Supporting Information

Rhodium-Catalyzed Sommelet Hauser Type Rearrangement of *α*-Diazoimines: Synthesis of Functionalized Enamides

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Table of contents

1. General Comments:

All reactions were carried out under nitrogen atmosphere using oven dried reaction tubes. Dry toluenewas prepared by distilling over sodium metal and stored over molecular sieves 4Å under nitrogen atmosphere. All the *N*-sulfonyl 1,2,3-triazoles were synthesized from corresponding acetylene and tosyl azide employing literature procedure.[1] All the α-thioesters were achieved from thiol and bromoesters.[2]

Column chromatography was performed using Rankem Silica gel (100-200 mesh) and the solvent system used unless otherwise specified, was ethyl acetate-hexanes with various percentage of polarity depending on the nature of the substrate.

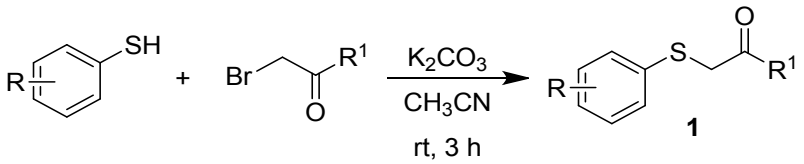
2. Analytical Methods:

NMR data were recorded on 400 and 500 MHz spectrometers. ^{13}C and ^{1}H NMR spectra were referenced to signals of deutero solvents and residual protiated solvents, respectively. Infrared spectra were recorded on a Thermo Nicolet iS10 FT spectormeter. HRMS were recorded by electron spry ionization (ESI) method on a Q-TOF Micro with lock spray source. Melting points are corrected.

[1] J. Raushel, V. V. Fokin, *Org. Lett.* **2010**, *12,* 4952-4955.

[2] R. VenkatRagavan, V. Vijaykumar, N. K. Suchetha, *Eur. J. Med. Chem.* **2009**, *44*, 3852-3857

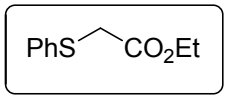
3. General procedure for synthesis of *α*-thiocarbonyl derivatives 1



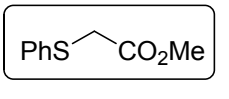
To a solution of arylthiols (2.72 mmol, 1 equiv) in CH_3CN (6 mL), was added K_2CO_3 (564 mg, 4.09 mmol, 1.5 equiv) followed by solution of bromocarbonyl compound (4.09 mmol, 1.5 equiv) in CH_3CN (4 mL) was added drop wise over 3 min. After approximately 3 h analyzed by TLC, ethyl acetate was added to the crude products, washed with water, brine and then dried over Na_2SO_4. The organic layer was filtered and evaporated under the reduced pressure. The obtained crude product was purified through column chromatography to afford the pure thiocarbonyl compoundsin high yields.

4. Properties of isolated *α*-thiocarbonyl derivatives 1

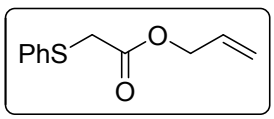
Thioester (2a): 395 mg; Light yellow liquid; Yield: 89%; R_f = 0.63 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3213, 3149, 3142, 2922, 2337, 1635, 1544, 1507, 1421, 1401, 1336, 1260, 1195, 1098, 961 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.44-7.38 (m, 2H), 7.33-7.19 (m, 3H), 4.16 (q, 2H, J = 7.1 Hz), 3.63(s, 3H), 1.22 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 145.2, 136.2, 135.7, 134.5, 130.5, 129.9, 129.2, 128.6, 127.2, 122.0, 28.9; HRMS: calcd.for $C_{10}H_{12}O_2S$+H: 197.0631; found: 197.0632.



Thioester (2b): 347 mg; Yellow liquid; yield: 81%; R_f = 0.63 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3272, 3109, 2928, 2856, 2356, 1712, 1642, 1550, 1396, 1270, 1225, 1079, 877 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C):δ 7.45-7.37 (m, 2H), 7.35-7.27 (m, 2H), 7.27-7.19 (m, 1H), 3.71 (s, 3H), 3.65 (s, 2H);$^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.3, 135.0, 130.0, 129.2, 127.1, 52.6, 36.6; HRMS: calcd.for $C_9H_{10}O_2S$+H: 183.0474; found: 183.0479.

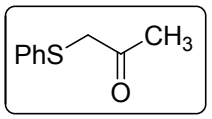


Thioester (2c): 330 mg; White solid; yield: 70%; R_f = 0.63 in 10:90 ethyl acetate/hexane; mp: 94-96ºC; FTIR (KBr): 3064, 2928, 2859, 1737, 1652, 1581, 1471, 1440, 1272, 1138, 991 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.43-7.39 (m, 2H), 7.32-7.27 (m, 2H), 7.25-7.20 (m, 1H), 5.85 (ddt, 1H, J = 17.1, 10.1, 5.6 Hz), 5.28 (dq, 1H, J = 17.1, 1.4 Hz), 5.22 (dt, 1H, J = 10.4, 1.2 Hz), 4.60 (dt, 1H, J = 5.7, 1.3

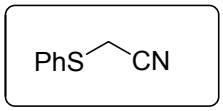


Hz), 3.66 (s, 2H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 169.5, 135.0, 131.7, 130.2, 129.1, 127.1, 118.8, 66.2, 36.8;HRMS: calcd.for $C_{11}H_{12}O_2S$+Na: 231.0450; found: 231.0451.

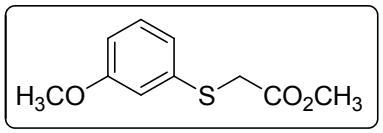
Thioketone (2d): 297 mg; Colourless liquid; yield: 79%; R_f = 0.60 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3061, 3004, 2925, 1714, 1638, 1583, 1477, 1430, 1404, 1359, 1278, 1230, 1151, 1088, 743 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.38-7.24 (m, 4H), 7.24-7.18 (m, 1H), 3.66 (s, 2H), 2.27 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ203.7, 134.7, 129.6, 129.2, 127.0, 44.7, 28.1; HRMS: calcd.for $C_9H_{10}OS$+Na: 189.0345; found: 189.0345.



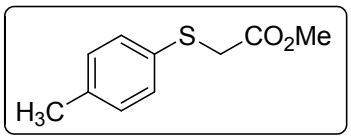
2-(phenylthio)acetonitrile (2g): 219 mg; Colorless liquid; yield: 65%; R_f = 0.70 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3405, 3390, 3376, 3362, 3344, 3298, 3289, 3362, 3298, 3171, 3057, 2927, 2856, 2307, 1739, 1586, 1472, 1431, 1266, 1195, 1034, 894 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.65-7.49 (m, 2H), 7.46-7.31 (m, 3H), 3.56 (s, 2H);$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 132.5,132.2, 129.7, 129.1, 116.6, 21.5; HRMS: calcd.for C_8H_7NS+K: 187.9931; found: 188.0137.



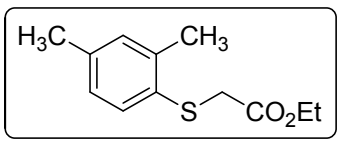
Thioester (2h): 356 mg; Colorless liquid; yield: 74%; R_f = 0.57 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3057, 2987, 2848, 2685, 2522, 2412, 2306, 2136, 1738, 1598, 1427, 1266, 1159, 1039, 985 cm^{-1}; ^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.21 (t, 1H, J = 7.9 Hz), 7.02-6.89 (m, 2H), 6.81-6.69 (m, 1H), 3.79 (s, 3H), 3.73 (s, 3H), 3.66 (s, 2H); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.2, 160.0, 136.3, 130.0, 121.7, 114.9, 112.8, 55.4, 52.7, 36.3; HRMS: calcd.for $C_{10}H_{12}O_3S$+Na: 235.0399; found: 235.0393.



Thioester (2i): 391 mg; Light green liquid; yield: 88%; R_f = 0.64 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3299, 3197, 3135, 3120, 3055, 2982, 2930, 2357, 1733, 1638, 1605, 1472, 1464, 1407, 1274, 1135, 1030 810 cm^{-1}; ^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.36-7.28 (m, 2H), 7.14-7.07 (m, 2H), 3.69 (s, 3H), 3.59 (s, 2H), 2.31 (s, 3H); $^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 170.4, 137.5, 131.0, 129.9, 52.5, 37.3, 21.1; HRMS: calcd.for $C_{10}H_{12}O_2S$+H: 197.0631; found: 197.0634.

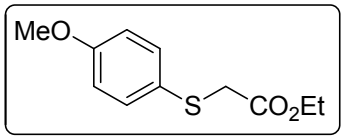


Thioester (2j): 361 mg; Colorless liquid; yield: 71%; R_f = 0.67 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3227, 3056, 2981, 2871, 2346, 2333, 1733, 1651, 1606, 1448, 1271, 1133, 1028, 741 cm^{-1}; ^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ7.28 (d, 1H, J = 7.7 Hz), 7.01 (m, 1H), 6.96 (m, 1H), 4.13 (q, 2H, J = 7.1Hz), 3.54 (s, 2H), 2.39 (s, 3H), 2.28 (s, 3H), 1.21 (t, 3H, J = 7.1 Hz);$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 169.9, 139.1, 137.4, 131.3, 131.2, 130.3,

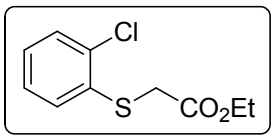


127.4, 61.5, 36.7, 21.0, 20.4, 14.1; HRMS: calcd.for $C_{12}H_{16}O_2S$+Na: 247.0763; found: 247.0764.

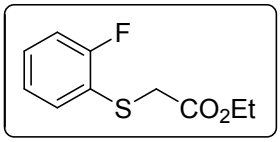
Thioester (2k): 356 mg; Colorless liquid; yield: 57%; R_f = 0.40 in 15:85 ethyl acetate/hexane; FTIR (Neat): 1739, 1494, 1285, 1247, 1030, 911, 762, 669 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ7.42 (d, 2H, J = 8.9 Hz), 7.84 (d, 2H, J = 8.8 Hz),4.14 (q, 2H), 3.79(s, 3H), 3.50 (s, 2H), 1.21 (t, 3H); $^{13}C\{^1H\}$ NMR (125MHz, $CDCl_3$, 24 °C): δ170.1, 159.8, 134.3, 125.1,114.8, 61.5, 55.5, 38.8, 14.2; HRMS (ESI) m/z: $[M+Na]^+$calcd for $C_{11}H_{14}O_3S$+Na 249.2813; Found; 249.2818.



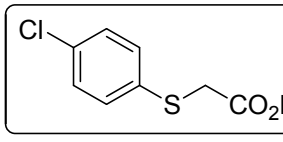
Thioester (2l): 402 mg; Colorless liquid; yield: 77%; R_f = 0.63 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3057, 2986, 2306, 1734, 1609, 1579, 1444, 1271, 1134, 1030, 897 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.39-7.30 (m, 2H), 7.30-7.22 (m, 2H), 4.16 (q, 2H, J = 7.1 Hz), 3.60 (s, 2H), 1.22 (t, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 169.5, 133.5, 133.2, 131.5, 129.2, 61.7, 36.9, 14.1; HRMS: calcd. for $C_{10}H_{11}ClO_2S$+H: 231.0241; found: 231.0242.



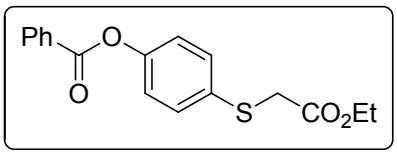
Thioester (2m): 408 mg; Light green liquid; yield: 84%; R_f = 0.62 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3058, 2987, 2306, 1733, 1580, 1465, 1432, 1272, 1143, 1028, 898 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.67-7.51 (m, 1H), 7.49-7.39 (m, 1H), 7.31-7.21 (m, 2H), 4.25 (q, 2H, J =7.0 Hz), 4.12 (s, 2H), 1.29 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ168.0, 163.4, 152.1, 141.8, 124.3 (d, J = 30.4 Hz), 118.7, 110.1, 62.3, 34.3, 14.2; HRMS: calcd.for $C_{10}H_{12}FO_2S$+Na: 237.0356; found: 237.0356.



Thioester (2n): 417 mg; Light yellow liquid; yield: 80%; R_f = 0.64 in 10:90 ethyl acetate/hexane; FTIR (KBr): 3127, 3055, 2981, 2934, 1733, 1625, 1588, 1457, 1283, 1155, 1019, 946 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.42-7.32 (m, 2H), 7.31-7.22 (m, 2H), 4.16 (q, 2H, J = 7.1 Hz), 3.60 (s, 2H), 1.22 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 169.5, 133.5, 133.2, 131.5, 129.2, 61.7, 36.9, 14.1; HRMS: calcd. for $C_{10}H_{11}ClO_2S$+Na: 253.0060; found: 253.0062.

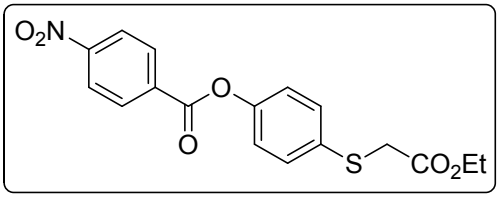


Thioester (2o): 564 mg; White semi solid; yield: 78%; R_f = 0.56 in 15:85 ethyl acetate/hexane; FTIR (KBr): 2971, 2952, 2926, 2858, 1738, 1678, 1648, 1630, 1590, 1545, 1457, 1396, 1264, 1201, 1170, 1069, 1085, 935 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.23-8.14 (m, 2H), 7.67-7.59 (m, 1H), 7.55-7.46 (m, 4H), 7.21-7.13 (m, 2H), 4.17 (q,

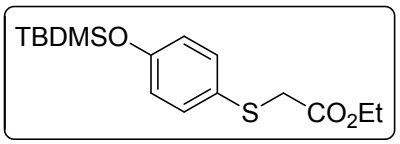


2H, J = 7.0 Hz), 3.63 (s, 2H), 1.24 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ169.7, 165.0, 150.4, 133.8, 132.3, 132.0, 130.3, 129.4, 128.7, 122.5, 61.7, 37.4, 14.2; HRMS: calcd. for $C_{17}H_{16}O_4S$+H: 317.0842; found: 317.0842.

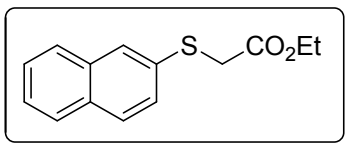
Thioester (2p): 420 mg; White semi solid; yield: 49%; R_f = 0.56 in 20:85 ethyl acetate/hexane; FTIR (KBr): 3051, 2971, 2825, 1738, 1678, 1658, 1634, 1590, 1545, 1457, 1396, 1264, 1201, 1172, 1069, 1084 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.42-8.19 (m, 4H), 7.61-7.51 (m, 2H), 7.25-7.19 (m, 2H), 4.17 (q, 2H, J = 7.0 Hz), 3.63 (s, 2H), 1.23 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 169.6, 163.2, 151.0, 149.6, 134.7, 133.1, 131.7, 131.4, 123.8, 122.1, 61.7, 37.1, 14.1; HRMS: calcd. for $C_{17}H_{16}O_4S$+H: 361.3691; found: 361.3697.



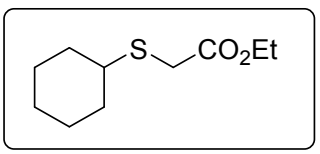
Thioester (2q): 518 mg; Colorless liquid; yield: 70%; R_f = 0.45 in 15:85 ethyl acetate/hexane; FTIR (Neat): 3056, 2948, 2863, 2307, 1731, 1591, 1487, 1419, 1266, 1156, 1027, 910 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.21-7.10 (m, 2H), 6.68-6.49 (m, 2H), 3.94 (q, 2H, J = 7.0 Hz), 3.33 (s, 2H), 1.02 (t, 3H, J = 7.1Hz), 0.78 (s, 9H), 0.00 (s, 6H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.0, 155.9, 133.9, 125.9, 120.9, 61.4, 38.5, 25.7, 18.3, 14.2, -4.3; HRMS: calcd. for $C_{16}H_{26}O_3SSi$+Na: 349.1264; found: 349.1265.



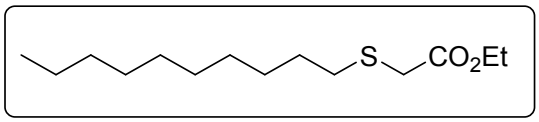
Thioester (2r): 429 mg; liquid; yield: 77%; R_f = 0.64 in 10:90 ethyl acetate/hexane; FTIR (Neat): 3273, 3166, 3057, 2978, 2929, 1733, 1656, 1623, 1588, 1454, 1397, 1388, 1376, 1275, 1134, 1027 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.84 (s, 1H), 7.82-7.70 (m, 3H), 7.51-7.39 (m, 3H), 4.16 (q, 2H, J = 7.1 Hz), 3.73 (s, 2H), 1.20 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ169.8, 133.7, 132.5, 132.2, 128.7, 128.2, 127.8, 127.6, 127.3, 126.7, 126.1, 61.7, 36.7, 14.2; HRMS: calcd.for $C_{14}H_{14}SO_2$+H: 247.0780; found: 247.0787.



Thioester (2t): 1.68 g; liquid; yield: 89%; R_f = 0.64 in 5:95 ethyl acetate/hexane; FTIR (Neat): 2981, 2927, 2854, 1731, 1450, 1365, 1268, 1133 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 4.17-4.12 (s, 2H), 3.22 (s, 2H), 2.77 (s, 1H), 1.96 (m, 2H), 1.75 (m, 2H), 1.59 (d, 1H, J = 10 Hz), 1.30-1.23 (m, 7H).; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ171.0, 61.3, 44.1, 33.2, 32.2, 26.0, 25.8, 14.2.; HRMS: calcd. for $C_{10}H_{18}SO_2$+Na: 225.0920; found: 225.0920.

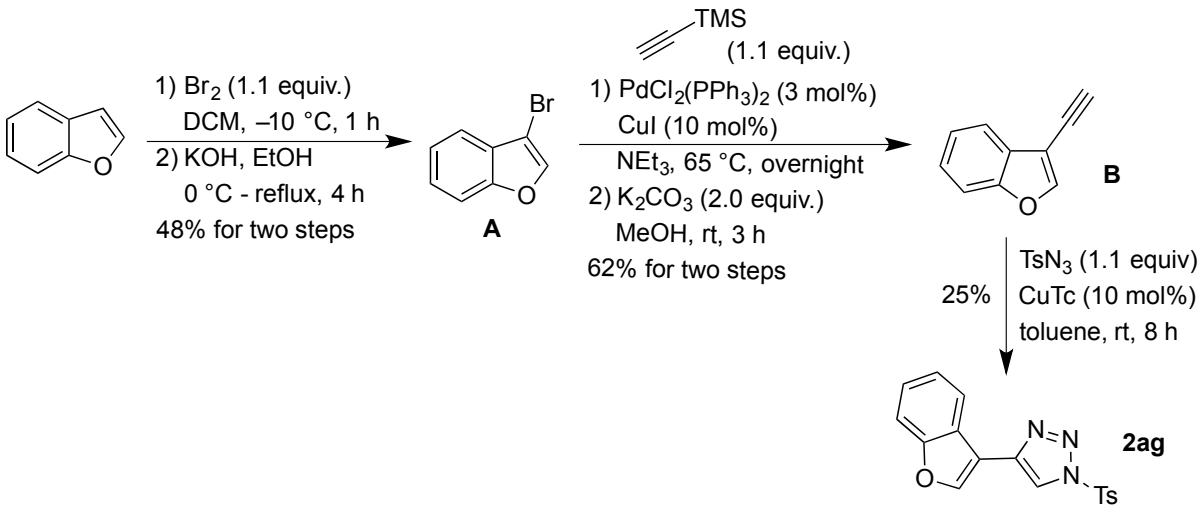


Thioester (2u): 670 mg; liquid; yield: 87%; R_f = 0.64 in 5:95 ethyl acetate/hexane; FTIR



(Neat): 2980, 2925, 28332, 1735, 1445, 1360, 1264, 1132 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 4.24-4.15 (m, 2H), 3.19 (s, 2H), 2.62 (t, 2H, J = 8.4 Hz,), 1.59 (m, 2H), 1.38-1.25 (m, 17H), 0.90 (t, 3H, J = 6.9 Hz), 1.30-1.23 (m, 7H).; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ170.8, 61.4, 33.9, 32.8, 32.0, 29.7, 29.6, 29.4, 29.3, 29.1, 28.9, 22.8, 14.3.; HRMS: calcd.for $C_{14}H_{28}SO_2$+Na: 283.1702; found: 283.1695.

5. Synthesis of 4-(Benzofuran-3-yl)-1-tosyl-1*H*-1,2,3-triazole (2ag):



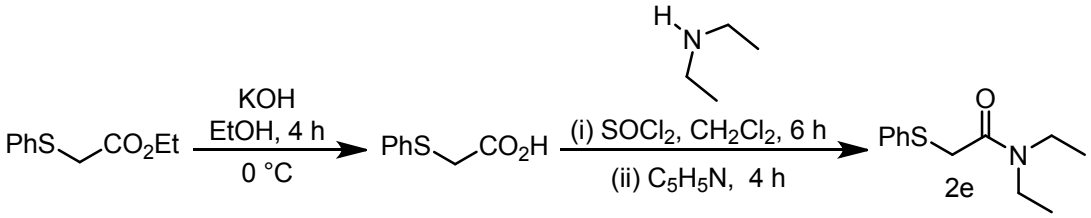
In a round bottom flask, benzofuran (1 g, 1.0 equiv.) was dissolved in 20 mL of DCM and cooled to –10 °C. Bromine (0.6 mL, 1.1 equiv.) in DCM (3 mL) was slowly added at same temperature. The reaction mixture was stirred for 1 h at –10 °C. Subsequently, aq. NaOH solution (1 mL, 1 M) was added and the reaction mixture was diluted with water (40 mL) followed by $Na_2S_2O_3$ solution (20 mL) was added. The resultant reaction mixture was extracted with DCM and the combined organic extract was dried over anhydrous Na_2SO_4. The organic layer was filtered and concentrated under reduced pressure and the residue obtained was subjected for next step without any further purification. The dibromide obtained was dissolved in ethanol (20 mL) and saturated solution of KOH in ethanol (20mL) was added dropwise at 0 °C. Next, the reaction mixture was kept for refluxing for 4 h. After refluxing for 4 h, water was added (10 mL) and the reaction mixture containing EtOH was removed under reduced pressure. The aqueous residue was extracted with ethyl acetate and the organic extract was washed successively with water and brine followed by dried over anhydrous Na_2SO_4. Upon filtration, this organic extract was concentrated under reduced

pressure and the residue was purified by silica gel flash column chromatography (petroleum ether: EtOAc, 20:1) and the product **A** was obtained in 56% yield as a dark yellow oil.

The 3-bromobenzofuran **A** was taken in round bottom flask along with trimethylsilylacetylene (1.1 equiv), $PdCl_2(PPh_3)_2$ (3 mol%), CuI (10 mol%) and Et_3N (10 mL). The reaction flask was sealed and kept for reflux overnight. The reaction mixture was cooled to room temperature and filtered through Celite. Evaporation solvent followed by column chromatography using ethylacetate : hexane (1:9) as an eluent afforded the timethylsilylalkyne in 72% yield. The isolated timethylsilylalkyne was treated with K_2CO_3 (2.0 equiv) in MeOH (8 mL) at room temperature for 3 hours. The reaction was monitored by TLC, after complete consumption of alkyne, the reaction mixture was diluted with water (10 mL) and extracted with DCM. Evaporation of solvent followed by column chromatography furnished the compound **B** in 85% yield.

The compound **B** (1.0 equiv) was taken in round bottom flask, followed by TsN_3 (1.1 equiv), CuTc (10 mol%) and toluene (4 mL) were added at room temperature and stirred for 8 hours. Evaporation of solvent followed by column purification using ethyl acetate : hexane (20:80) gave the compound **2ag** in 25% yield. FTIR (KBr): 2950, 2514, 1605, 1415, 123, 586cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.38 (s, 1H), 8.14 (s, 1H), 8.05 (d, 1H, J = 7.8 Hz); 7.90 (d, 1H, J = 7.1 Hz), 7.54 (d, 1H, J = 7.5 Hz), 7.40-7.28 (m, 6H), 2.44 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 155.6, 147.6, 143.3, 139.8, 133.1, 132.6, 128.9, 125.3, 123.6, 120.7, 118.9, 111.9, 111.4, 111.1, 104.8, 21.9.; HRMS: m/z: $[M+H]^+$ Calcd. for $C_{17}H_{13}N_3O_3S$+Na: 362.0570; found: 362.0569.

6. Synthesis of *N, N*-diethyl-2-(phenylthio)acetamide:



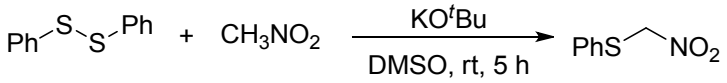
A solution of ethyl 2-(phenylthio)acetate (0.80 g, 4.0 mmol) in EtOH (10 mL) was added to an aqueous solution (10 mL) of potassium hydroxide (2.1 g, 38.0 mmol) at 0 °C. After being stirred for 4 h, by the TLC analysis, reaction mixture was evaporated and was acidified by 2 M HCl and extracted with EtOAc. The organic layer was washed with brine,

dried over anhydrous sodium sulfate, and concentrated in vacuum, purified through column chromatography to give 2-(phenylthio)acetic acid as a colorless liquid.

To a solution 2-(phenylthio)acetic acid (0.60 g, 3.57 mmol, 1 equiv) in dichloromethane, thionyl chloride (0.77 mL, 10.71 mmol, 3 equiv) was added and stirred at room temperature for 6 h. After consumption of acid (by TLC), excess thionyl chloride was then removed under reduced pressure to afford (phenylsulfanyl)acetyl chloride as a yellow liquid.

Pyridine (0.56 mL, 7.14 mmol, 2 equiv) was added to a stirred solution of diethylamine (0.74 mL, 7.14 mmol, 2 equiv) in dichloromethane at 0 °C and (phenylsulfonyl)acetyl chloride was also added drop wise to the reaction mixture at same temperature. By TLC analysis the reaction was quenched with water and extracted with dichloromethane, dried over Na_2SO_4 and concentrated in vacuum. Purified through column chromatography to afford corresponding amide as light yellow liquid; 210 mg; yield: 41%; FTIR (KBr): 3415, 2358, 2121, 1647, 1555, 1160, 670, 586 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.49-7.41 (m, 2H), 7.34-7.25 (m, 2H), 7.25-7.18 (m, 1H), 3.73 (s, 2H), 3.43-3.28 (m, 4H), 1.19 (t, 3H, J = 7.0 Hz), 1.10 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 167.6, 135.4, 130.5, 129.0, 127.0, 42.6, 40.5, 37.1, 14.4, 12.9; HRMS: m/z: $[M+H]^+$ Calcd. for $C_{12}H_{17}NOS$: 224.1104; found: 224.1109.

7. Synthesis of (nitromethyl)(phenyl)sulfide 2f



In a 50 mL three-neck round-bottomed flask equipped with nitrogen inlet, 5 mL of dry and degassed dimethylsulfoxide and potassium *t*-butoxide (123 mg, 1.10 mmol) were added. The mixture was stirred till the complete dissolution of the base, the nitromethane (44 µL, 0.82 mmol) was added and stirred for 5 min. To the reaction mixture, diphenyldisulfide(92 mg, 0.42 mmol) was added as a suspension. The reaction mixture was stirred for 5 h and quenched with an excess of ammonium nitrate and 30 mL of water was added. Subsequently, the reaction mixture was acidified with dilute HCl to pH-4 and extracted with dichloromethane (3 × 10 mL). The organic layer obtained was washed with water (2 × 10 mL) to remove the traces of dimethylsulfoxide. Subsequently, it was dried with $MgSO_4$, filtered, and concentrated to give a crude product, which was further purified by column chromatography with silica gel using ethylacetate/hexaneas an eluent gave the product in 55

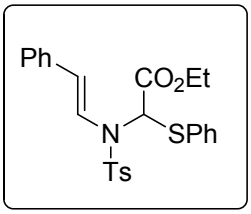
mg, 78% yield as yellow oil. R_f = 0.40 in 10:90 ethyl acetate/hexane; FTIR (KBr): 3061, 3002, 2951, 2843, 1739, 1524, 1471, 1357, 1281, 1150, 1039, 855 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.53-7.45 (m, 2H), 7.40-7.32 (m, 3H), 5.44 (s, 2H); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ132.2, 131.7, 129.7, 129.3, 79.5; HRMS: calcd. for $C_7H_7NO_2S$+Na: 192.0090; found: 192.0096.

