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Supporting Information

69451 Weinheim, Germany

SUPPORTING EXPERIMENTAL DATA

The first enantioselective synthesis of an atropisomeric diaryl ether

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All non-aqueous reactions were performed under an inert atmosphere of dry nitrogen, using oven dried apparatus. The temperatures quoted are those of an external bath.

Tetrahydrofuran and diethyl ether were freshly distilled over sodium under an atmosphere of nitrogen and using benzophenone as an indicator. Dichloromethane and toluene were distilled over calcium hydride under an atmosphere of nitrogen. DMF was distilled from sodium sulphate under reduced pressure, and subsequently stored over molecular sieves. Diisopropylamine and TMEDA were freshly distilled over potassium hydroxide under an atmosphere of nitrogen. Petrol refers to petroleum ether (boiling range 40-60°C) and was distilled prior to use.

Analytical TLC was carried out on Machery-Nagel pre-coated 0.2 mm silica plates with fluorescent indicator on aluminium, with the exception of ephedrine derived oxazolidine containing compounds where TLC was carried out on Machery-Nagel pre coated 0.2 mm aluminium oxide plates on plastic sheets, with visualisation by UV light at 254 nm.

Flash column chromatography was carried out using Fluorochem Davisil 40 – 63 μm 60 Å silica, with the exception of ephedrine derived oxazolidine containing compounds where Fluka basic alumina 0.05 – 0.15 mm (pH = 9.05 – 10.0) was used, under a positive pressure of air.

Proton nuclear magnetic resonance (^{1}H NMR) spectra were recorded on Varian XL 300 (300 MHz), Bruker Ultrashield 400 (400 MHz) or Bruker Ultrashield 500 (500 MHz) spectrometer with residual non-deuterated solvent as the internal standard. Carbon nuclear magnetic resonance (^{13}C NMR) spectra were recorded on Varian XL 300 (75 MHz), Bruker Ultrashield 400 (100 MHz) or Bruker Ultrashield 500 (125 MHz) spectrometer. All chemical shifts (δ_H and δ_C) are quoted in parts per million (ppm), using tetramethylsilane as a standard. Coupling constants *J* are given in Hertz (Hz). Splitting patterns are abbreviated as follows: singlet (s), doublet (d), triplet (t), quartet (q), septet (sept), multiplet (m), broad (br) or a combination of these.

Mass spectra were recorded on Kratos MS25, Kratos Concept IS and Fisons VG Trio 2000 spectrometers using electron impact (EI), chemical ionisation (CI) and electrospray (ES).

Infrared spectra were recorded on a Perkin-Elmer Spectrum RX I FT-IR or a ATI Matterson Genesis FT-IR spectrometer. All samples were run as evaporated films on a sodium chloride plate. Absorption maxima (ν_{max}) are quoted in wavenumbers(cm^{-1}).

Melting points are uncorrected and were carried out on a 'GallenKamp Melting Point' apparatus or a Kofler microscopemelting point machine.

Chiral HPLC measurements were carried out on a Hewlett Packard Series 1050 instrument, using Daicel Chiralcel OD-H, Daicel ChiralPak OT(+), (*R,R*)-Whelk 01 or (*R,R*)-β-Gem 1 chiral stationary phases using a mixture of hexane and *iso*propanol as eluents with a Diode Array Detector set at 254 nm.

Optical rotations were measured on an Optical Activity AA-100 polarimeter with a 0.5 ml, 0.25 dm cell.

General Procedure A. *Nucleophilic aromatic substitution*.

The phenoxide was prepared as follows: the phenol (1 equiv.), potassium hydroxide (1 equiv.), and toluene were charged to a flask and heated under reflux using Dean-Stark conditions for 2 hours, cooled to RT and solvent removed under reduced pressure. The product was used without purification.

The 2-Chlorobenzonitrile (1 equiv.), phenoxide (1 equiv.), and dry DMF were charged to a flask and heated to 150 °C under N_2. The reaction mixture was allowed to stir at this temperature for 16 hours, and the excess DMF was removed by vacuum distillation. The resultant brown oil was dissolved in portions of EtOAc (x 3) and the combined organics washed with water (x 3), brine, dried (Na_2SO_4), and solvent removed under reduced pressure.

General Procedure B. *Br → Li exchange*.

n-BuLi (1 equiv.) was added dropwise to a stirring solution of bromide (1 equiv.) in anhydrous THF at –78 °C under N_2 and stirred for 1 min, unless otherwise stated. The specified quench was added and the mixture was stirred for 16 hours with warming to RT. The mixture was quenched by addition of saturated ammonium chloride solution and diluted using EtOAc. The layers were separated and the organic fraction was washed with water, brine, dried (Na_2SO_4), and solvent removed under reduced pressure.

General Procedure C. *α-Methylation of sulfoxides*.

LDA (1.1 equiv.) in anhydrous THF was added to a stirred solution of sulfoxide (1 equiv.) in anhydrous THF under N_2 at –78 °C and stirred for 30 min. Iodomethane (1.5 equiv.) was added and the mixture was stirred for 30 min, warmed to RT and stirred for a further 2 h. The mixture was quenched by addition of saturated ammonium chloride solution and extracted using two portions of EtOAc. The combined organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under reduced pressure.

General Procedure D. *ortho-Methylation of sulfoxides*.

*n*BuLi (1.1 equiv.) was added to a stirring solution of sulfoxide (1 equiv.) in anhydrous THF at –78 °C and stirred for 1 h. Iodomethane (1.5 equiv) was added and the mixture was stirred for 30 min, warmed to RT and stirred for a further 2 h. The mixture was quenched by addition of saturated ammonium chloride solution and extracted using two portions of EtOAc. The combined organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under reduced pressure.

General Procedure E. *Oxidation of sulfoxides to sulfones*.

Sulfoxide (1 equiv.), dissolved in anhydrous DCM, was added to a stirring suspension of *m*CPBA (2 equiv.) and anhydrous DCM under N_2 at 0 °C. The mixture was stirred for 3 h with warming to ~10 °C and quenched by addition of water. The layers were separated and the organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under reduced pressure.

General Procedure F. *DIBAL reduction of nitriles*.

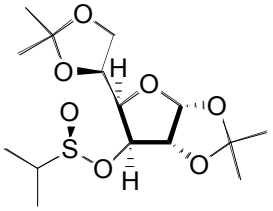
DIBAL (1M solution in solvent) (2.5 equiv.) was added slowly to a stirring solution of nitrile (1 equiv.) in dry solvent under nitrogen at –78 °C, unless otherwise stated. The mixture was allowed warm to RT over a period of 16 hours, HCl (cooled to 5

°C) was added to the mixture and allowed to stir for a further hour. The layers were separated and the organic fraction washed with water (x 3), brine, dried (Na_2SO_4), and the solvent removed under reduced pressure.

General Procedure G. *Reduction of aldehydes*.

The aldehyde, dissolved in THF, was added to a stirring suspension of sodium borohydride and THF under N_2 and stirred for 16 hours. 2M NaOH solution was added and the mixture was stirred for 1 min, diluted using EtOAc and layers separated. The organic fraction was washed with water, brine, dried (Na_2SO_4), and solvent removed under reduced pressure.

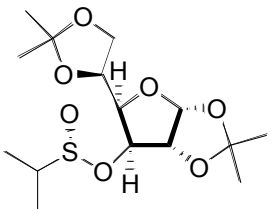
1,2:5,6-Di-O-isopropylidene-α-D-glucofuranosyl-(S)-isopropanesulfinate[1] (S_S)-**12a**



By the method of Herrmann;[2] a mixture of diisopropyldisulfide (1 cm^3, 9.92 mmol, 1 equiv.) and glacial acetic acid (1.1 cm^3, 19.83 mmol, 2 equiv.) were cooled to –20 °C where the mixture froze. Sulfuryl chloride (2.5 cm^3, 30.74 mmol, 3.1 equiv.) was added dropwise over 20 min whereupon the mixture dissolved. The mixture was stirred at –20 °C for 2.5 h, warmed to room temperature over 45 min, heated to 40 °C and stirred at this temperature for a further 1 h. The mixture was cooled to RT and solvent removed under reduced pressure to yield isopropylsulfinyl chloride as a yellow oil.

By the method of Fernandez,[1] a suspension of diacetone-*D*-glucose (3.5 g, 13.45 mmol, 1 equiv.) and di-*iso*propylethylamine (2.9 cm^3, 16.41 mmol, 1.2 equiv.) in toluene (50 cm^3) was added portionwise over a period of 45 min to a stirred solution of isopropylsulfinyl chloride (20.15 mmol, 1.5 equiv.) in toluene (45 cm^3) at –78 °C. The mixture was stirred for 2 h quenched with water (50 cm^3) and warmed to RT. DCM (30 cm^3) was added and the aqueous layer was extracted with DCM (2 x 30 cm^3 portions). The combined organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under reduced pressure. The crude product was purified by flash column chromatography (6:1 petrol:EtOAc) to yield the product as a colourless oil (630 mg, 17 %); δH (500 MHz; $CDCl_3$) 5.91 (1H, d, *J* 3.5, H-1), 4.72 (1H, d, *J* 2.5, H-3), 4.60 (1H, d, *J* 3.5, H-2), 4.32 – 4.28 (2H, m, H-4), 4.09 (1H, m, H-5), 3.99 (1H, m, H-6), 2.80 (1H, sept, *J* 7, C*H*(CH_3)$_2$), 1.51 (3H, s, OC(CH_3)$_2$O), 1.43 (3H, s, OC(CH_3)$_2$O), 1.34 (3H, s, OC(CH_3)$_2$O), 1.32 (3H, s, OC(CH_3)$_2$O) and 1.25 (6H, d, *J* 7, CH(CH_3)$_2$). $[\alpha]_D^{23} = –60.4$ (c = 1.9, acetone); (Lit[1] $[\alpha]_D^{22} = –50$ (c = 0.3, acetone)).

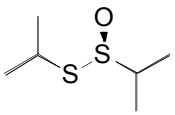
1,2:5,6-Di-O-isopropylidine-α-D-glucofuranosyl-(R)-isopropanesulfinate[1] (R_S)-**12a**



By the method of Fernandez,[1] a suspension of diacetone-*D*-glucose (3.44 g, 13.23 mmol, 1 equiv.) and pyridine (1.3 cm^3, 15.87 mmol, 1.2 equiv.) in THF (50 cm^3) was added portionwise over a period of 45 min to a stirred solution of isopropanesulfinyl chloride (19.84 mmol, 1.5 equiv.) in THF (50 ml) at –78 °C. The mixture was stirred for 2.5 h and quenched with water (50 cm^3) and warmed to RT. DCM (60 cm^3) was added and the aqueous layer was extracted with DCM (2 x 30 cm^3 portions). The combined organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under

reduced pressure. The crude product was purified by flash column chromatography (6:1 petrol:EtOAc) to yield the product as a colourless oil (1.37 g, 36 %). δH (500 MHz; $CDCl_3$) 5.81 (1H, d, *J* 3.5, H-1), 4.70 (1H, d, *J* 3.5, H-2), 4.61 (1H, d, *J* 2.5, H-3), 4.07 – 4.01 (3H, m, H-4, H-5), 3.86 (1H, m, H-6), 2.73 (1H, sept, *J* 7, C*H*(CH_3)$_2$), 1.40 (3H, s, OC(C*H*$_3$)$_2$O), 1.32 (3H, s, OC(C*H*$_3$)$_2$O), 1.21 (3H, s, OC(C*H*$_3$)$_2$O), 1.20 (3H, s, OC(C*H*$_3$)$_2$O) 1.18 (3H, d, *J* 7, CH(C*H*$_3$)$_2$) and 1.17 (3H, d, *J* 7, CH(C*H*$_3$)$_2$). $[\alpha]_D^{23}$ = +8.9 (*c* = 3.2, acetone); (Lit[1] $[\alpha]_D^{22}$ = +11 (*c* = 2.9, acetone).

