General. All commercially available reagents were used without further purification. All solvents were used after distillation. Tetrahydrofuran (THF), diethyl ether, benzene, toluene, and dimethoxyethane (DME) were refluxed over and distilled from sodium-benzophenone ketyl. Dichloromethane was refluxed over and distilled from P2O5. Dimethylformamide (DMF), dimethyl sulfoxide (DMSO), and hexamethylenephosphoric triamide (HMPA) were distilled from CaH2 under reduced pressure. Methanol was refluxed over and distilled from Mg(OMe)2. Triethylamine, diisopropylamine, and diisopropylethylamine were refluxed over and distilled from KOH. Preparative separation was performed by column chromatography on silica gel. 1H NMR and 13C NMR spectra were recorded on a 400MHz and 750 MHz spectrometer and chemical shifts were represented as δ-values relative to the internal standard TMS. IR spectra were recorded on a FT-IR Spectrometer. High-resolution mass spectra (HRMS) were measured on a ESI-TOF MS. Melting point was uncorrected.

(1S,2R,4S)-4-Acetoxy-1,2-Epoxy-1-ethynyl-2,6,6-trimethylcyclohexanol (15). To a solution of acetylene 14 (215 mg, 1.21 mmol) in pyridine (5 mL) was added acetic anhydride (0.18 mL, 1.94 mmol) at room temperature and the reaction mixture was stirred for 18 h at the same temperature. A saturated aqueous CuSO4 solution was added, and then the resulting mixture was extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO4, filtered and concentrated in vacuo. Purification by silica gel column chromatography (5% ethyl acetate in hexane) afforded acetate 15 (209 mg, 77%): [α]24.0D =–20.3 (c 1.18, CHCl3); IR (neat, cm–1) 3281, 2966, 2930, 2872, 1738, 1460, 1367, 1242, 1157, 1105, 1043; 1H NMR (CDCl3, 400 MHz) δ 4.85 (m, 1H), 2.42 (s, 1H), 2.37 (dd, J = 15.1, 5.7 Hz, 1H), 2.01 (s, 3H), 1.79 (dd, J = 15.1, 6.4 Hz, 1H), 1.60 (dd, J = 13.8, 3.4 Hz, 1H), 1.52 (s, 3H), 1.38 (dd, J = 13.5, 8.24 Hz, 1H), 1.27 (s, 3H), 1.16 (s, 3H); 13C NMR (CDCl3, 100 MHz) δ 170.1, 80.2, 74.2, 66.9, 64.9, 63.1, 39.7, 35.6, 33.5, 28.4, 25.9, 21.7, 21.3; ESI-HRMS m/z calcd for C13H18O3Na (M+Na)+ 245.1154, found 245.1164.

(2E,4E)-7-[(1'S,2'R,4'S)-4'-Acetoxy-1’,2’-Epoxy-2’,6’,6'-trimethylcyclohexa-1'-yl]5-methylhepta-2,4-diene-6-yn-1-ol (18). To a solution of ester 16 (1.11 g, 1.89 mmol) in dichloromethane (18.9 mL) was added dropwise diisobutylaluminium hydride (1.0 M in toluene, 4.56 mL, 4.56 mmol) at –78 °C. After the reaction mixture was
stirred for 5 min at the same temperature, aqueous potassium sodium (+)-tartrate tetrahydrate solution were added and then resulting mixture was extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo to afford crude vinyl iodide 17, which was used to the next reaction without further purification.

To a solution of crude vinyl iodide 17 and acetylene 15 (420 mg, 1.89 mmol) in diisopropylamine (9.45 mL) was added tetrakis(triphenylphosphine)palladium (262 mg, 0.23 mmol) and CuI (40 mg, 0.21 mmol). After being stirred for 1.5 h at room temperature, the reaction mixture was poured into a saturated aqueous NH₄Cl solution, and then the resulting mixture was extracted with diethyl ether. The organic layers were combined, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography (from 30% to 50% ethyl acetate in hexane) afforded the conjugated acetylene derivative 18 (484 mg, 81%): [α]²⁴₀ +15.1 (c 1.07, CHCl₃); IR (neat, cm⁻¹) 3458, 2965, 2926, 1738, 1448, 1370, 1244, 1043; ¹H NMR (CDCl₃, 400 MHz) δ 6.50 (dd, J = 14.8, 11.4 Hz, 1H), 6.39 (d, J = 11.2 Hz, 1H), 5.90 (dt, J = 14.9, 5.5 Hz, 1H), 4.87 (m, 1H), 4.23 (d, J = 5.5 Hz, 2H), 2.38 (dd, J = 14.9, 5.7 Hz, 1H), 2.01 (s, 3H), 1.91 (s, 3H), 1.80 (dd, J = 14.8, 6.4 Hz, 1H), 1.62 (dd, J = 13.8, 3.5 Hz, 1H), 1.51 (s, 3H), 1.39 (dd, J = 13.5, 8.3 Hz, 1H), 1.27 (s, 3H), 1.16 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.3, 135.4, 134.2, 125.9, 118.0, 89.3, 85.5, 67.1, 65.6, 63.9, 62.9, 39.8, 35.7, 34.0, 28.6, 26.1, 21.9, 21.3, 17.4; ESI-HRMS m/z calcd for C₁₉H₂₆O₄Na (M+Na)+ 341.1729, found 341.1740.

