Synthesis of Fused Piperidinones Through Free-Radical-Ionic Cascade

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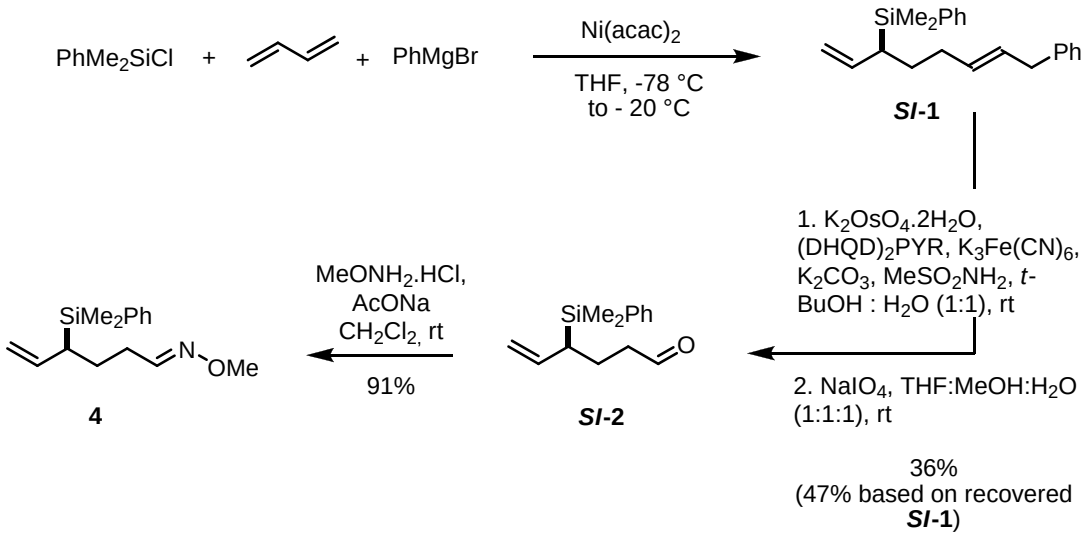
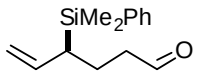
GENERAL EXPERIMENTAL

All reactions were carried out under a nitrogen atmosphere with dry solvents under anhydrous conditions, unless otherwise noted. Yields refer to chromatographically and spectroscopically (^{1}H and ^{13}C NMR) homogeneous materials, unless otherwise stated. Commercial reagents were used without further purification, unless otherwise stated. ^{1}H NMR and ^{13}C NMR were recorded on a Bruker AC-250 FT (^{1}H: 250 MHz, ^{13}C: 62.9 MHz), Bruker AC-300 FT and (^{1}H: 300 MHz, ^{13}C: 75.46 MHz), Bruker ARX-400 FT (^{1}H: 400 MHz, ^{13}C: 100.6 MHz) using $CDCl_3$ as internal reference unless otherwise indicated. The chemical shifts (δ) and coupling constants (*J*) are expressed in ppm and Hz respectively. The following abbreviations were used to explain the multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, b = broad. Gas chromatography was run on a Fisons Intruments, GC 8000 series. IR spectra were recorded on a Perkin-Elmer 1710 spectrophotometer, on a Perkin-Elmer Paragon 500 FT-IR spectrophotometer or on a Perkin-Elmer Mattson Unicam 500 16PC FT-IR. Mass spectra were recorded on a Nermag R10-10C. High resolution mass spectra were recorded on a FTICR mass spectrometer Bruker 4.7T BioApex II. Melting points were not corrected and determined by using a Büchi Totolli apparatus. Merk silica gel 60 (70-230 mesh), (230-400 mesh ASTM) and Baker silica gel (0.063-0.200 mm) were used for flash chromatography. CH_2Cl_2, Et_3N, $(i\text{-}Pr)_2NH$ were distilled from CaH_2. THF and Et_2O were distilled from sodium and benzophenone. Chlorosilanes were distilled from magnesium.

Synthesis of allylsilane compound **4**



Aldehyde ***SI*-2**



***SI*-2**

Chemical Formula: $C_{14}H_{20}OSi$
Molecular Weight: 232,39

To a solution of chlorodimethylphenylsilane (13.4 mL, 80 mmol) in THF (80 mL) at -78 °C was added $Ni(acac)_2$ (1.03 g, 4 mmol). 1,3-Butadiene (13.3 mL, 160 mmol), dissolved in THF (10 mL) was then added to the resulting mixture, immediately followed by phenylmagnesium bromide (3.0m solution in THF, 32 mL, 96 mmol). The reaction mixture was allowed to warm up to -20 °C and stirred at this temperature for 20 h. The reaction was then quenched with 1m HCl and the aqueous layer was extracted with Et_2O (3x). The combined organic extracts were then washed with brine (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo* to afford crude dienylsilane ***SI*-1** used in the next step without further purifications.[1]

To a solution of t-BuOH-H_2O (1/1, 320 mL) were added $K_3Fe(CN)_6$ (52 g, 158 mmol, 2 equiv), K_2CO_3 (21.8 g, 158 mmol, 2 equiv), $K_2OsO_4.2H_2O$ (0.209 g, 0.57 mmol, 0.7 mol %), $(DHQD)_2PYR$ (0.5 g, 0.57 mmol, 0.7 mol %). The orange solution was cooled to 5 °C and methanesulfonamide was added (2.31 g, 24 mmol, 0.25 equiv). The crude allylsilane, in solution in t-BuOH (20 mL) was then added dropwise, and the resulting mixture was stirred at room temperature for 30 h. Sodium sulfite (19 g, 2.0 equiv) was then added at 0 °C, and stirring was continued at room temperature for 1 h. The reaction was diluted with water and extracted with EtOAc (4x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and the solution was concentrated in *vacuo*. The resulting brown oil was

taken up in MeOH (100 mL), THF (100 mL) and H_2O (100 mL). Sodium periodate (26 g, 120 mmol) was added portionwise. The reaction mixture was stirred at room temperature for 1.5 h and then diluted with H_2O. The mixture was extracted with Et_2O (4x). The combined organics was then washed with brine (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. Flash column chromatography (silica gel, 30:1 Petroleum Ether/ EtOAc) afforded aldehyde ***SI*-2** (6.60 g, 36 %) as a light yellow oil and unreacted dienyl silane ***SI*-1** from the first step (6.39 g, 47% yield base on recovered starting material).

4-(Dimethyl-phenyl-silanyl)-hex-5-enal (*SI*-2).

R_f = 0.21 (silica gel, 30:1 Petroleum Ether:EtOAc)

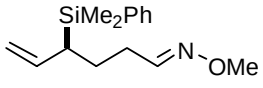
IR (neat) ν_{max} (cm^{-1}) 2956, 1713, 1427, 1250, 1115, 833 (cm^{-1})

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 9.71 (t, *J* = 1.9 Hz, 1H), 7.49-7.52 (m, 2H), 7.34-7.39 (m, 3H), 5.55 (dt, *J* = 10.2, 17.0 Hz, 1H), 4.96 (dd, *J* = 1.9, 10.6 Hz, 1H), 4.85 (d, *J* = 17.0 Hz, 1H), 2.46-2.56 (m, 1H), 2.26-2.40 (m, 1H), 1.55-1.88 (m, 3H), 0.31 (s, 3H), 0.30 (s, 3H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 202.7, 138.5, 137.1, 134.0, 129.1, 127.7, 113.8, 43.5, 34.0, 21.0, -4.6, -5.4.

Anal. calcd. for $C_{14}H_{20}OSi$ C, 72.36; H, 8.67. Found C, 72.23; H, 8.63.

Allylsilane oxime **4**



4

Chemical Formula: $C_{15}H_{23}NOSi$
Molecular Weight: 261,43

To a solution of aldehyde ***SI*-2** (1.67 g, 7.19 mmol) in CH_2Cl_2 (70 mL) were added methoxyamine hydrochloride (0.63 g, 7.54 mmol, 1.05 equiv) and sodium acetate (1.18 g, 14.4 mmol, 2 equiv). The resulting white slurry was stirred at room temperature for 12 h. The reaction was quenched with H_2O. The aqueous layer was extracted with CH_2Cl_2 (2x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. Flash column chromatography (silica gel, 40:1 Petroleum Ether/ EtOAc) afforded expected oxime **4** (1:1 *E*:*Z* mixture of stereoisomers) (1.71 g, 91 %) as a light yellow oil.

4-(Dimethyl-phenyl-silanyl)-hex-5-enal O-methyl-oxime (*Z*)-(4).[2]

R_f = 0.27 (silica gel, 30:1 Petroleum Ether:EtOAc).

IR (neat) ν_{max} (cm^{-1}) 2956, 1626, 1428, 1114, 1049, 835.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.47–7.50 (m, 2H), 7.35-7.37 (m, 3H), 7.29 (t, *J* = 6.4 Hz, 1H), 5.56 (dt, *J* = 9.8, 17.0 Hz, 1H), 4.95 (dd, *J* = 1.1, 10.6 Hz, 1H), 4.85 (d, *J* = 17.3 Hz, 1H), 3.79 (s, 3H), 2.22-2.34 (m, 1H), 1.97-2.10 (m, 1H), 1.43-1.80 (m, 3H), 0.28 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 150.7, 138.6, 137.2, 134.0, 129.1, 127.7, 113.6, 61.1, 34.1, 29.1, 25.8, -4.5, -5.4.

HRMS calcd. for $C_{15}H_{23}NOSi$ [M^+] 261.1549, found 261.1531.

4-(Dimethyl-phenyl-silanyl)-hex-5-enal O-methyl-oxime (*E*)-(4).

R_f = 0.23 (silica gel, 30:1 Petroleum Ether:EtOAc).

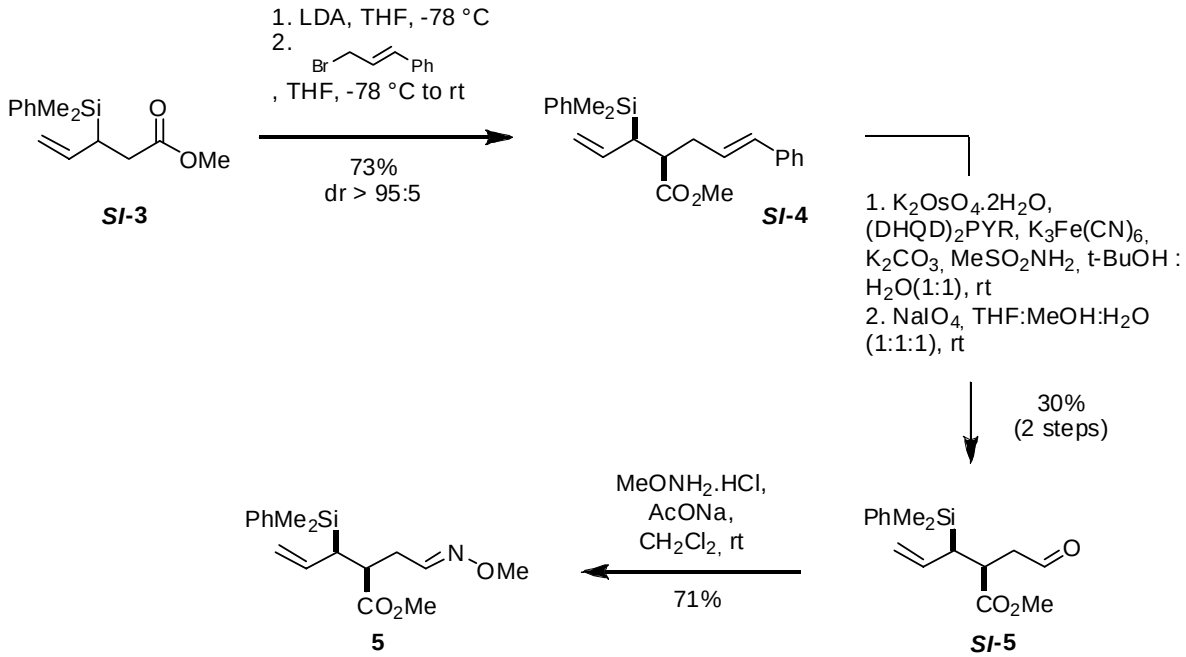
IR (neat) ν_{max} (cm^{-1}) 2960, 1626, 1249, 1114, 1043, 900, 835.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.47–7.50 (m, 2H), 7.35-7.37 (m, 3H), 6.55 (t, *J* = 14.3 Hz, 1H), 5.57 (dt, *J* = 10.2, 17.0 Hz, 1H), 4.95 (dd, *J* = 1.5, 10.2 Hz, 1H), 4.86 (d, *J* = 17.3 Hz, 1H), 3.82 (s, 3H), 2.31-2.43 (m, 1H), 2.15-2.26 (m, 1H), 1.41-1.72 (m, 3H), 0.28 (s, 6H).

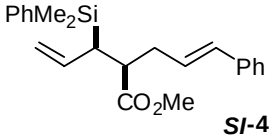
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 151.6, 138.5, 137.3, 134.0, 129.1, 127.7, 113.6, 61.5, 34.3, 25.4, 25.1, -4.5, -5.4.

HRMS (EI) calcd. for $C_{15}H_{23}NOSi$ [M+] 261.1549, found 261.1531.

Synthesis of allylsilane compound **5**



Dienyl ester ***SI*-4**



***SI*-4**

Chemical Formula: $C_{23}H_{28}O_2Si$
Molecular Weight: 364,55

To a solution of diisopropylamine (0.37 mL, 2.63 mmol, 1.3 equiv.) in THF (3 mL) at -78 °C was added dropwise n-butyllithium (2.41 m in hexane, 1.10 mL, 2.63 mmol, 1.3 equiv.). The mixture was stirred at 0 °C for 15 minutes and then recooled to – 78 °C. A solution of methyl 3-(dimethyl(phenyl)silyl)pent-4-enoate[3] (0.5 g, 2.02 mmol, 1 equiv.) was then added dropwise to the LDA solution. The resulting yellow solution was stirred at – 78 °C for 30 minutes and cinnamyl bromide (0.60 mL, 4.04 mmol, 2 equiv.) was added dropwise. The reaction was allowed to gradually warm up to room temperature and stirred for an additional 12 h. Saturated aqueous NH_4Cl was then added. Layers were separated and the aqueous phase was washed with saturated aqueous NaCl, dried over $MgSO_4$ and the solvents ere evaporated in *vacuo*. Flash column chromatography (silica gel, 30:1 Petroleum Ether/ EtOAc) afforded expected ester ***SI*-4** (0.535 g, 73 %) as a light yellow oil.

3-(Dimethyl-phenyl-silanyl)-2-(3-phenyl-allyl)-pent-4-enoic acid methyl ester (*SI*-4).

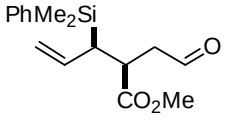
R_f = 0.36 (silica gel, 30:1 Petroleum Ether:EtOAc)

IR (neat) ν_{max} (cm^{-1}) 2950, 1735, 1625, 1493, 1428, 1359, 1249, 1161, 1112, 965

^{1}H-NMR ($CDCl_3$, 300 MHz): δ (ppm) 7.52-7.55 (m, 2H), 7.19-7.39 (m, 8H), 6.30 (d, *J* = 15.8 Hz, 1H), 6.04 (ddd, *J* = 7.2, 7.5, 15.7 Hz, 1H), 5.59 (ddd, *J* = 10.6, 10.6, 17.0 Hz, 1H), 5.04 (dd, *J* = 1.9, 10.2 Hz, 1H), 4.94 (d, *J* = 16.7 Hz, 1H), 3.38 (s, 3H), 2.60-2.68 (dt, *J* = 4.2, 9.8 Hz, 1H), 2.43-2.51 (m, 2H), 2.21-2.40 (t, *J* = 10.2 Hz, 1H), 0.36 (s, 3H), 0.31 (s, 3H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 175.0, 137.4, 136.9, 136.2, 134.3, 131.7, 129.1, 128.4, 127.6, 127.2, 127.0, 126.0, 115.3, 51.1, 45.8, 37.2, 35.4, -3.5, -4.5.

