Supporting Information

High-Yield Synthesis of Fluorinated Benzothiazolyl Sulfones: General Synthons for Fluoro-Julia Olefinations

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Solvents were purified and dried as follows: toluene was distilled over sodium, THF was distilled over LiAlH₄ and then over sodium. For reactions, which were performed under a nitrogen atmosphere, glassware was flame dried under vacuum. *tert*-BuLi (1.7 M in pentane), LDA (2.0 M solution in heptane/THF/EtPh), LHMDS (1.0 M in THF) and NaHMDS (1.0 M in THF) were obtained from commercial sources. *N*-Fluorobenzenesulfonimide was a gift from Honeywell (Dr. George A. Shia). 2-Bromomethylthiophene **1c** was synthesized from commercial 2-thiophenemethanol according to a literature procedure.¹ Thin layer chromatography was performed on 250 μ m silica plates and column chromatographic purifications were performed on 200-300 mesh silica gel. All other reagents were obtained from commercial sources and used without further purification. ¹H NMR spectra were recorded at 500 MHz in CDCl₃ and were referenced to residual CHCl₃. ¹⁹F NMR spectra were recorded at 282 or 470 MHz using CFCl₃ as internal standard. Chemical shifts are reported in δ parts per million and coupling constants are in hertz.

General Procedure for the Synthesis of 1,3-Benzothiazol-2-yl Sulfides (**2a-d**).

To a solution of 1 molar equiv of bromomethyl arene (**1a-c**) in DMF (4.3 mL per mmol of bromomethyl arene) at rt, the sodium salt of 2-mercapto-1,3-benzothiazole (1.2 molar equiv) was added and the reaction mixture was stirred for 2-3 h, until complete consumption of the starting material was observed by tlc. The reaction mixture was diluted with water and extracted 3 times with EtOAc. The combined organic layer was thoroughly washed with water and finally with brine, dried over anhydrous Na₂SO₄ and the solvent evaporated under reduced pressure. The crude products **2a-c** were purified by column chromatography on silica gel using 0-5% EtOAc in hexanes.

Sulfide **2d** was prepared and used without further purification, see synthesis of **3d** below.

Table 1 shows a compilation of eluting solvents for chromatography, product yields and the proton NMR data of sulfides **2a–d**.

Table 1. Experimental details for sulfides **2a–d**.

Compd.	Solvent ^a , Yield	¹ H NMR data in CDCl ₃ ^b
2a	5%EtOAc, 99%	□ 7.91 (d, 1H, Ar-H, <i>J</i> = 7.8), 7.76 (d, 1H, Ar-H, <i>J</i> = 7.8), 7.47–7.42 (m, 3H, Ar-H), 7.35–7.27 (m, 4H, Ar-H), 4.61 (s, 2H, CH ₂)
2b	5%EtOAc, 64%	□ 7.95 – 7.92 (m, 2H, Ar-H), 7.84–7.81 (m, 3H, Ar-H), 7.75 (d, 1H, Ar-H, <i>J</i> = 7.8), 7.58 (dd, 1H, Ar-H, <i>J</i> = 8.3; 1.4), 7.50–7.47 (m, 2H, Ar-H), 7.44 (br td, 1H, Ar-H, <i>J</i> = 8.3; 0.9), 7.31 (br td, 1H, Ar-H, <i>J</i> = 7.8; 0.9), 4.78 (s, 2H, CH ₂)
2c	hexanes 94%	□ 7.93 (d, 1H, Ar-H, <i>J</i> = 8.3), 7.76 (d, 1H, Ar-H, <i>J</i> = 8.3), 7.44 (br td, 1H, Ar-H, <i>J</i> = 7.8; 0.9), 7.31 (br td, 1H, Ar-H, <i>J</i> = 7.8; 0.9), 7.22 (dd, 1H, Ar-H, <i>J</i> = 5.1; 0.9), 7.11 (br d, 1H, Ar-H, <i>J</i> = 2.8), 6.93 (dd, 1H, Ar-H, <i>J</i> = 5.1; 3.7), 4.84 (s, 2H, CH ₂)
2d	-- ^c	□ 7.91 (d, 1H, Ar-H, <i>J</i> = 8.3), 7.76 (d, 1H, Ar-H, <i>J</i> = 7.8), 7.53 (dd, 1H, Ar-H, <i>J</i> = 3.7; 0.9), 7.43 (br td, 1H, Ar-H, <i>J</i> = 8.3; 0.9), 7.40 (br dd, 1H, Ar-H, <i>J</i> = 5.1; 1.4), 7.31 (br td, 1H, Ar-H, <i>J</i> = 7.8; 0.9), 7.28 (s, 1H, Ar-H), 7.07 (dd, 1H, Ar-H, <i>J</i> = 5.1; 3.7), 4.76 (s, 2H, CH ₂)

^a Eluting solvent for chromatography. ^b Recorded at 500 MHz. ^c Crude product was used in the next step.

