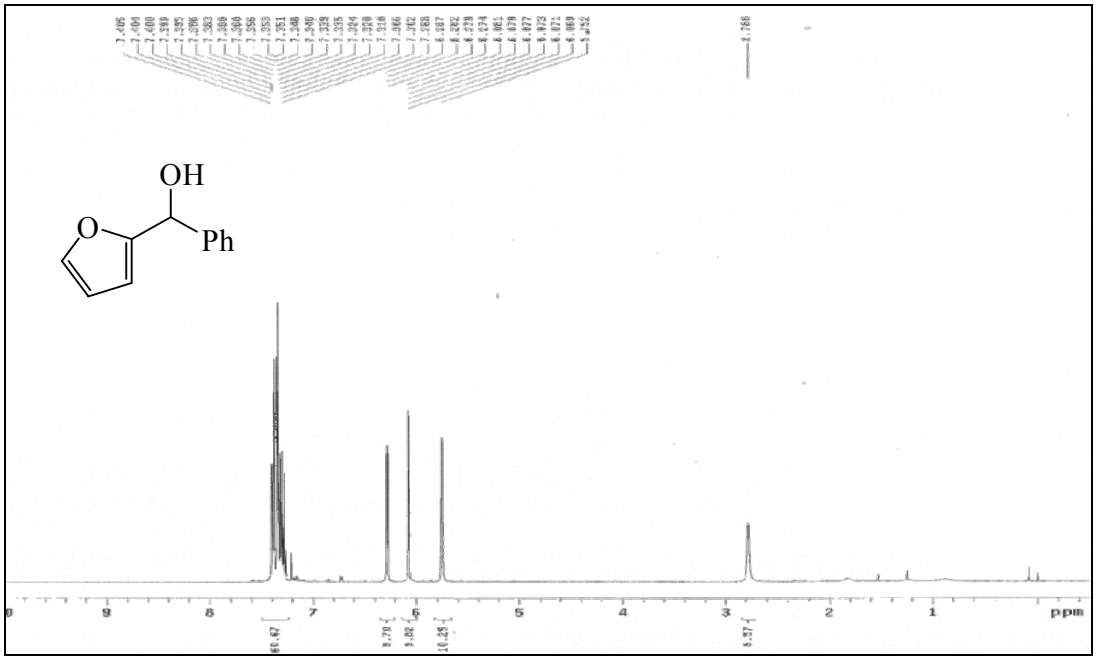
	Column:	Chiralcel OD
	Eluent:	Hexane/IPA = 95/5
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	12.913 min (*S*), 15.620 min (*R*)

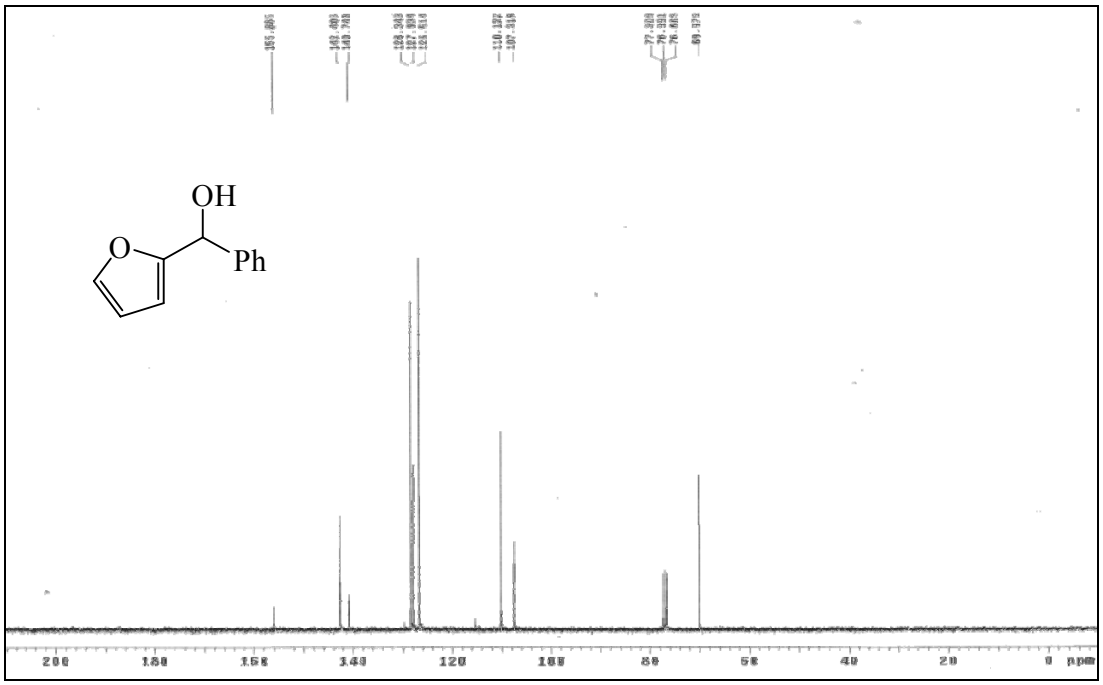
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	12.913	15.620	Time	12.392	15.423
Height(mAU)	178.424	146.731	Height(mAU)	4.629	28.785
Area(mAU-s)	6797.808	6656.792	Area(mAU-s)	110.723	906.779
Area%	50.524	49.476	Area%	10.882	89.118

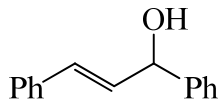
Spectrum Data:

$[\alpha]^{25}_{D}$ = +6.23 (c 1.07, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.41-7.29 (m, 6H), 6.28 (dd, *J* = 2.0, 1.6 Hz, 1H), 6.07 (d, *J* = 1.6, 0.8 Hz) 5.75 (s, 1H), 2.79 (s, 1H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 155.9, 142.4, 140.7, 125.6, 128.3, 127.9, 126.5, 110.1, 107.3, 69.9 ppm.

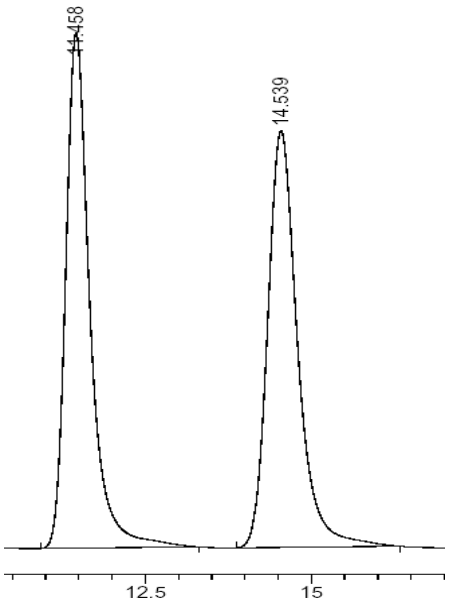
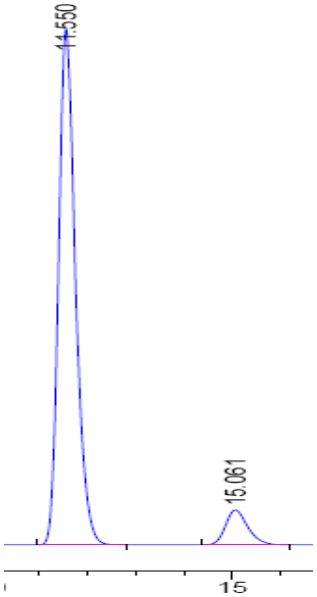

OH
O
Ph
ppm


OH
O
Ph
ppm

(*E*)-1,3-Diphenyl-prop-2-en-1-ol (**4u**) (Table 2, entry 21, 84% ee).



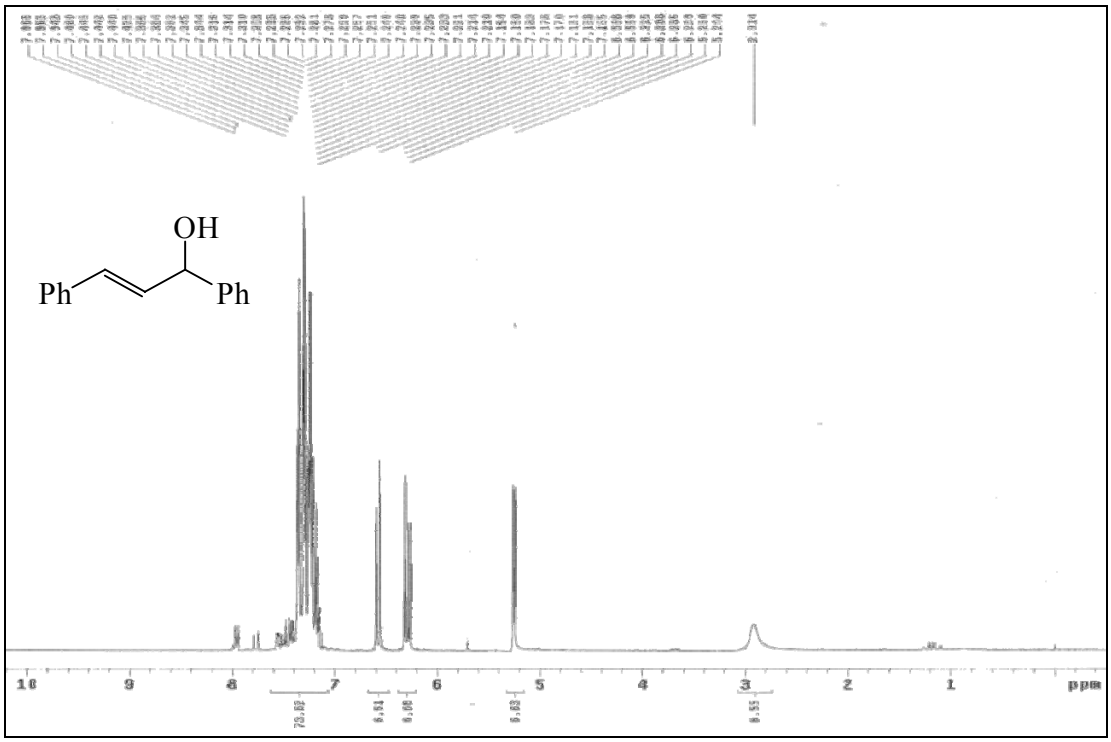
Column:	Chiralcel OD
Eluent:	Hexane/IPA = 88/12
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	11.458 min (*S*), 14.539 min (*R*)

