Supporting Information

Two Homochiral Organocatalytic Metal-Organic-Materials with Nanoscopic Channels

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1. General methods.

Commercially available reagents were purchased in high purity from Fisher Scientific or Frontier Scientific and used without further purification. L_1 was synthesized according to the literature[1-2]. L_2 was also synthesized based upon a literature method[1,2] but using 3,5-Bis(methoxycarbonyl)phenylboronic acid as an intermediate rather than 4-(methoxycarbonyl)phenylboronic acid. Solvents were purified according to standard methods and stored in the presence of molecular sieves. Thermogravimetric analysis (TGA) was performed under nitrogen on a TA Instrument TGA 2950 Hi-Res from 30°C-700°C at a speed of 10°C/min. X-ray powder diffraction (XPRD) data were recorded on a Bruker D8 Advance X-ray diffractometer at 20 kV, 5 mA for Cu_{kR} (λ = 1.5418 Å), with a scan speed of 0.5 s/step (6°/min) and a step size of 0.05° in 2θ at room temperature. Calculated XPRD patterns were produced using Powder Cell for Windows Version 2.4 (programmed by W. Kraus and G. Nolze, BAM Berlin, 2000). Thin-layer-chromatography (TLC) analysis of reaction mixtures was performed using Merck silica gel 60 F254 plates. Flash column chromatography was carried out on Merck 60 silica gel (230-400 mesh). Enantiomeric excess (ee) was determined using a Varia Prostar HPLC system with a Prostar 210 binary pump and a 335 diode array detector with Daicel Chiralcel OD-H chiral columns (eluent and flow rates shown below). NMR spectra were recorded on a Varian Inova 400 Spectrometer (400 MHz for ^1H, ^{13}C.). ^1H and ^{13}C chemical shifts are reported in ppm downfield from tetramethylsilane (TMS). Proton spectra are reported as follows: δ (position of proton, multiplicity, coupling constant J, number of protons). Multiplicities are indicated by s (singlet), d (doublet), t (triplet), q (quartet), and m (multiplet).

2. Synthesis of ocMOM-1

A mixture of L_1 (10.0mg), $In(NO_3)_3 \cdot H_2O$ (10.0mg) in 1.5 mL of solvent (DMF:EtOH = 2:1) was sealed in a Pyrex tube under vacuum and heated to 100 °C for 24 hours, and then 130 °C for 72h. The resulting pale yellow block crystals were washed with DMF to afford ocMOM-1 (7.4mg, 57% based on L_1)

3. Synthesis of ocMOM-2

A mixture of L_2 (10.0mg), $CdCl_2 \cdot 2.5H_2O$ (10.0mg), and 1.5 mL DMF with 3 drop of 3M HCl was sealed in a Pyrex tube under vacuum and heated to 120 °C for 72 hours. The resulting pale yellow leaf-like crystals were washed with DMF to afford ocMOM-2 (7.1mg, 65% based on L_2)

4. **X-ray Structure Determination**

The X-ray diffraction data for ocMOM-1 were collected using synchrotron radiation, λ = 0.41328 Å, at the Advanced Photon Source, Argonne National Lab, Chicago Il. Indexing was performed using *APEX2* [3] (Difference Vectors method). Data integration and reduction were performed using SaintPlus 6.01 [4]. Absorption correction was performed by a multi-scan method implemented in SADABS [5]. The space groups were determined using XPREP implemented in APEX2 [3]. The structure was solved using SHELXS-97 (direct methods) and refined using SHELXL-97 (full-matrix least-squares on F^2) contained in the APEX2 [3] and WinGX v1.70.01[6,7,8,9] programs package. All non-H atoms were found in the difference Fourier map and due to the disorder were refined using the distance restraints. Restraints were also used to refine the anisotropic displacement parameters of some of disordered carbon atoms. Some of the disordered carbon atoms were refined isotropically. Hydrogen atoms were placed in geometrically calculated positions and included in the refinement process using a riding model with isotropic thermal parameters: Uiso(H) = 1.2Ueq(-CH). Restraints (AFIX 66, AFIX 116) were used to refine disordered benzene and naphthalene moieties. The contribution of heavily disordered solvent molecules was treated as diffuse using Squeeze procedure implemented in the program Platon[10,11] According to TGA, all solvent molecules are lost before 100°C. At this point, the solvent molecules removed by the SQUEEZE process could be regarded as EtOH molecules as well as nitrate anions. In every single unit cell, there are 6 nitrate anions containing 186 electrons, so the rest of 8510–186= 8324 electrons belong to EtOH molecules. As a result, there are 320 EtOH molecules per unit cell. The theoretical occupied volume of a single EtOH molecule and anitrate anion are 49.41 $Å^3$and 38.61 $Å^3$ respectively, indicating total volume of free molecules is 49.41*320+38.61*6=16042 $Å^3$ per unit cell. This is much smaller than 28926 $Å^3$ calculated by PLATON. When taking the contribution of disordered solvent into consideration, a reasonable estimate of the molecular formula is $[(In_3O)_6(NO_3)_6(L_1)_9]\cdot[320EtOH]$. Based on this formula the weight percent of EtOH is around 60% which matches with TGA pattern. As required by the referee, the overall formula, formula weight, density, F(000), etc., calculations have been regenerated in the crystal-data text and in the cif files. Further, discussion on this matter is now been included in the ESI.

X-ray diffraction data for ocMOM-2 were collected using Bruker-AXS SMART-APEXII CCD diffractometer using CuKα (λ = 1.54178 Å). Indexing was performed using *APEX2* [3] (Difference Vectors method). Data integration and reduction were performed using SaintPlus 6.01[4]. Absorption correction was performed by a multi-scan method implemented in SADABS [5]. The space group was determined using XPREP implemented in APEX2 [3]. The structure was solved using SHELXS-97 (direct methods) and refined using SHELXL-97 (full-matrix least-squares on F^2) contained in the APEX2 [3] and WinGX v1.70.01[6,7,8,9] program packages. All non-H atoms were found in the difference Fourier map and refined anisotropically. Hydrogen atoms were placed in geometrically calculated positions and included in the refinement process using a riding model with isotropic thermal parameters: Uiso(H) = 1.2Ueq(-CH). The contribution of disordered solvent molecules was treated as diffuse using Squeeze procedure implemented in the program Platon [10,11]. According to TGA, solvent molecules evaporated before 150°C. At this point, the solvent molecules removed by the SQUEEZE

process could be regarded as DMF molecules with dimethylammonium cations (DMA^+) as counterions. In every unit cell, there are 16 dimethylammonium cations containing 416 electrons, so the remaining 2594 – 416 = 2178 electrons belong to DMF molecules. As a result, there are ~55 DMF molecules per unit cell. The theoretical occupied volume of a single DMF molecule and a dimethylammonium cation are 75.26 $Å^3$ and 55.33 $Å^3$ respectively, indicating that the total volume of free molecules is 75.26*54 + 55.33*16 = 5024.58 $Å^3$ per unit cell. This is much smaller than the volume of 7921 $Å^3$ calculated by PLATON. When taking the contribution of disordered solvent into consideration, a reasonable estimate of the molecular formula is $[Cd_8(DMA^+)_{16}(L_2)_4]\cdot[55DMF]$. Based on this formula the weight percent of DMF is around 41% which matches well with the TGA pattern. Crystal data and refinement parameters with/without the contribution of any disordered solvents are given in Table S2 as ocMOM-2 and ocMOM-2-1 respectively.