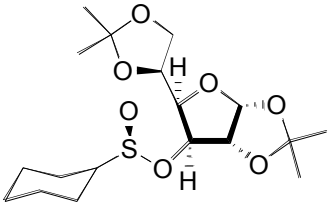
(R)-Isopropyl propane-2-sulfinothioate **A**



By the method of Ellman,[3] hydrogen peroxide (45 ml of a (30 % wt. soln in water) was added dropwise over 16 h to a stirred solution of *iso*propyl disulfide (40 cm^3, 400 mmol, 1 equiv.), ligand **B** (660 mg, 2 mmol, 0.5 mol %) and vanadyl acetylacetonate (550 mg, 2.08 mmol, 0.52 mol %) in acetone (130 cm^3). Saturated sodium sulfite solution (20 cm^3) was added dropwise over 20 min. The mixture was extracted using petrol (3 x 100 cm^3) and combined organics were dried (Na_2SO_4) and solvent removed under reduced pressure to yield the product as a brown oil (63.4 g, 96 %). δH (400 MHz; $CDCl_3$) 3.69 (1H, sept, *J* 7, C*H*(CH_3)$_2$), 3.25 (1H, sept, *J* 7, C*H*(CH_3)$_2$), 1.52 (3H, d, *J* 7, CH(C*H*$_3$)$_2$), 1.51 (3H, d, *J* 7, CH(C*H*$_3$)$_2$), 1.43 (3H, d, *J* 7, CH(C*H*$_3$)$_2$) and 1.41 (3H, d, *J* 7, CH(C*H*$_3$)$_2$). *HPLC*: Separation of enantiomers using (*R,R*)-Whelk 01 column running 1 ml/min with 95 : 5 hexane:IPA, retention times 23.2 and 28.0 min, 16 % ee.

Ligand **B** [(*1S,2R*)-1-(3,5-Di-tert-butyl-2-hydroxybenzylideneamino)-2,3-dihydro-1H-inden-2-ol][4] ewas made as follows: 3,5-Di-*tert*-butylsalicylaldehyde (2 g, 8.53 mmol, 1 equiv.) and *cis*-1,2-amino-indanol (1.3 g, 8.53 mmol, 1 equiv.) were stirred in the presence of magnesium sulphate (1 g per mol) under N_2 for 16 h. The mixture was filtered and solvent removed under reduced pressur to yield the product as a yellow foam (3.24 g, 100 %); δH (400 MHz; $CDCl_3$) 8.64 (1H, s, C*H*=N), 7.43 (1H, d, *J* 2.5, Ar*H*), 7.34 – 7.1 (4H, m, Ar*H*), 7.18 (1H, d, *J* 2.5, Ar*H*), 4.82 (1H, d, *J* 5.5, C*H*N), 4.70 (1H, q, *J* 5.5, C*H*OH), 3.29 – 3.12 (2H, CH AB m, *J* 16 and 5.5 CH_2), 1.42 (9H, s, C(C*H*$_3$)$_3$) and 1.33 (9H, s, C(C*H*$_3$)$_3$).

1,2:5,6-Di-O-isopropylidine-α-D-glucofuranosyl-(S)-cyclohexanesulfinate (S_S)-**12b**[5]

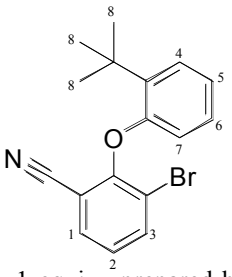


By the method of Herrmann,[2] a mixture of dicyclohexyldisulfide (3 cm^3, 13.67 mmol, 1 equiv.) and glacial acetic acid (1.6 cm^3, 27.34 mmol, 2 equiv.) were cooled to –38 °C where the mixture froze. Sulfuryl chloride (3.4 cm^3, 42.38 mmol, 3.1 equiv.) was added dropwise over 20 min whereupon the mixture dissolved. The mixture was stirred at –38 °C for 3 h, warmed to room temperature over 45 min and heated to 40 °C and stirred at this temperature for a further 1 h. The mixture was cooled to RT and solvent removed under reduced pressure to yield cyclohexanesulfinyl chloride as a yellow oil.

By the method of Alayrac,[5] a suspension of diacetone-*D*-glucose (4.7 g, 18.22 mmol, 1 equiv.) and di-*iso*propylethylamine (3.8 cm^3, 21.87 mmol, 1.2 equiv.) in THF (50 cm^3) was added portionwise over a period of 45 min to a stirred solution of cyclohexanesulfinyl chloride (27.34 mmol, 1.5 equiv.) in THF (45 ml) at –78 °C. The mixture was stirred for 16 h with warming to –10 °C and quenched with water (50 cm^3). DCM (30 cm^3) was added and the aqueous layer was

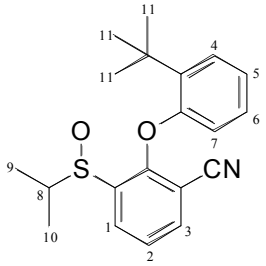
extracted with DCM (2 x 30 cm^3 portions). The combined organics were washed with HCl, $NaHCO_3$, brine, dried (Na_2SO_4) and solvent removed under reduced pressure. The crude product was recrystallised at –78 °C from 4:1 petrol : EtOAc to yield the product as a white solid (3.35 g, 47 %); δH (300 MHz; $CDCl_3$) 5.94 (1H, d, *J* 3, C*H*), 4.82 (1H, d, *J* 5, C*H*), 4.74 (1H, d, *J* 2, C*H*), 4.17 (3H, m), 3.99 (1H, m), 2,68 (1H, tt, *J* 12 and 4, C*H*), 2.07 (2H, m, CH_2), 1.89 (2H, m, CH_2), 1.72 (1H, m, CH_2), 1.53 (3H, s, CH_3), 1.45 (3H, s, CH_3), 1.35 (3H, s, CH_3), 1.33 (3H, s, CH_3) and 1.24 – 1.55 (5H, m, CH_2). $[\alpha]_D^{23} = -48$ (*c* = 1.8, acetone); (Lit[5] $[\alpha]_D^{22} = -60$ (*c* = 4, acetone)).

3-Bromo-2-(2-tert-butylphenoxy)-benzonitrile **4**



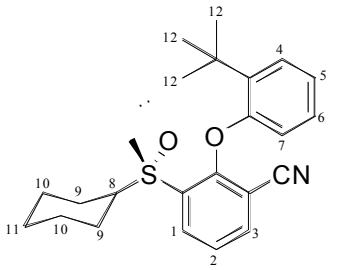
2-Chloro-3-bromobenzonitrile (2.62 g, 12.1 mmol, 1 equiv., prepared by the method of Betson et al.[6]), 2-*t*-butyl-phenoxide (2.75 g, 14.52 mmol, 1.2 equiv.), and anhydrous DMF (80 cm^3) were treated as described in general procedure A. The crude product was purified by flash column chromatography (60:1 petrol : EtOAc) to yield the product as a light yellow oil (2.62 g, 66 %). Rf = 0.40 (19:1 petrol:EtOAc); ν_{max}(film/cm^{-1}) 2233 (CN); δH (300 MHz; $CDCl_3$) 7.95 (1H, dd, *J* 8 and 1.5, H-1), 7.71 (1H, dd, *J* 8 and 1.5, H-3), 7.48 (1H, m, H-4), 7.25 (1H, t, *J* 8, H-2), 7.10 (2H, m, H-5 and H-6), 6.31 (1H, m, H-7) and 1.59 (9H, s, H-8).; δC (75 MHz, $CDCl_3$) 155.9, 154.1, 138.9, 138.2, 133.6, 128.1, 127.3, 126.5, 123.4, 118.8, 115.0, 113.7, 109.7, 35.3 and 30.4.; EI *m/z* 329 (M); CI *m/z* 347 (M + NH_4^+); (Found: M + NH_4^+, 347.0754. $C_{17}H_{20}N_2OBr$ requires *M*, 347.0754).

2-(2'-tert-Butylphenoxy)-3-(propane-2-sulfinyl)benzonitrile **5a**



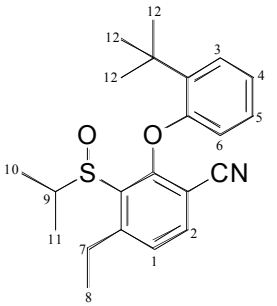
Bromide **4** (450 mg, 1.36 mmol, 1 equiv.), *n*-BuLi (1.4 M solution in hexanes) (0.97 cm^3, 1.36 mmol, 1 equiv.), isopropyl propane-2-sulfinothioate **A** (0.27 cm^3, 1.64 mmol, 1.2 equiv.) and THF (25 cm^3) were treated as described in General Procedure B. The crude product was purified by flash column chromatography (6:1 petrol : EtOAc) to yield the product as a light yellow solid (224 mg, 56 %). m.p. 123 – 127 °C; Rf = 0.13 (3:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 2232 (CN), 1057 (SO); δH (400 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 60:40] 8.14 (1H, dd, *J* 8 and 1.5, H-1^{major}), 8.10 (1H, dd, *J* 8 and 1.5, H-1^{minor}), 7.79 (1H, dd, *J* 7.5 and 1.5, H-3^{major}), 7.73 (1H, dd, *J* 7.5 and 1.5, H-3^{minor}), 7.53 (1H, t, *J* 8, H-2^{major}), 7.50 – 7.43 (3H, m, H-2^{minor} and H-$4^{min+maj}$), 7.18 – 7.09 (4H, m, H-$5^{min+maj}$ and H-$6^{min+maj}$), 6.51 (1H, m, H-7^{minor}), 6.44 (1H, m, H-7^{major}), 3.15 (1H, sept, *J* 7, H-8^{major}), 2.89 (1H, sept, *J* 7, H-8^{minor}), 1.51 (9H, s, H-11^{major}), 1.48 (9H, s, H-11^{minor}), 1.45 (3H, d, *J* 7, H-9^{major}), 1.38 (3H, d, *J* 7, H-9^{minor}), 1.09 (3H, d, *J* 7, H-10^{major}) and 1.03 (3H, d, *J* 7, H-10^{minor}).; δC (100 MHz; $CDCl_3$) 156.6, 155.6, 153.6, 153.6, 140.4, 139.0, 138.9, 137.7, 137.6, 137.3, 132.5, 132.0, 128.9, 128.4, 128.1, 127.9, 125.8, 125.4, 125.3, 124.8, 116.2, 116.1, 114.7, 114.6, 107.3, 105.5, 53.6, 51.5, 35.5, 35.4, 30.8, 30.7, 18.3, 18.3, 12.4 and 12.2.; EI *m/z* 341 (M); CI *m/z* 342 (M + H); (Found: M + H, 342.1533. $C_{20}H_{24}O_2NS$ requires *M*, 342.1522).

