Supplementary Information

Asymmetric Amplification in Asymmetric Alternating Copolymerization of Cyclohexene Oxide and Carbon Dioxide

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General Methods. All manipulations involving air- and/or moisture-sensitive compounds were carried out using the standard Schlenk technique under argon purified by passing through a hot column packed with BASF catalyst R3-11. NMR spectra were recorded in deuteriochloroform on a Varian Mercury 200 (^{1}H 200 MHz; ^{13}C 50 MHz) or JEOL JNM-ECP500 (^{1}H 500 MHz; ^{13}C 125 MHz) spectrometers. The GPC columns were eluted with tetrahydrofuran at 40 °C at 1 mL/min. Gas chromatography was performed on a SHIMADZU GC-2010 with a Chrompack CHIRASIL-DEX CB column and helium as the carrier gas.

All the solvents and cyclohexene oxide used for reactions were distilled under argon after drying over an appropriate drying reagent. Most of reagents were purchased from Aldrich Chemical Co. or Wako Pure Chemical Industries Ltd, and were used without further purification unless otherwise specified. (*S*)- and (*R*)-diphenyl(pyrrolidin-2-yl)methanol (**3**-H) and homochiral zinc dimer (*S*,*S*)-**2** were prepared according to the published literature.[1] Carbon dioxide (Teisan Co., 99.8% and Showa Tansan Co., Ltd., 99.9%) was used as received.

Copolymerization of Cyclohexene Oxide and CO_2 Using a Mixture of Et_2Zn, 3-H, and Ethanol. A flame-dried 80 mL Schlenk tube was charged with **3**-H of the appropriate ee (127 mg, 0.50 mmol) and toluene (16 mL). With stirring, a hexane solution of Et_2Zn (1.05 M, 0.48 mL, 0.50 mmol) was added at 20 °C. After ethane gas evolution ceased, the solution was stirred at 60 °C for 2 h. The resulting homogeneous solution was cooled to room temperature and transferred into a 50 mL autoclave. To the autoclave were introduced a toluene solution of ethanol (0.20 M, 1.0 mL, 0.20 mmol), cyclohexene oxide (1.0 mL, 10 mmol), and carbon dioxide (30 atm)

successively. After stirring at 40 °C for 19 h, the reaction mixture was cooled down to ambient temperature and the CO_2 pressure was slowly released. The mixture was diluted with toluene (30 mL) and washed with aqueous HCl (1 M, 10 mL × 2) and brine (10 mL × 2). The organic layer was dried over Na_2SO_4 and concentrated to 5 mL by evaporation. The copolymer was precipitated by adding MeOH (100 mL), filtered through a pad of Celite, washed with MeOH, and eluted by CH_2Cl_2. The eluent was concentrated by evaporation and dried *in vacuo* to give the copolymer. The chemical yields are summarized in Table S1 and Figure 1 of the main text.

In order to determine the %ee of the diol unit in the main chain, the following hydrolysis was carried out for each copolymer. A round-bottomed flask was charged with a part of the resulting copolymer (ca. 140 mg), THF (50 mL), MeOH (10 mL), and aqueous NaOH (4 M, 5 mL). After the resulting colorless homogeneous mixture was stirred at ambient temperature overnight, the reaction mixture was neutralization with aqueous HCl (1 M) and concentration to ca. 30 mL by evaporation. The solution was extracted by ethyl acetate (50 mL × 4). The combined organic layers were dried over $MgSO_4$ and concentrated by evaporation. Purification of the crude residue by silica gel column chromatography (ethyl acetate as an eluant) gave *trans*-cyclohexane-1,2-diol. The enantiomeric excess of the diol was determined by GLC analysis [Chrompack CHIRASIL-DEX CB, 120 °C, t_R = 18.3 min for (*S*,*S*)-diol and 20.0 min for (*R*,*R*)-diol]. The %ee's are also described in Table S1 and Figure 1.