8. Typical procedure for the rhodium catalyzed rearrangement reaction

To a 10 mL reaction tube equipped with stir bar, *N*-sulfonyl-1,2,3-triazole **1** (0.20 mmol, 1 equiv), substituted arylsulfide **2** (0.40 mmol, 2 equiv) and $Rh_2(Oct)_4$ (0.004 mmol, 2 mol%) were introduced. Next, 1.5 mL of dry toluene was added under an argon atmosphere, and the reaction mixture was transferred to preheated oil-both at 120 °C and allowed to stir for 8 h. After completion of the reaction, monitored by TLC, the reaction mixture was cooled to room temperature and the solvent was evaporated under reduced pressure. The crude product that obtained was purified by column chromatography using hexane/ethyl acetate mixture as an eluent to afford enamide derivatives **3** in high yield and purity.

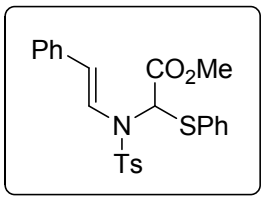
9. Properties of isolated enamides

Enamide (4a): 74 mg; Colorless liquid; yield: 80%; R_f = 0.55 in 20:80 ethyl acetate/hexane;



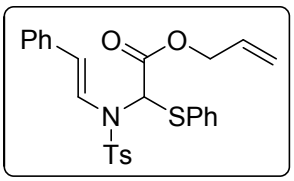
FTIR (neat): 3196, 3068, 2985, 2928, 2810, 2206, 1953, 1886, 1795, 1737, 1599, 1489, 1341, 1266, 1156, 1092, 905 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.63-7.57 (m, 2H), 7.56-7.50 (m, 2H), 7.40-7.33 (m, 3H), 7.30 -7.25 (m, 4H), 7.23-7.16 (m, 3H), 6.94 (d, 1H, J = 14.6 Hz), 6.39-6.25 (m, 2H), 4.18-4.02 (m, 2H), 2.38 (s, 3H), 1.12 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ167.1, 144.2, 136.2, 136.0, 134.6, 133.3, 131.7, 129.6, 129.3, 129.1, 128.7, 127.8, 127.2, 126.0, 123.1, 119.4, 67.3, 62.7, 21.6, 14.0; HRMS: calcd. for $C_{25}H_{25}NO_4S_2$ + Na: 490.1117; found: 490.1129.

Enamide (4b): 71 mg; Light green gummy liquid; yield: 79%; R_f = 0.55 in 20:80 ethyl



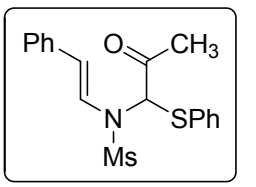
acetate/hexane; FTIR (neat): 3056, 2986, 2357, 1686, 1427, 1265,1171, 897, 740 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.60-7.55 (m, 2H), 7.54-7.48 (m, 2H), 7.38-7.33 (m, 3H), 7.31-7.26 (m, 4H), 7.24-7.18 (m, 3H), 6.94 (d, 1H, J = 14.7 Hz), 6.35 (s, 1H), 6.29 (s, 1H, J = 14.7 Hz), 3.65 (s, 3H), 2.39 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ167.6, 144.3, 135.9, 134.5, 133.3, 131.6, 129.6, 129.4, 129.2, 128.7, 127.8, 127.2, 126.0, 123.0, 119.4, 67.1, 53.4, 21.7; HRMS: calcd. for $C_{24}H_{23}NO_4S_2$ + Na: 476.0961; found: 476.0966.

Enamide (4c): 62 mg; Colorless liquid; yield: 65%; R_f = 0.52 in 20:80 ethyl acetate/hexane;

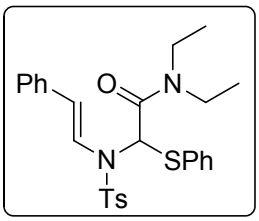


FTIR (neat): 3061, 2933, 2865, 2805, 1952, 1883, 1742, 1645, 1597, 1444, 1355, 1264, 1167, 1089, 1000, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.63 (m, 2H), 7.56-7.50 (m, 2H) 7.40-7.33 (m, 3H), 7.31-7.25 (m, 4H), 7.23-7.18 (m, 3H), 6.94 (d, 1H, J = 14.6 Hz), 6.37 (s, 1H), 6.30 (d, 1H, J = 14.6 Hz), 5.72 (ddt, 1H, J = 17.2, 10.5, 5.9 Hz), 5.30-5.16 (m, 2H), 4.61-4.44 (m, 2H), 2.38 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 166.8, 144.3, 135.9(8), 135.9(5), 134.6, 131.6, 130.9, 129.6, 129.4, 129.2, 128.7, 127.8, 127.2, 126.0, 122.9, 119.5, 119.4, 67.2, 67.1, 21.7; HRMS: calcd. for $C_{26}H_{25}NO_4S_2$ + Na: 502.1117; found: 502.1126

Enamide (4d): 40 mg; Light green gummy liquid; yield: 56%; R_f = 0.49 in 20:80 ethyl acetate/hexane; FTIR (neat): 3281, 3063, 2926, 2857, 2477, 2357, 1953, 1896, 1716, 1597, 1442, 1406, 1327, 1213, 1156, 976 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.61-7.55 (m, 2H), 7.38-7.34 (m, 3H), 7.33-7.31 (m, 4H), 7.25-7.19 (m, 1H), 6.97 (d, 1H, J = 14.7 Hz), 6.32 (d, 1H, J = 14.7 Hz), 6.28 (s, 1H), 2.70 (s, 3H), 2.39 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 200.9, 135.4, 134.0, 132.1, 129.7, 129.1, 128.8, 127.5, 126.0, 122.8, 118.0, 75.1, 39.8, 27.0; HRMS: calcd. for $C_{18}H_{19}NO_3S_2$ + H: 362.0879; found: 362.0882.

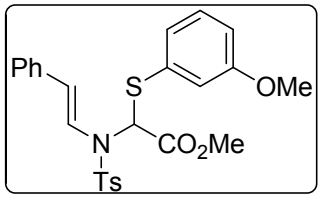


Enamide (4e): 70 mg; White solid; yield: 71%; R_f = 0.45 in 20:80 ethyl acetate/hexane;



FTIR (KBr): 3183, 3057, 2984, 2935, 2411, 2363, 2306, 2127, 2056, 1933, 1890, 1800, 1732, 1653, 1435, 1350, 1266, 1163, 1039, 949 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.56-7.43 (m, 4H), 7.39-7.30 (m, 5H), 7.31-7.23 (m, 2H), 7.22-7.13 (m, 4H), 6.75 (d, 1H, J = 14.3 Hz), 6.46 (s, 1H), 3.71-3.41 (m, 2H), 3.44-3.16 (m, 2H), 2.35 (s, 3H), 1.36 (t, 3H, J = 7.1 Hz), 1.07 (t, 3H, J = 7.1 Hz);$^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ165.2, 144.0, 136.2, 135.9, 132.4, 129.5, 129.4, 128.6, 128.5, 127.7, 127.2, 126.3, 124.9, 124.3, 64.9, 42.7, 41.3, 21.6, 14.5, 12.8; HRMS: calcd. for $C_{27}H_{30}N_2O_3S_2$ + Na: 517.1590; found: 517.1595.

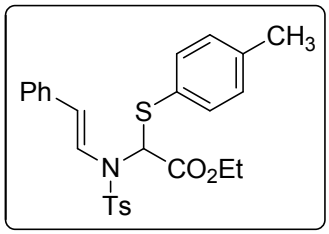
Enamide (4h): 78 mg; Colorless liquid; yield: 81%; R_f = 0.49 in 20:80 ethyl acetate/hexane;



FTIR (neat): 3061, 3018, 2938, 2852, 2357, 1746, 1645, 1589, 1470, 1449, 1351, 1247, 116, 1089, 1032, 940 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.63-7.54 (m, 2H), 7.31-7.26 (m, 4H), 7.24-7.15 (m, 4H), 7.09 (d, 1H, J = 7.6 Hz), 7.04 (s, 1H), 6.98-6.85 (m, 2H), 6.37 (s, 1H), 6.30 (d, 1H, J = 14.6 Hz), 3.78 (s, 3H), 3.67 (s, 3H), 2.39 (s, 3H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ167.6, 160.0, 144.3, 136.0, 135.9, 132.9,

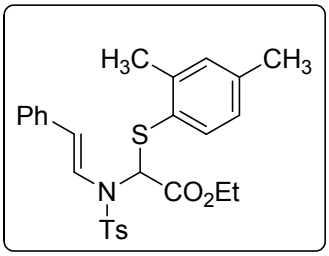
130.1, 129.6, 128.7, 127.8, 127.3, 126.1, 126.0, 123.1, 119.7, 118.7, 115.5, 67.1, 55.4, 53.4, 21.7; HRMS: calcd. for $C_{25}H_{25}NO_5S_2$ + NH_4: 501.1512; found: 501.1522.

Enamide (4i): 75 mg; Colorless liquid; yield: 72%; R_f = 0.54 in 20:80 ethyl acetate/hexane;



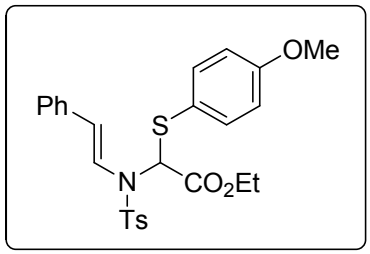
FTIR (neat): 3057, 3028, 2974, 2928, 2865, 2357, 1740, 1645, 1599, 1483, 1450, 1354, 1260, 1166, 1091, 936 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.62-7.53 (m, 2H), 7.44-7.40 (m, 1H), 7.34-7.25 (m, 5H), 7.24-7.13 (m, 5H), 7.01-6.90 (d, 1H, J = 14.6 Hz), 6.39-6.22 (m, 2H), 4.16-4.03 (m, 2H), 2.38 (s, 3H), 2.35 (s, 3H), 1.11 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.1, 144.2, 139.4, 136.1, 136.0, 134.9, 130.1, 129.5, 128.7, 127.7, 127.1, 125.9, 123.1, 118.8,67.4, 62.7, 21., 21.4, 13.9; HRMS: calcd. for $C_{26}H_{27}NO_4S_2$ + Na: 504.1274; found: 504.1283.

Enamide (4j): 80 mg; Colorless liquid; yield: 81%; R_f = 0.55 in 20:80 ethyl acetate/hexane;

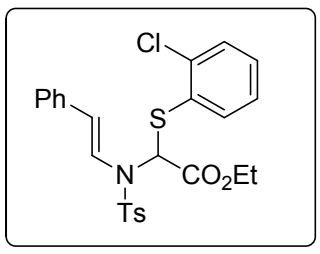


FTIR (neat): 3288, 2974, 2929, 2356, 1740, 1645, 1600, 1450, 1358, 1260, 1166, 1091, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.60-7.49 (m, 2H), 7.46- 7.37 (m, 1H), 7.34 -7.26 (m, 4H), 7.23-7.16 (m, 3H), 7.06 (s, 1H), 7.02-6.87 (m, 2H), 6.36 (d, 1H, J = 14.7 Hz), 6.25 (s, 1H), 4.17-4.02 (m, 2H), 2.44 (s, 3H), 2.38 (s, 3H), 2.33 (s, 3H), 1.12 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ167.3, 144.1, 142.3, 139.7, 136.3, 136.2, 136.1, 131.6, 129.5, 128.7, 127.7 (6), 127.7 (2), 127.1, 127.0, 125.9, 123.2, 118.7, 66.5, 62.6, 21.6, 21.3, 20.9, 14.0; HRMS: calcd. for $C_{27}H_{29}NO_4S_2$ + H: 496.1611; found: 496.1615.

Enamide (4k): 56 mg; Colorless liquid; yield: 57%; R_f = 0.48 in 20:80 ethyl acetate/hexane;



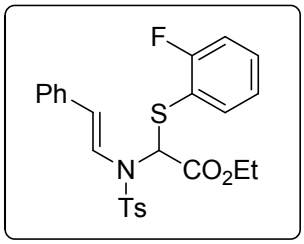
FTIR (neat): 3142, 3044, 2928, 2852, 2366, 2250, 1934, 1885, 1739, 1645, 1529, 1490, 1350, 1251, 1167, 1021, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.64-7.58 (m, 2H), 7.48-7.44 (m, 2H), 7.31-7.26 (m, 4H), 7.25-7.19 (m, 3H), 6.96 (d, 1H, J = 14.7 Hz), 6.88-6.84 (m, 2H), 6.31(d, 1H, J = 14.7 Hz), 6.22 (s, 1H), 4.16-4.03 (m, 2H), 3.81 (s, 3H), 2.39 (s, 3H), 1.11(t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ167.1, 160.8, 144.2, 137.2, 136.2, 136.1, 129.6, 128.7, 127.8, 127.1, 125.9, 123.1, 121.7, 118.5, 114.8, 67.7, 62.7, 55.4, 21.7, 14.0; HRMS: calcd. for $C_{26}H_{27}NO_5S_2$ + H: 498.1403; found: 498.1417.



Enamide (4l): 74 mg; Colorless liquid; yield: 74%; R_f = 0.53 in 20:80 ethyl acetate/hexane; FTIR (neat): 3059, 2974, 2928, 2859,

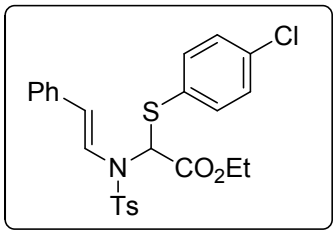
2357, 1904, 1740, 1645, 1599, 1471, 1359, 1262, 1167, 1092, 936 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.66-7.55 (m, 3H), 7.51-7.42 (m, 1H), 7.36-7.17 (m, 9H), 6.91 (1H, d, J = 14.7 Hz), 6.54 (s, 1H), 6.31 (1H, d, J = 14.7 Hz), 4.18-4.04 (m, 2H), 2.38 (s, 3H), 1.10 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 166.8, 144.3, 139.0, 137.0, 136.0, 130.7, 130.2, 130.0, 129.6, 128.7, 127.8, 127.5, 127.2, 126.0, 122.9, 119.0, 65.4, 62.9, 21.6, 14.0; HRMS: calcd. for $C_{25}H_{24}ClNO_4S_2$ + H: 502.0908; found:502.0919.

Enamide (4m): 82 mg; Colorless liquid; yield: 84%; R_f = 0.53 in 20:80 ethyl acetate/hexane;



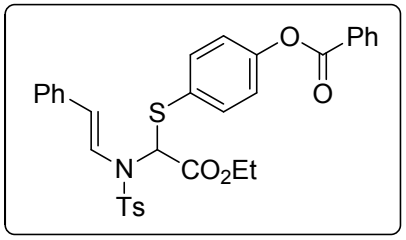
FTIR (neat): 3063, 2996, 2858, 2357, 1922, 1740, 1646, 1597, 1468, 1360, 1262, 1167, 1017, 936 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.69-7.56 (m, 2H), 7.50 (t, 1H, J = 7.4 Hz), 7.45-7.34 (m, 1H), 7.34-7.08 (m, 10H), 6.89 (d, 1H, J = 14.7 Hz), 6.48 (s, 1H), 6.30 (d, 1H, J = 14.7 Hz), 4.17-4.03 (m, 2H), 2.39 (s, 3H), 1.09 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 166.8, 144.3, 137.6, 136.1 (J= 8.0 Hz), 131.9 (J = 8.2 Hz), 129.6, 128.7, 127.8, 127.2, 126.0, 124.8 (J= 3.7 Hz), 122.7, 119.0, 116.3, 116.1, 65.6, 62.9, 21.6, 14.0; HRMS: calcd. for $C_{25}H_{24}FNO_4S_2$ + Na: 508.1023; found: 501.1033.

Enamide (4n): 80 mg; Colorless liquid; yield: 80%; R_f = 0.52 in 20:80 ethyl acetate/hexane;



FTIR (neat): 3061, 2982, 2860, 1740, 1646, 1599, 1448, 1408, 1348, 1264, 1164, 1021, 968 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.60-7.55 (m, 2H), 7.50-7.40 (m, 2H), 7.35-7.26 (m, 6H), 7.26-7.18 (m, 3H), 6.94 (d, 1H, J = 14.7 Hz), 6.31 (s, 1H), 6.28 (d, 1H, J = 14.7 Hz), 4.20-4.00 (m, 2H), 2.40 (s, 3H), 1.11 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 166.9, 144.4, 136.2, 136.0, 135.9, 135.7, 129.9, 129.7, 129.5, 128.8, 127.7, 127.2, 125.9, 122.8, 118.9, 67.2, 62.9, 21.7, 14.0; HRMS: calcd. for $C_{25}H_{24}ClNO_4S_2$ + K: 540.0467; found:540.0457.

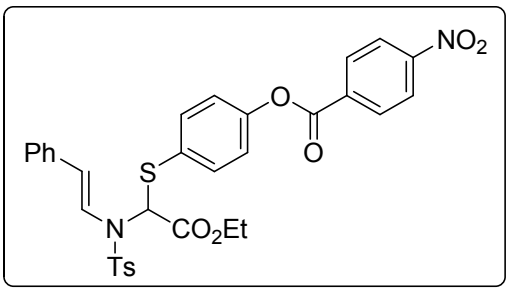
Enamide (4o): 78 mg; White semi solid; yield: 67%; R_f = 0.46 in 20:80 ethyl acetate/hexane;



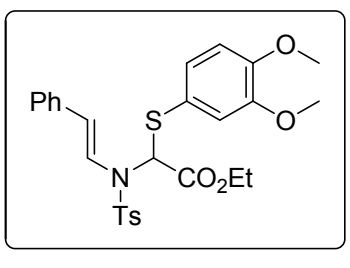
FTIR (neat): 3062, 2977, 2932, 2356, 1740, 1645, 1596, 1487, 1452, 1357, 1260, 1200, 1168, 1063, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ8.23-8.15 (m, 2H), 7.66-7.57 (m, 5H), 7.54-7.49 (m, 2H), 7.32-7.27 (m, 4H), 7.27-7.22 (m, 4H), 7.22-7.20 (m, 1H), 6.97 (d, 1H, J = 14.7 Hz), 6.33 (s, 1H), 6.31 (d, 1H, J = 14.7 Hz), 4.19-4.06 (m, 2H), 2.39 (s, 3H), 1.13 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.0, 164.9, 151.9, 144.3, 136.2, 133.8, 130.3, 129.7,

129.4, 128.9, 128.8, 128.7, 127.8, 127.2, 126.0, 123.1, 122.7, 119.0, 67.4, 62.8, 21.7, 14.0; HRMS: calcd. for $C_{32}H_{29}NO_6S_2$ + Na: 610.1329; found: 610.1341.

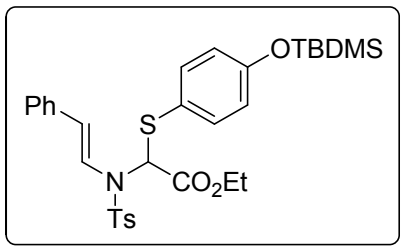
Enamide (4p): 78 mg; Colorless semi solid; yield: 62%; R_f = 0.42 in 20:80 ethyl acetate/hexane; FTIR (neat): 3295, 3166, 3056, 2982, 2926, 2856, 2358, 1797, 1644, 1599, 1437, 1347, 1267, 1201, 1167, 1060, 1201, 1167, 1060, 899 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 8.40-8.35 (m, 4H), 7.69-7.60 (m, 4H), 7.34-7.28 (m, 4H), 7.28-7.24 (m, 5H), 6.96 (d, 1H, J = 14.7 Hz), 6.30 (s, 1H), 6.28 (d, 1H, J = 14.7Hz), 4.19-4.05 (m, 2H), 2.40 (s, 3H), 1.11 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 166.9, 163.0, 151.4, 151.0, 144.4, 136.5, 136.0, 135.9, 134.8, 131.4, 129.7, 129.4, 128.8, 128.2, 127.8, 127.2, 125.9, 123.9, 122.8, 122.4, 118.6, 67.3, 62.9, 21.7, 14.0; HRMS: calcd. for $C_{32}H_{28}N_2O_8S_2$ + Na: 655.1179; found: 655.1182.



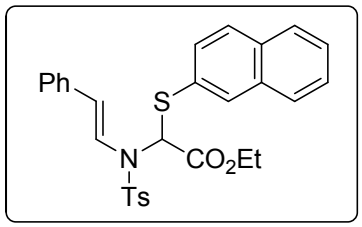
Enamide (4q): 71 mg; White semi solid; yield: 68%; R_f = 0.45 in 20:80 ethyl acetate/hexane; FTIR (neat): 3061, 2948, 2848, 2578, 2328, 1974, 1740, 1644, 1587, 1502, 1453, 1353, 1336, 1252, 1167, 1022, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.63-7.58 (m, 2H), 7.33-7.27 (m, 4H), 7.24-7.19 (m, 3H), 7.13 (dd, 1H, J = 8.3, 2.0 Hz), 7.05 (d, 1H, J = 2.0 Hz), 6.97 (d, 1H, J = 14.7 Hz), 6.82 (d, 1H, J = 8.3 Hz), 6.31 (d, 1H, J = 14.7 Hz), 6.29 (s, 1H), 4.16-4.03 (m, 2H), 3.89 (s, 3H), 3.84 (s, 3H), 2.39 (s, 3H), 1.12 (t, 3H, J = 7.1Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.1, 150.3, 149.1, 144.2, 136.2, 136.1, 129.6, 128.8, 128.4, 127.7, 127.1, 125.9, 123.2, 122.0, 118.6, 118.0, 111.4, 67.7, 62.7, 56.0 (4), 56.0 (1), 21.7, 14.0; HRMS: calcd. for $C_{27}H_{29}NO_6S_2$ + H: 528.1509; found: 528.1522.



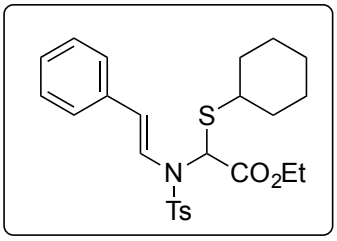
Enamide (4r): 88 mg; Colorless liquid; yield: 74%; R_f = 0.48 in 20:80 ethyl acetate/hexane; FTIR (neat): 3172, 3071, 2950, 2796, 2305, 1893, 1856, 1776, 1592, 1489, 1361, 1265, 1168, 1091, 910 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.42-7.38 (m, 2H), 7.22-7.17 (m, 2H), 7.10-7.06 (m, 4H), 7.03-7.00 (m, 2H), 6.75 (d, 1H, J = 14.7 Hz), 6.61-6.56 (m, 2H), 6.11 (d, 1H, J = 14.7 Hz), 6.01 (s, 1H), 3.94-3.82 (m, 2H), 2.18 (s, 3H), 0.90 (t, 3H, J = 7.0 Hz), 0.77 (s, 9H), 0.01 (s, 6H); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.2,157.2, 144.2, 137.0, 136.3, 136.1, 129.6, 128.7, 127.8, 127.1, 125.9, 123.2, 122.7, 121.1, 118.7, 67.6, 62.6, 25.7, 21.6, 18.3, 14.0, –4.3; HRMS: calcd. for $C_{31}H_{39}NO_5S_2Si$ + Na: 620.1931; found: 620.1946.



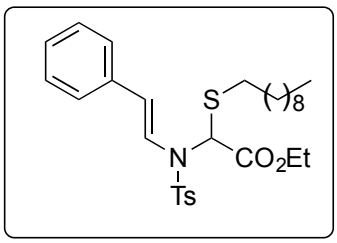
Enamide (4s): 65 mg; White gummy liquid; yield: 63%; R_f = 0.53 in 20:80 ethyl acetate/hexane; FTIR (neat): 3295, 3056, 2969, 2927, 2859, 2356, 1920, 1740, 1644, 1596, 1492, 1450, 1355, 1262, 1167, 1090, 938 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.97-7.91 (m, 1H), 7.85-7.80 (m, 2H), 7.75-7.72 (m, 1H), 7.60 (dd, 1H, J =1.7, 8.5 Hz), 7.53-7.49 (m, 2H), 7.48-7.44 (m, 2H), 7.32-7.27 (m, 4H), 7.24-7.19 (m, 1H), 7.05-6.94 (m, 3H), 6.46(s, 1H), 6.35(d, 1H, J = 14.7 Hz), 4.19-4.09 (m, 2H), 2.30 (s, 3H), 1.16 (t, 3H, J = 7.1Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.2, 144.1, 136.0, 135.9, 134.3, 133.6, 133.2, 130.8, 129.5, 129.1, 128.9, 128.7, 127.9, 127.8, 127.6, 127.2, 127.0, 126.7, 126.0, 123.1, 119.3, 67.4, 62.9, 21.6, 14.0; HRMS: calcd. for $C_{29}H_{27}NO_4S_2 + NH_4$: 535.1720; found: 535.1728.



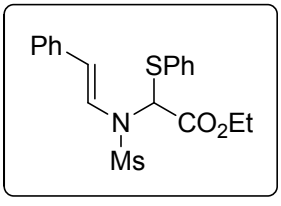
Enamide (4t): 122 mg; Light green gummy liquid; yield: 76%; R_f = 0.50 in 20:80 ethyl acetate/hexane; FTIR (neat): 2923, 2854, 2358, 1739, 1643, 1450, 1357, 1257, 1222, 1160, 938 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$): δ 7.76 (d, 2H, J = 7.8 Hz), 7.29-7.25 (m, 7H), 6.35 (d, 1H, J = 14.9 Hz), 6.14 (s, 1H), 4.07-3.96 (m, 2H), 2.90 (t, 1H, J = 9.5 Hz), 2.41 (s, 3H), 2.16 (d, J = 11.6 Hz, 1H), 1.92 (d, 1H, J = 8.3 Hz), 1.81-1.72 (m, 3H), 1.49-1.20 (m, 8H), 1.08 (t, 3H, J = 7.2 Hz).; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.7, 144.3, 136.2, 129.7, 128.7, 127.7, 127.1, 126.0, 123.1, 119.7, 62.4, 62.1, 44.2, 33.8, 32.9, 26.1, 25.8, 25.8, 21.7, 13.9.; HRMS: calcd. for $C_{25}H_{31}NO_4S_2$ + Na: 496.1587; found: 496.1583.



Enamide (4u): 122 mg; Light green gummy liquid; yield: 81%; R_f = 0.50 in 20:80 ethyl acetate/hexane; FTIR (neat): 2920, 2851, 2357, 1732, 1634, 1452, 1358, 1241, 1214, 938 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$): δ 7.76 (d, 2H, J = 7.8 Hz), 7.29-7.25 (m, 7H), 6.35 (d, 1H, J = 14.9 Hz), 6.14 (s, 1H), 4.07-3.96 (m, 2H), 2.90 (t, 1H, J = 9.5 Hz), 2.41 (s, 3H), 2.16 (d, J = 11.6 Hz, 1H), 1.92 (d, 1H, J = 8.3 Hz), 1.81-1.72 (m, 3H), 1.49-1.20 (m, 8H), 1.08 (t, 3H, J = 7.2 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.7, 144.3, 136.2, 129.7, 128.7, 127.7, 127.1, 126.0, 123.1, 119.7, 62.4, 62.1, 44.2, 33.8, 32.9, 26.1, 25.8, 25.8, 21.7, 13.9; HRMS: calcd. for $C_{25}H_{31}NO_4S_2$ + Na: 496.1587; found: 496.1583.

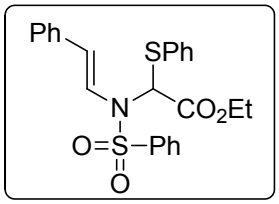


Enamide (4v): 57 mg; Colorless liquid; yield: 73%; R_f = 0.51 in 20:80 ethyl acetate/hexane; FTIR (neat): 3193, 3061, 2982, 2933, 2860, 1740, 1646, 1599, 1448, 1408, 1348, 1264, 1164, 1021, 968 cm^{-1}; ^1H NMR (400 MHz,



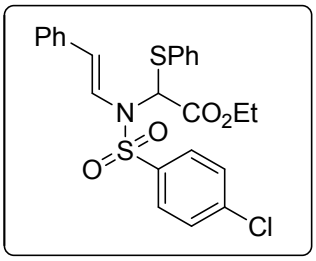
$CDCl_3$): δ 7.67-7.48 (m, 2H), 7.42-7.28 (m, 7H), 7.27-7.18 (m, 1H), 6.95 (d, 1H, J = 14.7 Hz), 6.38 (d, 1H, J = 14.8 Hz), 6.31 (s, 1H), 4.45-4.16 (m, 2H), 2.86 (s, 3H), 1.31 (t, 3H, J = 7.0 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.3, 135.8, 134.8, 131.2, 129.4, 129.3, 128.8, 127.3, 125.9, 122.8, 118.2, 67.3, 63.2, 40.1, 14.2; HRMS: calcd. for $C_{19}H_{21}NO_4S_2$+ Na: 414.0804; found: 414.0819.