1,3-Benzothiazol-2-yl Benzyl Sulfone (**3a**).

To a vigorously stirred solution of **2a** (0.97 g, 3.8 mmol) in CHCl₃ (12.2 mL) at –10 °C (ice-salt cooling) a solution of *m*-CPBA (1.49 g, 8.71 mmol) in CHCl₃ (28.5 mL) was added dropwise. After complete addition, the mixture was stirred for an additional 10 min at –10 °C, allowed to warm to rt and stirred at rt for 5 h. The reaction mixture was then poured into sat aq NaHCO₃ (30 mL) and vigorously stirred for 15 min. After layer separation, the aqueous layer was extracted with CHCl₃ (3 x 50 mL), and the combined organic layer was washed with aqueous NaHCO₃, water and brine. The organic layer was dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude product was purified by column chromatography on silica gel using 30% EtOAc in hexanes to yield **3a** as a white solid (1.02 g, 94%). ¹H NMR: □ 8.27 (d, 1H, Ar-H, *J* = 7.8), 7.95 (d, 1H, Ar-H, *J* = 7.8), 7.66 (br td, 1H, Ar-H, *J*

= 8.3; 0.9), 7.59 (br td, 1H, Ar-H, J = 7.8; 0.9), 7.32–7.27 (m, 5H, Ar-H), 4.76 (s, 2H, CH₂). FAB HRMS calcd. for C₁₄H₁₂NO₂S₂ (M⁺ + H) 290.0309, found 290.0334.

1,3-Benzothiazol-2-yl (2-Naphthyl)methyl Sulfone (3b).

To a solution of **2b** (1.600 g, 5.21 mmol) in CH₃OH (130 mL) at 0 °C was added Na₂WO₄·2H₂O (0.859 g, 2.60 mmol) and after 10 min H₂O₂ (50%, 1.18 mL, 20.84 mmol). The reaction mixture was stirred overnight at rt, then cooled to 0 °C and quenched with sat aq Na₂SO₃ (50 mL). The aqueous layer was extracted with CH₂Cl₂ (3 x 100 mL), the combined organic layer was washed with brine, dried over anhydrous Na₂SO₄ and the solvent evaporated under reduced pressure. The crude product was purified by column chromatography on silica gel using 30% EtOAc in hexanes to yield **3b** as a white solid (1.57 g, 89%). ¹H NMR: δ 8.28 (d, 1H, Ar-H, J = 8.3), 7.88 (d, 1H, Ar-H, J = 7.8), 7.79–7.74 (m, 3H, Ar-H), 7.70 (d, 1H, Ar-H, J = 7.8), 7.65 (br td, 1H, Ar-H, J = 7.8; 0.9), 7.56 (br td, 1H, Ar-H, J = 7.8; 0.9), 7.50–7.43 (m, 2H, Ar-H), 7.35 (dd, 1H, Ar-H, J = 8.3; 1.8), 4.93 (s, 2H, CH₂). FAB HRMS calcd. for C₁₈H₁₄NO₂S₂ (M⁺ + H) 340.0466, found 340.0467.

1,3-Benzothiazol-2-yl (2-Thienyl)methyl Sulfone (3c).

To a solution of **2c** (2.900 g, 11.02 mmol) in CH₃OH (185 mL) at 0 °C was added Na₂WO₄·2H₂O (2.018 g, 6.11 mmol) and after 5 min H₂O₂ (50%, 3.5 mL, 61.76 mmol). The reaction mixture was stirred overnight at rt, then cooled to 0 °C and quenched with sat aq Na₂SO₃ (120 mL). The aqueous layer was extracted with CH₂Cl₂ (3 x 200 mL), the combined organic layer was washed with brine, dried over anhydrous Na₂SO₄ and the solvent evaporated under reduced pressure. The crude product was purified by column chromatography on silica gel using 25% EtOAc in hexanes to yield **3c** as an off-white solid (2.98 g, 92%). ¹H NMR: δ 8.27 (d, 1H, Ar-H, J = 8.3), 7.97 (d, 1H, Ar-H, J = 8.3), 7.66 (br td, 1H, Ar-H, J = 7.8; 0.9), 7.60 (br t, 1H, Ar-H, J = 7.4), 7.28 (dd, 1H, Ar-H, J = 5.5; 0.9), 7.02 (br d, 1H, Ar-H, J = 3.2), 6.93 (dd, 1H, Ar-H, J = 5.1; 3.2), 4.99 (s, 2H, CH₂). FAB HRMS calcd. for C₁₂H₁₀NO₂S₃ (M⁺ + H) 295.9874, found 295.9866.

4-[[1,3-Benzothiazol-2-yl)sulfonyl]methyl]-2-(2-thienyl)-1,3-thiazole (3d).