Table S1. Crystal data and structure refinement for ocMOM-1

Identification code	ocMOM-1
Empirical formula	$C_{144}H_{72}O_{44}P_3In_6$
Formula weight	3287.85
Temperature	298K
Wavelength	0.41328
Crystal system, space group	R 3
Unit cell dimensions	a=31.1023(19) alpha=90 b=31.1023(19) beta=90 c=45.205(3) gamma=120
Volume	37870(4) A^3
Z, Calculated density	3, 0.433 g cm^{-3}
Absorption coefficient	0.357 mm -1
F(000)	4881.0
Crystal size	0.08*0.08*0.08 mm
Theta range for data collection	0.68 to 13.43 deg.

Limiting indices	-17<=h<=34, -31<=k<=32, -50<=l<=50
Completeness to theta = 13.43	99.8%
Max. and min. transmission	0.9720 and 0.9720
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	23627 / 370 / 871
Goodness-of-fit on F^2	1.066
Final R indices [I>2sigma(I)]	R_1 = 0.0491, wR2 = 0.1155
R indices (all data)	R_1 = 0.0735, wR2 = 0.1208
Absolute structure parameter	0.090(9)
Largest diff. peak and hole	0.639 and -0.449 e.A^{-3}

Table S1. Crystal data and structure refinement for ocMOM-1-1	
Identification code	ocMOM-1
Empirical formula	$C_{357.33}H_{712}O_{156.67}N_2P_3In_6$
Formula weight	8352.79
Temperature	298K
Wavelength	0.41328
Crystal system, space group	R 3
Unit cell dimensions	a=31.1023(19) alpha=90 b=31.1023(19) beta=90 c=45.205(3) gamma=120
Volume	37870(4) A^3
Z, Calculated density	3, 1.095 g cm^{-3}

Absorption coefficient	0.366 mm -1
F(000)	13387
Crystal size	0.08*0.08*0.08 mm
Theta range for data collection	0.68 to 13.43 deg.
Limiting indices	-17<=h<=34, -31<=k<=32, -50<=l<=50
Completeness to theta = 13.43	99.8%
Max. and min. transmission	0.9713 and 0.9713
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	23627 / 380 / 1015
Goodness-of-fit on F^2	0.991
Final R indices [I>2sigma(I)]	R_1 = 0.0458, wR2 = 0.1066
R indices (all data)	R_1 = 0.0702, wR2 = 0.1120
Absolute structure parameter	0.088(8)
Largest diff. peak and hole	0.599 and -0.434 $e.A^{-3}$

Table S2. Crystal data and structure refinement for ocMOM-2	
Identification code	ocMOM-2
Empirical formula	$C_{52}H_{20}O_{20}P_1Cd_2$
Formula weight	1220.47
Temperature	230K
Wavelength	1.54178
Crystal system, space group	P 212121

Unit cell dimensions	a=17.4396(10) alpha=90 b=22.4040(15) beta=90 c=22.4040(15) gamma=90
Volume	11437.4(12) A^3
Z, Calculated density	4, 0.709 g cm^{-3}
Absorption coefficient	3.415 mm^{-1}
F(000)	2408
Crystal size	0.1*0.1*0.1 mm
Theta range for data collection	2.48 to 64.74 deg.
Limiting indices	-18<=h<=20, -26<=k<=26, -33<=l<=34
Reflections collected / unique	96572 / 19193 [R(int) = 0.0718]
Completeness to theta = 64.74	99.5%
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	19193 / 11 / 676
Goodness-of-fit on F^2	0.923
Final R indices [I>2sigma(I)]	R_1=0.0314 wR_2=0.0691
R indices (all data)	R_1=0.0364 wR_2=0.0707
Absolute structure parameter	0.007(3)
Largest diff. peak and hole	0.589 and -0.248 $e.A^{-3}$

Table S2. Crystal data and structure refinement for ocMOM-2-1

Identification code	ocMOM-2-2
Empirical formula	$C_{104.25}H_{148.25}O_{33.}75N_{17.75}P_1Cd_2$
Formula weight	2445.93
Temperature	230K
Wavelength	1.54178
Crystal system, space group	P 212121
Unit cell dimensions	a=17.4396(10) alpha=90 b=22.4040(15) beta=90 c=22.4040(15) gamma=90
Volume	11437.4(12) A^3
Z, Calculated density	4, 1.420 g cm^{-3}
Absorption coefficient	3.836 mm^{-1}
F(000)	5116
Crystal size	0.1*0.1*0.1 mm
Theta range for data collection	2.48 to 64.74 deg.
Limiting indices	-18<=h<=20, -26<=k<=26, -33<=l<=34
Reflections collected / unique	96572 / 19193 [R(int) = 0.0718]
Completeness to theta = 64.74	99.5%
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	19193 / 11 / 676
Goodness-of-fit on F^2	0.923
Final R indices [I>2sigma(I)]	R_1=0.0314 wR_2=0.0691

R indices (all data)	R_1=0.0364 wR_2=0.0707
Absolute structure parameter	0.007(3)
Largest diff. peak and hole	0.589 and -0.248 e.A^{-3}

5. Gas Adsorption Experiments

Gas adsorption isotherms of ocMOM-1 and ocMOM-2 were collected using a surface area analyzer (ASAP-2020). Before the measurements, freshly prepared samples were soaked with ethanol. ocMOM-1 was degassed at 60 °C for 24h under vacuum whereas ocMOM-2 was activated using supercritical CO_2 in a Tousmimis Samdri PVT-3D critical point dryer. N_2 gas adsorption isotherms were measured at 77 K using a liquid N_2 bath and CO_2 gas adsorption isotherms were measured at 273 K using an ice-water bath.

6. General Procedure for transfer hydrogenation of benzoxazine reactions.

ocMOM-1 samples were exchanged with EtOH 3 times in 3 days and then soaked in the $CHCl_3$ with a drop of concentrated acetic acid to protonate the phosphoric acid for 1 day. The substrate, catalyst (5 mol%) and Hantzsch dihydropyridine (1.25 equiv.) were suspended in $CHCl_3$ in a screw-capped vial. The resulting mixture was allowed to stir at RT for 3d. The solvent was removed under reduced pressure and purification of the crude product by column chromatography on silica gel (ethyl acetate/hexane) afforded the pure product. Enantiomeric excess was determined by chiral HPLC analysis.

