Highly Stereoselective $TiCl_4$ -Catalyzed Evans-Aldol and Et_3Al -Mediated Reformatsky Reactions. Efficient Accesses to Optically Active syn- or anti- α -Trifluoromethyl- β -hydroxy Carboxylic Acid Derivatives

Taichi Shimada, Masamitsu Yoshioka, Tsutomu Konno, and Takashi Ishihara*

Department of Chemistry and Materials Technology, Kyoto Institute of Technology,

Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan

ishihara@kit.ac.jp

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I. General Experimental

Infrared spectra (IR) were recorded on a Shimadzu FTIR-8200A (PC) spectrophotometer. ¹H NMR spectra were measured with a Bruker DRX 500 (500.13 MHz) in a chloroform-*d* (CDCl₃) solution using tetramethylsylane (Me₄Si) as internal standard. ¹³C NMR spectra were measured with a Bruker DRX (125.75 MHz) in a (CDCl₃) solution with chloroform (CHCl₃) as internal reference. ¹⁹F NMR spectra were measured with JEOR JNM-EX 90A (84.10 MHz) and ECA 500 (470.62 MHz) in a CDCl₃ solution. Trichlorofluoromethane (CFCl₃) was used as an internal standard for ¹⁹F NMR. All reactions were routinely monitored by ¹⁹F NMR spectroscopy or TLC. High resolution mass spectra (HRMS) were taken on a JEOL JMS-700 mass spectrometer by FAB method.

Anhydrous tetrahydrofuran (THF) was purchased from Wako Chemical Co. and used without any purification. Dichloromethane (CH_2Cl_2) was distilled over calcium hydride. All chemicals were of reagent grade and, if necessary, were purified in the usual manner prior to use. Thin layer chromatography (TLC) was done with Merck silica gel 60 F_{254} plates, and column chromatography was carried out with Wako gel C-200. All reactions were carried out under an atmosphere of argon.

II. Synthetic Chemistry

Preparation of (4S)-Benzyl-3-(3,3,3-trifluoro-propanoyl)-oxazolidin-2-one (3)

To a dry three-necked flask under argon was added a solution of 3,3,3-trifluoropropanoic acid (2.561 g, 20.0 mmol) in THF (100 mL). To the mixture was added trimethylacethyl chloride (t-BuCOCl, 2.653 g, 22.0 mmol) and triethylamine (Et₃N, 2.226 g, 22.0 mmol) at -78 °C. The reaction was allowed to stir at -78 °C for 15-min prior to warming to -15 °C and strring for 45-min. Then the solution was cooled to -78 °C, 40.0 mmol of lithiated oxazolidinone was added. After stirring at 0 °C for 1 h, the reaction was quenched with saturated aqueous ammonium chloride (40 mL). The bulk of the THF was removed on a rotary evaporator at a bath temperature of 30 °C, and the resulting mixture was extracted with ethyl acetate (40 mL x 2), saturated sodium hydrogencarbonate (40 mL). Combined extracts were dried over anhydrous sodium sulfate, filtered, concentrated under reduced pressure. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate = 3/1) to afford pure product 3 (0.293 g, 10.2 mmol, 51 % yield).

IR (neat) 1790, 1715, 1454, 1410, 1393, 1244, 1144 cm⁻¹; ¹H NMR (CDCl₃)
$$\delta = 2.81$$
 (dd, $J = 9.6$, 13.4 Hz, 1H), 3.32 (dd, $J = 3.2$, 13.4 Hz, 1H), 3.81 – 3.98 (m, 1H), 4.23 – 4.29 (m, 2H), 4.69 – 4.45 (m, 1H), 7.20 (d, $J = 7.3$ Hz, 2H), 7.27 – 7.37 (m, 3H); ¹³C NMR (CDCl₃) $\delta = 37.5$, 39.7 (q, $J = 29.9$ Hz), 55.2, 66.6, 123.5 (q, $J = 276.6$ Hz), 127.6, 129.1, 129.4, 134.6, 153.1, 163.3 (q, $J = 3.4$ Hz); ¹⁹F NMR (CDCl₃) $\delta = -63.3$ (t, $J = 9.0$ Hz, 3F); HRMS (FAB⁺) Found: m/z 288.0849, Calcd for (M+H) $C_{13}H_{13}F_{3}NO_{3}$: 288.0848.

Preparation of (4S)-Benzyl-3-(2-bromo-3,3,3-trifluoro-propanoyl)-oxazolidin-2-one (4)

Under an argon atmosphere, to a solution of imide 1 (0.287 g, 1.00 mmol) in CH_2Cl_2 (5.0 mL) was gradually added trimethylsilyltrifluoromethanesulfonate (TMSOTf, 0.333 g, 1.50 mmol) at -20 °C. To the mixture was added triethylamine (Et₃N, 0.152 g 1.50 mmol). After stirring at the reflux temperature for 0.5 h, the solution was cooled -78 °C, then a solution of bromine (0.208 g, 1.30 mmol) in CH_2Cl_2 (8.0 mL) was added. After stirring at that temperature for 0.5 h, the reaction was quenched with ice water (20 mL). The mixture was extracted with CH_2Cl_2 (20 mL x 4), and the extracts were washed with saturated aqueous sodium sulfite (20 mL) and brine (20 mL). The combined extracts were dried over anhydrous sodium sulfate, filtered, and concentrated under reduced pressure. The resulting residue was purified by silica gel column chromatography (hexane/ethyl acetate = 3/1) to afford pure product 4 (0.297 g, 0.811 mmol, 81 % yield).

IR (neat) 3011, 1771, 1705, 1456, 995, 874, 760 cm⁻¹; ¹H NMR (CDCl₃) $\delta = CF_3$ (2.84 (dd, J = 9.4, 13.9 Hz, 1H, for one isomer), 2.87 (dd, J = 9.4, 14.6 Hz, 1H, for another isomer), 3.30 (dd, J = 2.1, 13.5 Hz, 1H), 4.26 – 4.35 (m, 1H), 4.70 – 4.76 (m, 1H, for one isomer), 4.75 – 4.76 (m, 1H, for another isomer), 6.17 (q, J = 6.3 Hz, 1H, for one isomer), 6.21 (q, J = 6.3 Hz, 1H, for another isomer), 7.18 – 7.37 (m, 5H); ¹³C NMR (CDCl₃) $\delta = 36.8$ (for one isomer), 37.4 (for another isomer), 37.1 (q, J = 34.7 Hz, for one isomer), 37.3 (q, J = 34.5 Hz, for another isomer), 55.2 (for one isomer), 55.7 (for another isomer), 66.5 (for one isomer), 66.6 (for another isomer), 121.9 (q, J = 278.3 Hz, for one isomer), 121.9 (q, J = 278.7 Hz, for another isomer), 127.7 (for another isomer), 127.7 (for another isomer), 129.1, 129.3, 129.4, 134.1 (for another isomer), 134.2 (for another isomer), 152.3, 162.1; ¹⁹F NMR (CDCl₃) $\delta = -68.6$ (d, J = 4.4 Hz, 3F); HRMS (FAB⁺) Found: m/z 365.9954, Calcd for (M+H) $C_{13}H_{12}BrF_3NO_3$: 365.9953.

General procedure for synthesis of α -trifluoromethyl- β -hydroxyimides 1 by *syn*-selective Evans-aldol reaction

To a dried three-necked flask was added imide **3** (0.287 g, 1.00 mmol) in CH_2Cl_2 (5.0 mL) under argon. To the mixture were added trimethylsilyltrifluoromethanesluflonate (TMSOTf, 0.333 g, 1.50 mmol) and triethylamine (Et_3N , 0.152 g, 1.50 mmol) at -20 °C. After stirring at reflux temperature for 0.5 h, the solution was cooled to 0 °C. Then benzaldehyde (0.127 g, 1.20 mmol) and titanium tetrachloride (0.057 g, 0.3 mmol) were added to it. After stirring at that temperature for 4 h, the solution was poured into cooled water. The mixture was extracted with CH_2Cl_2 (20 mL x 4). The combined extracts were dried over anhydrous sodium sulfate, filtered, and concentrated under reduced pressure. The resulting residue was purified by silica gel column chromatography (benzene/ethyl acetate = 95/5) to afford pure product **1a** (0.248 g, 0.63 mmol, 63 % yield).

General procedure for synthesis of α -trifluoromethyl- β -hydroxyimides 1 by *anti*-selective Reformatsky reaction

To a suspension of zinc (0.078 g, 1.20 mmol) and benzaldehyde (0.053 g, 0.5 mmol) in THF (2 mL) and triethylaluminum in hexane solution (0.53 mL) was added a solution of (4S)-benzyl-3-(2-bromo-3,3,3-trifluoro-propanoyl)-oxazolidin-2-one **4** (0.366 g, 1.0 mmol) in THF (1 mL) at -40 °C under an argon atmosphere. After stirring at the same temperature for 3 h, the reaction was quenched with saturated aqueous ammonium chloride (25 mL) and acidified by the addition of 1N hydrochloric acid solution. The resulting mixture was extracted with ethyl acetate (25 mL x 3). The organic layers were dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The residue was purified by silica-gel column chromatography (benzene/ethyl acetate 95/5) to afford pure product **1a** (0.169 g, 0.430 mmol, 86%).