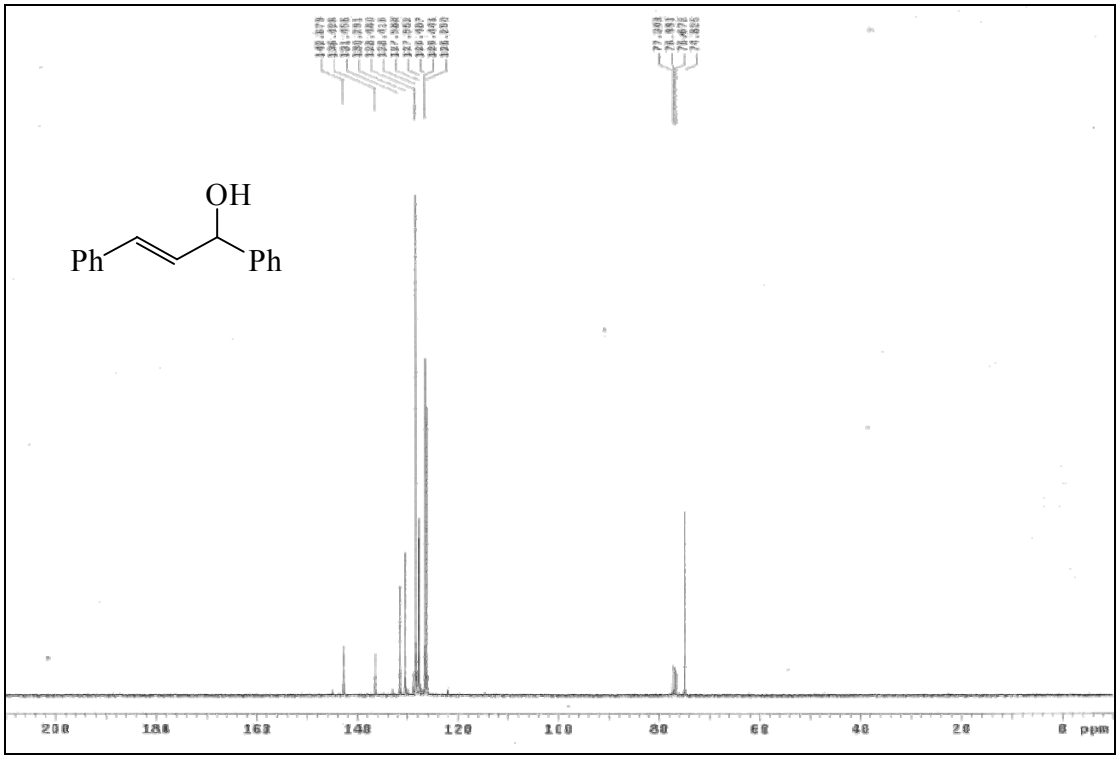
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	11.458	14.539	Time	11.550	15.061
Height(mAU)	788.505	637.287	Height(mAU)	1399.955	94.299
Area(mAU-s)	20002.3	19941.7	Area(mAU-s)	3.40383e4	3017.196
Area%	50.076	49.924	Area%	91.858	8.142

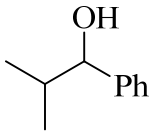
Spectrum Data:

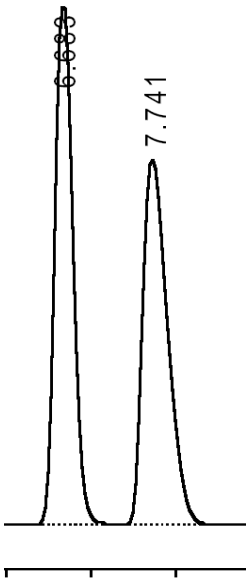
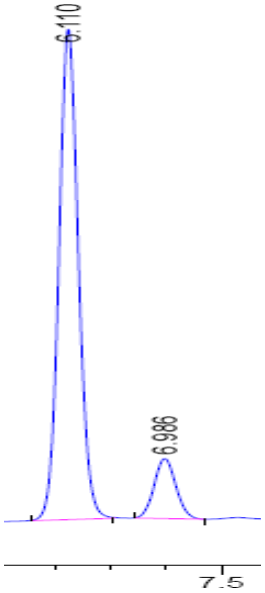
$[\alpha]^{25}_{D}$ = -9.91 (c 0.37, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.48-7.16 (m, 10H), 6.60-6.56 (m, 1H), 6.33-6.27 (m, 1H), 5.26-5.24 (m, 1H), 2.91 (br, 1H) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 142.7, 136.4, 131.5, 130.3, 128.5, 128.4, 127.59, 127.55, 126.5, 126.4, 126.3, 74.8 ppm.


OH
Ph
Ph
10
9
8
7
6
5
4
3
2
1
ppm


OH
Ph
Ph
200
160
120
80
40
0 ppm

2-Methyl-1-phenyl-propan-1-ol (**4v**) (Table 2, entry 22, 76% ee).

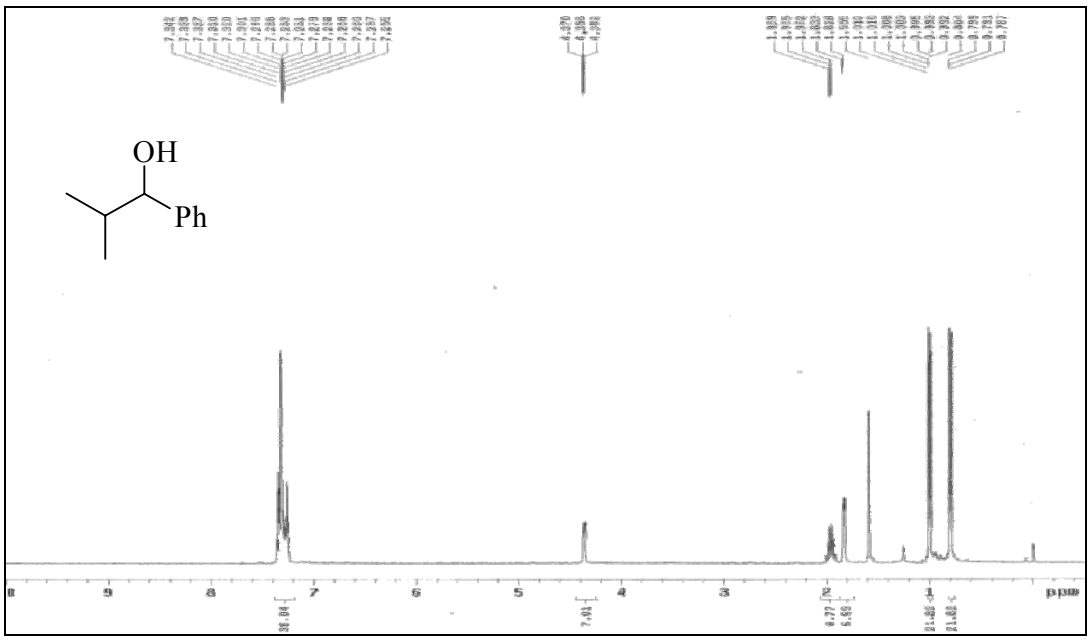
	Column:	Chiralcel OD-H
	Eluent:	Hexane/IPA = 98/2
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	6.683 min (*S*), 7.741 min (*R*)

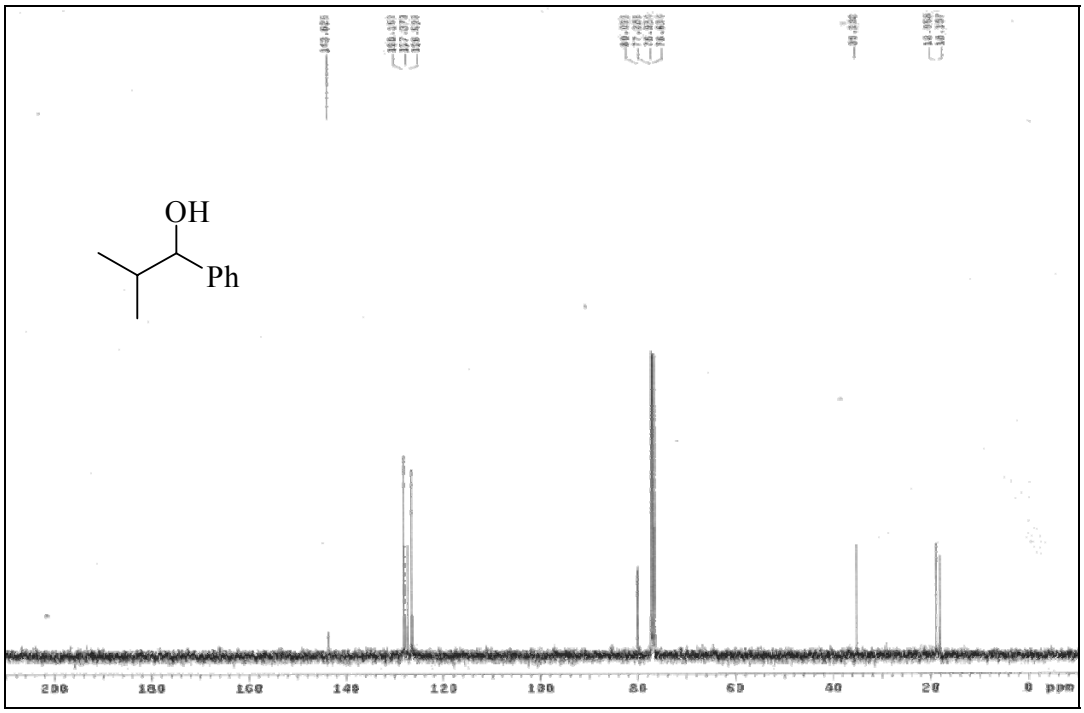
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	6.683	7.741	Time	6.110	6.986
Height(mAU)	211048	148333	Height(mAU)	36.022	4.414
Area(mAU-s)	2758207	2763774	Area(mAU-s)	442.798	60.479
Area%	49.950	50.050	Area%	87.983	12.017