2-[[((2'E,4'E)-7'-(1''S,2''R,4''S)-4''-Acetoxy-1''''-Epoxy-2'',6'',6''-trimethylcyclohexylidene-1''''-yl)-5'-methylhepta-2,4-diene-6-yn)sulfanyl)benzothiazole (19). To a solution of 18 (100 mg, 0.31 mmol), 2-mercaptopbenzothiazole (68 mg, 0.41 mmol) and triphenylphosphine (107 mg, 0.41 mmol) in THF (4 mL) was added dropwise diisopropyl azodicarboxylate (0.09 mL, 0.44 mmol) at 0 °C. The reaction mixture was stirred for 1 h at room temperature and the all solvents were removed in vacuo. To a residue was added diethyl ether and the precipitate was removed by filtration through a pad of Celite to give the crude products as a solution, which was concentrated in vacuo. Purification by short silica gel column chromatography (from 5% to 10% ethyl acetate in hexane) afforded the thioether 19 (127 mg, 87%): [α]²⁶₀ +8.5 (c 0.97, CHCl₃); IR (neat, cm⁻¹) 2967, 2926, 1736, 1460,
1427, 1367, 1242, 1042; ^1^H NMR (CDCl\textsubscript{3}, 400 MHz) δ 7.87 (m, 1H), 7.75 (m, 1H), 7.42 (m, 1H), 7.30 (m, 1H), 6.60 (dd, \(J = 14.9, 11.2\) Hz, 1H), 6.36 (d, \(J = 11.5\) Hz, 1H), 5.93 (m, 1H), 4.87 (m, 1H), 4.08 (d, \(J = 7.6\) Hz, 2H), 2.37 (ddd, \(J = 14.9, 5.7, 0.9\) Hz, 1H), 2.00 (s, 3H), 1.89 (s, 3H), 1.79 (dd, \(J = 15.1, 6.6\) Hz, 1H), 1.61 (m, 1H), 1.48 (s, 3H), 1.38 (dd, \(J = 13.7, 8.2\) Hz, 1H), 1.24 (s, 3H), 1.14 (s, 3H); ^13^C NMR (CDCl\textsubscript{3}, 100 MHz) δ 170.3, 165.8, 153.2, 135.4, 135.0, 129.8, 128.9, 126.1, 124.3, 121.5, 120.9, 118.9, 89.2, 86.1, 67.1, 65.6, 63.9, 39.9, 35.9, 34.1, 28.7, 26.2, 21.9, 21.4, 17.5, -0.02; ESI-HRMS m/z calcd for C\textsubscript{26}H\textsubscript{29}NO\textsubscript{3}S\textsubscript{2}Na (M+Na)^+ 490.1487, found 490.1467.

2-[[((2’E,4’E)-7’-((1’’S,2’’R,4’’S)-4’’-Acetoxy-1’’-2’’-Epoxy-2’’,6’’,6’’-trimethylcyclohexylidene-1’’-yl)-5’’-methylhepta-2,4-diene-6-yn)sulfonyl]benzothiazole (6). To a solution of the thioether 19 (133 mg, 0.28 mmol) in ethanol (3 mL) was added dropwise a solution of ammonium heptamolybdate tetrahydrate (527 mg, 0.43 mmol) in hydrogen peroxide (30 wt.% in water, 1.4 mL) at 0 °C. After being stirred for 30 min at room temperature, the reaction mixture was poured into water and then extracted with diethyl ether. The organic layers were combined, dried over MgSO\textsubscript{4}, filtered and concentrated in vacuo. Purification by short silica gel column chromatography afforded the sulfone 6 (from 10% to 20% ethyl acetate in hexane) (79 mg, 58%): [α]\textsuperscript{24}\textsubscript{D} +9.6 (c 0.29, CHCl\textsubscript{3}); IR (neat, cm\textsuperscript{-1}) 2967, 2928, 1736, 1472, 1368, 1333, 1244, 1150, 1028; ^1^H NMR (CDCl\textsubscript{3}, 400 MHz) δ 8.23 (m, 1H), 8.02 (m, 1H), 7.64 (m, 2H), 6.46 (dd, \(J = 14.9, 11.5\) Hz, 1H), 6.31 (d, \(J = 11.4\) Hz, 1H), 5.69 (m, 1H), 4.87 (m, 1H), 4.31 (d, \(J = 7.8\) Hz, 2H), 2.37 (dd, \(J = 15.1, 5.7\) Hz, 1H), 2.01 (s, 3H), 1.78 (dd, \(J = 15.1, 6.4\) Hz, 1H), 1.72 (s, 3H), 1.60 (m, 1H), 1.47 (s, 3H), 1.37 (dd, \(J = 13.7, 8.4\) Hz, 1H), 1.23 (s, 3H), 1.13 (s, 3H); ^13^C NMR (CDCl\textsubscript{3}, 100 MHz) δ 170.3, 165.4, 152.6, 135.7, 134.0, 128.1, 127.7, 125.4, 122.4, 121.5, 117.7, 88.7, 87.3, 67.1, 65.7, 63.8, 58.7, 39.9, 35.8, 34.1, 28.6, 26.2, 21.9, 21.4, 17.5, -0.02; ESI-HRMS m/z calcd for C\textsubscript{26}H\textsubscript{29}NO\textsubscript{3}S\textsubscript{2}Na (M+Na)^+ 522.1385, found 522.1381.

**Peridinin Derivative B (2).** To a solution of acetylene segment 6 (22 mg, 0.044 mmol) and ylidenbutenolide segment 5 (15 mg, 0.044 mmol) in THF (0.87 mL) was added dropwise sodium bis(trimethylsilyl)amide (1.0 M in THF, 0.12 mL, 0.12 mmol) at -78 °C in the dark. After being stirred for 5 min at the same temperature, the reaction
mixture was poured into water and then extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by short silica gel column chromatography (from 30% to 50% ethyl acetate in hexane) in the dark afforded peridinin derivative 2 (5 mg, 18%) as a mixture of the isomers as a red film. A solution of a mixture of all-trans-peridinin derivative 2 and its cis-isomer in benzene was left at room temperature in the fluorescence light. After 11 days, partial separation by preparative HPLC [column: Develosil CN-UG (0.6 x 25 cm); mobile phase: acetone / n-hexane = 1 / 10; flow rate: 2.0 mL / min.; UVdetect: 438 nm; retention time: (all-trans-isomer) 51 min., (9Z, 13E-isomer) 58 min.] in the dark, and HPLC [column: YMC Carotenoid C30 (10 x 250 mm); reverse phase: acetonitrile / methanol / water = 50 / 48 / 2; flow rate: 2.0 mL / min.; UVdetect: 438 nm; retention time: (all-trans-isomer) 22 min.] in the dark, was afforded the desired optically active peridinin derivative 2 as a red film: IR (neat, cm⁻¹) 3455, 2924, 2853, 2367, 1701, 1655, 1561, 1419, 1379, 1259, 1121, 1041; ¹H NMR (C₆D₆, 750 MHz) δ 7.57 (d, J = 15.5 Hz, 1H), 6.61 (d, J = 11.7 Hz, 1H), 6.56 (d, J =15.5 Hz, 1H), 6.42 (dd, J =13.9, 12.3 Hz, 1H), 6.38 (dd, J =14.3, 12.1 Hz, 1H), 6.30 (d, J =11.8 Hz, 1H), 6.26 (dd, J =14.2, 11.5 Hz, 1H), 6.15 (s, 1H), 6.13 (dd, J =14.2, 11.7 Hz, 1H), 5.18 (s, 1H), 3.75 (m, 1H), 2.25 (dd, J = 14.8, 3.5 Hz, 1H), 2.20 (ddd, J = 14.5, 4.2, 1.0 Hz, 1H), 2.11 (s, 3H), 1.79 (s, 3H), 1.68 (s, 3H), 1.62 (m, 1H), 1.46 (s, 3H), 1.41 (m, 2H), 1.35 (m, 1H), 1.34 (s, 3H), 1.31 (s, 3H), 1.13 (s, 3H), 1.09 (s, 3H), 1.08 (s, 3H), 1.06 (m, 1H); ¹³C NMR (C₆D₆, 188 MHz) δ 169.3, 168.3, 147.7, 137.3,136.8, 136.4, 136.3, 135.1, 135.0, 134.9, 130.9, 130.0, 125.4, 122.3, 119.5, 118.2, 90.1, 89.1, 70.5, 67.4, 67.2, 65.6, 64.1, 63.9, 47.3, 41.1, 40.4, 36.2, 35.3, 34.4, 29.5, 29.0, 26.6, 25.3, 22.1, 20.9, 19.9, 17.7, 15.6; ESI-HRMS m/z calcd for C₃₉H₄₈O₇Na (M+Na)+ 651.3298, found 651.3276.