To a solution of the 4-(chloromethyl)-2-(2-thienyl)-1,3-thiazole (**1d**, 0.750 g, 3.48 mmol) in DMF (22.5 mL) was added the sodium salt of 2-mercapto-1,3-benzothiazole (0.788 g, 4.17 mmol) at rt and the reaction mixture was stirred for 1.5 h. The reaction mixture was diluted with water and extracted 3 times with EtOAc. The combined organic layer was thoroughly washed with water and finally with brine, dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude reaction mixture was dissolved in CHCl₃ (18 mL), cooled to

–10 °C (ice-salt cooling) and a solution of *m*-CPBA (1.71 g, 9.96 mmol) in CHCl₃ (29 mL) was added dropwise. After complete addition, the mixture was stirred for an additional 10 min at –10 °C, allowed to warm to rt and stirred at rt for 12 h. The reaction mixture was then poured into sat aq NaHCO₃ (40 mL) and vigorously stirred for 10 min. After layer separation, the aqueous layer was extracted with CHCl₃ (3 x 50 mL), and the combined organic layer was washed with aq NaHCO₃, water and brine. The organic layer was dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude product was purified by column chromatography on silica gel using 30% EtOAc in hexanes to yield **3d** as a white solid (1.04 g, 79% yield over two steps). ¹H NMR: δ 8.28 (d, 1H, Ar-H, *J* = 8.3), 7.95 (d, 1H, Ar-H, *J* = 7.8), 7.65 (br td, 1H, Ar-H, *J* = 7.8; 0.9), 7.58 (br td, 1H, Ar-H, *J* = 7.8; 0.9), 7.32 (s, 1H, Ar-H), 7.31 (dd, 1H, Ar-H, *J* = 3.7; 0.9), 7.25 (m, 1H, Ar-H), 6.97 (dd, 1H, Ar-H, *J* = 5.1; 3.7), 4.97 (s, 2H, CH₂). FAB HRMS calcd. for C₁₅H₁₁N₂O₂S₄ (M⁺ + H) 378.9703, found 378.9709.

General Procedure for the Fluorination of Sulfones **3a–d**.

A stirred solution of sulfone **3a–d** (1 molar equiv) in dry toluene (the amount of toluene per mmol of sulfone depended on the solubility of the sulfone), was cooled to –85 °C (dry-ice/*iso*-PrOH) under nitrogen. LDA (1.2 molar equiv of a 2 M solution in heptane/THF/EtPh) was added to the reaction mixture. After 11 min, solid NFSi (1.23 molar equiv for **3a–c**, 2.00 molar equiv for **3d**) was added. The reaction mixture was allowed to stir at –85 °C for 50 min, then warmed to rt and stirring was continued for an additional 50 min. Sat aq NH₄Cl was added to the reaction mixture and the layers were separated. The aqueous layer was extracted with EtOAc (3 x), and the combined organic layer was washed with sat aq NaHCO₃ and brine. The organic layer was dried over Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude reaction mixtures were purified by column chromatography on silica gel. For each substrate, the amount of substrate, reagents and solvent, eluting solvent for chromatography and product yield are given under the specific compound heading below.

Note: consistent results in the fluorination reactions were obtained only when a fresh LDA solution was used for the reactions. Presence of salts in the LDA solution was detrimental for reasons not known currently.

1,3-Benzothiazol-2-yl (Phenyl)fluoromethyl Sulfone (**4a**).

Sulfone **3a**: 1.00 g (3.46 mmol); toluene: 25 mL; LDA: 2.07 mL (2 M, 4.15 mmol); NFSi: 1.34 g (4.25 mmol). Eluting solvent for column chromatography: 20% EtOAc in hexanes. Yield: 0.951 g (90%) of white solid product. ¹H NMR: δ 8.30 (d, 1H, Ar-H, *J* = 7.8), 8.04 (d, 1H, Ar-H, *J* = 9.8),

7.70–7.62 (m, 4H, Ar-H), 7.55 (t, 1H, Ar-H, $J = 7.8$), 7.41 (t, 2H, Ar-H, $J = 7.8$), 6.63 (d, 1H, CHF, $^2J_{\text{FH}} = 46.9$); ^{19}F NMR (282 MHz): δ 173.08 (d, $^2J_{\text{FH}} = 45.8$). FAB HRMS calcd. for $\text{C}_{14}\text{H}_{11}\text{FNO}_2\text{S}_2$ ($\text{M}^+ + \text{H}$) 308.0215, found 308.0221.

1,3-Benzothiazol-2-yl (2-Naphthyl)fluoromethyl Sulfone (4b).