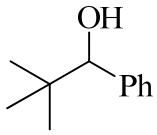
Spectrum Data:

$[\alpha]^{25}_{D}$ = -26.07 (c 1.01, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.34-7.26 (m, 5H, *Ph*), 4.37-4.35 (m, 5H, C*H*Ph), 1.97-1.95 (m, 1H, C*H*$(CH_3)_2$), 1.83 (s, 1H, O*H*), 1.01-0.99 (m, 3H, CH_3), 0.80-0.78 (m, 3H, CH_3) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 143.6, 128.2, 127.4, 126.5, 80.0, 77.3, 77.0, 76.7, 35.2, 19.0, 18.2 ppm.

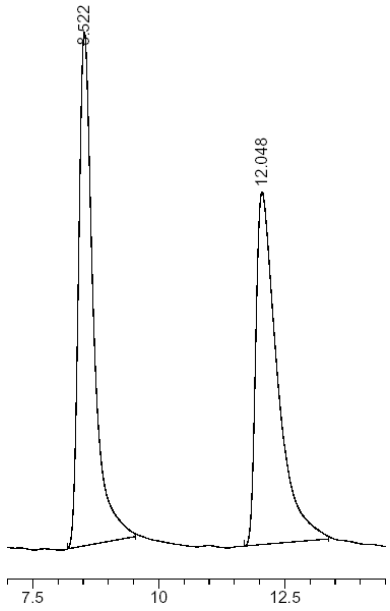
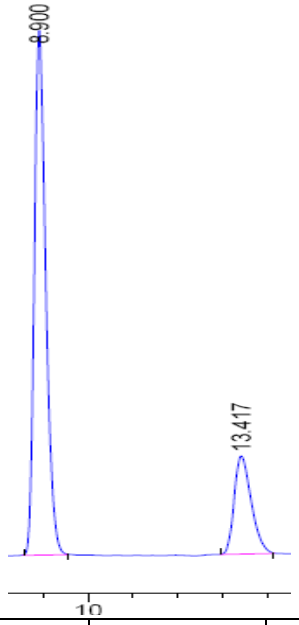

OH
Ph
ppm


OH
Ph
ppm

2,2-Dimethyl-1-phenyl-propan-1-ol (**4w**) (Table 2, entry 23, 56% ee).

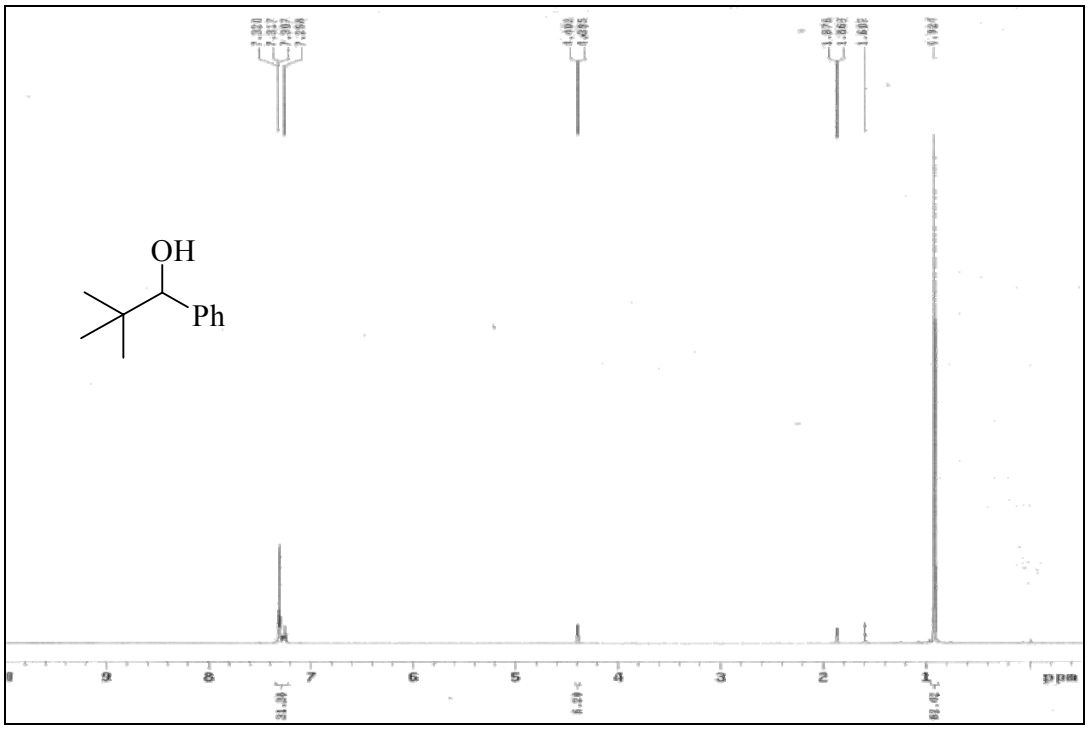


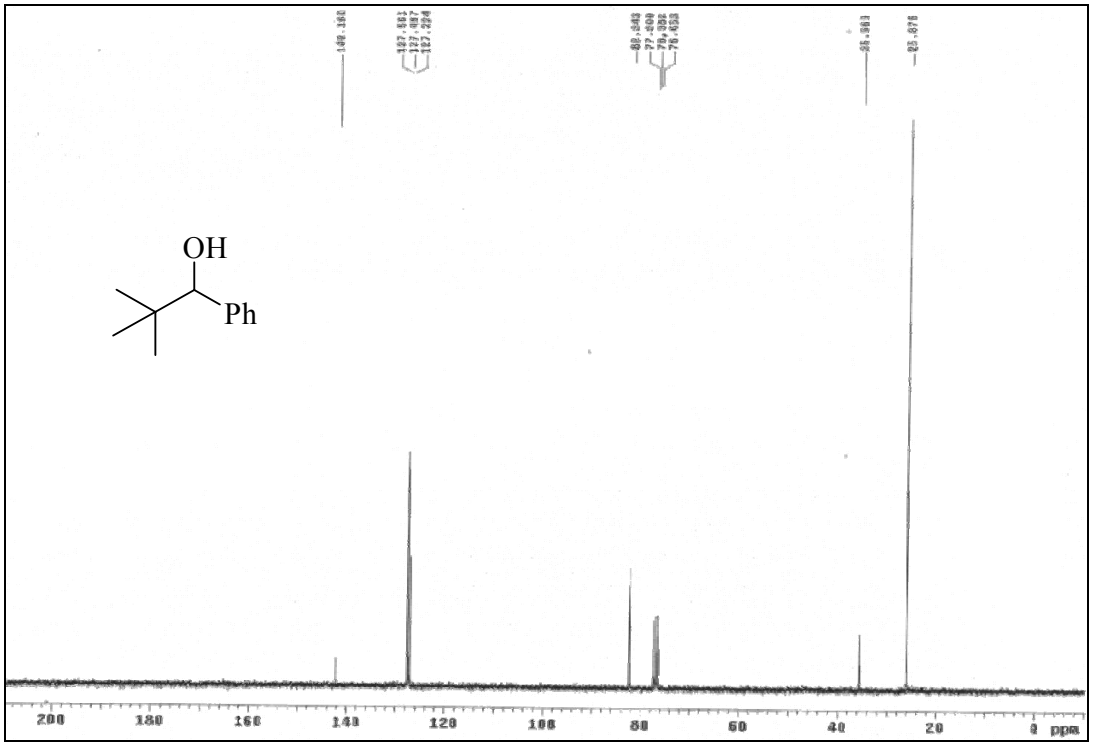
Column:	Chiralcel OD
Eluent:	Hexane/IPA = 98/2
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	8.522 min (*S*), 12.048 min (*R*)

Racemic standard			Catalytic Reaction Product		
					
Peak No.	1	2	Peak No.	1	2
Time	8.522	12.048	Time	8.900	13.417
Height(mAU)	59.378	40.734	Height(mAU)	40.973	7.660
Area(mAU-s)	1219.933	1208.752	Area(mAU-s)	727.084	203.109
Area%	50.230	49.770	Area%	78.165	21.835

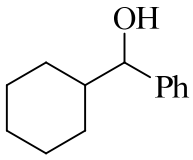
Spectrum Data:

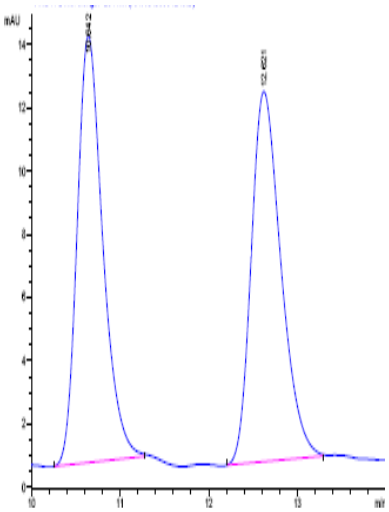
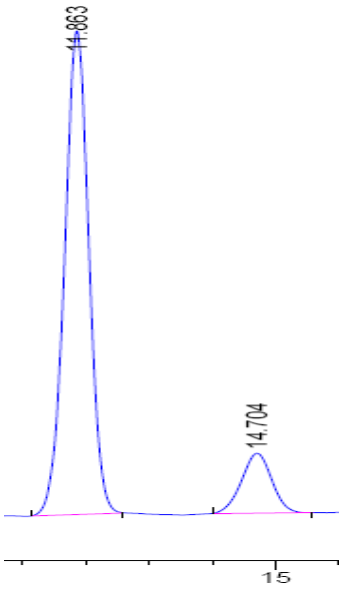
$[\alpha]^{25}_{D}$ = -17.13 (c 1.07, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32-7.29 (m, 5H, *Ph*), 4.40 (d, *J* = 2.8 Hz, 1H, C*H*O), 1.87 (d, *J* = 2.8 Hz, 1H, O*H*), 0.92 (s, 9H, CH_3) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 142.1, 127.6, 127.5, 127.2, 82.3, 35.6, 25.9 ppm.


OH
Ph
9
8
7
6
5
4
3
2
1
ppm


OH
Ph
200
180
160
140
120
100
80
60
40
20
0 ppm

Cyclohexyl-phenyl-methanol (**4x**) (Table 2, entry 24, 73% ee).

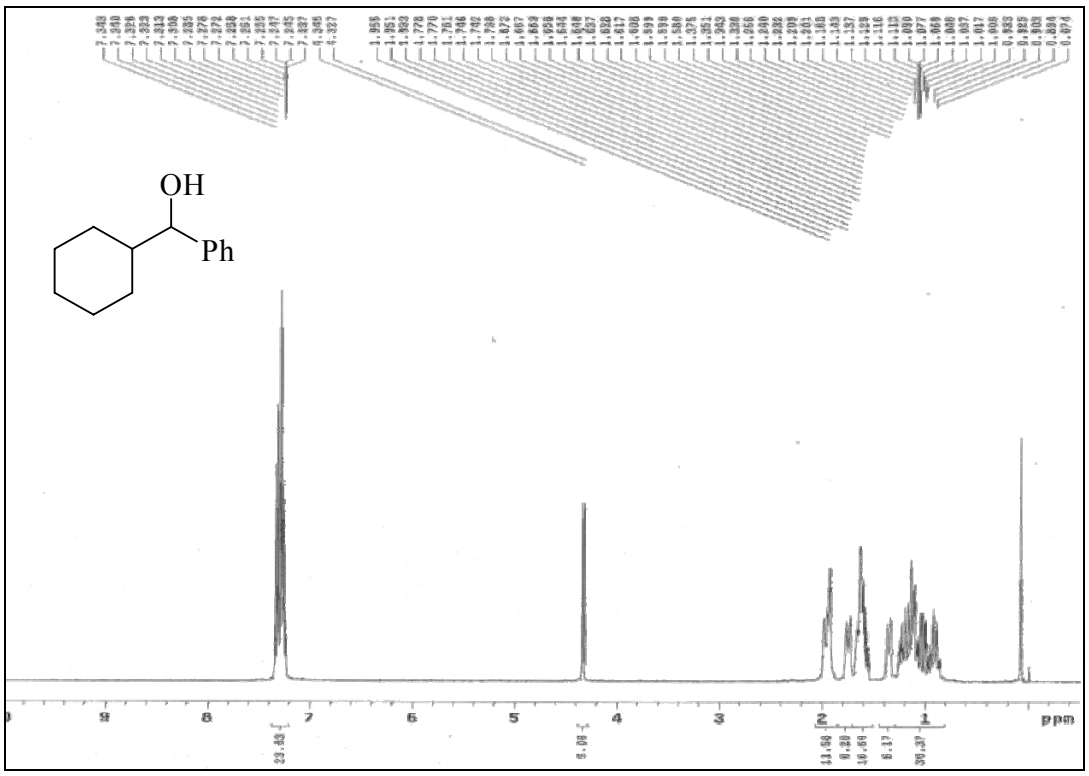
	Column: Chiralcel OD Eluent: Hexane/IPA = 98/2 Flow rate: 1 mL/min Detector: UV, 254 nm Retention time: 10.642 min (*S*), 12.621 min (*R*)

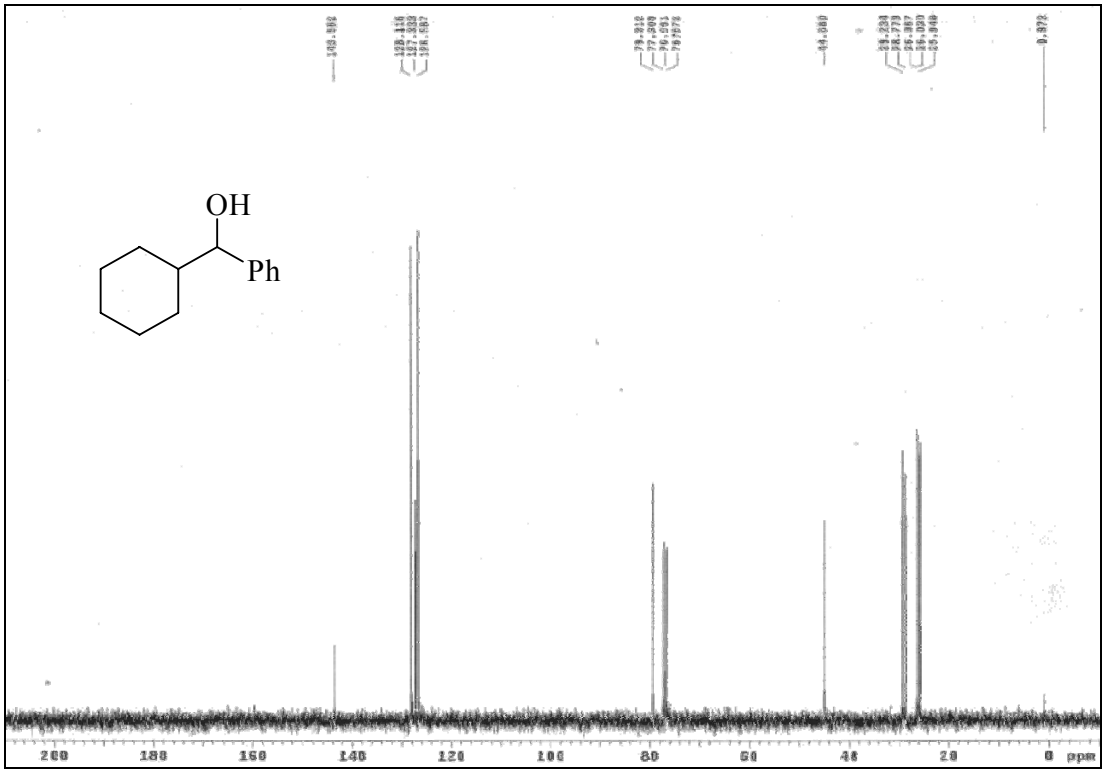
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	10.642	12.621	Time	11.863	14.704
Height(mAU)	13.503	11.705	Height(mAU)	43.560	5.399
Area(mAU-s)	270.926	272.626	Area(mAU-s)	1.96141e4	4176.73096
Area%	49.843	50.156	Area%	86.588	13.412

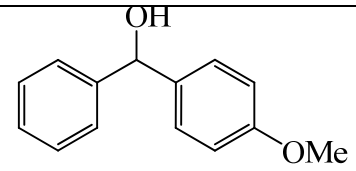
Spectrum Data:

$[\alpha]^{25}_{D}$ = -20.92 (c 1.02, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.34-7.24 (m, 5H, *Ph*), 4.33 (d, *J* = 7.2 Hz, 1H, C*H*O), 1.96-0.89 (m, 11H, O*H* and Cy) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 143.6, 128.1, 127.3, 126.6, 79.3, 44.9, 29.2, 28.8, 26.4, 26.0, 25.9 ppm.