(trans)-2-[(1'S,2'R,4'S)-4'-Acetoxy-1’,2’-Epoxy-2’,6’,6’-trimethylcyclohexyl]-1-(tributylstannyl)ethylene. To a solution of acetylene 15 (649 mg, 2.92 mmol), tetrakis(triphenylphosphine)palladium (169 mg, 0.15 mmol) in THF (29 mL) was added dropwise tributyltin hydride (1.55 mL, 5.84 mmol) at -78 °C. After being stirred for 15 min at room temperature and the reaction mixture was filtered through a pad of silica gel to give the crude products as a solution, which was concentrated in vacuo. Purification by silica gel column chromatography afforded 20 (1.31 g, 87%): [α]₂₃₀D -
(trans)-2-[(1S,2R,4S)-4-Acetoxy-1,2-Epoxy-2,6,6-trimethylcyclohexyl]-1-iodoethylene (21). To a solution of iodine (445 mg, 1.75 mmol), Na₂CO₃ (372 mg, 3.51 mmol) in dichloromethane (7 mL) was added dropwise a solution of 20 (450 mg, 0.88 mmol) in dichloromethane (2 mL) at 0 °C. After stirred for 5 min at 0 °C, the mixture was poured into a saturated aqueous Na₂S₂O₃ solution and then extracted with Chloroform. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography afforded iodide 21 (273 mg, 89%): [α]₂³⁰ D −68.0 (c 1.01, CHCl₃); IR (neat, cm⁻¹) 2965, 2932, 1736, 1603, 1468, 1365, 1242, 1032; ¹H NMR (CDCl₃, 400 MHz) δ 6.77 (d, J =14.2 Hz, 1H), 6.28 (d, J =14.2 Hz, 1H), 4.89 (m, 1H), 2.37 (dd, J =14.9, 5.5 Hz, 1H), 2.01 (s, 3H), 1.76 (dd, J =15.1, 6.8 Hz, 1H), 1.63 (dd, J =13.5, 3.4 Hz, 1H), 1.35 (dd, J =13.5, 8.9 Hz, 1H), 1.22 (s, 3H), 1.15 (s, 3H), 0.99 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.3, 141.3, 79.8, 72.5, 67.3, 65.1, 41.3, 36.6, 34.3, 28.4, 25.4, 21.5, 20.2; ESI-HRMS m/z calcd for C₁₃H₁₉IO₃Na (M+Na)⁺ 373.0277, found 373.0277.

Ethyl (2E,4E)-5-(tributylstannyl)hexa-2,4-dienate (22a). A mixture of 22 (1.0 g, 2.77 mmol) and manganese dioxide (16.6 g) in THF (17 mL) was stirred at room temperature for 6 h. The precipitate was filtered through a pad of Celite, and the filtrate was concentrated in vacuo to afford crude aldehyde, which was used in the next reaction without further purification.

To a solution of triethyl phosphonoacetate (0.72 mL, 3.6 mmol) in THF (13 mL) was added sodium hydride (133 mg, 3.32 mmol) at 0 °C and the mixture was stirred for 10 min. To this mixture was added a solution of the crude aldehyde in THF
(3 mL) at 0 °C. After being stirred for 5 min at room temperature, the reaction mixture was poured into water and then extracted with ethyl acetate. The organic layers were combined, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography afforded ethyl ester 22a (936 mg, 79% for 2 steps): IR (neat, cm⁻¹) 2961, 2928, 2870, 2852, 1716, 1620, 1462, 1419, 1367, 1340, 1304, 1265, 1234, 1180, 1132, 1095, 1076, 1043; ¹H NMR (CDCl₃, 400 MHz) δ 7.67 (dd, J = 15.3, 11.2 Hz, 1H), 6.34 (d, J = 11.3 Hz, 1H), 5.79 (d, J = 15.1 Hz, 1H), 4.21 (q, J = 7.1 Hz, 2H), 2.13 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 167.8, 157.9, 137.6, 136.5, 119.9, 60.1, 29.0, 27.3, 20.6, 14.3, 13.6, 9.2; ESI-HRMS m/z calcd for C₂₀H₃₈O₂SnNa (M+Na)+ 453.1795, found 453.1777.