(4S)-Benzyl-3-[3-hydroxy-3-phenyl-2-(trifluoromethyl)propanoyl]-oxazolidin-2-one (1a)

syn-(2*R*,3*S*) : IR (KBr) 1778, 1763, 1705, 1682, 1369, 1161, 700, 681 cm⁻¹; ¹H NMR (CDCl₃) δ = 1.80 (dd, J = 10.1, 13.5 Hz, 1H), 2.44 (d, J = 3.7 Hz, 1H), 2.57 (dd, J = 3.3, 13.5 Hz, 1H), 3.95 (dd, J = 2.7, 9.2 Hz, 1H), 4.07 (dd, J = 8.2, 9.2 Hz, 1H), 4.49 – 4.55 (m, 1H), 5.39 (dd, J = 3.7, 9.1

Hz, 1H), 5.66 (dq, J = 9.1, 7.7 Hz, 1H), 6.91 – 6.93 (m, 2H), 7.20 – 7.28 (m, 3H), 7.31 – 7.40 (m, 3H), 7.47 – 7.49 (m, 2H); ¹³C NMR (CDCl₃) $\delta = 36.6$, 53.2 (q, J = 25.5 Hz), 54.9, 65.7, 72.8 (q, J = 1.3 Hz), 124.1 (q, J = 281.8 Hz), 127.4, 127.6, 128.8, 129.0, 129.1, 129.2, 134.7, 139.1, 152.6, 164.9 (q, J = 3.1 Hz); ¹⁹F NMR (CDCl₃) $\delta = -63.4$ (d, J = 7.7 Hz, 3F); HRMS (FAB⁺) Found: m/z 394.1266, Calcd for (M+H) $C_{20}H_{19}F_3NO_4$: 394.1266.

anti-(**2***S*,**3***S*) : IR (KBr) 3499, 1786, 1709, 1456, 1391, 1211, 1078, 955 cm⁻¹; ¹H NMR (CDCl₃) δ = 2.79 (br, 1H), 2.79 (dd, J = 9.5 Hz, 13.5 Hz, 1H), 3.30 (dd, J = 3.4, 13.5 Hz, 1H), 4.06 (dd, J = 8.5, 8.5 Hz, 1H), 4.16 (dd, J = 2.7, 9.0 Hz, 1H), 4.64 – 4.69 (m, 1H), 5.31 (d, J = 7.4 Hz, 1H), 5.55 (dq, J = 7.8, 7.8 Hz, 1H), 7.20 – 7.21 (m, 2H), 7.27 – 7.34 (m, 3H),

7.35 – 7.40 (m, 3H), 7.42 – 7.44 (m, 2H); 13 C NMR (CDCl₃) δ = 37.6, 53.7 (q, J = 25.4 Hz), 55.4, 66.1, 72.0 (q, J = 1.6 Hz), 123.3 (q, J = 281.3 Hz), 126.4, 127.5, 128.7, 128.8, 129.0, 129.3, 134.6, 139.7, 153.1, 166.3 (q, J = 2.5 Hz); 19 F NMR (CDCl₃) δ = -63.88 (d, J = 8.5 Hz, 3F); HRMS (FAB⁺) Found: m/z 394.1267, Calcd for (M+H) $C_{20}H_{19}F_3NO_4$: 394.1266.

(4S) - Benzyl - 3 - [3 - hydroxy - 3 - (4 - methylphenyl) - 2 - (trifluoromethyl) propanoyl] - oxazolidin - 2 - one (1b)

Me CF₃

syn-(2*R*,3*S*) : IR (KBr) 3452, 1780, 1684, 1163, 1113, 1001, 754 cm⁻¹; ¹H NMR (CDCl₃) δ = 1.84 (dd, J = 9.8, 13.6 Hz, 1H), 2.30 (s, 3H), 2.45 (br s, 1H), 2.59 (dd, J = 3.3, 13.6 Hz, 1H), 3.95 (dd J = 2.6, 9.2 Hz, 1H), 4.05 – 4.09 (m, 1H), 4.51 – 4.57 (m, 1H), 5.35 (d, J = 9.3 Hz, 1H), 5.55

-5.65 (m, 1H), 6.88 - 6.90 (m, 2H), 7.17 - 7.38 (m, 7H); 13 C NMR (CDCl₃) $\delta = 21.1$, 36.6, 53.1 (q, J = 25.4 Hz), 54.8, 65.6, 72.6 (q, J = 1.5 Hz), 124.1 (q, J = 282.1 Hz), 127.4, 127.5, 128.9, 129.1, 129.4, 134.7, 136.2, 139.1, 152.6, 165.0 (q, J = 3.3 Hz); 19 F NMR (CDCl₃) $\delta = -63.6$ (d, J = 6.6 Hz, 3 F); HRMS (FAB⁺) Found: m/z 407.1346, Calcd for (M+) $C_{21}H_{20}F_{3}NO_{4}$: 407.1344.

anti-(2S,3S): m.p. 42 - 44 °C; IR (KBr) 3445, 2924, 1786, 1456, 1393, 1254, 1111, 1032 cm⁻¹; ¹H NMR (CDCl₃) δ = 2.35 (s, 3H), 2.68 (br s, 1H), 2.79 (dd, J = 9.5, 13.5 Hz, 1H), 3.30 (dd, J = 2.8, 9.1 Hz, 1H), 4.65 – 4.71 (m, 1H), 5.26 (d, J = 7.7 Hz, 1H), 5.54 (dq, J = 7.9, 7.9 Hz, 1H),

7.18 – 7.21 (m, 4H), 7.29 – 7.35 (m, 5H); 13 C NMR (125.75 MHz, CDCl₃, TMS) δ = 21.1, 37.6, 52.8 (q, J = 25.2 Hz), 55.4, 66.1, 72.0, 123.4 (q, J = 281.1 Hz), 126.4, 127.4, 129.0, 129.4, 129.4, 134.7, 136.8, 138.7, 153.2, 166.4 (q, J = 2.6 Hz); 19 F NMR (CDCl₃) δ = -63.8 (d, J = 8.5 Hz, 3F); HRMS (FAB⁺) Found: m/z 407.1349, Calcd for (M+) $C_{21}H_{20}F_3NO_4$: 407.1344.

$(4S)\hbox{-Benzyl-3-[3-hydroxy-3-(4-methoxyphenyl)-2-(trifluoromethyl)propanoyl]-oxazolidin-2-one \ (1c)$

anti-(2*S*,3*S*) : m.p. 114 - 116 °C; IR (KBr) 3531, 2926, 1782, 1713, 1516, 1352, 1254, 1161 cm⁻¹; ¹H NMR (CDCl₃) δ = 2.61 (br s, 1H), 2.80 (dd, J = 9.5, 13.5 Hz, 1H), 3.80 (s, 3H), 4.13 (dd, J = 8.4, 8.4 Hz, 1H), 4.17 (dd, J = 2.9, 9.0 Hz, 1H), 4.69 – 4.73 (m, 1H), 5.24 (d, J = 8.1 Hz, 1H), 5,52 (dq, J = 8.0, 8.0 Hz, 1H), 6.89 – 6.92 (m, 2H), 7.20

-7.21 (m, 2H), 7.27 - 7.36 (m, 5H); 13 C NMR (CDCl₃) $\delta = 37.7$, 52.9 (q, J = 25.0 Hz), 55.3, 55.4, 66.1, 71.8 (q, J = 1.5 Hz), 114.1, 123.4 (q, J = 281.6 Hz), 127.5, 127.8, 129.0, 129.4, 131.8, 134.7, 153.2, 160.0, 166.5 (q, J = 2.7 Hz); 19 F NMR (CDCl₃) $\delta = -63.8$ (d, J = 8.2 Hz, 3F); HRMS (FAB+) Found: m/z 423.1302, Calcd for (M+H) $C_{21}H_{21}F_3NO_5$: 423.1294.

$(4S)\hbox{-Benzyl-3-[3-(4-chloro-phenyl)-3-hydroxy-2-(trifluoromethyl)propanoyl]-oxazolidin-2-one\ (1d)$

syn-(2*R*,3*S*) : IR (KBr) 3443, 1778, 1682, 1194, 1165, 822, 702 cm⁻¹; ¹H NMR (CDCl₃) δ = 2.79 (dd, J = 9.5, 13.5 Hz, 1H), 3.23 (d, J = 5.5 Hz, 1H), 3.28 (dd, J = 3.2, 13.5 Hz, 1H), 4.12 (dd J = 8.0, 9.1 Hz, 1H), 4.17 (dd J = 2.9, 9.1 Hz, 1H), 4.65 – 4.73 (m, 1H), 5.25 – 5.28 (m, 1H), 5.49 – 5.56 (m, 1H), 7.18 – 7.21 (m, 2H), 7.26 – 7.38 (m, 7H); ¹³C NMR

(CDCl₃) δ = 21.1, 36.6, 53.1 (q, J = 25.4 Hz), 37.5, 52.7 (q, J = 25.3 Hz), 66.1, 71.3 (q, J = 1.3 Hz), 123.2 (q, J = 281.1 Hz), 127.5, 128.0, 128.3, 128.9, 129.0, 129.3, 134.6 (q, J = 13.5 Hz), 138.3, 153.12, 166.1 (q, J = 2.6 Hz); ¹⁹F NMR (84.10 MHz, CDCl₃, CFCl₃) δ = -63.6 (d, J = 6.6 Hz, 3F); HRMS (FAB⁺) Found: m/z 428.0880, Calcd for (M+H) C₂₀H₁₈CIF₃NO₄: 428.0876.

anti-(2S,3S): IR (neat) 3468, 2924, 1784, 1391, 1352, 1252, 1211, 1169, 1015 cm⁻¹; ¹H NMR (CDCl₃) $\delta = 2.78$ (dd, J = 9.5, 13.5 Hz, 1H), 3.29 (dd, J = 3.4, 13.5 Hz, 1H), 4.12 (dd, J = 8.5, 8.5 Hz, 1H), 4.18 (dd, J = 3.0, 9.1 Hz, 1H), 4.67 – 4. 71 (m, 1H), 5.27 (d, J = 7.9 Hz, 1H), 5,52

(dq, J = 7.9, 7.9 Hz, 1H), 7.19 – 7.20 (m, 2H), 7.27 – 7.30 (m, 2H), 7.32 – 7.34 (m, 2H), 7.35 – 7.38 (m, 3H); ¹³C NMR (CDCl₃) $\delta = 37.6$, 52.7 (q, J = 25.4 Hz), 55.4, 66.2, 71.4 (q, J = 1.5 Hz), 123.2 (q, J = 280.9 Hz), 127.5, 127.9, 129.0, 129.0, 139.3, 134.5, 134.7, 138.3, 153.2, 166.2 (q, J = 2.6 Hz); ¹⁹F NMR (CDCl₃) $\delta = -63.7$ (d, J = 8.8 Hz, 3F); HRMS (FAB⁺) Found: m/z 427.0804,

Calcd for (M+) C₂₀H₁₇ClF₃NO₄: 427.0798.

(4S) - Benzyl - 3 - [3 - (4 - fluoro - phenyl) - 3 - hydroxy - 2 - (trifluoro methyl) propanoyl] - oxazolidin - 2 - one (1e)

syn-(2R,3S): IR (KBr) 3485, 1784, 1607, 1393, 1227, 1161 cm⁻¹; ¹H NMR (CDCl₃) δ = 1.95 (dd, J = 10.0, 13.5 Hz, 1H), 2.57 (br s, 1H), 2.68 (dd, J = 3.2, 13.5 Hz, 1H), 4.00 (dd, J = 1.7, 9.2 Hz, 1H), 4.09 (dd, J = 0.8, 8.8 Hz, 1H), 6.94 – 6.96 (m, 2H), 7.06 (t, J = 8.6 Hz, 2H), 7.22 – 7.30 (m, 3H); ¹³C NMR (CDCl₃) δ = 36.8, 53.2 (q, J = 25.4 Hz), 55.0, 65.8, 72.0 (d, J = 1.3 Hz), 115.7 (d, J = 21.8 Hz), 124.0 (q, J = 281.8 Hz), 127.5, 129.0, 129.1, 129.4 (d, J = 8.2 Hz), 134.5, 135.0 (d, J = 2.6 Hz), 152.6, 163.0 (d, J = 248.6 Hz), 165.0 (q, J = 3.0 Hz); ¹⁹F NMR (CDCl₃) δ = -63.5 (d, J = 8.8 Hz, 3F), -112.3 – -112.8 (m, 1F); HRMS (FAB⁺) Found: m/z 412.1175, Calcd for (M+H) $C_{20}H_{18}F_4NO_4$: 412.1172.