(*S*$_S$)-*2-(2'-tert-butylphenoxy)-3-(cyclohexylsulfinyl)benzonitrile* **5b**



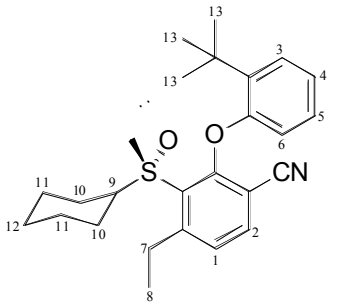
Bromide **4** (100 mg, 0.3 mmol, 1 equiv.), *n*BuLi (1.4 M solution in hexanes) (0.21 cm^3, 0.3 mmol, 1 equiv.), cyclohexyl-DAG-sulfinate (*S*$_S$)-**12b** (142 mg, 0.36 mmol, 1.2 equiv.) and THF (10 cm^3) were treated as described in General Procedure H. The crude product was purified by flash column chromatography (3:1 petrol : EtOAc) to yield the product as a white solid (75 mg, 66 %), m.p. 87 – 90 °C. Rf = 0.40 (4:1 petrol:EtOAc); $[\alpha]_D^{23}$ = –181.5 (*c* 0.8 in acetone); ν_{max} (film/cm^{-1}) 2232 (CN), 1054 (SO); δH (500 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 60:40] 8.12 (1H, dd, *J* 8 and 2, H-1^{major}), 8.09 (1H, dd, *J* 8 and 2, H-1^{minor}), 7.78 (1H, dd, *J* 7.5 and 2, H-3^{major}), 7.74 (1H, dd, *J* 7.5 and 2, H-3^{minor}), 7.52 (1H, t, *J* 8, H-2^{major}), 7.51 – 7.44 (3H, m, H-2^{minor} and H-4$^{min+maj}$), 7.13 (4H, m, H-5$^{min+maj}$ and H-6$^{min+maj}$), 6.46 (2H, m, H-7$^{min+maj}$), 2.91 (1H, tt, *J* 12 and 4, H-8^{major}), 2.55 (1H, tt, *J* 12 and 4, H-8^{minor}), 2.08 – 0.99 (20H, m, H-9$^{min+maj}$, H-10$^{min+maj}$ and H-11$^{min+maj}$), 1.51 (9H, s, H-12^{major}) and 1.48 (1H, s, H-12^{minor}).; δC (125 MHz; $CDCl_3$) 156.4, 155.7, 153.4, 153.3, 140.0, 138.9, 138.0, 137.4, 137.2, 136.9, 132.6, 132.0, 128.7, 128.2, 127.9, 127.6, 125.4, 125.2, 125.0, 124.7, 116.2, 115.5, 114.6, 114.5, 107.0, 105.9, 61.3, 59.5, 35.4, 35.2, 30.6, 30.5, 28.4, 28.0, 26.4, 26.3, 25.7, 25.6, 25.4, 22.0 and 21.6.; EI *m/z* 397 (M + NH_4^+), 381 (M); CI *m/z* 382 (M + H); (Found: M + H, 382.1841. $C_{23}H_{28}O_2NS$ requires *M*, 382.1835).

2-(2'-tert-Butyl-phenoxy)-3-isopropylsulfinyl-4-ethyl-benzonitrile **6a**



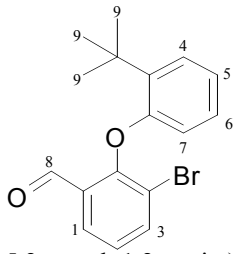
Isopropylsulfoxide **5a** (140 mg, 0.41 mmol, 1 equiv.), LDA (1.7 M solution in hexanes) (0.26 cm^3, 0.45 mmol, 1.1 equiv.), iodomethane (0.03 cm^3, 0.49 mmol, 1.2 equiv.) and THF (10 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the product as a yellow oil (29 mg, 19 %). Rf = 0.17 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 2231(CN), 1056 (SO); δH (300 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 66:34] 7.71 (1H, d, *J* 8, H-2^{major}), 7.65 (1H, d, *J* 8, H-2^{minor}), 7.46 (2H, m, H-3$^{min+maj}$), 7.31 (1H, d, *J* 8, H-1^{major}), 7.22 (1H, d, *J* 8, H-1^{minor}), 7.14 (4H, m, H-4$^{min+maj}$ and H-5$^{min+maj}$), 6.53 (1H, m, H-6^{minor}), 6.49 (1H, m, H-6^{major}), 3.62 – 3.48 (3H, m, H-7$^{A\text{-}min+maj}$ and H-7$^{B\text{-}major}$), 3.38 (1H, m, H-7$^{B\text{-}minor}$), 3.09 (2H, m, H-9$^{maj+min}$), 1.54 (9H, s, H-12^{major}), 1.53 (9H, s, H-12^{minor}), 1.48 (3H, d, *J* 7, H-10^{major}), 1.47 (3H, d, *J* 7, H-10^{minor}), 1.40 (3H, t, *J* 7.5, H-8^{major}), 1.38 (3H, t, *J* 7.5, H-8^{minor}), 1.26 (3H, d, *J* 7, H-11^{major}) and 1.20 (3H, d, *J* 7, H-11^{minor}).; δC (75 MHz; $CDCl_3$) 156.7, 156.4, 155.7, 154.8, 154.3, 139.6, 138.8, 136.9, 135.3, 134.8, 128.0, 127.8, 127.7, 127.5, 126.7, 124.5, 124.1, 116.8, 115.7, 114.8, 114.7, 105.0, 104.2, 53.4, 52.6, 35.2, 35.1, 30.7, 30.5, 25.3, 24.6, 17.5, 17.4, 16.4, 16.1 and 15.9.; EI *m/z* 370 (M + H); CI *m/z* 370 (M + H); (Found: M + H, 370.1833. $C_{22}H_{28}O_2NS$ requires *M*, 370.1835).

(*S*$_S$)-*2-(2'-tert-Butyl-phenoxy)-3-cyclohexylsulfinyl-4-ethyl-benzonitrile* **6b**



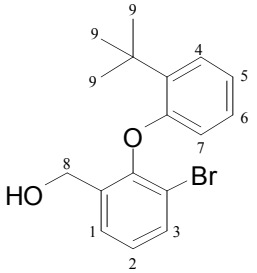
Cyclohexylsulfoxide **5b** (220 mg, 0.58 mmol, 1 equiv.), LDA (1.6 M solution in hexanes) (0.43 cm^3, 0.69 mmol, 1.2 equiv.), iodomethane (0.05 cm^3, 0.81 mmol, 1.4 equiv.) and THF (15 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (6:1 petrol : EtOAc) to yield the product as a yellow oil (22 mg, 9 %). Rf = 0.35 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 2230 (CN), 1055 (SO); δH (500 MHz; $CDCl_3$) Mixture of diastereoisomers in the ratio of 66:34. 7.58 (1H, d, *J* 8, H-2^{major}), 7.53 (1H, d, *J* 8, H-2^{minor}), 7.34 (2H, m, H-3$^{min+maj}$), 7.18 (1H, d, *J* 8, H-1^{major}), 7.09 (1H, d, *J* 8, H-1^{minor}), 7.02 (4H, m, H-4$^{min+maj}$ and H-5$^{min+maj}$), 6.42 (1H, m, H-6^{minor}), 6.49 (1H, dd, *J* 7.5 and 1.5, H-6^{major}), 3.37 (1H, br m, H-9^{minor}), 3.15 (2H, br d, H-9^{minor} and H-7$^{A\text{-}minor}$), 3.00 – 2.90 (3H, m, H-7$^{A\text{-}major}$ and H-7$^{B\text{-}maj+min}$), 2.12 – 1.06 (26H, m, H-8$^{min+maj}$, H-10$^{min+maj}$, H-11$^{min+maj}$ and H-12$^{min+maj}$) and 1.42 (18H, br s, H-13$^{maj+min}$).; δC (75 MHz; $CDCl_3$) 156.7, 154.9, 154.2, 139.5, 138.8, 137.0, 136.8, 134.9, 134.6, 128.0, 127.7, 127.5, 126.4, 124.4, 124.1, 117.0, 115.6, 114.8, 114.7, 105.1, 60.5, 35.2, 35.1, 30.8, 30.5, 27.4, 27.1, 26.4, 26.3, 25.8, 25.7, 25.6, 25.4, 24.7, 15.9 and 15.8.; CI *m/z* 410 (M + H); (Found: M + H, 410.2140. $C_{25}H_{32}O_2NS$ requires *M*, 410.2148).

3-Bromo-2-(2-tert-butyl-phenoxy)-benzaldehyde **C**



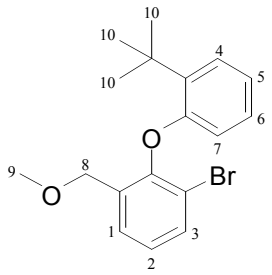
DIBAL (1M solution in toluene) (5.2 cm^3, 5.2 mmol, 1.2 equiv.), nitrile **4** (1.43 g, 4.33 mmol, 1 equiv.) and anhydrous toluene (80 cm^3) were treated as described in general procedure F. The crude was purified by flash column chromatography (60:1 Petrol : EtOAc) to yield the product as a white solid (816 mg, 57%), m.p. 58 - 64^{o}C. Rf = 0.36 (19:1 petrol:EtOAc); ν_{max}(film/cm^{-1}) 1708 and 1687 (CHO); δH (300 MHz; $CDCl_3$) 10.15 (1H, s, H-8), 8.01 (1H, dd, *J* 8 and 1.5, H-1), 7.98 (1H, dd, *J* 8 and 1.5, H-3), 7.48 (1H, m, H-4), 7.33 (1H, td, J 8 and 1, H-2), 7.07 (2H, m, H-5 and H-6), 6.29 (1H, m, H-7) and 1.61 (9H, s, H-9).; δC ($CDCl_3$) 188.9, 157.5, 154.4, 140.2, 137.4, 131.7, 128.2, 128.0, 127.5, 127.0, 122.8, 119.0, 113.7, 35.3 and 30.2.; EI *m/z* 332 (M); CI *m/z* 350 (M + NH_4^+); (Found: M + NH_4^+, 350.0749. $C_{17}H_{21}O_2NBr$ requires *M*, 350.0750).