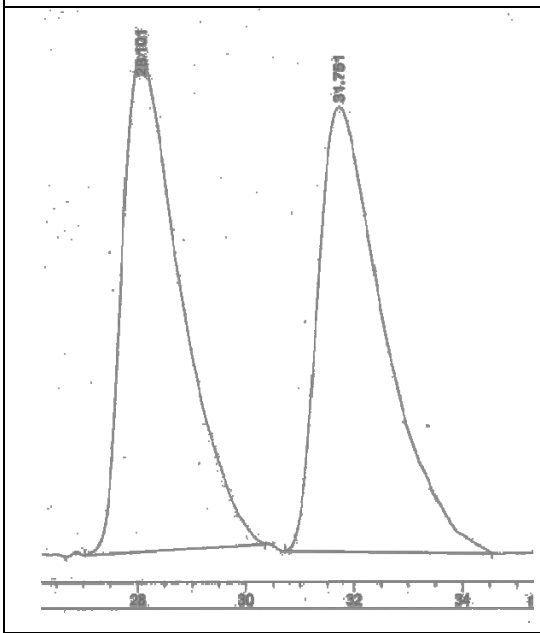
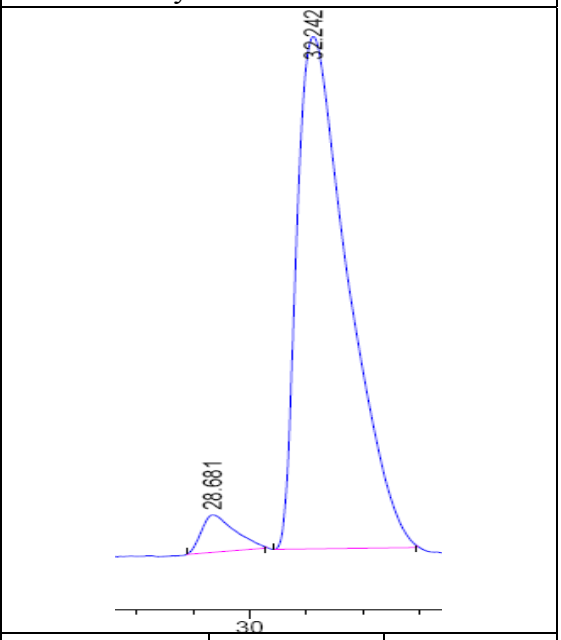

OH
Ph
ppm


OH
Ph
ppm

(4-Methoxy-phenyl)-phenyl-methanol (**4c'**) (Table 2, entry 25, 90% ee).



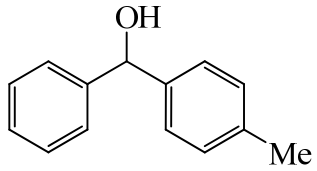
Column:	Chiralcel OJ
Eluent:	Hexane/IPA = 90/10
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	28.101 min (*R*), 31.751 min (*S*)

Racemic standard			Catalytic Reaction Product		
					
Peak No.	1	2	Peak No.	1	2
Time	28.101	31.751	Time	28.681	32.242
Height(mAU)	20.899	18.678	Height(mAU)	1.176	16.027
Area(mAU-s)	1571.790	1584.489	Area(mAU-s)	96.129	2011.535
Area%	49.799	50.201	Area%	4.561	95.439

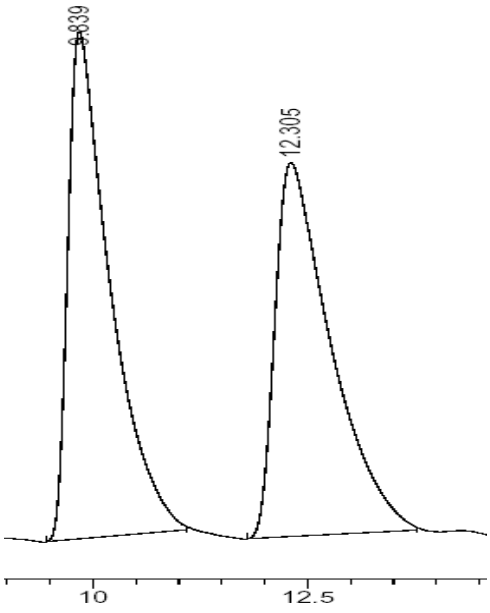
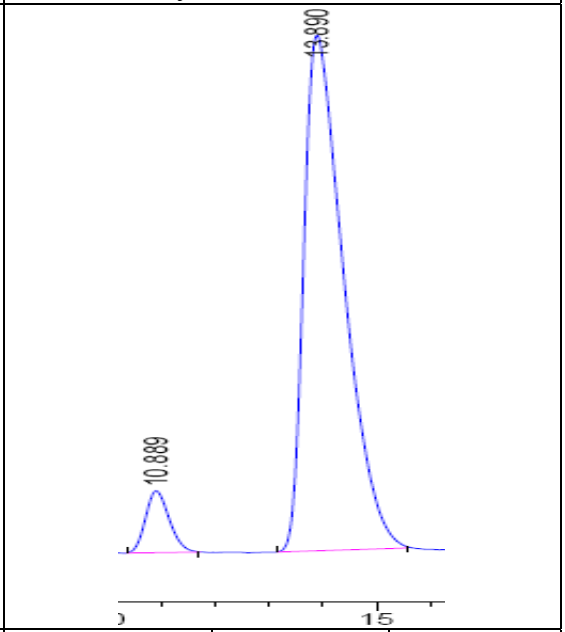
Spectrum Data:

$[\alpha]^{25}_{D}$ = +4.44 (c 1.05, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.39-6.85 (m, 9H, *Ar*), 5.81 (d, *J* = 2.0 Hz, 1H, C*H*O), 3.79 (s, 3H, OCH_3), 2.19 (d, *J* = 3.2 Hz 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 158.9, 144.0, 136.1, 128.6, 128.5, 128.4, 127.9, 127.3, 127.0, 126.4, 113.8, 75.7, 55.2 ppm.

(4-Methyl-phenyl)-phenyl-methanol (**4f'**) (Table 2, entry 26, 87% ee).



Column:	Chiralcel OB-H
Eluent:	Hexane/IPA = 95/5
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	9.839 min (*R*), 12.305 min (*S*)

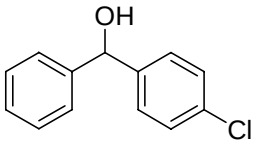
Racemic standard	Catalytic Reaction Product
	

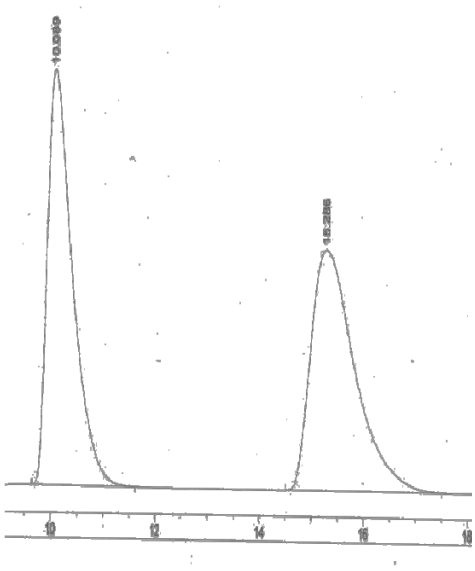
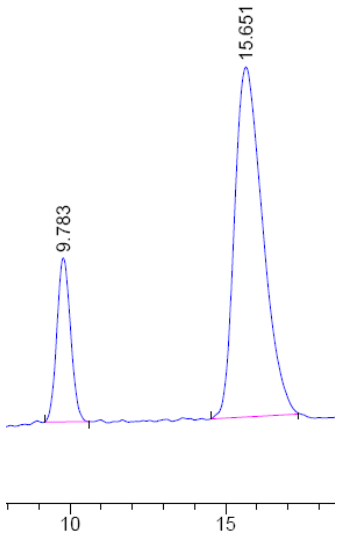
Peak No.	1	2	Peak No.	1	2
Time	9.839	12.305	Time	10.889	13.890
Height(mAU)	33.884	24.974	Height(mAU)	2.052	17.083
Area(mAU-s)	1163.255	1124.632	Area(mAU-s)	63.013	884.941
Area%	50.844	49.156	Area%	6.647	93.353

Spectrum Data:

$[\alpha]^{25}_{D}$ = -4.85 (c 1.10, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ7.32-7.09 (m, 9H, *Ar*), 5.69 (s, 1H, C*H*O), 2.51 (br, 1H, O*H*), 2.29 (s, 3H, CH_3), ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 144.3, 141.3, 137.5, 129.5, 128.7, 127.7, 126.9, 126.8, 76.3, 21.4 ppm.

(4-Chloro-phenyl)-phenyl-methanol (**4i'**) (Table 2, entry 27, 62% ee).

	Column:	Chiralcel OB-H
	Eluent:	Hexane/IPA = 92/8
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	10.089 min (*R*), 15.286 min (*S*)

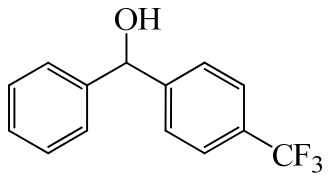
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	10.089	15.286	Time	9.783	14.082
Height(mAU)	160.592	92.939	Height(mAU)	3.507	7.484
Area(mAU-s)	5346.728	5440.219	Area(mAU-s)	107.321	471.456
Area%	49.567	50.433	Area%	18.543	81.457

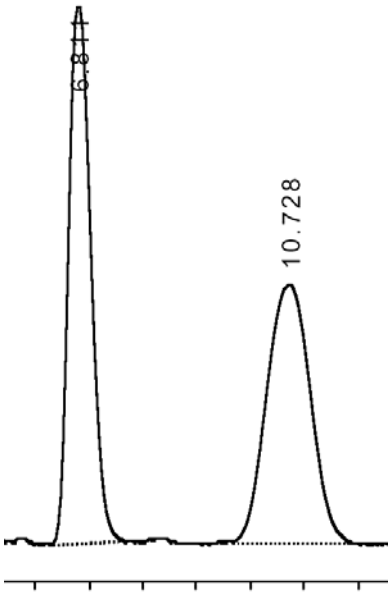
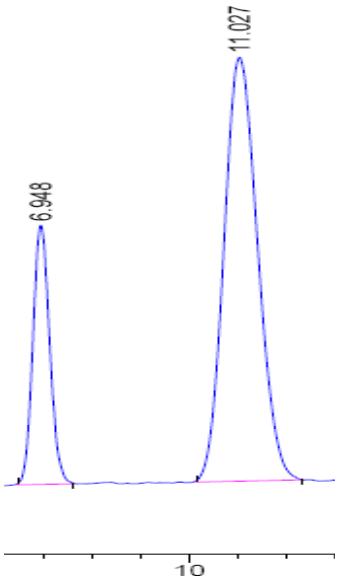
Spectrum Data:

$[\alpha]^{25}_{D}$ = -12.21 (c 1.01, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.33-7.26 (m, 9H, *Ar*), 5.76 (s, 1H, C*H*O), 2.48 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 143.4, 142.1, 133.2, 129.3, 128.6, 128.5, 127.83, 127.80, 126.5, 116.6, 75.5 ppm.