(4S)-Benzyl-3-[3-hydroxy-2-(trifluoromethyl)hexanoyl]-oxazolidin-2-one (1f)

 $\begin{array}{c} \text{Syn-}(2R,3S): \text{ IR (neat) } 3512, \ 2963, \ 1782, \ 1705, \ 1388, \ 1213 \ \text{cm}^{-1}; \ ^{1}\text{H NMR} \\ \text{(CDCl}_{3}) \ \delta = 0.96 \ (\text{t}, J = 7.0 \ \text{Hz}, \ 3\text{H}), \ 1.40 - 1.47 \ (\text{m}, \ 1\text{H}), \ 1.53 - 1.69 \ (\text{m}, \ 3\text{H}), \\ 2.35 \ (\text{br s}, \ 1\text{H}), \ 2.76 \ (\text{dd}, J = 9.9, \ 13.3 \ \text{Hz}, \ 1\text{H}), \ 3.34 \ (\text{dd}, J = 3.3, \ 13.3 \ \text{Hz}, \ 1\text{H}), \\ 4.20 - 4.30 \ (\text{m}, \ 3\text{H}), \ 4.75 - 4.80 \ (\text{m}, \ 1\text{H}), \ 5.00 - 5.08 \ (\text{m}, \ 1\text{H}), \ 7.22 - 7.40 \ (\text{m}, \ 5\text{H}); \ ^{13}\text{C NMR} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 24.6 \ \text{Hz}), \ 55.5, \\ 66.3, \ 69.7, \ 124.2 \ (\text{q}, J = 281.7 \ \text{Hz}), \ 127.5, \ 129.0, \ 129.3, \ 134.6, \ 153.2, \ 166.0 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3 \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3, \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3, \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{CDCl}_{3}) \ \delta = 13.7, \ 18.8, \ 36.5, \ 37.6, \ 51.9 \ (\text{q}, J = 3.3, \ \text{Hz}); \ ^{19}\text{F} \\ \text{NMM} \ (\text{RMM} \ (\text{$

NMR (CDCl₃) δ = -62.5 (d, J = 8.7 Hz, 3F); HRMS (FAB⁺) Found: m/z 360.1430, Calcd for (M+H) $C_{17}H_{21}F_3NO_4$: 360.1422.

anti-(2S,3S): IR (neat) 3479, 2964, 1784, 1709, 1391, 1254, 1165 cm⁻¹; ¹H NMR (CDCl₃) δ = 0.96 (t, J = 7.3 Hz, 3H), 1.37 – 1.47 (m, 1H), 2.32 (br s, 1H), 2.78 (dd, J = 9.5, 13.5 Hz, 1H), 3.32 (dd, J = 3.3, 13.5 Hz, 1H), 4.20 (dd, J = 3.3, 9.1 Hz, 1H), 4.23 – 4.26 (m, 2H), 4.76 – 4.81 (m, 1H), 5.104 (dq, J = 8.1, 8.1 Hz, 1H), 7.20 – 7.22 (m, 2H), 7.28 –7.30 (m, 1H), 7.32 – 7.35 (m, 2H); ¹³C NMR (CDCl₃) δ = 13.6, 18.2, 37.3, 37.6, 51.9 (q, J = 25.3 Hz), 55.4, 66.2, 69.4, 123.8 (q, J = 281.1 Hz), 127.5, 129.0, 129.3, 134.7, 153.4, 166.9 (q, J = 3.1 Hz); ¹⁹F NMR (CDCl₃) δ = -64.0 (d, J = 8.2 Hz, 3F); HRMS (FAB⁺) Found: m/z 360.1424, Calcd for (M+H) $C_{17}H_{21}F_3NO_4$: 360.1422.

(4S)-Benzyl-3-[3-hydroxy-4-methyl-2-(trifluoromethyl)pentanoyl]-oxazolidin-2-one (1g)

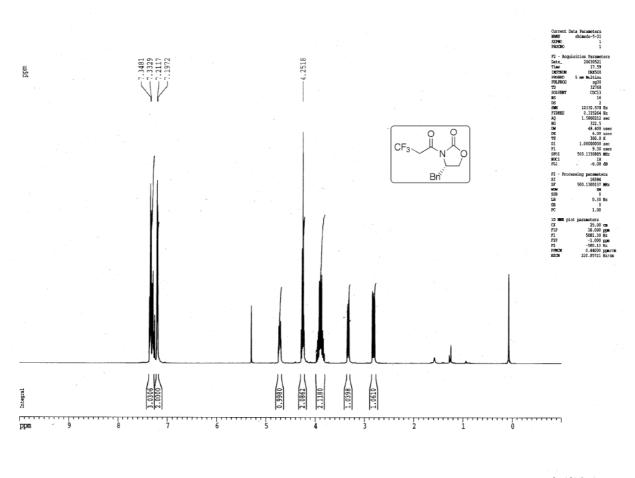
OH O O Syn-(2R,3S): IR (KBr) 3464, 2970, 2343, 1757, 1705, 1394, 1213 cm⁻¹; H NMR (CDCl₃) δ = 1.03 (dd, J = 6.7, 10.6 Hz, 6H), 1.77 – 1.84 (m, 1H), 2.16 (br s, 1H), 2.75 (dd, J = 9.8, 13.3 Hz, 1H), 3.31 (dd, J = 3.4, 13.3 Hz, 1H), 4.03 – 4.10 (m, 1H), 4.20 – 4.28 (m, 2H), 4.75 – 4.81 (m, 1H), 5.16 – 5.23 (m, 5H), 7.21 – 7.23 (m, 2H), 7.27 – 7.36 (m, 3H); ¹³C NMR (CDCl₃) δ = 16.7, 19.6, 31.4, 37.8, 49.6 (q, J = 24.2 Hz), 55.3, 66.3, 74.6, 124.4 (q, J = 281.9 Hz), 127.6, 129.1, 129.3, 134.6, 152.8, 166.4 (q, J = 3.4 Hz); ¹⁹F NMR (CDCl₃) δ = -62.2 (d, J = 8.7 Hz, 3F); HRMS (FAB⁺) Found: m/z 360.1430, Calcd for (M+H) $C_{17}H_{21}F_3NO_4$: 360.1422.

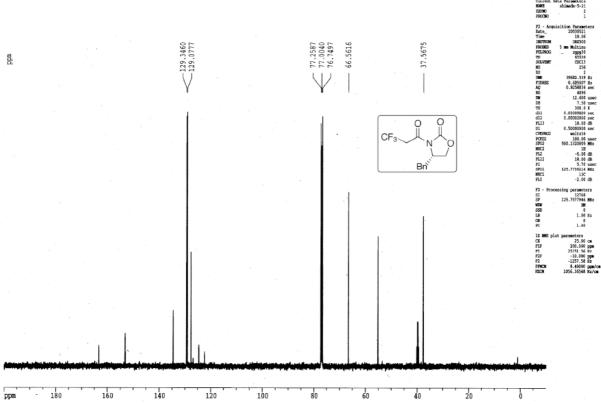
OH O O anti-(2S,3S): IR (neat) 3503, 2970, 1786, 1709, 1391, 1352, 1213, 1094 cm⁻¹;
¹H NMR (CDCl₃) δ = 0.99 (d, J = 6.7 Hz, 3H), 1.01 (d, J = 6.7 Hz, 3H), 1.89 – 1.94 (m, 1H), 2.33 (br s, 1H), 2.78 (dd, J = 9.6, 13.5 Hz, 1H), 3.32 (dd, J = 3.4, 13.5 Hz, 1H), 4.06 (dd, J = 4.0, 7.7 Hz, 1H), 4.22 – 4.26 (m, 2H), 4.75 – 4.80 (m, 1H), 5.27 (dq, J = 8.0, 8.0 Hz, 1H), 7.20 – 7.2 2 (m, 2H), 7.28 – 7.30 (m, 1H), 7.32 – 7.35 (m, 2H); ¹³C NMR (CDCl₃) δ = 15.1, 19.6, 31.0, 37.5, 49.4 (q, J = 25.5 Hz), 55.4, 66.2, 74.2, 123.8 (q, J = 281.2 Hz), 127.5, 129.0, 129.3, 134.7, 153.3, 167.3 (q, J = 3.5 Hz); ¹⁹F NMR (CDCl₃) δ = -64.1 (d, J = 8.8 Hz, 3F); HRMS (FAB⁺) Found: m/z 360.1424, Calcd for (M+H) $C_{17}H_{21}F_3NO_4$: 360.1422.

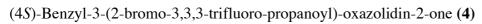
(4S)-Benzyl-3-[3-hydroxy-2-(trifluoromethyl)hex-4-enoyl]-oxazolidin-2-one (1h)