(2E,4E)-5-(Tributylstannyl)hexa-2,4-dien-1-ol (23). To a suspension of lithium aluminum hydride (36 mg, 0.95 mmol) in THF (6 mL) was added dropwise a solution of 22a (338 mg, 0.79 mmol) in THF (2 mL) at 0 °C. After being stirred for 10 min at the same temperature, Rochelle salt was carefully added. The reaction mixture was stirred for 30 min at room temperature and then extracted with ethyl acetate. The organic layers were combined, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography afforded 23 (223 mg, 73%): IR (neat, cm⁻¹) 3327, 2957, 2920, 2852, 1460, 1417, 1375, 1340, 1292, 1089, 1005; ¹H NMR (CDCl₃, 400 MHz) δ 6.64 (dd, J = 15.1, 10.5 Hz, 1H), 6.19 (d, J = 10.5 Hz, 1H), 5.78 (dt, J = 14.8, 5.9 Hz, 1H), 4.22 (t, J = 5.8 Hz, 2H), 2.00 (s, 3H), 1.49 (m, 6H), 1.30 (m, 6H), 0.89 (m, 15H); ¹³C NMR (CDCl₃, 100 MHz) δ 145.2, 138.0, 130.9, 126.3, 63.7, 29.2, 27.5, 19.9, 13.8, 9.2.

(2E,4E,6E)-7-[(1’S,2’R,4’S)-4’-Acetoxy-1’,2’-Epoxy-2’,6’,6’-trimethylcyclohexa-1’-yl]-5-methylhepta-2,4,6-triene-1-ol (24). To a solution of iodide 21 (560 mg, 1.6 mmol) and (2E,4E)-5-(tributyl stannyl)hexa-2,4-dien-1-ol 23 (915 mg, 2.40 mmol) in DMF (8 mL) was added bis(acetonitrile)dichloropalladium(II) (21 mg, 0.05 mmol) and lithium chloride (136 mg, 3.20 mmol). After being stirred for 10 min at 55 °C, the reaction mixture was poured into water and then extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography afforded coupling product 24 (482 mg, 94%) as a yellow oil: [α]D²³₀ −41.6 (c 1.02, CHCl₃); IR
(neat, cm⁻¹) 3443, 2964, 2928, 1736, 1450, 1365, 1244, 1030; ¹H NMR (CDCl₃, 400 MHz) δ 6.60 (dd, J = 14.2, 10.3 Hz, 1H), 6.27 (d, J = 15.8 Hz, 1H), 6.10 (d, J = 11.2 Hz, 1H), 5.88 (d, J = 15.8 Hz, 1H), 5.86 (m, 1H), 4.93 (m, 1H), 4.24 (m, 2H), 2.40 (dd, J = 15.1, 5.8 Hz, 1H), 2.01 (s, 3H), 1.88 (s, 3H), 1.77 (dd, J = 14.8, 6.8 Hz, 1H), 1.66 (dd, J = 13.2, 3.4 Hz, 1H), 1.34 (m, 1H), 1.18 (s, 3H), 1.15 (s, 3H), 0.96 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.3, 137.4, 134.5, 132.8, 130.4, 127.5, 123.7, 70.3, 67.7, 65.5, 63.5, 41.4, 36.8, 34.7, 28.6, 25.5, 21.4, 20.2, 12.8; ESI-HRMS m/z calcd for C₁₉H₂₈O₄Na (M+Na)+ 343.1885, found 343.1883.

2-[(2′E,4′E,6′E)-7’-((1’S,2′R,4′S)-4’’-Acetoxy-1’’’,2’’’-Epoxy-2’’’,6’’,6’’’-trimethylcyclohexylidene-1’’’-yl)-5’-methylhepta-2,4,6-triene)sulfanyl] benzothiazole (25). To a solution of 24 (330 mg, 1.03 mmol), 2-mercaptobenzothiazole (241 mg, 1.44 mmol) and triphenylphosphine (378 mg, 1.44 mmol) in THF (10 mL) was added dropwise diisopropyl azodicarboxylate (0.32 mL, 1.65 mmol) at 0 °C. The reaction mixture was stirred for 10 min at room temperature and the all solvents were removed in vacuo. To a residue was added diethyl ether and the precipitate was removed by filtration through a pad of Celite to give the crude products as a solution, which was concentrated in vacuo. Purification by short silica gel column chromatography afforded the thioether 25 (444 mg, 92%): [α]₂³⁺₀°⁻²⁵.₆ (c 1.08, CHCl₃); IR (neat, cm⁻¹) 2964, 2926, 1734, 1460, 1427, 1365, 1242, 1028; ¹H NMR (CDCl₃, 400 MHz) δ 7.87 (m, 1H), 7.75 (m, 1H), 7.40 (m, 1H), 7.28 (m, 1H), 6.71 (d, J = 14.7, 11.3 Hz, 1H), 6.24 (d, J = 15.5 Hz, 1H), 6.07 (d, J = 11.4 Hz, 1H), 5.88 (d, J = 15.5 Hz, 1H), 5.86 (m, 1H), 4.93 (m, 1H), 4.11 (d, J = 7.5 Hz, 2H), 2.38 (dd, J = 15.8, 5.7 Hz, 1H), 2.01 (s, 3H), 1.87 (s, 3H), 1.76 (dd, J = 14.8, 6.8 Hz, 1H), 1.65 (dd, J = 13.2, 3.4 Hz, 1H), 1.33 (m, 1H), 1.16 (s, 3H), 1.14 (s, 3H), 0.96 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.3, 166.1, 153.2, 137.2, 135.3, 134.9, 130.9, 129.9, 127.4, 125.9, 124.2, 124.1, 121.5, 120.9, 70.3, 67.6, 65.5, 41.4, 36.7, 36.1, 34.7, 28.5, 25.5, 21.4, 20.2, 12.8; ESI-HRMS m/z calcd for C₂₆H₃₁NO₃S₂Na (M+Na)+ 492.1643, found 492.1640.