Aldehyde ***SI*-5**



***SI*-5**

Chemical Formula: $C_{16}H_{22}O_3Si$
Molecular Weight: 290,43

To a *t*-butanol and water solution (1:1, 120 mL) were added $K_3Fe(CN)_6$ (11.8 g, 36 mmol, 2 equiv.), K_2CO_3 (4.98 g, 36 mmol, 2 equiv.), $(DHQ)_2PHAL$ (288 mg, 5 mol %) and potassium osmium dehydrate (133 mg, 0.36 mmol, 4.5 mol %). After 10 minutes at 0 °C,

methanesulfonamide (1.71 mg, 18 mmol, 1 equiv.) was added to the orange solution. The mixture was cooled to 0 °C and a solution of ester ***SI*-4** (6.58 g, 18 mmol, 1 equiv.) was added dropwise. The reaction was then stirred at room temperature for 4 h. Sodium sulfite (4.53 g, 36 mmol, 2 equiv.) was then added at 0 °C and stirring was continued at 0 °C for 1 h. The mixture was extracted with EtOAc (4x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$ and concentrated in *vacuo*. The resulting crude diol was taken up in THF (60 mL), MeOH (60 mL) and water (60 mL) and sodium periodate (5.77 g, 27 mmol, 1.5 equiv.) was added. The white solution was stirred at room temperature for 3 h. The reaction was then diluted with H_2O and extracted with Et_2O (3x). The combined organics was washed with saturated aqueous NaCl (1x), dried over $MgSO_4$ and concentrated in *vacuo*. Flash column chromatography (silica gel, 25:1 Petroleum Ether:EtOAc) afforded expected aldehyde ***SI*-5** (1.56 g, 30 % over the 2 steps) as a light yellow oil.

3-(Dimethyl-phenyl-silanyl)-2-(2-oxo-ethyl)-pent-4-enoic acid methyl ester (*SI*-5).

R_f = 0.20 (silica gel, 96:4 Petroleum Ether:EtOAc)

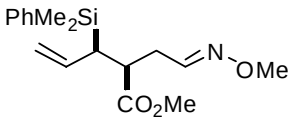
IR (neat) ν_{max} (cm^{-1}) 2954, 2724, 1732, 1626, 1428, 1250, 1174, 1114, 837

^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 9.60 (s, 1H), 7.47 – 7.50 (m, 2H), 7.34 – 7.37 (m, 3H), 5.56 (ddd, *J* = 10.2, 10.6, 17.0 Hz, 1H), 5.00 (dd, *J* = 1.9, 10.2 Hz, 2H), 3.43 (s, 3H), 3.03 – 3.10 (m, 1H), 2.82 (dd, *J* = 10.2, 18.1 Hz, 1H), 2.47 (dd, *J* = 3.0, 18.1 Hz, 1H), 2.21 (dd, *J* = 7.2, 10.6 Hz, 1H), 0.35 (s, 3H), 0.31 (s, 3H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 200.2, 174.5, 136.5, 135.3, 134.0, 129.4, 127.8, 116.2, 51.7, 44.3, 39.3, 36.8, -3.51, -4.4

HRMS (LSIMS) calcd. for $C_{16}H_{22}O_3SiNa$ [M+Na^+] 313.1236, found 313.1231.

Allylsilane oxime **5**



5

Chemical Formula: $C_{17}H_{25}NO_3Si$
Molecular Weight: 319,47

To a solution of aldehyde ***SI*-5** (1.34 g, 4.61 mmol, 1 equiv.) in CH_2Cl_2 (46 mL) were added sodium acetate (0.76 g, 9.22 mmol, 2.2 equiv.) and methoxylamine hydrochloride (0.42 g, 9.22 mmol, 1.1 equiv.). The mixture was stirred at room temperature for 15 h. The reaction was diluted with H_2O. Layers were separated and the organic phase was washed with saturated aqueous NaCl (1x), dried over $MgSO_4$ filtered and the solution concentrated in

vacuo. Flash column chromatography (silica gel, 10:1 Petroleum Ether/ EtOAc) afforded expected oxime **5** (1:1 mixture of E:Z stereoisomers) (1.00 g, 71%) as a colourless oil.

3-(Dimethyl-phenyl-silanyl)-2-(2-methoxyimino-ethyl)-pent-4-enoic acid methyl ester (5).

R_f = 0.57 and 0.67 (silica gel, 90:10 Petroleum Ether:EtOAc)

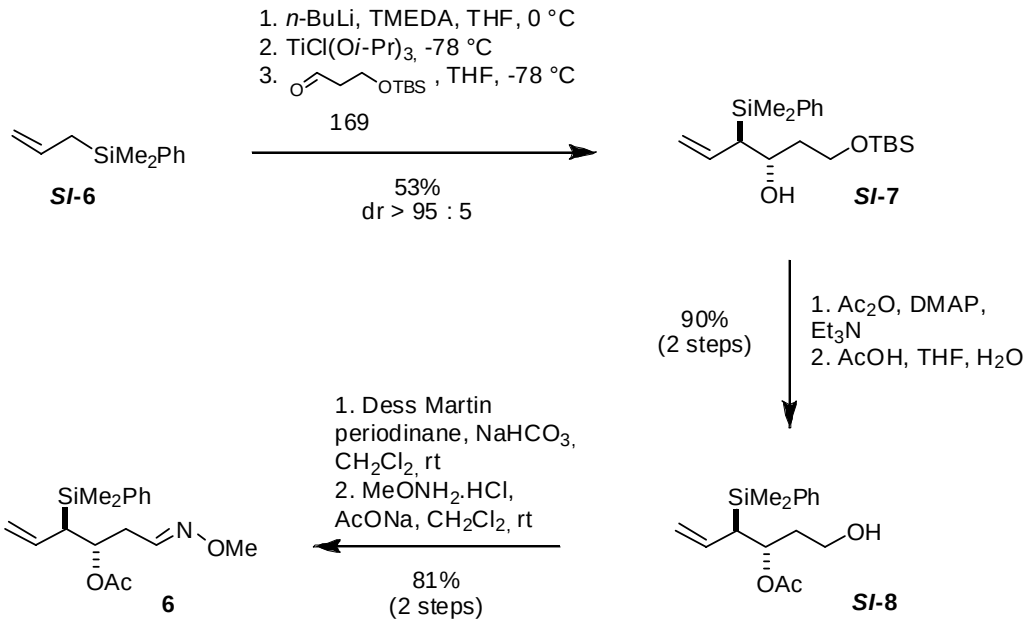
IR (neat) ν_{max} (cm^{-1}) 3071, 2953, 1732, 1626, 1428, 1250, 1170

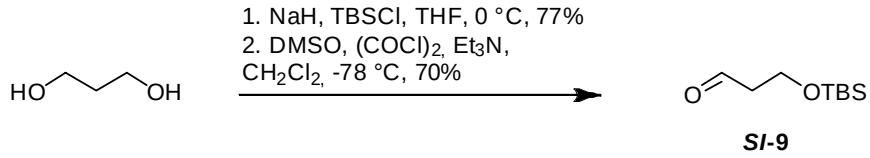
^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 7.47-7.50 (m, 2H), 7.34-7.36 (m, 3H), 7.22-7.26 (m, 0.6 x 1H), 6.59 (t, *J* = 5.5 Hz, 0.4 x 1H), 5.48-5.62 (m, 1H), 4.88-5.03 (m, 2H), 3.82 (s, 0.4 x 3H), 3.76 (0.6 x 3H), 3.42 (0.4 x 3H), 3.39 (s, 0.6 x 3H), 2.37-2.75 (m, 3H), 2.17-2.28 (m, 1H), 0.34 (s, 3H), 0.30 (s, 0.4 x 3H), 0.28 (s, 0.6 x 3H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 174.7 (0.5C), 174.4 (0.5C), 148.8 (0.5C), 148.2 (0.5C), 136.6 (0.5C), 136.6 (0.5C), 135.6 (0.5C), 135.3 (0.5C), 135.3 (0.5 x 2C), 134.2 (0.5 x 2C), 129.2 (1C), 127.6 (2C), 116.0 (0.5C), 115.9 (0.5C), 61.6 (0.5C), 61.3 (0.5C), 51.5 (0.5C), 51.3 (0.5C), 43.4 (0.5C), 42.8 (0.5C), 37.1 (0.5C), 31.4 (0.5C), 27.3 (0.5C), -3.5 (0.5C), -3.6 (1C), -4.5 (1C)

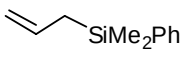
HRMS (EI) calcd. for $C_{16}H_{19}O_2Si$ [M^+-OMe] 288.1420, found 288.1445.

Synthesis of allylsilane compound **6**





Allyldimethylphenylsilane ***SI*-6**



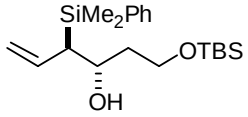
***SI*-6**

Chemical Formula: $C_{11}H_{16}Si$
Molecular Weight: 176,33

Allyl bromide (10.3 mL, 119.1 mmol) in dry THF (28 mL) was added dropwise to a stirred mixture of Mg turnings (3.14 g, 131 mmol), chlorodimethylphenylsilane (20 mL, 119.1 mmol) and dry THF (92 mL) at a rate sufficient to maintain gentle reflux. After being stirred at 25°C for 12h, the mixture was poured onto ice, and the organic layer was washed with a saturated NaCl solution, dried over $MgSO_4$. The yellow oil (20.32 g, 98%) was directly used to prepared β- and γ-hydroxyallylsilanes. All spectroscopic data were in agreement with those previously reported.[4]

^{1}H NMR (250MHz, $CDCl_3$) δ (ppm) 7.54-7.50 (m, 2H), 7.37-7.35 (m, 3H), 5.78 (m, 1H), 4.88 (m, 1H), 4.83 (m, 1H), 1.76 (d, J = 7.9 Hz, 2H), 0.29 (s, 6H).

Alcohol ***SI*-7**



***SI*-7**

Chemical Formula: $C_{20}H_{36}O_2Si_2$
Molecular Weight: 364,67

To a solution of allyldimethylphenylsilane ***SI*-6** (5.0 g, 28.4 mmol, 1.4 equiv) in THF (57 mL) was added at 0 °C n-Butylithium (2.27 m in hexane, 12.5 mL, 28.4 mmol, 1.4 equiv). Once the addition is complete, the resulting clear red solution was stirred for 20 minutes at room temperature, and then cooled to -78 °C. $TiCl(Oi\text{-}Pr)_3$ (1.0 m in THF, 30.5 mL, 30.5 mmol) was then added, and the reaction mixture was stirred for an additional 30 minutes at this temperature. 3-(tert-butyldimethylsilyloxy)propanal (3.82 g, 20.3 mmol, 1 equiv) in solution in THF (20 mL) was then added dropwise. The resulting mixture was stirred at – 78 °C for 12h. Saturated aqueous NH_4Cl was added at -78 °C. The white slurry was allowed to warm to room temperature and stirred for 20 minutes. Et_2O was added, and the aqueous layer was extracted with Et_2O (3x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and the solution concentrated in *vacuo*. Flash chromatography (silica gel, 98:2 Petroleum Ether:EtOAc) afforded allylsilane ***SI*-7** as a colorless oil (5.48 g, 53%).

1-(tert-Butyl-dimethyl-silanyloxy)-4-(dimethyl-phenyl-silanyl)-hex-5-en-3-ol (*SI*-7).

R_f = 0.21 (silica gel, 98:2 Petroleum Ether:EtOAc)

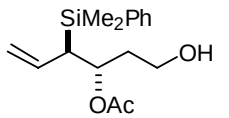
IR (neat) ν_{max} (cm^{-1}) 3510, 2955, 2855, 1624, 1471, 1427, 1388, 1254, 1087, 890

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.57-7.40 (m, 2H), 7.34-7.27 (m, 3H), 5.63 (dt, *J* = 5.3, 8.7 Hz, 1H), 4.96 (dd, *J* = 2.3, 10.2 Hz, 1H), 4.81 (dd, *J* = 2.3, 17.7 Hz, 1H), 3.91-3.99 (m, 1H), 3.59-3.78 (m, 2H), 2.85 (bs, 1H), 1.79 (dd, *J* = 3.8, 10.2 Hz, 1H), 1.60-1.75 (m, 1H), 1.35-1.45 (m, 1H), 0.84 (s, 9H), 0.34 (s, 3H), 0.29 (s, 3H), 0.00 (s, 6H)

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 138.3, 135.7, 134.1, 128.9, 127.6, 114.6, 71.3, 62.5, 42.9, 38,9, 25.9, 18.2, -3.5, -3.9, -5.5, -5.6

HRMS (LSIMS) calcd. for $C_{20}H_{36}O_2Si_2Na$ [$M+Na^+$] 387.2152, found 387.2154.

Bis-protected diol ***SI*-8**



***SI*-8**

Chemical Formula: $C_{16}H_{24}O_3Si$
Molecular Weight: 292,45

To a solution of alcohol ***SI*-7** (3.0 g, 8.2 mmol, 1 equiv) in CH_2Cl_2 (40 mL) was added acetic anhydride (2.28 ml, 24.3 mmol, 3 equiv), Et_3N (3.40 mL, 24.3 mmol, 3 equiv) and DMAP (0.099 g, 0.81 mmol, 0.1 equiv.). The resulting solution was stirred at room temperature overnight (14 h). Saturated aqueous NH_4Cl was added and the mixture was diluted with Et_2O. The aqueous layer was extracted with Et_2O (1x). The combined organics was washed with brine (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. Flash chromatography (silica gel, 98:2 Petroleum Ether:EtOAc) afforded the corresponding intermediate acetate as a colorless oil (3.27 g, 98%).

Acetic acid 1-[2-(tert-butyl-dimethyl-silanyloxy)-ethyl]-2-(dimethyl-phenyl-silanyl)-but-3-enyl ester.

R_f = 0.29 (silica gel, 98:2 Petroleum Ether:EtOAc).

IR (neat) ν_{max} (cm^{-1}) 2958, 1738, 1626, 1428, 1372, 1235, 1116, 1024, 835.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.42-7.51 (m, 2H), 7.29-7.36 (m, 3H), 5.85 (dt, *J* = 10.6, 17.3 Hz, 1H), 5.19 (dt, *J* = 3.8, 6.8 Hz, 1H), 5.04 (dd, *J* = 2.3, 10.6 Hz, 1H), 4.88 (dd, *J* = 1.5, 17.0 Hz, 1H), 3.53 (dt, *J* = 2.6, 6.4 Hz, 2H), 2.06 (dd, *J* = 3.8, 10.6 Hz, 2H), 1.64-1.83 (m, 5H), 0.87 (s, 9H), 0.33 (s, 3H), 0.31 (s, 9H), 0.00 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 170.2, 137.6, 135.0, 134.2, 129.2, 127.8, 115.9, 71.7, 59.8, 39.9, 37.2, 26.0, 21.2, 18.4, -3.7, -3.8, -5.3.

HRMS (EI) Calcd. for $C_{18}H_{29}O_3Si_2$ [M^+- *t*-Bu] 349.1655, found 349.1665.

The intermediate TBS-protected alcohol (0.32 g, 0.80 mmol) was then dissolved in THF (3.2 mL), H_2O (3.2 mL) and acetic acid (9.6 mL). The resulting solution was stirred at room temperature for 12 h. The mixture was carefully quenched with 1M NaOH. The aqueous layer was extracted with Et_2O (3x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), brine (1x), dried over $MgSO_4$, filtered and the solution was concentrated in *vacuo*. Flash chromatography (silica gel, 75:25 Petroleum Ether:EtOAc) afforded primary alcohol ***SI*-8** as a colorless oil (0.23 g, 92%).

Acetic acid 2-(dimethyl-phenyl-silanyl)-1-(2-hydroxy-ethyl)-but-3-enyl ester (*SI*-8).

R_f = 0.32 (silica gel, 70:30 Petroleum Ether:EtOAc)

IR (neat) ν_{max} (cm^{-1}) 3452, 2958, 1731, 1428, 1372, 1248, 1114, 903

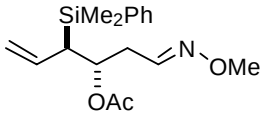
^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.50-7.42 (m, 2H), 7.39-7.31 (m, 3H), 5.84 (dt, *J* = 10.6, 17.3 Hz, 1H), 5.22 (quint., *J* = 4.1 Hz, 1H), 5.06 (dd, *J* = 1.9, 10.2 Hz, 1H), 4.99 (dd, *J* =

1.1, 17.0 Hz, 1H), 3.46-3.60 (m, 1H), 3.32-3.44 (m, 1H), 2.39-2.50 (bs, 1H), 1.98 (dd, *J* = 3.4, 10.6 Hz, 1H), 1.86 (s, 3H), 1.66-1.74(m, 2H), 0.33 (s, 3H), 0.31 (s, 3H)

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 171.8, 137.2, 134.7, 134.1, 129.3, 127.9, 116.1, 71.2, 58.6, 40.5, 38.0, 21.0, -3.8, -3.9

HRMS (LSIMS) calcd. for $C_{16}H_{24}O_3SiNa$ [M+Na^+] 315.1392, found 315.1380.