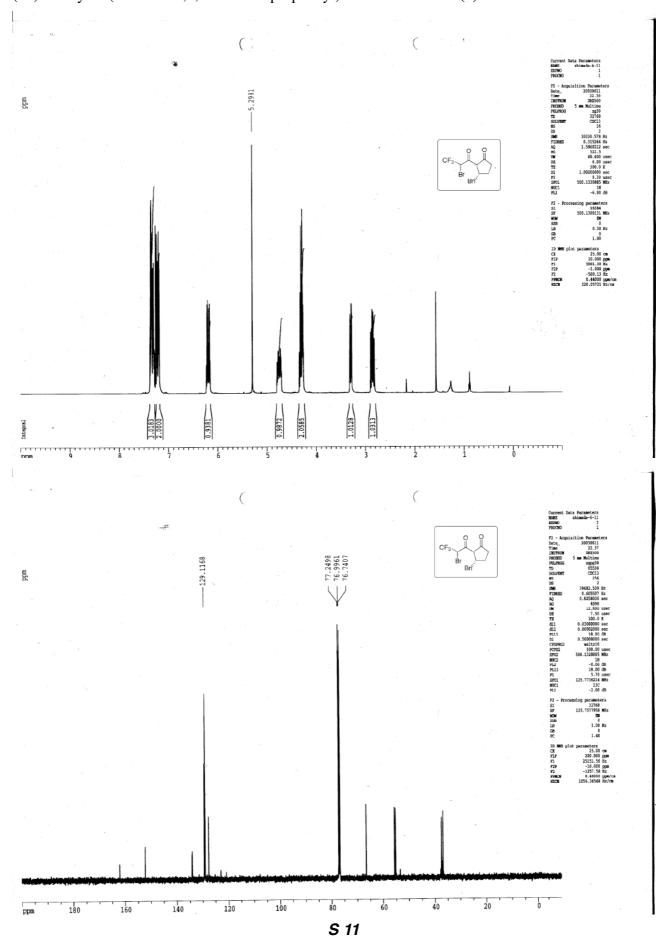
OHO O anti-(2S,3S): IR (neat) 3468, 3032, 1786, 1707, 1391, 1354, 1167, 1142 cm⁻¹; ¹H NMR (CDCl₃) δ = 1.74 (d, J = 6.5 Hz, 3H), 2.24 (br s, 1H), 2.79 (dd, J = 9.6, 13.5 Hz, 1H), 3.31 (dd, J = 3.2, 13.5 Hz, 1H), 4.18 – 4.24 (m, 2H), 4.68 (dd, J = 7.7, 7.7 Hz, 1H), 4.74 – 4.79 (m, 1H), 5.15 (dq, J = 8.2, 8.2 Hz, 1H), 5.56 (dd, J = 7.5, 15.2 Hz, 1H), 5.88 (dq, J = 6.6, 15.2 Hz, 1H), 7.20 – 7.22 (m, 2H), 7.28 – 7.29 (m, 1H), 7.31 – 7.35 (m, 2H); ¹³C NMR (CDCl₃) δ = 17.6, 37.6, 52.1 (q, J = 25.0 Hz), 55.4, 66.1, 70.7, 123.4 (q, J = 280.7 Hz), 127.4, 129.0, 129.4, 129.4, 130.8, 134.7, 153.3, 166.4; ¹⁹F NMR (CDCl₃) δ = -63.8 (d, J = 8.7 Hz, 3F); HRMS (FAB⁺) Found: m/z 357.1272, Calcd for (M+H) $C_{17}H_{19}F_3NO_4$: 358.1266.

(4S)-Benzyl-3-(3,3,3-trifluoro-propanoyl)-oxazolidin-2-one (3)

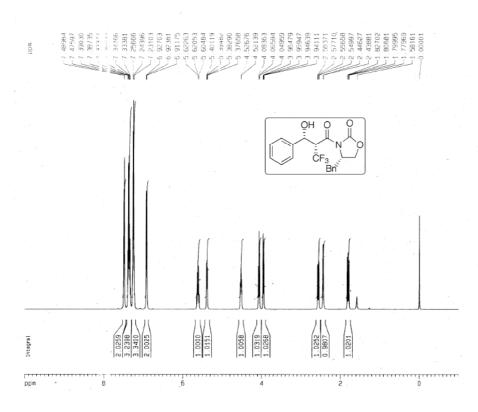




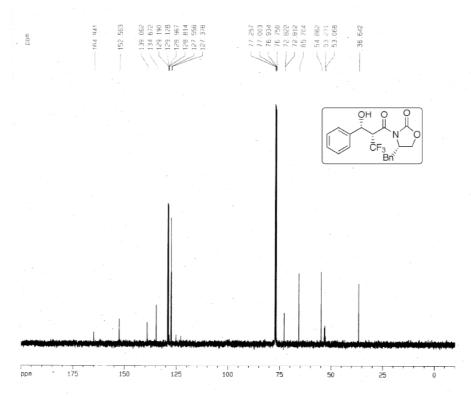




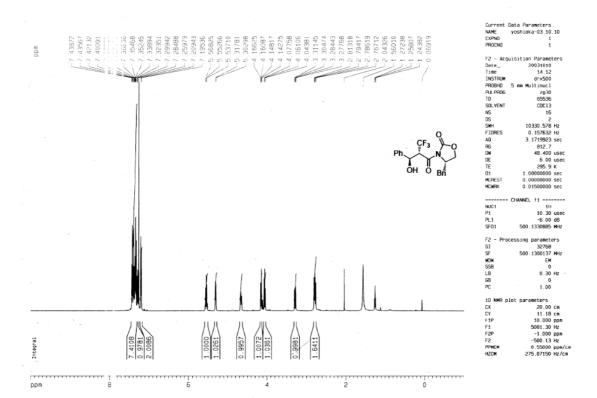
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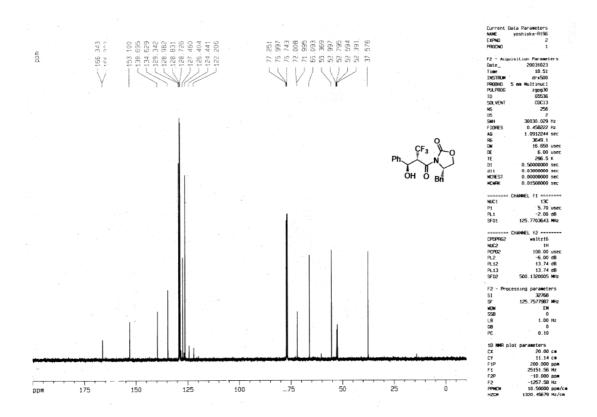




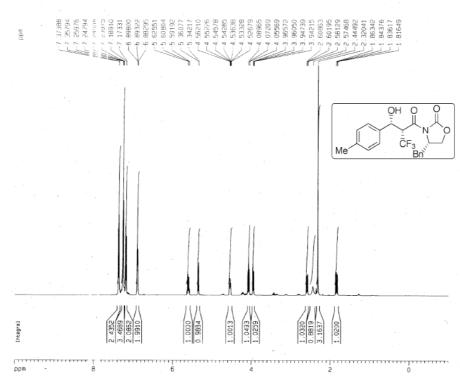


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PL13	13.74	
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FO - Door		
SI ·	cessing parameto 32768	ers
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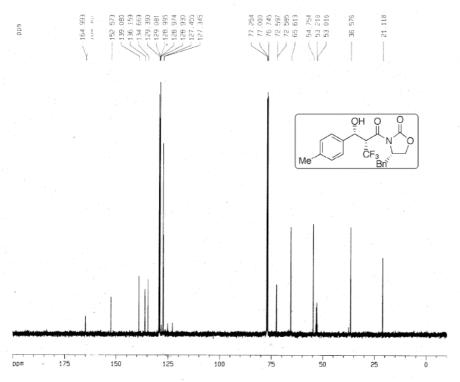




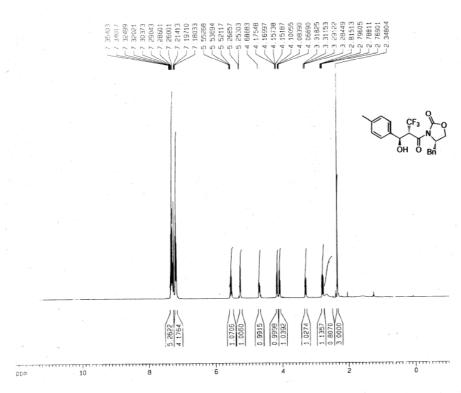
syn-(2R,3S) (1b)



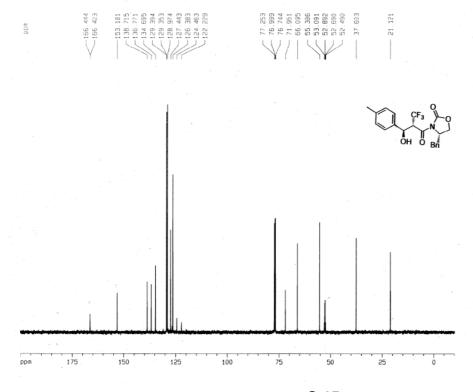




	Current (Data Parameters	
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	PI ··		usec
	PL1	-2.00	
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	31 03	125.7705043	PHILIP.
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	PL13	13.74	dΒ
	SF02	500.1320005	
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	.8	1.00	Hz
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	ID NAH DI	ot parameters 20.00	
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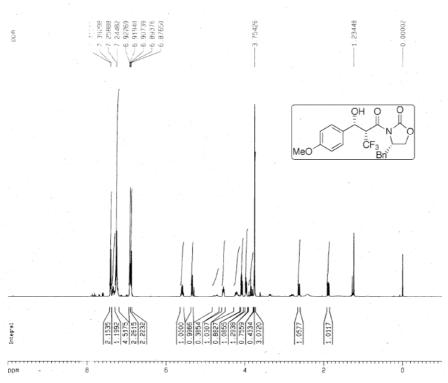