[3-Bromo-2-(2-tert-butyl-phenoxy)-phenyl]-methanol **D**



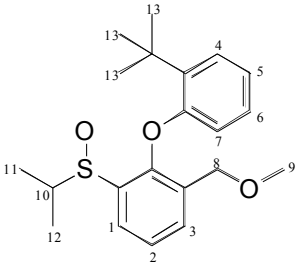
Aldehyde **C** (734 mg, 2.23 mmol, 1 equiv.), sodium borohydride (42.2 mg, 11.15 mmol, 5 equiv.) and anhydrous THF (80 cm^3) were treated as described in General Procedure G. The crude was purified by flash column chromatography (9:1 petrol : EtOAc) to yield the product as a white solid (565 mg, 76%). m.p. 72 - 75°C; Rf = 0.42 (9:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 3340 (OH).; δH (300 MHz; $CDCl_3$) 7.66 (1H, dd, *J* 8 and 1.5, H-1), 7.60 (1H, m, H-3), 7.46 (1H, dd, *J* 7 and 2.5, H-4), 7.23 (1H, t, *J* 8, H-2), 7.04 (2H, m, H-5 and H-6), 6.29 (1H, dd, J 7 and 2.5, H-7), 4.82 – 4.50 (2H, CH AB m, *J* 13.5, H-8) and 1.60 (9H, s, H-9).; δC (75 MHz; $CDCl_3$) 156.1, 148.6, 137.3, 136.9, 133.4, 128.3, 127.8, 127.4, 126.9, 122.2, 118.1, 112.7, 60.9, 35.3 and 30.3.; EI *m/z* 334 (M); CI *m/z* 352 ($M + NH_4^+$); (Found: $M + NH_4^+$, 352.0916. $C_{17}H_{23}O_2NBr$ requires *M*, 352.0907).

2-(2'-tert-Butylphenoxy)-1-methoxyethyl-3-bromobenzene **7**



Alcohol **D** (863 g, 2.57 mmol, 1 equiv.), sodium hydride (60 % dispersion in mineral oil) (154 mg, 3.86 mmol, 1.5 equiv.), iodomethane (0.24 cm^3, 3.86 mmol, 1.5 equiv.) and THF (40 cm^3) were reacted as described in General Procedure I. The crude was purified by flash column chromatography (50:1 petrol : EtOAc) to yield the product as a colourless oil (823 mg, 92 %). Rf = 0.72 (19:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 2955, 1925 (CH).; δH (300 MHz; $CDCl_3$) 7.64 (1H, dd, *J* 8 and 1.5, H-1), 7.57 (1H, dd, *J* 8 and 1.5, H-3), 7.46 (1H, dd, *J* 7.5, H-4), 7.21 (1H, t, *J* 8, H-2), 7.04 (2H, CH ABXY m, H-5 and H-6), 6.28 (1H, dd, *J* 7.5 and 2, H-7), 4.54 – 4.28 (2H, CH AB m, *J* 13, H-8), 3.35 (3H, s, H-9) and 1.60 (9H, s, H-10).; δC (75 MHz; $CDCl_3$) 156.0, 148.7, 137.2, 134.8, 133.3, 128.4, 127.6, 127.2, 126.7, 122.0, 118.0, 112.7, 69.7, 58.8, 35.2 and 30.2.; EI *m/z* 348 (M); CI *m/z* 366 ($M + NH_4^+$); (Found: M, 348.0712. $C_{18}H_{21}O_2Br$ requires *M*, 348.0719).

*(S_S)- and (R_S)-2-(2'-tert-Butylphenoxy)-1-methoxymethyl-3-isopropylsulfinyl-benzene (S_S)- and (R_S)-***8a**

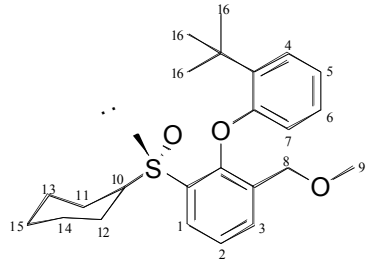


Bromide **7** (403 mg, 1.15 mmol, 1 equiv.), *n*BuLi (2.4 M solution in hexanes) (0.48 cm^3, 1.15 mmol, 1 equiv.), (S_S)-**12a** (480 mg, 1.27 mmol, 1.1 equiv.) and THF (35 cm^3) were treated as described in General Procedure B. The crude product was purified by flash column chromatography (6:1 petrol : EtOAc) to yield the product *(S_S)*-**8a** as a colourless oil (281 mg, 68 %). Rf = 0.45 and 0.38 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1056 (SO); δH (400 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in ratio of 66:34] 7.87 (1H, dd, *J* 8 and 1.5, H-1^{major}), 7.82 (1H, dd, *J* 8 and 1.5, H-1^{minor}), 7.71 (1H, dd, *J* 8 and 1.5, H-3^{major}), 6.69 (1H, dd, *J* 8 and 1.5, H-3^{minor}), 7.50 (2H, m, H-$2^{min+maj}$), 7.40 (2H, m, H-$4^{min+maj}$), 6.99 (4H, m, H-$5^{min+maj}$ and H-$6^{min+maj}$), 6.30 (1H, m, H-7^{major}), 6.27 (1H, m, H-7^{minor}), 4.19 (4H, CH AB m, *J* 12.5, H-$8^{min+maj}$), 3.26 (3H, s, H-9^{major}), 3.21 (3H, s, H-9^{minor}), 3.03 (1H, sept, *J* 7, H-10^{major}), 2.50 (1H, sept, *J* 7, H-10^{minor}), 1.52 (9H, s, H-13^{major}), 1.51 (9H, s, H-13^{minor}), 1.37 (3H, d, *J* 7, H-11^{major}), 1.23 (3H, d, *J* 7, H-11^{minor}), 1.08 (3H, d, *J* 7, H-12^{major}) and 0.95 (3H, d, *J* 7, H-12^{minor}).; δC (100 MHz; $CDCl_3$) 154.4, 154.3, 145.5, 145.2, 135.6, 135.0, 134.5, 134.1, 130.4, 130.3, 130.0, 129.7, 125.9, 125.4, 124.9, 124.7,

124.1, 124.1, 123.9, 120.6, 120.4, 111.6, 110.9, 66.6, 66.5, 56.6, 56.5, 51.2, 48.4, 33.0, 32.8, 28.0, 27.9, 15.8, 15.7, 9.8 and 9.4.; CI *m/z* 361 (M + H); (Found: M + H, 361.5188. $C_{21}H_{28}O_3S$ requires *M*, 361.5183). $[\alpha]_D^{23} = -185.8$ (c = 0.73, acetone).

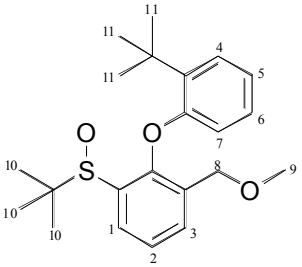
In the same way, bromide **7** (402 mg, 1.15 mmol, 1 equiv.), *n*BuLi (2.4 M solution in hexanes) (0.48 cm^3, 1.15 mmol, 1 equiv.), (R_S)-**12a** (479 mg, 1.27 mmol, 1.1 equiv.) and THF (30 cm^3) were treated as described in General Procedure B. The crude product was purified by flash column chromatography (6:1 petrol : EtOAc) to yield the product *(R_S)*-**8a** as a colourless oil (316 mg, 76 %). $[\alpha]_D^{23} = +244.2$ (c = 0.66, acetone).

(S_S)-*2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-3-cyclohexylsulfinylbenzene* **8b**



Bromide **7** (481 mg, 1.38 mmol, 1 equiv.), *n*BuLi (2.3 M solution in hexanes) (0.6 cm^3, 1.38 mmol, 1 equiv.), cyclohexyl-DAG-sulfinate (S_S)-**12b** (591 mg, 1.51 mmol, 1.1 equiv.) and THF (40 cm^3) were treated as described in General Procedure H. The crude product was purified by reverse phase flash column chromatography (1:1 acetonitrile : water) followed by flash column chromatography (4:1 petrol : EtOAc) to yield the product as a colourless oil (300 mg, 54 %). Rf = 0.67 and 0.55 (4:1 petrol:EtOAc); $[\alpha]_D^{23} = -235.3$ (*c* 1.1 in acetone); ν_{max} (film/cm^{-1}) 1054 (SO); δH (300 MHz; $CDCl_3$) Mixture of diastereoisomers in ratio of 57:43. 7.89 (1H, dd, *J* 8 and 2, H-1^{major}), 7.82 (1H, dd, *J* 8 and 27, H-1^{minor}), 7.75 (2H, m, H-$3^{min+maj}$), 7.54 (1H, t, *J* 8 H-2^{major}), 7.53 (1H, t, *J* 8, H-2^{minor}), 7.36 (2H, m, H-$4^{min+maj}$), 7.04 (4H, m, H-$5^{min+maj}$ and H-$6^{min+maj}$), 6.35 (1H, m, H-7^{major}), 6.30 (1H, m, H-7^{minor}), 4.24 (4H, CH AB m, *J* 12.5, H-$8^{min+maj}$), 3.30 (3H, s, H-9^{major}), 3.27 (3H, s, H-9^{minor}), 2.83 (1H, m, H-10^{minor}), 2.22 (1H, tt, *J* 12 and 3.5, H-10^{major}), 1.55 (9H, s, H-16^{major}), 1.54 (9H, s, H-16^{minor}) and 2.01 – 0.81 (10H, m, H11 – $H15^{min+maj}$).; δC (75 MHz; $CDCl_3$) 156.6, 156.5, 147.7, 147.2, 137.7, 136.7, 136.5, 135.7, 132.7, 132.7, 132.5, 131.7, 129.2, 128.4, 128.1, 127.6, 127.2, 127.1, 126.5, 126.2, 122.8, 122.6, 113.7, 113.0, 68.8, 61.4, 58.9, 58.8, 58.6, 35.3, 35.0, 30.1, 28.2, 27.9, 26.3, 25.5, 25.3, 21.4 and 21.3.; CI *m/z* 401 (M + H); (Found: M + H, 401.2146. $C_{24}H_{33}O_3S$ requires *M*, 401.2145).