Allylsilane oxime **6**



6

Chemical Formula: $C_{17}H_{25}NO_3Si$
Molecular Weight: 319,47

To a solution of alcohol ***SI*-8** (2.50 g, 8.5 mmol, 1 equiv) in CH_2Cl_2 (34 mL) was added Dess-Martin periodinane (5.40 g, 12.7 mmol, 1.5 equiv) and $NaHCO_3$ (3.57 g, 42.5 mmol, 5 equiv). The resulting mixture was stirred at room temperature for 30 minutes. Et_2O and a 1:1 mixture of saturated aqueous $NaHCO_3$ and saturated aqueous $Na_2S_2O_3$ were then added. The aqueous layer was extracted with Et_2O (2x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and the solution was concentrated in *vacuo*. Flash chromatography (silica gel, 85:15 Petroleum Ether:EtOAc) afforded the intermediate corresponding aldehyde as a colorless oil (2.30 mg, 93%). This aldehyde was usually obtained with sufficient purity to be used without further purifications.

Acetic acid 2-(dimethyl-phenyl-silanyl)-1-(2-oxo-ethyl)-but-3-enyl ester.

R_f = 0.34 (silica gel, 85:15 Petroleum Ether:EtOAc).

IR (neat) ν_{max} (cm^{-1}) 2929, 2857, 1738, 1626, 1372, 1237, 1112, 836.

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 9.60 (s, 1H), 7.46-7.49 (m, 2H), 7.33-7.38 (m, 3H), 5.82 (dt, *J* = 10.6, 17.3 Hz, 1H), 5.41 (dt, *J* = 3.4, 6.4 Hz, 1H), 5.09 (dd, *J* = 1.9, 10.2 Hz, 1H), 4.91 (dd, *J* = 1.1, 17.0 Hz, 1H), 2.61-2.64 (m, 2H), 2.10 (dd, *J* = 3.4, 10.6 Hz, 1H), 1.83 (s, 3H), 0.34 (s, 3H), 0.33 (s, 3H).

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 199.3, 170.0, 136.7, 133.9, 133.8, 129.3, 127.8, 116.9, 69.2, 48.2, 40.0, 20.8, -4.0, -4.2.

HRMS (LSIMS) calcd. for $C_{16}H_{22}O_3SiNa$ [M+Na^+] 313.1236, found 313.1216.

The crude aldehyde (8.5 mmol, 1 equiv) was taken up in CH_2Cl_2 (11 mL) and methoxylamine hydrochloride (0.70 g, 8.6 mmol) and sodium acetate (1.08 g, 13.1 mmol, 1.5 equiv) were

added. The heterogeneous mixture was stirred at room temperature for 12 h. H_2O was then added, and the aqueous layer was extracted with CH_2Cl_2 (1x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. Flash chromatography (silica gel, 85:15 Petroleum Ether:EtOAc) afforded oxime **6** (1:1 mixture of *E*:*Z* stereoisomers) as a colorless oil (2.12 g, 81% for the 2 steps).

Acetic acid 2-(dimethyl-phenyl-silanyl)-1-(2-methoxyimino-ethyl)-but-3-enyl ester (*Z*)-(6).

R_f = 0.62 (silica gel, 85:15 Petroleum Ether:EtOAc).

IR (neat) ν_{max} (cm^{-1}) 2958, 1739, 1428, 1372, 1234, 1114, 1039, 906, 833.

^{1}H NMR (250 MHz, $CDCl_3$) δ (ppm) 7.44-7.48 (m, 2H), 7.32-7.37 (m, 3H), 7.21 (t, *J* = 6.1 Hz, 1H), 5.84 (dt, *J* = 10.4, 17.4 Hz, 1H), 5.18 (dt, *J* = 3.1, 6.4 Hz, 1H), 5.09 (dd, *J* = 1.8, 10.1 Hz, 1H), 4.92 (ddd, *J* = 0.6, 1.8, 17.1 Hz, 1H), 3.78 (s, 3H), 2.27-2.50 (m, 2H), 2.02 (dd, *J* = 3.4, 10.7 Hz, 1H), 1.82 (s, 3H), 0.34 (s, 3H), 0.31 (s, 3H).

^{13}C NMR (62.5 MHz, $CDCl_3$) δ (ppm) 170.0, 146.8, 136.8, 133.9, 133.9, 129.2, 127.7, 116.6, 70.9, 61.3, 39.7, 34.6, 20.9, -4.1.

HRMS calcd. for $C_{17}H_{22}NOSi$ [M^+- CO_2Me] 260.14707, found 260.1478.

Acetic acid 2-(dimethyl-phenyl-silanyl)-1-(2-methoxyimino-ethyl)-but-3-enyl ester (*E*)-(6).

R_f = 0.54 (silica gel, 85:15 Petroleum Ether:EtOAc).

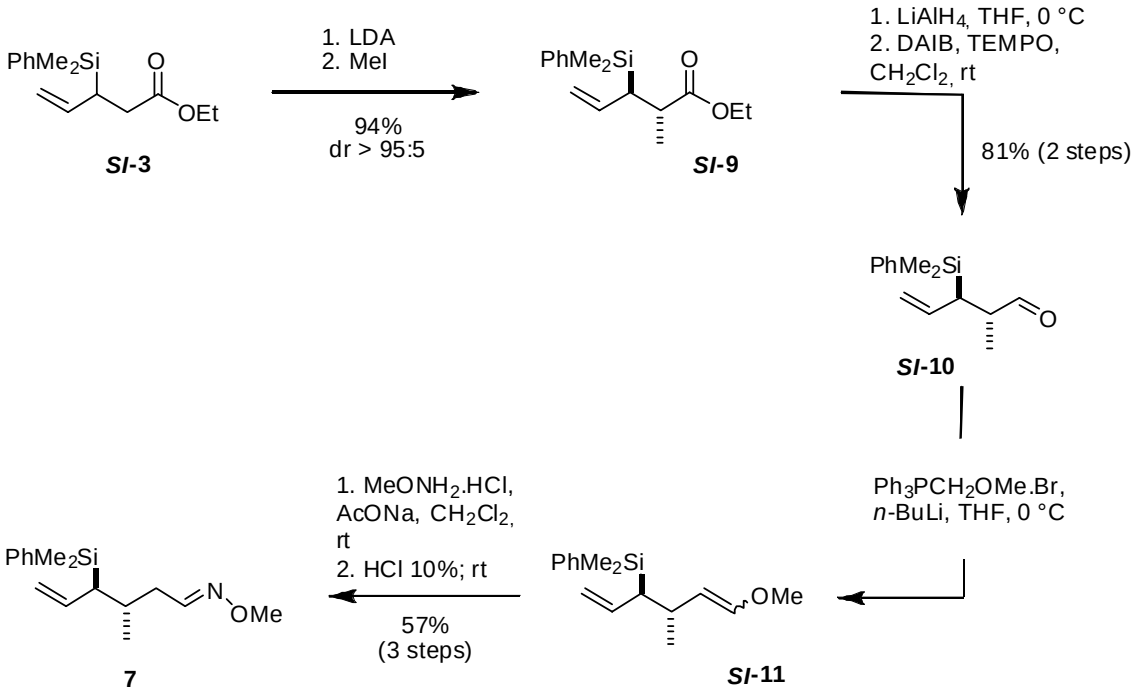
IR (neat) ν_{max} (cm^{-1}) 2958, 1739, 1428, 1372, 1234, 1039.

^{1}H NMR (250 MHz, $CDCl_3$) δ (ppm) 7.44-7.48 (m, 2H), 7.33-7.36 (m, 3H), 6.56 (t, *J* = 5.5 Hz, 1H), 5.83 (dt, *J* = 10.4, 17.1 Hz, 1H), 5.23 (dt, *J* = 4.0, 6.7 Hz, 1H), 5.07 (dd, *J* = 1.9, 10.4 Hz, 1H), 4.91 (ddd, *J* = 0.6, 1.2, 17.1 Hz, 1H), 3.82 (s, 3H), 2.41-2.66 (m, 2H), 1.98 (dd, *J* = 4.0, 10.7 Hz, 1H), 1.82 (s, 3H), 0.34 (s, 3H), 0.31 (s, 3H)

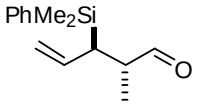
^{13}C NMR (62.5 MHz, $CDCl_3$) δ (ppm) 146.8, 136.8, 134.0, 133.9, 133.9, 129.2, 127.8, 116.4, 70.8, 61.6, 40.3, 31.1, 20.9, -4.1

HRMS (LSIMS) calcd. for $C_{17}H_{25}NO_3SiNa$ [M+Na^+] 342.1501**,** found 342.1488.

Synthesis of allylsilane compound **7**



Aldehyde **SI-10**



***SI*-10**

Chemical Formula: $C_{14}H_{20}OSi$
Molecular Weight: 232,39

To a solution of the β-silyl ester ***SI*-9**[5] (0.146 g, 0.56 mmol, 1 equiv) in THF (5.6 mL) at 0 °C was added $LiALH_4$ (0.043 g, 1.12 mmol, 2 equiv). The resulting grey slurry was stirred at 0 °C for 1h, and NaOH 15% (0.15 mL), H_2O (0.15 mL) and NaOH 15% (0.4 mL) were successively added. The resulting mixture was stirred at 0 °C for 15 minutes. The white slurry was filtered through a pad of Celite® and the white cake washed with Et_2O. The filtrate was washed with brine (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. The alcohol was taken up in CH_2Cl_2 (2.5 mL) and diacetoxyiodobenzene (0.27 mg, 0.84 mmol, 1.5 equiv) followed by TEMPO (0.017 g, 0.11 mmol, 20 mol%) were successively added. The resulting orange solution was stirred at room temperature for 3.5 h and saturated aqueous $Na_2S_2O_3$ was added. The mixture was diluted with CH_2Cl_2, layers were separated and the organic layer was washed with brine (1x), dried over $MgSO_4$, filtered and the solution concentrated in *vacuo*. Flash chromatography (silica gel, 97:3 Petroleum Ether:EtOAc) afforded the sensitive aldehyde ***SI*-10** as a colorless oil (0.105 g, 81% for the 2 steps). This sensitive aldehyde was briefly characterized by NMR before being used in the next step.

3-(Dimethyl-phenyl-silanyl)-2-methyl-pent-4-enal (*SI*-10).

R_f = 0.36 (silica gel, 97:3 Petroleum Ether:EtOAc).

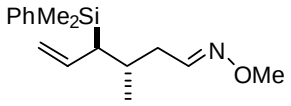
IR (neat) ν_{max} (cm^{-1}) 2961, 1725, 1625, 1428, 1250, 1114, 834.

^{1}H NMR (250 MHz, $CDCl_3$) δ (ppm) 9.46 (t, *J* = 1.2 Hz, 1H), 7.51-7.55 (m, 2H), 7.36-7.41 (m, 3H), 5.66 (ddd, *J* = 10.1, 10.4, 16.8 Hz, 1H), 4.91-5.03 (m, 2H), 2.32-2.46 (m, 2H), 1.04 (d, *J* = 7.0 Hz, 3H), 0.38 (s, 3H), 0.36 (s, 3H).

^{13}C NMR (62.5 MHz, $CDCl_3$) δ (ppm) 204.7, 136.8, 134.2, 134.0, 129.3, 127.8, 115.8, 45.9, 34.9, 11.3, -4.1

HRMS (EI) calcd. for $C_{13}H_{17}OSi$ [M^+- CH_3] 217.10487, found 217.1055.

Allylsilane oxime **7**



Chemical Formula: $C_{16}H_{25}NOSi$
Molecular Weight: 275,46

7

Aldehyde ***SI*-10** (0.090 g, 0.39 mmol, 1 equiv) was dissolved in THF (4mL) and added at 0° C to a solution of ylid preformed from (methoxymethyl)triphenylphosphonium chloride (1.07 g, 3.12 mmol, 8 equiv) and n-butyllithium (1.7 m in hexane, 1.80 mL, 3.12 mmol, 8 equiv). The red color of the ylid progressively disappeared after a few minutes, and the mixture was quenched with the dropwise addition of H_2O. The mixture was diluted with Et_2O and the aqueous layer extracted with Et_2O (1x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and the solution concentrated in *vacuo*. Flash chromatography (silica gel, 99:1 → 98:2 Petroleum Ether:EtOAc) afforded a 80:20 mixture of E:Z enol ethers ***SI*-11** as a colorless oil (0.058 g, 57%).

Enol ether (*SI*-11).

R_f = 0.41 (silica gel, 98:2 Petroleum Ether:EtOAc)

IR (neat) ν_{max} (cm^{-1}) 2958, 1653, 1428, 1248, 1207, 1114, 831

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.48-7.51 (m, 2H), 7.33-7.35 (m, 3H), 6.15 (d, *J* = 12.4 Hz, 0.8 x 1H), 5.61-5.75 (m, 1H + 0.2 x 1H), 4.78-4.98 (m, 1H), 4.46 (dd, J = 9.4, 12.8 Hz, 0.8 x 1H), 4.19 (dd, *J* = 7.3, 9.8 Hz, 0.2 x 1H), 3.54 (s, 0.2 x 3H), 3.20 (s, 0.8 x 3H), 2.81-2.94 (m, 0.2 x 1H), 2.20-2.32 (m, 0.8 x 1H), 1.77 (dd, *J* = 7.2, 10.6 Hz, 1H), 0.96 (d, *J* = 6.8 Hz, 0.8 x 3H), 0.91 (d, *J* = 6.8 Hz, 0.2 x 3H), 0.32 (s, 0.2 x 3H), 0.31 (s, 0.8 x 3H), 0.30 (s, 0.2 x 3H), 0.27 (s, 0.8 x 3H)

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 145.3 (0.8 x 1C), 144.0 (0.2 x 1C), 139.0, 137.8, 134.1 (0.2 x 2C), 134.0 (0.8 x 2C), 128.6 (0.8 x 1C), 128.6 (0.2 x 1C), 127.5 (0.8 x 2C), 127.4 (0.2 x 2C), 114.0 (0.8 x 1C), 113.8 (0.2 x 1C), 113.7 (0.2 x 1C), 109.6 (0.8 x 1C), 59.4 (0.2 x 1C), 55.3 (0.8 x 1C), 42.8 (0.8 x 1C), 41.8 (0.2 x 1C), 33.6 (0.8 x 1C), 29.0 (0.2 x 1C), 21.8 (0.8 x 1C), 20.4 (0.2 x 1C), -2.4 (0.8 x 1C), -3.0 (0.2 x 1C), -3.6 (0.2 x 1C), -3.9 (0.8 x 1C).

To a solution of the above enol ether ***SI*-11** (0.049 g, 0.19 mmol, 1 equiv) in THF (2 mL) was added HCl 10% (0.5 mL). The resulting mixture was stirred at room temperature for 4 h. Saturated aqueous Na_2CO_3 was then carefully added. Layers were separated and the aqueous phase was extracted with Et_2O (1x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), brine (1x), dried over $MgSO_4$, filtered and the solution concentrated in *vacuo* to afford the pure aldehyde (0.046 g, 99%) which was used immediately without further purification. The aldehyde (0.19 mmol) was taken up in CH_2Cl_2 (2 mL) and methoxylamine hydrochloride (0.044 g, 0.53 mmol, 2.8 equiv) and sodium acetate (0.069 g, 0.84 mmol, 4.4 equiv) were successively added. The resulting mixture was stirred for 12 h at room temperature and H_2O was added. The solution was diluted with Et_2O and the aqueous layer extracted with Et_2O (1x). The combined organic extracts were washed with brine (1x), dried over $MgSO_4$, filtered and the solution concentrated in *vacuo*. Flash chromatography (silica gel, 97:3 → 96:4 Petroleum Ether:EtOAc) afforded oxime **7** (1:1 mixture of E:Z stereosiomers) as a colorless oil (0.044 g, 85% for the 2 steps).

4-(Dimethyl-phenyl-silanyl)-3-methyl-hex-5-enal O-methyl-oxime (7).

R_f = 0.37 and 0.39 (silica gel, 96:4 Petroleum Ether:EtOAc)

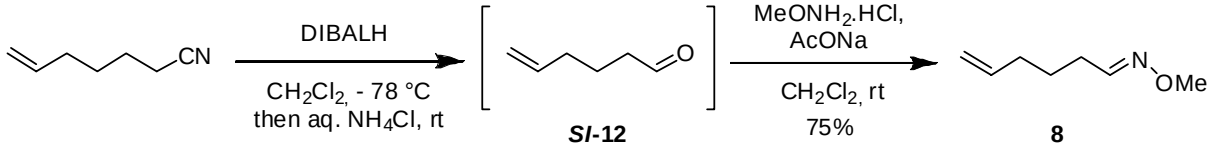
IR (neat) ν_{max} (cm^{-1}) 2959, 1623, 1427, 1249, 1113, 1068, 830

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.49-7.53 (m, 2H), 7.34-7.37 (m, 3H), 7.28 (t, *J* = 6.0 Hz, 0.5 x 1H), 6.55 (t, *J* = 5.7 Hz, 0.5 x 1H), 5.68-5.81 (ddd, *J* = 1.1, 10.9, 16.6 Hz, 1H), 5.01 (dt, *J* = 2.3, 10.2 Hz, 1H), 4.89 (d, *J* = 16.6 Hz, 1H), 3.83 (s, 0.5 x 3H), 3.81 (s, 0.5 x 3H), 1.82-2.29 (m, 4H), 0.89 (d, *J* = 6.8 Hz, 3H), 0.34 (s, 3H), 0.31 (s, 3H)

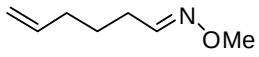
^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 150.9 (0.5 x 1C), 150.2 (0.5 x 1C), 137.9, 135.0 (0.5 x 1C), 134.9 (0.5 x 1C), 134.0(0.5 x 2C), 134.0 (0.5 x 2C), 129.0, 127.7 (2C), 115.7 (0.5 x 1C), 115.6 (0.5 x 1C), 61.4 (0.5 x 1C), 61.1 (0.5 x 1C), 40.4 (0.5 x 1C), 40.1 (0.5 x 1C), 36.9 (0.5 x 1C), 32.3 (0.5 x 1C), 31.5 (0.5 x 1C), 31.0 (0.5 x 1C), 17.6 (0.5 x 1C), 17.3 (0.5 x 1C), -3.4 (0.5 x 1C), -3.4 (0.5 x 1C), -3.8 (0.5 x 1C), -3.9 (0.5 x 1C).