Enamide (4w): 67 mg; Colorless liquid; yield: 75%; R_f = 0.53 in 20:80 ethyl acetate/hexane;



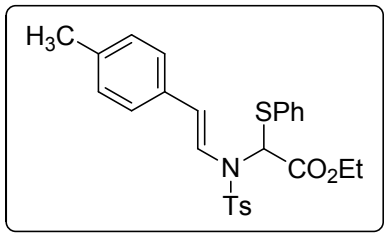
FTIR (neat): 3065, 2979, 2930, 2357, 1741, 1645, 1585, 1473, 1364, 1260, 1170, 1091, 1014, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.75-7.67 (m, 2H), 7.57-7.51 (m, 3H), 7.45-7.41 (m, 2H), 7.38-7.33 (m, 3H), 7.32-7.26 (m, 4H), 7.23-7.19 (m, 1H), 6.95 (d, 1H, J =14.7 Hz), 6.40-6.23 (m, 2H), 4.15-4.02 (m, 2H), 1.10 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.0, 139.1, 135.9, 134.7, 133.3, 131.6, 129.4, 129.2, 129.0, 128.8, 127.7, 127.3, 126.0, 122.9, 119.8, 67.4, 62.8, 14.0; HRMS: calcd. for $C_{24}H_{23}NO_4S_2$ + Na: 476.0961; found: 476.0966.

Enamide (4x): 68 mg; Colorless liquid; yield: 70%; R_f = 0.51 in 20:80 ethyl acetate/hexane;



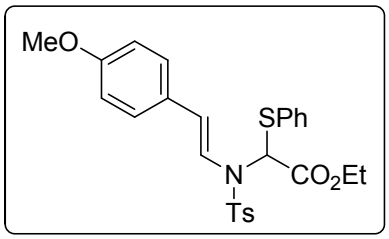
FTIR (neat): 3059, 2983, 2357, 1740, 1646, 1585, 1474, 1443, 1363, 1265, 1171, 1091, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.75-7.67 (m, 2H), 7.57-7.51 (m, 3H), 7.45-7.41 (m, 2H), 7.38-7.33 (m, 3H), 7.32-7.26 (m, 4H), 7.23-7.19 (m, 1H), 6.95 (d, 1H, J =14.7 Hz), 6.40-6.23 (m, 2H), 4.15-4.02 (m, 2H), 1.10 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.0, 139.1, 135.9, 134.7, 133.3, 131.6, 129.4, 129.2, 129.0, 128.8, 127.7, 127.3, 126.0, 122.9, 119.8, 67.4, 62.8, 14.0; HRMS: calcd. for $C_{24}H_{22}ClNO_4S_2$ + Na: 510.0571; found: 510.0575.

Enamide (4y): 71 mg; Colorless liquid; yield: 74%; R_f = 0.51 in 20:80 ethyl acetate/hexane;

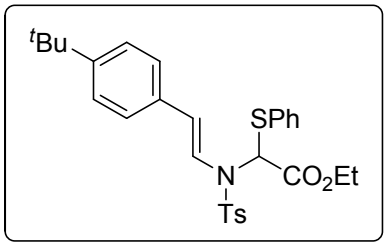


FTIR (neat): 3057, 3028, 2974, 2928, 2865, 2357, 1740, 1645, 1599, 1483, 1354, 1260, 1166, 1091, 936 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.62-7.56 (m, 2H), 7.55-7.51 (m, 2H), 7.37-7.33 (m, 3H), 7.22-7.16 (m, 4H), 7.13-7.07 (m, 2H), 6.87 (d, 1H, J = 14.6 Hz), 6.33 (s, 1H), 6.28 (d, 1H, J = 14.6 Hz), 4.18-4.04 (m, 2H), 2.38 (s, 3H), 2.32 (s, 3H), 1.11 (t, 3H, J= 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.2, 144.2, 137.1, 136.1, 134.6, 133.0, 131.7, 129.6, 129.4, 129.3, 129.1, 127.8, 125.9, 122.1, 119.9, 67.3, 62.7, 21.6, 21.2, 14.0; HRMS: calcd. for $C_{26}H_{27}NO_4S_2$ + Na: 504.1274; found: 504.1284.

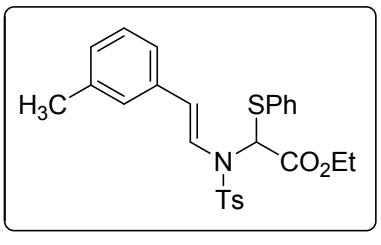
Enamide (4z): 78 mg; Colorless gummy solid; yield: 79%; R_f = 0.48 in 20:80 ethyl acetate/hexane; FTIR (neat): 3061, 2948, 2848, 2573, 2328, 1974, 1740, 1644, 1587, 1502, 1453, 1353, 1336, 1252, 1167, 1092, 937 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.61-7.56 (m, 2H), 7.56-748 (m, 2H), 7.39-7.33 (m, 3H), 7.24-7.18 (m, 4H), 6.88-6.80 (m, 2H), 6.79-6.72 (m, 1H), 6.45-6.20 (m, 2H), 4.16-4.04 (m, 2H), 3.80 (s, 3H), 2.39 (s, 3H), 1.13 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.2, 159.1, 144.1, 136.1, 134.5, 131.7, 129.6, 129.3, 129.0, 128.8, 128.4, 127.8, 127.6, 127.3, 121.0 (9), 121.0(5), 114.2, 67.4, 62.7, 55.4, 21.7, 14.0; HRMS: calcd. for $C_{26}H_{27}NO_5S_2$ + Na: 520.1223; found: 520.1229.



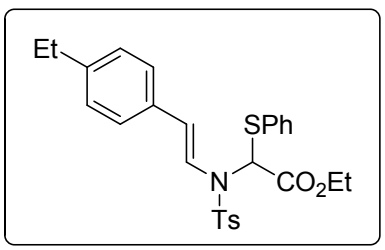
Enamide (4aa): 94 mg; Colorless gummy liquid; yield: 90%; R_f = 0.51 in 20:80 ethyl acetate/hexane; FTIR (neat):3058, 2959, 2869, 2357, 1741, 1645, 1599, 1463, 1359, 1262, 1167, 1093, 935 cm^{-1};^1H NMR (400 MHz, $CDCl_3$): δ 7.64-7.56 (m, 2H), 7.56 (m, 2H), 7.37-7.30 (m, 5H), 7.25-7.17 (m, 4H), 6.90 (d, 1H, J = 14.6 Hz), 6.34 (s, 1H), 6.29 (d, 1H, J = 14.6Hz), 4.17-4.03 (m, 2H), 2.38 (s, 3H), 1.31 (s, 9H), 1.11 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.1, 150.3, 144.2, 136.1, 134.6, 133.1, 131.6, 129.6, 129.3, 129.1, 127.8, 125.7, 125.6, 122.3, 119.4, 67.3, 62.7, 34.6, 31.3, 21.6, 14.0; HRMS: calcd. for $C_{29}H_{33}NO_4S_2$ + Na: 546.1743; found: 546.1758.



Enamide (4ab): 45 mg; Colorless gummy liquid; yield: 80%; R_f = 0.52 in 20:80 ethyl acetate/hexane; FTIR (neat):3262, 3053, 2968, 2927, 2863, 2357, 1740, 1645, 1598, 1451, 1357, 1259, 1168, 1091, 934 cm^{-1};^1H NMR (400 MHz, $CDCl_3$): δ 7.63-7.56 (m, 2H), 7.56-7.51 (m, 2H), 7.39-7.32 (m, 3H), 7.24-7.15 (m, 3H), 7.13-7.05 (m, 2H), 7.05-7.00 (m, 1H), 6.94 (d, 1H, J = 14.6 Hz), 6.33 (s, 1H), 6.26 (d, 1H, J = 14.6 Hz), 4.18-4.03 (m, 2H), 2.38 (s, 3H), 2.33 (s, 3H), 1.11 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.1, 144.2, 138.3, 136.1, 135.8, 134.7, 131.6, 129.6, 129.3, 129.1, 128.6, 128.0, 127.7, 126.7, 123.1, 122.8, 119.2, 67.2, 62.8, 21.6, 21.5, 14.0; HRMS: calcd. for $C_{26}H_{27}NO_4S_2$+ Na: 504.1274; found: 504.1274.

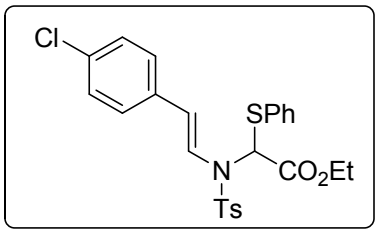


Enamide (4ac): 87 mg; Colorless gummy liquid; yield: 88%; R_f = 0.53 in 20:80 ethyl acetate/hexane; FTIR (neat): 3057, 2971, 2933, 2872, 2356, 1740, 1646, 1600, 1442, 1355, 1265, 1168, 1091, 934 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ7.61-7.56 (m, 2H), 7.56-7.50

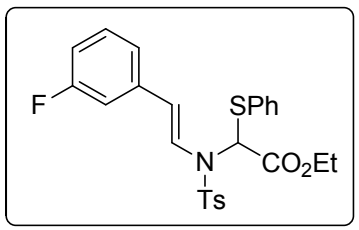


(m, 2H), 7.38-7.32 (m, 3H), 7.23-7.18 (m, 4H), 7.15-7.11 (m, 2H), 6.88 (d, 1H, *J* = 14.6 Hz), 6.34 (s, 1H), 6.29 (d, 1H, *J* = 14.6 Hz),4.16-4.03 (m, 2H), 7.66 (q, 2H, *J* = 7.6 Hz), 2.38 (s, 3H), 1.22 (t, 3H, *J* = 7.6 Hz), 1.11 (t, 3H, *J* = 7.2 Hz); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ 167.1, 144.1, 143.5, 136.1, 134.6, 133.3, 131.7, 129.6, 129.3, 129.1, 128.2, 127.8, 126.0, 122.2, 119.8, 67.3, 62.7, 28.6, 21.6, 15.7, 14.0; HRMS: calcd. for $C_{27}H_{29}NO_4S_2$ + Na: 518.1430; found: 518.1437.

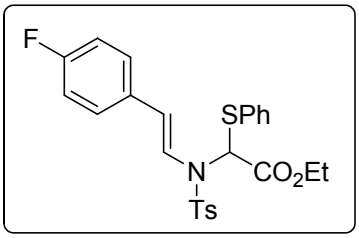
Enamide (4ad): 72 mg; Light green semi solid; yield: 71%; R_f = 0.51 in 20:80 ethyl acetate/hexane; FTIR (neat): 2925, 2857, 2357, 1892, 1740, 1645, 1609, 1447, 1351, 1257, 1166, 1092, 1020, 935 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$): 7.64-7.59 (m, 2H), 7.58 (dd, 1H, *J* = 7.5, 1.7 Hz), 7.48 (dd, 1H, *J* = 7.9, 1.3 Hz), 7.34 (dd, 1H, *J* = 7.6, 1.6 Hz), 7.32-7.25 (m, 5H), 7.24-7.19 (m, 3H), 6.91 (d, 1H, *J* = 14.7 Hz), 6.54 (s, 1H), 6.30 (d, 1H, *J* = 14.7 Hz), 4.20-4.03 (m, 2H), 2.38 (s, 3H), 1.10 (s, 3H, *J* = 7.1 Hz); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ 166.8, 144.3, 139.0, 137.1, 136.0, 130.7, 130.2, 129.9, 129.6, 128.7, 127.8, 127.5, 127.2, 125.9, 122.8, 118.9, 65.4, 62.9, 21.6, 14.0; HRMS: calcd. for $C_{25}H_{24}ClNO_4S_2 + NH_4$: 519.1179; found: 519.1190.



Enamide (4ae): 76 mg; Colorless gummy liquid; yield: 79%; R_f = 0.51 in 20:80 ethyl acetate/hexane; FTIR (neat): 3581, 3466, 3304, 3064, 2929, 2860, 2357, 1741, 1645, 1597, 1477, 1445, 1358, 1259, 1166, 1090, 931 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.65-7.56 (m, 2H), 7.56-7.50 (m, 2H), 7.40-7.33 (m, 3H), 7.26-7.20 (m, 3H), 7.06-7.02 (m, 1H), 7.01-6.94 (m, 2H), 6.92-6.85 (m, 1H), 6.33(s, 1H), 6.23 (s, 1H, *J* = 14.6 Hz), 4.18-4.05 (m, 2H), 2.39 (s, 3H), 1.12 (t, 3H, *J* = 7.1 Hz); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$): δ 167.0, 163.2 (d, *J* =246.4 Hz), 144.4, 138.4 (d, *J* = 8.0 Hz), 135.8, 134.7, 131.4, 130.2 (d, *J* = 8.4 Hz), 129.7, 129.4, 129.3, 127.7, 124.2, 121.8, 116.7, 113.8 (d, *J* = 21.2 Hz), 112.3 (d, *J* =22.0 Hz), 67.1, 62.8, 21.7, 14.0; HRMS: calcd. for $C_{25}H_{24}FNO_4S_2 + NH_4$: 503.1469; found: 503.1482.

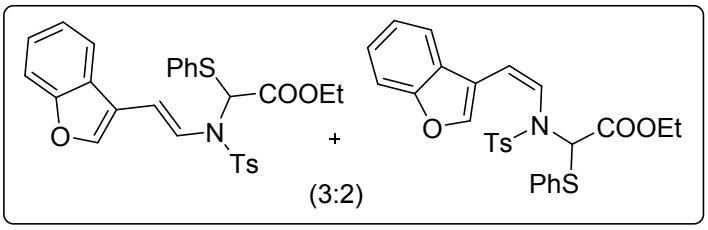


Enamide (4af): 68 mg; Light green gummy liquid; yield: 71%; R_f = 0.50 in 20:80 ethyl acetate/hexane; FTIR (neat):3057, 2971, 2933, 2872, 2356, 1740, 1646, 1600, 1442, 1355, 1265, 1168, 1091, 934 cm^{-1};^{1}H NMR (400 MHz, $CDCl_3$): δ 7.52-7.39 (m, 4H), 7.37-7.24 (m, 3H), 7.19-7.11 (m, 4H), 6.95-6.87 (m, 2H), 6.78 (d, 1H, *J* = 14.7 Hz), 6.25 (m, 1H), 6.20 (d, 1H, *J* = 14.7 Hz), 4.09-3.97



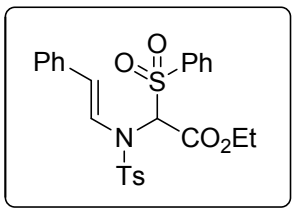
(m, 2H), 2.31 (s, 3H), 1.05 (t, 3H, J = 7.1 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.1, 162.1 (d, J = 246.3 Hz), 144.3, 135.9, 134.6, 132.0 (d, J = 3.5 Hz), 131.5, 129.6, 129.3, 129.2, 127.7, 127.4 (d, J = 7.8 Hz), 122.8, 118.4, 115.6 (d, J = 21.6 Hz), 67.2, 62.8, 21.7, 14.0; HRMS: calcd. for $C_{25}H_{24}FNO_4S_2$ + Na: 508.1023; found: 508.1017.

Enamide(4g): 16 mg; Light green gummy liquid; yield: 27% (E/Z = 3/2); R_f = 0.50 in 20:80 ethyl acetate/hexane; FTIR (neat):3053, 2974, 2930, 2874, 2354, 1740, 1600, 1440, 1350, 1267, 934 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 7.74 (d, 2H, J = 7.8 Hz), 7.57 (d, 2H, J = 6.9 Hz), 7.52-7.46 (m, 3H), 7.42-7.30 (m, 8H), 7.27-7.23 (m, 5H), 7.07 (d, 1H, J = 14.1 Hz), 6.83 (d, 1H, J = 6.6 Hz), 6.47 (d, 1H, J = 14.4 Hz), 6.37 (s, 1H), 6.04 (s, 1H), 5.99 (d, 1H, J = 7.2 Hz), 4.25-4.08 (m, 4H), 2.41 (s, 2.6H), 2.37 (s, 3H), 1.27 (t, 3H, J = 7.0 Hz), 1.16 (t, 3H, J = 7.0 Hz).; $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 167.2, 167.1, 144.7, 144.3, 142.9, 136.1, 135.7, 134.5, 131.6, 130.1, 130.1, 129.7, 129.4, 129.2, 127.8, 127.2, 125.7, 125.0, 124.8, 124.1, 123.5, 123.5, 123.2, 122.6, 120.7, 111.9, 111.9, 111.8, 111.3, 100.7, 67.2, 62.7, 62.6, 56.7, 21.7, 14.2, 14.1.; HRMS: calcd. for $C_{27}H_{25}NO_5S_2$ + Na: 530.1066; found: 530.1071.



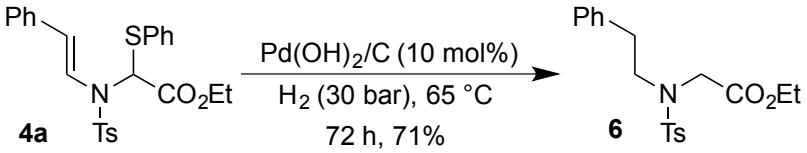
10. Synthesis of sulfone 5

To a 25 mL round bottom flask equipped with stir bar, enamide **3a** (0.21 mmol, 1 equiv) was dissolved with dry CH_2Cl_2 (10 mL), transferred to a magnetic stir with ice-bath. Next, at 0 °C temperature m-CBPA (0.64 mmol, 3 equiv) was added *via* portion-wise and allowed to stir for 2hat room temperature. After completion of the reaction, by TLC, the reaction was neutralized with $NaHCO_3$ solution and workup with CH_2Cl_2,the organic layer was evaporated under reduced pressure. The crude product that obtained was purified by column chromatography using hexane/ethyl acetate mixture as eluent to afford sulfone derivatives **5** in high yield and purity. Green semi solid; 81 mg; yield: 78%; R_f = 0.41 in 20:80 ethyl acetate/hexane; FTIR (neat):3288, 3174, 3064, 2934, 2747, 2661, 2594, 2550, 2380, 1956, 1912, 1742, 1650, 1594, 1448, 1334, 1274, 1164, 1086, 1022, 939, 809 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$): δ 8.03-7.99 (m, 2H), 7.74-7.66 (m, 3H), 7.64-7.58 (m, 2H), 7.31-7.22 (m, 7H), 6.74 (d, 1H, J = 14.5 Hz), 6.62 (d, 1H, J = 14.5 Hz), 6.30 (s, 1H), 4.23 (q, 2H, J = 7.2 Hz), 2.39 (s, 3H), 1.21 (t, 3H, J = 7.2 Hz); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$): δ 162.4, 145.0,



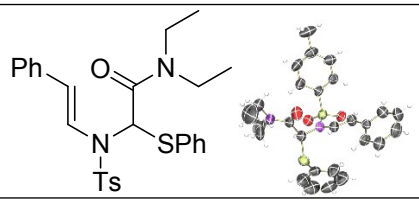
137.4, 135.4, 134.9, 134.8, 133.8, 129.8, 129.7, 129.2, 128.7, 128.2, 127.7, 126.3, 124.0, 122.6, 63.4, 21.7, 14.0; HRMS: calcd. for $C_{25}H_{25}NO_6S_2$ + Na: 522.1016; found: 522.1026.

11. Hydrogenation of enamide 4a:



In a 250 mL autoclave Enamine **4a** was taken in 50 mg scale (1.0 equiv.) and 10% Pd-hydroxide on carbon (10 mol%) in MeOH was taken, followed by autoclave was closed tightly. Slowly hydrogen was purged three times. Finally 30 bar presure was set inside the autoclave. The reaction was monitored for 72 h at 65 °C. After 72 h, the reaction mixture was filtered with celite three times using DCM solvent. The filtered solution was concentrated in high-vaccumm pump, which was further purified by column chromatography with silica gel using ethylacetate/hexane as (5:95 ratio) an eluent gave the product **6** with 71% yield. FTIR (neat): 2992, 2931, 2887, 2350, 1741, 1633, 1432, 1351, 1260, 930 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.73 (d, J = 8.0 Hz, 1H), 7.30-7.28 (m, 4H), 7.24 (d, J = 7.3 Hz, 1H), 7.17 (d, J = 7.3 Hz, 1H), 4.11-4.07 (m, 2H), 4.00 (s, 2H), 4.32 (s, 2H), 3.49 (d, J = 9.1 Hz, 2H) 2.90 (t, J = 9.1 Hz, 2H), 2.44 (s, 3H), 1.20 (t, J = 7.7 Hz, 3H).; $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 169.1, 143.5, 138.4, 136.9, 129.7, 128.9, 128.7, 127.5, 126.7, 61.4, 50.2, 48.8, 35.3, 21.6, 14.1. HRMS: calcd. for $C_{19}H_{23}NO_4$+ Na: 384.1240; found: 384.1242.

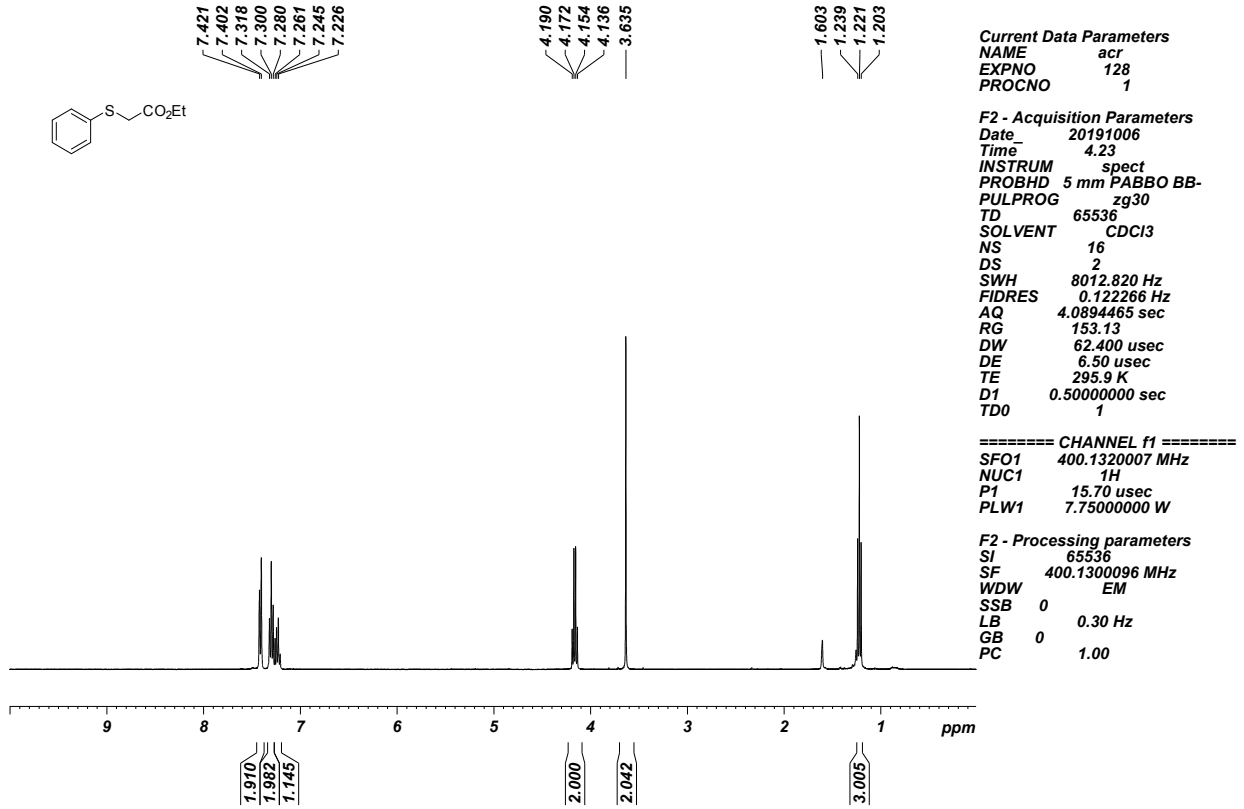
12. Crystallographic data and structure refinements summary for compound 4e

DATA	4e
Molecular Structure (ORTEP Structure)	
Formula	$C_{27}H_{30}N_2O_3S_2$
Formula weight	494.65
Color	white
Temperature/K	293(2)
Radiation	Mo Kα
Wavelength/Å	0.71073
Crystal system	Monoclinic
Space group	P21/c
a (Å)	13.5570(9)
b (Å)	15.9431(9)
c (Å)	12.6454(8)
α (°)	90
β (°)	101.401(2)
γ (°)	90
Volume (Å^3)	2679.3(3)
Z	4
Density (g/ml)	1.226
μ (1/mm)	0.0077
F (000)	1048
θ (min, max)	2.217, 24.999
No. of unique reflns	4735
No. of parameters	500
R_obs, wR_2_obs	0.0605, 0.1537
$\Delta\rho_{min}$, $\Delta\rho_{max}$ (eÅ^{-3})	-0.220, 0.403
GooF	1.066