2-[(2′E,4′E,6′E)-7’-((1’S,2′R,4′S)-4’’-Acetoxy-1’’’,2’’’-Epoxy-2’’’,6’’,6’’’-trimethylcyclohexylidene-1’’’-yl)-5’-methylhepta-2,4,6-triene)sulfonyl] benzothiazole (7). To a solution of the thioether 25 (30 mg, 0.064 mmol) in ethanol (0.64 mL) was added dropwise a solution of sodium tungstate (VI) dihydrate (42 mg,
0.128 mmol) in hydrogen peroxide (30 wt.% in water, 0.51 mL) at 0 °C. After being stirred for 50 min at room temperature, the reaction mixture was poured into water and then extracted with diethyl ether. The organic layers were combined, dried over MgSO₄, filtered and concentrated in vacuo. Purification by short silica gel column chromatography afforded the sulfone 7 (18 mg, 56%) as a yellow solid: [α]₂⁴₀,D –22.5 (c 0.79, CHCl₃); IR (neat, cm⁻¹) 3471, 2930, 2865, 1736, 1637, 1473, 1381, 1334, 1240, 1147, 1116, 976, 763; ¹H NMR (CDCl₃, 400 MHz) δ 8.22 (d, J =7.8 Hz, 1H), 8.01 (d, J =8.7 Hz, 1H), 7.65 (m, 2H), 6.59 (dd, J =14.7, 11.0 Hz, 1H), 6.20 (d, J =15.6, 1H), 6.02 (d, J =15.6 Hz, 1H), 5.90 (d, J =15.6 Hz, 1H), 5.64 (dt, J =15.1, 7.8 Hz, 1H), 4.91 (m, 1H), 4.31 (d, J =7.8 Hz, 1H), 2.36 (dd, J =15.1, 5.7, 1H), 2.00 (s, 3H), 1.78 (dd, J =15.2, 6.5 Hz, 1H), 1.71 (s, 3H), 1.63 (m, 1H), 1.37 (dd, J =13.7, 8.5 Hz, 1H), 1.13 (s, 3H), 1.12 (s, 3H), 0.95 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.7, 165.9, 153.0, 137.5, 137.2, 129.5, 128.3, 128.0, 125.8, 125.7, 122.7, 116.5, 70.5, 67.9, 65.9, 59.3, 41.7, 37.1, 35.0, 28.9, 25.8, 21.7, 20.5, 13.1; ESI-HRMS m/z calcd for 26H₃₁NO₅S₂Na (M+Na)⁺ 524.1541, found 524.1524.

Peridinin Derivative C (3). To a solution of olefin segment 7 (22 mg, 0.044 mmol) and ylidenbutenolide segment 5 (15 mg, 0.044 mmol) in THF (0.65 mL) was added dropwise sodium bis(trimethylsilyl)amide (1.0M in THF, 0.13 mL, 0.13 mmol) at -78 °C in the dark. After being stirred for 5 min at the same temperature, the reaction mixture was poured into water and then extracted with diethyl ether. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by short silica gel column chromatography (from 30% to 50% ethyl acetate in hexane) in the dark afforded peridinin derivative 2 (11 mg, 40%) as a mixture of the isomers as a red film. A solution of a mixture of all-trans-peridinin derivative 2 and its cis-isomer in benzene was left at room temperature in the fluorescence light. After 2 days, partial separation by preparative HPLC [column: Develosil CN-UG (0.6 x 25 cm); mobile phase: acetone / n-hexane = 1 / 10; flow rate: 2.0 mL / min.; UVdetect: 450 nm; retention time: (all-trans-isomer) 49 min., (15-cis-isomer) 43 min.] in the dark, and HPLC [column: YMC Carotenoid C30 (10 x 250 mm); reverse phase: acetonitrile / methanol / water = 87 / 10 / 3; flow rate: 2.0 mL / min.; UVdetect: 450 nm; retention time: (all-trans-isomer) 30 min., (15-cis-isomer) 24 min.] in the dark, afforded the desired optically active peridinin derivative 2 as a red film: IR (neat, cm⁻¹) 3327, 2924,
1741, 1712, 1462, 1377, 1259, 1153, 1028; 1^H NMR (C\textsubscript{6}D\textsubscript{6}, 750 MHz) \(\delta\) 7.57 (d, \(J = 15.5\) Hz, 1H), 6.68 (d, \(J = 15.4\) Hz, 1H), 6.62 (dd, \(J = 14.0, 12.3\) Hz, 1H), 6.56 (d, \(J = 15.5\) Hz, 1H), 6.45 (dd, \(J = 14.1, 11.9\) Hz, 1H), 6.38 (dd, \(J = 14.3, 11.2\) Hz, 1H), 6.33 (d, \(J = 11.7\) Hz, 1H), 6.26 (dd, \(J = 14.2, 11.3\) Hz, 1H), 6.17 (d, \(J = 11.7\) Hz, 1H), 6.15 (s, 1H), 5.92 (d, \(J = 15.5\) Hz, 1H), 5.20 (s, 1H), 5.19 (m, 1H), 3.86 (m, 1H), 2.35 (dd, \(J = 14.7, 5.3\) Hz, 1H), 2.19 (dd, \(J = 14.7, 5.1, 1.1\) Hz, 1H), 2.13 (s, 3H), 1.79 (s, 3H), 1.72 (s, 3H), 1.71 (m, 1H), 1.62 (dd, \(J = 14.8, 7.2\) Hz, 1H), 1.42 (m, 2H), 1.35 (m, 1H), 1.13 (s, 3H), 1.12 (s, 3H), 1.09 (s, 3H), 1.09 (s, 3H), 1.08 (s, 3H), 1.05 (s, 3H), 1.05 (m, 1H); 13^C NMR (C\textsubscript{6}D\textsubscript{6}, 188 MHz) \(\delta\) 169.3, 168.3, 147.5, 138.1, 137.7, 137.1, 136.4, 135.8, 134.7, 134.6, 134.4, 132.5, 131.4, 129.9, 125.1, 125.0, 122.4, 118.5, 70.5, 70.3, 67.7, 67.5, 65.8, 63.9, 49.3, 42.2, 41.2, 37.3, 35.3, 35.1, 29.5, 28.8, 25.7, 25.3, 21.0, 19.9, 15.6, 12.9; ESI-HRMS m/z calcd for C\textsubscript{39}H\textsubscript{48}O\textsubscript{7}Na (M+Na)+ 651.3298, found 651.3276.