HRMS (EI) Calcd. for $C_{15}H_{22}NSi$ $[M\text{-}OMe]^+$ 244.1522, found 244.1526.

Synthesis of ene-aldoxime **8**



Oxime **8**

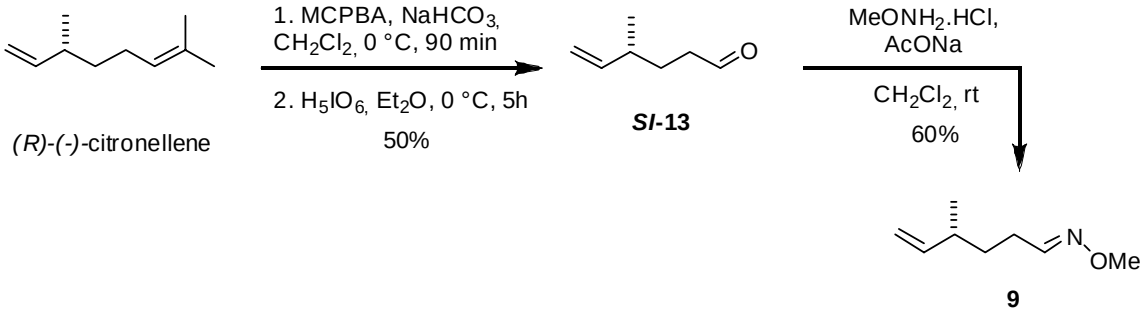


8

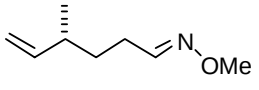
Chemical Formula: $C_7H_{13}NO$
Molecular Weight: 127,18

To a solution of 5-hexene nitrile (1.9 g, 20 mmol, 1 equiv.) in CH_2Cl_2 (40 mL) at –78 °C was added DIBAL-H (1M in hexane, 24 mL, 24 mmol, 1.2 equiv.) over a 30 minute period. The resulting mixture was stirred for an additional 30 minutes at this temperature and a saturated aqueous solution of Rochelle's salt (25 mL) was added dropwise. The white cloudy solution was allowed to warm to room temperature and stirred for 20 minutes. Layers were separated and the aqueous layer was extracted with CH_2Cl_2 (2x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$ and filtered. To the resulting CH_2Cl_2 solution of aldehyde were added sodium acetate (4.92 g, 60 mmol, 3 equiv.) and methoxylamine hydrochloride (3.3 g, 40 mmol, 2 equiv.) The mixture was stirred at room temperature for 2 h. Water was added, layers were separated and the organic phase was washed with saturated aqueous NaCl (1x), dried over $MgSO_4$ and filtered. CH_2Cl_2 was removed by normal distillation (1 bar), and the resulting oil was distilled under vacuum (1 mbar, $T_{eb.}$ 88 °C) to afforded expected oxime **19** as a colorless oil (1.90 g, 75% over the 2 steps). All spectroscopic data matched those reported in the literature.[6]

Synthesis of ene-aldoxime **9**



Oxime **9**



9

Chemical Formula: $C_8H_{15}NO$
Molecular Weight: 141,21

To a solution of the aldehyde ***SI*-13**[7] (0.37 g, 3.34 mmol, 1 equiv.) in CH_2Cl_2 (14 mL) were added sodium acetate (1.21 g, 14.7 mmol, 4.4 equiv.) and methoxylamine hydrochloride (0.78 g, 9.35 mmol, 2.8 equiv.). The mixture was stirred at room temperature for 4 h. The reaction was diluted with CH_2Cl_2 (10 mL) and water. Layers were separated and the organic phase was washed with saturated aqueous NaCl (1x), dried over $MgSO_4$ filtered and the solution concentrated in *vacuo* (15 °C bath temperature). Flash column chromatography (silica gel, 98:2 Petroleum Ether:EtOAc) afforded expected oxime **9** (1:1 mixture of *E*:*Z* stereoisomers) (0.25 g, 52%) as a as colorless oil.

4-Methyl-hex-5-enal O-methyl-oxime (9).

R_f = 0.75 and 0.83 (silica gel, 92:8 Petroleum Ether:EtOAc).

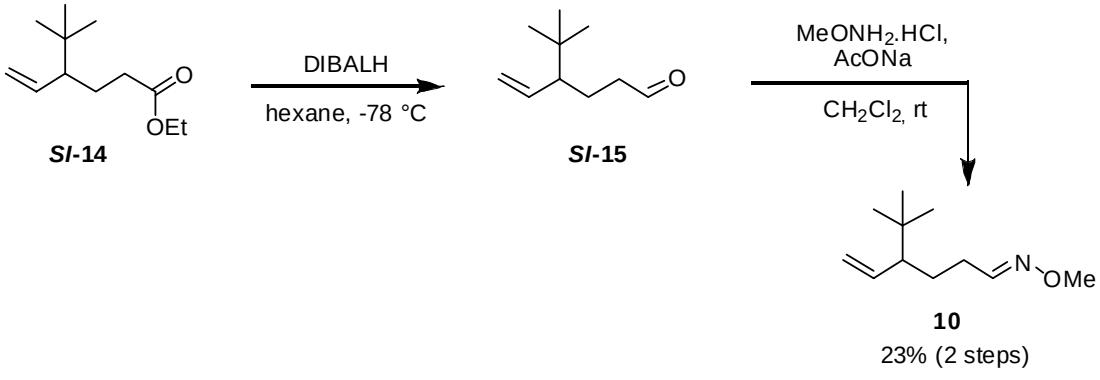
IR (neat) ν_{max} (cm^{-1}) 2957, 1640, 1456, 1348, 1058, 914.

^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 7.36 (t, *J* = 6.0 Hz, 0.5x1H), 6.62 (t, *J* = 5.3 Hz, 0.5x1H), 5.59-5.74 (m, 1H), 4.92-5.04 (m, 2H), 3.86 (s, 0.5x3H), 3.81 (s, 0.5 x 3H), 2.26-2.36 (m, 1H), 2.08-2.23 (m, 2H), 1.42-1.52 (m, 2H), 1.02 (s, 0.5x3H), 1.00 (s, 0.5 x 3H).

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 151.7 (0.5x1C), 150.8 (0.5x1C), 143.6 (0.5x1C), 143.6 (0.5x1C), 113.4 (0.5x1C), 113.4 (0.5x1C), 61.5 (0.5x1C), 61.2 (0.5x1C), 37.6 (0.5x1C), 37.4 (0.5x1C), 33.4 (0.5x1C), 32.9 (0.5x1C), 27.3 (0.5x1C), 23.5 (0.5x1C), 20.0 (0.5x1C), 20.0 (0.5x1C).

MS (EI): m/z calcd. for $C_8H_{15}NO$ [M^+] 141.2, found 141.2.

Synthesis of ene-aldoxime **10**



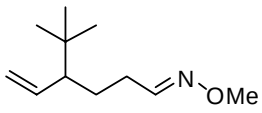
***SI*-14**

***SI*-15**

10

23% (2 steps)

Oxime **10**



10

Chemical Formula: $C_{11}H_{21}NO$
Molecular Weight: 183,29

To a solution of 4-tert-Butyl-hex-5-enoic acid ethyl ester ***SI*-15**[8] (0.35 g, 1.77 mmol, 1 equiv.) in CH_2Cl_2 (6 mL) at -78 °C was added DIBAL-H (1 m in hexane, 1.77 mL, 1.77 mmol, 1 equiv.) over a 45 min period. The reaction was stirred at -78 °C for 1 h and a saturated aqueous Rochelle's salt solution (potassium sodium tartrate, 7 mL) was added at -30 °C. Layers were separated and the aqueous phase was extracted with CH_2Cl_2 (2x). The combined organic extracts were washed with saturated aqueous NaCl (1x), and dried over $MgSO_4$ filtered. To this crude solution of aldehyde in CH_2Cl_2 were added methoxylamine hydrochloride (0.297 g, 3.55 mmol, 2 equiv.) and sodium acetate (0.640 g, 7.80 mmol, 4 equiv.). The resulting mixture was stirred at room temperature for 18 h. H_2O (20 mL) was then added. Layers were separated and the aqueous phase was extracted with CH_2Cl_2 (2x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo* (15 °C bath temperature). Flash chromatography (silica gel, 98.5:1.5 pentane:EtOAc) afforded title oxime **10** (1:1 mixture of E:Z stereoisomers) as a colorless oil (0.074 g, 23% over 2 steps).

4-*tert*-Butyl-hex-5-enal O-methyl-oxime (10).

R_f = 0.49 (silica gel, 99:1 Petroleum Ether:EtOAc).

IR (neat) ν_{max} (cm^{-1}) 2964, 1742, 1467, 1366, 1059, 914.

^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 7.34 (t, *J* = 6.0 Hz, 0.8x1H), 6.60 (t, *J* = 5.3 Hz, 0.2x1H), 5.59–5.447 (m, 1H), 5.03-5.09 (m, 1H), 4.88-4.98 (m, 1H), 3.84 (s, 0.2x3H), 3.79 (s, 0.8 x 3H), 1.83-2.39 (m, 2H), 1.56-1.74 (m, 2H), 1.18-1.43 (m, 1H), 0.86 (s, 0.2x9H), 0.85 (s, 0.8x9H).

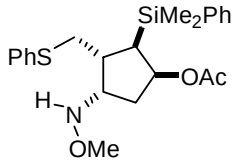
^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 152.0 (0.2x1C), 151.0 (0.8x1C), 139.3 (0.8x1C), 139.2 (0.2x1C), 116.9, 61.5 (0.2x1C), 61.1 (0.8x1C), 55.0 (0.2x1C), 54.8 (0.8x1C), 32.8 (0.2x1C), 32.6, 28.2 (0.8x1C), 27.6 (3C), 25.9 (0.8x1C), 24.0 (0.2x1C).

MS (EI): m/z calcd. for $C_{11}H_{21}NO$ [M^+] 183.3, found 183.2.

HRMS (EI) Calcd. for $C_{10}H_{18}NO$ [M^+- CH_3] 168.1388, found 168.1380.

Thiyl radical addition-cyclisation

Silyl cyclopentane **12a**



12a

Chemical Formula: $C_{23}H_{31}NO_3SSi$
Molecular Weight: 429,65

To a solution of allylsilane oxime **8** (100 mg, 0.31 mmol, 1 equiv) in degassed toluene (3 mL) was added thiophenol (62 μL, 0.62 mmol, 2 equiv). The solution was thermostated at 25 °C, and the reaction mixture was irradiated with a sun lamp for 6 h. TLC then indicated complete consumption of the starting material. Solvent was then removed in vacuo. Flash chromatography (silica gel, 80:20 → 75:25 Petroleum Ether:EtOAc) afforded the title compound **12a** as a yellow solid as a 88:12 mixture with its diastereomer **12b** (125 mg, 95% combined yield).

Acetic acid 2-(dimethyl-phenyl-silanyl)-4-methoxyamino-3-phenylsulfanylmethyl-cyclopentyl ester (12a).

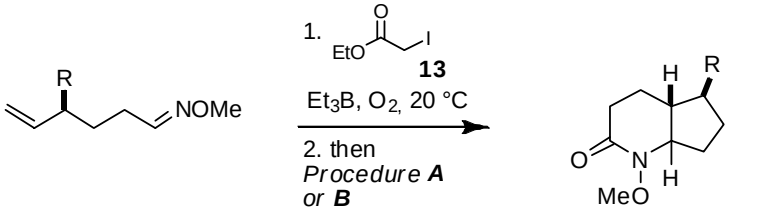
IR (neat, NaCl) ν_{max} (cm^{-1}) 2938, 1743, 1584, 1427, 1372, 1247, 1112, 1023

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 7.47-7.51 (m, 2H), 7.35-7.35 (m, 3H), 7.11-7.24 (m, 5H), 5.95 (bs, 1H), 5.41 (dt, *J* = 3.0, 6.4 Hz, 1H), 3.68 (q, *J* = 6.4 Hz, 1H), 3.50 (s, 3H), 2.85 (dd, *J* = 4.5, 12.4 Hz, 1H), 2.68 (dd, *J* = 10.6, 12.4 Hz, 1H), 2.40-2.52 (m, 1H), 2.20-2.3 (m, 1H), 1.91 (s, 3H), 1.73-1.87 (m, 2H), 0.33 (s, 3H), 0.30 (s, 3H).

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 170.2, 138.6, 136.3, 133.6, 129.1, 128.9, 127.9, 126.0 126.6, 78.6, 62.3, 61.2, 43.0, 38.8, 36.1, 34.0, 21.2, -2.6, -3.1.

HRMS (LSIMS) Calcd. for $C_{23}H_{32}NO_3SSi$ [$M+H^+$] 430.1872, found 430.1860

General Procedure for the "Two Pot" radical addition – ionic lactamization processes



4 R = $SiMe_2Ph$
8 R = H

16a-b R = $SiMe_2Ph$
17a-b R = H

To a solution of oxime (1 equiv.) in CH_2Cl_2 (0.1 M) (not degassed) under an N_2 atmosphere was added the desired ethyliodoacetate **13** (2 to 3 equivalents). The resulting mixture was cooled to the indicated temperature and Et_3B (1.0 m in hexane, 2 equivalents) was added. A balloon filled with O_2 was then adapted above the flask and the mixture was stirred at the same temperature until TLC indicated complete consumption of the starting oxime. In the case of non-silylated oxime, completion of the reaction often required additional Et_3B injections (via portions of 2 equivalents directly in the solution to avoid premature reaction with the O_2 atmosphere, 1.0 m in hexane, generally up to 6 equivalents) every 3h until no starting material could be identified by TLC. Volatile materials were then removed in *vacuo* and the resulting crude oil was treated either via the following procedure **A** or procedure **B**.

Procedure **A**

The crude mixture obtained was dissolved in benzene (ca. 0.1M) and trifluoroacetic acid was added. The resulting solution was heated at reflux for 2 h. Saturated aqueous $NaHCO_3$ was then cautiously added at 5 – 10 °C. The aqueous layer was extracted with CH_2Cl_2 (3x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and the solution was concentrated in *vacuo*. The crude oil obtained was purified by flash chromatography (silica gel).

*Lactam **16a***: Prepared according to the procedure described above from oxime **4** (0.1 g, 0.38 mmol, 1 equiv.) in CH_2Cl_2 (3.8 mL), ethyliodoacetate **13** (0.135 mL, 1.14 mmol, 3 equiv.) and triethylborane (1.0 m in hexane, 1.14 mL, 1.14 mmol, 3 equiv) at -20 °C. Volatiles were removed in *vacuo*. The resulting oil (0.079 g, 0. mmol, 1 equiv.) was taken up in benzene (10 mL) and cooled to 0 °C. Trifluoroacetic acid (0.045 mL, 0.57 mmol, 5 equiv.) was added and the mixture was heated at 85 °C for 1 h. Upon work up, purification by flash column chromatography afforded **16a** as yellow oil (80 mg, 70%). See next page for characterization data for **16a**.