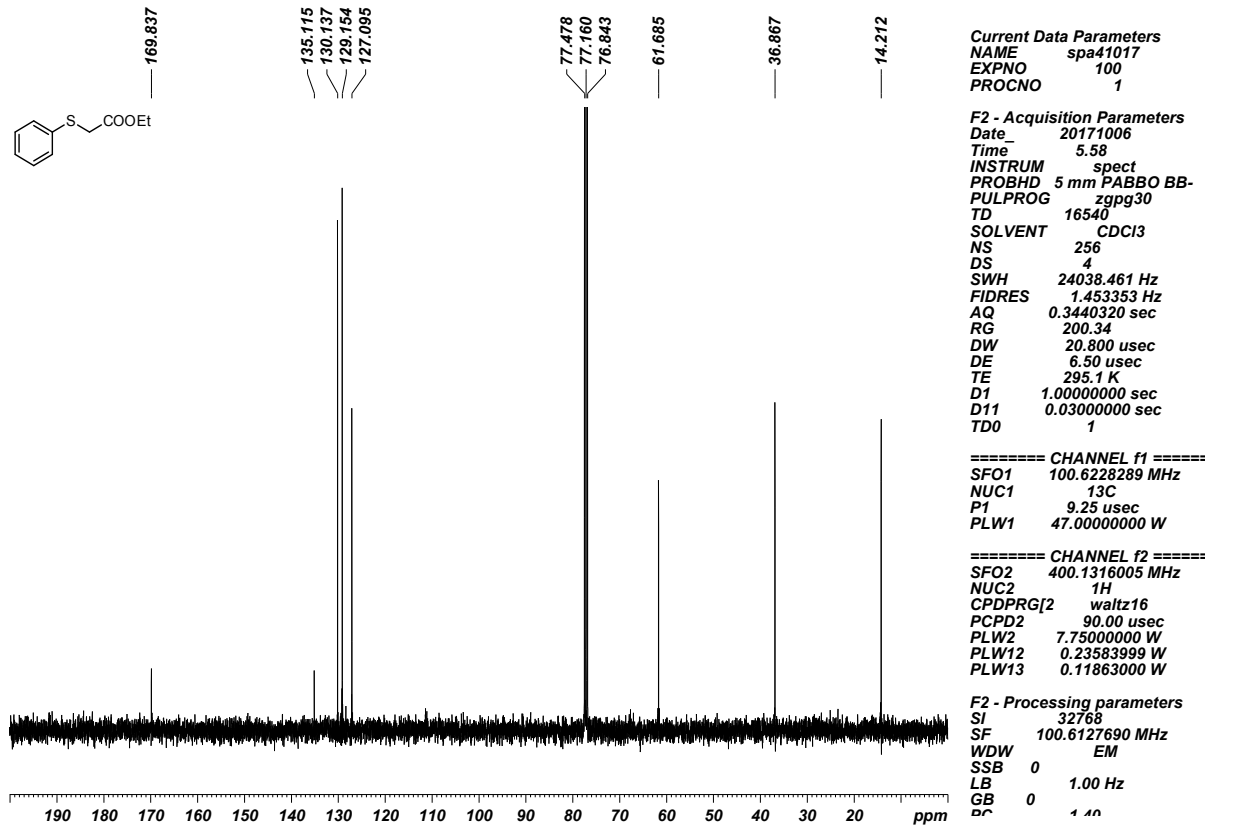
13. NMR spectra of isolated compounds

Thioester 4a

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

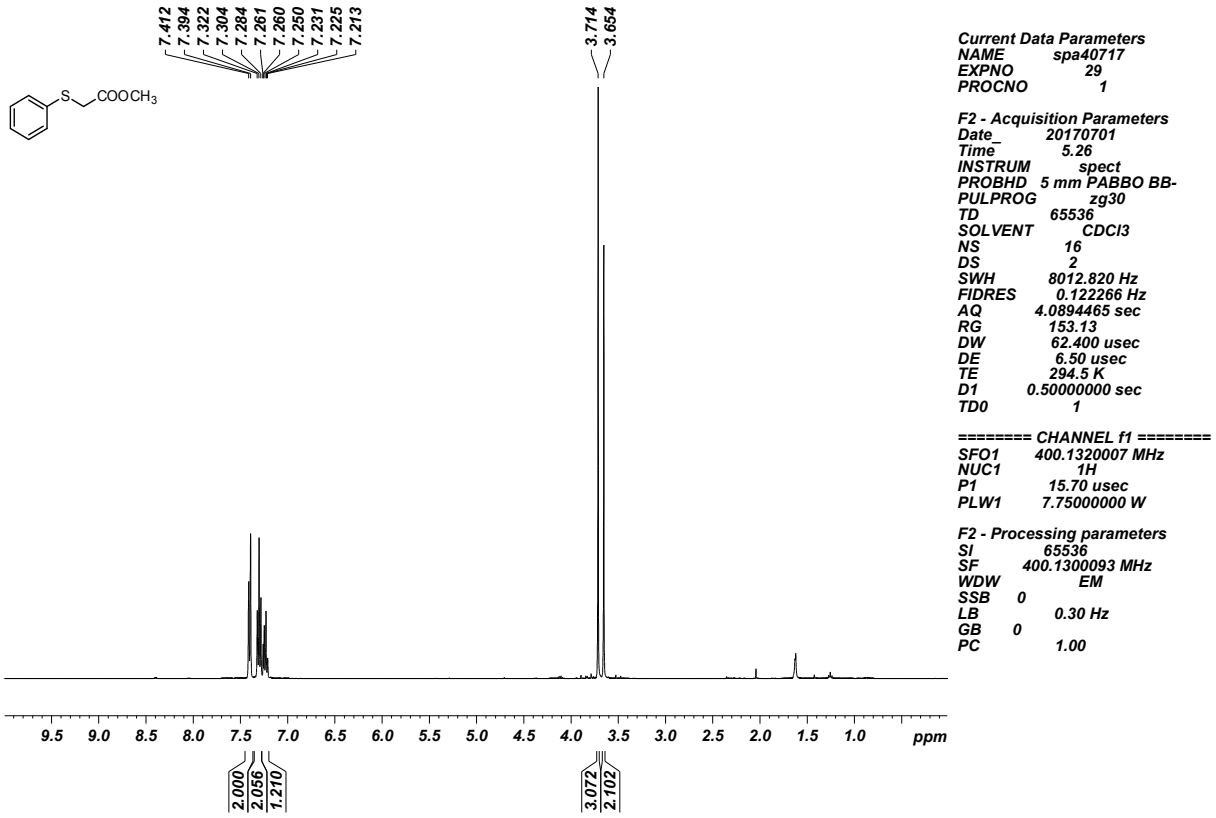


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)

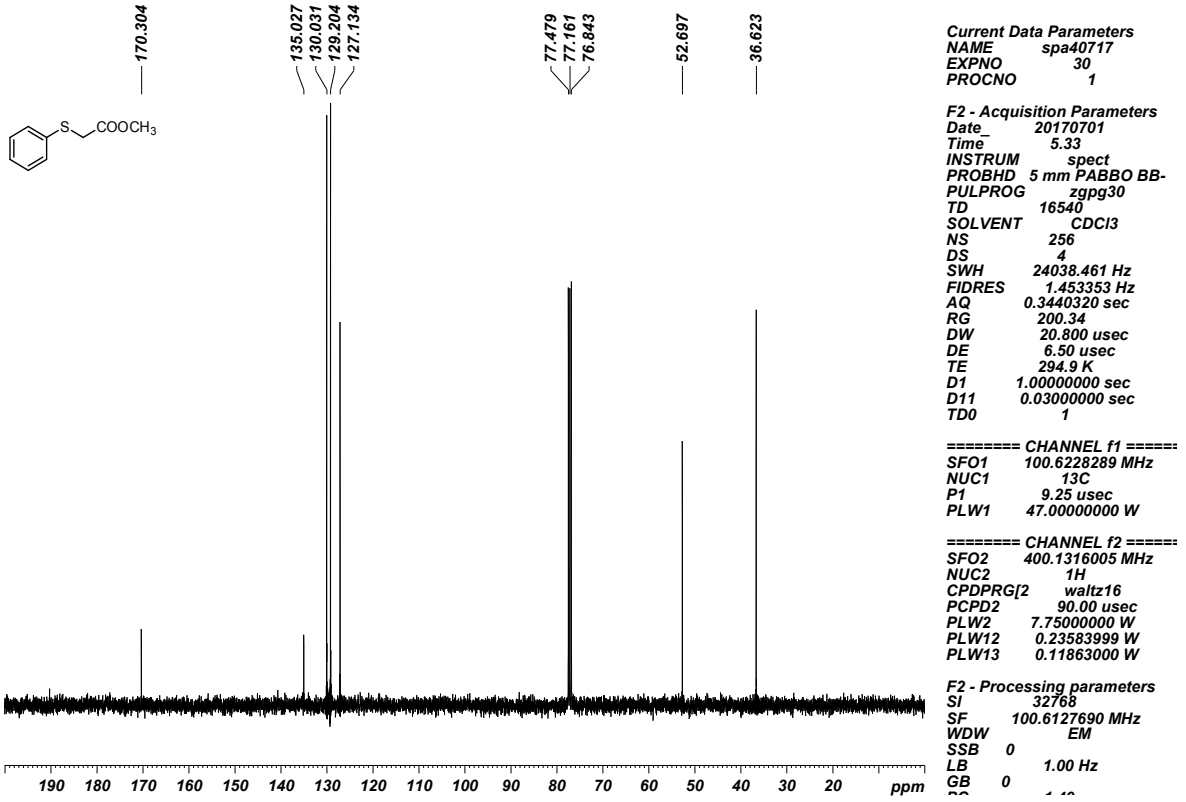


Thioester 1b

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

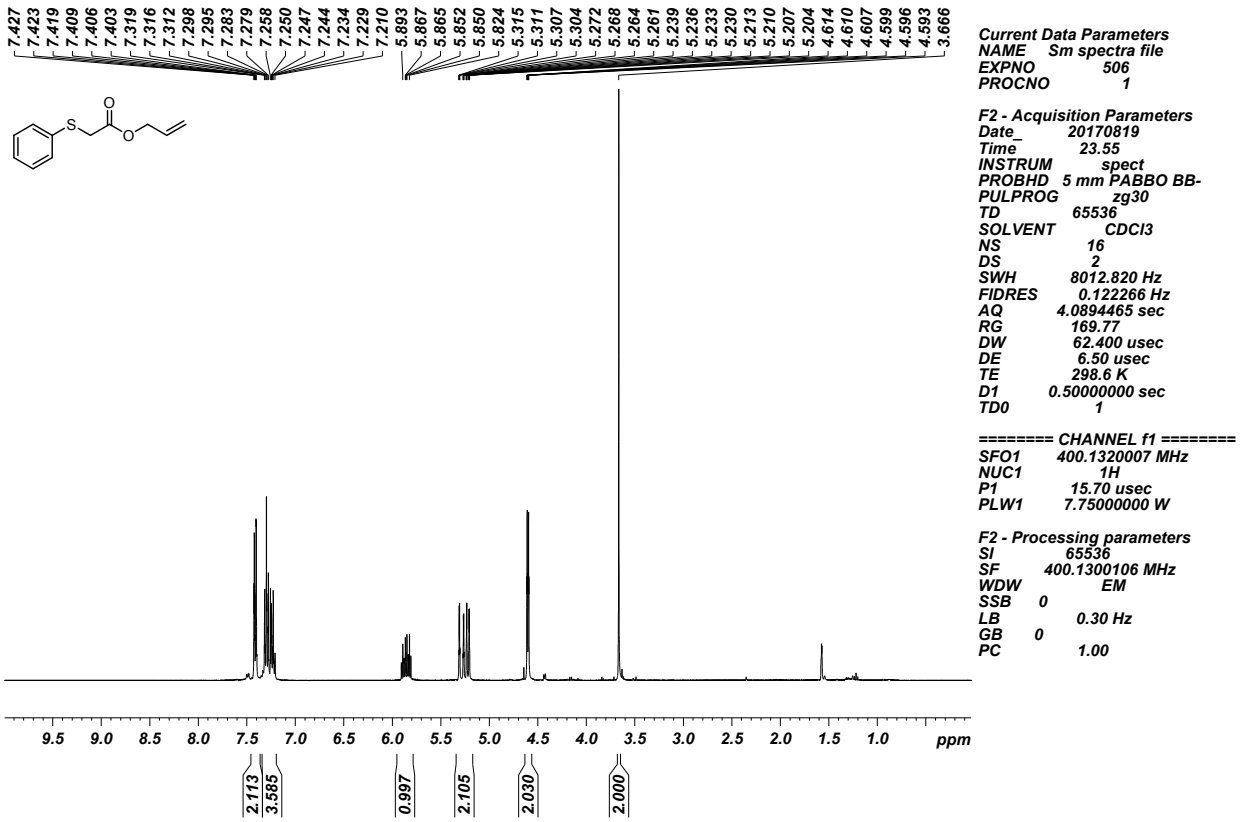


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)



Thioester 1c

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

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PROCNO           1

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DS                 2
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AQ           4.0894465 sec
RG             169.77
DW             62.400 usec
DE              6.50 usec
TE             298.6 K
D1           0.50000000 sec
TD0                1

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P1              15.70 usec
PLW1         7.75000000 W

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PC              1.00
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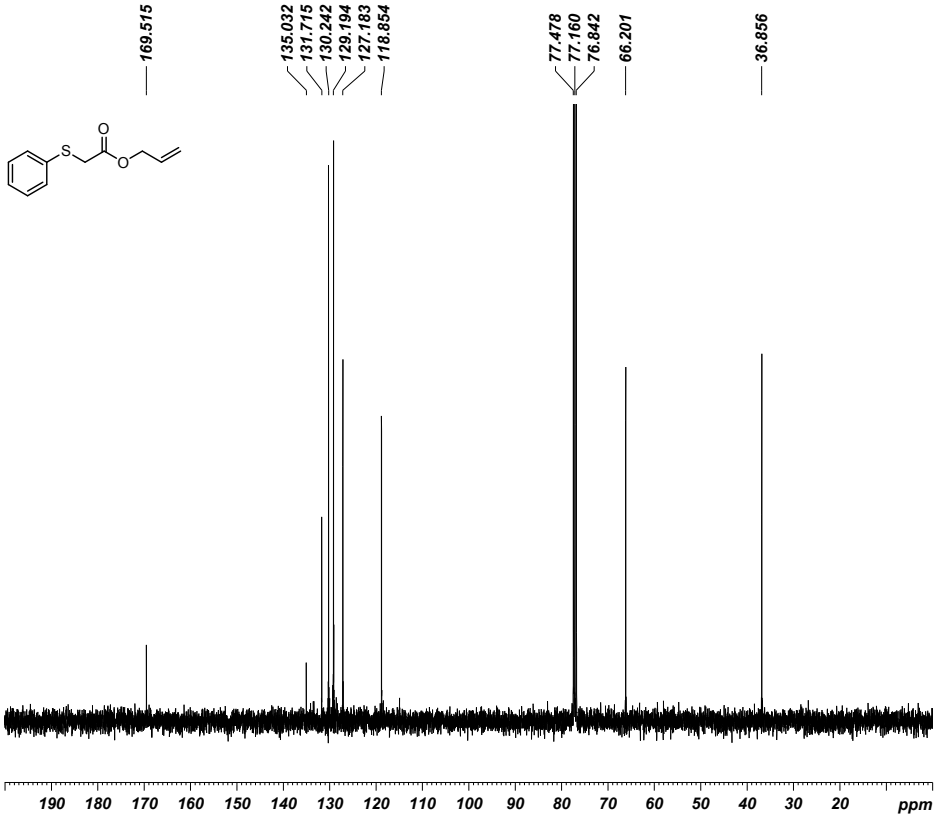
^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)

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TD             16540
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FIDRES        1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW             20.800 usec
DE              6.50 usec
TE             299.0 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

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NUC1              13C
P1              9.25 usec
PLW1        47.00000000 W

======== CHANNEL f2 ========
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NUC2              1H
CPDPRG[2       waltz16
PCPD2          90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.11863000 W

F2 - Processing parameters
SI             32768
SF         100.6127560 MHz
WDW               EM
SSB     0
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GB      0
PC              1.40
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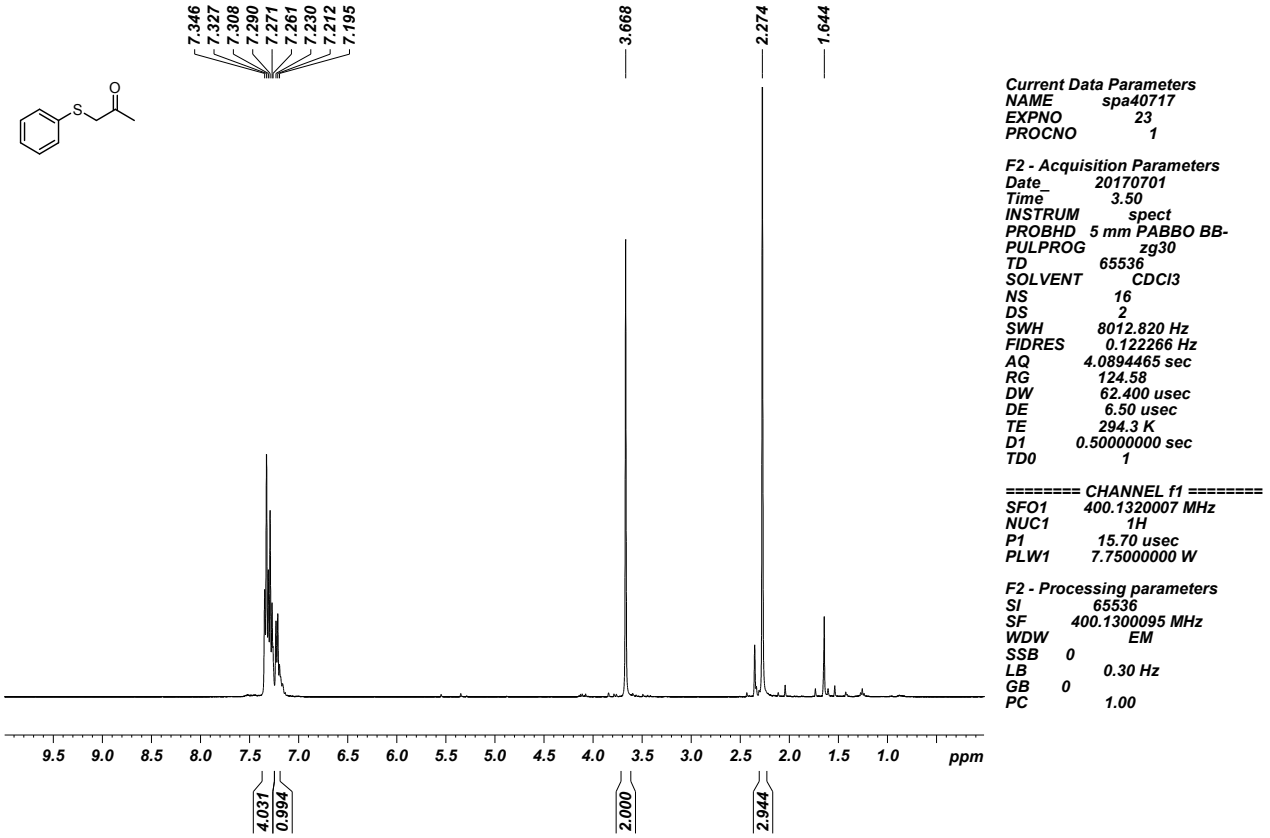
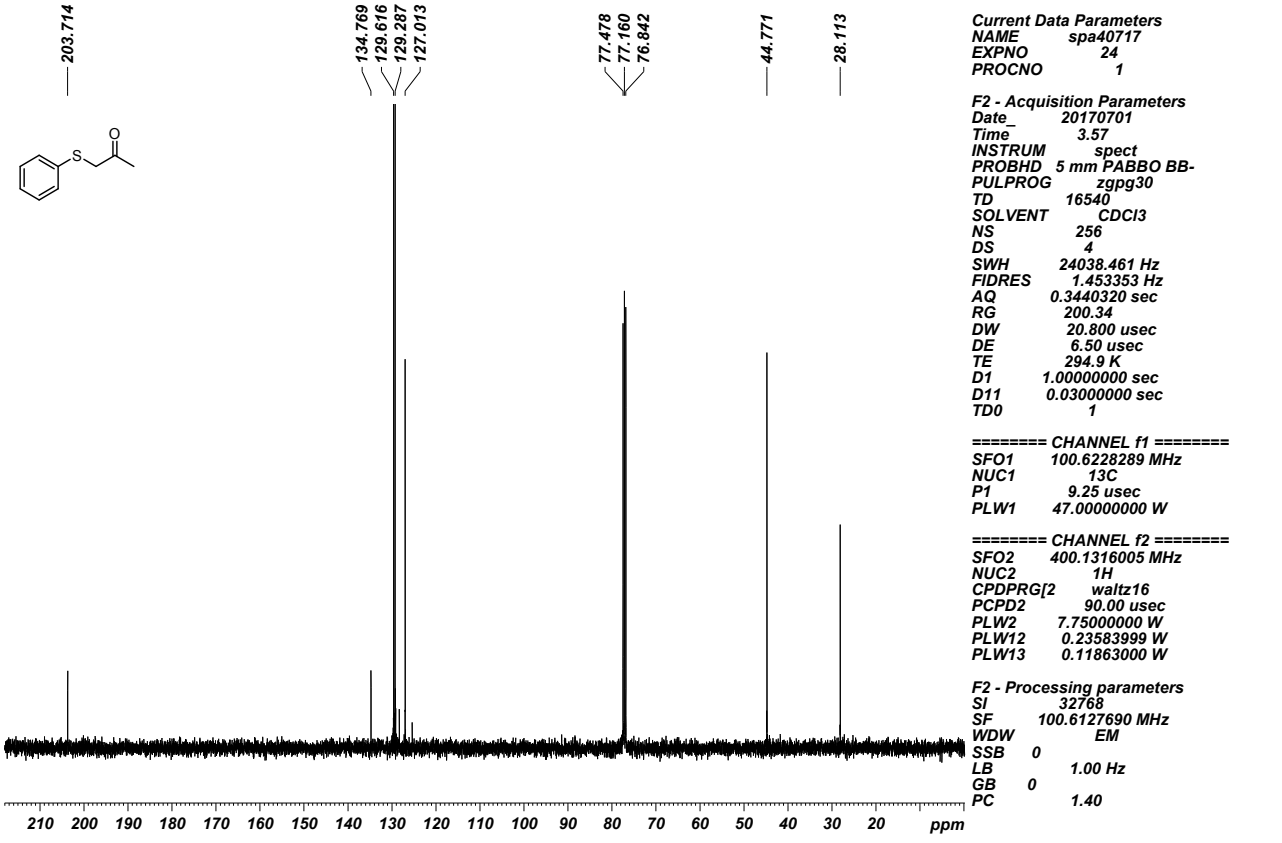
Thioketone 1d

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

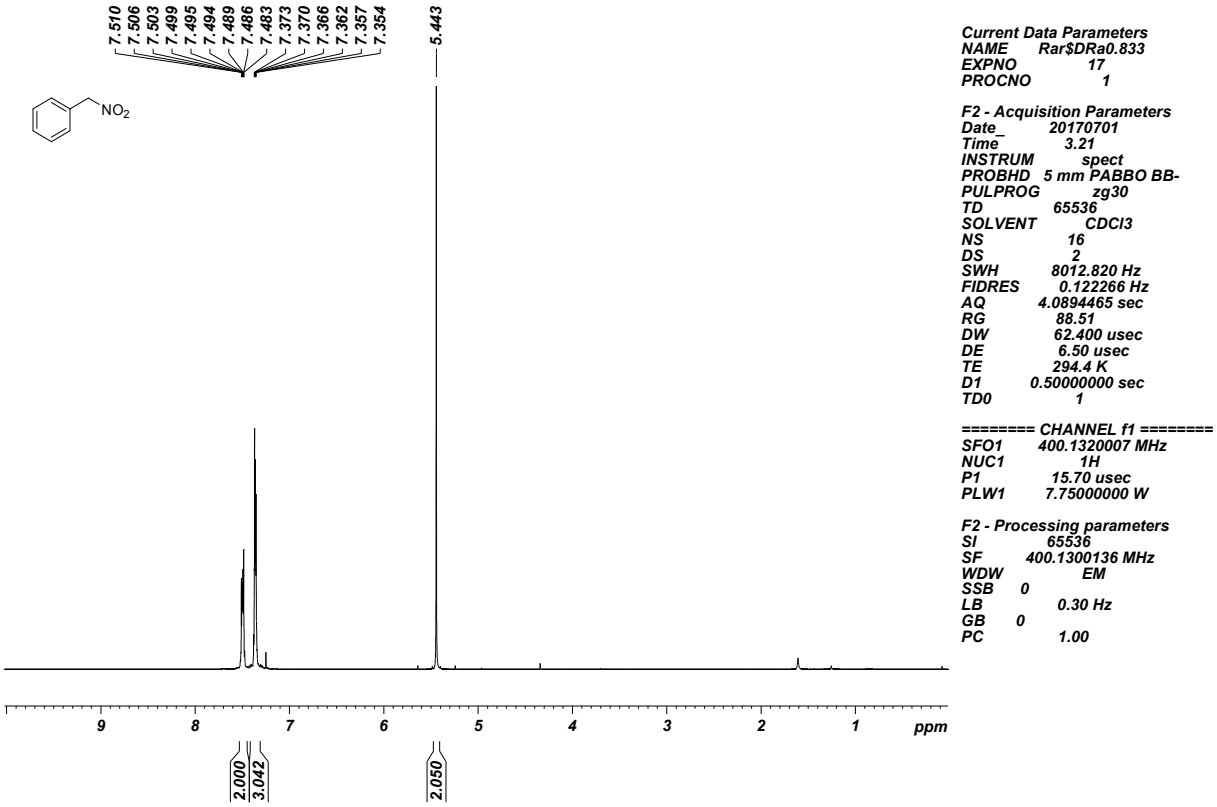


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)

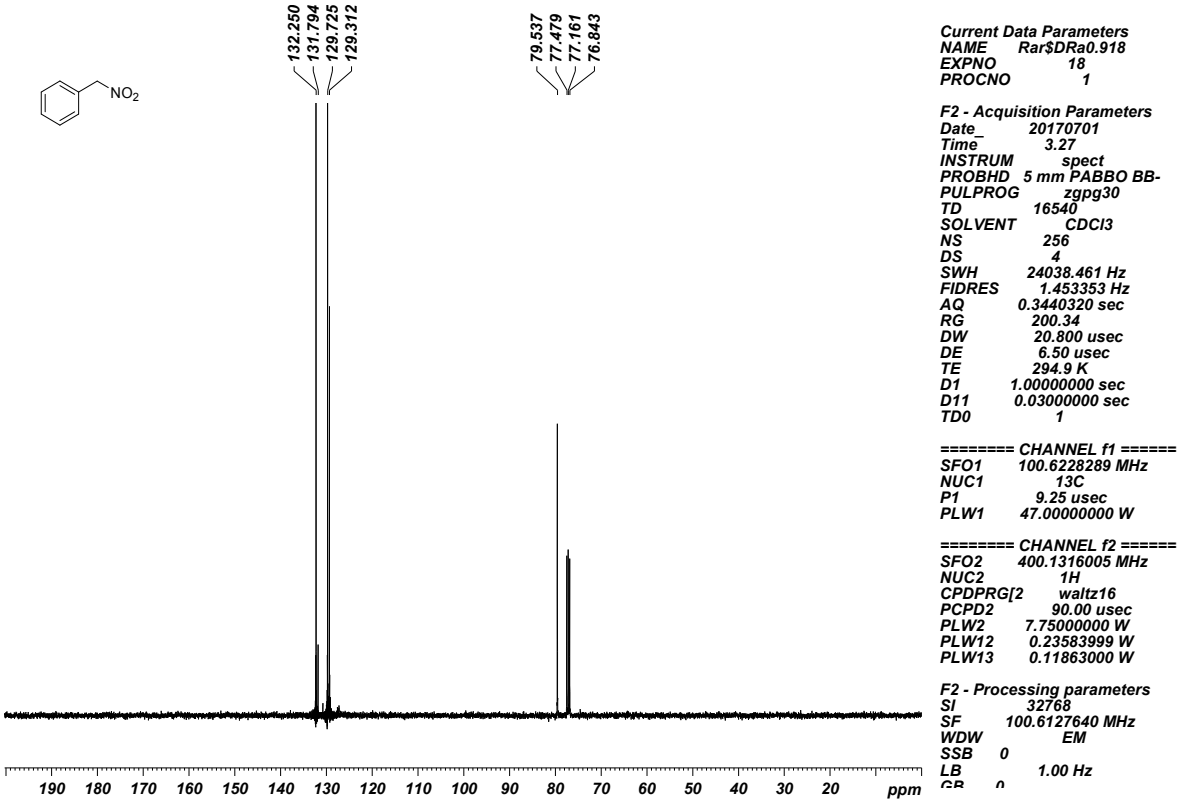


(Nitromethyl)benzene 1f

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

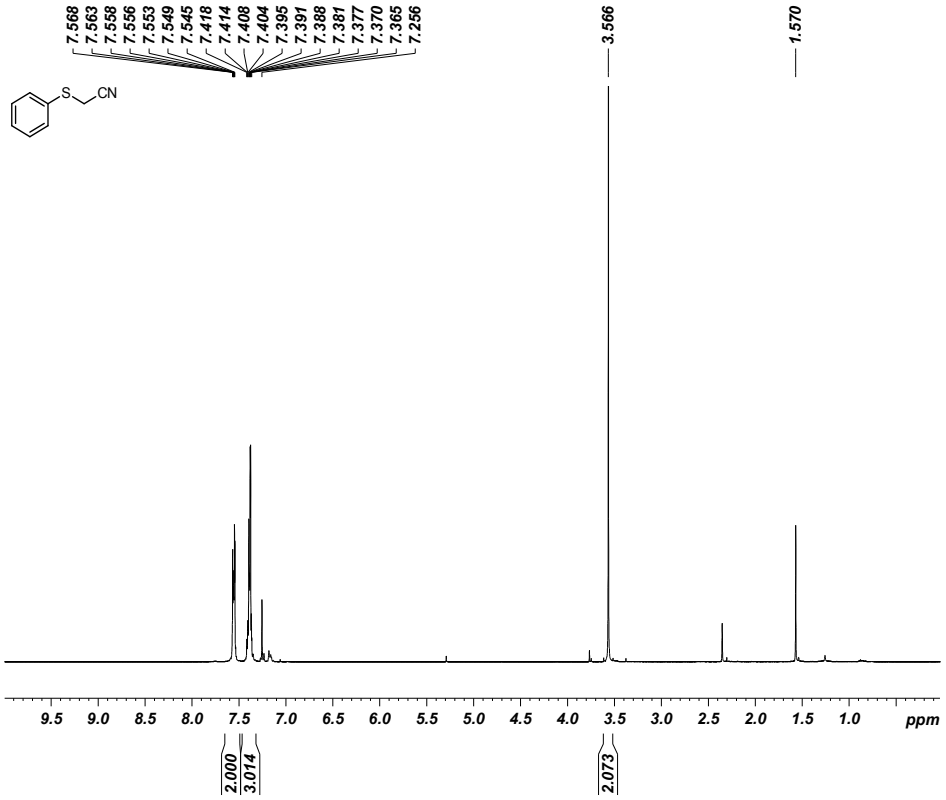


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)