Table S1. Copolymerization of cyclohexene oxide and CO_2 with a mixture of Et_2Zn, **3**-H, and ethanol.[a]

run	ee of **3**-H (%)	yield (%) of polymer[b]	% ee[c] (*R*,*R*)
1	0	29	3
2	10	60	18
3	20	76	34
4	30	76	43
5	40	78	49
6	50	85	58
7	60	99	59
8	80	92	70
9	100	99	77

[a] Cyclohexene oxide (10 mmol) was treated with CO_2 (30 atm) in the presence of a mixture of Et_2Zn (0.50 mmol), **3**-H (0.50 mmol), and EtOH (0.20 mmol) in toluene (17 mL) at 40 °C for 19 h. [b] Calculated based on the consumed cyclohexene oxide. [c] Determined based on the enantiomeric excess of *trans*-cyclohexane-1,2-diol given after hydrolysis of copolymer.

Synthesis of Complex (*R*,*S*)-2. In a flame-dried 80 mL Schlenk tube was placed a racemic diphenyl(pyrrolidin-2-yl)methanol **3**-H (0.13 g, 0.50 mmol) and THF (30 mL). To the solution was added Et_2Zn (1.05 M in hexane, 0.48 mL, 0.50 mmol) with stirring at room temperature. After ethane gas evolution ceased, the resulting mixture was stirred at 50 °C for 2 h, and then concentrated and dried *in vacuo*. The resulting white solid was recrystallized from THF/hexane at –20 °C to give colorless crystals (432 mg, 62%).

Copolymerization of Cyclohexene Oxide and CO_2 Using an Equimolar Mixture of (*S*,*S*)-2 and (*R*,*R*)-2 as an Initiator Precursor. A flame-dried 80 mL Schlenk tube was charged with zinc complex (*S*,*S*)-**2** (109 mg, 0.157 mmol) and (*R*,*R*)-**2** (107 mg, 0.154 mmol) and toluene (12 mL). After complex **2** was allowed to dissolved completely by stirring at 60 °C, the resulting

homogeneous solution was cooled to room temperature and transferred into a 50 mL autoclave. To the autoclave were introduced a toluene solution of ethanol (0.256 M, 1.0 mL, 0.256 mmol), cyclohexene oxide (1.25 mL, 12.4 mmol), and carbon dioxide (30 atm) successively. After stirring at 40 °C for 19 h, the reaction mixture was cooled down to ambient temperature and the CO_2 pressure was slowly released. Work-up procedure as described above gave the copolymer in 43% yield.

X-ray Crystallography. Suitable single crystal was selected under ambient conditions, attached to the tip of a glass fiber and then mounted in Bruker SMART system at 130 K. The X-ray data were collected on Bruker SMART CCD diffractometer, and were covered more than a hemisphere of reciprocal space by three sets of frames. Each of frame sets had a different φ and each of frames was collected with 0.30° steps in ω.

Space groups were determined on the basis of systematic absences and intensity statistics. The crystal structures were solved by direct method and refined by full-matrix least-squares. All non-hydrogen atoms were refined anisotropically, and all hydrogen atoms were placed in ideal positions with isotropic thermal parameters.