(S_S)- and (R_S)-2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-3-tert-butylsulfinyl-benzene (S_S)- and (R_S)-**9a**



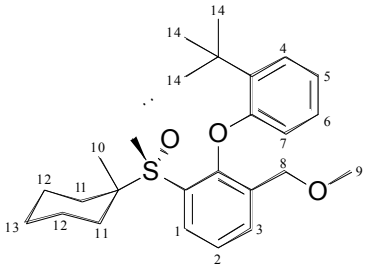
Isopropylsulfoxide (R_S)-**8a** (203 mg, 0.56 mmol, 1 equiv.), LDA (0.62 mmol, 1.1 equiv.), iodomethane (0.04 cm^3, 0.68 mmol, 1.2 equiv.) and THF (12 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (5:1 petrol : EtOAc) to yield the product as a colourless oil (159 mg, 76 %). m.p. 121 – 124 °C; $[\alpha]_D^{23} = +219.7$ (*c* 0.59 in acetone). Rf = 0.18 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1045 (SO); δH (400 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 86:14] 7.77 (1H, dd, *J* 8 and 1.5, H-1^{major}), 7.73 (1H, dd, *J* 8 and 1.5, H-1^{minor}), 7.62 (1H, m, H-3^{major}), 7.58 (1H, m, H-3^{minor}), 7.38 (1H, t, *J* 8, H-2^{major}), 7.32 (1H, t, *J* 8, H-2^{minor}), 7.28 (2H, m, H-$4^{min+maj}$),

6.86 (4H, m, H-5$^{min+maj}$ and H-6$^{min+maj}$), 6.36 (1H, dd, *J* 8 and 1.5, H-7^{minor}), 6.13 (1H, m, H-7^{major}), 4.27 – 3.90 (2H, CH AB m, *J* 13, H-8^{major}), 3.95 (2H, d, *J* 9.5, H-8^{minor}), 3.13 (3H, s, H-9^{major}), 3.02 (3H, s, H-9^{minor}), 1.42 (9H, s, H-10^{major}), 1.40 (9H, s, H-10^{minor}), 1.14 (9H, s, H-11^{major}) and 1.02 (9H, s, H-11^{minor}).; δC (100 MHz; $CDCl_3$) 156.9, 156.0, 150.4, 149,9, 136.9, 135.5, 134.8, 133.0, 132.6, 131.3, 128.3, 127.9, 127.7, 127.7, 127.3, 126.6, 126.0, 125.5, 122.7, 122.6, 114.7, 114.4, 69.3, 68.9, 58.8, 58.5, 58.0, 56.7, 35.2, 30.4, 30.2, 23.7 and 23.3.; CI *m/z* 375 (M + H); (Found: M + H, 375.1987. $C_{22}H_{31}O_3S$ requires *M*, 375.1988).

Preparation of LDA: *n*-BuLi (2.2 M in hexanes) (0.22 cm^3, 0.49 mmol, 1.1 equiv.) was added dropwise to a stirred solution of anhydrous diisopropylamine (0.07 cm^3, 0.49 mmol, 1.1 equiv.) dissolved in anhydrous THF (5 cm^3) at 0 ^{o}C under N_2 and allowed to stir for 30 min.

In the same way isopropylsulfoxide (S_S)-**8a** (274 mg, 0.76 mmol, 1 equiv.), LDA (0.84 mmol, 1.1 equiv.), iodomethane (0.06 cm^3, 0.91 mmol, 1.2 equiv.) and THF (15 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (5:1 petrol : EtOAc) to yield the product (R_S)-**8b** as a colourless oil (235 mg, 83 %). $[\alpha]_D^{23}$ = –269.5 (*c* 1.18 in acetone); Analysis matched that described above.

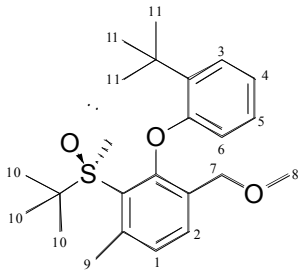
2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-3-(1-methyl-cyclohexylsulfinyl)-benzene (S_S)-**9b**



Cyclohexylsulfoxide **8b** (24 mg, 0.06 mmol, 1 equiv.), LDA (0.07 mmol, 1.1 equiv.), iodomethane (4.5 μL, 0.07 mmol, 1.2 equiv.) and THF (3 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (5:1 petrol : EtOAc) to yield the product as an orange oil (23 mg, 92 %). $[\alpha]_D^{23}$ = –6.4 (*c* 1.8 in acetone); Rf = 0.42 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1044 (SO); δH (500 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 80:20] 7.74 (1H, dd, *J* 7.5 and 2, H-1^{major}), 7.71 (1H, dd, *J* 7.5 and 2, H-1^{minor}), 7.60 (1H, dd, *J* 7.5 and 1, H-3^{major}), 7.55 (1H, dd, J 7.5 and 1, H-3^{minor}), 7.35 (1H, t, *J* 8, H-2^{major}), 7.29 (1H, t, *J* 8, H-2^{minor}), 7.27 (2H, m, H-4$^{maj+min}$), 6.90 – 6.81 (4H, m, H-5$^{maj+min}$ and H-6$^{maj+min}$), 6.37 (1H, dd, *J* 8 and 1.5, H-7^{minor}), 6.13 (1H, dd, *J* 8 and 1.5, H-7^{major}), 4.26 – 3.88 (2H, CH AB m, *J* 13, H-8^{major}), 3.94 (2H, d, *J* 6.5, H-8^{minor}), 3.12 (3H, s, H-9^{major}), 3.01 (3H, s, H-9^{minor}), 1.80 – 0.97 (20H, m, H-11$^{maj+min}$, H-12$^{maj+min}$ and H-13$^{maj+min}$), 1.41 (9H, s, H-14^{major}), 1.38 (9H, s, H-14^{minor}), 1.97 (3H, s, H-10^{major}) and 0.95 (3H, s, H-10^{minor}).; δC (75 MHz; $CDCl_3$) 156.9, 156.0, 150.6, 150.1, 137.7, 136.8, 134.5, 132.9, 132.6, 128.8, 127.9, 127.7, 127.7, 126.6, 125.9, 125.4, 122.6, 122.6, 114.6, 114.4, 69.4, 68.9, 61.7, 60.6, 58.8, 58.5, 41.1, 35.2, 35.2, 32.3, 31.7, 30.8, 30.5, 30.2, 29.5, 25.6, 24.1, 22.4, 22.0, 22.0, 21.8, 21.0, 17.7, 17.5, 17.0, 15.7 and 14.9.; CI *m/z* 415 (M + H); (Found: M + H, 415.2301. $C_{25}H_{35}O_3S$ requires *M*, 415.2301).

Preparation of LDA: n-BuLi (2.4 M in hexanes) (0.03 cm^3, 0.07 mmol, 1.1 equiv.) was added dropwise to a stirred solution of anhydrous diisopropylamine (0.01 cm^3, 0.07 mmol, 1.1 equiv.) dissolved in anhydrous THF (1 cm^3) at 0 ^{o}C under N_2 and allowed to stir for 30 min.

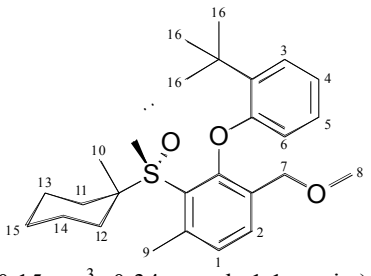
*(R_S)- and (S_S)-2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-methyl-3-tert-butylsulfinyl-benzene (R_S)- and (S_S)-***10a**



*n*BuLi (2.3 M solution in hexanes) (0.19 cm^3, 0.44 mmol, 1.1 equiv.), *t*-butyl-sulfoxide *(R_S)*-**9a** (151 mg, 0.44 mmol, 1 equiv.), iodomethane (0.04 cm^3, 0.61 mmol, 1.5 equiv) and THF (10 cm^3) were treated as described in General Procedure D. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the sulfoxide *(R_S)*-**10a** as a white solid (98 mg, 63 %). m.p. 101 – 103 ^{o}C; Rf = 0.31 (4:1 petrol:EtOAc); $[\alpha]_D^{23}$ = +257.4 (*c* 0.53 in acetone); ν_{max} (film/cm^{-1}) 1051 (SO); δH (500 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 95:5] 7.58 (1H, dd, *J* 8, H-1^{major}), 7.54 (1H, d, *J* 8, H-1^{minor}), 7.40 (2H, dd, *J* 7.5 and 2, H-3$^{min+maj}$), 7.19 (1H, d, *J* 8 H-2^{major}), 7.13 (1H, d, *J* 8, H-2^{minor}), 6.98 (4H, m, H-4$^{min+maj}$ and H-5$^{min+maj}$), 6.48 (1H, dd, *J* 8 and 1.5, H-6^{minor}), 6.23 (1H, dd, *J* 8 and 1.5, H-6^{major}), 4.33 – 3.94 (2H, CHAB m, *J* 13, H-7^{major}), 4.14 (2H, q, J 7, H-7^{minor}), 3.22 (3H, s, H-8^{major}), 3.11 (3H, s, H-8^{minor}), 2.84 (3H, s, H-9^{major}), 2.81 (3H, s, H-9^{minor}), 1.54 (9H, s, H-10^{major}), 1.52 (9H, s, H-10^{minor}), 1.36 (9H, s, H-11^{major}) and 1.24 (9H, s, H-11^{minor}).; δC (75 MHz; $CDCl_3$) 156.9, 150.9, 142.4, 136.7, 132.0, 131.2, 131.1, 129.9, 127.7, 127.6, 122.4, 114.7, 68.8, 60.5, 58.6, 35.1, 30.4, 30.3$^{(minor)}$, 25.6$^{(minor)}$, 24.7 and 18.9.; CI *m/z* 389 (M + H); (Found: M + H, 389.2144. $C_{23}H_{33}O_3S$ requires *M*, 389.2145).

In the same way, *n*-BuLi (2.3 M solution in hexanes) (0.29 cm^3, 0.6 mmol, 1.1 equiv.), *t*-butyl-sulfoxide *(S_S)*-**9a** (223 mg, 0.6 mmol, 1 equiv.), iodomethane (0.06 cm^3, 0.89 mmol, 1.5 equiv) and THF (15 cm^3) were treated as described in General Procedure D. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the sulfoxide *(S_S)*-**10a** as a white solid (174 mg, 75 %). $[\alpha]_D^{23}$ = –235.8 (*c* 0.48 in acetone); Analysis matched that described above.

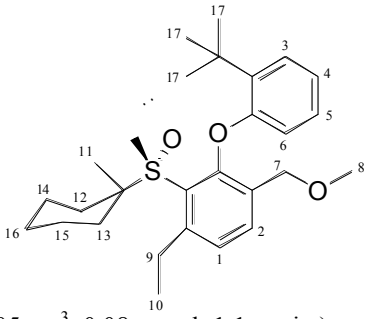
*2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-methyl-3-(1-methyl-cyclohexylsulfinyl)-benzene (S_S)-***10b**



n-BuLi (2.3 M solution in hexanes) (0.15 cm^3, 0.34 mmol, 1.1 equiv.), sulfoxide *(S_S)*-**9b** (130 mg, 0.31 mmol, 1 equiv.), iodomethane (0.03 cm^3, 0.41 mmol, 1.3 equiv) and THF (10 cm^3) were treated as described in General Procedure D. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the product as a white solid (94 mg, 71 %). m.p. 117 – 119 ^{o}C; Rf = 0.65 (4:1 petrol:EtOAc); $[\alpha]_D^{23}$ = –195.8 (*c* 1.14 in acetone); ν_{max} (film/cm^{-1}) 1089/1049 (SO); δH (300 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 94:6] 7.56 (1H, d, *J* 8, H-1^{major}), 7.53 (1H, d, *J* 8, H-1^{minor}), 7.38 (2H, dd, *J* 7.5 and 2, H-3$^{min+maj}$), 7.17 (1H, d, *J* 8 H-2^{major}), 7.12 (1H, d, *J* 8, H-2^{minor}), 6.97 (4H, m, H-4$^{min+maj}$ and H-5$^{min+maj}$), 6.48 (1H, dd, *J* 8 and 2, H-6^{major}), 6.24 (1H, dd, *J* 8 and 2, H-6^{minor}), 4.35 – 3.92 (4H, CH AB m, *J* 13, H-7$^{min+maj}$), 3.22 (3H, s, H-8^{major}), 3.11 (3H, s, H-8^{minor}), 2.82 (3H, s, H-9^{major}), 2.80 (3H, s, H-9^{minor}), 1.54 (9H, s, H-16^{major}), 1.51 (9H, s, H-16^{minor}), 1.34 (3H, s, H-10^{major}), 1.23 (3H, s, H-10^{minor}) and 2.03 – 1.12 (10H, m, H11 – H15$^{min+maj}$).; δC (75 MHz; $CDCl_3$) 156.9, 156.3, 151.1, 142.9, 142.5, 136.7, 131.9, 131.0, 130.7, 129.8, 127.6, 127.5, 122.3, 115.1, 114.7, 70.8, 69.3, 68.9,

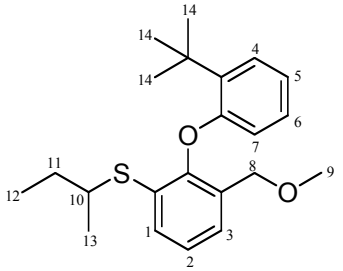
64.5, 58.6, 35.1, 32.8, 32.1, 31.8, 31.1, 30.5, 30.3, 25.5, 22.6, 22.2, 19.6, 19.2, 18.7 and 17.0.; CI *m/z* 429 (M + H); (Found: M + H, 429.2455. $C_{26}H_{37}O_3S$ requires *M*, 429.2458).