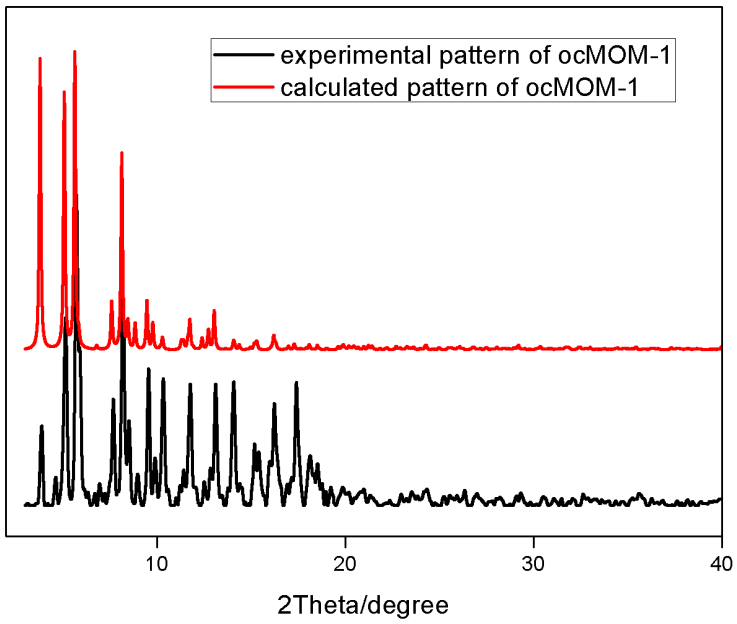


Figure S1. Comparison of experimental and calculated powder x-ray diffraction patterns of ocMOM-1

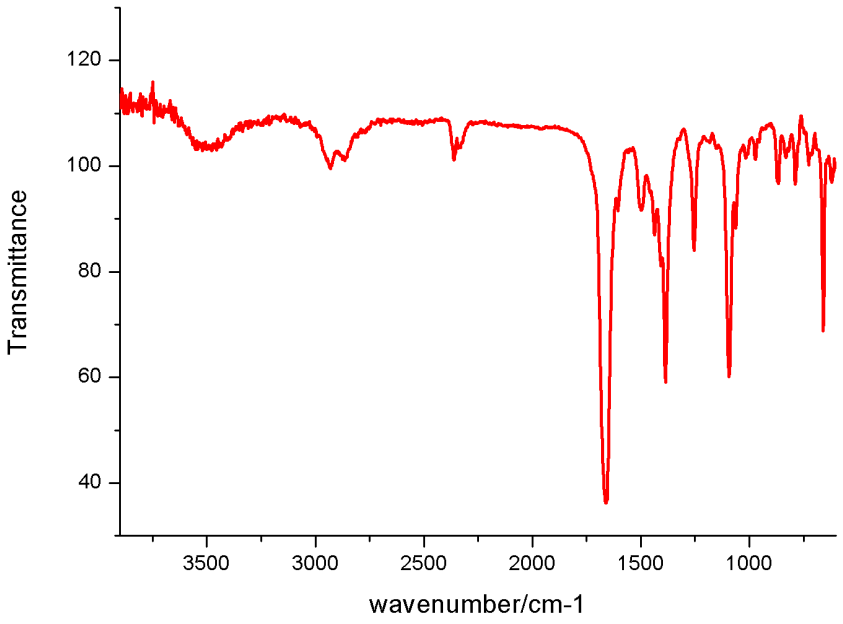


Figure S2. FT-IR of ocMOM-1 (Nicolet Avatar 320 FTIR, solid state)

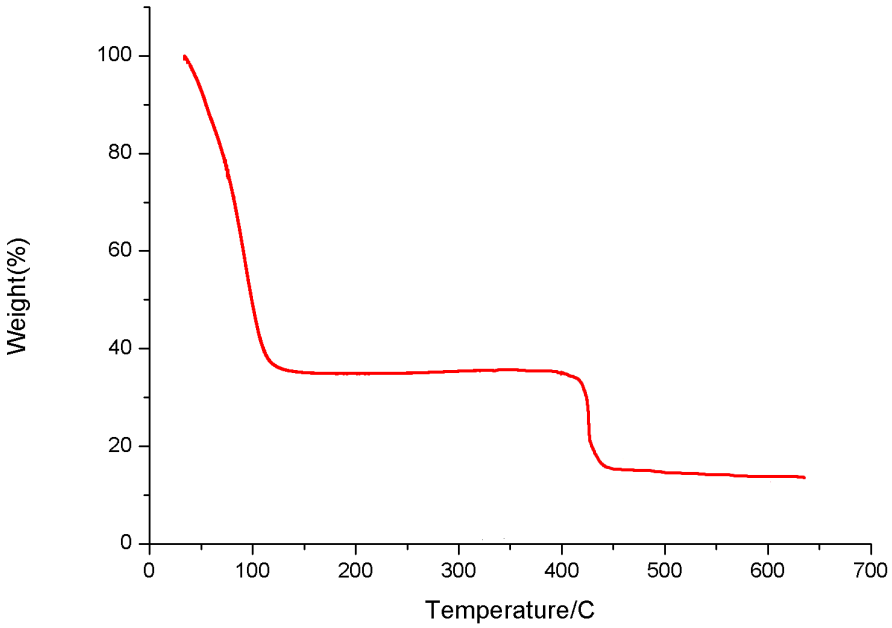


Figure S3. Thermogravimetric analysis of ocMOM-1

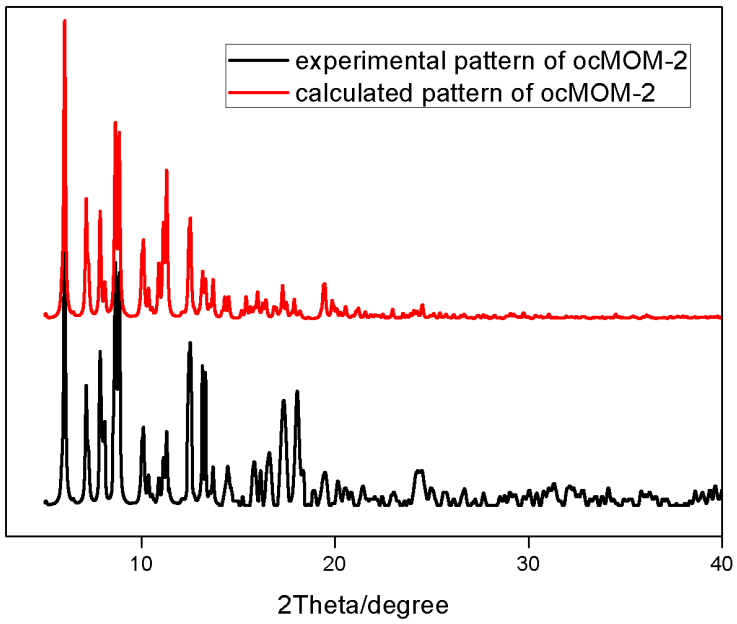


Figure S4. Comparison of experimental and calculated powder x-ray diffraction patterns of ocMOM-2