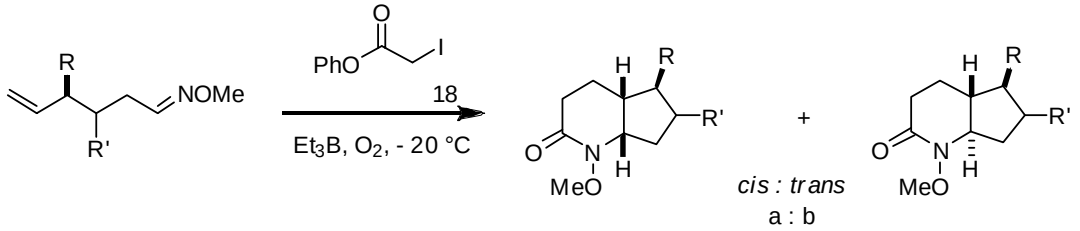
Procedure **B**

The crude material obtained from the radical cascade was dissolved in toluene (ca. 0.05M) and cooled to 0 °C. Trimethylaluminum (2.5 equivalents) was then added and the resulting solution was progressively heated at 100 °C for a period ranging from 18 to 24 h. Upon cooling to room 5 – 10 °C, 1.0M HCl was cautiously added to the mixture and stirring was

continued at room temperature for 30 minutes to ensure complete hydrolysis. The aqueous layer was extracted with CH_2Cl_2 (3x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and the solution was concentrated in *vacuo*. The crude oil obtained was purified by flash chromatography (silica gel).

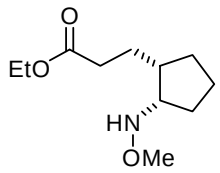
*Lactam **17a-b***: Prepared according to the procedure described above from oxime **8** (0.047 g, 0.79 mmol, 1 equiv.) in CH_2Cl_2 (5 mL), ethyliodoacetate **13** (0.19 mL, 1.58 mmol, 2 equiv.) and triethylborane (1.0 m in hexane, 1.8 mL, 1.8 mmol, 2 equiv.) at 0 °C. Additional triethylborane (1.0 m in hexane, 1.8 mL, 1.8 mmol, 2 equiv.) was required to completely consume all starting materials. Volatiles were removed in *vacuo*. Flash chromatography afforded diastereomers **14a** and **14b** (136 mg, 80% combined yield). A portion of the resulting oil (0.079 g, 0.37 mmol, 1 equiv.) was taken up in toluene (10 mL) and cooled to 0 °C. Trimethylaluminum (2M in hexane, 0.46 mL, 0.92 mmol, 2.5 equiv.) and the mixture was heated at 100 °C for 20 h. Upon work up, purification by flash column chromatography afforded a mixture (80:20) of **17a** and **17b** as yellow oil (36 mg, 57%). See next page for characterization data for **14a**, **14b**, **17a** and **17b**.

General Procedure for "One Pot" radical addition – ionic lactamization processes

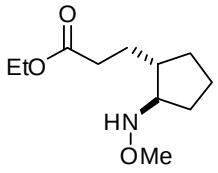


To a solution of oxime (1 equiv.) in CH_2Cl_2 (0.1 m) (not degassed) under an N_2 atmosphere was added the desired α-iodoester (see text for number of equivalents). The resulting mixture was cooled to the indicated temperature (generally -20 °C) and Et_3B (1.0 m in hexane, see text for number of equivalents) was added. A balloon filled with O_2 was then adapted above the flask and the mixture was stirred at the same temperature until TLC indicated complete consumption of the starting oxime. In the case of non-silylated oxime, completion of the reaction often required additional Et_3B injections (via portions of 2 equivalents directly in the solution to avoid premature reaction with the O_2 atmosphere, 1.0 M in hexane, see text for total number of equivalents) every 3h until no starting material could be identified by TLC. Volatile materials were then removed in *vacuo* and the resulting crude oil was purified by flash chromatography (silica gel).

Methoxyamino ester **14a-b**



14a



14b

Chemical Formula: $C_{11}H_{21}NO_3$
Molecular Weight: 215,29

Prepared according to the general procedure described above from oxime **8** (0.160 g, 1.26 mmol, 1 equiv), ethyliodoacetate **13** (0.224 mL, 1.68 mmol, 1.5 equiv) and triethylborane (1.0 m in hexane, 3.7 mL, 3.7 mmol, 3 equiv) in CH_2Cl_2 (13 mL) at –20 °C. Flash chromatography (silica gel, 85:15 Petroleum ether/EtOAc) afforded minor diastereomer **14b** (0.037 g, 17%) and major diastereoisomer **14a** (0.116 g, 53%).

3-(2-Methoxyamino-cyclopentyl)-propionic acid ethyl ester; major diastereomer (14a).

R_f = 0.33 (silica gel, 90:10 Petroleum ether:EtOAc)

IR (neat) ν_{max} (cm^{-1}) 3263, 2940, 2872, 1732, 1466, 1446, 1371, 1251, 1179, 1036

^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 5.40 (bs, 1H), 4.11 (q, *J* = 6.8 Hz, 2H), 3.49 (s, 3H), 3.39 (q, *J* = 5.6 Hz, 1H), 2.34 (t, *J* = 5.6 Hz, 2H), 1.26-1.86 (m, 9H), 1.24 (t, *J* = 7.1 Hz, 3H).

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 173.8, 62.6, 61.7, 60.2, 42.8, 33.5, 29.7, 29.5, 24.3, 21.8, 14.2

HRMS (LSIMS) calcd for $C_{11}H_{21}NO_3$ [M+] 215.1521, found 215.1525

3-(2-Methoxyamino-cyclopentyl)-propionic acid ethyl ester; minor diastereomer (14b).

R_f = 0.32 (silica gel, 85:15 Petroleum ether:EtOAc)

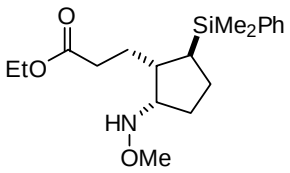
IR (neat) ν_{max} (cm^{-1}) 3525; 2938; 1732, 1466, 1447, 1374, 1254, 1182, 1036

^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 5.40 (bs, 1H), 4.10 (q, J = 7.2 Hz, 2H), 3.51 (s, 3H), 3.09 (m,1H), 2.24-2.41 (m, 2H), 1.73-1.91 (m, 3H), 1.47-1.66 (m, 5H),1.24 (t, J = 7.2 Hz, 3H), 1.20-1.24 (m, 1H)

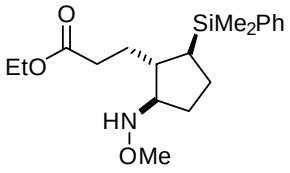
^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 173.7, 67.1, 62.1, 60.2, 42.7, 33.1, 31.4, 30.5, 29.8, 23.4, 14.2

HRMS (LSIMS) calcd for $C_{11}H_{22}NO_3$ [M+H^+] 216.1599, found 216.1600.

Silyl aminoester **15a-b**



15a



15b

Chemical Formula: $C_{19}H_{31}NO_3Si$
Molecular Weight: 349,54

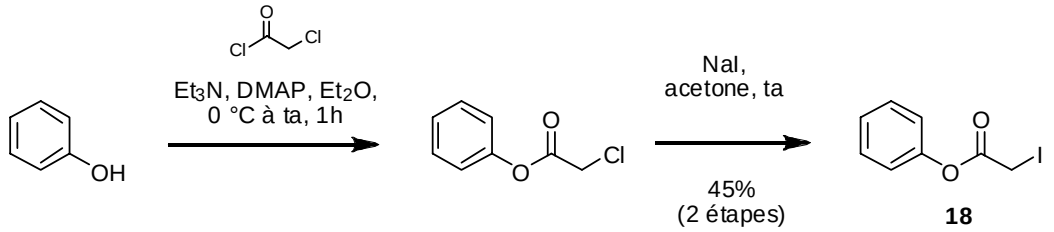
Prepared according to the general procedure described above from oxime **4** (0.07 g, 0.268 mmol, 1 equiv), ethyliodoacetate **13** (0.063 mL, 0.53 mmol, 2 equiv) and triethylborane (0.67 mL, 0.67 mmol, 2.5 equiv) in CH_2Cl_2 (2.0 mL) at –20 °C. Flash chromatography (silica gel, 25:1 PE:EtOAc) afforded the title methoxyamino ester **15a** and **15b** (0.051 g, 54% yield) as a yellow oil and lactam **16a** (0.025 g, 30% yield) as a yellow oil.

NOTE: No significant amount of lactam was initially detected on the crude ^{1}H NMR, observation which led us to assume that **15a** is transformed to **16a** during the flash chromatography on silica gel. Upon repetition of this experiment, we found that the ratios of **15a** and **16a** were **NOT** reproducible from experiment to experiment.

3-[2-(dimethyl-phenyl-silanyl)-5-methoxyamino-cyclopentyl]-propionic acid ethyl ester (15a-b). 85:15 mixture of diastereomer also containing 6-7% of lacatm **16a**. This compound was only briefly characterized by ^{1}H NMR spectroscopy.

^{1}H-NMR ($CDCl_3$, 250 MHz) δ (ppm) 7.48-7.52 (m, 2H), 7.33-7.35 (m, 3H), 5.38 (bs, 1H), 4.04 - 4.20 (m, 2H), 3.49 (s, 0.85x3H), 3.44 (s, 0.15x3H), 3.65 (q, J = 5.2 Hz, 0.85x1H), 3.18 (q, J = 5.2 Hz, 0.15x1H), 2.21-2.36 (m, 2H), 1.75-1.91 (m, 2H), 1.41-1.70 (m, 5H), 1.08-1.30 (m, 4H), 0.27-0.32 (m, 6H)

Phenyliodoacetate **18**



18

Chemical Formula: $C_8H_7IO_2$
Molecular Weight: 262,04

To a solution of phenol (2.0 g, 34 mmol, 1 equiv.) in Et_2O (34 mL), at 0 °C, was added Et_3N (7.1 mL, 51 mmol, 1.5 equiv.) and DMAP (0.41 g, 3.4 mmol, 0.1 equiv.). Chloroacetylchoride (3.0 mL, 37 mmol, 1.1 equiv.) was then added dropwise and the resulting mixture was stirred for 1 h. H_2O was then added and layers were separated. The aqueous layer

was extracted with Et_2O (2x). The combined organic extracts were washed with saturated aqueous NH_4Cl (2x), saturated aqueous NaCl (1x), dried over $MgSO_4$ and concentrated in vacuo. The resulting dark oil was taken up in acetone (34 mL) and sodium iodide was added (5.5 g, 37 mmol). The reaction was heated at reflux overnight. Once cooled to room temperature, H_2O and Et_2O were added. Layers were separated and the aqueous phase was extracted with Et_2O (2x). The combined organic extracts were washed with H_2O (1x), saturated aqueous $Na_2S_2O_3$ (2x), saturated aqueous NaCl (1x), dried over $MgSO_4$ and concentrated in vacuo. The resulting white brown solid was recrystallized to afford a first crop of pure phenyliodoacetate **18** (1.70 g, 19% yield). Concentration and recrystallization of mother liquors afforded a second crop (1.38 g, 16% yield). Finally, mothers liquors were purified by flash chromatography (silica gel, 95:5 → 96:4 Petroleum Ether:EtOAc) afforded the title compound **18** as a white solid (0.912 g, 10% yield, 45% total yield).

R_f = 0.30 (silica gel, 95:5 Petroleum Ether:EtOAc)

Mp 75-77 °C

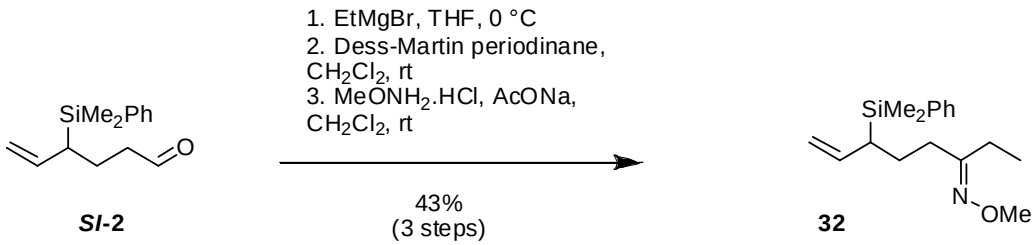
IR (neat) ν_{max} (cm^{-1}) 1736, 1418, 1249, 1185, 1147, 1075, 938

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.37-7.43 (m, 2H), 7.23-7.28 (m, 1H), 7.11-7.14 (m, 2H), 3.90 (s, 2H)

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 167.4, 150.5, 129.5, 126.2, 120.9, -6.0

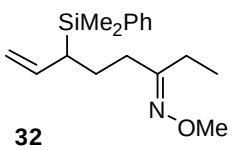
MS (EI) *m/z* calcd. for $C_8H_7IO_2$ [M+] 262.0, found 262.0.

Synthesis of ketoxime **32**



***SI*-2** **32**

Ketoxime **32**



32

Chemical Formula: $C_{17}H_{27}NOSi$
Molecular Weight: 289,49

To a solution of aldehyde ***SI*-2** (0.5 g, 2.14 mmol, 1 equiv.) in THF (8 mL) at 0 °C was added dropwise ethylmagnesium bromide (3.0 M in THF). The resulting mixture was stirred at 0 °C for 1 h and the reaction was then quenched with water and HCl 1n and diluted with Et_2O. Layers were separated and the aqueous phase was extracted with Et_2O (3x). The combined organic extracts were then washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. The resulting crude alcohol (mixture of diastereomers) was of sufficient purity to be used in the next step without further purification. Crude alcohol was dissolved in CH_2Cl_2 (21 mL) and Dess-Martin periodinane was added (1.34 g, 3.21 mmol, 1.5 equiv.). The resulting mixture was stirred at room temperature for 1 h. It was then diluted with CH_2Cl_2 and saturated aqueous $Na_2S_2O_3$ was added. Layers were separated and the aqueous layer was extracted with CH_2Cl_2 (3x). The combined organics was then washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in *vacuo*. (Flash chromatography (silica gel, 97:3 Petroleum Ether:EtOAc) eventually afforded the corresponding ketone). The crude ketone was then taken up in EtOH (5.7 mL) and H_2O (2.9 mL). Sodium acetate (0.131 g, 1.6 mmol, 2 equiv.) and methoxylamine hydrochloride (0.080 g, 0.96 mmol, 1.2 equiv.) were added. The resulting mixture was stirred at 60 °C for 2 h. Once cooled to room temperature, water was added, and the aqueous phase was extracted with CH_2Cl_2 (3x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over MgSO4, filtered and concentrated in *vacuo*. Flash chromatography (silica gel, 35:1 Petroleum Ether:EtOAc) afforded oxime **32** (1:1 mixture of E:Z stereoisomers) as a yellow oil (0.266 g, 43% over the 3 steps).

(E)-6-(dimethyl(phenyl)silyl)oct-7-en-3-one O-methyl oxime (32).

R_f = 0.37 and 0.40 (silica gel, 25:1 Petroleum Ether:EtOAc)

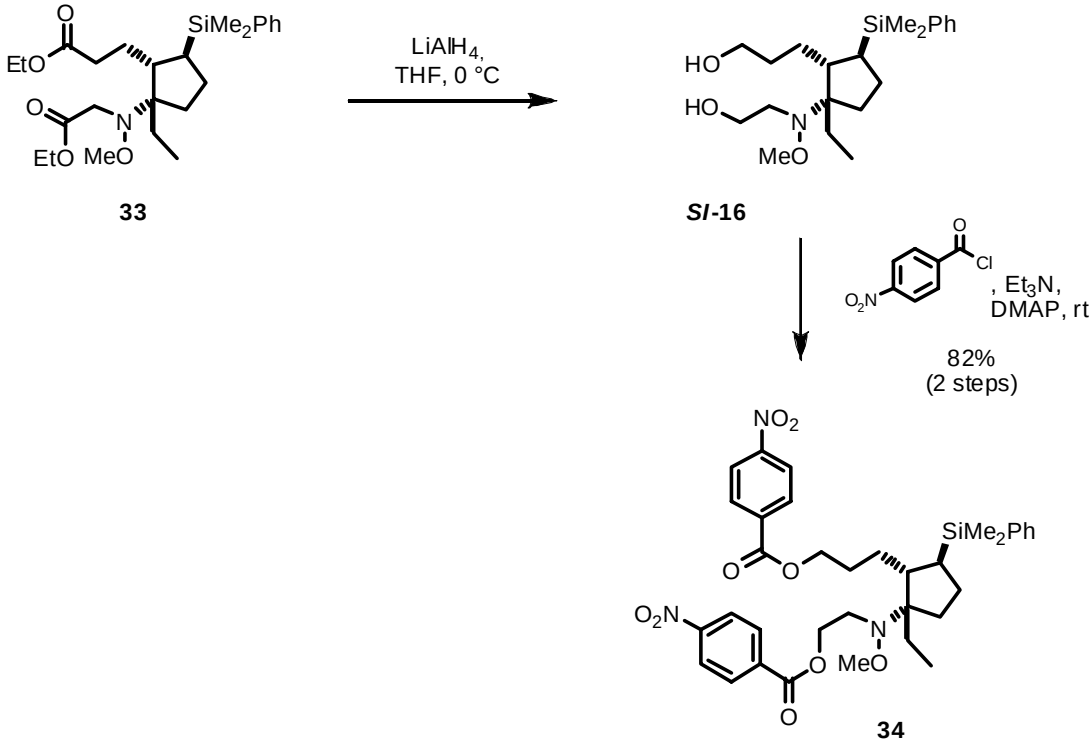
IR (neat) ν_{max} (cm^{-1}) 2858, 1625, 1427, 1249, 1114, 1053, 832

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 7.48-7.50 (m, 2H), 7.35-7.36 (m, 3H), 5.52-5.68 (m, 1H), 4.93-4.96 (m, 1H), 4.82-4.89 (m, 1H), 3.79 (s, 0.5 x 3H), 3.76 (s, 0.5 x 3H), 1.78-2.39 (m, 4H), 1.78-1.95 (m, 2H), 1.41-1.47 (m, 1H), 0.95-1.04 (m, 3H), 0.28 (s, 6H)

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 162.4 (0.5 x 1C), 162.3 (0.5 x 1C), 139.0 (1C), 137.5 (1C), 134.0 (2C), 129.0 (1C), 127.6 (2C), 113.4 (0.5 x 1C), 113.1 (0.5 x 1C), 61.0 (0.5 x 1C), 60.9 (0.5 x 1C), 34.8 (0.5 x 1C), 34.3 (0.5 x 1C), 33.3 (0.5 x 1C), 28.0 (0.5 x 1C), 27.6 (0.5 x 1C), 25.6 (0.5 x 1C), 24.7 (0.5 x 1C), 21.4 (0.5 x 1C), 11.1 (0.5 x 1C), 10.3 (0.5 x 1C), -4.5 (1C), -5.2 (1C)

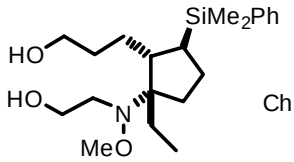
HRMS (EI) calcd. for $C_{17}H_{27}NOSi$ [M^+] 289.1862, found 289.1883.