2-(Phenylthio)acetonitrile 1g

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

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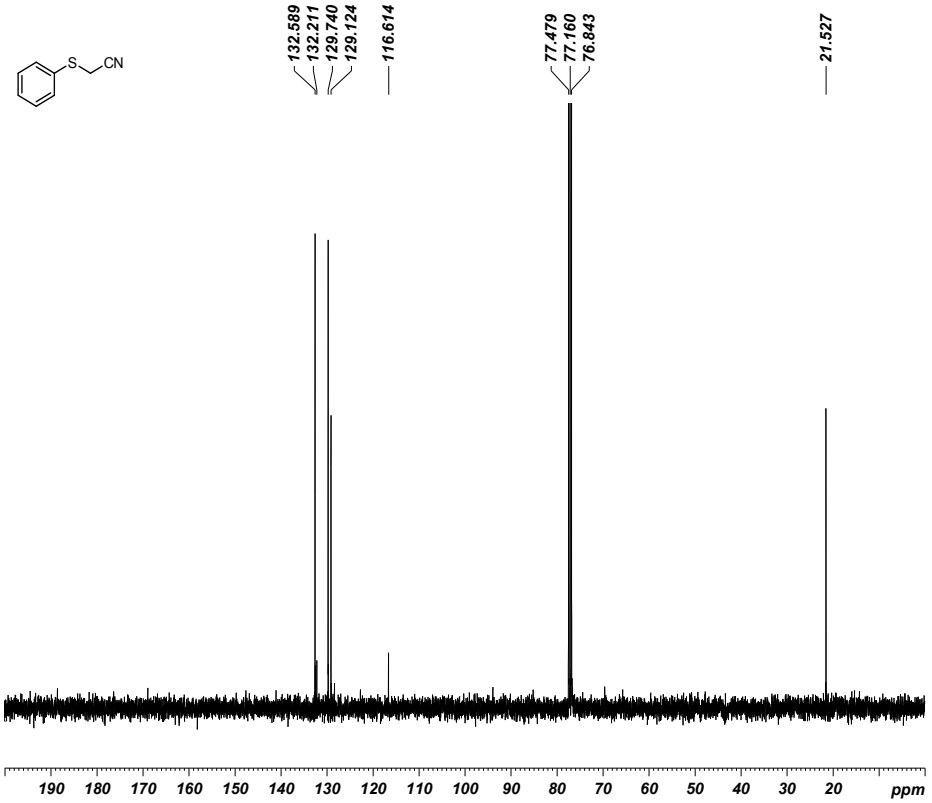
Current Data Parameters
NAME          spa41217
EXPNO            71
PROCNO            1

F2 - Acquisition Parameters
Date_         20171202
Time            22.51
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW               62.400 usec
DE                6.50 usec
TE              298.5 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300111 MHz
WDW               EM
SSB      0
LB             0.30 Hz
GB       0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME          spa41217
EXPNO            72
PROCNO            1

F2 - Acquisition Parameters
Date_         20171202
Time            22.57
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              298.9 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

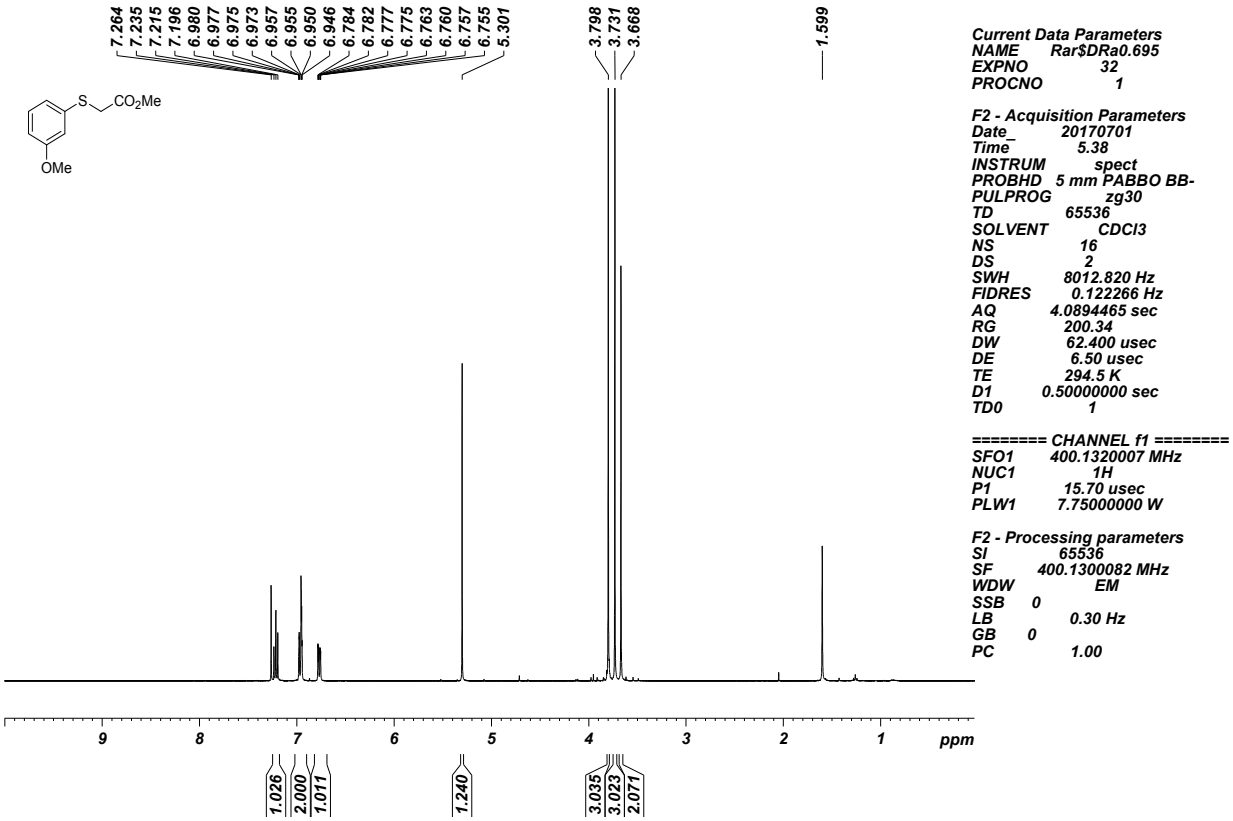
======== CHANNEL f1 =====
SFO1        100.6228289 MHz
NUC1              13C
P1               9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 =====
SFO2        400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI             32768
SF          100.6127690 MHz
WDW               EM
SSB      0
LB             1.00 Hz
GB       0
```

Thioester 1h

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



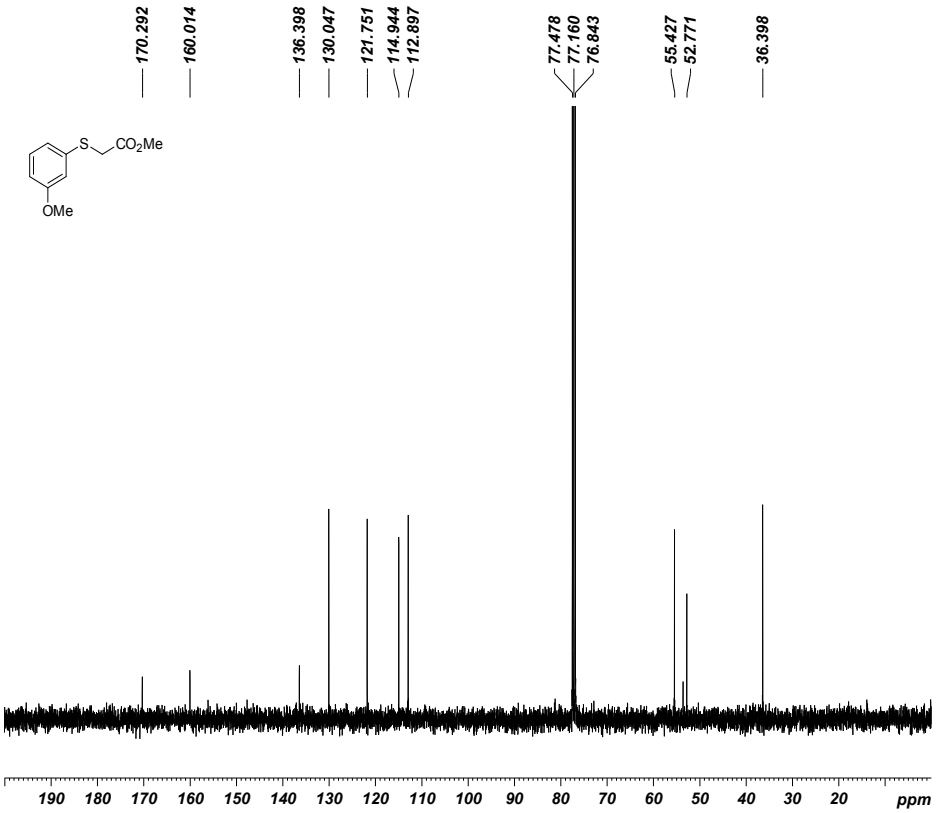

```
Current Data Parameters
NAME      Rar$DRa0.695
EXPNO           32
PROCNO           1

F2 - Acquisition Parameters
Date_        20170701
Time            5.38
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW               62.400 usec
DE                6.50 usec
TE              294.5 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1               1H
P1              15.70 usec
PLW1         7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300082 MHz
WDW               EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME      Rar$DRa0.116
EXPNO           33
PROCNO           1

F2 - Acquisition Parameters
Date_        20170701
Time            5.45
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH         24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              294.9 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

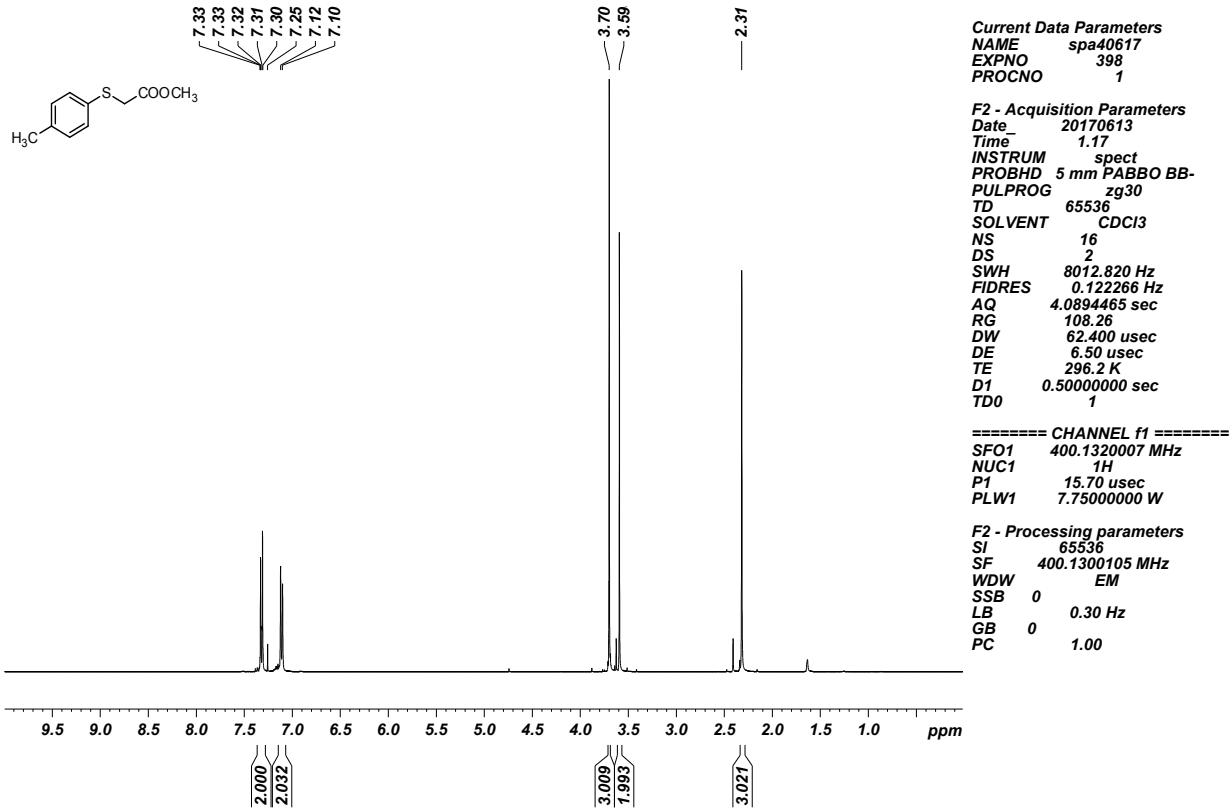
======== CHANNEL f1 ======
SFO1        100.6228289 MHz
NUC1               13C
P1               9.25 usec
PLW1        47.00000000 W

======== CHANNEL f2 ======
SFO2        400.1316005 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.11863000 W

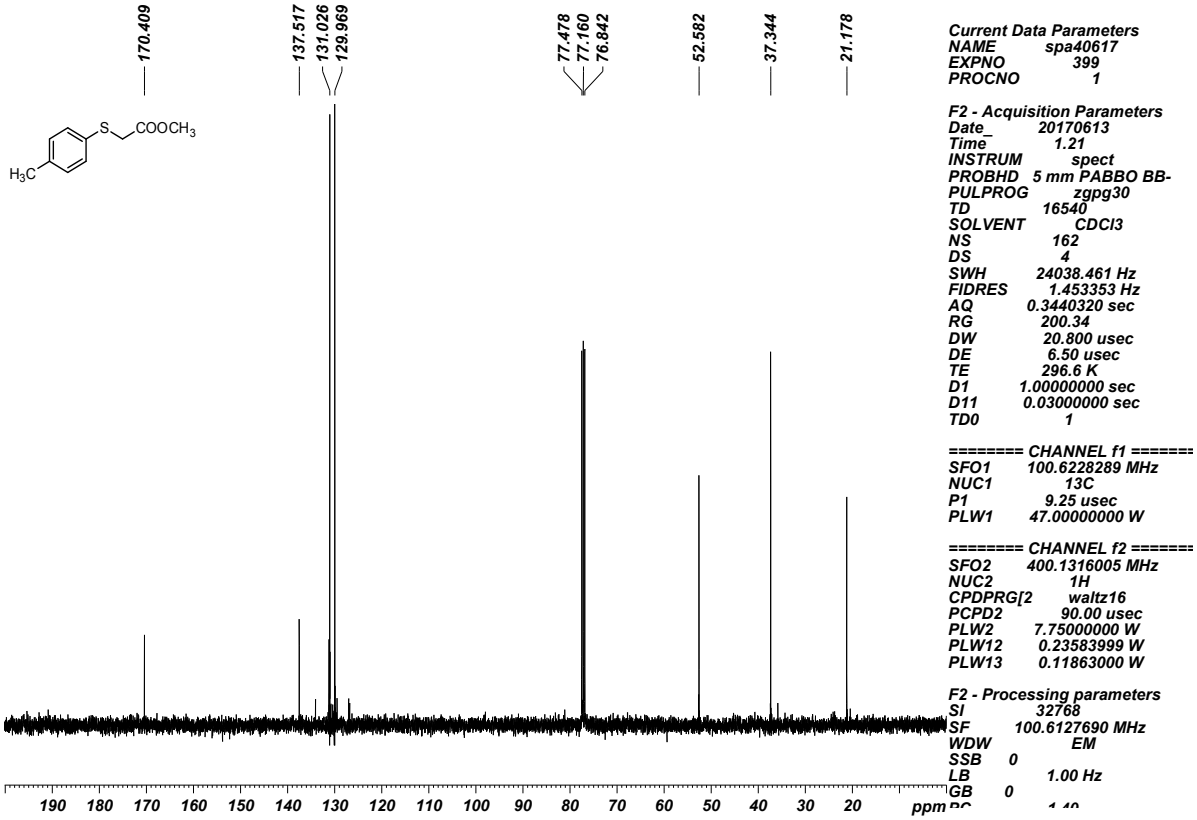
F2 - Processing parameters
SI             32768
SF          100.6127563 MHz
WDW               EM
SSB     0
LB              1.00 Hz
GB      0
```

Thioester 1i

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

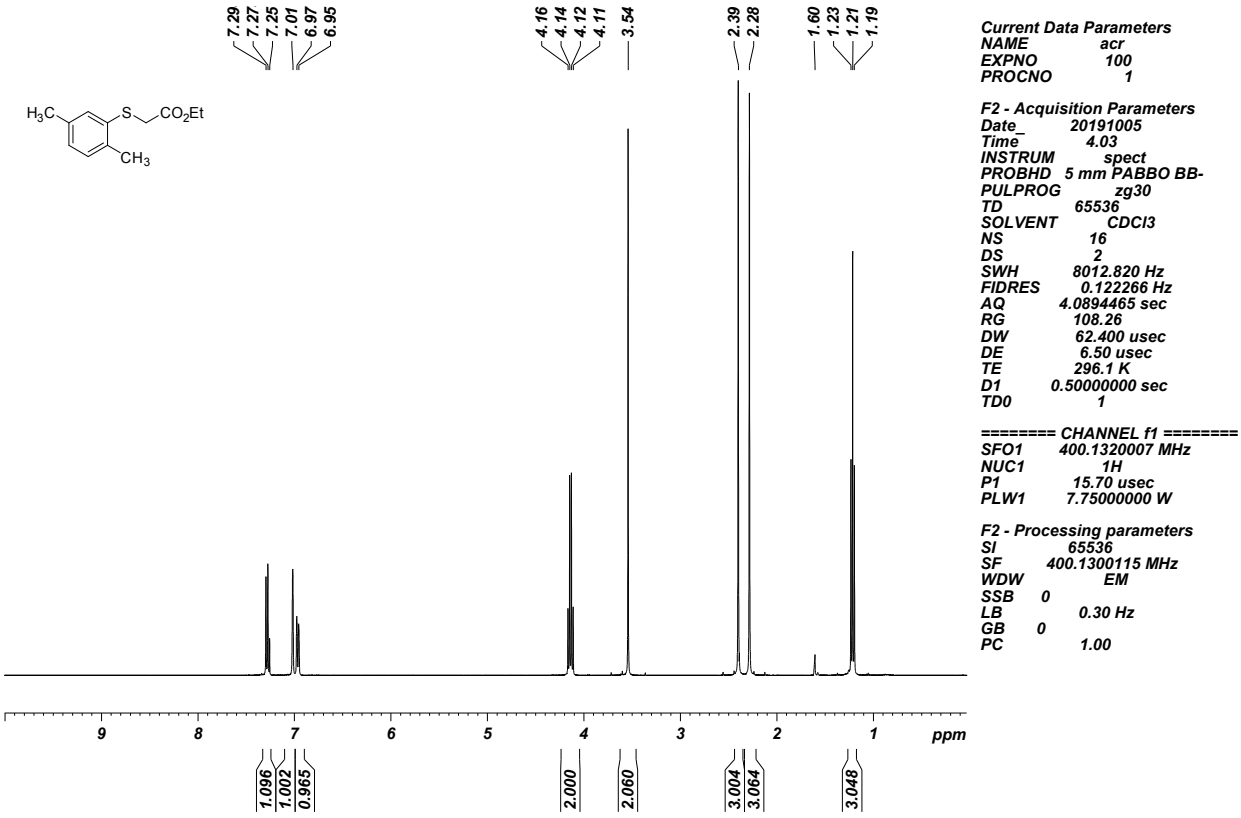


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)

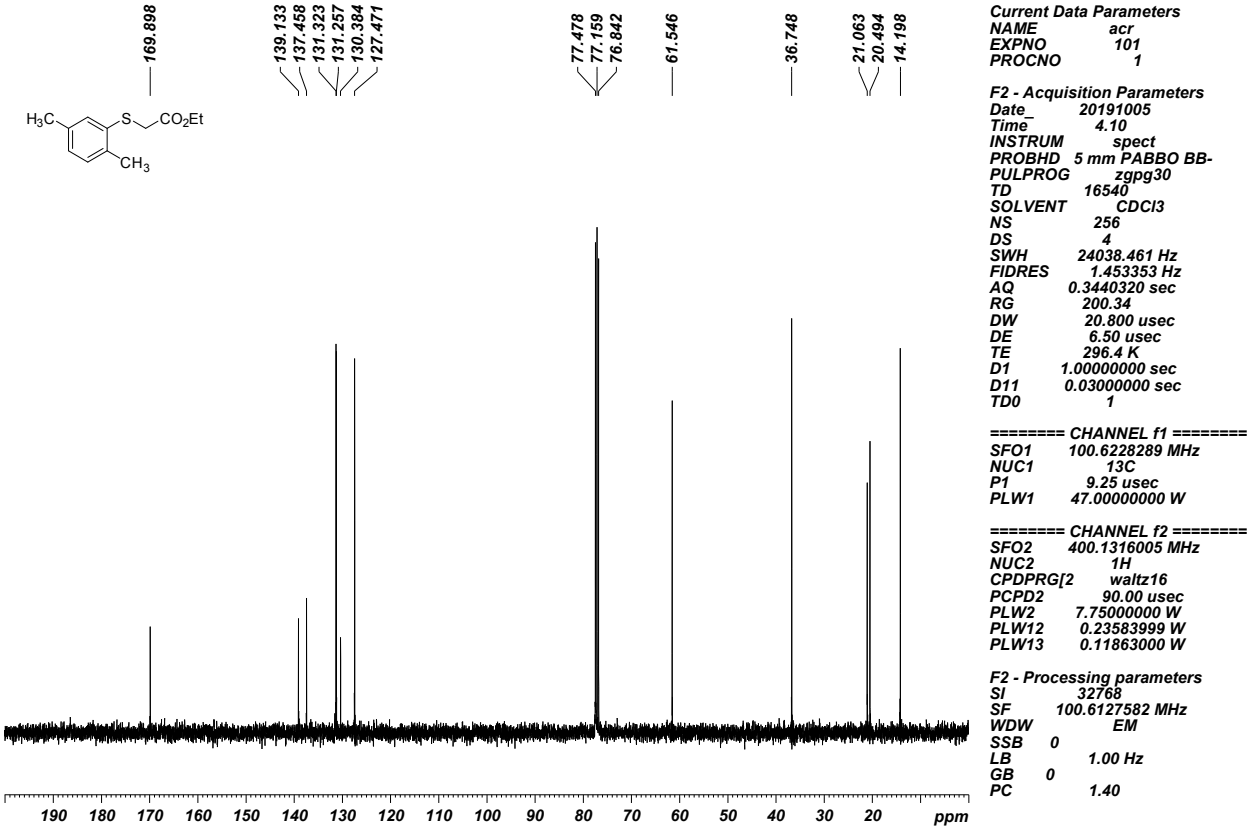


Thioester 1j

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

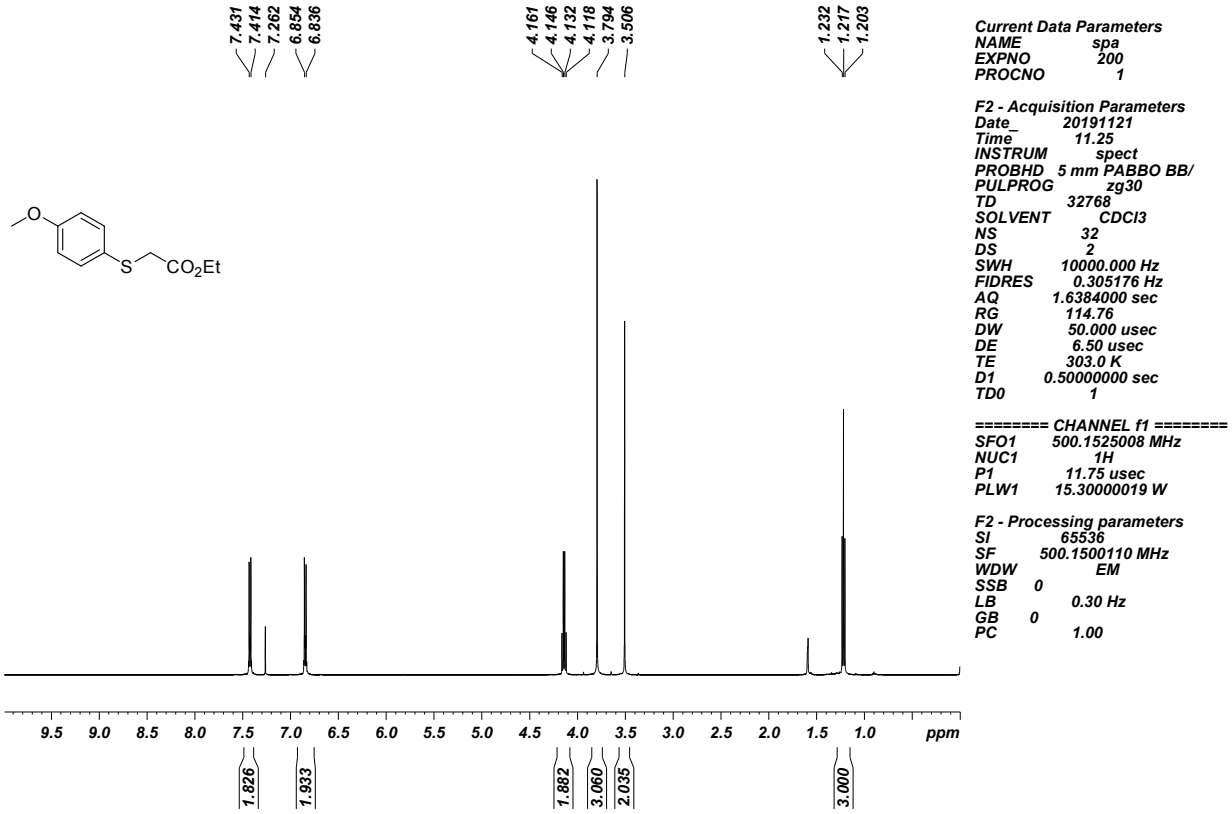


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)

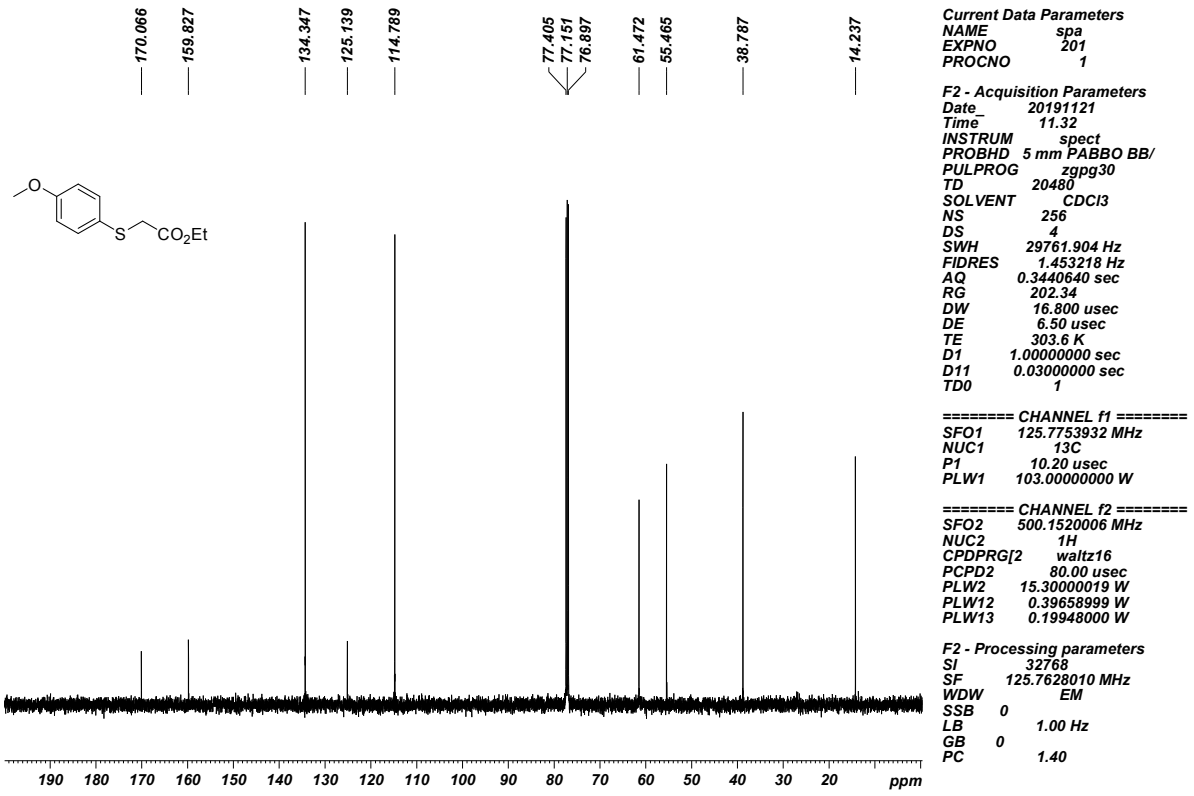


Thioester 1k

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C)

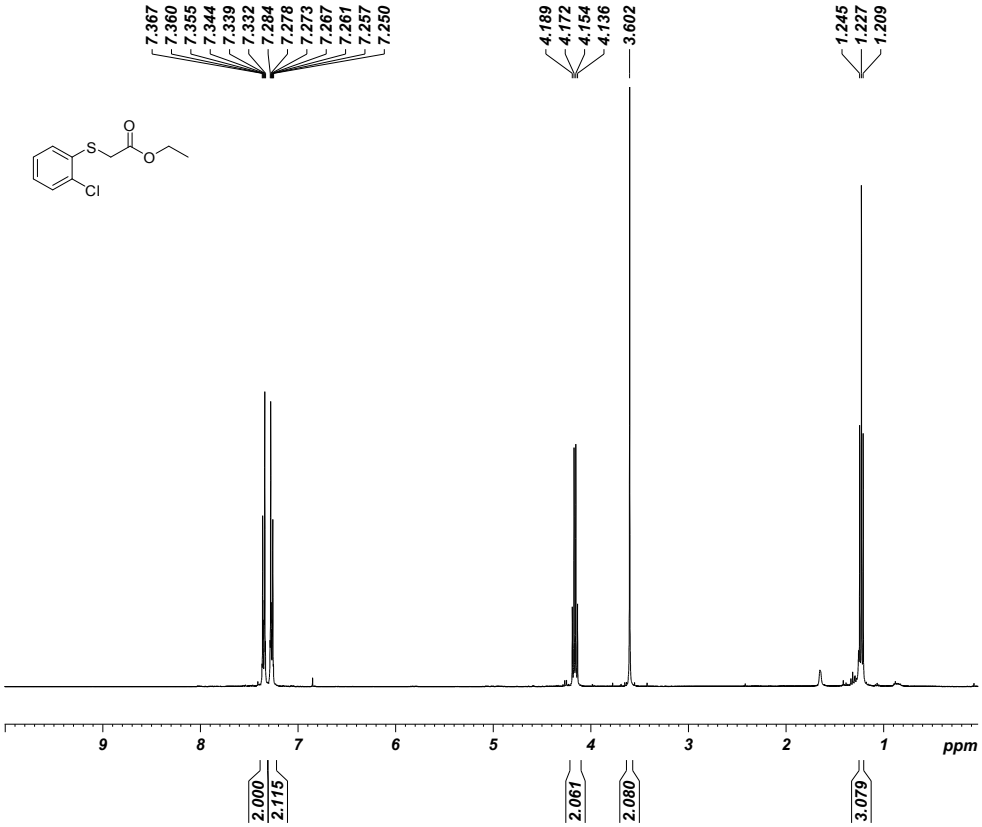


^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C)



Thioester 1l

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



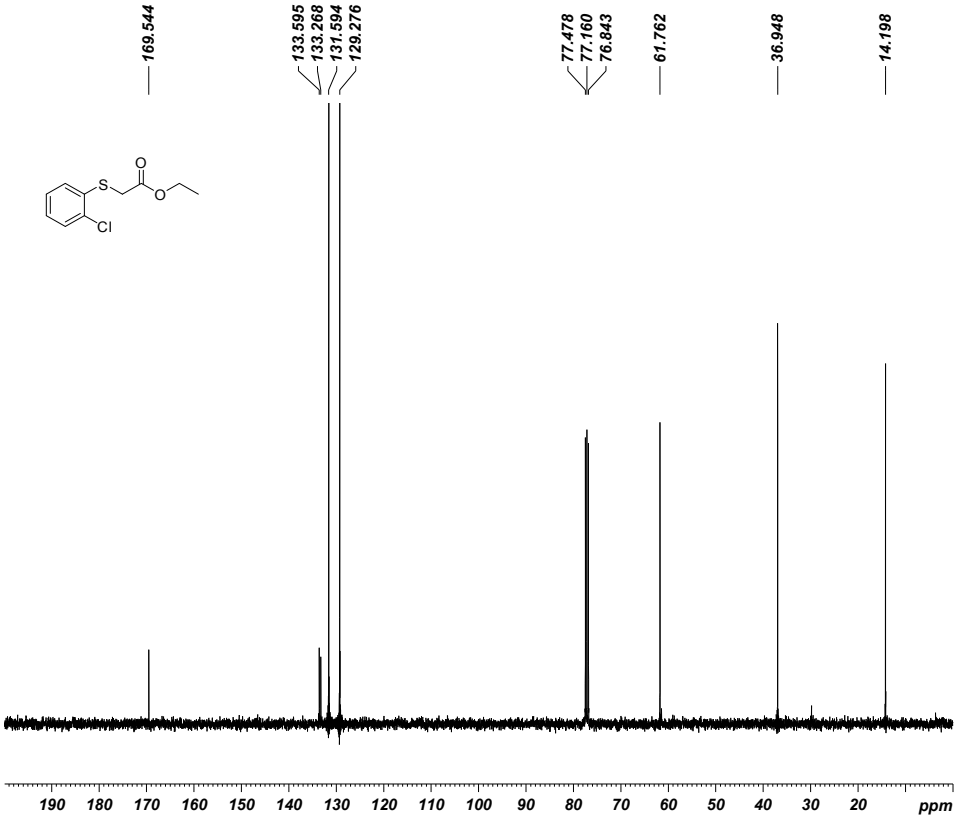