(4-Trifluoromethyl-phenyl)-phenyl-methanol (**4n'**) (Table 2, entry 28, 53% ee).



Column:	Chiralcel OB-H
Eluent:	Hexane/IPA = 94/6
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	6.811 min (*R*), 10.728 min (*S*)

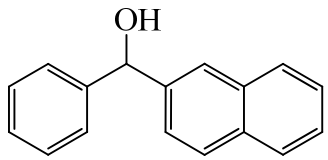
Racemic standard	Catalytic Reaction Product
	

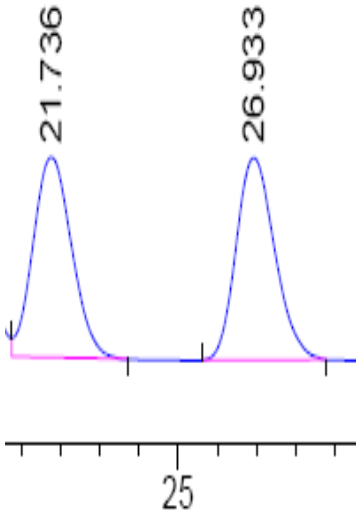
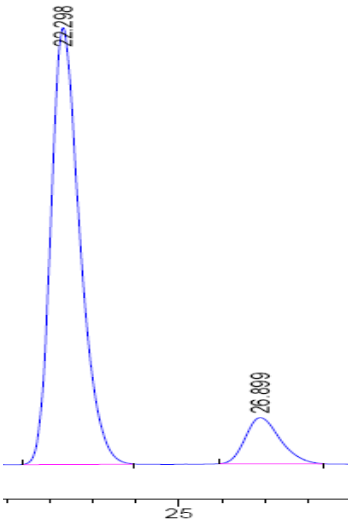
Peak No.	1	2	Peak No.	1	2
Time	6.811	10.728	Time	6.948	11.027
Height(mAU)	367614	177379	Height(mAU)	5.397	8.823
Area(mAU-s)	9539451	9568137	Area(mAU-s)	129.472	423.845
Area%	49.924	50.075	Area%	23.399	76.601

Spectrum Data:

$[\alpha]^{25}_{D}$ = +23.71 (c 0.97, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.55-7.21 (m, 9H, *Ar*), 5.75 (s, 1H, C*H*O), 2.74 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 147.4, 143.0, 129.4, 128.7, 128.0, 126.61, 126.59, 125.45, 125.39, 125.35, 125.31, 125.28, 122.8, 75.6 ppm.

Naphthalen-2-yl-phenylmethanol (**4s')** (Table 2, entry 29, 77% ee).

	Column:	Chiralcel OD
	Eluent:	Hexane/IPA = 95/5
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	21.736 min (*S*), 26.933 min (*R*)

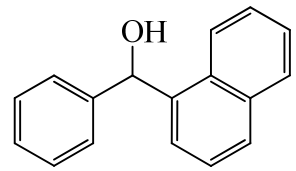
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	21.736	26.933	Time	22.298	26.899
Height(mAU)	25.452	25.723	Height(mAU)	52.692	5.577
Area(mAU-s)	1761.768	1780.118	Area(mAU-s)	2479.387	316.437
Area%	49.741	50.259	Area%	88.682	11.318

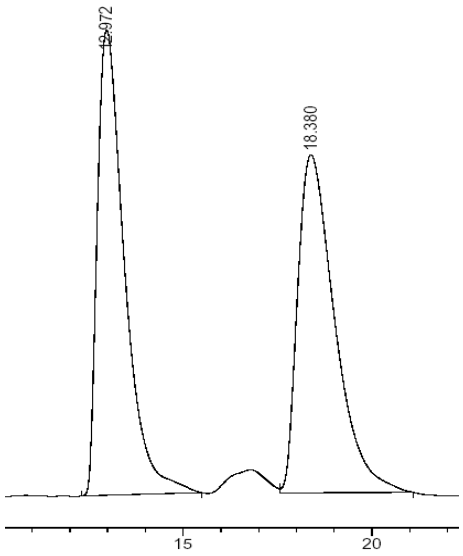
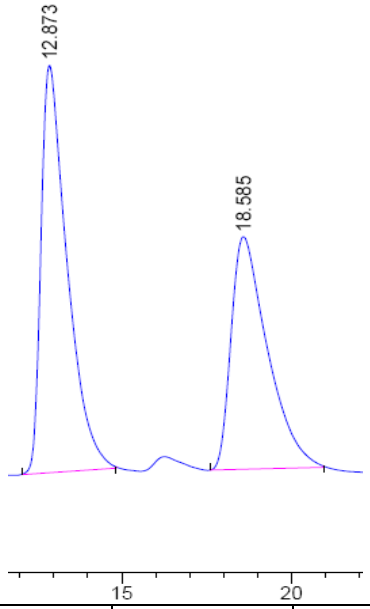
Spectrum Data:

$[\alpha]^{25}_{D}$ = +7.77 (c 1.03, CH_2Cl_2). ^{1}H NMR (100 MHz, $CDCl_3$): δ 7.81-7.17 (m, 12H, *Ar*), 5.87 (s, 1H, C*H*O), 2.64 (br, 1H, O*H*) ppm. ^{13}C NMR (100MHz, $CDCl_3$): δ 143.5, 141.0, 133.1, 132.8, 128.4, 128.2, 128.0, 127.6, 127.5, 126.6, 126.1, 125.9, 124.9, 76.2 ppm.

Naphthalen-1-yl-phenyl-methanol **(4r')** (Table 2, entry 30, 12% ee).



Column:	Chiralcel OJ
Eluent:	Hexane/IPA = 80/20
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	12.972 min (*S*), 13.380 min (*R*)

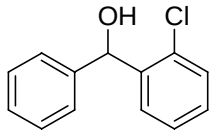
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	12.972	18.380	Time	12.873	18.585
Height(mAU)	280.200	203.455	Height(mAU)	28.787	16.439
Area(mAU-s)	14040000	13910000	Area(mAU-s)	1541.957	1223.888
Area%	50.244	49.756	Area%	55.750	44.250

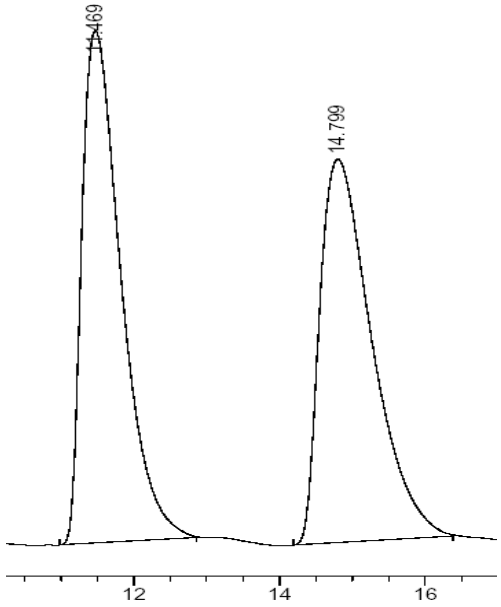
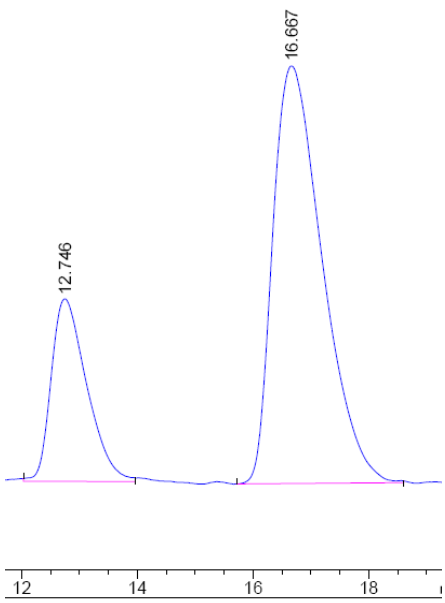
Spectrum Data:

$[\alpha]^{25}_{D}$ = -1.23 (c 1.08, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.98-7.19 (m, 12H, *Ar*), 6.43 (s, 1H, C*H*O), 2.55 (s, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 128.7, 128.43, 128.39, 127.6, 127.0, 126.1, 125.5, 125.3, 124.5, 123.9, 73.5 ppm.

(2-Chloro-phenyl)-phenyl-methanol (**4g'**) (Table 2, entry 32, 52% ee).