Sulfone **3b**: 0.70 g (2.06 mmol); toluene: 56 mL; LDA: 1.24 mL (2 M, 2.48 mmol); NFSi: 0.80 g (2.54 mmol). Eluting solvent for column chromatography: 15% EtOAc in hexanes. Yield: 0.64 g (87%) of off-white solid product. ^1H NMR: δ 8.31 (d, 1H, Ar-H, $J = 7.8$), 8.14 (s, 1H, Ar-H), 8.05 (d, 1H, Ar-H, $J = 7.8$), 7.96 (d, 1H, Ar-H, $J = 7.8$), 7.90 (br app t, 2H, Ar-H, $J \sim 6.9$), 7.70–7.68 (m, 2H, Ar-H), 7.62 (t, 1H, Ar-H, $J = 7.8$), 7.61–7.55 (m, 2H, Ar-H), 6.80 (d, 1H, CHF, $^2J_{\text{FH}} = 44.9$); ^{19}F NMR (470 MHz): δ 172.19 (d, $^2J_{\text{FH}} = 50.3$). FAB HRMS calcd. for $\text{C}_{18}\text{H}_{13}\text{FNO}_2\text{S}_2$ ($\text{M}^+ + \text{H}$) 358.0372, found 358.0377.

1,3-Benzothiazol-2-yl (2-Thienyl)fluoromethyl Sulfone (4c).

Sulfone **3c**: 1.00 g (3.39 mmol); toluene: 30 mL; LDA: 2.03 mL (2 M, 4.06 mmol); NFSi: 1.32 g (4.17 mmol). Eluting solvent for column chromatography: CH_2Cl_2 . Yield: 0.864 g (81%) of pale yellow solid product. ^1H NMR: δ 8.30 (d, 1H, Ar-H, $J = 7.8$), 8.05 (d, 1H, Ar-H, $J = 9.8$), 7.69 (t, 1H, Ar-H, $J = 7.8$), 7.66–7.61 (m, 2H, Ar-H), 7.53 (s, 1H, Ar-H), 7.17 (br t, 1H, Ar-H, $J = 3.9$), 6.86 (1H, CHF, $^2J_{\text{FH}} = 44.9$); ^{19}F NMR (470 MHz): δ 158.45 (d, $^2J_{\text{FH}} = 43.1$). FAB HRMS calcd. for $\text{C}_{12}\text{H}_9\text{FNO}_2\text{S}_3$ ($\text{M}^+ + \text{H}$) 313.9779, found 313.9790.

4-[(1,3-Benzothiazol-2-yl)sulfonyl]fluoromethyl-2-(2-thienyl)-1,3-thiazole (4d).

Sulfone **3d**: 0.15 g (0.40 mmol); toluene: 40 mL; LDA: 0.24 mL (2 M, 0.48 mmol); NFSi: 0.25 g (0.79 mmol). Eluting solvent for column chromatography: CH_2Cl_2 . Yield: 0.129 g (82%) of white solid product. ^1H NMR: δ 8.30 (d, 1H, Ar-H, $J = 7.8$), 8.04 (d, 1H, Ar-H, $J = 7.8$), 7.76 (s, 1H, Ar-H), 7.68 (br app t, 1H, Ar-H, $J \sim 6.9$), 7.64 (t, 1H, Ar-H, $J = 7.8$), 7.49 (br d, 1H, Ar-H, $J = 3.9$), 7.39 (br d, 1H, Ar-H, $J = 5.9$), 7.06 (br app t, 1H, Ar-H, $J \sim 4.9$), 6.86 (d, 1H, CHF, $^2J_{\text{FH}} = 46.9$); ^{19}F NMR (470 MHz): δ 170.00 (d, $^2J_{\text{FH}} = 43.1$). FAB HRMS calcd. for $\text{C}_{15}\text{H}_9\text{FN}_2\text{O}_2\text{S}_4$ ($\text{M}^+ + \text{H}$) 396.9609, found 396.9634.

General Procedure for Condensation of Carbonyl Compounds with Fluorinated Sulfones 4a–d.

A stirred solution of the carbonyl compound (1 molar equiv) and fluorinated sulfone (**4a–d**, 1.2 molar equiv) in dry THF (13 mL per mmol of carbonyl compound) was cooled to 0 °C under nitrogen. LHMDs (2.4 molar equiv of a 1 M solution in THF) was added and the reaction

mixture was stirred at 0 °C for 1.5-2 h. Sat aq NH₄Cl was added to the reaction mixture and the mixture was extracted with EtOAc (3 x), the combined organic layer was washed with brine, dried over Na₂SO₄ and the solvent evaporated under reduced pressure. The crude *E/Z* product mixture was purified by column chromatography on silica gel using 0-10% EtOAc in hexanes as eluting solvent (depending on product polarity). Table 2 shows ¹⁹F NMR listings and HRMS data of alkenes **5a–d** to **11a–d**.

Table 2. ¹⁹F NMR and HRMS data of compounds **5a–d** to **11a–d**.