**(4S)-4-hydroxy-2,6,6-trimethylcyclohex-1-enyltrifluoromethanesulfonate (10a).**

To a solution of 10 (200 mg, 0.50 mmol) in THF (2.47 mL) was added tetra-n-butylammonium fluoride (1.0M in THF, 1.49 mL, 1.49 mmol) at room temperature. After being stirred for 45 min at the same temperature, the reaction mixture was poured into a saturated aqueous NH\textsubscript{4}Cl solution and then extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO\textsubscript{4}, filtered and concentrated in vacuo. Purification by silica gel column chromatography (from 10% to 50% ethyl acetate in hexane) afforded alcohol 10a (112 mg, 78%) as a colorless oil: [\(\alpha\)\textsuperscript{23.0}\textsubscript{D} -25.4 (c 0.99, CHCl\textsubscript{3}); IR (neat, cm\textsuperscript{-1}) 3359, 2932, 2361, 1686, 1404, 1210, 1067, 913; 1^H NMR (CDCl\textsubscript{3}, 400 MHz) \(\delta\) 4.11 (m, 1H), 2.50 (ddd, \(J = 17.0, 5.5, 1.9\) Hz, 1H), 2.18 (ddd, \(J = 16.5, 9.2, 0.9\) Hz, 1H), 1.86 (ddd, \(J = 12.4, 3.7, 0.3\) Hz, 1H), 1.77 (s, 3H), 1.68 (dd, \(J = 11.9, 11.9\) Hz, 1H), 1.22 (s, 3H), 1.17 (s, 3H); 13^C NMR (CDCl\textsubscript{3}, 100 MHz) \(\delta\) 149.3, 123.9, 64.1, 49.0, 41.3, 37.1, 27.7, 27.0, 17.9; FAB-HRMS m/z calcd for C\textsubscript{39}H\textsubscript{48}O\textsubscript{7}Na (M+H)+ 288.0716, found 289.0759.

**(trans)-2-[(4S)-4-hydroxy-2,6,6-trimethylcyclohexene]-1-(tributylstannyl)ethylene (27).**

To a solution of alcohol 10a (388 mg, 1.17 mmol) and bisstannane 26 (855 mg, 1.41 mmol) in DMF (5.86 mL) was added diisopropylethylamine (0.61 mL, 3.52 mmol), tetrakis(triphenylphosphine)palladium (67 mg, 0.059 mmol), and lithium chloride (99 mg, 2.34 mmol) After being stirred for 1
h at 90 °C, the reaction mixture was poured into water and then extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography (from 0% to 30% ethyl acetate 3% triethylamine in hexane) afforded 27 (451 mg, 85%) as a colorless oil: [α]²³⁰ₒD -72.0 (c 0.84, CHCl₃); IR (neat, cm⁻¹) 3360, 2924, 2855, 2361, 1579, 1464, 1174, 1045, 691; ¹H NMR (CDCl₃, 400 MHz) δ 6.30 (d, J = 19.6 Hz, 1H), 5.90 (d, J = 19.2 Hz, 1H), 3.98 (m, 1H), 2.35 (dd, J = 16.5, 5.5 Hz, 1H), 2.00 (dd, J = 16.1, 9.5 Hz, 1H), 1.75 (dd, J = 19.0, 3.6, 2.3 Hz, 1H), 1.70 (s, 3H), 16.0-1.47 (m, 6H), 1.45 (dd, J = 12.3 Hz, 1H), 1.06 (s, 3H), 1.04 (s, 3H), 0.90 (m, 15H); ¹³C NMR (CDCl₃, 100 MHz) δ 145.4, 141.5, 133.9, 124.9, 48.6, 42.5, 36.9, 30.4, 29.6, 28.8, 27.6, 21.7, 14.1, 9.9.

(trans)-2-[(4S)-4-hydroxy-2,6,6-trimethylcyclohexene]-1-iodoethylene (28). To a solution of iodide (728 mg, 2.87 mmol), Na₂CO₃ (608 mg, 5.74 mmol) in dichloromethane (11.4 mL) was added dropwise a solution of stannane 27 (654 mg, 1.44 mmol) in dichloromethane (3 mL) at 0°C. After stirred for 5 min at 0 °C, the mixture was poured into a saturated aqueous Na₂S₂O₃ solution and then extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography (from 5% to 30% ethyl acetate in hexane) afforded iodide 28 (379 mg, 94%) as a colorless oil: [α]²³⁰ₒD -115.0 (c 0.64, CHCl₃); IR (neat, cm⁻¹) 3301, 2955, 1590, 1466, 1364, 1166, 1047, 945, 781; ¹H NMR (CDCl₃, 400 MHz) δ 6.89 (d, J = 14.6 Hz, 1H), 5.96 (d, J = 14.6 Hz, 1H), 3.95 (m, 1H), 2.33 (dd, J = 17.0, 5.5 Hz, 1H), 1.94 (dd, J = 17.0, 9.6, 1.4 Hz, 1H), 1.73 (dd, J = 12.4, 3.7, 1.4 Hz, 1H), 1.66 (s, 3H), 1.42 (dd, J = 11.9, 11.9 Hz, 1H), 1.02 (s, 6H); ¹³C NMR (CDCl₃, 100 MHz) δ 143.5, 139.0, 128.2, 79.5, 65.1, 48.2, 42.4, 36.8, 30.2, 28.7, 21.7; FAB-HRMS m/z calcd for C₁₁H₁₇IO₇ (M+H)+ 293.0397, found 293.0423.

(trans)-2-[(4S)-4-Acetoxy-2,6,6-trimethylcyclohexene]-1-iodoethylene (29). To a solution of iodide 28 (379 mg, 1.30 mmol) in pyridine (5.19 mL) was added acetic anhydride (0.24 mL, 2.59 mmol) at room temperature, and the reaction mixture was stirred for 16 h at the same temperature. A saturated aqueous CuSO₄ solution was added and then the resulting mixture was extracted with ethyl acetate. The organic layers were
combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography (30% ethyl acetate in hexane) afforded acetate 29 (374 mg, 86%) as a colorless oil: [α]²⁵°D = -99.8 (c 1.10, CHCl₃); IR (neat, cm⁻¹) 2963, 2867, 1740, 1588, 1466, 1242, 1117, 1035, 968; NMR (CDCl₃, 400 MHz) δ 6.91 (d, J = 14.6 Hz, 1H), 6.00 (d, J = 15.1Hz, 1H), 5.02 (m, 1H), 2.39 (dd, J = 16.9, 5.4 Hz, 1H), 2.04 (s, 3H), 2.01 (m, 1H), 1.76 (ddd, J = 11.9, 3.2, 1.8 Hz, 1H), 1.67 (s, 3H), 1.55 (dd, J = 11.5, 11.5 Hz, 1H), 1.07 (s, 3H), 1.04 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 171.1, 143.3, 139.2, 127.8, 79.8, 68.3, 43.9, 38.4, 36.4, 30.0, 28.5, 21.8, 21.6; FAB-HRMS m/z calcd for C₃₉H₅₁O₇ (M+H)+ 335.0502, found 335.0541.