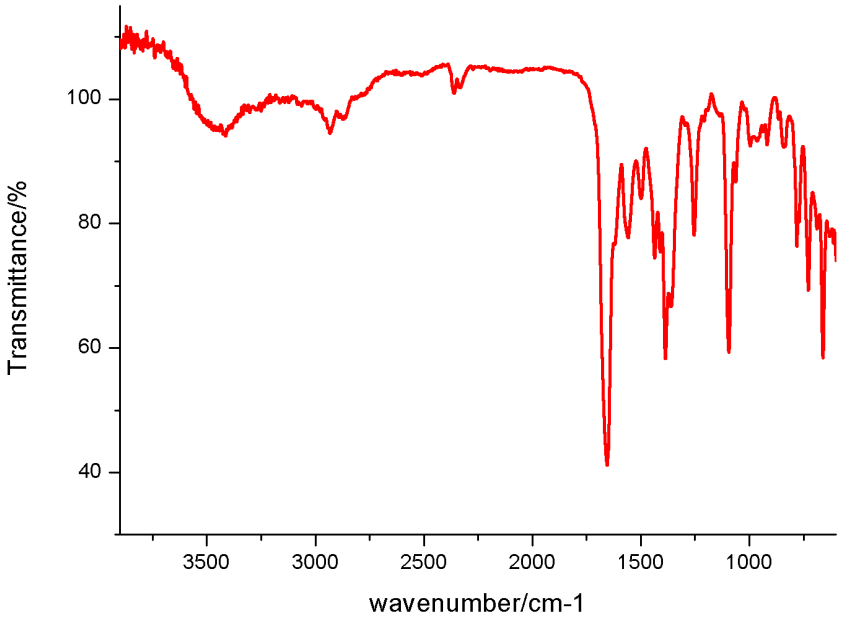


Figure S5. FT-IR of ocMOM-2 (Nicolet Avatar 320 FTIR, solid state).

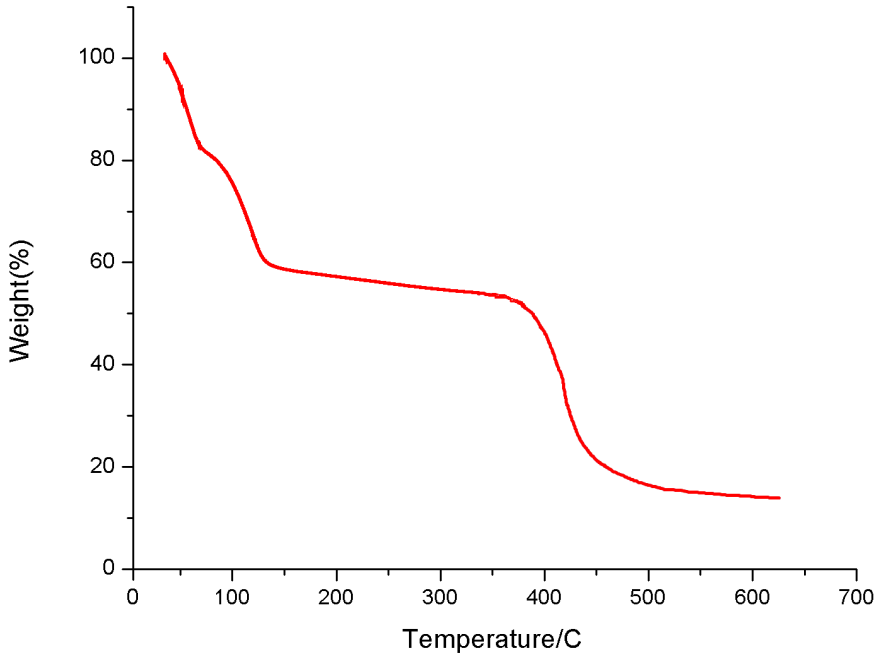


Figure S6. Thermogravimetric analysis of ocMOM-2

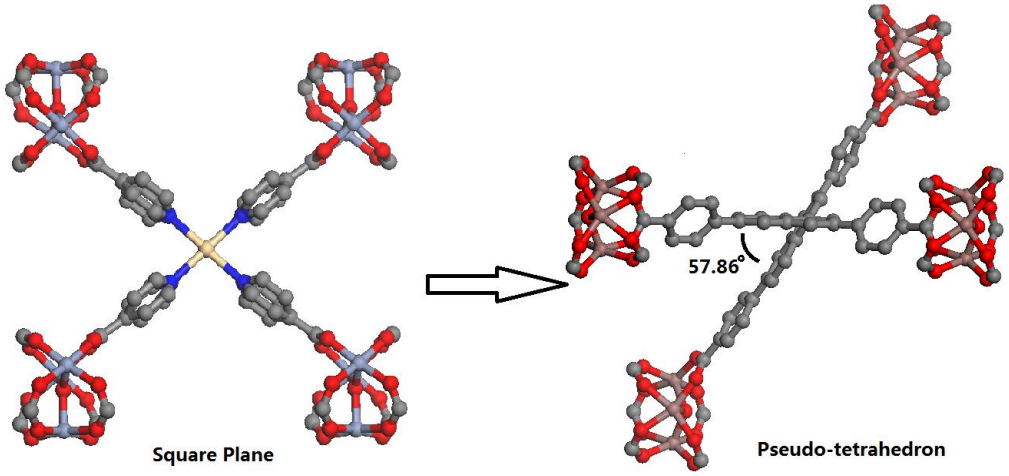


Figure S7. 4 connected square planar node to 4 connected pseudo-tetrahedron node[12]