Compound	¹⁹ F NMR data	HRMS data
<i>E</i>- and <i>Z</i>-5a.	282 MHz: □ -96.12 (d, ³ J _{FH} = 20.5, <i>E</i> isomer), □ -114.31 (d, ³ J _{FH} = 38.1, <i>Z</i> isomer)	FAB HRMS calcd. for C ₁₈ H ₁₃ F (M ⁺) 248.1001, found 248.0999
<i>E</i>- and <i>Z</i>-5b.	282 MHz: □ -96.13 (d, ³ J _{FH} = 21.4, <i>E</i> isomer), □ -114.5 (d, ³ J _{FH} = 39.7, <i>Z</i> isomer)	FAB HRMS calcd. for C ₂₂ H ₁₅ F (M ⁺) 298.1158, found 298.1162
<i>E</i>- and <i>Z</i>-5c.	470 MHz: □ -95.35 (d, ³ J _{FH} = 21.5, <i>E</i> isomer), □ -107.93 (d, ³ J _{FH} = 43.1, <i>Z</i> isomer)	FAB HRMS calcd. for C ₁₆ H ₁₁ FS (M ⁺) 254.0566, found 254.0567
<i>E</i>- and <i>Z</i>-5d.	282 MHz: □ -105.97 (d, ³ J _{FH} = 24.4, <i>E</i> isomer), □ -120.13 (d, ³ J _{FH} = 39.7, <i>Z</i> isomer)	FAB HRMS calcd. for C ₁₉ H ₁₃ FNS ₂ (M ⁺ + H) 338.0473, found 338.0463
<i>E</i>- and <i>Z</i>-6a.	282 MHz: □ -99.86 (d, ³ J _{FH} = 18.3, <i>E</i> isomer), □ -118.16 (d, ³ J _{FH} = 33.6, <i>Z</i> isomer)	FAB HRMS calcd. for C ₁₆ H ₁₃ F (M ⁺) 224.1001, found 224.0993
<i>E</i>- and <i>Z</i>-6b.	470 MHz: □ -99.58 (d, ³ J _{FH} = 21.5,	FAB HRMS calcd. for C ₂₀ H ₁₅ F

<i>E</i> isomer), Δ -118.35 (d, $^3J_{FH}$ = 35.9, <i>Z</i> isomer)	(M^+) 274.1158, found 274.1157
<i>E</i>- and <i>Z</i>-6c.	282 MHz: Δ -98.81 (d, $^3J_{FH}$ = 18.3, <i>E</i> isomer), Δ -111.45 (d, $^3J_{FH}$ = 33.6, <i>Z</i> isomer)	FAB HRMS calcd. for $C_{14}H_{11}FS$ (M^+) 230.0566, found 230.0562
<i>E</i>- and <i>Z</i>-6d.	470 MHz: Δ -115.87 (d, $^3J_{FH}$ = 21.5, <i>E</i> isomer), Δ -123.72 (d, $^3J_{FH}$ = 35.9, <i>Z</i> isomer)	FAB HRMS calcd. for $C_{17}H_{12}FNS_2$ (M^+) 313.0395, found 313.0387
<i>E</i>- and <i>Z</i>-7a.	282 MHz: Δ -103.18 (d, $^3J_{FH}$ = 23.5, <i>E</i> isomer), Δ -121.89 (d, $^3J_{FH}$ = 38.1, <i>Z</i> isomer)	FAB HRMS calcd. for $C_{15}H_{21}F$ (M^+) 220.1627, found 220.1617
<i>E</i>- and <i>Z</i>-7b.	282 MHz: Δ -102.86 (d, $^3J_{FH}$ = 23.5, <i>E</i> isomer), Δ -121.94 (d, $^3J_{FH}$ = 38.2, <i>Z</i> isomer)	FAB HRMS calcd. for $C_{19}H_{23}F$ (M^+) 270.1784, found 270.1786
<i>E</i>- and <i>Z</i>-7c.	282 MHz: Δ -101.75 (d, $^3J_{FH}$ = 21.4, <i>E</i> isomer), Δ -114.31 (d, $^3J_{FH}$ = 39.7, <i>Z</i> isomer)	FAB HRMS calcd. for $C_{13}H_{19}FS$ (M^+) 226.1192, found 226.1205
<i>E</i>- and <i>Z</i>-7d.	282 MHz: Δ -115.62 (d, $^3J_{FH}$ = 24.4, <i>E</i> isomer), Δ -126.65 (d, $^3J_{FH}$ = 36.6, <i>Z</i> isomer)	FAB HRMS calcd. for $C_{16}H_{21}FNS_2$ (M^+ + H) 310.1099, found 310.1078
<i>E</i>- and <i>Z</i>-8a.	282 MHz: Δ -93.54 (d, $^3J_{FH}$ = 17.6, <i>E</i> isomer), Δ -112.54 (d, $^3J_{FH}$ =	FAB HRMS calcd. for $C_{12}H_9FS$ (M^+) 204.0409, found 204.0404