Synthesis of bis p-nitrobenzoylester **34**



33 ***SI*-16** **34**

Diol ***SI*-16**



Chemical Formula: $C_{21}H_{37}NO_3Si$
Molecular Weight: 379,61

***SI*-16**

$LiAlH_4$ (156 mg, 4.1 mmol, 2.7 equiv.) was slurried in THF (12 ml). The grey mixture was cooled to 0 °C, and **32** (710 mg, 1.53 mmol, 1 equiv.) was added as a solution in THF (5 mL). The mixture was stirred 0.5 h at 0 °C and then carefully quenched by successive addition of H_2O (0.16 mL), NaOH 15% (0.16 mL) and H_2O (0.48 mL). Upon warming to room temperature, the white slurry was filtered through a pas of Celite®. The white cake was further washed with ether. The combined organic filtrate was concentrated in vacuo. The diol ***SI*-16** can eventually be purified by column chromtatography on silica gel (EtOAc).

3-(5-(dimethyl(phenyl)silyl)-2-ethyl-2-((2ydroxyethyl)(methoxy)amino)cyclopentyl)propan-1-ol (*SI*-16).

R_f = 0.52 (EtOAc)

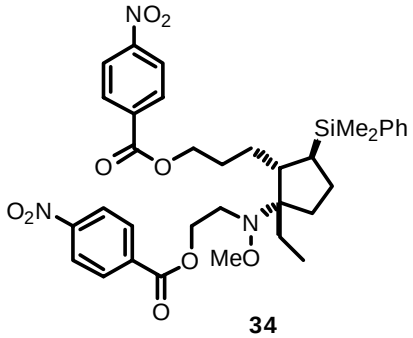
IR (neat, NaCl) ν_{max} (cm^{-1}) 3416, 1469, 1427, 1248, 1110, 1046

^{1}H-NMR (250 MHz, $CDCl_3$) δ (ppm) 7.48-7.51 (m, 2H), 7.33-7.35 (m, 3H), 3.70-3.79 (m, 2H), 3.54 (s, 3H), 3.41 (t, *J* = 6.0 Hz, 2H), 2.81-2.96 (m, 2H), 1.61-1.97 (m, 4H), 1.10-1.61 (m, 9H), 0.83 (t, *J* = 7.5 Hz, 3H), 0.29 (s, 3H), 0.28 (s, 3H)

^{13}C-NMR (62.5 MHz, $CDCl_3$) δ (ppm) 138.8, 133.9, 128.9, 127.6, 75.2, 63.9, 63.1, 60.2, 56.0, 48.5, 32.1, 31.3, 31.3, 28.3, 28.1, 26.0, 9.5, -3.5, -4.1.

HRMS (TOF) Calcd. for $C_{21}H_{37}NO_3SiNa$ [M+Na^+] 402.2440, found 402.2447.

Bis-*p*-nitrobenzoyl ester **34**



34

Chemical Formula: $C_{35}H_{43}N_3O_9Si$
Molecular Weight: 677,82

The crude diol ***SI*-16** (1.53 mmol, 1 equiv.) was then taken up in CH_2Cl_2 (4mL) and added dropwise to a CH_2Cl_2 (11 ml) solution containing Et_3N (1.0 mL, 7.65 mmol, 5 equiv.), *p*-nitrobenzoylchloride (852 mg, 4.59 mmol, 3 equiv.) and DMAP (cat. amount). The yellow mixture was stirred for 0.5 h at room temperature. Saturated aqueous NH_4Cl was added and the organic layer was further washed with saturated aqueous NH_4Cl (1x), saturated aqueous $NaHCO_3$ (1x), brine (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Flash column chromatography (silica gel, 90:10 to 83:17 petroleum ether/EtOAc) afforded the title compound **34** as a yellow foamy solid (1.037 g, 82% over the 2 steps).

2-((-3-(dimethyl(phenyl)silyl)-1-ethyl-2-(3-(4-nitrobenzoyloxy)propyl)cyclopentyl)(methoxy)amino)ethyl 4-nitrobenzoate (34).

R_f = 0.17 (Petroleum Ether:EtOAc)

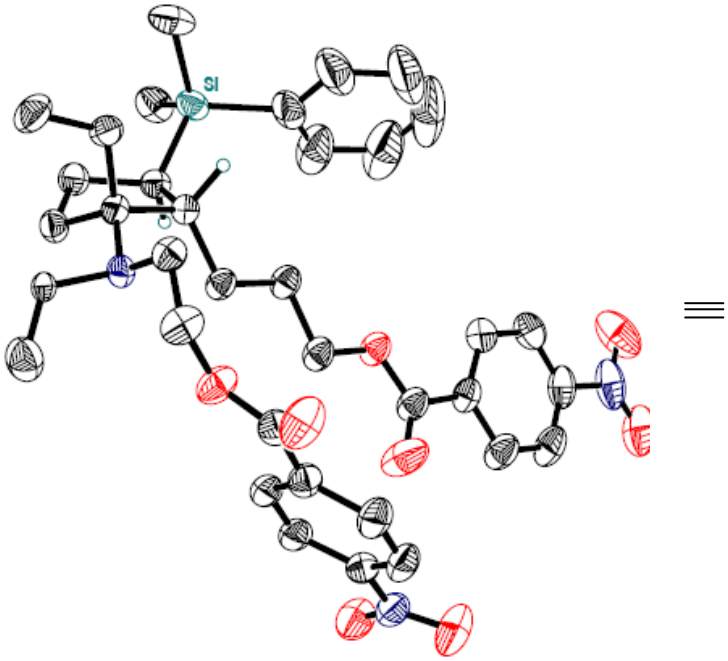
Mp 99-102 °C

IR (neat, NaCl) ν_{max} (cm^{-1}) 3428, 1724, 1529, 1348, 1276, 1104

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) = 8.09–8.26 (m, 9H), 7.34–7.50 (m, 2H), 7.2–7.30 (m, 3H), 4.52 (t, *J* = 6.4 Hz, 2H), 3.96 (t, *J* = 6.8 Hz, 2H), 3.55 (s, 3H), 3.03 – 3.22 (m, 2H), 1.76 – 1.93 (m, 3H), 1.40 – 1.76 (m, 5H), 1.12 – 1.30 (m, 3H), 0.87 (t, *J* = 7.2 Hz, 3H), 0.30 (s, 3H), 0.29 (s, 3H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) = 164.6, 164.5, 150.6, 150.4, 138.7, 135.7, 135.4, 133.9, 130.6, 130.6, 129.0, 127.7, 123.6, 123.5, 75.3, 66.2, 64.0, 63.6, 52.8, 48.8, 31.9, 31.9, 28.6, 28.0, 27.4, 26.1, 9.4, -3.4, -4.1.

X-Ray of bis-*p*-nitrobenzoyl ester **34**



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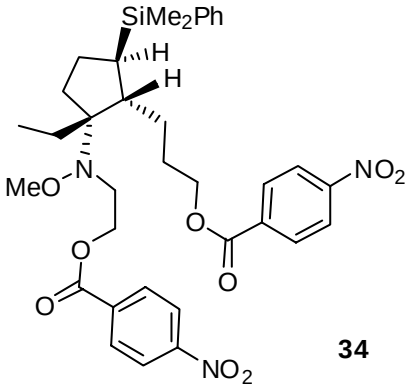
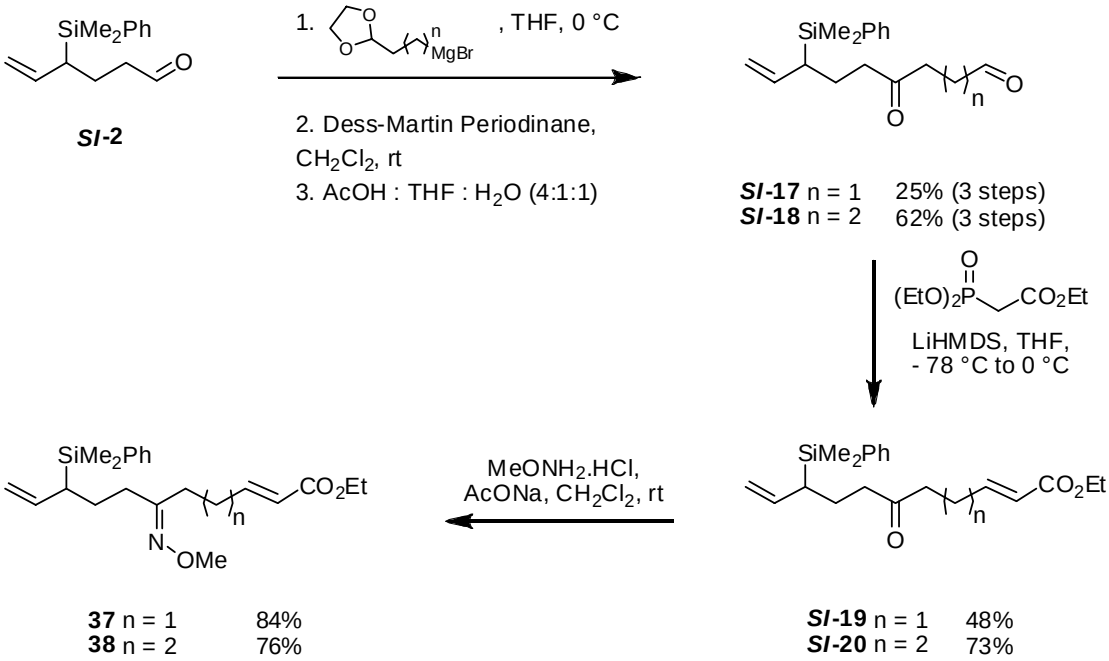
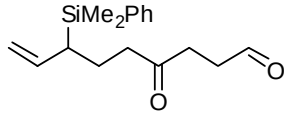


34

Synthesis of ketoximes **37** and **38**



Aldehyde ***SI*-17**



***SI*-17**

Chemical Formula: $C_{17}H_{24}O_2Si$
Molecular Weight: 288,46

To a solution containing activated magnesium turnings (161 mg, 6.7 mmol, 2 equiv.) in THF (10 mL) was slowly added 2-(2-bromoethyl)-1,3-dioxolane (0.61 mL, 5.17 mmol, 1.5 equiv.). The resulting mixture was heated at reflux for 1.5h. The yellow solution was then added to a cooled (0 °C) solution of aldehyde ***SI*-2** (800mg, 3.44 mmol, 1 equiv.) in THF (10 mL). The resulting mixture was allowed to gradually warm up to room temperature and stirred at room temperature overnight (ca. 15h). It was then quenched by the addition of HCl 1N. Layers were separated and the aqueous phase was extracted with Et_2O (2x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. The crude mixture of alcohols (mixture of diastereomers) was dissolved in CH_2Cl_2 (15 mL) and solid $NaHCO_3$ (630 mg, 7.5 mmol, 5 equiv.) and Dess-Martin periodinane (1.27 g, 3.00 mmol, 2 equiv.) were successively added. The mixture was stirred at room temperature for 3h. The mixture was then quenched with saturated aqueous $NaHCO_3$:$Na_2S_2O_3$ (1:1). The aqueous layer was extracted with Et_2O (1x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo.

The corresponding acetal was taken up in H_2O (1.5 mL) and AcOH (3 mL). The resulting mixture was heated at 60 °C for 4h. It was then carefully quenched by adjusting the pH to 8 by the addition of NaOH 10%. The solution was diluted with Et_2O. The aqueous layers was drained off and extracted with Et_2O (2x). The combined organic extracts were washed with saturated aqueous NH_4Cl (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 90 : 10 Petreoleum Ether / EtOAc) affored the sensitive aldehyde ***SI*-17** (248 mg, 25 % yield over 3 steps) as a colourless oil.

7-(dimethyl(phenyl)silyl)-4-oxonon-8-enal (*SI*-17)

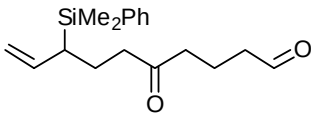
R_f = 0.10 (90 : 10 Petroleum Ether:EtOAc)

IR (neat, NaCl) ν_{max} (cm^{-1}) 2957, 1713, 1625, 1427, 1249, 1113, 833

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 9.78 (s, 1H), 7.47 – 7.51 (m, 2H), 7.33 – 7.35 (m, 3H), 5.53 (ddd, *J* = 7.0, 10.1, 17.1 Hz, 1H), 4.93 (dd, *J* = 1.5, 10.4 Hz, 1H), 4.82 (dd, *J* = 0.9, 17.1 Hz, 1H), 2.29 – 2.73 (m, 6H), 1.51 – 1.95 (m, 3H), 0.28 (s, 6H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 208.9, 200.5, 138.8, 137.2, 134.0, 129.1, 127.7, 113.5, 42.0, 37.4, 34.8, 34.0, 22.4, - 4.6, - 5.4.

Aldehyde ***SI*-18**



Chemical Formula: $C_{18}H_{26}O_2Si$
Molecular Weight: 302,48

***SI*-18**

To a solution containing activated magnesium turnings (141 mg, 5.9 mmol, 12.0 equiv.) in THF (10 mL) was slowly added 2-(3-bromopropyl)-1,3-dioxolane (1.21 g, 4.51 mmol, 1.5 equiv.). The resulting mixture was heated at reflux for 1.5h. The yellow solution was then added to a cooled (0 °C) solution of aldehyde ***SI*-2** (700 mg, 3.01 mmol, 1 equiv.) in THF (10 mL). The resulting mixture was allowed to gradually warm up to room temperature and stirred at room temperature overnight (ca. 15h). It was then quenched by the addition of HCl 1N. Layers were separated and the aqueous phase was extracted with Et_2O (2x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. The reaction was also run separately on a 1.5 mmol scale (relative to the aldehyde). The combined crude mixture of alcohols (mixture of diastereomers, theoretically 4.5 mmol if we assume a 100% yield in the first step)) was dissolved in CH_2Cl_2 (15 mL) and solid $NaHCO_3$ (1.26 g, 15 mmol, 3.3 equiv.) and Dess-Martin periodinane (2.93 g, 6.9 mmol, 1.5 equiv.) were successively added. The mixture was stirred at room temperature for 2.5h. The mixture was then quenched with saturated aqueous $NaHCO_3$:$Na_2S_2O_3$ (1:1). The aqueous layer was extracted with Et_2O (1x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo.

The corresponding acetal was taken up in H_2O (2.8 mL), THF (2.8 mL) and AcOH (11 mL). The resulting mixture was heated at 60 °C for 2h. It was then carefully quenched by adjusting the pH to 8 by the addition of saturated aqueous Na_2CO_3. The solution was diluted with Et_2O. The aqueous layers was drained off and extracted with Et_2O (2x) and EtOAc (1x). The combined organic extracts were washed with saturated aqueous NH_4Cl (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 88:12 Petreoleum Ether / EtOAc) afforded the sensitive aldehyde ***SI*-18** (645 mg, 48 % yield over 3 steps) as a colourless oil.