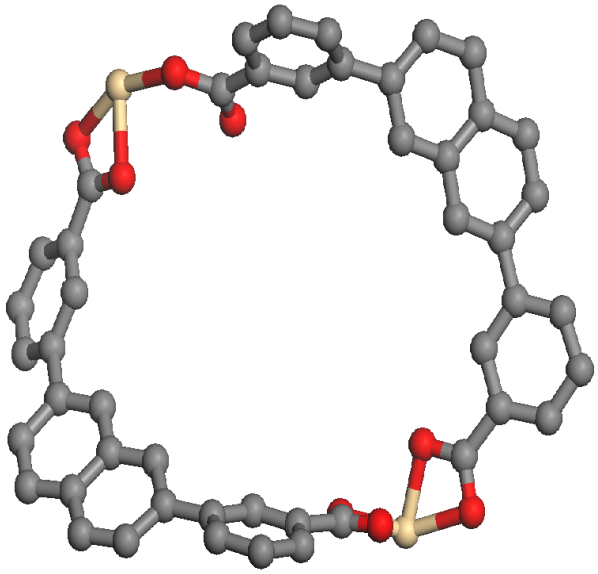


Figure S8. 4 member rings in 1.2 nm channel

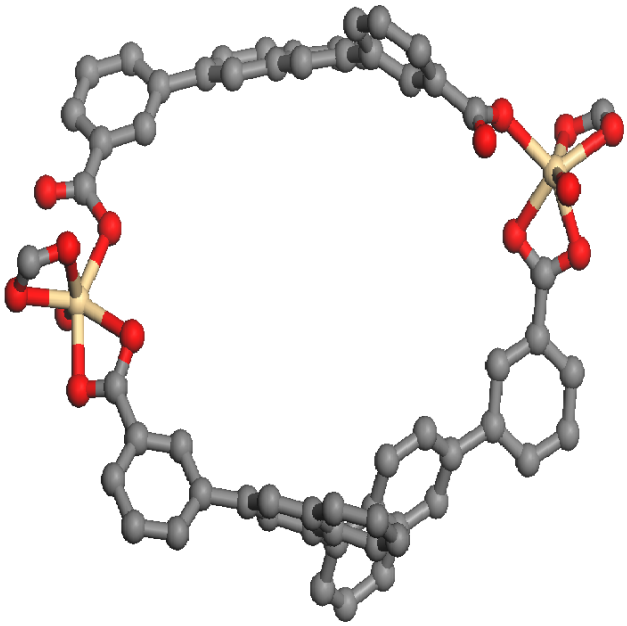


Figure S9. 4 member rings in 0.8nm channel

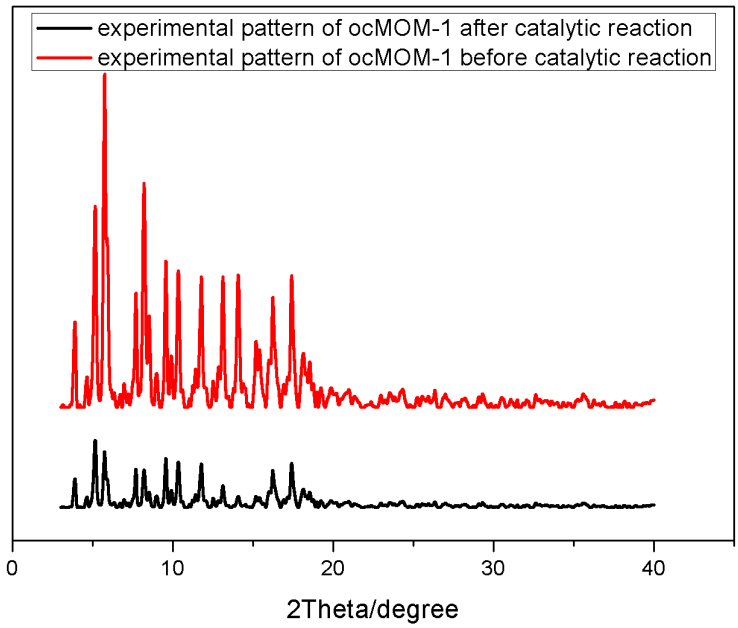


Figure S10. Comparison of experimental XPRD pattern of ocMOM-1 before and after catalytic reaction.

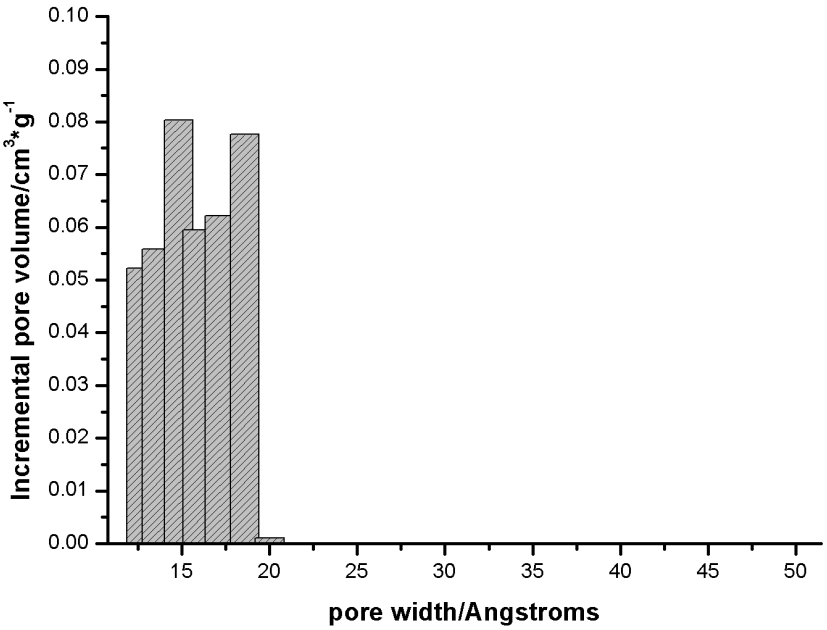


Figure S11. The pore size distribution of ocMOM-1

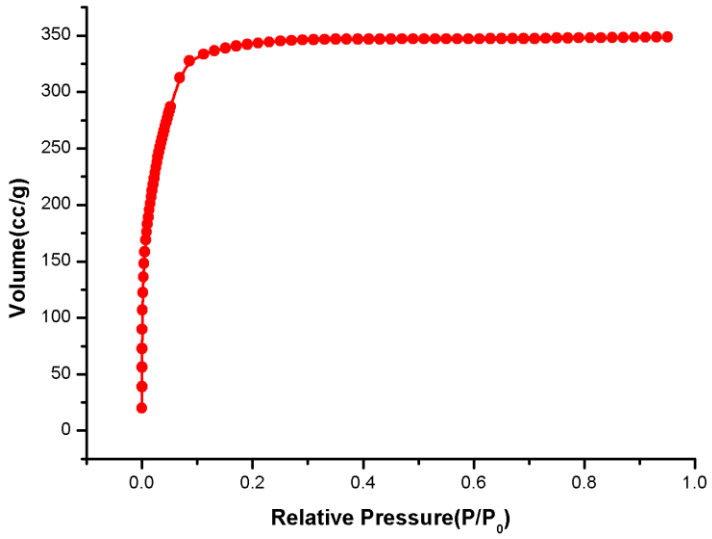


Figure 12 . N_2 adsorption isotherm of ocMOM-1 at 77K;

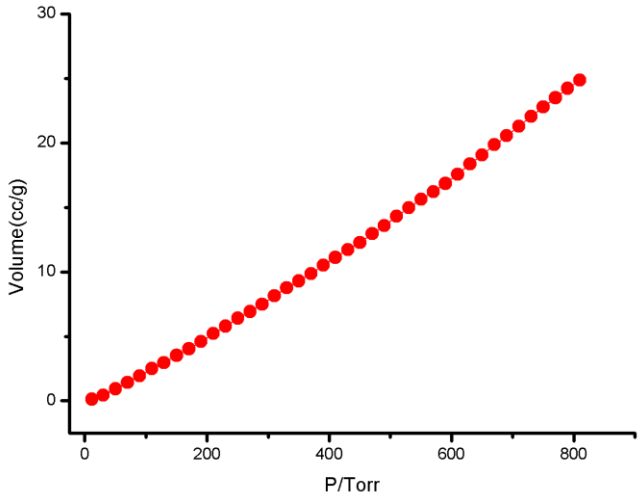


Figure 13. CO_2 adsorption at 273K.