38.2, Z isomer)	
E- and Z-8b.	282 MHz: δ -94.05 (d, $^3J_{FH} = 20.5$, <i>E</i> isomer), δ -112.73 (d, $^3J_{FH} = 38.1$, Z isomer)	FAB HRMS calcd. for $C_{16}H_{11}FS$ (M^+) 254.0566, found 254.0567
E- and Z-8c.	282 MHz: δ -91.72 (d, $^3J_{FH} = 17.6$, <i>E</i> isomer), δ -106.21 (d, $^3J_{FH} = 38.2$, Z isomer)	FAB HRMS calcd. for $C_{10}H_7FS_2$ (M^+) 209.9973, found 209.9987
E- and Z-8d.	282 MHz: δ -110.81 (d, $^3J_{FH} = 24.4$, <i>E</i> isomer), δ -118.87 (d, $^3J_{FH} = 36.6$, Z isomer)	FAB HRMS calcd. for $C_{13}H_8NFS_3$ (M^+) 292.9803, found 292.9806
Z-9a.	470 MHz: δ -117.95 (d, $^3J_{FH} = 35.9$, Z isomer)	FAB HRMS calcd. for $C_{18}H_{15}FFe$ (M^+) 306.0507, found 306.0525
Z-9b.	282 MHz: δ -117.80 (d, $^3J_{FH} = 33.6$, Z isomer)	FAB HRMS calcd. for $C_{22}H_{17}FFe$ (M^+) 356.0664, found 356.0675
E- and Z-9c.	282 MHz: δ -94.27 (d, $^3J_{FH} = 18.3$, <i>E</i> isomer), δ -110.88 (d, $^3J_{FH} = 39.7$, Z isomer)	FAB HRMS calcd. for $C_{16}H_{13}FFeS$ (M^+) 312.0071, found 312.0060
E- and Z-9d.	470 MHz: δ -109.46 (d, $^3J_{FH} = 21.5$, <i>E</i> isomer), δ -123.10 (d, $^3J_{FH}$	FAB HRMS calcd. for $C_{19}H_{14}FFeNS_2$ (M^+) 394.9901,

= 35.9, Z isomer)	found 394.9900
10a.	470 MHz: δ -108.72 (s)	FAB HRMS calcd. for $C_{19}H_{21}FN$ ($M^+ + H$) 282.1658, found 282.1673
10b.	470 MHz: δ -108.48 (s)	FAB HRMS calcd. for $C_{23}H_{23}FN$ ($M^+ + H$) 332.1815, found 332.1837
10c.	470 MHz: δ -104.92 (s)	$C_{17}H_{19}FNS$ ($M^+ + H$) 288.1222, found 288.1232
10d.	470 MHz: δ -121.35 (s)	FAB HRMS calcd. for $C_{20}H_{20}FN_2S_2$ ($M^+ + H$) 371.1052, found 371.1057.
E- and Z-11a.	282 MHz: δ -91.63 (s), δ -112.88 (s)	FAB HRMS calcd. for $C_{16}H_{13}F$ (M^+) 224.1001, found 224.1009
E- and Z-11b.	470 MHz: δ -92.09 (s), δ -112.55	FAB HRMS calcd. for $C_{20}H_{15}F$

(s)	(M ⁺) 274.1158, found 274.1167
E- and Z-11c.	470 MHz: δ -84.49 (s), δ -110.54 (s)	FAB HRMS calcd. for C ₁₄ H ₁₁ FS (M ⁺) 230.0566, found 230.0583
E- and Z-11d.	470 MHz: δ -105.36 (s), δ -122.77 (s)	FAB HRMS calcd. for C ₁₇ H ₁₃ FNS ₂ (M ⁺ + H) 314.0473, found 314.0461.

A One Pot Fluorination-Condensation Procedure for the Synthesis of **5a** (unoptimized)

A stirred solution of sulfone **3a** (200 mg, 0.692 mmol) in dry toluene (5 mL), was cooled to –85 °C (dry-ice/*iso*-PrOH) under nitrogen. LDA (484 μ L of a 2 M solution in heptane/THF/EtPh, 0.969 mmol, 1.2 molar equiv) was added to the reaction mixture. After 12 min, solid NFSi (327 mg, 1.038 mmol, 1.23 molar equiv) was added. The reaction mixture was allowed to stir at –85 °C for 50 min, then warmed to rt and stirring was continued for an additional 50 min. The reaction mixture was cooled to 0 °C and a solution of 2-naphthaldehyde (89 mg, 0.572 mmol, 0.83 molar equiv) in dry THF (8 mL) was added, followed by LHMDS (1.380 mL of a 1 M solution in THF, 1.380 mmol, 2.4 molar equiv). The reaction mixture was stirred at 0 °C for 2h, sat aq NH₄Cl (8 mL) was added and the mixture was extracted with EtOAc (3 x), the combined organic layer was washed with aqueous NaHCO₃, brine, dried over Na₂SO₄ and the solvent evaporated under reduced pressure. The crude product was purified by column chromatography on silica gel using hexanes as eluting solvent to yield 104 mg (72%) of **5a** (E/Z ratio 2.7:1). Subsequent elution by 5% EtOAc in hexanes afforded 2-naphthaldehyde (19 mg, 21%). Yield of **5a** based on recovered 2-naphthaldehyde: 93%.