```
Current Data Parameters
NAME            acr
EXPNO           459
PROCNO          1

F2 - Acquisition Parameters
Date_           20170817
Time            13.18
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD              65536
SOLVENT         CDCl3
NS              16
DS              2
SWH             8012.820 Hz
FIDRES          0.122266 Hz
AQ              4.0894465 sec
RG              108.26
DW              62.400 usec
DE              6.50 usec
TE              298.0 K
D1              0.50000000 sec
TD0             1

======== CHANNEL f1 ========
SFO1            400.1320007 MHz
NUC1            1H
P1              15.70 usec
PLW1            7.75000000 W

F2 - Processing parameters
SI              65536
SF              400.1300068 MHz
WDW             EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME            acr
EXPNO           460
PROCNO          1

F2 - Acquisition Parameters
Date_           20170817
Time            13.24
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT         CDCl3
NS              256
DS              4
SWH             24038.461 Hz
FIDRES          1.453353 Hz
AQ              0.3440320 sec
RG              200.34
DW              20.800 usec
DE              6.50 usec
TE              298.4 K
D1              1.00000000 sec
D11             0.03000000 sec
TD0             1

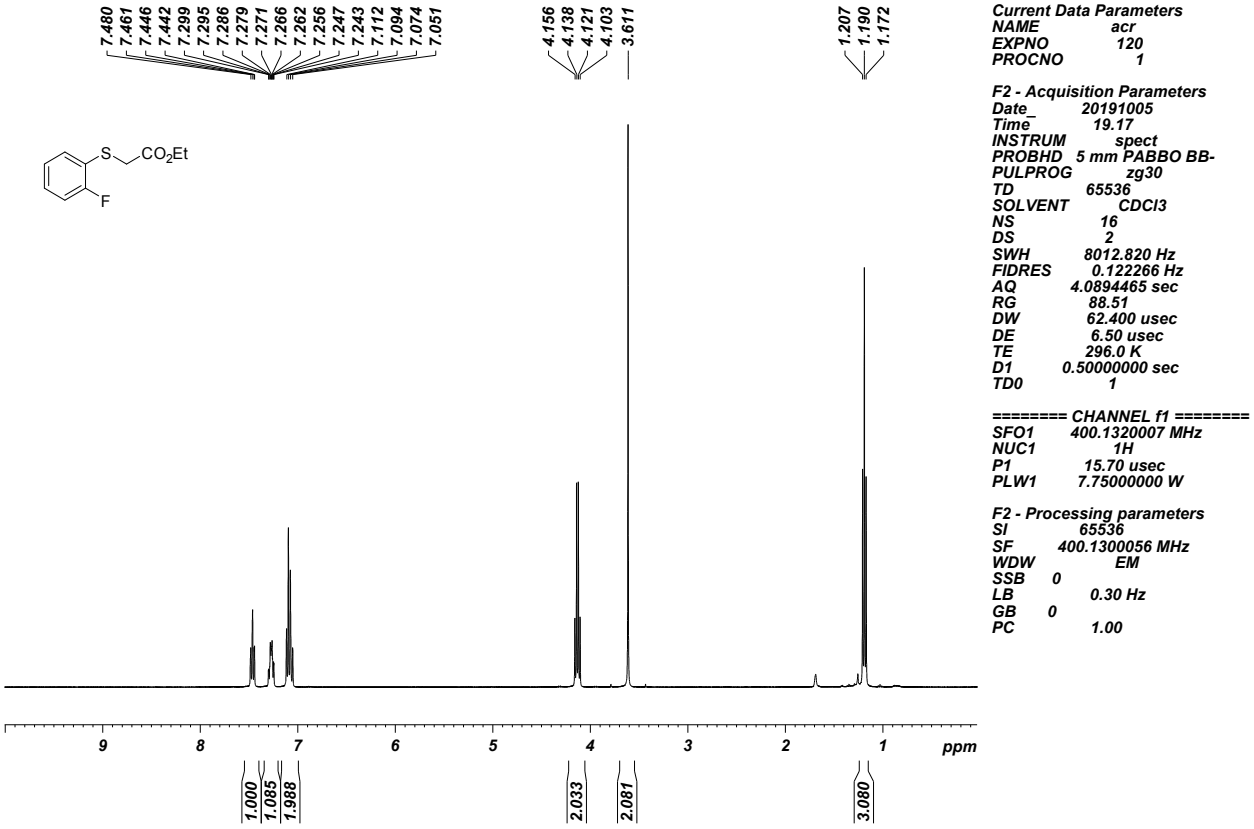
======== CHANNEL f1 ========
SFO1            100.6228289 MHz
NUC1            13C
P1              9.25 usec
PLW1            47.00000000 W

======== CHANNEL f2 ========
SFO2            400.1316005 MHz
NUC2            1H
CPDPRG[2        waltz16
PCPD2           90.00 usec
PLW2            7.75000000 W
PLW12           0.23583999 W
PLW13           0.11863000 W

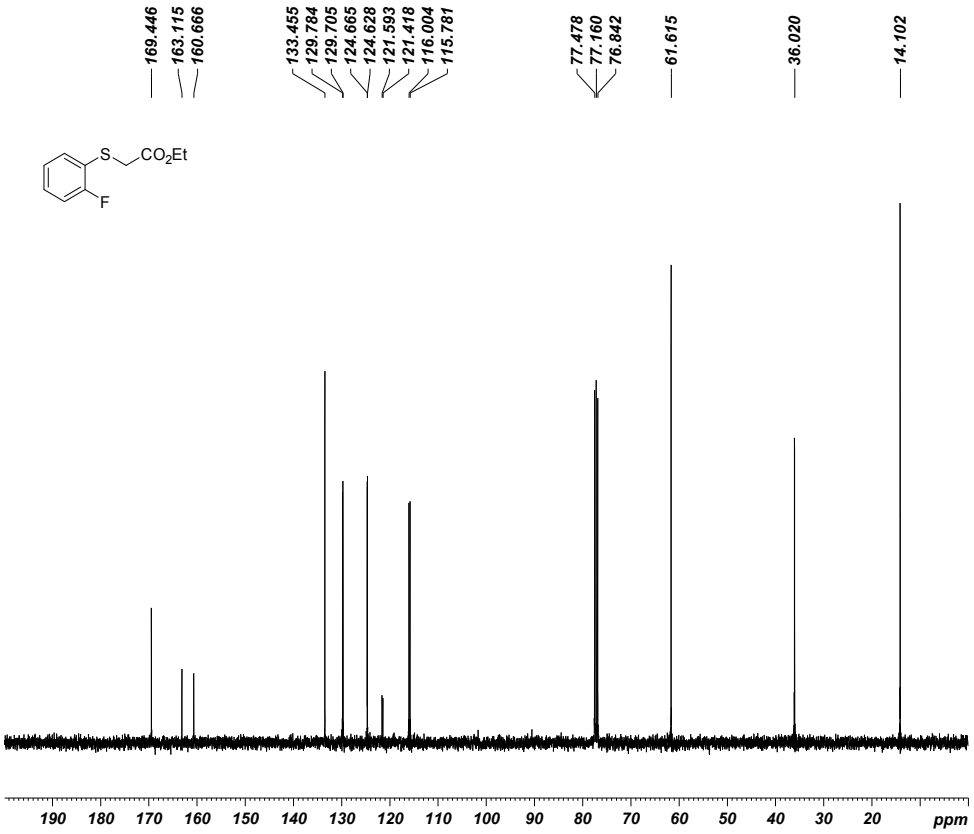
F2 - Processing parameters
SI              32768
SF              100.6127581 MHz
WDW             EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Thioester 1m

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME          acr
EXPNO         121
PROCNO        1

F2 - Acquisition Parameters
Date_         20191005
Time          19.23
INSTRUM       spect
PROBHD  5 mm PABBO BB-
PULPROG       zgpg30
TD            16540
SOLVENT       CDCl3
NS            256
DS            4
SWH           24038.461 Hz
FIDRES        1.453353 Hz
AQ            0.3440320 sec
RG            200.34
DW            20.800 usec
DE            6.50 usec
TE            296.4 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0           1

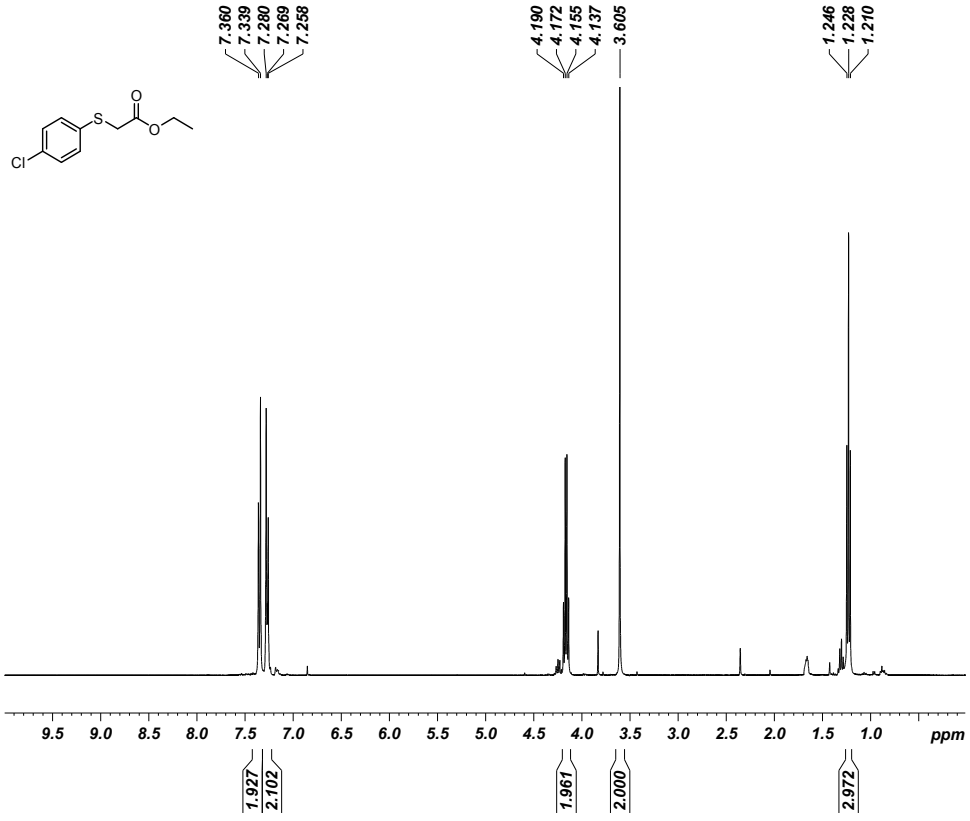
======== CHANNEL f1 ========
SFO1          100.6228289 MHz
NUC1          13C
P1            9.25 usec
PLW1          47.00000000 W

======== CHANNEL f2 ========
SFO2          400.1316005 MHz
NUC2          1H
CPDPRG[2      waltz16
PCPD2         90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI            32768
SF            100.6127604 MHz
WDW           EM
SSB   0
LB            1.00 Hz
GB    0
PC            1.40
```

Thioester 1n

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



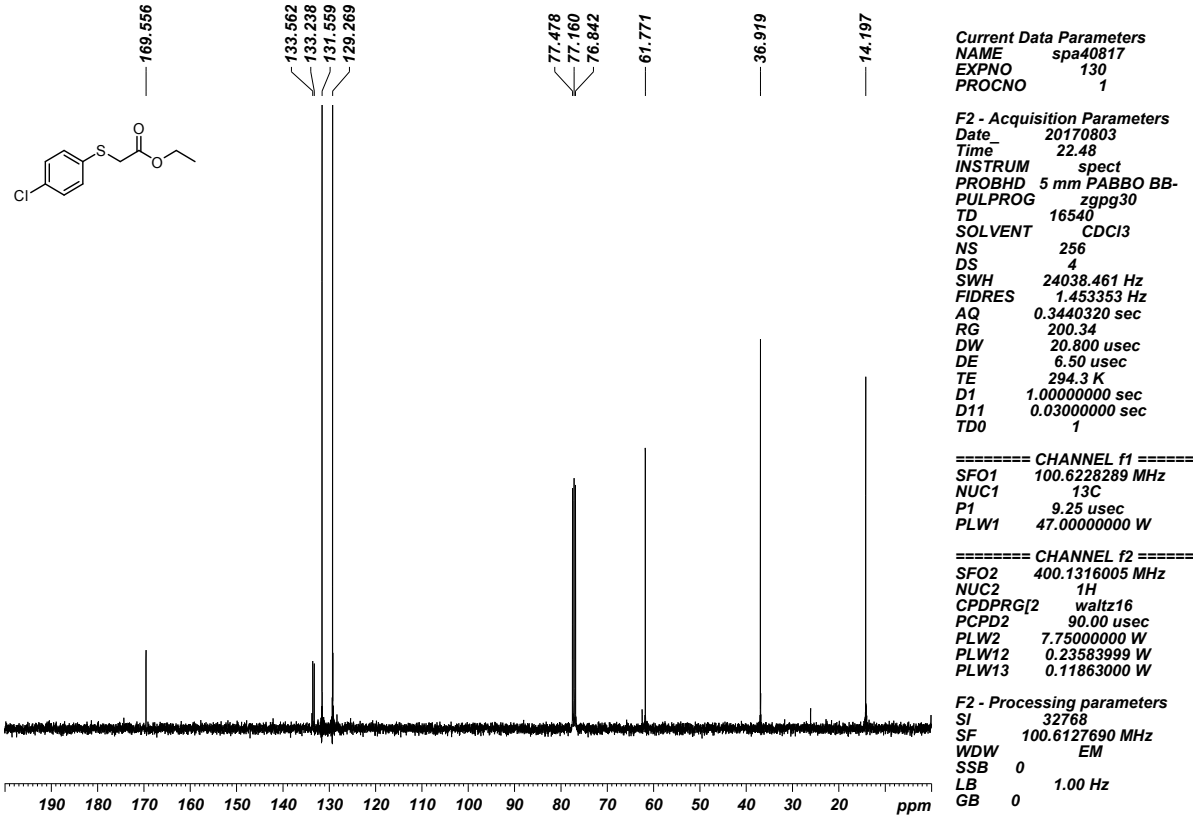

```
Current Data Parameters
NAME          spa40817
EXPNO         129
PROCNO        1

F2 - Acquisition Parameters
Date_         20170803
Time          22.42
INSTRUM       spect
PROBHD  5 mm PABBO BB-
PULPROG       zg30
TD            65536
SOLVENT       CDCl3
NS            16
DS            2
SWH           8012.820 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG            95.73
DW            62.400 usec
DE            6.50 usec
TE            293.9 K
D1            0.50000000 sec
TD0           1

======== CHANNEL f1 ========
SFO1          400.1320007 MHz
NUC1          1H
P1            15.70 usec
PLW1          7.75000000 W

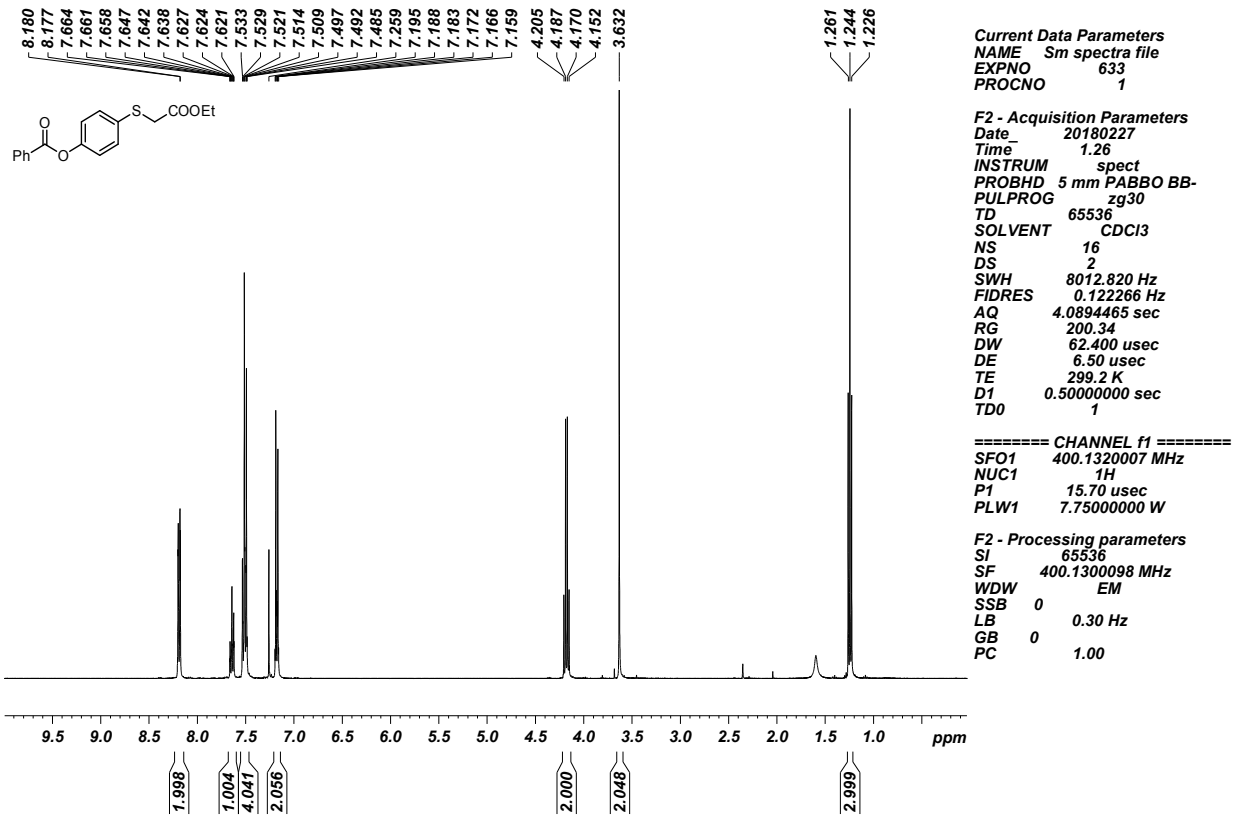
F2 - Processing parameters
SI            65536
SF            400.1300061 MHz
WDW           EM
SSB   0
LB            0.30 Hz
GB    0
PC            1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