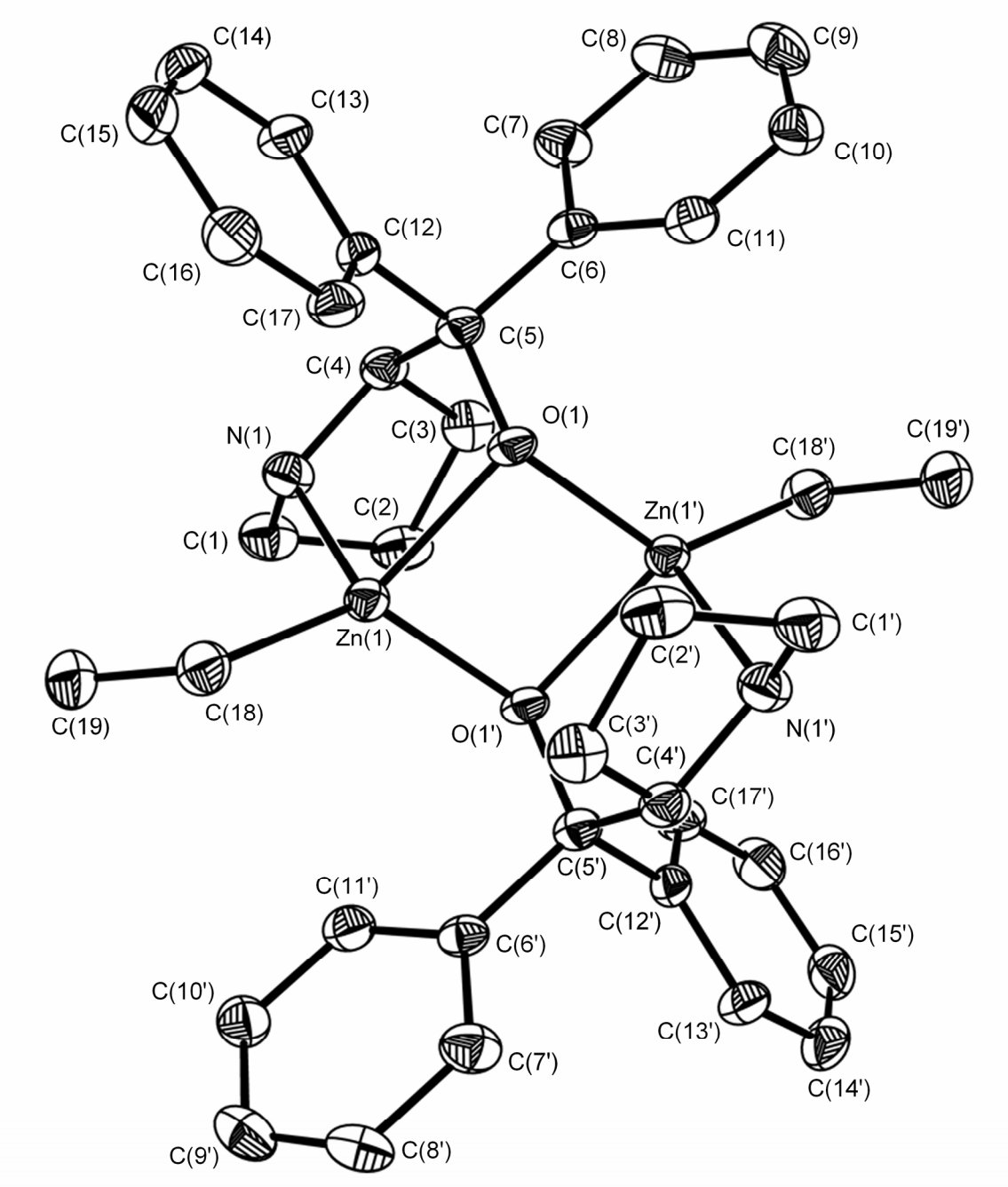

Figure S1. ORTEP drawing of complex (*R*,*S*)-**2** with thermal ellipsoids shown at 50% probability level. All hydrogen atoms are ommitted for clarity. Equivalent atoms generated by symmetry transformations are distinguished by prime (').

Table S2. Crystal data and structure refinement for (*R*,*S*)-**2**.

Identification code	heteroz	
Empirical formula	$C_{19}H_{23}NOZn$	
Formula weight	346.75	
Temperature	130(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P2(1)/n	
Unit cell dimensions	a = 12.1430(7) Å	α = 90°
	b = 11.2307(6) Å	β = 101.6860(10)°
	c = 12.2015(7) Å	γ = 90°
Volume	1629.48(16) Å^3	
Z	4	
Density (calculated)	1.413 Mg/m^3	
Absorption coefficient	1.508 mm^{-1}	
F(000)	728	
Crystal size	0.30 x 0.30 x 0.20 mm^3	
Theta range for data collection	2.16 to 27.50°	
Index ranges	-15<=h<=10, -14<=k<=14, -15<=l<=15	
Reflections collected	11160	
Independent reflections	3723 [R(int) = 0.0247]	
Completeness to theta = 27.50°	99.3 %	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3723 / 0 / 204	
Goodness-of-fit on F^2	1.195	
Final R indices [I>2sigma(I)]	R1 = 0.0594, wR2 = 0.1624	
R indices (all data)	R1 = 0.0664, wR2 = 0.1648	
Largest diff. peak and hole	1.767 and -0.673 e.Å^{-3}	

Table S3. Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters ($Å^2$ x 10^3) for (*R*,*S*)-**2**. U (eq) is defined as one third of the trace of the orthogonalized U^{ij} tensor.