References

1. (a) Rossi, R.; Carpita, A.; Lippolis, V.; Benetti, M. *Gazzetta Chimica Italiana* **1990**, *120*, 783-791. (b) Reiser, O.; Koenig, B.; Meerholz, K.; Heinze, J.; Wellauer, T.; Gerson, F.; Frim, R.; Rabinovitz, M.; de Meijere, A. *J. Am. Chem. Soc.* **1993**, *115*, 3511-3518.

1222-Ag-01-95-dil

Archive directory: /export/home/mkl/vnmrsws/data
Sample directory: auto_13dec2004

Pulse sequence: szpul

Solvent: cdcl3

Ambient temperature

File: Ag-1222-01-95-dil

INOVA-500 "cspella500"

Relax. delay 1.000 sec

Pulse 45.0 degrees

Acq. time 1.392 sec

Width 7544.3 Hz

32 repetitions

OBSERVE H1, 499.7707212 MHz

DATA PROCESSING

FT size 32768

Total time 1 min, 32 sec

Ag-1222-01-141

Archive directory: /export/home/mkl/vnmrsws/data
Sample directory: auto_13Dec2004

Pulse sequence: e2pul
Solvent: cdcl3
Ambient temperature
File: Ag-1222-01-141
INOVA-500 "casbella500"

Relax. delay 1.000 sec
Pulse 45.0 degrees
Acq. time 1.392 sec
Width 7544.3 Hz
16 repetitions
OBSERVE H1, 499.7707166 MHz
DATA PROCESSING
Ft size 32768
Total time 0 min, 46 sec

1222-Kg-02-161-p-Dil

Archive directory: /export/home/mkl/vnmrsws/data
Sample directory: auto_13Dec2004

Pulse Sequence: s2pul

Solvent: cdcl3

Ambient temperature

File: Kg-1222-02-161-p-Dil

INOVA-500 "cspella500"

Relax. delay 1.000 sec

Pulse 45.0 degrees

Acq. time 1.392 sec

Width 7544.3 Hz

48 repetitions

OBSERVE H1, 499.7707212 MHz

DATA PROCESSING

FT size 32768

Total time 12 min, 22 sec

3c

1222-Ag-02-211-d11

Archive directory: /export/home/mkl/vnmrsws/data
Sample directory: auto_13Dec2004

Pulse sequence: s2pul

Solvent: cdcl3

Ambient temperature

File: Ag-1222-02-211-d11

INOVA-500 "cspella500"

Relax. delay 1.000 sec

Pulse 45.0 degrees

Acq. time 1.392 sec

Width 7544.3 Hz

32 repetitions

OBSERVE H1, 499.7707212 MHz

DATA PROCESSING

FT size 32768

Total time 1 min, 32 sec

1222-AG-01-97-Crys-1H

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-01-97-Crys-1H

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.770795 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

4a

AG-1222-02-195A

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: AG-1222-02-195A
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 8000.0 Hz
16 repetitions
OBSERVE R1, 499.7707220 MHz
DECODE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 1 min, 20 sec

4b

AG-1222-02-193A

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: AG-1222-02-193A
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
16 repetitions
OBSERVE K1, 499.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 1 min, 20 sec

1222-Ag-02-217-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-217-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
8 repetitions
OBSERVE K1, 499.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 0 min, 40 sec

4d

1222-Ag-02-233-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-233-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

5a

```
Archive directory: /export/home/mkl/vnmrsys/data
Sample directory: auto_13Dec2004
```

Solvent: cdcl3

Ambient temperature

INOVA-500 "capella500"

Relax. delay 1.000 sec

Pulse 45.0 degrees

Acq. time 1.892 sec

Width 7544.3 Hz

32 repetitions

OBSERVE H1, 499.7707216 MHz

DATA PROCESSING

FT size 32768

Total time 1 min, 32 sec

1222-Ag-02-243-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-243-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707064 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

Resol. enhancement 0.1 Hz

Gauss apodization 0.01 sec

FT size 8192

Total time 1 min, 20 sec

5c

1222-Ag-02-269-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-269-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
8 repetitions
OBSERVE K1, 493.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 0 min, 40 sec

1222-Ag-03-345-pure

Archive directory: /export/home/mkl/vmrsys/data
Sample directory: auto_13Dec2004

Pulse Sequence: s2pul

Solvent: cdcl3
Ambient temperature
File: 1222-Ag-03-345-pure
INOVA-500 "capella500"

Relax. delay 1.000 sec
Pulse 45.0 degrees
Acq. time 1.892 sec
Width 7544.3 Hz
32 repetitions
OBSERVE H1, 499.7707216 MHz
DATA PROCESSING
Ft size 32768
Total time 1 min, 32 sec