**2-[((2E,4E,6E)-7-[(4'S)-4'-Acetoxy-2',6',6'-trimethylcyclohexene]-5'-methylhepta-2,4,6-triene-1-ol (30).** To a solution of acetate 29 (194 mg, 0.58 mmol) and (2E,4E)-5-(tributylstannyl)hexa-2,4-dien-1-ol 23 (247 mg, 0.64 mmol) in DMF (2.9 mL) was added diisopropylethylamine (0.30 mL, 1.74 mmol), bis(acetonitrile)dichloropalladium(II) (7 mg, 0.03 mmol) and lithium chloride (49 mg, 1.16 mmol). After being stirred for 50 min at room temperature, the reaction mixture was poured into water and then extracted with ethyl acetate. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated in vacuo. Purification by silica gel column chromatography (from 10% to 30% ethyl acetate in hexane) afforded 30 (151 mg, 85%) as a yellow oil: [α]²³°D = -91.0 (c 1.33, CHCl₃); IR (neat, cm⁻¹) 3414, 2961, 2924, 1736, 1366, 1244, 1030; ¹H NMR (CDCl₃, 400 MHz) δ 6.63 (dd, J = 15.1, 11.2 Hz, 1H), 6.13-5.96 (m, 3H), 5.88 (td, J = 12.1, 5.9 Hz, 1H), 5.06 (m, 1H), 4.24 (m, 1H), 2.44 (dd, J = 17.0, 5.72 Hz, 1H), 2.06 (m, 1H), 2.05 (s, 3H), 1.92 (s, 3H), 1.77 (ddd, J = 12.2, 3.4, 1.8 Hz, 1H), 1.71 (s, 3H), 1.56 (m, 1H), 1.10 (s, 3H), 1.06 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.8, 138.3, 137.3, 135.9, 132.0, 129.3, 127.9, 125.8, 125.6, 68.4, 63.7, 43.9, 38.4, 36.6, 29.9, 28.4, 21.5, 21.4, 12.6; ESI-HRMS m/z calcd for C₁₉H₂₈O₃Na (M+Na)+ 327.1936, found 327.1940.

2-[((2E,4E,6E)-7-[(4'S)-4''-Acetoxy-1''',2'''-Epoxy-2'',6'',6'''-trimethylcyclohexene]-5''-methylhepta-2,4,6-triene)sulfanyl) benzothiazole (30a). To a solution of alcohol 30 (110 mg, 0.29 mmol), 2-mercaptobenzothiazole (68 mg, 0.41 mmol) and triphenylphosphine (107 mg, 0.41 mmol) in THF (3 mL) was added dropwise diisopropyl azodicarboxylate (0.09 mL, 0.47 mmol) at 0 °C. The reaction
mixture was stirred for 10 min at room temperature and the all solvents were removed in vacuo. To a residue was added diethyl ether and the precipitate was removed by filtration through a pad of Celite to give the crude products as a solution, which was concentrated in vacuo. Purification by short silica gel column chromatography (from 10% to 30% ethyl acetate in hexane) afforded thioether 30a (111 mg, 84%): [α]_{D}^{23.0} - 64.1 (c 0.93, CHCl₃); IR (neat, cm⁻¹) 2963, 2926, 1734, 1460, 1427, 1363, 1244, 1030; ¹H NMR (CDCl₃, 400 MHz) δ 7.87 (m, 1H), 7.75 (m, 1H), 7.41 (m, 1H), 7.27 (m, 1H), 6.74 (dd, J = 14.6, 11.2 Hz, 1H), 6.09-6.04 (m, 2H), 6.02 (d, J = 10.0 Hz, 1H), 5.88 (m, 1H), 5.04 (m, 1H), 4.11 (d, J = 7.6 Hz, 2H), 2.43 (dd, J = 17.0Hz, 5.5 Hz, 1H), 2.08 (dd, J = 17.0, 9.4 Hz, 1H), 2.04 (s, 3H), 1.91 (s, 3H), 1.73 (m, 1H), 1.69 (s, 3H), 1.56 (m, 1H), 1.08 (s, 3H), 1.05 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 170.7, 166.2, 153.2, 138.2, 137.6, 136.3, 135.3, 131.2, 128.9, 126.7, 126.1, 125.9, 125.6, 124.2, 121.5, 120.9, 68.2, 43.9, 38.3, 36.6, 36.2, 29.9, 28.4, 21.4, 21.4, 12.56; ESI-HRMS m/z calcd for C₂₆H₃₁NO₂S₂Na (M+Na)+ 476.1694, found 476.1694.