	x	y	z	U(eq)
Zn(1)	4295(1)	499(1)	805(1)	21(1)
O(1)	5816(3)	-321(3)	850(3)	21(1)
C(12)	6572(4)	-72(4)	2819(4)	22(1)
C(6)	7841(4)	-181(4)	1454(4)	20(1)
N(1)	5383(4)	1966(4)	1450(4)	27(1)
C(4)	6561(4)	1610(4)	1431(4)	24(1)
C(5)	6679(4)	237(4)	1609(4)	22(1)
C(18)	3054(4)	449(5)	1654(4)	29(1)
C(7)	8800(4)	531(5)	1685(5)	31(1)
C(13)	7280(4)	428(5)	3739(4)	29(1)
C(17)	5756(4)	-870(5)	3007(4)	27(1)
C(15)	6316(5)	-589(6)	4989(4)	38(1)
C(11)	7969(4)	-1347(5)	1099(4)	26(1)
C(10)	9004(4)	-1775(5)	959(4)	30(1)
C(16)	5627(5)	-1128(5)	4082(4)	34(1)
C(3)	6743(4)	2080(5)	289(4)	29(1)
C(9)	9946(4)	-1044(5)	1184(5)	34(1)
C(2)	5708(4)	2859(5)	-177(5)	32(1)
C(14)	7136(5)	165(5)	4823(4)	36(1)
C(19)	2765(5)	1678(5)	2059(5)	34(1)
C(1)	5212(5)	3116(5)	836(5)	33(1)
C(8)	9840(4)	110(5)	1544(5)	35(1)

Table S4. Bond lengths [Å] and angles [°] for (*R*,*S*)-**2**.

Zn(1)-C(18)	1.994(5)	C(17)-C(16)	1.384(7)
Zn(1)-O(1')	2.007(3)	C(17)-H(6)	0.9300
Zn(1)-O(1)	2.055(3)	C(15)-C(14)	1.354(9)
Zn(1)-N(1)	2.158(4)	C(15)-C(16)	1.384(8)
Zn(1)-Zn(1')	3.0693(10)	C(15)-H(7)	0.9300
O(1)-C(5)	1.399(5)	C(11)-C(10)	1.387(7)
O(1)-Zn(1')	2.007(3)	C(11)-H(8)	0.9300
C(12)-C(13)	1.387(7)	C(10)-C(9)	1.389(8)
C(12)-C(17)	1.388(7)	C(10)-H(9)	0.9300
C(12)-C(5)	1.548(6)	C(16)-H(10)	0.9300
C(6)-C(7)	1.394(7)	C(3)-C(2)	1.541(7)
C(6)-C(11)	1.398(7)	C(3)-H(11)	0.9700
C(6)-C(5)	1.534(6)	C(3)-H(12)	0.9700
N(1)-C(1)	1.486(7)	C(9)-C(8)	1.383(8)
N(1)-C(4)	1.490(6)	C(9)-H(13)	0.9300
N(1)-H(23)	0.88(6)	C(2)-C(1)	1.509(8)
C(4)-C(3)	1.547(7)	C(2)-H(14)	0.9700
C(4)-C(5)	1.560(6)	C(2)-H(15)	0.9700
C(4)-H(1)	0.9800	C(14)-H(16)	0.9300
C(18)-C(19)	1.531(8)	C(19)-H(17)	0.9600
C(18)-H(2)	0.9700	C(19)-H(18)	0.9600
C(18)-H(3)	0.9700	C(19)-H(19)	0.9600
C(7)-C(8)	1.392(7)	C(1)-H(20)	0.9700
C(7)-H(4)	0.9300	C(1)-H(21)	0.9700
C(13)-C(14)	1.400(7)	C(8)-H(22)	0.9300
C(13)-H(5)	0.9300		