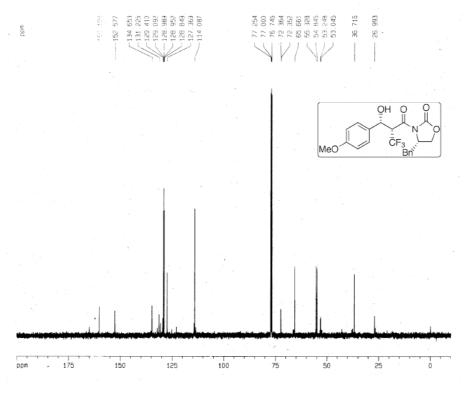


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	13.74	dθ
PL12 PL13	13.74	diB ∪B
PL12	13.74	diB ∪B
PL12 PL13 SF02	13.74 13.74 500.1320005	dB dB MHz
PL12 PL13 SF02 F2 - Pro	13.74 13.74 500.1320005 cessing paramete	dB dB MHz
PL12 PL13 SF02 F2 - Pro SI	13.74 13.74 500.1320005 cessing paramete 32768	dB dB MHz
PL12 PL13 SF02 F2 - Pro SI SF	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978	dB dB MHz
PL12 PL13 SF02 F2 - Pro SI SF WOM	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 EM	dB dB MHz
PL12 PL13 SF02 F2 - Pro SI SF	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978	dB dB MHz
PL12 PL13 SF02 F2 - Pro SI SF WOM	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 EM 0	dB dB Miz ers
PL12 PL13 SF02 F2 - Pro SI SF WOM SS8 LB	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 EM	dB dB Miz ers
PL12 PL13 SF02 F2 - Pro SI SF WOM SSB LB G8	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 EM 0 1.00	dB dB Miz ers
PL12 PL13 SF02 F2 - Pro SI SF WOM SS8 LB	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 EM 0	dB dB Miz ers
PL12 PL13 SF02 F2 - Pro SI SF WDM SS8 LB G8 PC	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 6 0 0 1.00 0	dB dB Miz ers
PL12 PL13 SF02 F2 - Pro SI SF MDM SSB LB GB PC	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 EM 0 1.00 0 1.40	dB dB MHz ers MHz
PL12 PL13 SF02 F2 = Pro SI SF MDM SSB LB GB PC	13.74 500.1320005 cessing parawete 32768 125.7577796 0 1.00 1.40	dB dB MHz ers MHz
PL12 PL13 SF02 F2 = Pro SI SF WDM SS8 LB GB PC 1D NMR p CX CY	13.74 13.74 500.132005 cessing paraecte 32/58 125.7577978 EM 0 1.00 0 1.40 lot paraecters 20.00 10.43	dB dB Miz ens Miz Hz
PL12 PL13 SF02 F2 - Pro SI SF MDM SS8 LB 08 PC 10 NMR p CX CY F1P	13.74 13.74 13.74 500.1320005 cessing parameter 32768 125.7577978 0 1.00 1.00 1.40 lot parameters 20.00 10.43 200.003	dB dB Miz ers Miz Hz
PL12 PL13 SF02 F2 = Pro SI SF WDM SS8 LB GB PC 1D NMR p CX CY	13.74 13.74 500.132005 cessing paraecte 32/58 125.7577978 EM 0 1.00 0 1.40 lot paraecters 20.00 10.43	dB dB Miz ers Miz Hz
PL12 PL13 SF02 F2 - Pro SI SF MDM SS8 LB 08 PC 10 NMR p CX CY F1P	13.74 13.74 500.1320005 cessing paramete 32/88 125.7577978 EM 0 1.00 0 1.40 lot parameters 20.00 10.43 200.000 25151.56	dB dB MHz ers MHz Hz
PL12 PL13 SF02 F2 - Pro SI SF WDM SS8 LB 06 PC 10 NMR p CX CY F1P F1 F2P	13.74 13.74 500.1320005 cessing parameter 32768 125.7577978 0 1.00 0 1.40 lot parameters 20.00 10.43 200.000 25151.56	dB WHZ PS WHZ HZ Cm Cm Cm ppm HZ ppm
PL12 PL13 SF02 F2 - Pro SI SF MOM SS8 BB PC 10 NMR p CX CY F1P F1 F2P F2	13.74 13.74 500.1320005 cessing parameter 32768 125.7577978 10.00 1.00 1.40 lot parameters 20.00 10.43 20.000 25151.56 -10.000 1.257.59	dB vB MHz crs MHz cm cm ppn Hz
PL12 PL13 SF02 F2 - Pro SI SF WDM SS8 LB GB PC 1D NMR P C CY F1P F1 F2P F2 PPHCM	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 1.00 1.00 1.40 1.40 101 paramete 10.43 200.00 25151.56 -10.000 1.257.52	dB dB MHz ers MHz cm cm ppm Hz ppm Hz ppm Hz
PL12 PL13 SF02 F2 - Pro SI SF MOM SS8 BB PC 10 NMR p CX CY F1P F1 F2P F2	13.74 13.74 500.1320005 cessing parameter 32768 125.7577978 10.00 1.00 1.40 lot parameters 20.00 10.43 20.000 25151.56 -10.000 1.257.59	dB dB MHz ers MHz cm cm ppm Hz ppm Hz ppm Hz
PL12 PL13 SF02 F2 - Pro SI SF WDM SS8 LB GB PC 1D NMR P C CY F1P F1 F2P F2 PPHCM	13.74 13.74 500.1320005 cessing paramete 32768 125.7577978 1.00 1.00 1.40 1.40 101 paramete 10.43 200.00 25151.56 -10.000 1.257.52	dB dB MHz ers MHz cm cm ppm Hz ppm Hz ppm Hz

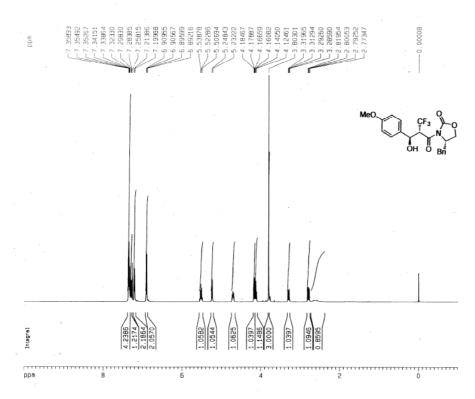
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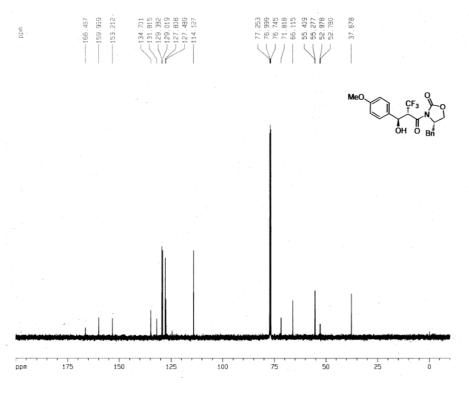




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F0 - D	essing paramet	
SI Pro	essing parameti. 32768	
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PC .	0.10	
	0.10	
10 NMR n	lot parameters	
CX .	20.00	ćm
CY -	11.27	
F1P	200.000	
F1	25151.56	
F2P	~10.000	
F2	-1257.58	
PPHCH	10.50000	
HZCM	1320.45679	

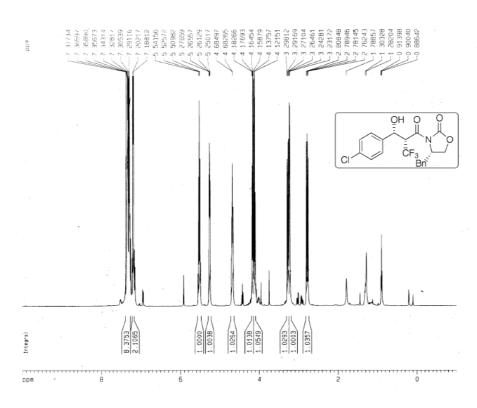




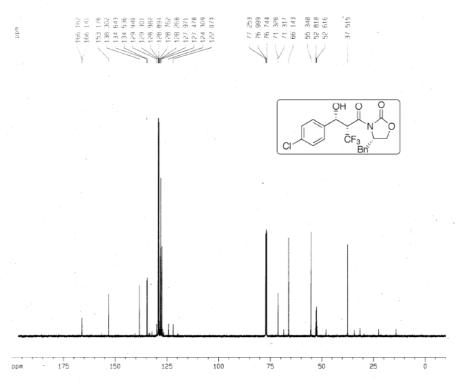


F2 - Acquis	ition Parame	ters
Date_	20040521	
Time	12.05	
INSTRUM	drx500	
PROBHO 5	mm Multinucl	
PULPRO6	zgpg30	
TD	65536	
SOLVENT	CDC13	
NS	256	
DS	230	
SWH	30030.029	
FIDRES	0.458222	
AQ .	1.0912244	sec
RG.	1625.5	
DW	16.650	
DE ·	6.00	
TE	297.5	K
D1	0.50000000	sec
d11	0.03000000	sec
MCREST	0.00000000	
HCMBK	0.01500000	
THE REAL PROPERTY.	0.0130000	360
CH	ANNEL f1	
NUC1	130	
P1		
	5.70	
PL1	-2.00	
SF01 .	125.7703643	MP12
	ANNEL f2 ====	
CPOPR62	waltz16	
MUC2	1H	
PCP02	100.00	usec
PL2	-6.00	dB
PL12	13.74	dΒ
PL13	13.74	dD .
SF02	500.1320005	MHz.
F2 - Deares	sing paramete	ees :
SI	32768	
SF	125.7577932	
MOH	123.7577932 FM	
SSB	0	
LB .	1.00	
GB	. 0	
PC	1.40	
PC	1.40	
PC		
PC	1.40 parameters 20.00	co
PC 1D NMR plot	1.40 parameters	co
PC 1D NMR plot CX	1.40 parameters 20.00	cm cm
PC 1B NMR plot CX CY	1.40 parameters 20.00 9.72 200.000	ca ca ppa
PC 1D NMR plot CX CY F1P F1	1.40 parameters 20.00 9.72 200.000 25151.56	ca ca ppa Hz
PC 1D NMR plot CX CY F1P F1 F2P	1.40 parameters 20.00 9.72 200.000 25151.56 -10.000	ca ca ppa Hz ppa
PC 10 NMR plot CX CY F1P F1 F2P F2	1.40 parameters 20.00 9.72 200.000 25151.56 -10.000 -1257.58	cm cm ppm Hz ppm Hz
PC 10 NMR plot CX CY F1P F1 F2P F2 PPMCM	1.40 parameters 20.00 9.72 200.000 25151.56 -10.000 -1257.58 10.50000	cm cm ppm Hz ppm Hz ppm/cm
PC 10 NMR plot CX CY F1P F1 F2P F2	1.40 parameters 20.00 9.72 200.000 25151.56 -10.000 -1257.58	cm cm ppm Hz ppm Hz ppm/cm
PC 10 NMR plot CX CY F1P F1 F2P F2 PPMCM	1.40 parameters 20.00 9.72 200.000 25151.56 -10.000 -1257.58 10.50000	cm cm ppm Hz ppm Hz ppm/cm

syn-(2R,3S) (1d)