8-(dimethyl(phenyl)silyl)-5-oxodec-9-enal (*SI*-18)

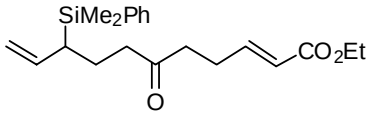
R_f = 0.41 (86:14 Petroleum Ether:EtOAc)

IR (neat, NaCl) ν_{max} (cm^{-1}) 2956, 1712, 1428, 1250, 1114, 832

^{1}H NMR (300 MHz, $CDCl_3$) δ (ppm) 9.72 (s, 1H), 7.35 – 7.50 (m, 2H), 7.33 – 7.35 (m, 3H), 5.53 (ddd, *J* = 9.0, 10.2, 17.0 Hz, 1H), 4.92 (dd, *J* = 1.5, 10.2 Hz, 1H), 4.81 (dd, *J* = 1.9, 17.0 Hz, 1H), 2.23 – 2.50 (m, 6H), 1.45 – 1.89 (m, 5H), 0.28 (s, 3H), 0.27 (s, 3H)

^{13}C NMR (75 MHz, $CDCl_3$) δ (ppm) 210.4, 201.8, 138.9, 137.2, 134.0, 129.0, 127.7, 113.4, 42.9, 42.2, 41.4, 34.0, 22.4, 16.0, - 4.6, - 5.4.

α,β unsaturated ester ***SI*-19**



***SI*-19**

Chemical Formula: $C_{21}H_{30}O_3Si$
Molecular Weight: 358,55

Preparation of LiHMDS solution: To a stirring solution of hexamethyldisilylazane (808 mg, 5 mmol, 1 equiv.) in THF (2.8 mL) was added at – 10 °C, n-BuLi (2.3 M in hexane, 2.3 mL, 5 mmol, 1 equiv.). The resulting pale yellow solution was stirred at – 30 °C and then kept until needed in the freezer at – 20 °C (this LiHMDS solution was titrated at 0.98 M).

To a solution of triphenylphosphonoacetate (0.5 mL, 2.52 mmol, 1.7 equiv.) in THF (10 mL) was added at – 10 °C, LiHMDS (0.98 M in THF/hexane, 1.98 mL, 1.98 mmol, 1.3 equiv.). The solution was stirred at room temperature for 30 minutes and was then added to a solution of aldehyde ***SI*-17** (110 mg, 0.38 mmol, 1 equiv.) in THF (3 mL) at 0 °C. The reaction mixture was kept at this temperature 1h. The reaction was quenched with H_2O and extracted with Et_2O (3x). The combined organic extracts were washed with saturated aqueous NH_4Cl (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 94:6→92:8 Petreoleum Ether / EtOAc) yielded α,β unsaturated ester ***SI*-19** (66 mg, 48 % yield) (*E*:*Z* ratio >10:1) as a colourless oil.

(E)-ethyl 9-(dimethyl(phenyl)silyl)-6-oxoundeca-2,10-dienoate (*SI*-19)

R_f = 0.37 (92:8 Petroleum Ether:EtOAc)

IR (neat, NaCl) ν_{max} (cm^{-1}) 2957, 1715, 1652, 1427, 1368, 1264, 1180

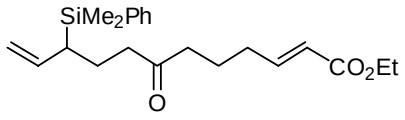
^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 7.39-7.42 (m, 2H), 7.25-7.28 (m, 3H), 6.82 (ddd, *J* = 6.8, 9.0, 12.8 Hz, 1H), 5.70 (d, *J* = 15.5 Hz, 1H), 5.45 (ddd, *J* = 9.3, 10.2, 17.3 Hz, 1H), 4.84

(dd, *J* = 1.9, 10.6 Hz, 1H), 4.73 (d, *J* = 17.0 Hz, 1H), 4.08 (q, *J* = 7.2 Hz, 2H), 2.17-2.48 (m, 6H), 1.42-1.75 (m, 3H), 1.19 (t, *J* = 7.2 Hz, 3H), 0.20 (s, 6H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 202.2, 166.4, 147.2, 138.8, 137.2, 134.0, 129.1, 127.7, 121.9, 113.5, 60.2, 42.2, 40.7, 34.0, 25.9, 22.4, 14.2, - 4.6, - 5.4

HRMS (EI) Calcd. for $C_{21}H_{30}O_3Si$ [M+]358.1964, found 358.1953.

α,β unsaturated ester ***SI*-20**



***SI*-20**

Chemical Formula: $C_{22}H_{32}O_3Si$
Molecular Weight: 372,57

Preparation of LiHMDS solution: To a stirring solution of hexamethyldisilylazane (808 mg, 5 mmol, 1 equiv.) in THF (2.8 mL) was added at – 10 °C, n-BuLi (2.3 M in hexane, 2.3 mL, 5 mmol, 1 equiv.). The resulting pale yellow solution was stirred at – 30 °C and then kept until needed in the freezer at – 20 °C (this LiHMDS solution was titrated at 0.98 M).

To a solution of triphenylphosphonoacetate (0.5 mL, 2.52 mmol, 1.7 equiv.) in THF (10 mL) was added at – 10 °C, LiHMDS (0.98 M in THF/hexane, 1.98 mL, 1.98 mmol, 1.3 equiv.). The solution was stirred at room temperature for 30 minutes and was then added to a solution of aldehyde ***SI*-18** (448 mg, 1.48 mmol, 1 equiv.) in THF (14 mL) at room temperature. The reaction mixture was kept at this temperature for 30 minutes and was then quenched with saturated aqueous NH_4Cl. Layers were separated and the organic layer was washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 91:9 Petreoleum Ether / EtOAc) yield α,β unsaturated ester ***SI*-20** (402 mg, 73 % yield) (*E*:*Z* ratio 8:1) as a colourless oil.

(E)-ethyl 10-(dimethyl(phenyl)silyl)-7-oxododeca-2,11-dienoate (*SI*-20)

R_f = 0.29 and 0.2 (91:9 Petroleum Ether:EtOAc)

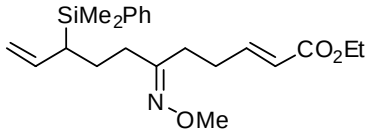
IR (neat, NaCl) ν_{max} (cm^{-1}) 2956, 1715, 1427, 1368, 1264, 1182, 1034

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 7.47 – 7.50 (m, 2H), 7.33 – 7.36 (m, 3H), 6.89 (ddd, *J* = 6.7, 8.7, 13.9 Hz, 1H), 5.79 (d, *J* = 15.8 Hz, 1H), 5.53 (ddd, *J* = 9.4, 10.2, 17.0 Hz, 1H), 4.92 (dd, *J* = 1.9, 10.6 Hz, 1H), 4.81 (d, *J* = 18.1 Hz, 1H), 4.18 (q, *J* = 7.2 Hz, 2H), 2.39 – 2.50 (m, 1H), 2.20 – 2.36 (m, 3H), 2.15 (q, *J* = 7.2 Hz, 2H), 1.31 – 1.83 (m, 4H), 1.28 (t, *J* = 7.2 Hz, 3H), 0.28 (s, 6H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 210.6, 166.5, 148.1, 138.9, 137.3, 134.0, 129.1, 127.7, 121.9, 113.4, 60.2, 42.2, 41.8, 34.1, 22.4, 21.9, 14.2, - 4.6, - 5.4

HRMS (EI) Calcd. for $C_{22}H_{32}O_3Si$ [M+] 372.2121, found 372.2105.

Oxime **37**



37

Chemical Formula: $C_{22}H_{33}NO_3Si$
Molecular Weight: 387,59

To a solution of ketone ***SI*-19** (64 mg, 0.215 mmol, 1 equiv.) in ethanol (0.5 mL) and H_2O (1.5 mL) was added methoxyamine hydrochloride (16 mg, 0.60 mmol, 1.1 equiv.) and sodium acetate (24 mg, 0.29 mmol, 1.5 equiv.). The resulting mixture was stirred at 70 °C for 3h. It was then quenched by the addition of H_2O and the aqueous layer was extracted with Et_2O (3x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 94:6 Petreoleum Ether / EtOAc) yielded oxime **37** (59 mg, 84 % yield) as a 1:1 mixture of E/Z stereoisomers, as a colourless oil.

(2E)-ethyl 9-(dimethyl(phenyl)silyl)-6-(methoxyimino)undeca-2,10-dienoate (37)

R_f = 0.26 and 0.20 (94:6 Petroleum Ether:EtOAc)

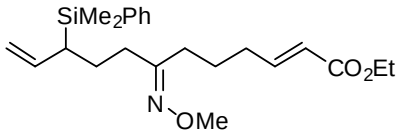
IR (neat, NaCl) ν_{max} (cm^{-1}) 2957, 1722, 1656, 1627, 1428, 1264, 1053

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 7.47-7.50 (m, 2H), 7.33-7.36 (m, 3H), 6.85 (ddd, *J* = 6.4, 9.0, 13.2 Hz, 1H), 5.71 (dd, *J* = 5.7, 15.8 Hz, 1H), 5.51 (ddd, *J* = 8.7, 9.4, 17.3 Hz, 1H), 4.82 (d, *J* = 10.6 Hz, 1H), 4.74 (dd, *J* = 3.4, 16.2 Hz, 1H), 4.08 (q, *J* = 7.2 Hz, 2H), 3.71 (s, 0.5x3C), 3.68 (s, 0.5x3C), 2.08-2.34 (m, 6H), 1.38-1.65 (m, 3H), 1.21 (t, *J* = 6.8 Hz, 3H), 0.2 (s, 6H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) 166.5, 159.3 (0.5x1C), 159.3 (0.5x1C), 147.7 (0.5x1C), 147.6 (0.5x1C), 138.8, 137.4, 134.0 (2C), 129.0, 127.6 (2C), 121.8 (0.5x1C), 121.7 (0.5x1C), 113.4 (0.5x1C), 113.2 (0.5x1C), 61.1, 60.2, 34.7 (0.5x1C), 34.2 (0.5x1C), 33.8 (0.5x1C), 32.6 (0.5x1C), 28.8 (0.5x1C), 28.4 (0.5x1C), 28.2 (0.5x1C), 26.6 (0.5x1C), 25.4 (0.5x1C), 24.6 (0.5x1C), 14.2, -4.5, -5.4

HRMS (EI) Calcd. for $C_{22}H_{33}NO_3Si$ [M+] 387.2230, found 387.2257.

Oxime **38**



Chemical Formula: $C_{23}H_{35}NO_3Si$
Molecular Weight: 401,61

38

To a solution of ketone ***SI*-20** (300 mg, 0.80 mmol, 1 equiv.) in ethanol (3.0 mL) and H_2O (2.0 mL) was added methoxyamine hydrochloride (232 mg, 2.78 mmol, 3.5 equiv.) and sodium acetate (358 mg, 4.37 mmol, 5.5 equiv.). The resulting mixture was stirred at 60 °C for 2h. It was then quenched by the addition of H_2O and the aqueous layer was extracted with CH_2Cl_2 (3x). The combined organic extracts were washed with saturated aqueous $NaHCO_3$ (1x), saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 91:9 Petreoleum Ether / EtOAc) yielded oxime **38** (245 mg, 76 % yield) as a 1.4:1 mixture of E/Z stereoisomers, as a colourless oil.

(2E)-ethyl 10-(dimethyl(phenyl)silyl)-7-(methoxyimino)dodeca-2,11-dienoate (38)

R_f = 0.40 and 0.42 (91:9 Petroleum Ether:EtOAc)

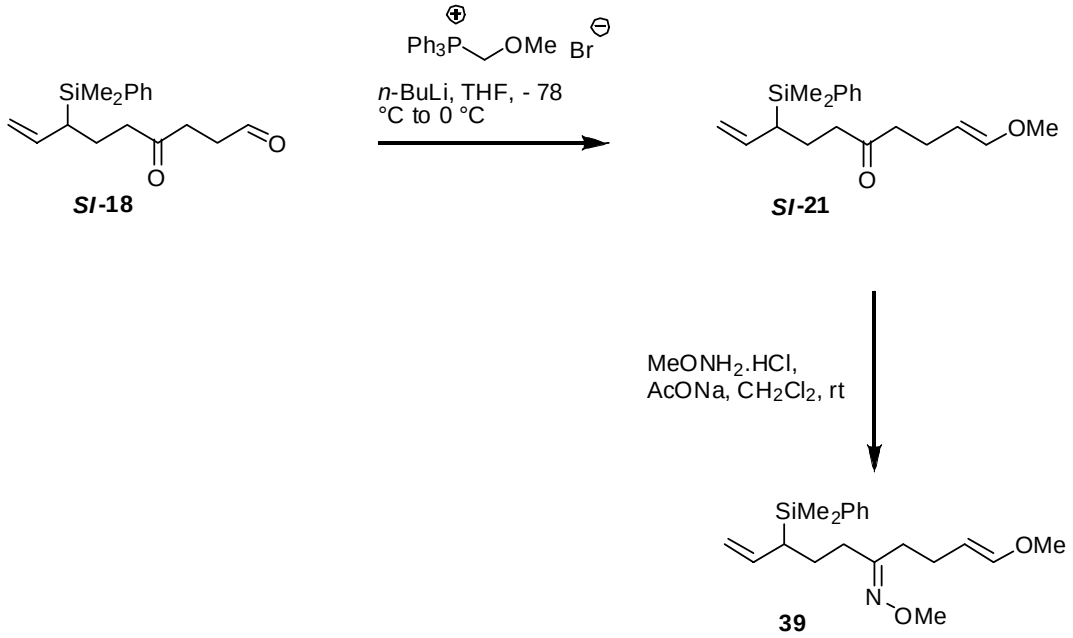
IR (neat, NaCl) ν_{max} (cm^{-1}) 2954, 1721, 1654, 1625, 1427, 1264, 1182, 1051, 968

^{1}H-NMR (MHz, $CDCl_3$) δ (ppm) 7.46 – 7.49 (m, 2H), 7.34 – 7.36 (m, 3H), 6.91 (ddd, *J* = 6.8, 8.6, 15.4, 1H), 5.80 (ddd, *J* = 1.5, 3.4, 15.8 Hz, 1H), 5.59 (ddd, *J* = 9.0, 10.2, 17.7 Hz, 1H), 4.94 (d, *J* = 10.6 Hz, 1H), 4.84 (dd, *J* = 3.8, 17.0 Hz, 1H), 4.19 (q, *J* = 6.9 Hz, 2H), 3.78 (s, 0.5 x 3H), 3.75 (s, 0.5 x 3H), 1.92 – 2.35 (m, 6H), 1.76 – 1.94 (m, 5H), 1.29 (t, *J* = 7.1 Hz, 3H), 0.27 – 0.28 (s, 6H)

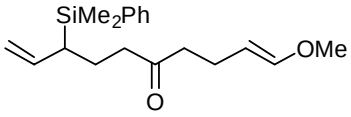
^{13}C-NMR (MHz, $CDCl_3$) δ (ppm) 166.6, 160.4 (0.5C), 160.2 (0.5C), 148.3 (0.5C), 148.2 (0.5C), 138.9, 137.4, 134.0 (2C), 129.0, 127.6 (2C), 121.7, 113.4 (0.5C), 113.2 (0.5C), 61.0, 60.1, 34.8 (0.5C), 34.2 (0.5C), 33.7, 32.0 (0.5C), 31.7 (0.5C), 28.2 (0.5C), 27.6 (0.5C), 25.5 (0.5C), 24.8 (0.5C), 24.6 (0.5C), 24.2 (0.5C), 14.3, - 4.5, - 5.4

HRMS (EI) Calcd. for $C_{23}H_{35}NO_3Si$ [$M+Na^+$] 424.2284, found 424.2290.

Synthesis of enol ether oxime **39**



Enol ether ketone ***SI*-21**



Chemical Formula: $C_{19}H_{28}O_2Si$
Molecular Weight: 316,51

To a solution of methoxymethyl)triphenylphosphonium chloride (267 mg, 0.78 mmol, 2.2 equiv.) in THF (3.1 mL) at 0 °C was added *n*-BuLi (1.9 M in hexane, 0.41 mL, 0.78 mmol, 2.2 equiv.). The dark red mixture was stirred for 10 minutes at 0 °C and 45 minutes at room temperature. This solution of ylid was then added to a solution of aldehyde ***SI*-18** (100 mg, 0.35 mmol, 1 equiv.) in THF at 0 °C. The resulting mixture was then stirred at room temperature for 2h. The mixture was quenched by the addition of H_2O and saturated aqueous NH_4Cl. The aqueous layer was extracted with Et_2O (2x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 95:5→ 94:6 Petreoleum Ether / EtOAc) yielded enol ether ***SI*-21** (24.5 mg, 23 % yield) (as a 2:1 mixture of *Z*/*E* stereoisomers) as a colourless oil.