1222-Ag-02-251-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-251-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.770720 MHz

DECOUPLE C13, 125.630698 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-255-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-255-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-279-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-279-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

8 repetitions

OBSERVE K1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 0 min, 40 sec

6d

1222-Ag-02-177-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-177-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE H1, 499.7707201 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

7a

1222-Ag-02-261-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-261-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
16 repetitions
OBSERVE K1, 499.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 1 min, 20 sec

1222-Ag-02-267-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-267-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707095 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

7c

1222-Ag-02-277-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-277-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

8 repetitions

OBSERVE H1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 0 min, 40 sec

1222-Ag-03-347-pure

Archive directory: /export/home/mkl/vnmrsws/data
Sample directory: auto_13Dec2004
File: PROTON

Pulse sequence: zgpg30
Solvent: cdcl3
Ambient temperature
INOVA-500 "capella500"

Relax. delay 1.000 sec
Pulse 45.0 degrees
Acq. time 1.892 sec
Width 7544.3 Hz
32 repetitions
OBSERVE H1, 499.7707216 MHz
DATA PROCESSING
F2 size 32768
Total time 1 min, 32 sec

8a

1222-Ag-02-249-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-249-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
16 repetitions
OBSERVE K1, 499.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 1 min, 20 sec

1222-Ag-02-253-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-253-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE H1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-275-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-275-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

8 repetitions

OBSERVE H1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 0 min, 40 sec

8d

1222-Ag-02-247-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-247-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
16 repetitions
OBSERVE K1, 499.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
Line broadening 1.0 Hz
FT size 8192
Total time 1 min, 20 sec

1222-Ag-02-245-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-245-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE H1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-271-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-271-P

NOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

8 repetitions

OBSERVE H1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 0 min, 40 sec

1222-Ag-02-219-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-219-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE H1, 499.7707217 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

10a

Pulse sequence: zgpg30
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-259-P
NOVA-500 "capella500"

Relax. delay	3.000 sec
Pulse	56.8 degrees
Acq. time	2.000 sec
Width	8000.0 Hz
16 repetitions	
CONSERVE	H1, 495.77070220 MHz
DECOUPLE	C13, 125.6306098 MHz
Power	32 dB
on during acquisition	
off during delay	
GRAP-1	modulated
DATA PROCESSING	
FT size	8192
Total time	1 min, 20 sec

10b

1222-Ag-02-265-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-265-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-281-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-281-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707240 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

Resol. enhancement 0.2 Hz

Gauss apodization 0.071 sec

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-187-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-187-P

NOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE H1, 499.7707181 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

11a

1222-Ag-02-257-P

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: Ag-1222-02-257-P

INOVA-500 "capella500"

Relax. delay 3.000 sec

Pulse 56.8 degrees

Acq. time 2.000 sec

Width 3000.0 Hz

16 repetitions

OBSERVE K1, 499.7707220 MHz

DECOUPLE C13, 125.6306098 MHz

Power 32 dB

on during acquisition

off during delay

GARP-1 modulated

DATA PROCESSING

FT size 8192

Total time 1 min, 20 sec

1222-Ag-02-263-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-263-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
16 repetitions
OBSERVE K1, 499.7707181 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 1 min, 20 sec

11c

1222-Ag-02-273-P

Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
File: Ag-1222-02-273-P
INOVA-500 "capella500"

Relax. delay 3.000 sec
Pulse 56.8 degrees
Acq. time 2.000 sec
Width 3000.0 Hz
16 repetitions
OBSERVE K1, 499.7707220 MHz
DECOUPLE C13, 125.6306098 MHz
Power 32 dB
on during acquisition
off during delay
GARP-1 modulated
DATA PROCESSING
FT size 8192
Total time 1 min, 20 sec

1222-Ag-04-459-pure-monoF

Pulse Sequence: s2pul

Solvent: CDCl3

Temp: 25.0 C / 298.1 K

File: 1222-Ag-04-459-pure-monoF

NOVA-500 "capella500"

Pulse 45.0 degrees

Acq. time 1.892 sec

Width 8000.0 Hz

32 repetitions

Observe K1, 499.7707207 MHz

DATA PROCESSING

FT size 32763

Total time 1 min, 0 sec

14

1222-Ag-04-459-pure-monoF-19F

Pulse Sequence: s2pul

Solvent: CDCl3

Ambient temperature

File: 1222-Ag-04-459-pure-monoF-19F

Mercury-300HS "vega300"

Relax. delay 4.000 sec

Pulse 25.0 degrees

Acq. time 0.300 sec

Width 100.0 kHz

288 repetitions

OBSERVE F19, 282.383511 MHz

DATA PROCESSING

Line broadening 0.5 Hz

FT size 65536

Total time 2 hr, 32 min, 9 sec

14