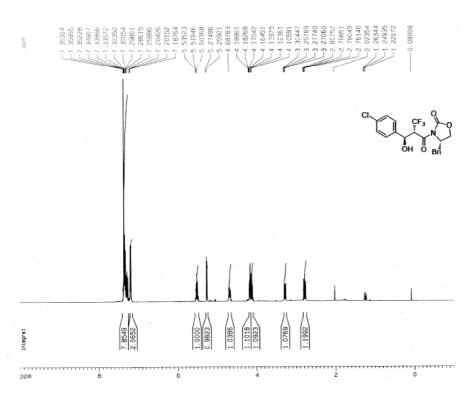




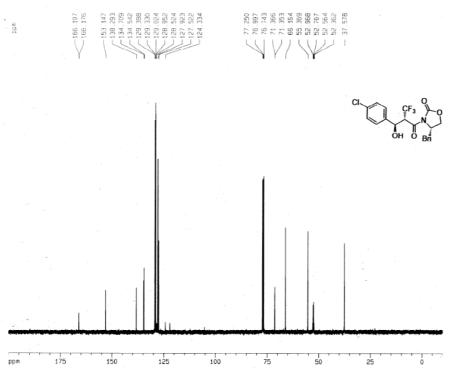


NAME	shimada-030825	-2
EXPN		
PROC		
PHUC	NU 1	
	Acquisition Parame	ters
Date		
1100	16.49	
INST	FUM drx500	
PROB	HD 5 mm Multinucl	
PULP		
TD	65536	
SOLV		
NS.	256	
DS	570	
SWH	30030.029	
FIDE		
АG	1.0912244	
RG	3649.1	
Ð₩	16.650	usec
DE	6.00	USEC
TE	297.1	K
91	0.50000000	sec
#11	0.03000000	
MCRE		
MONE		
THE PARTY	K 0.01300000	aer.
	de constante de la	
	CHANNEL f1	
NUC1		
P1		usec
PL1	-2.00	dB
PL1 SF01		
SF01	125.7703643	MHZ
SF01	125.7703643	MHZ
SF01	125.7703643 CHANNEL f2 962 Waltz16	MHz
SF01 CPDP NUC2	125.7703643 CHANNEL f2 962 waltz16	MHZ
SF01 CPDP NUC2 PCP0	125.7703643 CHANNEL f2 FRG2 Waltz16 ! 1H !2 100.00	MHz usec
SF01 CPOP NUC2 PCPO PL2	125.7703643 CHANNEL f2 FRG2 Waltz16 9 100.00 -6.00	MHz usec dB
SF01 CPDP NUC2 PCP0 PL2 PL12	125.7703643 CHANNEL f2 FRG2 Waltz16 2 100.00 -6.00 13.74	MHz usec dB dB
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13	125.7703643 CHANNEL f2 FRG2 Waltz16 1112 100.00 13.74 1 13.74	usec dB dB
SF01 CPDP NUC2 PCP0 PL2 PL12	125.7703643 CHANNEL f2 FRG2 Waltz16 1112 100.00 13.74 1 13.74	usec dB dB
SF01 CPOP NUC2 PCP0 PL12 PL13 SF02	125.7703643 CHANNEL f2 PRG2 Waltz16 12 100.00 -6.00 13.74 13.74 500.1320005	usec dB dB dB MHz
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13 SF02	125.7703643	usec dB dB dB MHz
9F01 CP0PP NUC2 PCP0 PL2 PL12 PL13 SF02 F2 - S1	125.7703643	usec dB dB dB MHz
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13 SF02	125.7703643	MHZ usec dB dB dB dB MHZ
9F01 CP0PP NUC2 PCP0 PL2 PL12 PL13 SF02 F2 - S1	125.7703643	MHZ usec dB dB dB dB MHZ
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13 SF02 F2 - S1 SF	125.7703643	usec dB dB dB MHz
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13 SF02 F2 - S1 SF NDN SSB	125.7703643 CHANNEL 12	usec dB dB dB MHz
SF01 CPOPP NUC2 PCP0 PL12 PL13 SF02 F2 - S1 SF HDH SSB LB	125.7703643 PRIC Waltz16 12 100.00 -5.00 -13.74 13.74 500.132005 Processing paramet 32708 125.7578015 EM 0	usec dB dB dB MHz
SF01 CPDP NUC2 PCP0 PL2 PL13 SF02 F2 - S1 SF NDN SSB L8 G8	125.7703643 CHANNEL 12	usec dB dB dB dB MHz ers
SF01 CPOPP NUC2 PCP0 PL12 PL13 SF02 F2 - S1 SF HDH SSB LB	125.7703643 PRIC Waltz16 12 100.00 -5.00 -13.74 13.74 500.132005 Processing paramet 32708 125.7578015 EM 0	usec dB dB dB dB MHz ers
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13 SF02 F2 S1 SF HDW SSB LB GB PC	125.7703643 CIANNEL {2	usec dB dB dB dB MHz ers
SF01 CPDP NUC2 PCP0 PL2 PL12 PL13 SF02 F2 - S1 SF NDW SSB LB S8 PC 10 N	125.7703643 FREQ DIANNEL 12 - 10.00 12 10.00 13.74 500.13207 Processing parameter 52.7578015 Processing parameter 50.00 10.00 10.00 M41 plot parameters	MHZ usec dB nR dB MHZ ers MHZ
SF01 CPDP NUC2 PCP0 PL12 PL13 SF02 F2 - S1 SF MDW SSB LB GB PC 1D N CX	125.7703643 CIANNEL f2 PREZ 100.00 100.00 100.00 Processing parameter 200.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 1	MHz usec dB dB dB MHz ers MHz
SF01 CPOPP NUC2 PCP0 PL12 PL13 SF02 F2 - S1 SF MDW SSB L8 G8 PC 10 N CX	125.7703643 FREQ DIANNEL [2	usec dB dB dB dB HHz ers MHz
SF01 CPDP NUC2 PCP0 PL12 PL13 SF02 F2 - S1 SF MDW SSB LB GB PC 1D N CX CY F1P	125.7703643 PREZ	MHZ usec dB dB dB dB HHZ ers MHZ
SF01 CPDP NUC2 PCP0 PL12 PL13 SF02 F2 - S1 SF MDH SSB LB G8 PC 10 N CX CY F1P F1	125.7703643 PRE2 MAINTEL [2 -	usec dB nR dB MHz ers MHz
SF01	125.7703643 PROC WAREL f2	usec d8 en d6 MHz ers MHz ce cn cn ppn Hz ppn ppn
SF011 CPDP NUC2 PCPDP PL2 PL13 SF02 F2	125.7703643 PREZ MAINTEL [2 -	MHz usec dB dB dB MHz ers MHz LE CB CB CB DDB HZ DDB HZ
F010 PPP PPP PPP PPP PPP PPP PPP PPP PPP	125.7703643 FREE VALUE 12 100.00 -6.00 -1.00 13.74 500.130005 -6.00 125.7578015 -6.00 0.00 0.00 2015.15.56 -1.00 2015.55	usec dB dB dB MHz ens MHz ens MHz Hz
SF011 CPDP NUC2 PCPDP PL2 PL13 SF02 F2	125.7703643 FREE VALUE 12 100.00 -6.00 -1.00 13.74 500.130005 -6.00 125.7578015 -6.00 0.00 0.00 2015.15.56 -1.00 2015.55	usec dB dB dB MHz ens MHz ens MHz Hz
F010 PPP PPP PPP PPP PPP PPP PPP PPP PPP	125.7703643 FREE VALUE 12 100.00 -6.00 -1.00 13.74 500.130005 -6.00 125.7578015 -6.00 0.00 0.00 2015.15.56 -1.00 2015.55	usec dB dB dB MHz ens MHz ens MHz Hz

Durrent Cata Parameters

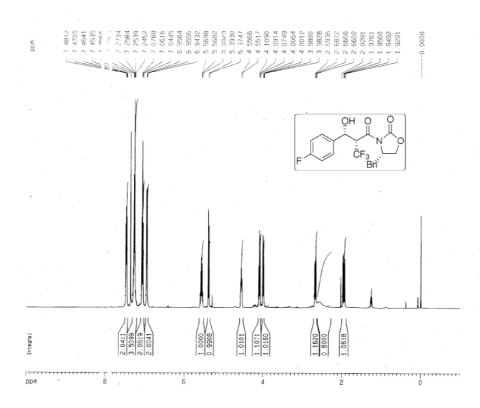




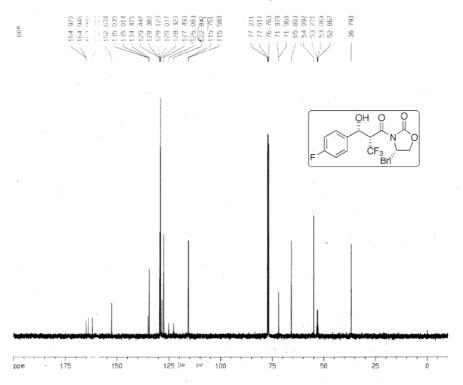


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EXPNO .		21-2
PROCNO	2	
PHEX.NE		
	uisition Parame	ters
Date_	20040521	
Time	21.27	
INSTRUM	drx500	
PROBHO	5 mm Hultinucl	
PULPROG	zgpg30	
TD-	65536	
SOLVENT NS	00013	
DS .	256	
SMH	30030.029	
FIDRES	0.458222	
AG AG	1.0912244	
RG	5160.6	sec
DM	16.650	usac
DE.	6.00	
TE	297.5	
D1	0.50000000	
d11	0.03000000	
MCREST	0.00000000	
HCHRK	0.01500000	
NUC1	CHANNEL f1	
P1	5.70	
PL1	-2.00	
SF01	125.7703643	
	CHANNEL f2 ====	
NUCS NUCS	waltz16	
PCPD2		
PL2	100.00	
PL12	-6.00 13.74	
PL12	13.74	
SF02	500 . 1320005	
Ji UE	300.1320003	-
	cessing paramete	ers -
SI	32768	
SF	125.7577960	MEZ
MDM	EM	
SSB	- 0	
LB GB	1.00	HZ
PC ·	1.40	
PC	1.40	
	lot parameters	
CX	20,00	
CY	10,51	
F1P	200.000	
F1	25151.56	
F2P	-10,000	
F2 .	-1257.58	
PPHCH HZCM	10.50000 1320.45679	

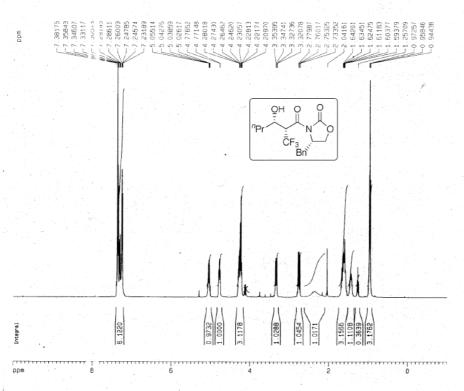
syn-(2R,3S) (1e)



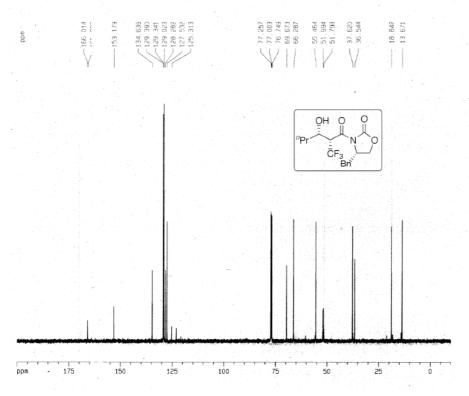




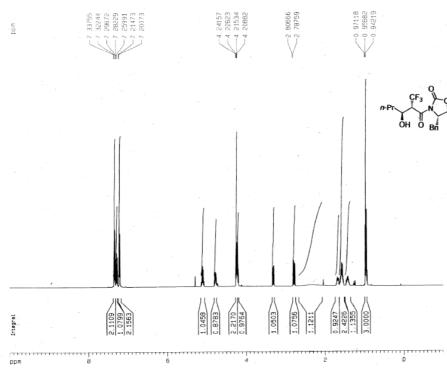
Durrent	Data Parameters	
NAME	shimada-03.12.	12
EXPNO	. 2	
PROCNO	1	
ED - Acc	quisition Parame	Para
Date_	20031212	
Time	19.03	
INSTRUM	drx500	
PROBHO	5 mm Multinuçl	
PULPROG	zgpg30	
TD	65536	
SOLVENT	CDC13	
NS	256	
DS	2	
SWH	30030.029	H ₂
FIDRES	0.458222	
AQ	1.0912244	
AS ·	3649.1	SEC
DM	16.650	
DE		usec
TE.	295.9	
D1	0.50000000	Sec
dii.	0.03000080	sec
NCREST	0.00000000	SEC
NCHEK	0.01500000	
	CHANNEL f1	
NUC1	130	
Pt		usec
	-2.00	
PL1	125.7703643	
SF01	125.7703643	MHZ
	CHANNEL f2 ===	*****
CPDPR62	waltz16	
NUC2	: 91	
PCPD2	100.00	usec
PL2	-6.00	dB ·
PL 12	13.74	dR 1
PL13	13.74	
SF02	500 . 1320005	
Si GE	500.1520003	
F2 - F2-	cessing paramet	
SI	cessing paramet 32768	
SF	125.7577932	
MDM	EM	
SSB	0	
LB	1.00	H2
GB -	. 0	
PC	0.10	
ID NHR (olot parameters	
CX	20.00	cm.
CY	10.89	
F1P	200.000	
F1	25151.56	
F2P	-10.000	
F2	-1257.58	
PPMCM	10.50000	
HZCM	1320.45679	Hz/cm