(E)-8-(dimethyl(phenyl)silyl)-1-methoxydeca-1,9-dien-5-one (*SI*-21)

R_f = 0.20 and 0.26 (95 : 5 Petroleum Ether:EtOAc)

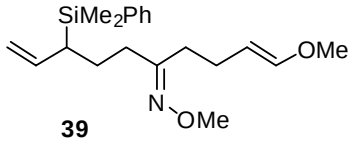
IR (neat, NaCl) ν_{max} (cm^{-1}) 3070, 2954, 1713, 1657, 1427, 1249, 1210, 1113

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 7.34-7.43 (m, 2H), 7.21-7.28 (m, 3H), 6.19 (d, *J* = 12.4 Hz, 0.6x1H), 5.75 (d, *J* = 6.4 z, 0.4x1H), 5.43 (dt, *J* = 9.8, 17.0 Hz, 1H), 4.82 (d, *J* = 10.2 Hz, 1H), 4.71 (dd, *J* = 1.1, 16.9 Hz, 1H), 4.55 (dt, *J* = 7.2, 12.4 Hz, 0.6x1H), 4.19 (q, *J* = 7.2 Hz, 0.4x1H), 3.45 (s, 0.4x3H), 3.36 (s, 0.6x3H), 2.00-2.42 (m, 6H), 1.38-1.74 (m, 3H), 0.18 (s, 6H)

^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) (Z stereoisomer): 211.0, 147.9, 139.1, 137.5, 134.2(2C), 129.2, 127.8(2C), 113.5,101.6, 56.0, 44.1, 42.5, 34.2, 22.5, 22.3, -4.4, -5.2

(E stereoisomer): 211.3, 146.9, 139.1, 137.5, 134.2 (2C), 129.2, 127.8 (2C), 113.5, 105.1, 59.6, 43.0, 42.1, 34.2, 22.6, 18.7, -4.4, -5.2.

Oxime **39**



39

Chemical Formula: $C_{20}H_{31}NO_2Si$
Molecular Weight: 345,55

To a solution of ketone ***SI*-21** (23 mg, 0.073 mmol, 1 equiv.) in ethanol (0.5 mL) and H_2O (1.5 mL) was added methoxyamine hydrochloride (17 mg, 0.20 mmol, 2.7 equiv.) and sodium acetate (26 mg, 0.32 mmol, 4.4 equiv.). The resulting mixture was stirred at 60 °C for 2h. It was then quenched by the addition of H_2O and the aqueous layer was extracted with Et_2O (3x). The combined organic extracts were washed with saturated aqueous NaCl (1x), dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography (silica gel, 96 : 4 Petreoleum Ether / EtOAc) yield oxime **39** (22 mg, 83 % yield) as a 2:1 mixture of *E*/*Z* enol ether (each of these enol ethers present as an 1:1 mixture of *E*/*Z* oxime stereoisomers) as a colourless oil.

(1E)-8-(dimethyl(phenyl)silyl)-1-methoxydeca-1,9-dien-5-one O-methyl oxime (39)

R_f = 0.19 (95:5Petroleum Ether:EtOAc)

^{1}H-NMR (300 MHz, $CDCl_3$) δ (ppm) 7.34-7.43 (m, 2H5), 7.20-7.30 (m, 3H5), 6.17 (d, *J* = 12.8 Hz, 0.6x1H13), 5.76 (dd, *J* = 1.1, 6.0 Hz, 0.4x1H), 5.50 (ddd, *J* = 9.0, 9.8, 18.8 Hz, 1H), 4.84 (dd, *J* = 2.3, 10.6 Hz, 1H), 4.75 (dd, *J* = 4.5, 17.0 Hz, 1H), 4.49-4.62 (m, 0.6x1H), 4.19 (quint, *J* = 6.8 Hz, 0.4x1H), 3.68 (s, 0.5x3H), 3.66 (0.5x3H), 3.45-3.46 (m, 0.3x3H), 3.66 (s, 0.6x3H), 1.81-2.29 (m, 6H), 1.30-1.69 (m, 3H), 0.17 (s, 6H)

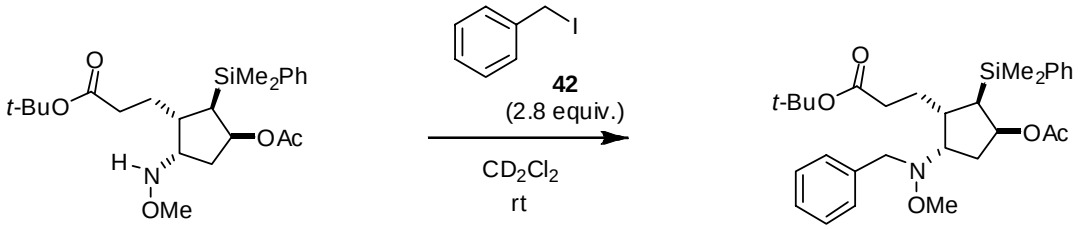
^{13}C-NMR (75 MHz, $CDCl_3$) δ (ppm) Major stereoisomer (1:1 E/Z mixture): 160.9 (0.5xC), 160.7 (0.5xC), 147.7 (0.5xC), 147.6 (0.5xC), 139.1, 134.2 (2C), 129.2, 127.8 (2C), 113.5 (0.5xC), 113.3 (0.5xC), 102.1 (0.5xC), 101.9 (0.5xC), 61.1 (0.5xC), 61.1 (0.5xC), 56.0

(0.5xC), 56.0 (0.5xC), 35.7 (0.5xC); 35.0 (0.5xC), 34.4 (0.5xC), 34.1 (0.5xC), 29.6 (0.5xC), 28.4 (0.5xC), 25.7 (0.5xC), 25.1 (0.5xC), 24.8 (0.5xC), 24.3 (0.5xC), -4.3, -5.1 (0.5xC), -5.2 (0.5xC)

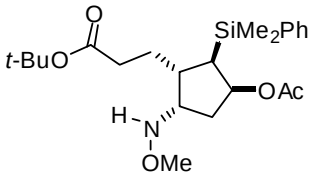
Minor stereoisomer (1:1 E/Z mixture): 161.2 (0.5xC), 161.1 (0.5xC), 146.8, 139.1, 137.7 (0.5xC), 137.6 (0.5xC), 134.2 (2C), 129.1, 127.8 (2C), 113.4 (0.5xC), 113.2 (0.5xC), 105.7 (0.5xC), 105.4 (0.5xC), 61.1 (0.5xC), 61.1 (0.5xC), 59.6 (0.5xC), 59.6 (0.5xC), 35.0 (0.5xC); 34.4 (0.5xC), 34.3 (0.5xC), 33.8 (0.5xC), 28.1 (0.5xC), 28.1 (0.5xC), 25.7 (0.5xC), 24.8 (0.5xC), 21.2 (0.5xC), 20.4 (0.5xC), -4.4, -5.0 (0.5xC), -5.1 (0.5xC)

HRMS (EI) Calcd. for $C_{20}H_{31}NO_2Si$ [M+] 345.2124, found 345.2131.

Control experiment excluding alkylation with benzyliodide in the absence of base

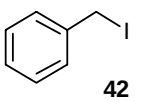


27 ***SI*-22**



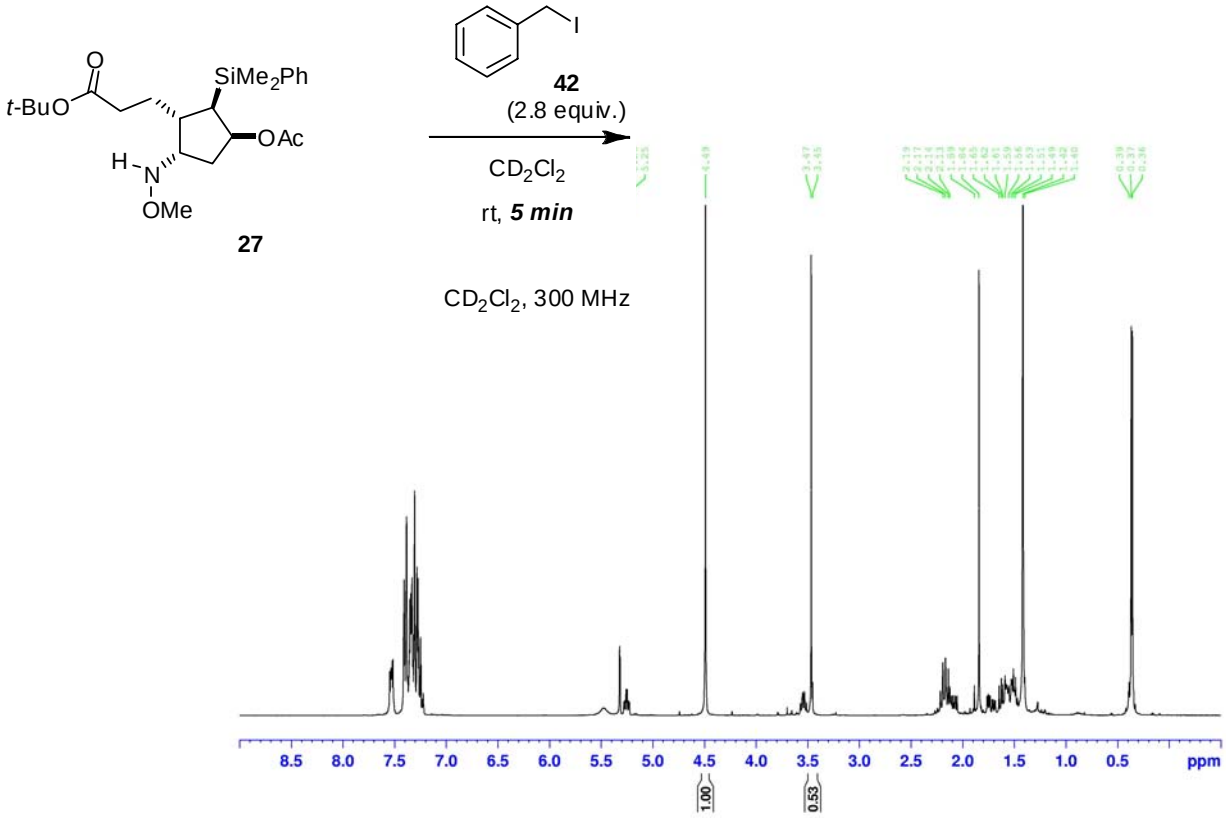
27

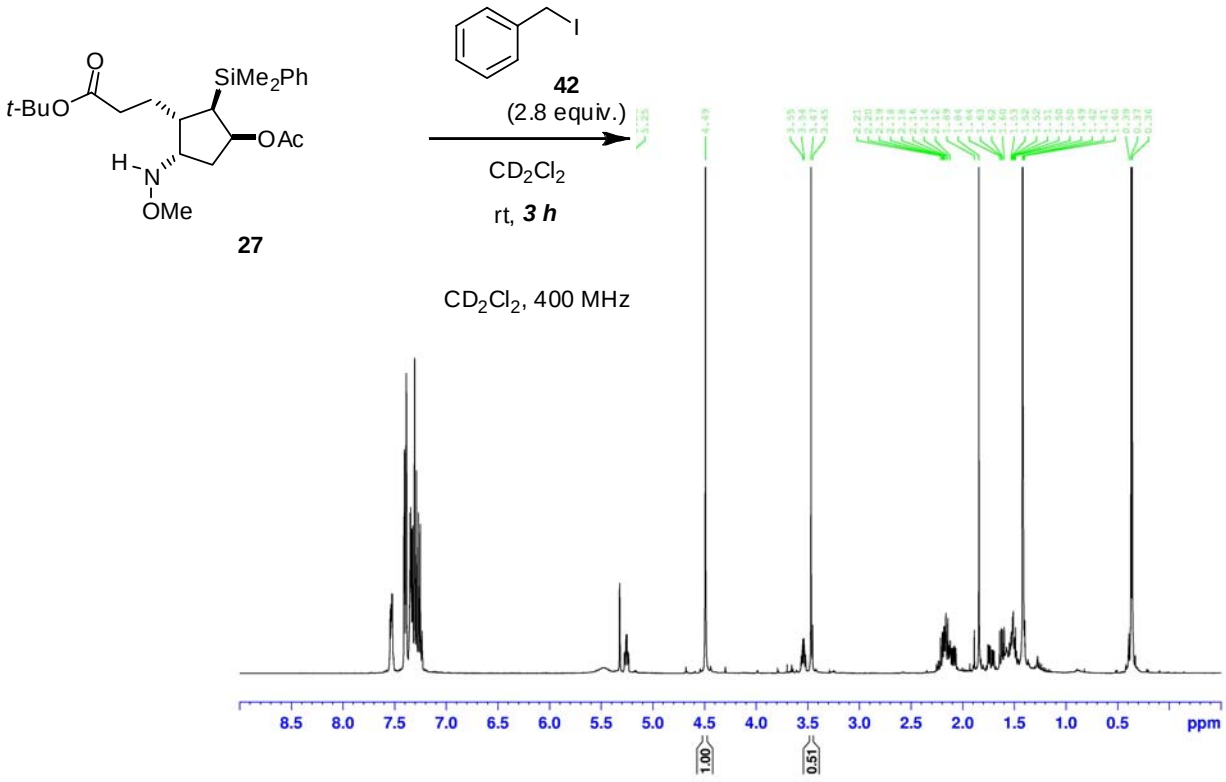
CD_2Cl_2, 400 MHz

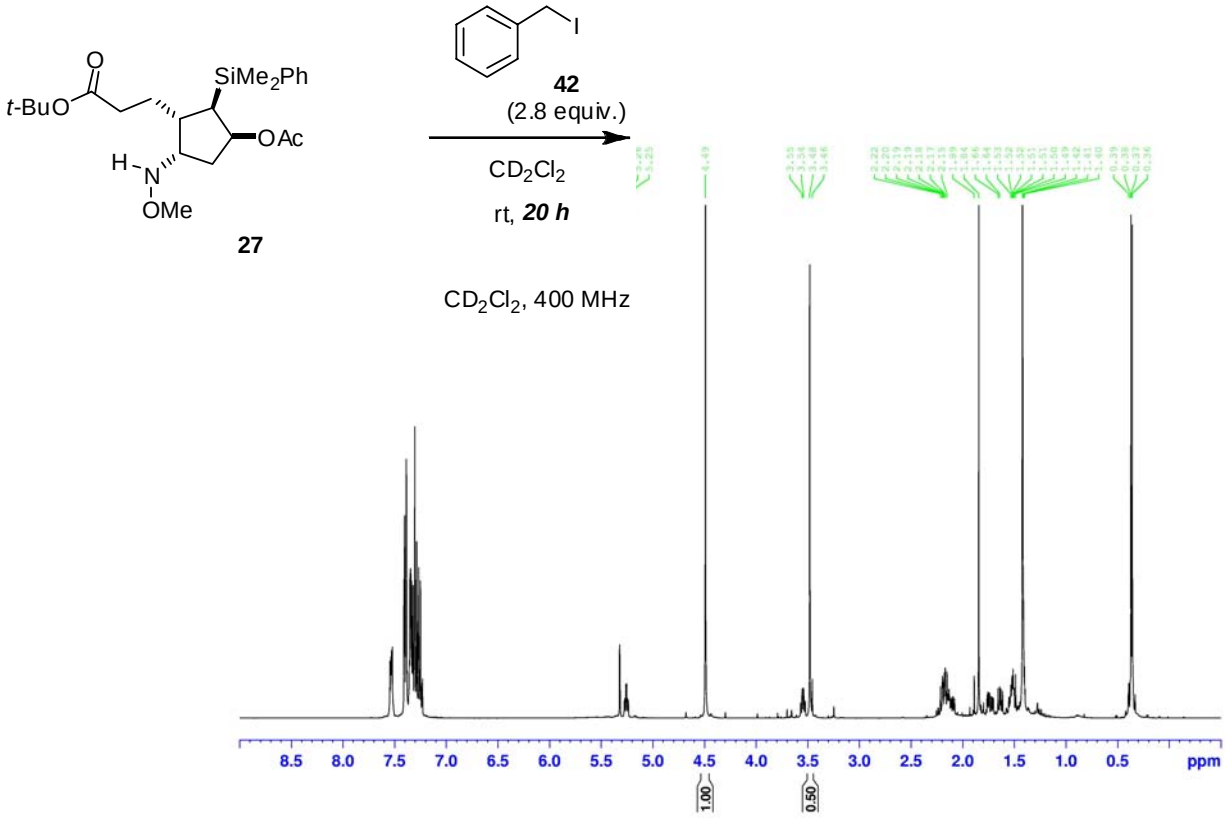


42

CD_2Cl_2, 400 MHz


t-BuO
O
SiMe2Ph
OAc
H
N
OMe
27
I
42
(2.8 equiv.)
CD2Cl2
rt, 5 min
CD2Cl2, 300 MHz
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
0.53


t-BuO
O
SiMe2Ph
OAc
H
N
OMe
27
I
42
(2.8 equiv.)
CD2Cl2
rt, 3 h
CD2Cl2, 400 MHz
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00
0.51



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