Column:	Chiralcel OJ
Eluent:	Hexane/IPA = 80/20
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	11.469 min (*R*), 14.799 min (*S*)

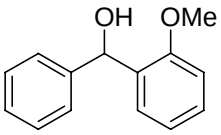
Racemic standard	Catalytic Reaction Product
	

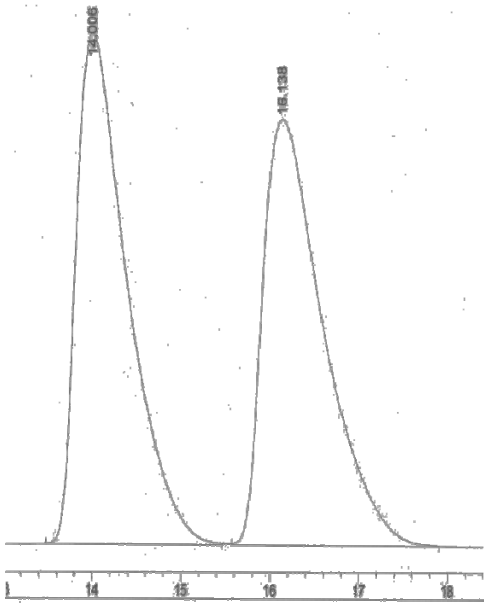
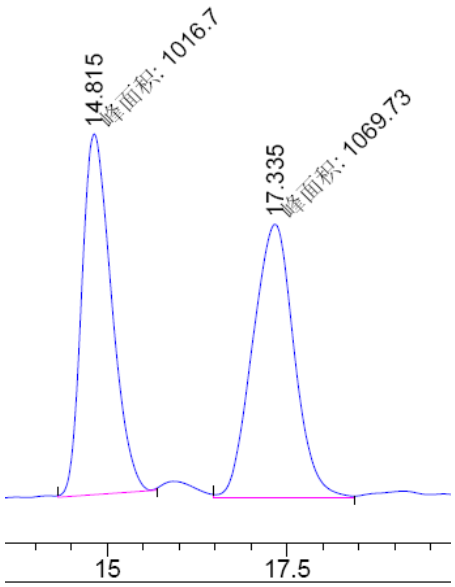
Peak No.	1	2	Peak No.	1	2
Time	11.469	14.799	Time	12.746	16.667
Height(mAU)	32.271	24.132	Height(mAU)	3.509	8.029
Area(mAU-s)	1208.563	1197.088	Area(mAU-s)	149.946	477.139
Area%	50.239	49.762	Area%	23.912	76.088

Spectrum Data:

$[\alpha]^{25}_{D}$ = - 3.5 (c 1.0, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.58-7.56 (m, 1H, *Ar*), 7.36-7.17 (m, 8H, *Ar*), 6.17 (s, 1H, C*H*O), 2.60 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 142.2, 140.9, 132.4, 129.5, 128.7, 128.4, 128.0, 127.7, 127.0, 126.9, 72.6 ppm.

(2-Methoxy-phenyl)-phenyl-methanol (**4a'**) (Table 2, entry 33; 3% ee)**.**

	Column:	Chiralcel OJ
	Eluent:	Hexane/IPA = 90/10
	Flow rate:	1 mL/min
	Detector:	UV, 254 nm
	Retention time:	14.006 min (*R*), 16.138 min (*S*)

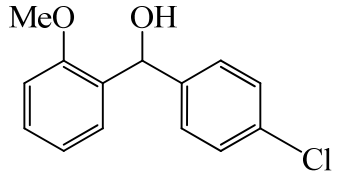
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	14.006	16.138	Time	14.815	17.335
Height(mAU)	62.690	52.299	Height(mAU)	35.261	26.688
Area(mAU-s)	2490.158	2469.972	Area(mAU-s)	1016.7	1069.73
Area%	50.204	49.797	Area%	48.72	51.27

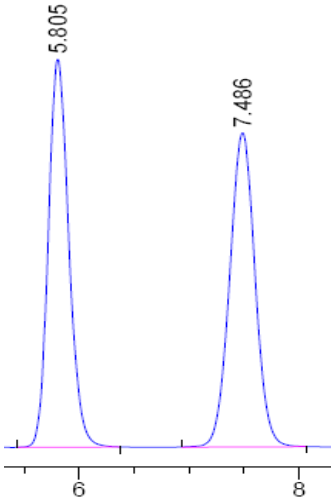
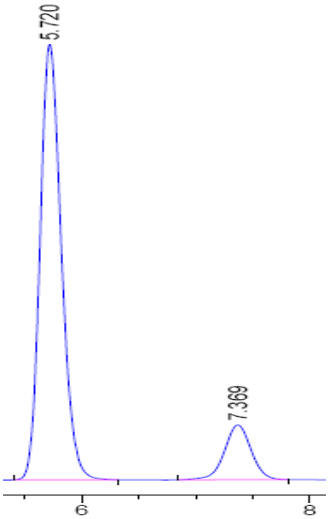
Spectrum Data:

^{1}H NMR (400 MHz, $CDCl_3$): δ 7.38-7.21 (m, 7H, *Ar*), 6.94-6.85 (m, 2H, *Ar*), 6.03 (s, 1H, C*H*O), 3.77 (s, 3H, OCH_3), 3.12 (br, 1H, O*H*) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 156.6, 143.2, 131.9, 128.6, 128.1, 127.7, 127.1, 126.5, 120.7, 110.6, 72.1, 55.3 ppm.

(4-Chloro-phenyl)-(2-methoxy-phenyl)-methanol (**4y**) (Table 2, entry 34, 72% ee).

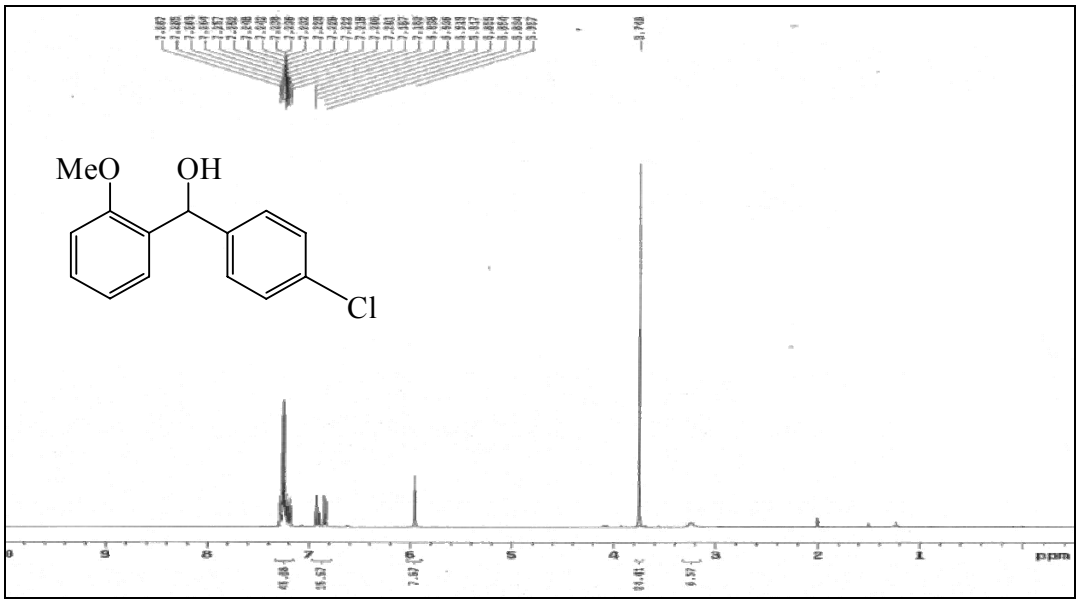


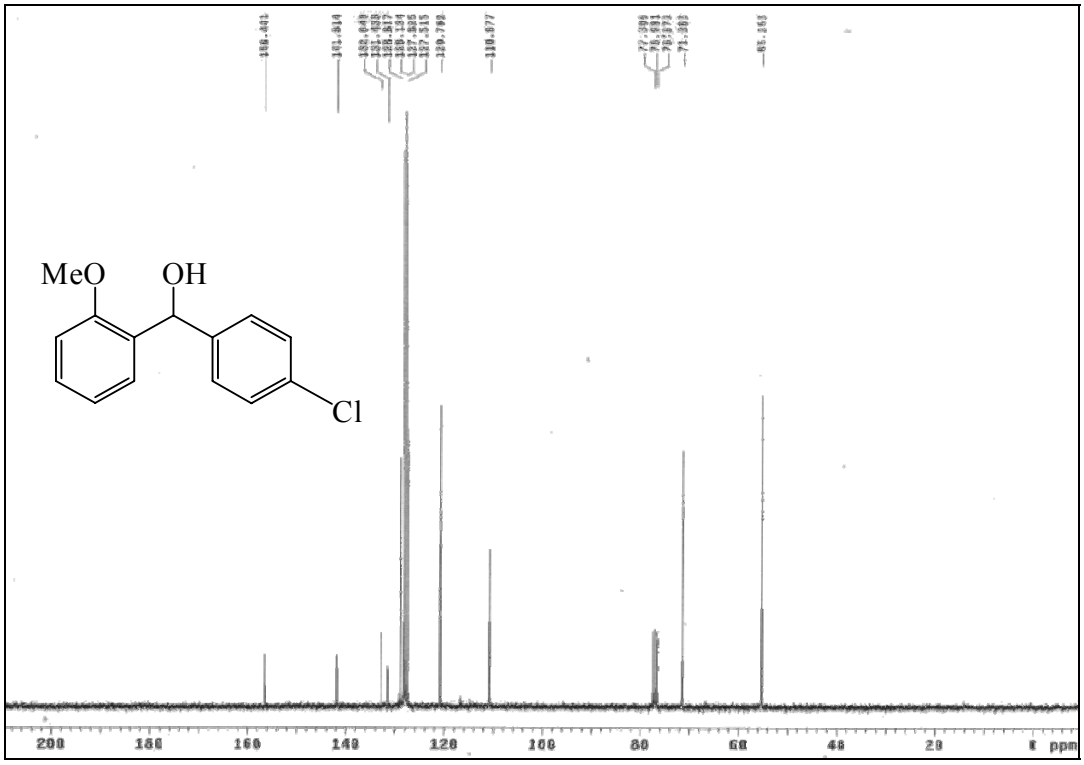
Column:	Chiralcel OD-H
Eluent:	Hexane/IPA = 90/10
Flow rate:	1 mL/min
Detector:	UV, 254 nm
Retention time:	5.805 min (*S*), 7.486 min (*R*)