C(18)-Zn(1)-O(1')	128.04(18)	C(13)-C(12)-C(5)	121.5(4)
C(18)-Zn(1)-O(1)	137.98(18)	C(17)-C(12)-C(5)	120.2(4)
O(1')-Zn(1)-O(1)	81.86(13)	C(7)-C(6)-C(11)	117.3(5)
C(18)-Zn(1)-N(1)	107.69(19)	C(7)-C(6)-C(5)	123.4(4)
O(1') -Zn(1)-N(1)	110.72(15)	C(11)-C(6)-C(5)	119.3(4)
O(1)-Zn(1)-N(1)	81.48(14)	C(1)-N(1)-C(4)	105.2(4)
C(18)-Zn(1)-Zn(1')	154.22(16)	C(1)-N(1)-Zn(1)	117.9(3)
O(1')-Zn(1)-Zn(1')	41.52(9)	C(4)-N(1)-Zn(1)	108.0(3)
O(1)-Zn(1)-Zn(1')	40.35(9)	C(1)-N(1)-H(23)	106(4)
N(1)-Zn(1)-Zn(1')	97.59(12)	C(4)-N(1)-H(23)	116(4)
C(5)-O(1)-Zn(1')	126.8(3)	Zn(1)-N(1)-H(23)	104(4)
C(5)-O(1)-Zn(1)	111.5(3)	N(1)-C(4)-C(3)	103.6(4)
Zn(1')-O(1)-Zn(1)	98.14(13)	N(1)-C(4)-C(5)	109.0(4)
C(13)-C(12)-C(17)	118.3(4)	C(3)-C(4)-C(5)	115.9(4)

N(1)-C(4)-H(1)	109.4	C(15)-C(16)-H(10)	120.0
C(3)-C(4)-H(1)	109.4	C(2)-C(3)-C(4)	105.8(4)
C(5)-C(4)-H(1)	109.4	C(2)-C(3)-H(11)	110.6
O(1)-C(5)-C(6)	111.5(4)	C(4)-C(3)-H(11)	110.6
O(1)-C(5)-C(12)	109.5(4)	C(2)-C(3)-H(12)	110.6
C(6)-C(5)-C(12)	107.8(4)	C(4)-C(3)-H(12)	110.6
O(1)-C(5)-C(4)	108.4(4)	H(11)-C(3)-H(12)	108.7
C(6)-C(5)-C(4)	110.3(4)	C(8)-C(9)-C(10)	119.4(5)
C(12)-C(5)-C(4)	109.4(4)	C(8)-C(9)-H(13)	120.3
C(19)-C(18)-Zn(1)	112.9(4)	C(10)-C(9)-H(13)	120.3
C(19)-C(18)-H(2)	109.0	C(1)-C(2)-C(3)	103.7(4)
Zn(1)-C(18)-H(2)	109.0	C(1)-C(2)-H(14)	111.0
C(19)-C(18)-H(3)	109.0	C(3)-C(2)-H(14)	111.0
Zn(1)-C(18)-H(3)	109.0	C(1)-C(2)-H(15)	111.0
H(2)-C(18)-H(3)	107.8	C(3)-C(2)-H(15)	111.0
C(8)-C(7)-C(6)	121.5(5)	H(14)-C(2)-H(15)	109.0
C(8)-C(7)-H(4)	119.2	C(15)-C(14)-C(13)	120.7(5)
C(6)-C(7)-H(4)	119.2	C(15)-C(14)-H(16)	119.7
C(12)-C(13)-C(14)	120.2(5)	C(13)-C(14)-H(16)	119.7
C(12)-C(13)-H(5)	119.9	C(18)-C(19)-H(17)	109.5
C(14)-C(13)-H(5)	119.9	C(18)-C(19)-H(18)	109.5
C(16)-C(17)-C(12)	120.9(5)	H(17)-C(19)-H(18)	109.5
C(16)-C(17)-H(6)	119.6	C(18)-C(19)-H(19)	109.5
C(12)-C(17)-H(6)	119.6	H(17)-C(19)-H(19)	109.5
C(14)-C(15)-C(16)	119.9(5)	H(18)-C(19)-H(19)	109.5
C(14)-C(15)-H(7)	120.1	N(1)-C(1)-C(2)	102.0(4)
C(16)-C(15)-H(7)	120.1	N(1)-C(1)-H(20)	111.4
C(10)-C(11)-C(6)	121.6(5)	C(2)-C(1)-H(20)	111.4
C(10)-C(11)-H(8)	119.2	N(1)-C(1)-H(21)	111.4
C(6)-C(11)-H(8)	119.2	C(2)-C(1)-H(21)	111.4
C(11)-C(10)-C(9)	120.1(5)	H(20)-C(1)-H(21)	109.2
C(11)-C(10)-H(9)	120.0	C(9)-C(8)-C(7)	120.2(5)
C(9)-C(10)-H(9)	120.0	C(9)-C(8)-H(22)	119.9
C(17)-C(16)-C(15)	120.0(6)	C(7)-C(8)-H(22)	119.9
C(17)-C(16)-H(10)	120.0		