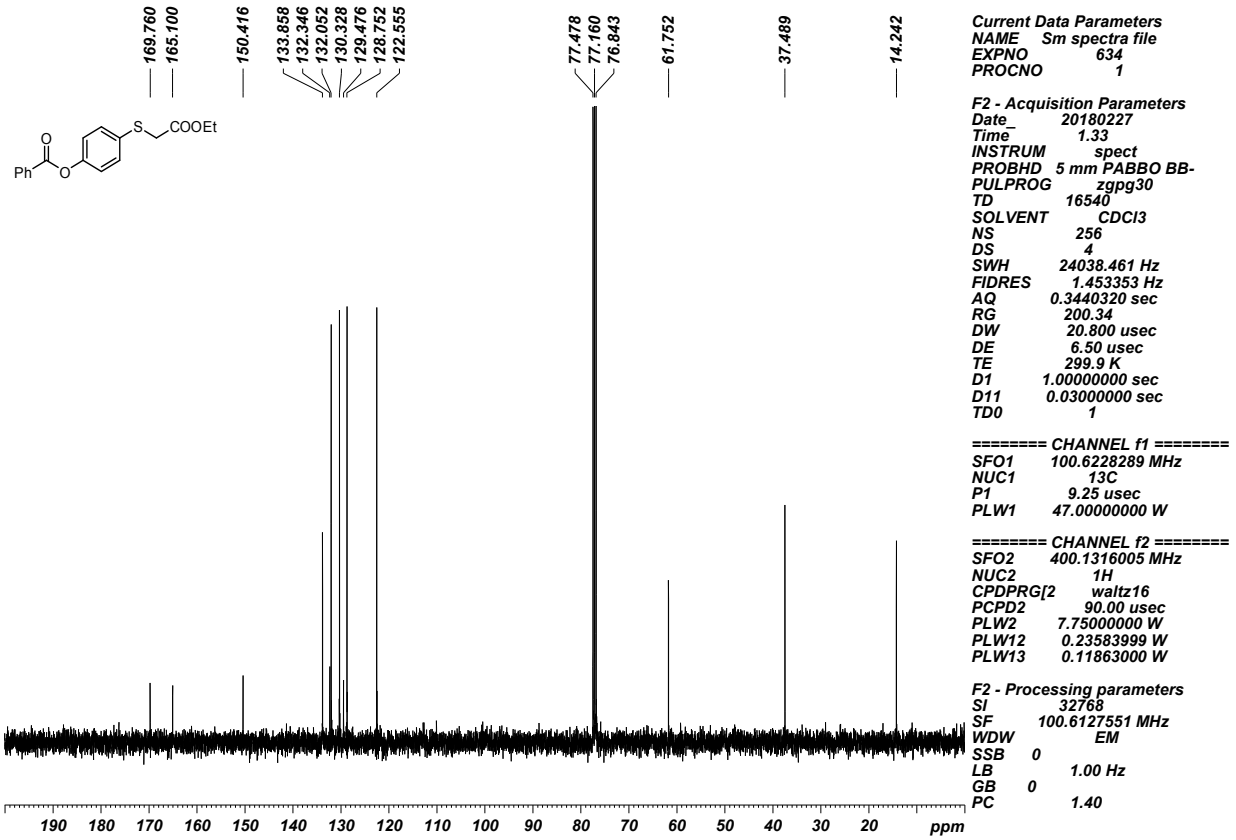


Thioester 1o

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

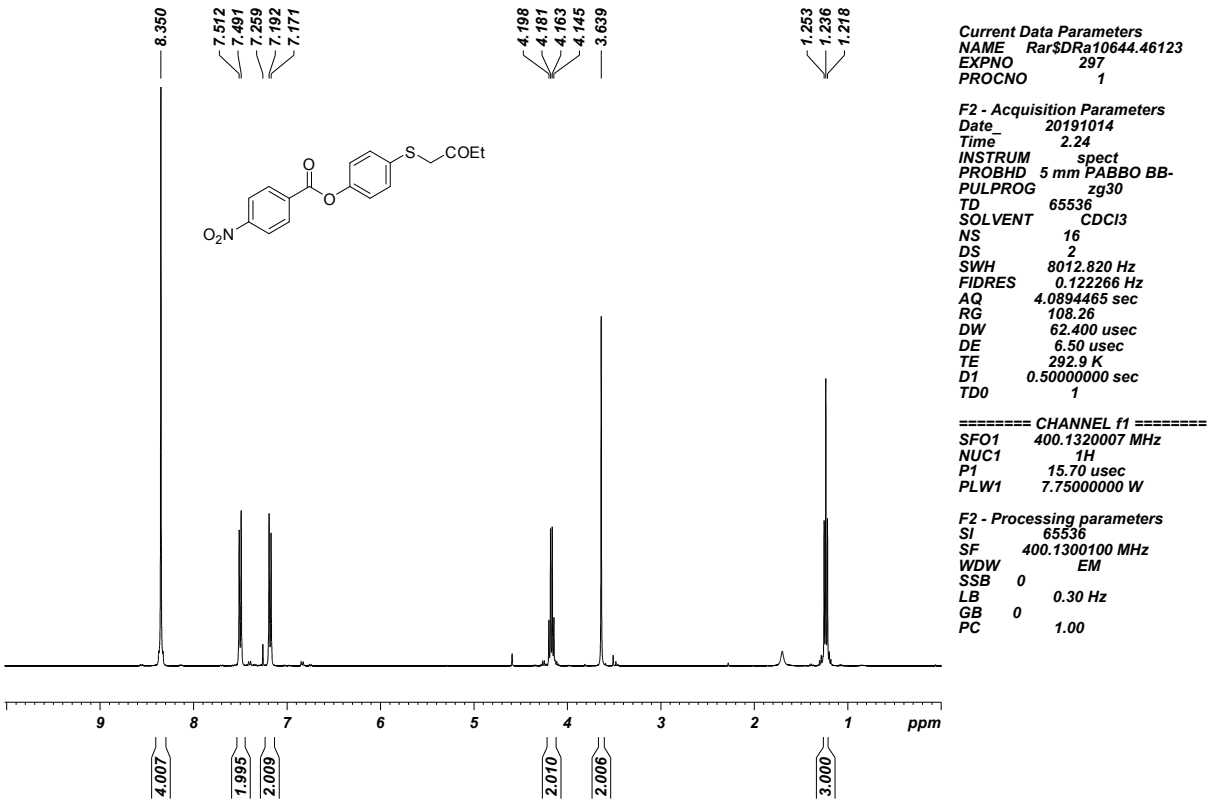


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

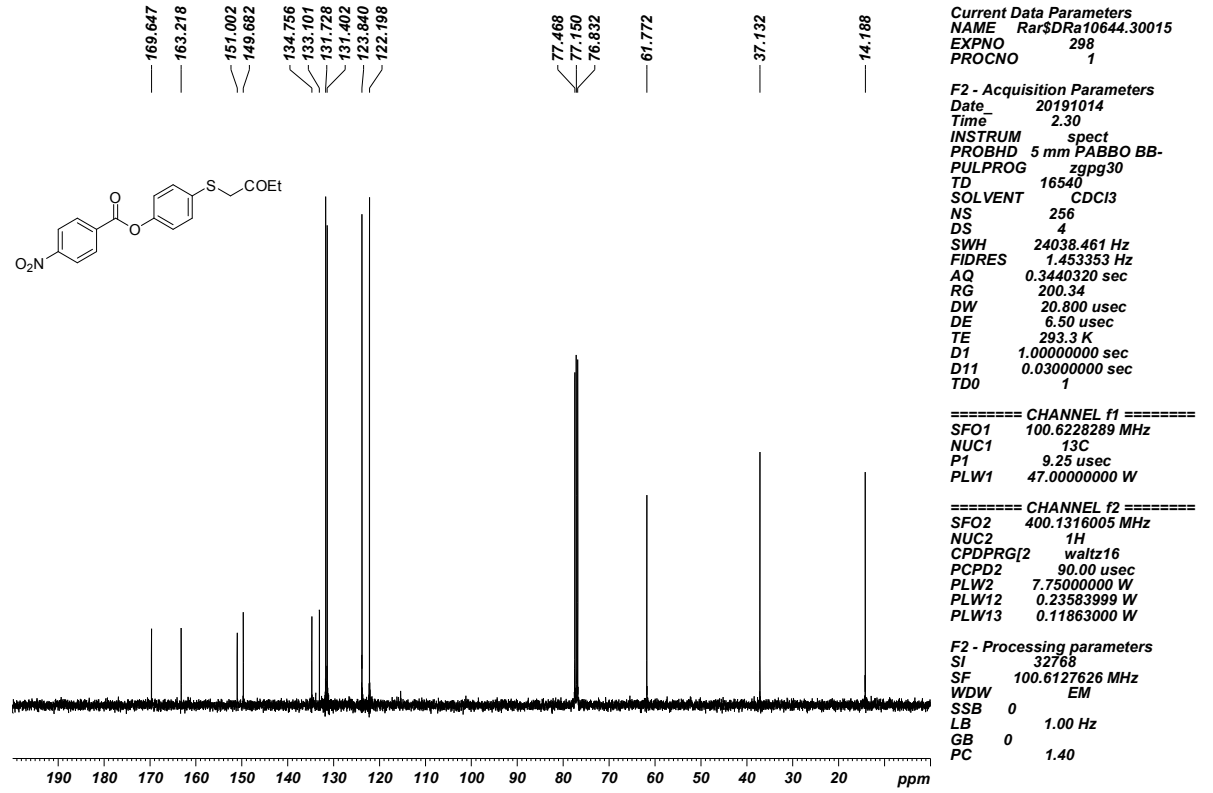


Thioester 1p

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

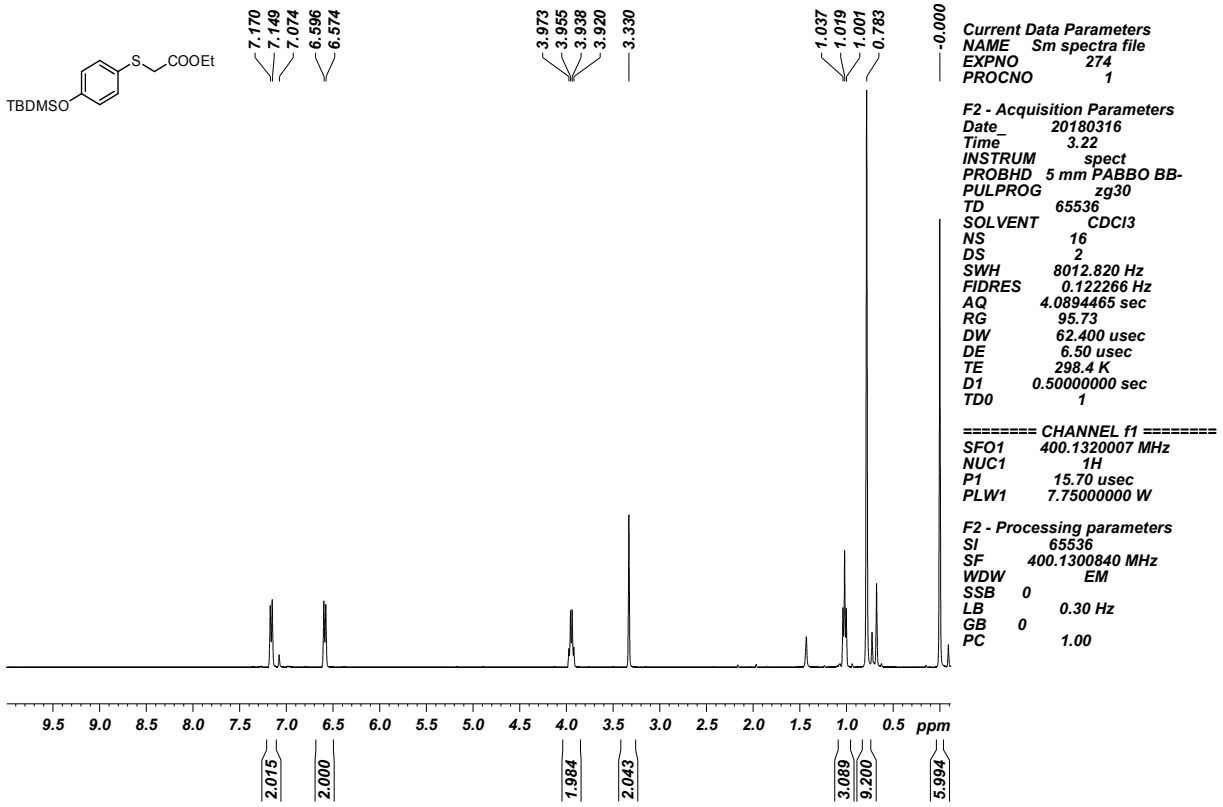


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

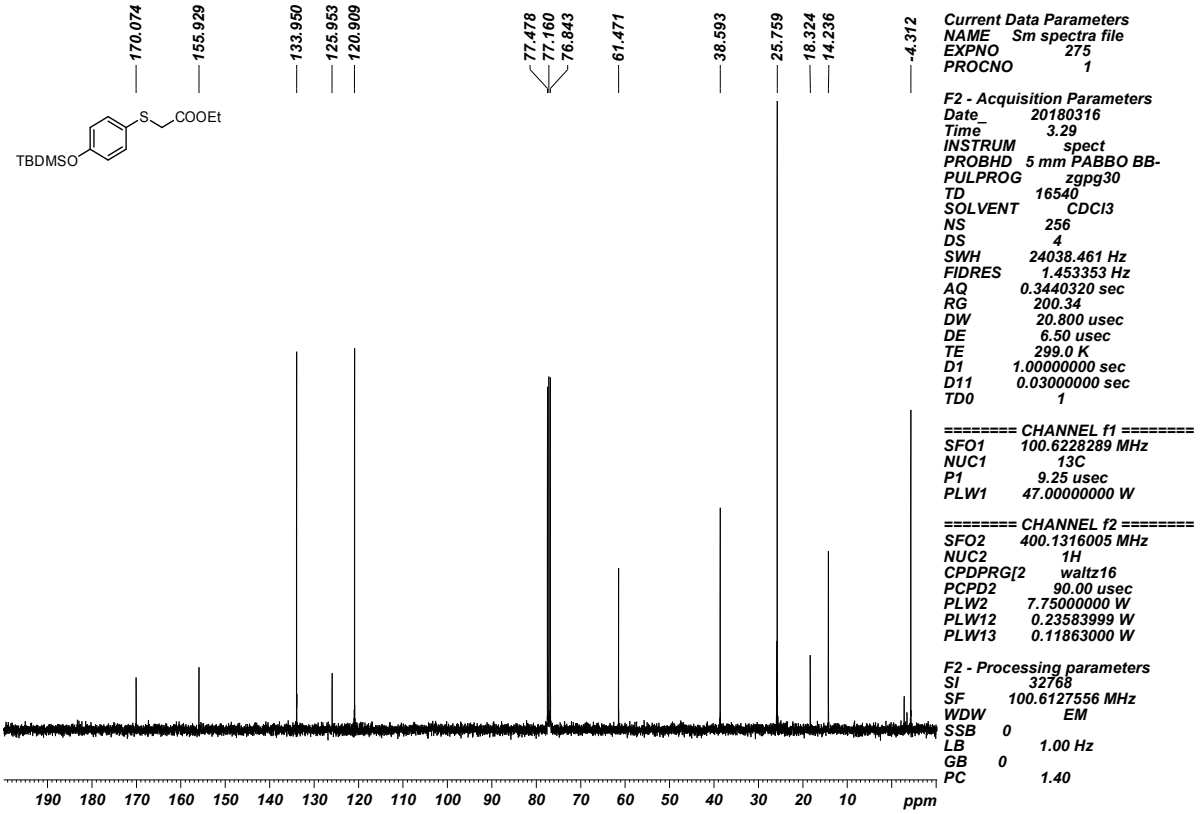


Thioester 1r

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

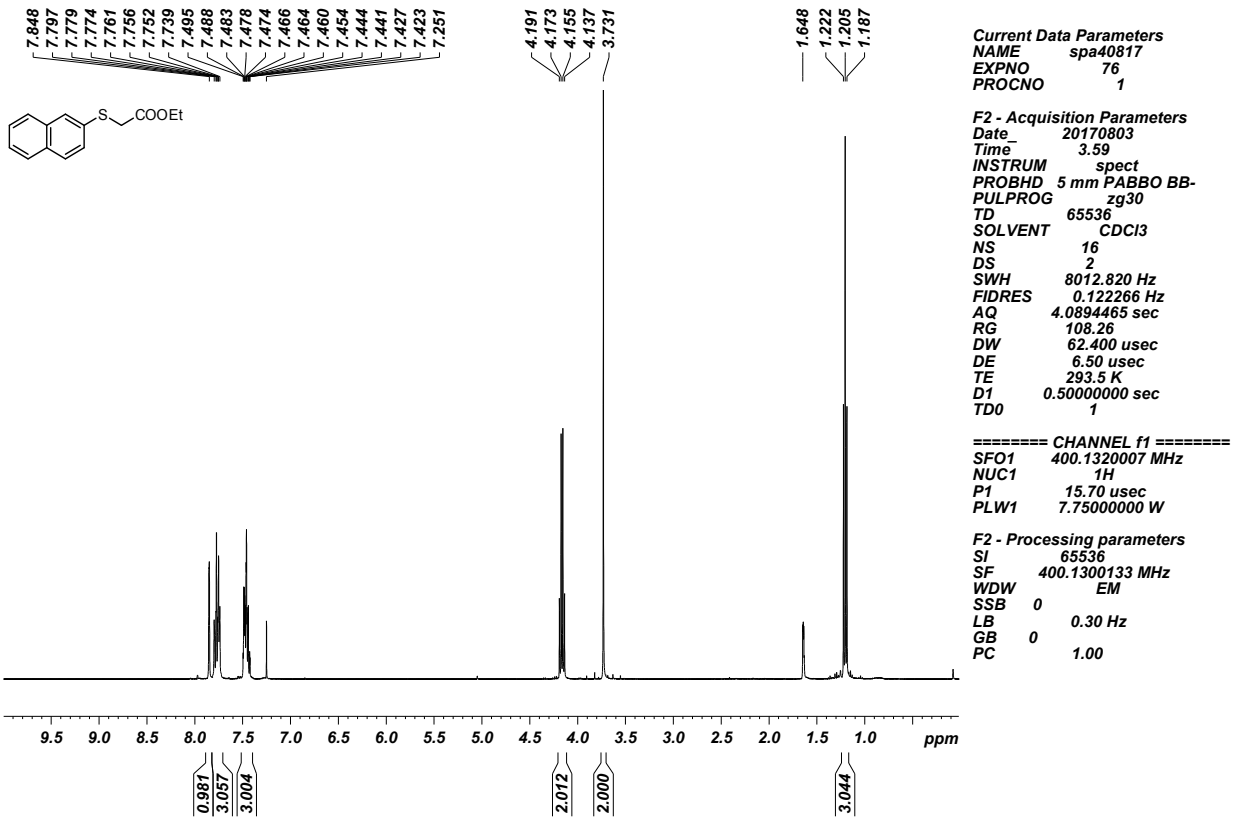


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

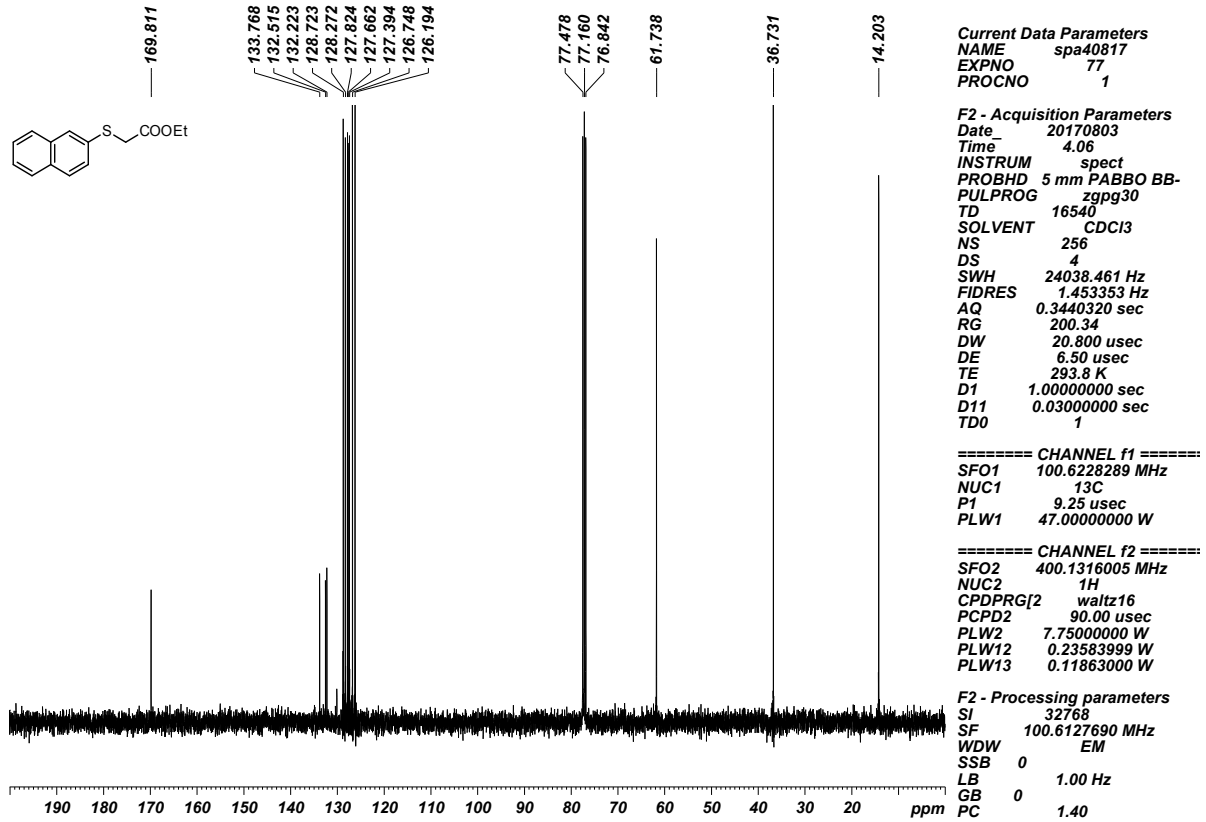


Thioester 1s

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

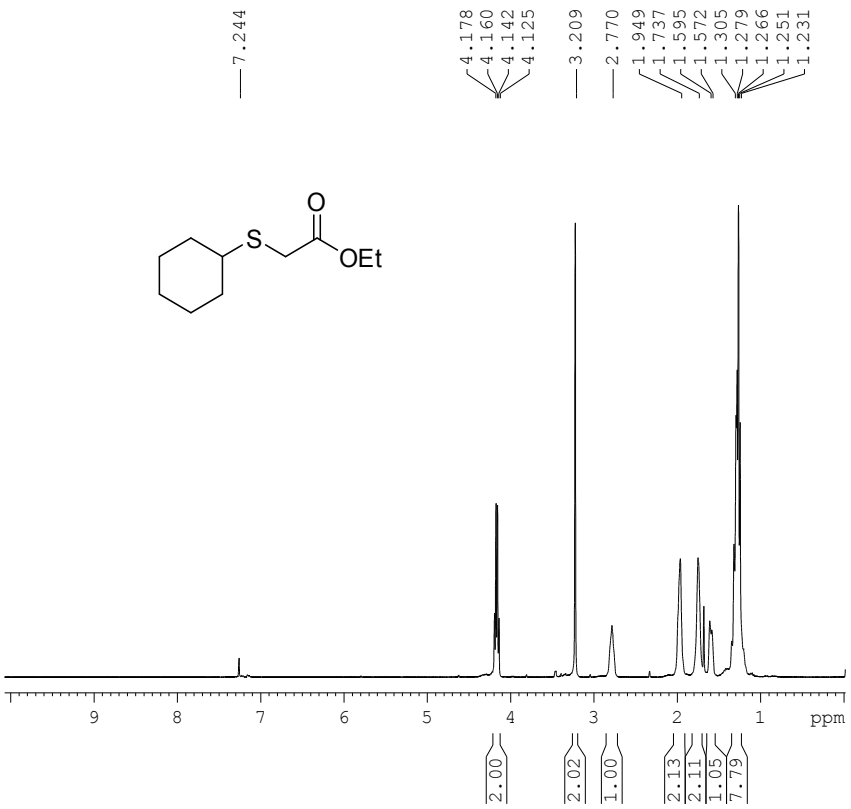


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Thioester 2t

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



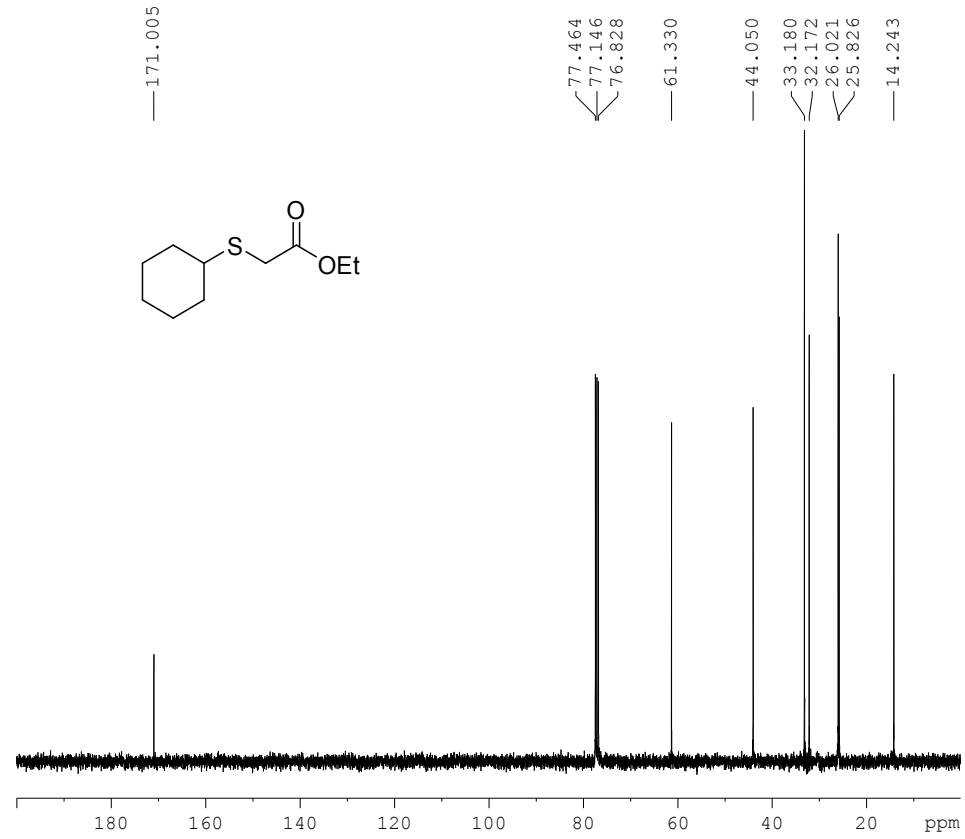

```
Current Data Parameters
NAME           spa40220
EXPNO               413
PROCNO                1

F2 - Acquisition Parameters
Date_          20200229
Time              16.16
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                   16
DS                    2
SWH            8012.820 Hz
FIDRES         0.122266 Hz
AQ             4.0894465 sec
RG                108.26
DW                62.400 usec
DE                 6.50 usec
TE                297.4 K
D1           0.50000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1         400.1320007 MHz
NUC1                 1H
P1                15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI                65536
SF           400.1300005 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Paramete
NAME      411 thio cy
EXPNO               4
PROCNO

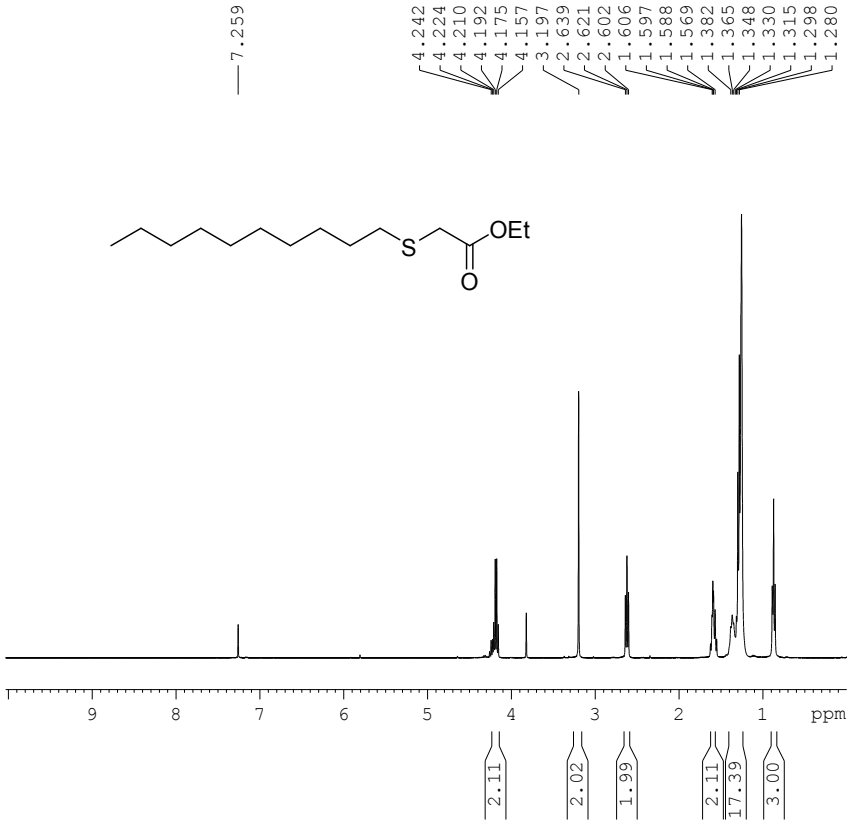
F2 - Acquisition Para
Date_          202002
Time             16.
INSTRUM           spe
PROBHD   5 mm PABBO B
PULPROG          zgpg
TD                165
SOLVENT           CDC
NS                  2
DS
SWH           24038.4
FIDRES         1.4533
AQ            0.34403
RG               200.
DW              20.8
DE                6.
TE               297
D1           1.000000
D11          0.030000
TD0

======== CHANNEL f1 =
SFO1         100.62282
NUC1                1
P1                  9.
PLW1         47.000000

======== CHANNEL f2 =
SFO2         400.13160
NUC2
CPDPRG[2         waltz
PCPD2              90.
PLW2          7.750000
```