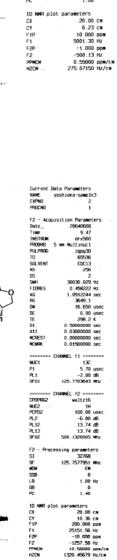






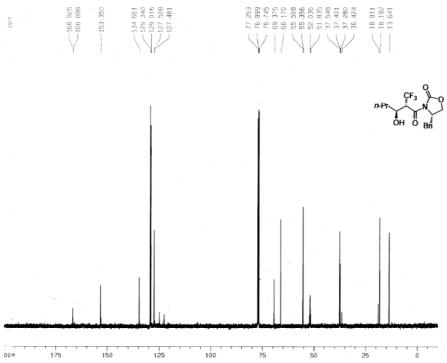
Current Bat	a Parameters
	inada-03.11.17-nPr
EXPNO	2
PROCNO	1
ringcino	·
F2 - Acouse	ition Parameters
Date_	20031117
Time	10.47
INSTRUM	drx500
	mm Hultinucl
PLL PROG	
	zgpg30 65536
TD .	
SOL VENT	C0C13
NS	256
DS	. 2
SMH	30030.029 Hz
FIDRES	0.458222 Hz
AG .	1.0912244 sec
RG .	4597.6
DH -	16.650 usec
DE	6.00 usec
TE	296.5 K
D1	0.50000000 sec
011	0.03000000 sec
MCREST	0.00000000 sec
HCHRK	0.01500000 sec
	ANNEL f1
NUC1	130
P1	5.70 usec
PL1	-2.00 dB
SF01	125.7703643 MHz
5	
	AMEL f2
ChObbes	Maltz16
NUC5	1H
PCPD2	100.00 usec
PLS	-6.00 dB
PL12	13.74 dB
PL13	13.74 dB
SF02	500.1320005 HHz
SI Proces	sing parameters 32768
SF	
	125.7577978 WHz
MDH	EM
SSB	0
LB :	1.00 Hz
68	0
PC .	0.10
en NMP olot	parameters
ID MAN DIOC	20.00 cm
CY	11.01 cm
FIP	200.000 ppm
F1	25151.56 Hz
F2P	-10.000 ppm
F2	-1257.58 Hz
PPHCH	10.50000 ppm/cm
HZCM	1320.45679 Hz/cm
	TOTAL PROPERTY OF THE PERTY OF

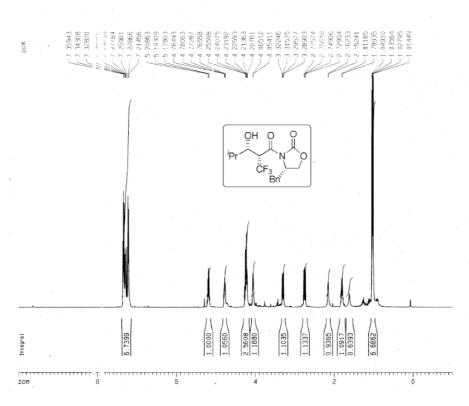




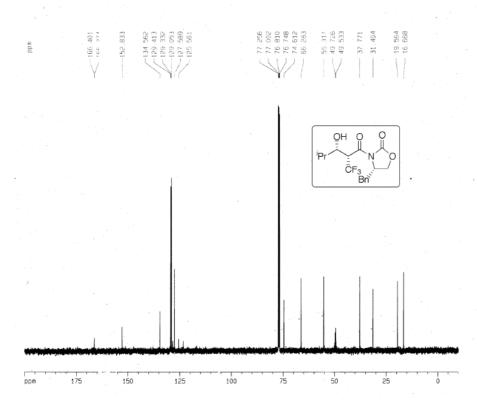
NUC1 P1 PL1 SF01

SI SF MDM SSB LB GB PC

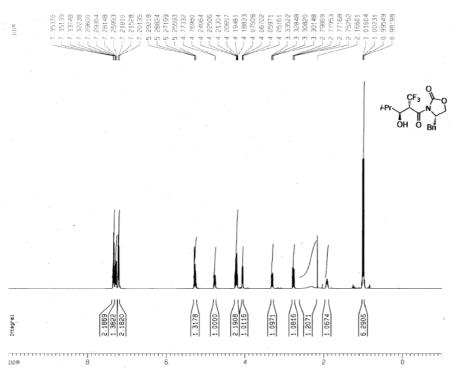




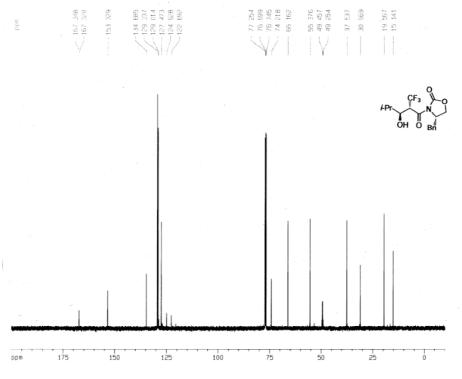




Current	Data Parameters	
NAME	shimada-03.11.	7-iPr
EXPNO	. 2	
PROCNO	1	
F2 - Acc	uisition Paramet	ters
Date_	20031117	
Time	11.05	
INSTRUM	drx500	
PROBHO	5 mm Multinucl	
PUL PROG	zapa30	
TD	65536	
SOLVENT	CDC13	
NS .	256	
DS		
SWH	30030.029	Hz
FIDRES	0.458222	
AB	1.0912244	
RG .	3649.1	000
DW	16.650	uene
DE	6.00	
TE .	296.4	
D1 ·	0.50000000	
	0.63000000	
HCREST	0.0000000	
MCMRK	0.01500000	
PICKIN,	0.01300000	sec
	CHANNEL f1	
NUC1	13C	
P1	5.70	
PL1	-2.00	
SF01	125.7703643	
	125.7703643	HHz
SF01	125.7703643 CHANNEL 12	HHz
SF01 CPDPRG2	125.7703643 CHANNEL 12 waltz16	MHz
SF01 CPDPRG2 NUC2	125.7703643 CHANNEL 12 waltz16 1H	MHZ
CPOPRIGE NUC2 PCPD2	125.7703643 CHANNEL 12 Waltz16 1H 100.00	WHZ
CPDPRG2 NUC2 PCPD2 PL2	125.7703643 CHANNEL 12	wec dB
CPDPRG2 NUC2 PCPD2 PL2 PL12	125.7703643 CHANNEL 12	usec dB dB
CPOPRG2 NUC2 PCPO2 PL2 PL12 PL13	125.7703643 CHANNEL 12 Waltz16 1H 100.00 -6.00 13.74 13.74	usec dB dB
CPDPRG2 NUC2 PCPD2 PL2 PL12	125.7703643 CHANNEL 12	usec dB dB
CPDPRG2 NUC2 PCPD2 PL2 PL12 PL13 SF02	125.7703643 CHANNEL 12	usec dB dB dB
CPDPRG2 NUC2 PCPD2 PL2 PL12 PL13 SF02	125.7703643 CHANNEL 12	usec dB dB dB
CPDPRG2 NUC2 PCPD2 PL2 PL12 PL13 SF02 F2 - Pro	125.7703643 CHANNEL 12	usec dB dB dB WHz
CPOPPAGE NUC2 PCPO2 PL2 PL12 PL13 SF02 F2 - Pro	125.7703643 CHANNÉL 12	usec dB dB dB WHz
CPDPRG2 NUC2 PCPD2 PL2 PL12 PL13 SF02 F2 - Pro	125.7703643 CHANNEL 12	usec dB dB dB WHz
CPOPPAGE NUC2 PCPO2 PL2 PL12 PL13 SF02 F2 - Pro	125.7703643 CHANNEL 12 waltz16 11 100.00 -5.00 13.74 13.74 500.1320005 ccessing parameter 32756 125.7577942 EM	usec dB dB dB HHz
SF01 CPDPPG2 NUC2 PCPD2 PL12 PL13 SF02 F2 - Pro SI SF MOM	125.7703643 • CHANNEL 12	usec dB dB dB HHz
SF01 CPDPRG2 NUC2 PCPD2 PL2 PL12 PL13 SF02 F2 - Pro SI SF WDM SSB	125.7703643 CHANNEL 12 waltz16 11 100.00 -5.00 13.74 13.74 500.1320005 ccessing parameter 32756 125.7577942 EM	usec dB dB dB HHz
SF01 CPDPRG2 NUC2 PCPD2 PL12 PL13 SF02 F2 - Pro SI SF WDM SSB LB	125.7703643 CHANNEL +2	usec dB dB dB HHz
SF01 CPDPRG2 NUC2 PCPD2 PL12 PL13 SF02 F2 - Pro SI SF WDM SSB LB GB	125.7703643 CHANNEL 12	usec dB dB dB HHz
SF01 CPDPPG2 NUC2 PCPD2 PL.2 PL.12 PL.12 FSF02 FS - Pro SF WDM SSB LB GB PC	125.7703643 CHANNEL 12	usec dB dB dB HHz
SF01 CPDPPG2 NUC2 PCPD2 PL.2 PL.12 PL.12 FSF02 FS - Pro SF WDM SSB LB GB PC	125.7703643 CHANNEL 12	WHZ USEC OB OB OB HHZ HTZ
SF01 CPDPPG2 NUC2 PCP02 PL12 PL12 PL13 SF02 F2 PC0 SF MOM SSB LB GB PC	125.7703643 CHANNEL F2	usec dB dB dB HHz ers HHz
SF01 CPDPRG2 NUC2 PCPU2 PL12 PL13 SF02 F2 - Pro SI SF MSM MSM SSB LB G8 PC 10 NHR 6 CX	125.7703643 CHANNEL 12	usec dB dB dB HHz ers
SF01 CPOPPGS NUC2 PCPD2 PL2 PL12 PL13 SF02 F2 - Pro SI SF MDM SSB LB G8 PC JD NMRL F CX CY	125.7703643 CHANNEL F2	Metz Usec dB dB dB Metz FFS Metz CM CM CM ppm Hz
SF01 CPDPRG2 NUC2 PL2 PL12 PL13 SF02 F2 - Pro SSB LB GB PC 10 NMFI p CX CY F1P	125.7703643 CHANNEL 12	Metz Usec dB dB dB Metz FFS Metz CM CM CM ppm Hz
SF01 CPOPPGS NUC2 PCPD2 PL12 PL13 SF02 F2 - Pro SI SF MOM SSB G8 PC 10 NMFI p CX CY F1P	125.7703643 CHANNEL F2	MHz usec dB dB HHz ers MHz cn cn ppa ppa
SF01 CPOPPAGE NUC2 PCP02 PL12 PL13 SF02 F2 - Pro SI SF MOM SSB LB G8 PC CX CY F1P F1 F2P	125.7703643 **CHANNEL **P2**********************************	MHz USEC dB dB MHz crs MHz cn cn ppm Hz
SF01 CPDPPGS NUC2 PCP02 PL12 PL13 SF02 F2 - Pro SSF NUM LB GB PC 10 NMFI p CX CY F1P F1P F2P F2	125.7703643 125.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.7703643 127.77	WHZ USEC dB dB dB HHZ ers MHZ En LD