2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-ethyl-3-(1-methyl-cyclohexylsulfinyl)-benzene (S_S)-**11b**



n-BuLi (1.7 M solution in hexanes) (0.05 cm^3, 0.08 mmol, 1.1 equiv.) was added to a stirred solution of sulfoxide *(S_S)*-**10b** (30 mg, 0.07 mmol, 1 equiv.) in THF (3 cm^3) at –78 °C and stirred for 1.5 h with warming to –40 °C. Iodomethane (0.01 cm^3, 0.08 mmol, 1.2 equiv) was added the mixture was stirred for 10 min and warmed to RT and stirred for a further 1.5 h. The mixture was quenched using NH_4Cl solution and extracted using 2 portions of EtOAc. The combined organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under reduced pressure. The crude sulfoxide *(S_S)*-**11b** was purified by flash column chromatography (10:1 petrol : EtOAc) to yield the product as an orange oil (7 mg, 23%). Rf = 0.70 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1048 (SO); δH (300 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in ratio of 93:7] 7.61 (1H, d, *J* 8, H-1^{major}), 7.59 (1H, d, *J* 8, H-1^{minor}), 7.38 (2H, dd, *J* 8 and 2, H-$3^{min+maj}$), 7.29 (1H, d, *J* 8 H-2^{major}), 7.25 (1H, d, *J* 8, H-2^{minor}), 7.02 (2H, td, *J* 7.5 and 2, H-$4^{min+maj}$), 6.95 (2H, td, *J* 7.5 and 2, H-$5^{min+maj}$), 6.49 (1H, dd, *J* 8 and 2, H-6^{minor}), 6.24 (1H, dd, *J* 8 and 2, H-6^{major}), 4.35 – 3.93 (4H, CH AB m, *J* 13, H-$7^{min+maj}$), 3.79 (1H, sext, *J* 7, H-$9^{A\text{-}major}$), 3.66 (1H, sext, *J* 7, H-$9^{A\text{-}minor}$), 3.13 (3H, s, H-8^{major}), 3.04 (3H, s, H-8^{minor}), 2.79 (2H, sext, *J* 7, H-$9^{B\text{-}maj+min}$), 1.54 (9H, s, H-17^{major}), 1.52 (9H, s, H-17^{minor}), 1.31 (3H, s, H-11^{major}), 1.30 (3H, t, *J* 7, H-10^{major}), 1.22 (3H, s, H-11^{minor}) and 2.00 – 1.15 (23H, m, H-10^{minor} and H-12 – $H16^{min+maj}$).; δC (75 MHz; $CDCl_3$) 156.9, 149.5, 136.7, 132.2, 129.7, 128.9, 127.7, 127.5, 122.3, 114.6, 68.9, 63.9, 58.6, 35.1, 31.7, 31.1, 30.5, 25.5, 24.6, 22.6, 22.3, 17.0 and 16.8.; CI *m/z* 443 (M + H); (Found: M + H, 443.2619. $C_{27}H_{39}O_3S$ requires *M*, 443.2614).

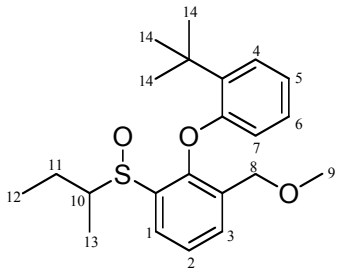
[2-(2'-tert-Butylphenoxy)-3-(sec-butylthio)phenyl]methoxymethyl **C**



Bromide **7** (114 mg, 0.33 mmol, 1 equiv.), *n*BuLi (2.2 M solution in hexanes) (0.15 cm^3, 0.33 mmol, 1 equiv.), *sec*-butyldisulphide (0.07 cm^3, 0.39 mmol, 1.2 equiv.) and THF (10 cm^3) were treated as described in General Procedure A. The crude product was purified by flash column chromatography (40:1 petrol : EtOAc) to yield the sulfide **C** as a colourless oil (112 mg, 95%). Rf = 0.73 (19:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 2962, 2926 and 2871 (CH); δH (500 MHz; $CDCl_3$) [Mixture of diastereoisomeric conformers in the ratio of 50:50]. 7.31 (6H, m, H-1^{A+B}, H-3^{A+B} and H-4^{A+B}), 7.16 (2H, t, *J* 7.5, H-2^{A+B}), 6.89 (2H, tt, *J* 7.5 and 2, H-5^{A+B}), 6.84 (2H, tt, *J* 7.5 and 2, H-6^{A+B}), 6.14 (1H, ddd, *J* 8, 4 and 2, H-7^{A+B}), 4.35 – 4.09 (4H, CH AB

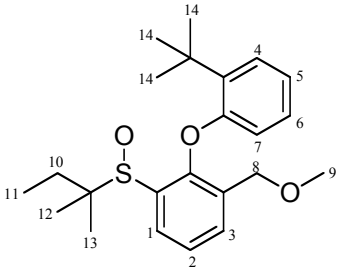
m, *J* 13 and 4, H-8^{A+B}), 3.20 (6H, s, H-9^{A+B}), 3.09 (2H, sept, *J* 6, H-10^{A+B}), 1.48 (18H, s, H-14^{A+B}), 1.15 (3H, d, *J* 6.5, H-13^{A}) 1.11 (3H, d, *J* 6.5, H-13^{B}), 0.84 (3H, t, *J* 7.5, H-12^{A}) and 1.23 (3H, t, *J* 7.5, H-12^{B}).; δC (100 MHz; $CDCl_3$) 156.9, 156.8, 150.1, 150.0, 137.1, 133.0, 131.7, 131.6, 130.8, 130.5, 129.5, 129.0, 127.4, 127.1, 126.9, 126.8, 125.8, 123.3, 123.1, 121.5, 121.5, 119.2, 118.4, 112.9, 69.6, 58.7, 43.5, 43.2, 35.2, 30.2, 29.7, 29.5, 20.4, 20.3, 11.6 and 11.4.; EI *m/z* 358 (M); CI *m/z* 358 (M); (Found: M, 358.1953. $C_{22}H_{30}O_2S$ requires *M*, 358.1961).

2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-3-sec-butylsulfinyl-benzene **D**



*m*CPBA (60% by weight) (56 mg, 0.2 mmol, 1 equiv.) was added to a stirred solution of *sec*-butylsulfide **C** (70 mg, 0.2 mmol, 1 equiv.) in DCM (5 cm^3) stirred for 20 s and quenched using sodium sulphite solution. The organics were washed with water, brine, dried (Na_2SO_4) and solvent removed under reduced pressure. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the product as a colourless oil (36 mg, 48%). Rf = 0.43 and 0.39 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1061 and 1041 (SO); δH (500 MHz; $CDCl_3$) [Mixture of diastereoisomeric conformers in the ratio of 56:44] 7.90 (1H, dd, *J* 8 and 2, H-1^{major}), 7.87 (1H, dd, J 8 and 2, H-1^{minor}), 7.72 (2H, m, H-3$^{maj+min}$), 7.54 (1H, t, *J* 8, H-2^{major}), 7.52 (1H, t, *J* 8, H-2^{minor}), 7.45 (1H, m, H-4^{minor}), 7.43 (1H, m, H-4^{major}), 7.02 (4H, m, H-5$^{maj+min}$ and H-6$^{maj+min}$), 6.35 (1H, m, H-7^{major}), 6.30 (1H, m, H-7^{minor}), 4.40 – 4.05 (4H, m, H-8$^{maj+min}$), 3.28 (3H, s, H-9^{major}), 3.24 (3H, s, H-9^{minor}), 2.91 – 1.62 (6H, m, H-10$^{maj+min}$ and H-11$^{maj+min}$), 1.55 (9H, s, H-14^{minor}), 1.54 (9H, s, H-14^{major}), 1.06 (3H, d, *J* 6.5, H-13^{major}), 0.97 (3H, d, *J* 6.5, H-13^{minor}), 0.82 (3H, t, *J* 7, H-12^{major}) and 0.71 (3H, t, *J* 7, H-12^{minor}).; δC (75 MHz; $CDCl_3$) 156.7, 156.6, 147.7, 147.3, 137.7, 136.9, 136.8, 136.2, 132.6, 132.6, 131.9, 128.1, 127.7, 127.2, 127.1, 126.7, 126.2, 126.1, 122.8, 122.7, 122.6, 114.0, 113.2, 68.8, 59.1, 58.8, 58.7, 57.8, 35.3, 35.1, 30.3, 30.2, 25.8, 25.5, 11.9, 11.7, 9.5 and 8.8.; EI *m/z* 375 (M + H); CI *m/z* 375 (M + H); (Found: M + H, 375.1990. $C_{22}H_{31}O_3S$ requires *M*, 375.1988).