Symmetry transformations used to generate equivalent atoms: -x+1,-y,-z

Table S5. Anisotropic displacement parameters ($Å^2 x10^3$) for (*R*,*S*)-**2**. The anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U^{11} + ... + 2 h k a^* b^* U^{12}]$

	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
Zn(1)	19(1)	24(1)	19(1)	-1(1)	4(1)	-1(1)
O(1)	17(2)	27(2)	17(2)	-1(1)	0(1)	-3(1)
C(12)	23(2)	23(2)	18(2)	-2(2)	2(2)	6(2)
C(6)	20(2)	25(2)	15(2)	5(2)	0(2)	-3(2)
N(1)	25(2)	27(2)	28(2)	1(2)	2(2)	2(2)
C(4)	22(2)	22(2)	25(2)	-3(2)	0(2)	-1(2)
C(5)	19(2)	24(2)	20(2)	-1(2)	2(2)	-3(2)
C(18)	26(2)	36(3)	24(2)	-1(2)	8(2)	-4(2)
C(7)	26(3)	29(3)	36(3)	0(2)	3(2)	-3(2)
C(13)	28(2)	32(3)	24(2)	-3(2)	-2(2)	1(2)
C(17)	24(2)	33(3)	23(2)	3(2)	1(2)	3(2)
C(15)	41(3)	50(3)	22(2)	2(2)	8(2)	18(3)
C(11)	24(2)	32(3)	22(2)	2(2)	1(2)	-2(2)
C(10)	31(3)	32(3)	26(2)	3(2)	5(2)	4(2)
C(16)	33(3)	43(3)	27(3)	8(2)	9(2)	10(2)
C(3)	32(3)	24(2)	31(3)	1(2)	5(2)	-2(2)
C(9)	24(3)	43(3)	36(3)	11(2)	10(2)	5(2)
C(2)	31(3)	27(3)	34(3)	7(2)	-2(2)	-7(2)
C(14)	46(3)	37(3)	21(2)	-4(2)	-4(2)	15(3)
C(19)	31(3)	43(3)	30(3)	-4(2)	10(2)	0(2)
C(1)	31(3)	25(2)	39(3)	2(2)	-1(2)	1(2)
C(8)	19(2)	42(3)	43(3)	1(2)	2(2)	-1(2)

Table S6. Hydrogen coordinates (x 10^4) and isotropic displacement parameters (Å^2 x 10^3) for (*R*,*S*)-**2**.

	x	y	z	U(eq)
H(1)	7077	2019	2036	28
H(2)	2389	113	1179	34
H(3)	3271	-72	2295	34
H(4)	8744	1305	1939	37
H(5)	7853	940	3636	35
H(6)	5291	-1236	2401	33
H(7)	6216	-744	5711	45
H(8)	7347	-1848	952	32
H(9)	9066	-2551	714	36
H(10)	5077	-1664	4196	41
H(11)	7427	2548	385	35
H(12)	6796	1424	-214	35
H(13)	10641	-1329	1094	41
H(14)	5928	3589	-499	38
H(15)	5177	2434	-743	38
H(16)	7608	513	5434	43
H(17)	3430	2034	2496	51
H(18)	2207	1596	2510	51
H(19)	2477	2175	1426	51
H(20)	5607	3760	1279	40
H(21)	4420	3315	624	40
H(22)	10466	606	1692	42
H(23)	5230(50)	2100(50)	2110(50)	32(16)

Table S7. Torsion angles [°] for (*R*,*S*)-**2**.