Racemic standard			Catalytic Reaction Product		
					
Peak No.	1	2	Peak No.	1	2
Time	5.805	7.486	Time	5.720	7.369
Height(mAU)	77.816	63.018	Height(mAU)	120.458	15.136
Area(mAU-s)	1009.424	1014.097	Area(mAU-s)	1557.304	246.490
Area%	49.885	50.115	Area%	86.335	13.665

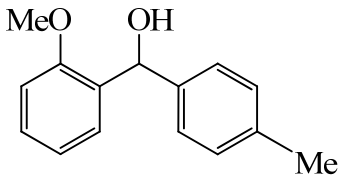
Spectrum Data:

$[\alpha]^{25}_{D}$ = +44.34 (c 1.06, CH_2Cl_2). ^{1}H NMR (400 MHz, CDCl3): δ 7.29-7.18 (m, 6H, *Ar*), 6.93-6.83 (m, 2H, *Ar*), 5.96 (s, 1H, C*H*O), 3.75 (s, 3H, OCH_3) ppm. ^{13}C NMR (100 MHz, CDCl3): δ 156.4, 141.8, 132.6, 131.4, 128.8, 128.1, 127.8, 127.5, 120.8, 110.7, 71.4, 55.3 ppm.

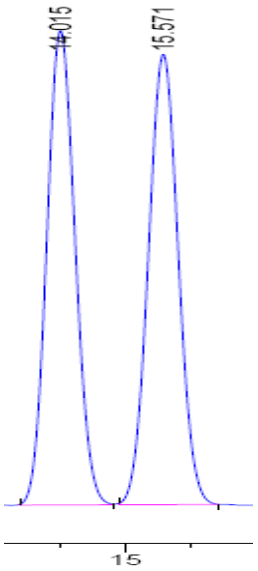
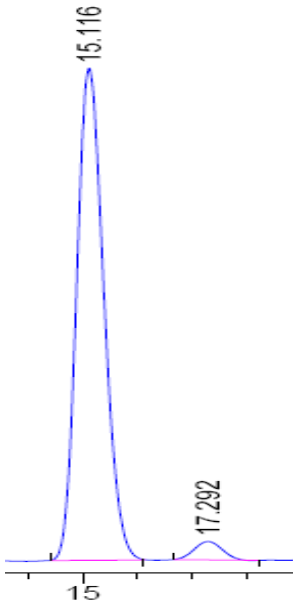

MeO
OH
Cl
ppm


MeO
OH
Cl
ppm

(4-Methyl-phenyl)-(2-methoxy-phenyl)-methanol (**4z**) (Table 2, entry 35, 93% ee).



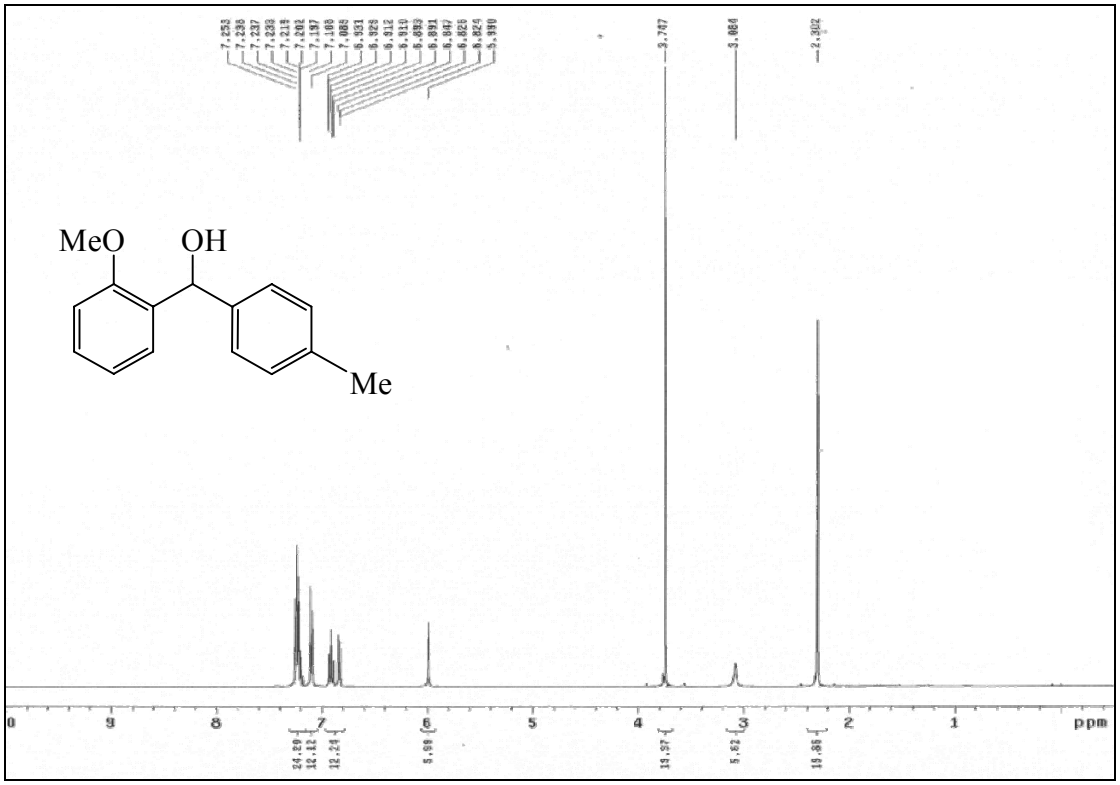
Column:	Chiralcel OD-H
Eluent:	Hexane/IPA = 97/3
Flow rate:	0.8 mL/min
Detector:	UV, 254 nm
Retention time:	14.015 min (*S*), 15.571 min (*R*)

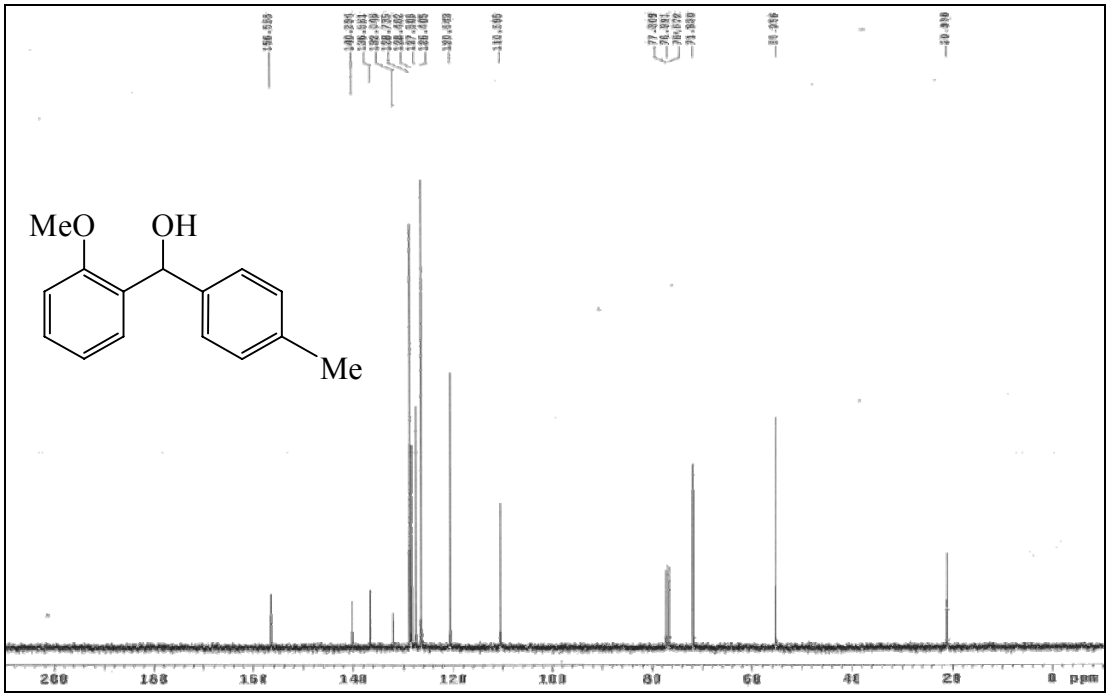
Racemic standard	Catalytic Reaction Product
	

Peak No.	1	2	Peak No.	1	2
Time	14.015	15.571	Time	15.116	17.292
Height(mAU)	22.263	21.144	Height(mAU)	44.335	1.664
Area(mAU-s)	662.289	664.538	Area(mAU-s)	1526.229	59.391
Area%	49.915	50.085	Area%	96.254	3.746

Spectrum Data:

$[\alpha]^{25}_{D}$ = +40.56 (c 1.20, CH_2Cl_2). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.25-7.19 (m, 4H, *Ar*), 7.10-7.08 (m, 2H, *Ar*), 6.93-6.82 (m, 2H, *Ar*), 5.99 (s, 1H, C*H*O), 3.75 (s, 3H, OCH_3), 3.08 (s, 1H, O*H*), 2.30 (s, 1H, CH_3) ppm. ^{13}C NMR (100 MHz, $CDCl_3$): δ 156.6, 140.3, 136.6, 132.0, 128.7, 128.5, 127.6, 126.4, 120.6, 110.6, 71.8, 55.3, 21.0 ppm.


MeO
OH
Me
ppm


MeO
OH
Me
ppm