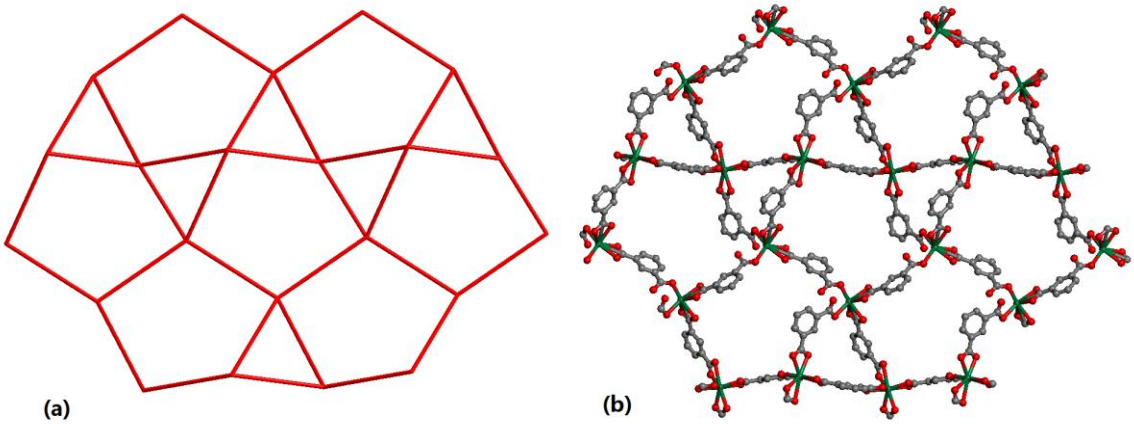
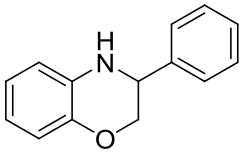


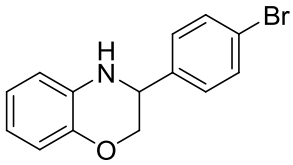
Figure 14. (a) Schematic of the tessellation in ocMOM-2; (b) A stick model of tessellation.

3-phenyl-3,4-dihydro-2*H*-1,4-benzoxazine



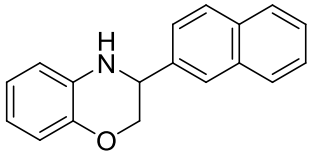
Colorless oil; HPLC analysis: Chiralcel OD-H (hexane/*i*PrOH = 80/20, 0.6mL/min), tR (major) = 15.52 min, tR (minor) = 21.60 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.36-7.42 (m, 5H), 6.82-6.90 (m, 2H), 6.67-6.75 (m, 2H), 4.50 (dd, *J*=2.8, 8.4 Hz,1H), 4.30 (dd, *J*=2.8, 10.6 Hz, 1H), 3.99-4.03 ppm (m, 2H); ^{13}C NMR(400 MHz, $CDCl_3$) : δ = 143.5, 139.2, 133.9, 128.8, 128.3, 127.2, 121.5, 118.9, 116.6, 115.4, 71.0, 54.2

3-(4-bromophenyl)-3,4-dihydro-2*H*-1,4-benzoxazine



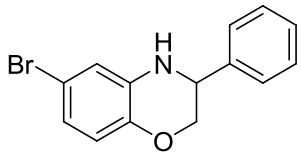
Pale yellow oil; HPLC analysis: Chiralcel OD-H (hexane/*i*PrOH = 80/20, 0.6mL/min), tR (major) = 18.89 min, tR (minor) = 35.29 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.50 (d, *J* = 6.6 Hz, 2H), 7.27 (d, *J* = 6.4 Hz, 2H), 6.79-6.85 (m, 2H), 6.66-6.72 (m, 2H), 4.47 (dd, *J*=2.8, 8.2 Hz,1H), 4.24 (dd, *J*=2.8, 10.6 Hz, 1H), 3.92-3.97 ppm (m, 2H); ^{13}C NMR(400 MHz, $CDCl_3$) : δ = 143.5, 138.2, 133.5, 131.9, 128.8, 122.2, 121.6, 119.1, 116.6, 115.4, 70.6, 53.6

3-(2-naphthalenyl)-3,4-dihydro-2*H*-1,4-benzoxazine



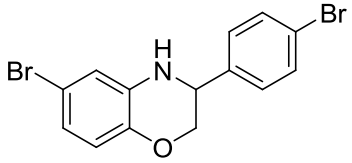
Pale yellow oil; HPLC analysis: Chiralcel OD-H (hexane/*i*PrOH = 80/20, 0.6mL/min), tR (major) = 25.11 min, tR (minor) = 48.04 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.85-7.89 (m, 4H), 7.49-7.53 (m, 3H), 6.84-6.92(m, 2H) , 6.71-6.77(m, 2H), 4.65 (dd, J=2.8, 8.6 Hz,1H), 4.36 (dd, *J*=2.8, 10.6 Hz, 1H), 4.07- 4.11ppm (m, 2H); ^{13}C NMR(400 MHz, $CDCl_3$) : δ = 143.6, 136.5, 133.9, 133.4, 133.3, 128.6, 127.9, 127.7, 126.4, 126.2, 126.2, 125.0, 121.6, 119.0, 116.7, 115.5, 71.0, 54.3

3-phenyl-6-bromo-3,4-dihydro-2*H*-1,4-benzoxazine



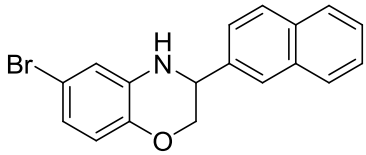
Pale yellow oil; HPLC analysis: Chiralcel OD-H (hexane/*i*PrOH = 80/20, 0.6mL/min), tR (major) = 16.63 min, tR (minor) = 19.31 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ=7.41-7.32 (m, 5H), 6.68-6.78 (m, 3H), 6.67-6.57 (m, 2H), 4.47 (dd, *J*=3.2, 8.4 Hz,1H), 4.26 (dd, *J*=3.2, 10.4 Hz, 1H), 4.05(s, 1H), 3.94 ppm (t, *J* = 9.6Hz, 1H) ; ^{13}C NMR(400 MHz, $CDCl_3$) : δ = 142.5, 138.6, 135.2, 128.9, 128.5, 127.1, 121.3, 117.9, 117.5, 113.4, 70.7, 53.9

3-(4-bromophenyl)-6-bromo-3,4-dihydro-2*H*-1,4-benzoxazine



Colorless oil; HPLC analysis: Chiralcel OD-H (hexane/*i*PrOH = 80/20, 0.6mL/min), tR (major) = 17.65 min, tR (major) = 27.08 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.50 (d, *J* = 8.4 Hz, 2H), 7.23 (d, *J* = 8.4 Hz, 2H), 6.78-6.68 (m, 3H), 4.45 (dd, *J* = 3.2, 8.2 Hz,1H), 4.22 (dd, *J* = 3.2, 10.8 Hz, 1H), 4.04(s, 1H), 3.90 ppm (t, *J* = 9.6 Hz, 1H); ^{13}C NMR(400 MHz, $CDCl_3$) : δ = 142.5, 137.7, 134.9, 132.0, 128.7, 122.4, 121.6, 118.0, 117.7, 113.5, 70.4, 53.4

3-(2-naphthalenyl)-6-bromo-3,4-dihydro-2*H*-1,4-benzoxazine



Pale yellow oil; HPLC analysis: Chiralcel OD-H (hexane/*i*PrOH = 80/20, 0.6mL/min), tR (major) = 34.45 min, tR (minor) = 49.89 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 7.87-7.82 (m, 4H), 7.51-7.44 (m, 3H), 6.83-6.71(m, 3H), 4.65 (dd, J=3.2, 8.4 Hz,1H), 4.33 (dd, *J*= 3.2, 10.8 Hz, 1H), 4.16(s, 1H), 4.03ppm (t, *J* = 9.6 Hz, 1H); ^{13}C NMR(400 MHz, $CDCl_3$) : δ = 142.6, 135.9, 135.2, 133.3, 128.7, 127.9, 127.7, 126.5, 126.3, 126.1, 124.7, 121.4, 118.0, 117.6, 113.5, 70.7, 54.0

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Chiral HPLC analysis of different entries in table 2.