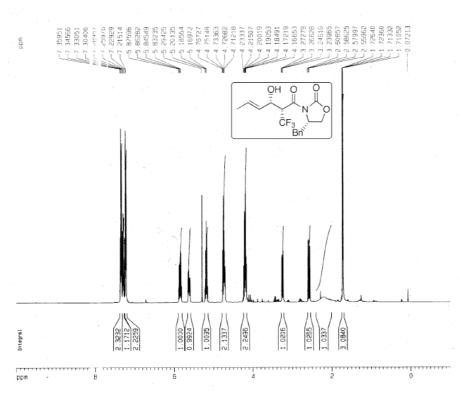




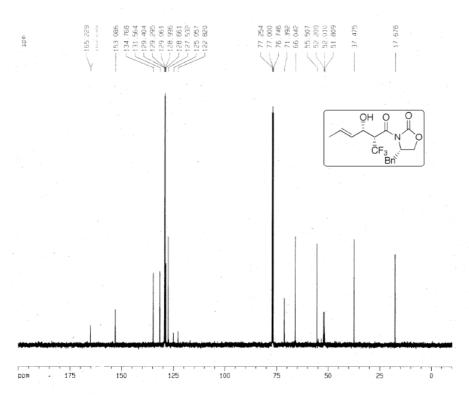


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F2 - Acquis	ition Parame	ters
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INSTRUM	drx500	
PROBHO 5	mm Hultinucl	
PULPROG	zgpg30	
TD	65536	
SOLVENT	CDC13	
NS	256	
BS ·	. 2	
SMH	30030.029	Hz
FIDRES	0.458222	Hz
AQ	1.0912244	sec
RG	1625.5	
DM	16.650	
DE		usec
TE	298.2	K
Di	0.50000000	sec
d11	0.03000000	sec
MCREST	0.00000000	sec
MCMRK	0.01500000	sec
CH	ANNEL f1	
NUC1	130	
P1	5.70	usec
PL1	-2.00	
SF01	125.7703643	MHz
CH	ANNEL 12 ===	****
CPDPR62	waltz16	
NUC2	111	
PCPD2	100.00	usec
PL2	-6.00	dB
PL12	13.74	dB
PL13	13.74	dB
SF02	500.1320005	MHZ
F2 - Proces	sing paramet	ers
SI	32768	
SF	125.7577951	MHZ
MDM -	EN	
SSB	0	
LB	1.00	Hz
68	0	
PC	. 1.40	
1D NMR plot	parameters	
CX	. 20.00	cm
EY	10.85	
F1P	200.000	
F1	25151.56	Hz
F2P	-10.000	ppm
F2	-1257.58	
PPMCM	10.50000	ppm/cm
HZCM	1320.45679	Hz/cm

syn-(2R,3S) (1h)

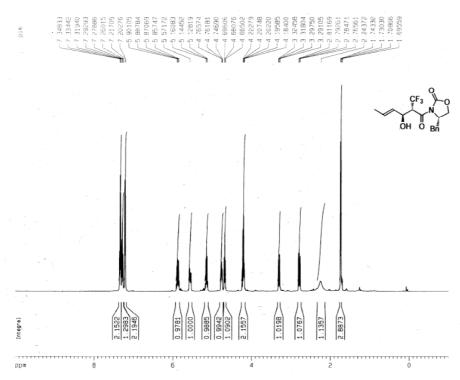




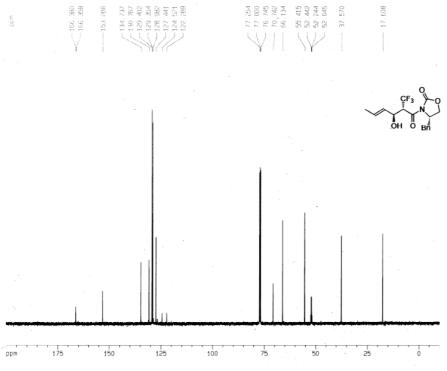


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PROCNO	1
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	mm Multinucl
PULPROS	zgpg30
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NS	256
DG.	2
SMH .	30030.029 Hz
FIDRES	0.458222 Hz
AG .	1.0912244 sec
RG.	
	2896.3
DM	16.650 usec
DE	6.00 usec
TE	296.5 K
D1	0.50000000 sec
d11	0.03000000 sec
MCREST	0.00000000 sec
MCWRK .	0.01500000 sec
	ANNEL f1
NUC1	130
P1	5.70 usec .
PL1	-2.00 dB
SF01	125.7703643 MHz
	ANNEL 12
CPOPRG2	waltzi6
NUC2	. 1H
PCPD2	100.00 usec
PL2	-6.00 dB
PL12	13.74 dB
PL13	13.74 dB
SF02	500.1320005 MHz
F2 - Proces	sing parameters
SI	32768
SF	125.7577960 MHz
MDM	EM
SSB	. 0
LB	1.00 Hz
GB	. 0
PC	0.10
	0.10
10 NMR plot	nanamatana
CX	20.00 cm
CY	11.54 cm
F1P	200,000 ppm
F1P	
	25151.56 Hz
F2P	-10.000 ppm
F2 PPMCN	-1257.58 Hz
	10.50000 ppm/cm
HZCM	1320.45679 Hz/cm

anti-(2S,3S) (1h)



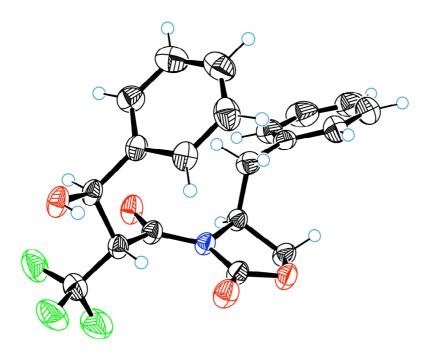




Current Data Paramete	
NAME yoshioka-04.	.6.9
EXPN0	5 .
PROCNO	1
F2 - Acquisition Para	aneters
Date 200408	
	.45
INSTRUM drx5	
PROBHD 5 mm Hulting	
TD 655	
SDLVENT CDD	
	256
DS	2
SMH 30030.0	129 Hz
FIDRES 0.4582	
AQ 1.09122	
RG 3649	
	550 usec
	.00 usec
	3.2 K
D1 0.500000	000 sec
d11 0.030000	000 sec
MCREST 0.000000	000 sec
NCMRK 0.015000	000 sec
CHANNEL f1 -	
	13C
	.70 usec
	.00 dB
SF01 125.77036	543 H Hz
CHANNEL f2 -	
CPDPRG2 waltz	:16
NUC2	1H
PCPD2 100.	.00 usec
	00 dB
	.74 dB
	74 dB
SF02 500.13200	NOS MHZ
F2 - Processing param	meters
SI 327	168
SF 125.75779	360 MHZ
	EM
MOM	EM
MDM SSB	EM
MDM SSB LB 1.	0 00 Hz
MDM SSB LB 1.	0 00 Hz 0
MDM SSB LB 1.	0 00 Hz
MDM SSB LB 1. GB PC 1.	0 0 Hz 0 40
MOM SSB LB 1. DB PC 1.	EM 0 0 00 Hz 0 40
MOM SSB LB 1. GB PC 1. 1D NMR plot parameter CX 20.	EM 0 0 00 Hz 0 40 40 cm
MOM SSB LB 1. GB PC 1. 1D NMR plot parameter CX 20.	EM 0 0 00 Hz 0 40
MOM 558 LB 1. GB PC 1. 10 NMR plot parameter CX 20. CY 9.	EM 0 0 00 Hz 0 40 40 cm
MOM SS8 1.8 1.08 PC 1.10 NMR plot parameter CX 20.07 9.9.0	EM 0 .00 Hz 0 .40
MOM SSB LB 1. GB 1. GB PC 1. ID NMR plot parameter CX 20. CY 9. CY 9. F1P 200.0	EM 0 0 Hz 0 0 40 Hz 0 0 0 Cm 992 Cm 1000 ppm 556 Hz
MOW SSB 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 68 1. 6	EM 0 0 Hz 0 0 Hz 0 0 0 Hz 0 0 0 Hz 0 0 0 Cm 0 0 Cm 0 0 Ppm 0 56 Hz 0 0 0 Ppm
MCW SSB LB 1. 88 PC 1. 10 NMRI plot parameter CX 20. CY 9. F1P 200.0 F1 25151, F2P -10.0	EM 0 0 Hz 0 0 0 Hz 0 0 0 0 Cm 992 Cm 1000 ppm 156 Hz 1000 ppm 158 Hz 158 Hz 158 Hz
MOW 558 LB 1.58 PC 1.10 NWR plot parameter CX 9.57 PF 200.0 F1 25151.72 PPWCM 10.500 PF2 11257.	EM 0 0 Hz 0 0 Hz 0 0 0 Hz 0 0 0 Hz 0 0 0 Cm 0 0 Cm 0 0 Ppm 0 56 Hz 0 0 0 Ppm

IV. ORTEP drawing

non-Evans syn (1a)



Evans anti (1c)