2-[(2',4',E,6'-E)-7'-(4''S)-4''-Acetoxy-2'',6'',6''-trimethylcyclohexene)-5'-methylhepta-2,4,6-triene)sulfonyl] benzothiazole (8). To a solution of the thioether 30a (205 mg, 0.45 mmol) in ethanol (9.0 mL) was added dropwise a solution of sodium tungstate (VI) dihydrate (164 mg, 0.50 mmol) in hydrogen peroxide (30 wt.% in water, 5.42 mL) at 0 °C. After being stirred for 50 min at room temperature, the reaction mixture was poured into water and then extracted with diethyl ether. The organic layers were combined, dried over MgSO₄, filtered and concentrated in vacuo. Purification by short silica gel column chromatography (from 10% to 30% ethyl acetate in hexane) afforded the sulfone 8 (68 mg, 31%): [α]_{D}^{23.0} -43.5 (c 1.50, CHCl₃); IR (neat, cm⁻¹) 2963, 1728, 1630, 1471, 1364, 1330, 1244, 1148, 1026, 970; ¹H NMR (CDCl₃, 400 MHz) δ 8.24 (m, 1H), 7.99 (m, 1H), 7.63 (m, 2H), 6.60 (dd, J = 14.9, 11.3 Hz, 1H), 6.10 (d, J = 16.2 Hz, 1H), 5.99 (d, J = 16.3 Hz, 1H), 5.98 (d, J = 11.4 Hz, 1H), 5.62 (m, 1H), 5.04 (m, 1H), 4.33 (d, J = 7.4 Hz, 2H), 2.37 (m, 1H), 2.09 (m, 1H), 2.04 (s, 3H), 1.80-1.65 (m, 1H), 1.74 (s, 3H), 1.60-1.50 (m, 1H), 1.43 (s, 3H), 0.97 (s, 3H), 0.88 (s, 3H); ¹³C NMR (CDCl₃, 100 MHz) δ 171.5, 166.3, 153.3, 139.2, 138.5, 137.8, 137.6, 133.9, 129.5, 128.6, 128.3, 128.2, 127.6, 126.1, 123.0, 116.1, 69.2, 59.8, 44.7, 38.7, 37.8, 29.5, 28.9, 22.12, 20.8, 13.2; ESI-HRMS m/z calcd for C₂₆H₃₃NO₄S₂Na (M+Na)+ 508.1592, found 508.1547.
**Peridinin derivative D (4).** To a solution of sulfone 8 (22 mg, 0.045 mmol) and aldehyde 5 (16 mg, 0.045 mmol) in THF (0.68 mL) was added dropwise sodium bis(trimethylsilyl)amide (1.0M in THF, 0.14 mL, 0.14 mmol) at -78 °C in the dark. After being stirred for 5 min at the same temperature, the reaction mixture was poured into water and then extracted with diethyl ether. The organic layers were combined, washed with brine, dried over MgSO₄, filtered and concentrated *in vacuo*. Purification by short silica gel column chromatography (from 30% to 50% ethyl acetate in hexane) in the dark afforded peridinin derivative (13 mg, 47%) as a mixture of the isomers as a red film. A solution of a mixture of all-trans-peridinin derivative 4 and its isomer in benzene was left at room temperature in the fluorescence light. After 4 days, partial separation by preparative HPLC [column: Develosil CN-UG (0.6 x 25 cm); mobile phase: acetone / n-hexane = 1 / 10; flow rate: 2 mL / min.; UVdetect: 459 nm; retention time: (all-trans-isomer) 68 min., (15-cis-isomer) 61 min.] in the dark, and HPLC [column: YMC Carotenoid C30 (10 x 250 mm); reverse phase: acetonitrile / methanol / water = 87 / 10 / 3; flow rate: 2.0 mL / min.; UVdetect: 459 nm; retention time: (all-trans-isomer) 34 min.] in the dark, afforded the desired optically active peridinin derivative 4 as a red film: IR (neat, cm⁻¹) 3449, 2924, 2853, 2363, 1751, 1655, 1509, 1364, 1242, 1124, 1034; ¹H NMR (C₆D₆, 750 MHz) δ 7.57 (d, J = 15.5 Hz, 1H), 6.68 (dd, J = 13.7, 12.3 Hz, 1H), 6.57 (d, J = 15.5 Hz, 1H), 6.49 (dd, J = 14.1, 12.0 Hz, 1H), 6.42 (dd, J = 14.1, 12.0 Hz, 1H), 6.36 (d, J = 11.4 Hz, 1H), 6.34 (dd, J = 14.1, 11.0 Hz, 1H), 6.27 (d, J = 15.8 Hz, 1H), 6.26 (d, J = 11.4 Hz, 1H), 6.19 (d, J = 16.1 Hz, 1H), 6.17 (s, 1H), 5.29 (m, 1H), 5.22 (s, 1H), 3.76 (m, 1H), 2.46 (dd, J = 17.1, 5.9 Hz, 1H), 2.20 (dd, J = 14.2, 4.8, 1.0 Hz, 1H), 2.15 (s, 3H), 2.13 (m, 1H), 1.87 (m, 1H), 1.84 (s, 3H), 1.68 (s, 3H), 1.64 (dd, J = 11.9, 11.9 Hz, 1H), 1.42 (m, 2H), 1.13 (s, 3H), 1.13 (s, 3H), 1.09 (s, 3H), 1.08 (s, 3H), 1.07 (s, 3H), 1.06 (m, 1.16); ¹³C NMR (C₆D₆, 188 MHz) δ 169.8, 168.3, 147.4, 139.0, 138.1, 137.7, 137.2, 136.3, 134.6, 134.3, 134.1, 131.6, 129.6, 126.7, 126.4, 125.1, 122.4, 118.5, 70.4, 68.1, 67.4, 63.8, 47.3, 44.4, 41.2, 38.8, 36.8, 35.3, 30.1, 29.5, 28.6, 25.3, 21.5, 21.0, 19.9, 15.6, 12.7; ESI-HRMS m/z calcd for C₃₀H₃₀O₆Na(M+Na)⁺ 637.3505, found 637.3517.
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T_r_presat = FALSE
Initial_wait = 1[s]
Recvr_gain = 24
Relaxation_delay = 5[s]
Repetition_time = 9.36731904[s]
Temp_get = 22.4[dC]

Irr_domain = 1H
Irr_freq = 399.78219838[MHz]
Irr_offset = 5[ppm]
T_r_mode = Off
Dante_presat = FALSE
Initial_wait = 1[s]
Recvr_gain = 24
Relaxation_delay = 5[s]
Repetition_time = 9.36731904[s]
Temp_get = 22.4[dC]
<table>
<thead>
<tr>
<th>X : parts per Million : 1H</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Supplementary Material (ESI) for Organic & Biomolecular Chemistry**

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Supplementary Material (ESI) for Organic & Biomolecular Chemistry
This journal is (c) The Royal Society of Chemistry 2009
Filename = d1-triflate-alcohol-1
Author = delta
Sample_id = single_pulse.ed
Solvent = CHLOROFORM-D
Creation_time = 11-NOV-2008 13:27:24
Revision_time = 30-DEC-2008 17:13:44
Current_time = 30-OCT-2008 17:14:07

Filename = d1-triflate-alcohol-1
Author = delta
Sample_id = single_pulse.ed
Solvent = CHLOROFORM-D
Creation_time = 11-NOV-2008 13:27:24
Revision_time = 30-DEC-2008 17:13:44
Current_time = 30-OCT-2008 17:14:07

Field_strength = 9.389766[T] (400[MHz]
X_acq_duration = 2.18365952[s]
X_domain = 1H
X_freq = 399.78219838[MHz]
X_offset = 4[ppm]
X_points = 16384
X_prescans = 1
X_resolution = 0.45794685[Hz]
X_sweep = 7.5030012[kHz]
Clipped = FALSE

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