Entry1

Chromatogram : YJ-II-195ODH80-20-0.61_channel1

System : HPLC
Method : Youngran
User : User1

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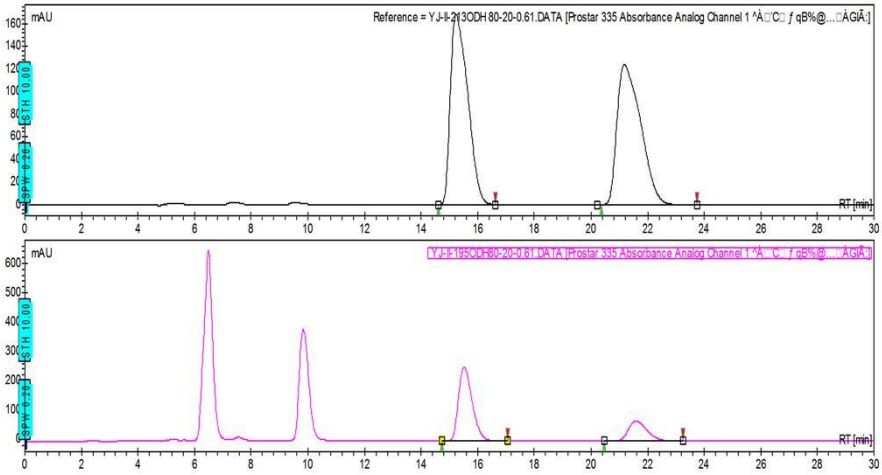
Processed : 6/11/2012 10:26:10 AM
Printed : 6/24/2012 2:54:23 PM



Peak results :

YJ-II-213ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@…□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	15.23	49.74	168.4	119.3	49.735
2	UNKNOWN	21.17	50.26	124.0	120.6	50.265
Total			100.00	292.5	239.9	100.000

YJ-II-195ODH80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@…□ÀGIÃ:]

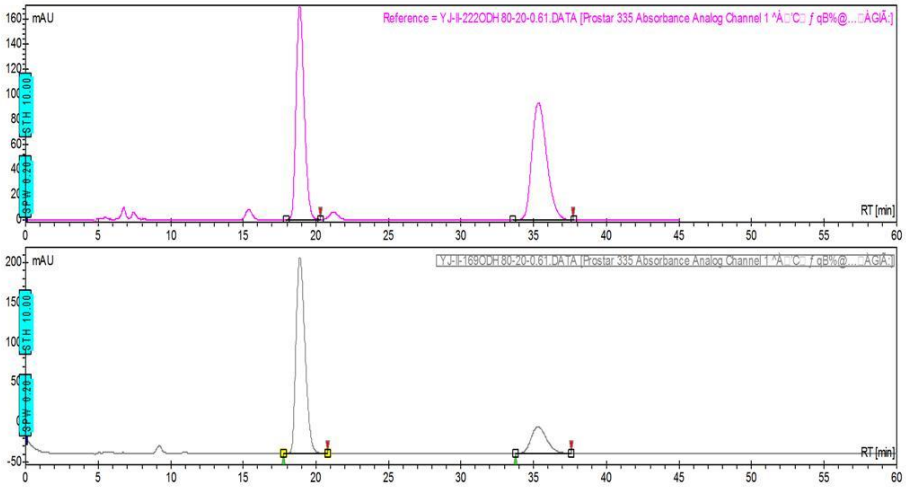
Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	15.52	73.02	251.0	141.7	73.022
2	UNKNOWN	21.60	26.98	67.8	52.3	26.978
Total			100.00	318.8	194.0	100.000

Entry2

Chromatogram : YJ-II-169ODH 80-20-0.61_channel1

System : HPLC
Method : Youngran
User : User1

Acquired : 5/29/2012 7:10:56 PM
Processed : 5/30/2012 9:28:56 AM
Printed : 6/24/2012 2:45:50 PM



Peak results :

YJ-II-222ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@…□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
2	UNKNOWN	18.88	49.75	171.5	110.1	49.750
1	UNKNOWN	35.35	50.25	94.0	111.2	50.250
Total			100.00	265.4	221.4	100.000

YJ-II-169ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@…□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	18.89	81.20	245.7	175.6	81.205
2	UNKNOWN	35.29	18.80	33.4	40.6	18.795
Total			100.00	279.2	216.3	100.000

Entry3

Chromatogram : YJ-II-170ODH 80-20-0.61_channel1

System : HPLC
Method : Youngran
User : User1

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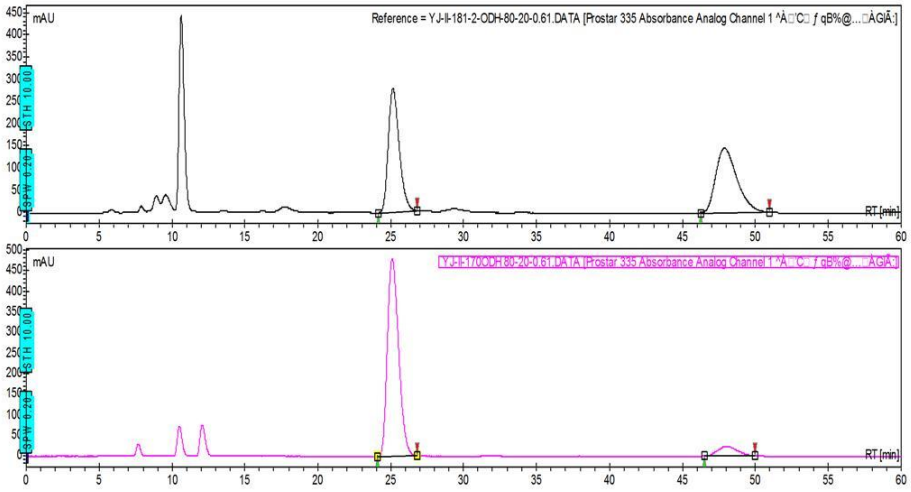
Processed : 5/29/2012 9:19:16 PM
Printed : 6/24/2012 3:11:14 PM



Peak results :

YJ-II-181-2-ODH-80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@…□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	25.15	49.59	277.7	242.0	49.586
2	UNKNOWN	47.87	50.41	145.4	246.1	50.414
Total			100.00	423.0	488.1	100.000

YJ-II-170ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@…□ÀGIÃ:]