C(18)-Zn(1)-O(1)-C(5)	-84.6(4)	C(13)-C(12)-C(5)-C(4)	-57.1(6)
O(1')-Zn(1)-O(1)-C(5)	134.9(3)	C(17)-C(12)-C(5)-C(4)	123.1(5)
N(1)-Zn(1)-O(1)-C(5)	22.4(3)	N(1)-C(4)-C(5)-O(1)	50.9(5)
Zn(1')-Zn(1)-O(1)-C(5)	134.9(3)	C(3)-C(4)-C(5)-O(1)	-65.3(5)
C(18)-Zn(1)-O(1)-Zn(1')	140.5(2)	N(1)-C(4)-C(5)-C(6)	173.2(4)
O(1')-Zn(1)-O(1)-Zn(1')	0.0	C(3)-C(4)-C(5)-C(6)	57.0(5)
N(1)-Zn(1)-O(1)-Zn(1')	-112.50(17)	N(1)-C(4)-C(5)-C(12)	-68.4(5)
C(18)-Zn(1)-N(1)-C(1)	-96.9(4)	C(3)-C(4)-C(5)-C(12)	175.4(4)
O(1')-Zn(1)-N(1)-C(1)	47.4(4)	O(1')-Zn(1)-C(18)-C(19)	-106.2(4)
O(1)-Zn(1)-N(1)-C(1)	125.3(4)	O(1)-Zn(1)-C(18)-C(19)	126.9(4)
Zn(1')-Zn(1)-N(1)-C(1)	88.2(4)	N(1)-Zn(1)-C(18)-C(19)	29.9(4)
C(18)-Zn(1)-N(1)-C(4)	144.2(3)	Zn(1')-Zn(1)-C(18)-C(19)	-161.7(3)
O(1')-Zn(1)-N(1)-C(4)	-71.5(3)	C(11)-C(6)-C(7)-C(8)	1.4(7)
O(1)-Zn(1)-N(1)-C(4)	6.4(3)	C(5)-C(6)-C(7)-C(8)	179.3(5)
Zn(1')-Zn(1)-N(1)-C(4)	-30.7(3)	C(17)-C(12)-C(13)-C(14)	-2.6(7)
C(1)-N(1)-C(4)-C(3)	-33.7(5)	C(5)-C(12)-C(13)-C(14)	177.6(5)
Zn(1)-N(1)-C(4)-C(3)	93.0(4)	C(13)-C(12)-C(17)-C(16)	2.2(7)
C(1)-N(1)-C(4)-C(5)	-157.6(4)	C(5)-C(12)-C(17)-C(16)	-178.0(5)
Zn(1)-N(1)-C(4)-C(5)	-30.9(4)	C(7)-C(6)-C(11)-C(10)	-1.2(7)
Zn(1')-O(1)-C(5)-C(6)	-48.1(5)	C(5)-C(6)-C(11)-C(10)	-179.2(4)
Zn(1)-O(1)-C(5)-C(6)	-167.0(3)	C(6)-C(11)-C(10)-C(9)	0.7(7)
Zn(1')-O(1)-C(5)-C(12)	-167.3(3)	C(12)-C(17)-C(16)-C(15)	0.0(8)
Zn(1)-O(1)-C(5)-C(12)	73.8(4)	C(14)-C(15)-C(16)-C(17)	-1.8(8)
Zn(1')-O(1)-C(5)-C(4)	73.5(4)	N(1)-C(4)-C(3)-C(2)	9.2(5)
Zn(1)-O(1)-C(5)-C(4)	-45.5(4)	C(5)-C(4)-C(3)-C(2)	128.5(4)
C(7)-C(6)-C(5)-O(1)	150.1(4)	C(11)-C(10)-C(9)-C(8)	-0.2(8)
C(11)-C(6)-C(5)-O(1)	-32.1(6)	C(4)-C(3)-C(2)-C(1)	17.7(5)
C(7)-C(6)-C(5)-C(12)	-89.7(5)	C(16)-C(15)-C(14)-C(13)	1.4(8)
C(11)-C(6)-C(5)-C(12)	88.1(5)	C(12)-C(13)-C(14)-C(15)	0.8(8)
C(7)-C(6)-C(5)-C(4)	29.6(6)	C(4)-N(1)-C(1)-C(2)	45.4(5)
C(11)-C(6)-C(5)-C(4)	-152.5(4)	Zn(1)-N(1)-C(1)-C(2)	-74.9(4)
C(13)-C(12)-C(5)-O(1)	-175.8(4)	C(3)-C(2)-C(1)-N(1)	-38.0(5)
C(17)-C(12)-C(5)-O(1)	4.5(6)	C(10)-C(9)-C(8)-C(7)	0.4(8)
C(13)-C(12)-C(5)-C(6)	62.8(6)	C(6)-C(7)-C(8)-C(9)	-1.0(8)
C(17)-C(12)-C(5)-C(6)	-116.9(5)		

Symmetry transformations used to generate equivalent atoms: -x+1,-y,-z

Reference

1) Nakano, K.; Nozaki, K.; Hiyama, T. *J. Am. Chem. Soc*. **2003**, *125*, 5501.