2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-3-(2-methyl-butane-2-sulfinyl)-benzene **13a**

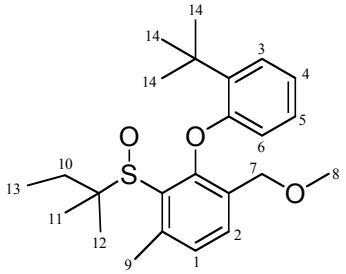


sec-Butylsulfoxide **D** (36 mg, 0.1 mmol, 1 equiv.), LDA (0.11 mmol, 1.1 equiv.), iodomethane (0.01 cm^3, 0.12 mmol, 1.2 equiv.) and THF (3 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the product as a colourless oil (31 mg, 79%). Rf = 0.23 and 0.27 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1044 (SO); δH (400 MHz; $CDCl_3$) [Mixture of diastereoisomeric conformers in the ratio of 80:20] 7.92 (1H, dd, *J* 8 and 2, H-1^{major}), 7.88 (1H, dd, *J* 8 and 2, H-1^{minor}), 7.76 (1H, ddd, *J* 7.5, 2 and 1, H-3^{major}), 7.73 (1H, ddd, *J* 7.5, 2 and 1, H-3^{minor}), 7.52 (1H, t, *J* 8, H-2^{major}), 7.46 (1H, t, *J* 8, H-2^{minor}), 7.42 (2H, m, H-4$^{min+maj}$), 7.00 (4H, m, H-5$^{min+maj}$ and H-6$^{min+maj}$), 6.51 (1H, dd, *J* 7.5 and 2, H-7^{minor}), 6.28 (1H, m, H-7^{major}), 4.42 – 4.01 (2H, CH AB m, *J* 13, H-8^{major}),

4.12 (2H, d, *J* 3.5, H-8^{minor}), 3.27 (3H, s, H-9^{major}), 3.17 (3H, s, H-9^{minor}), 1.81 – 1.49 (4H, m, H-10$^{maj+min}$), 1.56 (9H, s, H-14^{major}), 1.54 (9H, s, H-14^{minor}), 1.21 (3H, s, H-12^{major}) 1.18 (3H, s, H-12^{minor}), 1.17 (6H, s, H-13$^{maj+min}$), 0.99 (3H, t, *J* 7.5, H-11^{major}) and 0.88 (3H, t, *J* 7.5, H-11^{minor}).; δC (100 MHz; $CDCl_3$) 156.9, 156.0, 150.0, 137.8, 136.9, 135.2, 134.5, 132.9, 132.5, 131.2, 128.6, 127.9, 127.7, 126.6, 125.9, 125.5, 122.6, 122.6, 114.7, 114.5, 69.4, 68.9, 61.6, 60.3, 58.8, 58.5, 35.2, 35.2, 30.5, 30.2, 29.4, 29.0, 20.2, 19.8, 19.7, 19.1, 8.5 and 8.2.; EI *m/z* 389 (M + H); CI *m/z* 406 (M + NH_4^+), 389 (M +H); (Found: M + H, 389.2143. $C_{23}H_{33}O_3S$ requires *M*, 389.2145).

Preparation of LDA: *n*BuLi (2.25 M solution in hexanes) (0.05 cm^3, 0.11 mmol, 1.1 equiv.) was added dropwise to a stirred solution of anhydrous diisopropylamine (0.02 cm^3, 0.11 mmol, 1.1 equiv.) dissolved in anhydrous THF (3 cm^3) at 0^{o}C under N_2 and allowed to stir for 30 min.

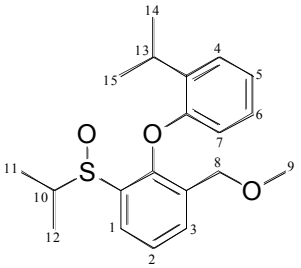
2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-methyl-3-(2-methyl-butane-2-sulfinyl)-benzene **13b**



*n*BuLi (2.2 M solution in hexanes) (0.06 cm^3, 0.13 mmol, 1.1 equiv.), sulfoxide **13a** (45 mg, 0.13 mmol, 1 equiv.), iodomethane(0.01 cm^3, 0.17 mmol, 1.5 equiv) and THF (5 cm^3) were treated as described in General Procedure D. The crude product was purified by flash column chromatography (6:1 petrol : EtOAc) to yield the product as a colourless oil (16 mg, 33%). Rf = 0.57 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1051 (SO); δH (500 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 91:9] 7.54 (1H, d, *J* 7.5, H-1^{major}), 7.51 (1H, *J* 7.5, H-1^{minor}), 7.37 (2H, dd, *J* 8, H-3$^{maj+min}$), 7.16 (1H, d, *J* 7.5, H-2^{major}), 7.10 (1H, d, *J* 7.5, H-2^{minor}), 6.98 (2H, td, *J* 7 and 1.5, H-4$^{maj+min}$), 6.94 (2H, td, *J* 7 and 1.5, H-5$^{maj+min}$), 6.47 (1H, dd, *J* 8 and 1.5, H-6^{minor}), 6.22 (1H, dd, *J* 8 and 1.5, H-6^{major}), 4.31 – 3.90 (2H, CH AB m, *J* 12.5, H-7^{major}), 4.12 (2H, q, *J* 7, H-7^{minor}), 3.20 (3H, s, H-8^{major}), 3.09 (3H, s, H-8^{minor}), 2.82 (3H, s, H-9^{major}), 2.79 (3H, s, H-9^{minor}), 1.77 (4H, q, *J* 7.5, H-10$^{maj+min}$), 1.52 (9H, s, H-14^{major}), 1.50 (9H, s, H-14^{minor}), 1.30 (3H, s, H-11^{major}), 1.27 (3H, s, H-11^{minor}), 1.24 (3H, s, H-12^{minor}), 1.23 (3H, s, H-12^{major}), 0.96 (3H, t, *J* 7.5, H-13^{major}) and 0.87 (3H, t, *J* 7.5, H-13^{minor}).; δC (75 MHz; $CDCl_3$) 157.0, 151.1, 142.7, 136.8, 132.0, 131.2, 131.1, 129.8, 127.9$^{(minor)}$, 127.7, 127.6, 122.4, 115.2$^{(minor)}$, 114.8, 68.9, 64.3, 58.6, 35.1, 30.5, 29.5, 20.9, 20.7, 19.1 and 8.7.; CI *m/z* 403 (M + H); (Found: M + H, 403.2309. $C_{24}H_{35}O_3S$ requires *M*, 403.2301).

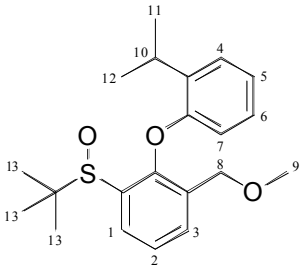
Sulfoxides **14** and **15** were obtained by methods analogous to those described for sulfoxides **8a**, **5b.** Sulfoxide **16** was obtained by methods described by Betson *et al.*[6, 7]

2-(2'-Isopropylphenoxy)-1-methoxymethyl-3-isopropylsulfinyl-benzene **14a**



The bromide (617 mg, 1.84 mmol, 1 equiv.), *n*BuLi (2.2 M solution in hexanes) (0.84 cm^3, 1.84 mmol, 1 equiv.), di-isopropylthiosulfinate **B** (0.36 cm^3, 2.02 mmol, 1.1 equiv.) and THF (20 cm^3) were treated as described in General Procedure H. Purified by reverse phase flash column chromatography (3:2 water : acetonitrile) to yield the product as a colourless oil (390 mg, 61 %). Rf = 0.41 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1057 (SO); δH (500 MHz; $CDCl_3$) [mixture of diastereoisomeric conformer in the ratio of 83:17] 7.71 (2H, d, *J* 7.5, H-$1^{maj+min}$), 7.55 (1H, d, *J* 7.5, H-$3^{maj+min}$), 7.37 (2H, 7, *J* 7.5, H-$2^{maj+min}$), 7.19 (2H, d, *J* 7, H-4), 6.91 – 6.85 (4H, m, H-$5^{min+maj}$ and H-$6^{min+maj}$), 6.20 (1H, d, *J* 8, H-7^{major}), 6.15 (1H, br d, H-7^{minor}), 4.23 – 3.99 (2H, CH AB m, *J* 12.5, H-8^{major}), 4.13 – 4.01 (2H, CH AB m, *J* 11, H-8^{minor}), 3.33 (1H, sept, *J* 7, H-$10^{maj+min}$), 3.15 (3H, s, H-9^{major}), 3.12 (3H, s, H-9^{minor}), 2.98 (1H, sept, *J* 7, H-$13^{maj+min}$), 1.24 (3H, d, *J* 7, H-$11^{maj+min}$), 1.22 (3H, d, *J* 7, H-$12^{maj+min}$), 1.20 (3H, d, *J* 7, H-14^{major}), 1.06 (3H, br d, H-14^{minor}), 0.94 (3H, d, *J* 7, H-15^{major}) and 0.83 (3H, d, *J* 7, H-15^{minor}).; δC (75 MHz; $CDCl_3$) 154.6, 148.0, 136.7, 136.0, 132.6, 132.3, 127.1, 127.0, 126.3, 123.0, 112.9, 68.7, 58.9, 53.2, 27.0, 23.3, 23.0, 17.6 and 12.7.; CI *m/z* 347 (M + H); (Found: M + H, 347.1679. $C_{20}H_{27}O_3S$ requires *M*, 347.1675).

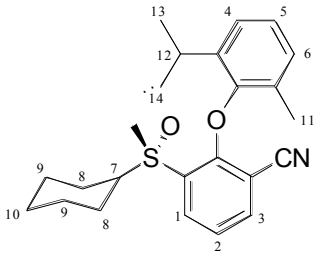
2-(2'-Isopropylphenoxy)-1-methoxymethyl-3-tert-butylsulfinyl-benzene **14b**



*Iso*propylsulfoxide **14a** (243 mg, 0.7 mmol, 1 equiv.), LDA (0.77 mmol, 1.1 equiv.), iodomethane (0.52 cm^3, 0.84 mmol, 1.2 equiv.) and THF (10 cm^3) were treated as described in General Procedure C. The crude product was purified by flash column chromatography (4:1 petrol : EtOAc) to yield the product as a colourless oil (217 mg, 86 %). Rf = 0.45 (4:1 petrol:EtOAc); ν_{max} (film/cm^{-1}) 1046 (SO); δH (500 MHz; $CDCl_3$) [mixture of diastereoisomers in the ratio of ≥ 98:2] 7.78 (1H, dd, *J* 8, H-1), 7.61 (1H, dd, *J* 8 and 2, H-3), 7.40 (1H, t, *J* 8, H-2), 7.22 (1H, dd, *J* 7 and 2, H-4), 6.91 (2H, m, H-5 and H-6), 6.21 (1H, d, *J* 8, H-7), 4.29 – 4.01 (2H, CH AB m, *J* 13, H-8), 3.44 (1H, sept, *J* 7, H-10), 3.19 (3H, s, H-9), 1.26 (3H, d, *J* 7, H-11), 1.24 (3H, d, *J* 7, H-12) and 1.15 (9H, s, H-13).; δC (75 MHz; $CDCl_3$) 154.6, 149.8, 136.1, 135.1, 132.7, 132.6, 127.3, 127.1, 126.9, 126.0, 122.9, 113.9, 68.7, 58.8, 57.9, 26.4, 23.7 and 23.2.; CI *m/z* 361 (M + H); (Found: M + H, 361.1824. $C_{21}H_{29}O_3S$ requires *M*, 361.1832).