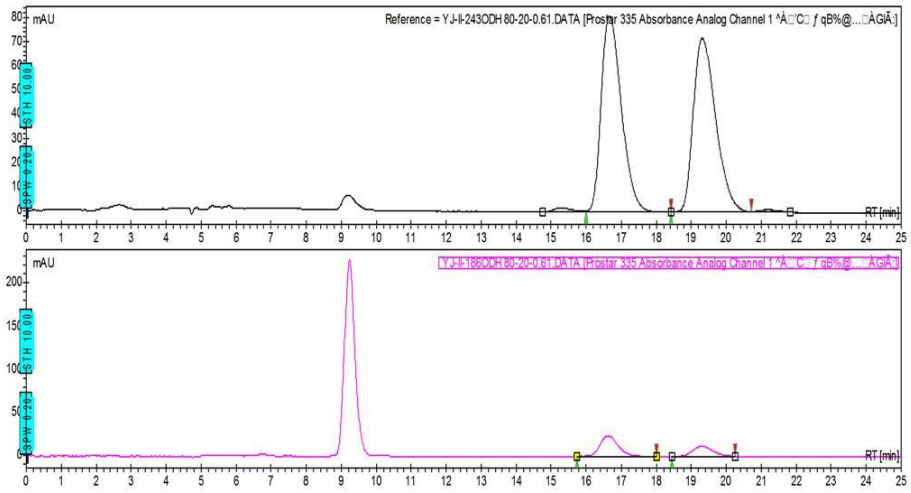
Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	25.11	92.20	479.3	428.4	92.195
2	UNKNOWN	48.04	7.80	23.1	36.3	7.805
Total			100.00	502.4	464.7	100.000

Entry4

Chromatogram : YJ-II-186ODH 80-20-0.61_channel1

System : HPLC
Method : Youngran
User : User1

Acquired : 6/7/2012 8:59:06 PM
Processed : 6/8/2012 9:41:48 AM
Printed : 6/24/2012 3:08:12 PM



Peak results :

YJ-II-243ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@...□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	16.65	50.12	81.2	54.1	50.116
2	UNKNOWN	19.32	49.88	72.2	53.9	49.884
Total			100.00	153.4	108.0	100.000

YJ-II-186ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@...□ÀGIÃ:]

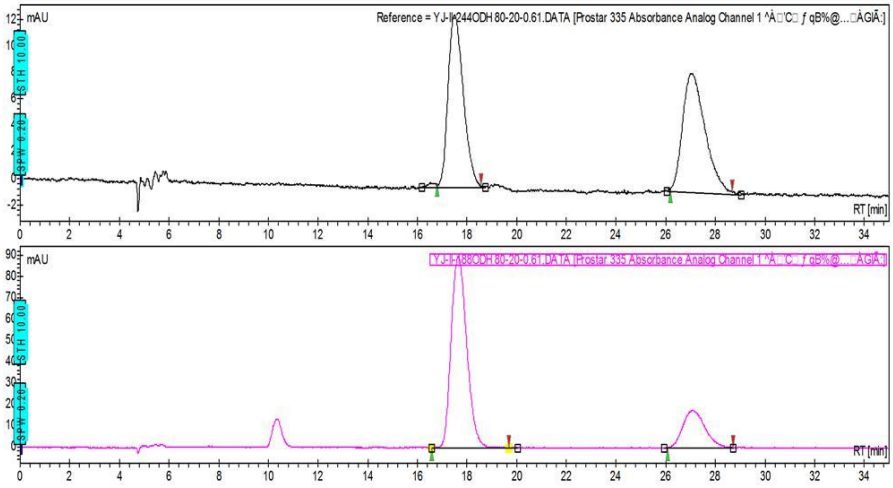
Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	16.63	64.80	23.5	13.9	64.796
2	UNKNOWN	19.31	35.20	11.5	7.5	35.204
Total			100.00	35.1	21.4	100.000

Entry5

Chromatogram : YJ-II-188ODH 80-20-0.61_channel1

System : HPLC
Method : Youngran
User : User1

Acquired : 6/4/2012 10:04:01 PM
Processed : 6/4/2012 10:41:18 PM
Printed : 6/24/2012 3:14:51 PM



Peak results :

YJ-II-244ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@...□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	17.49	49.57	13.0	9.3	49.572
2	UNKNOWN	27.05	50.43	9.0	9.5	50.428
Total			100.00	21.9	18.7	100.000

YJ-II-188ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@...□ÀGIÃ:]

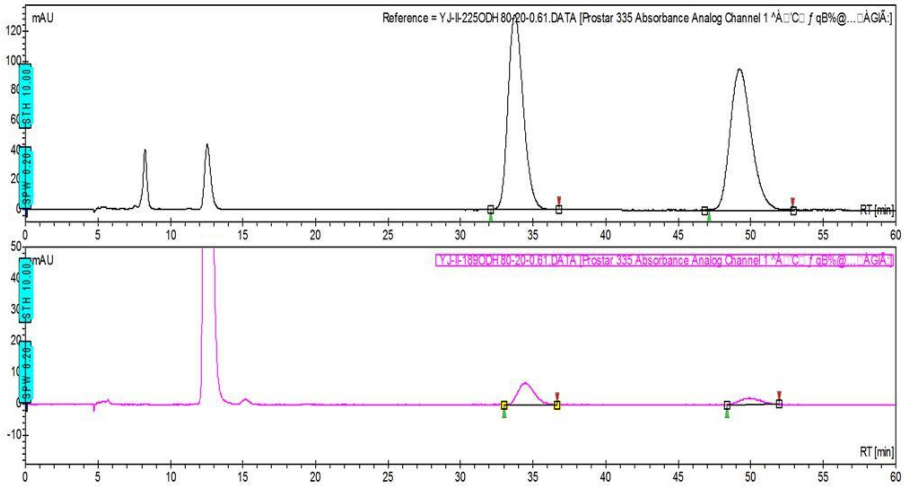
Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	17.65	78.25	89.7	65.4	78.251
2	UNKNOWN	27.08	21.75	17.3	18.2	21.749
Total			100.00	107.0	83.5	100.000

Entry6

Chromatogram : YJ-II-189ODH 80-20-0.61_channel1

System : HPLC
Method : Youngran
User : User1

Acquired : 6/4/2012 8:59:22 PM
Processed : 6/5/2012 9:40:50 AM
Printed : 6/24/2012 3:19:45 PM



Peak results :

YJ-II-225ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@...□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
2	UNKNOWN	33.73	49.61	131.5	159.3	49.609
1	UNKNOWN	49.23	50.39	95.2	161.8	50.391
Total			100.00	226.6	321.0	100.000

YJ-II-189ODH 80-20-0.61.DATA [Prostar 335 Absorbance Analog Channel 1 ^À□'C□ ƒ qB%@...□ÀGIÃ:]

Index	Name	Time [Min]	Quantity [% Area]	Height [mAU]	Area [mAU.Min]	Area % [%]
1	UNKNOWN	34.45	73.25	7.0	9.2	73.252
2	UNKNOWN	49.89	26.75	2.0	3.4	26.748
Total			100.00	8.9	12.6	100.000