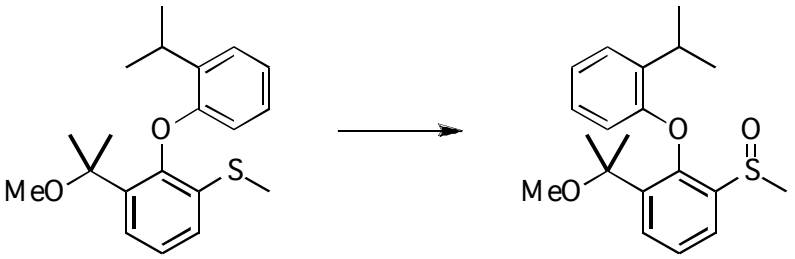
Preparation of LDA: *n*BuLi (2.2 M in hexanes) (0.35 cm^3, 0.77 mmol, 1.1 equiv.) was added dropwise to a stirred solution of anhydrous diisopropylamine (0.11 cm^3, 0.77 mmol, 1.1 equiv.) dissolved in anhydrous THF (2 cm^3) at 0 °C under N_2 and allowed to stir for 30 min.

2-(2'-Isopropyl-6'-methylphenoxy)-3-(cyclohexylsulfinyl)benzonitrile (S_S)-**15**



Obtained as two separable diastereoisomers of the product as yellow oils: diastereosiomer 1 (18 mg, 5 %), Rf = 0.32 (4:1 petrol:EtOAc); diastereoisomer 2 (23 mg, 7 %), Rf = 0.25 (4:1 petrol:EtOAc). Both diastereoisomers decayed to the 60:40 equilibrium mixture within a few days. $[\alpha]_D^{23}$ = –238.8 (*c* 0.99 in acetone); ν_{max} (film/cm^{-1}) 2222 (CN), 1054 (SO); δH (300 MHz; $CDCl_3$) Mixture of diastereoisomers in the ratio of 60:40. 8.12 (2H, dt, *J* 8 and 2, H-1$^{maj+min}$), 7.67 (2H, dt, *J* 8 and 2, H-3$^{maj+min}$), 7.41 – 7.29 (6H, m, H-2$^{maj+min}$, H-4$^{maj+min}$ and H-5$^{maj+min}$), 7.21 (1H, d, *J* 7.5, H-6^{minor}), 7.16 (1H, dd, *J* 7.5 and 1, H-6^{major}), 3.14 (3H, m, H-7$^{maj+min}$ and H-12^{major}), 2.96 (1H, sept, *J* 7, H-12 ^{major}), 2.30 (3H, s, H-11^{minor}), 2.27 – 1.16 (20H, m, H-8 – H-10$^{maj+min}$), 2.11 (3H, s, H-11^{major}), 1.41 (3H, d, *J* 7, H-13^{minor}), 1.33 (3H, d, *J* 7, H-13^{major}), 1.17 (3H, d, *J* 7, H-14^{major}) and 1.41 (3H, d, *J* 7, H-14^{minor}).; δC (75 MHz; $CDCl_3$) 154.8, 154.6, 149.9, 149.4, 142.0, 141.6, 138.0, 138.0, 133.1, 132.8, 132.3, 132.2, 131.8, 130.3, 129.4, 128.9, 128.1, 127.8, 125.3, 124.7, 122.8, 122.7, 113.9, 99.5, 98.8, 59.4, 59.3, 28.0, 27.9, 27.7, 26.4, 25.8, 25.8, 25.5, 25.4, 24.8, 24.5, 22.5, 22.3, 22.1, 22.1, 17.0 and 16.9.; EI *m/z* 382 (M + H); CI *m/z* 382 (M); (Found: M + H, 382.1826. $C_{23}H_{28}O_2NS$ requires *M*, 382.1835).

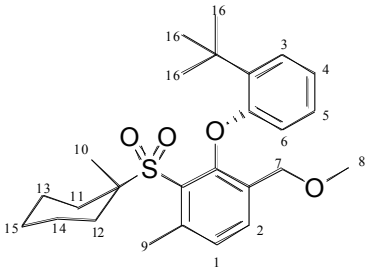
2-(2'-Isopropylphenoxy)-1-(2-methoxypropan-2-yl)-3-(methylsulfinyl)benzene **16**



ν_{max} (film/cm^{-1}): 1021 (m), 1033 (m), 1072 (s), 1084 (s), 1218 (s), 1423 (s), 1486 (s), 1574 (m), 2964 (s). δH (300 MHz; $CDCl_3$) [mixture of diastereoisomeric conformers in the ratio of 78:22]: 1.28-1.35 (6H^{minor} + 6H^{major}, m), 1.41 (3H^{major}, s), 1.50 (3H^{minor}, s), 1.57 (3H^{major}, s), 1.60 (3H^{minor}, s), 2.31 (3H^{minor}, s), 2.81 (3H^{major}, s), 3.12 (3H^{major}, s), 3.19 (3H^{minor}, s), 3.41-3.56 (1H^{major}, m), 3.53-3.67 (1H^{minor}, m), 6.13-6.18 (1H^{minor}, m), 6.29-6.33 (1H^{major}, m), 6.97-7.03 (2H^{minor} + 2H^{major}, m), 7.30-7.37 (1H^{minor}, m), 7.40 (1H^{major}, t, *J* = 7.9 Hz), 7.47-7.59 (1H^{major} + 1H^{minor}, m), 7.82 (1H^{minor}, dd, *J* = 7.9, 1.7 Hz), 7.95-8.03 (1H^{major} + 1H^{minor}, m), 8.06-8.09 (1H^{major}, m).

δC (75 MHz; $CDCl_3$; Signals given for major conformer only) 23.4, 23.8, 26.8, 27.3, 30.0, 42.9, 51.0, 77.2, 113.0, 122.9, 123.2, 123.9, 124.7, 126.1, 126.4, 135.9, 140.5, 140.9, 147.5, 154.9. EI *m/z* 346 (M); CI *m/z* 347 (M + H$^+$). (Found: M + H, 346.1605. $C_{20}H_{26}O_3S$ requires *M*, 346.1603).

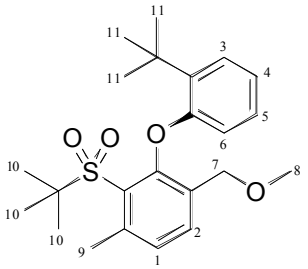
P-(–)-2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-methyl-3-(1-methyl-cyclohexylsulfonyl)-benzene P-(–)-**17b**



Sulfoxide (S_S)-**10b** (32 mg, 0.07 mmol,), *m*CPBA (50 % by wt) (52 mg, 0.15 mmol, 2 equiv.) and DCM (6 cm^3) were treated as described in General Procedure E. The crude product was purified by flash column chromatography (12:1 petrol : EtOAc) to yield the product as a white solid (20 mg, 64%), m.p. 156 - 159 °C. Rf = 0.58 (9:1 petrol:EtOAc); $[\alpha]_D^{23}$ = –172.9 (*c* 1.02 in acetone); ν_{max} (film/cm^{-1}) ; δH (300 MHz; $CDCl_3$) 7.73 (1H, d, *J* 8, H-1), 7.41 (1H, dd, *J* 7.5 and 2, H-3), 7.30 (1H, d, *J* 8, H-

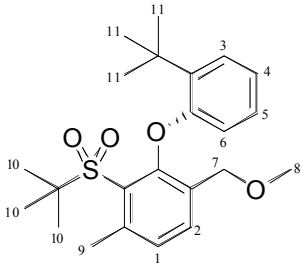
2), 7.00 (1H, td, *J* 7.5 and 2, H-4), 6.94 (1H, td, *J* 7.5 and 2, H-5), 6.20 (1H, dd, *J* 7.5 and 2, H-6), 4.43 – 3.87 (2H, CH AB m, *J* 13, H-7), 3.24 (3H, s, H-8), 2.86 (3H, s, H-9), 2.02 – 1.14 (10H, m, H-11 – H-15), 1.59 (9H, s, H-16) and 1.47 (3H, s, H-10).; δC (125 MHz; $CDCl_3$) 158.5, 153.1, 142.4, 139.8, 136.2, 133.8, 130.3, 127.4, 127.1, 121.7, 115.6, 68.9, 66.9, 58.5, 35.1, 30.7, 30.1, 29.6, 25.1, 23.7, 21.7, 21.5 and 16.6.; EI *m/z* 462 ($M + NH_4^+$); CI *m/z* 462 ($M + NH_4^+$); (Found: $M + NH_4^+$, 462.2669. $C_{26}H_{40}NO_4S$ requires *M*, 462.2673). *HPLC*: Separation using OT+ column running 0.6 ml/min with 98 : 2 hexane:IPA, retention times 13.5 and 15.1 min.

M-(+)-2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-methyl-3-tert-butylsulfonyl-benzene M-(+)-**17a**



t-Butylsulfoxide (R_S)-**10a** (91 mg, 0.25 mmol, 1 equiv.), *m*CPBA (50 % by weight) (174 cm^3, 0.5 mmol, 2 equiv.), and DCM (10 cm^3) were treated as described in General Procedure E. The crude product was purified by flash column chromatography (9:1 petrol : EtOAc) to yield the product as a white solid (100 mg, 99 %). m.p. 60 – 63 °C; Rf = 0.42 (9:1 petrol:EtOAc); $[\alpha]_D^{23}$ = +106.2 (*c* 1.06 in acetone); ν_{max} (film/cm^{-1}) 1308 and 1119 (SO_2); δH (500 MHz; $CDCl_3$) 7.63 (1H, d, *J* 8, H-3), 7.29 (1H, dd, *J* 8 and 2, H-3), 7.19 (1H, d, *J* 8, H-1), 6.88 (1H, ddd, *J* 8, 7.5 and 2. H-4), 6.83 (1H, td, 7.5 and 1.5, H-5), 6.08 (1H, dd, *J* 8 and 1.5, H-6), 4.29 – 3.79 (2H, CH AB m, *J* 13, H-7), 3.12 (3H, s, H-8), 2.75 (3H, s, H-9), 1.48 (9H, s, H-10) and 1.34 (9H, s, H-11).; δC (125 MHz; $CDCl_3$) 158.6, 153.1, 142.3, 136.3, 134.0, 132.3, 130.4, 127.6, 127.3, 127.1, 121.8, 115.5, 68.8, 63.0, 58.5, 35.1, 30.7, 23.9 and 23.6.; CI *m/z* 422 ($M + NH_4^+$); (Found: $M + NH_4^+$, 422.2372. $C_{23}H_{36}O_4NS$ requires *M*, 422.2360). *HPLC*: Separation using OT+ column running 0.6 ml/min with 98 : 2 hexane:IPA, retention times 10.6, 11.4 min.

P-(–)-2-(2'-tert-Butyl-phenoxy)-1-methoxymethyl-4-methyl-3-tert-butylsulfonyl-benzene P-(–)-**17a**



t-Butylsulfoxide (S_S)-**10a** (100 mg, 0.26 mmol), *m*CPBA (50 % by weight) (178 mg, 0.51 mmol, 2 equiv.), and DCM (10 cm^3) were treated as described in General Procedure E. The crude product was purified by flash column chromatography (9:1 petrol : EtOAc) to yield the product as a white solid (76 mg, 72 %) along with 27 mg of recovered starting material (27 %). $[\alpha]_D^{23}$ = –110.9 (*c* 1.1 in acetone); Analysis matched that described above.

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