Thioester 2u

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



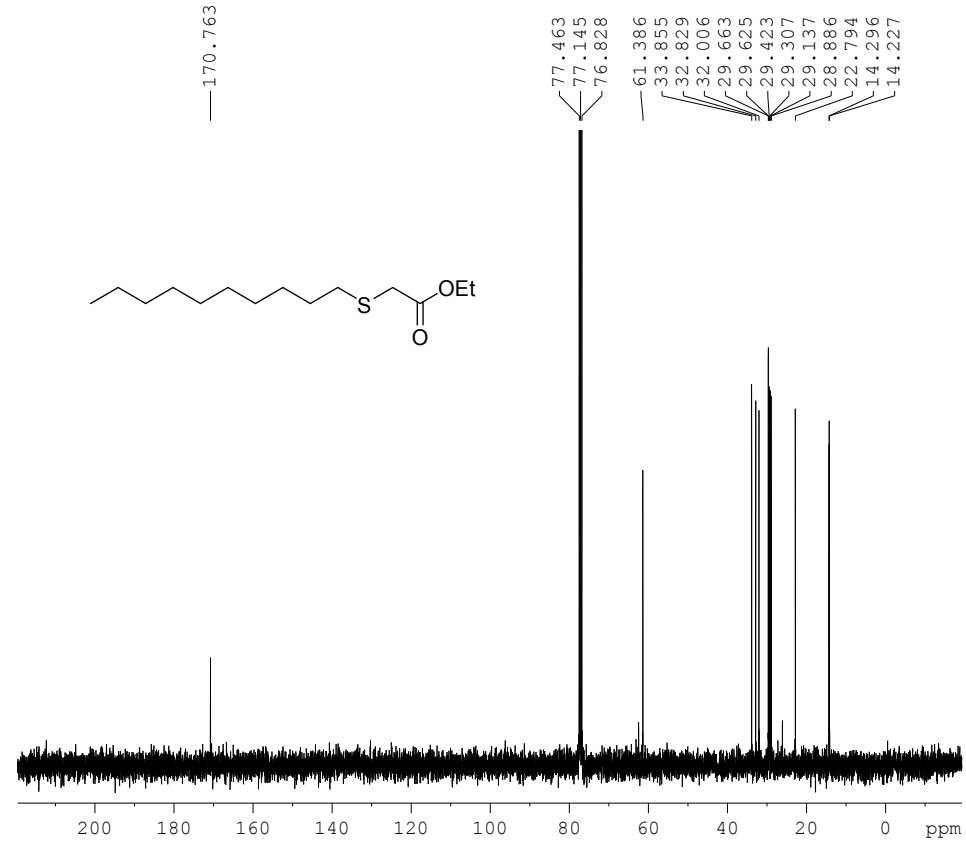

```
Current Data Parameters
NAME            spa40320
EXPNO                201
PROCNO                 1

F2 - Acquisition Parameters
Date_           20200315
Time               11.52
INSTRUM            spect
PROBHD   5 mm PABBO BB-
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH              8012.820 Hz
FIDRES           0.122266 Hz
AQ               4.0894465 sec
RG                  153.13
DW                62.400 usec
DE                 6.50 usec
TE                 297.0 K
D1              0.50000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1          400.1320007 MHz
NUC1                  1H
P1                 15.70 usec
PLW1           7.75000000 W

F2 - Processing parameters
SI                 65536
SF            400.1300064 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Paramete
NAME            spa403
EXPNO                2
PROCNO

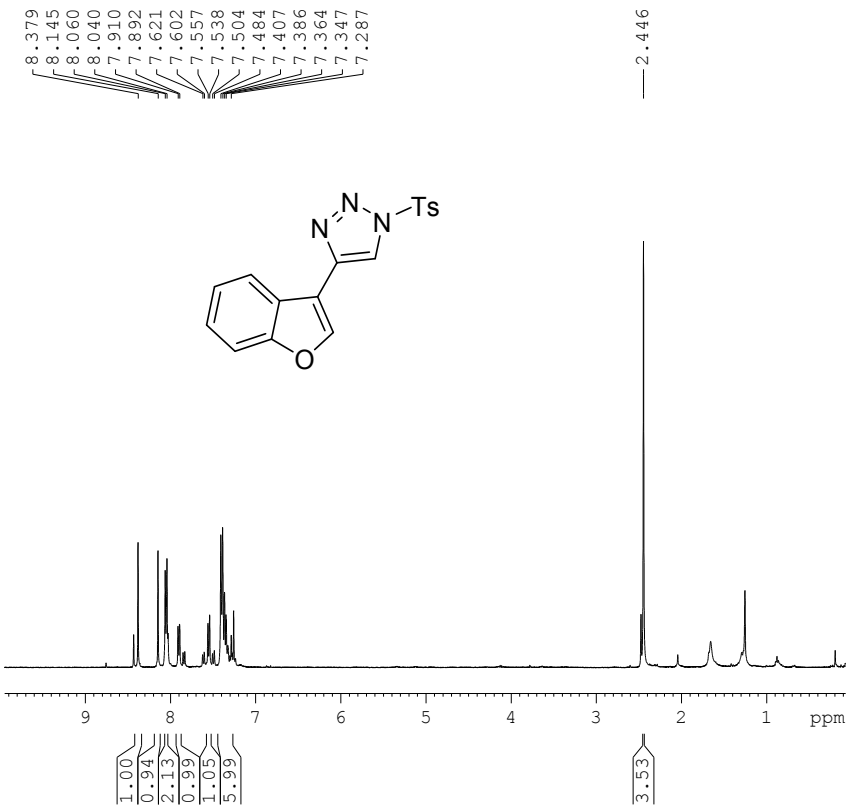
F2 - Acquisition Para
Date_           202003
Time               11.
INSTRUM            spe
PROBHD   5 mm PABBO B
PULPROG           zgpg
TD                 165
SOLVENT            CDC
NS                   2
DS
SWH            24038.4
FIDRES          1.4533
AQ             0.34403
RG                200.
DW                20.8
DE                  6.
TE                297
D1             1.000000
D11            0.030000
TD0

======== CHANNEL f1 =
SFO1          100.62282
NUC1                  1
P1                   9.
PLW1          47.000000

======== CHANNEL f2 =
SFO2          400.13160
NUC2
CPDPRG[2          waltz
PCPD2                90.
```

Thioester 2ag

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



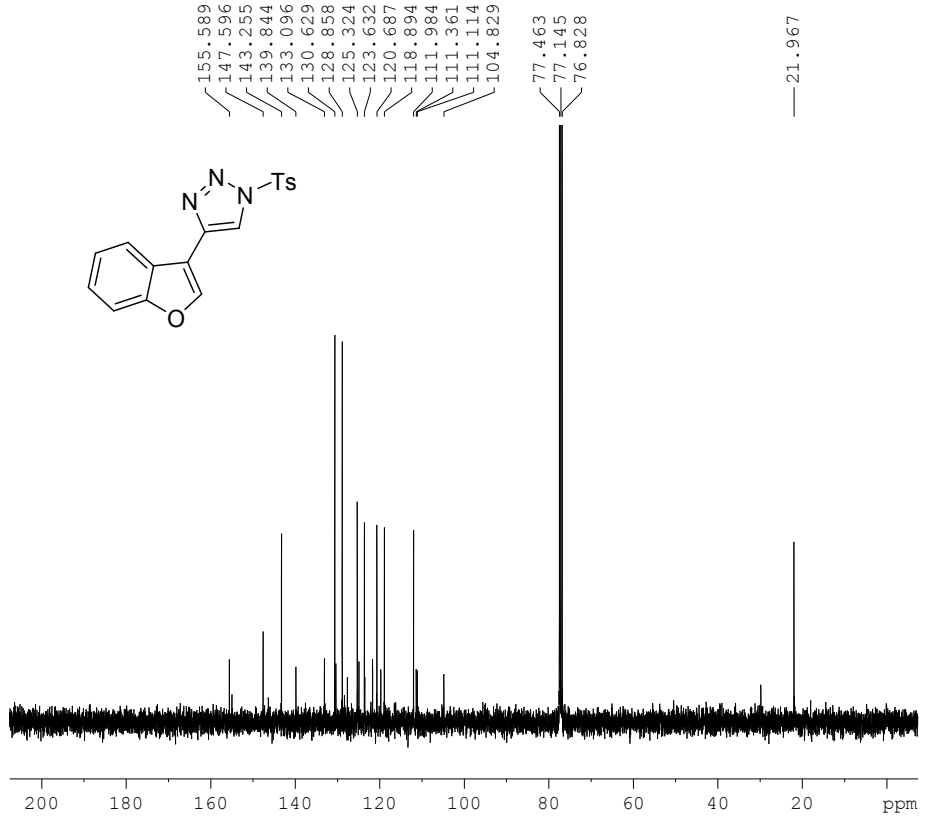

```
Current Data Parameters
NAME           spa40320
EXPNO               209
PROCNO                1

F2 - Acquisition Parameters
Date_           20200315
Time              22.17
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG            zg30
TD                65536
SOLVENT           CDCl3
NS                   16
DS                    2
SWH            8012.820 Hz
FIDRES         0.122266 Hz
AQ            4.0894465 sec
RG               200.34
DW               62.400 usec
DE                6.50 usec
TE                297.0 K
D1           0.50000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1         400.1320007 MHz
NUC1                 1H
P1                15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI                 65536
SF          400.1300100 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Paramete
NAME           spa403
EXPNO               2
PROCNO

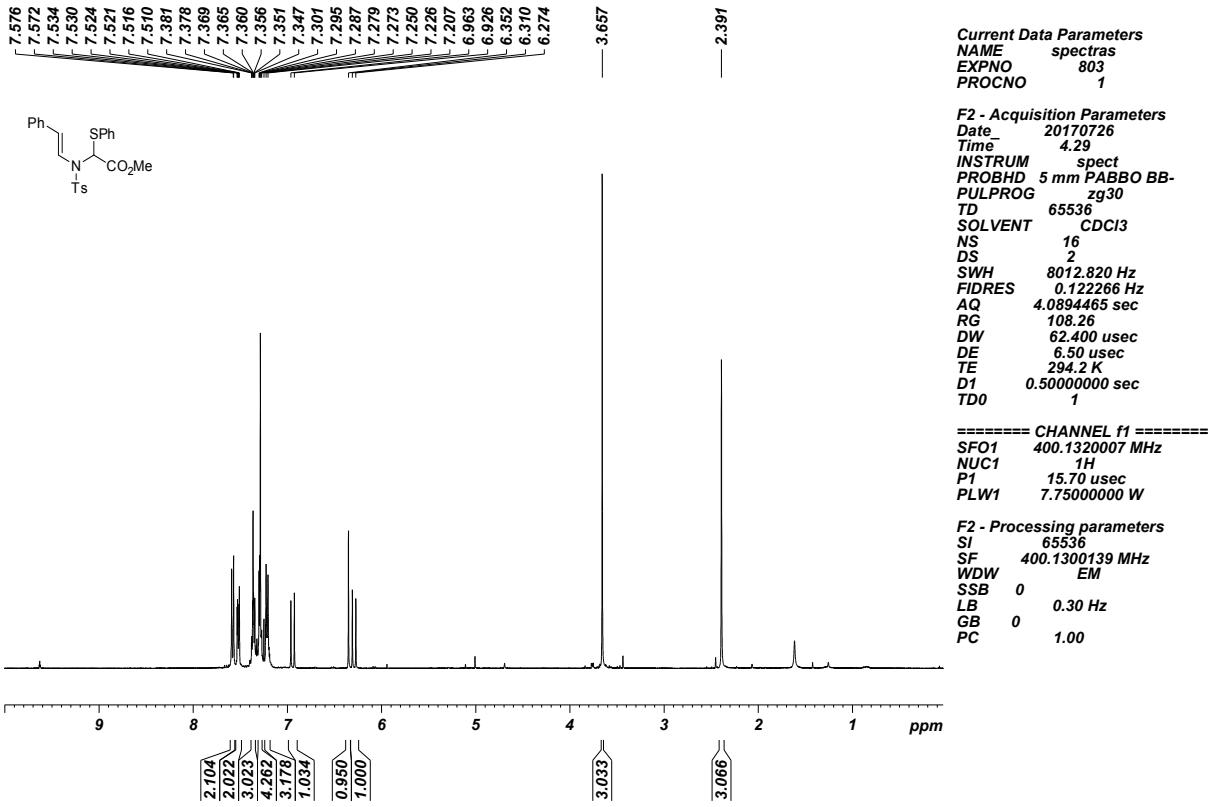
F2 - Acquisition Para
Date_           202003
Time              22.
INSTRUM           spe
PROBHD   5 mm PABBO B
PULPROG           zgpg
TD                165
SOLVENT           CDC
NS                  2
DS
SWH           24038.4
FIDRES         1.4533
AQ            0.34403
RG               200.
DW               20.8
DE                 6.
TE                297
D1           1.000000
D11          0.030000
TD0

======== CHANNEL f1 =
SFO1        100.62282
NUC1                1
P1                 9.
PLW1         47.000000

======== CHANNEL f2 =
SFO2        400.13160
NUC2
CPDPRG[2         waltz
PCPD2              90.
PLW2          7.750000
```

Enamide 4a

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



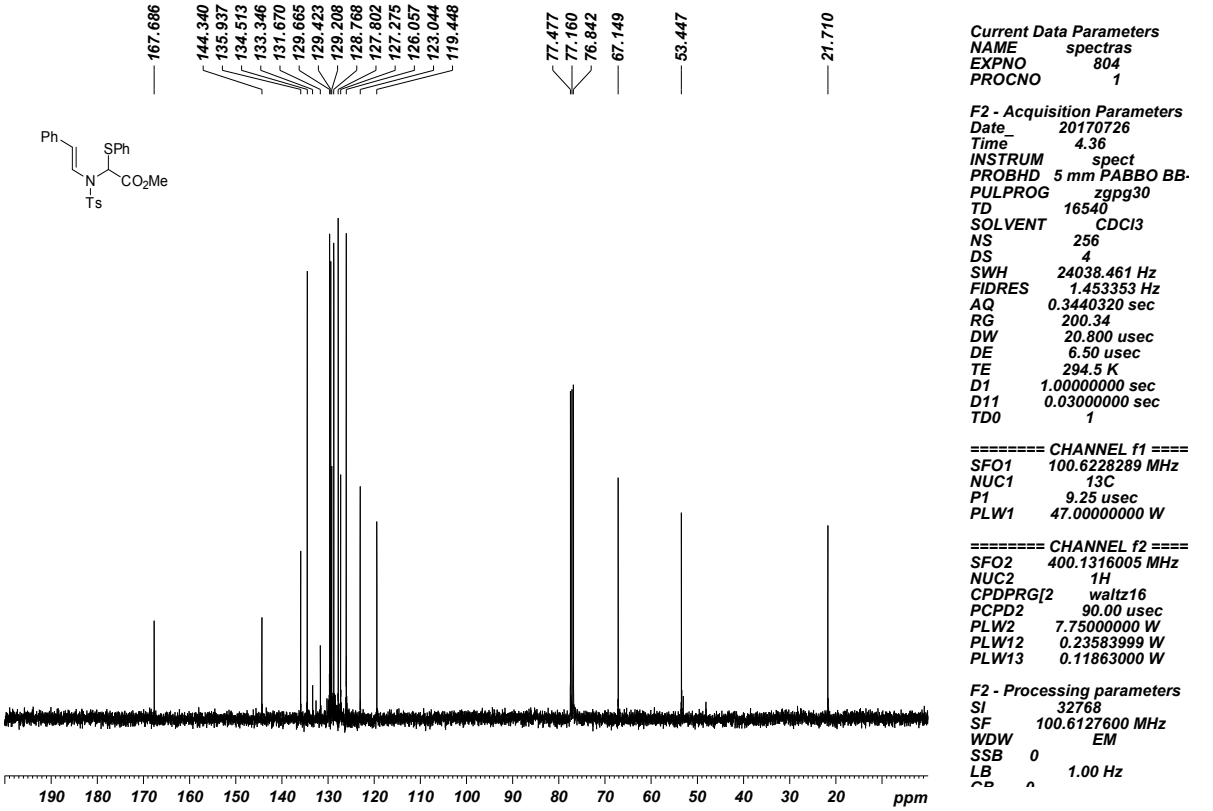

```
Current Data Parameters
NAME          spectras
EXPNO            803
PROCNO             1

F2 - Acquisition Parameters
Date_         20170726
Time             4.29
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT          CDCl3
NS                 16
DS                  2
SWH           8012.820 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG               108.26
DW               62.400 usec
DE                6.50 usec
TE               294.2 K
D1            0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1               1H
P1               15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI              65536
SF         400.1300139 MHz
WDW                EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME          spectras
EXPNO             804
PROCNO              1

F2 - Acquisition Parameters
Date_         20170726
Time             4.36
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD              16540
SOLVENT          CDCl3
NS                256
DS                  4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ            0.3440320 sec
RG               200.34
DW               20.800 usec
DE                6.50 usec
TE               294.5 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0                1

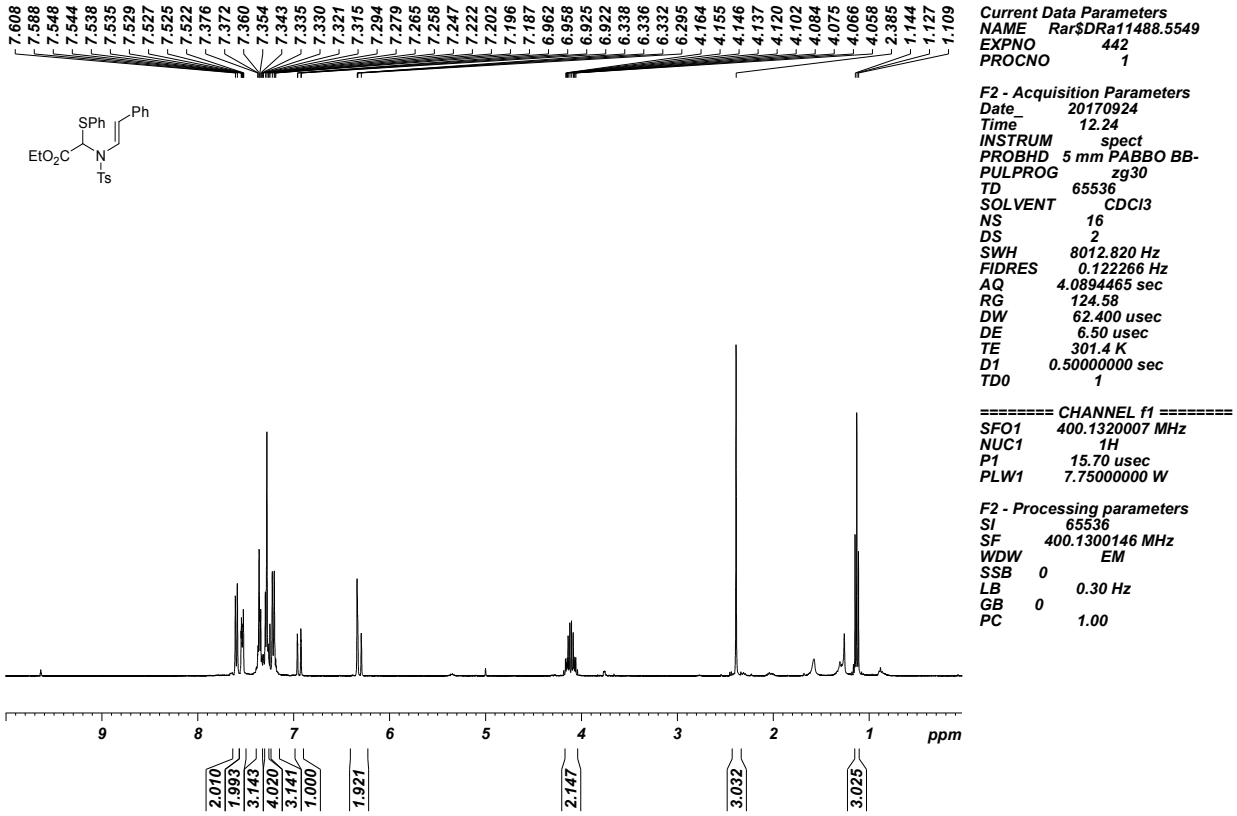
======== CHANNEL f1 ====
SFO1       100.6228289 MHz
NUC1               13C
P1                9.25 usec
PLW1       47.00000000 W

======== CHANNEL f2 ====
SFO2       400.1316005 MHz
NUC2               1H
CPDPRG[2       waltz16
PCPD2           90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.11863000 W

F2 - Processing parameters
SI              32768
SF         100.6127600 MHz
WDW                EM
SSB     0
LB              1.00 Hz
```

Enamide 4b

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



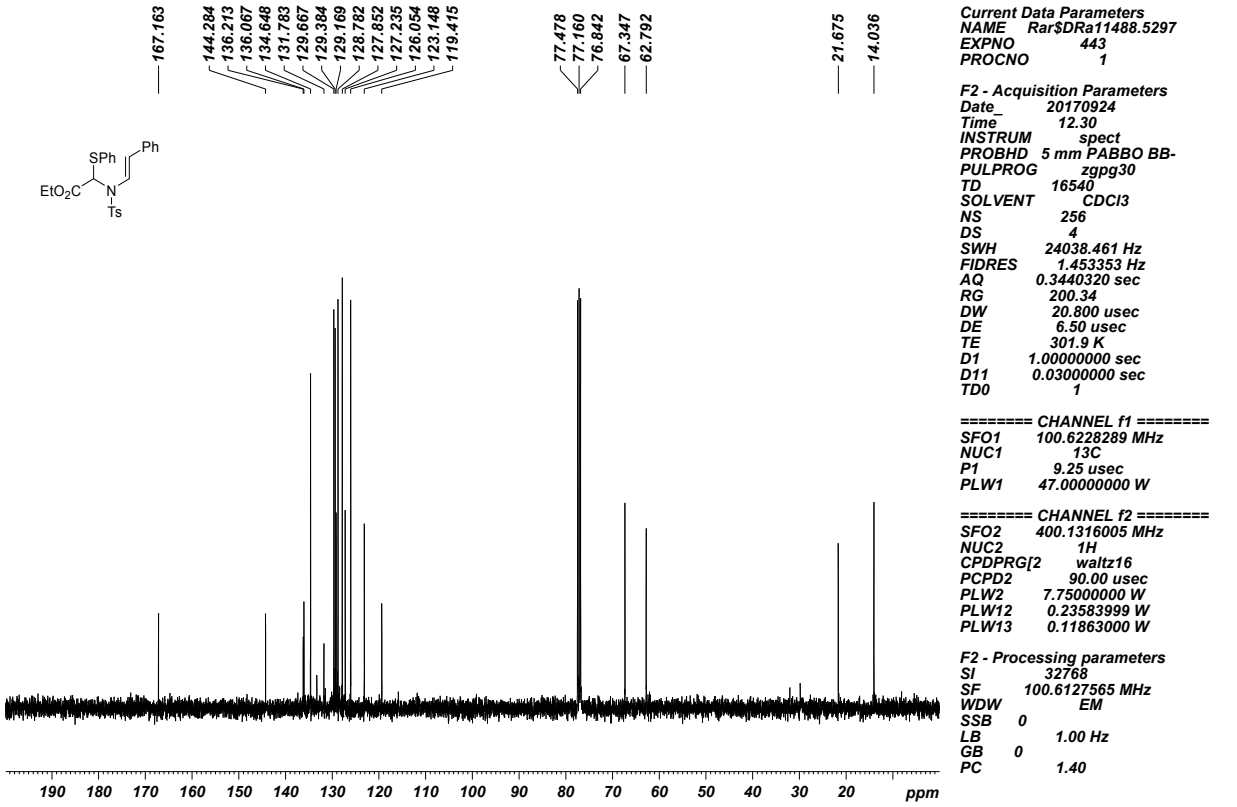

```
Current Data Parameters
NAME     Rar$DRa11488.5549
EXPNO          442
PROCNO           1

F2 - Acquisition Parameters
Date_        20170924
Time           12.24
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG               124.58
DW                62.400 usec
DE                 6.50 usec
TE               301.4 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300146 MHz
WDW               EM
SSB     0
LB               0.30 Hz
GB      0
PC               1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME     Rar$DRa11488.5297
EXPNO          443
PROCNO           1

F2 - Acquisition Parameters
Date_        20170924
Time           12.30
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG               200.34
DW                20.800 usec
DE                 6.50 usec
TE               301.9 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

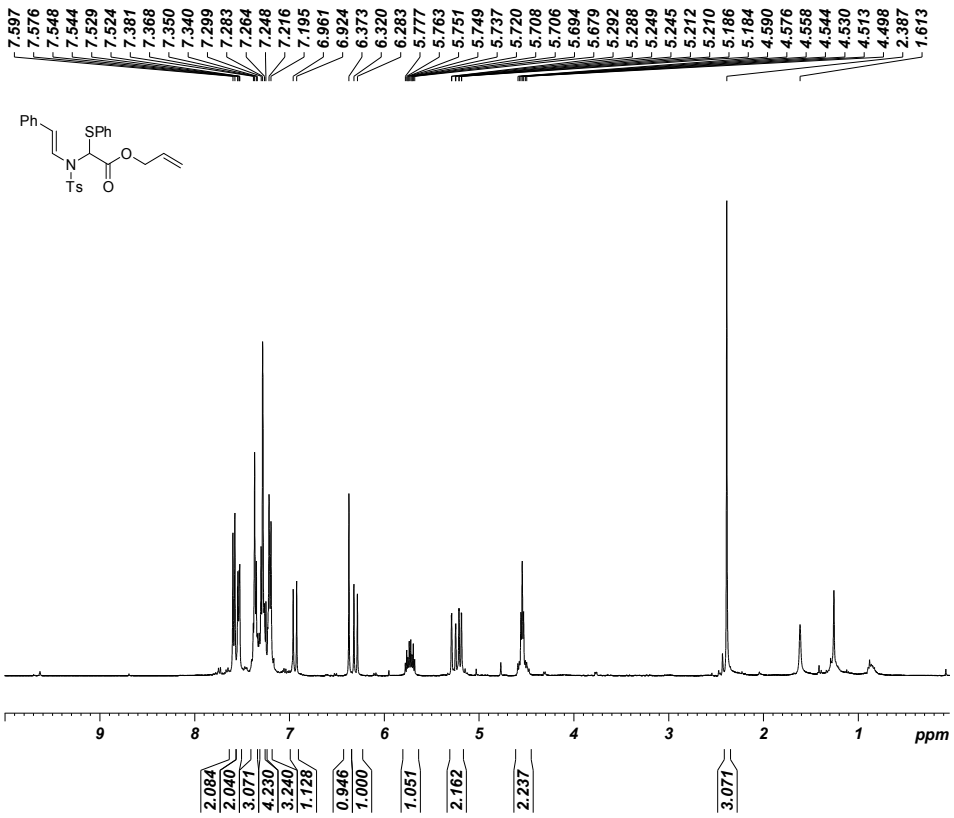
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI             32768
SF         100.6127565 MHz
WDW               EM
SSB     0
LB               1.00 Hz
GB      0
PC               1.40
```

Enamide 4c

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



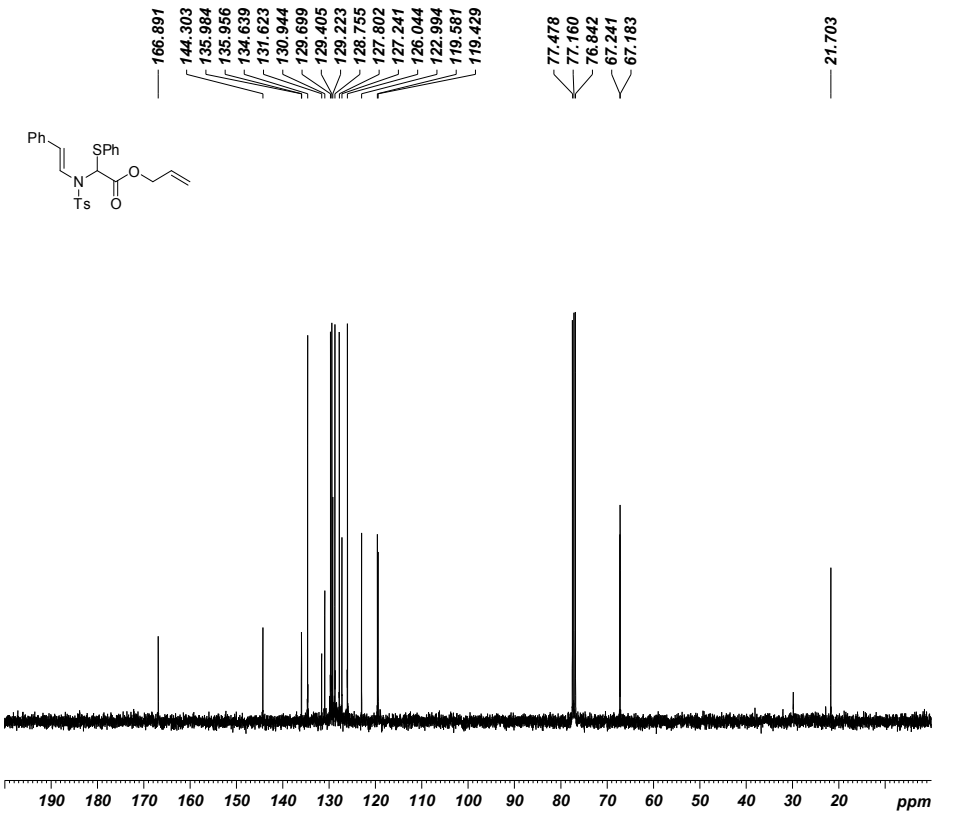

```
Current Data Parameters
NAME          spectras
EXPNO              402
PROCNO               1

F2 - Acquisition Parameters
Date_         20171218
Time              15.54
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD               65536
SOLVENT           CDCl3
NS                  16
DS                   2
SWH            8012.820 Hz
FIDRES            0.122266 Hz
AQ             4.0894465 sec
RG                108.26
DW                62.400 usec
DE                 6.50 usec
TE                293.4 K
D1             0.50000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1          400.1320007 MHz
NUC1               1H
P1                15.70 usec
PLW1           7.75000000 W

F2 - Processing parameters
SI               65536
SF            400.1300142 MHz
WDW                EM
SSB      0
LB                0.30 Hz
GB       0
PC                1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME          spectras
EXPNO              403
PROCNO               1

F2 - Acquisition Parameters
Date_         20171218
Time              16.01
INSTRUM           spect
PROBHD   5 mm PABBO BB
PULPROG         zgpg30
TD               16540
SOLVENT           CDCl3
NS                 256
DS                   4
SWH           24038.461 Hz
FIDRES            1.453353 Hz
AQ            0.3440320 sec
RG                200.34
DW                20.800 usec
DE                 6.50 usec
TE                293.5 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0                  1

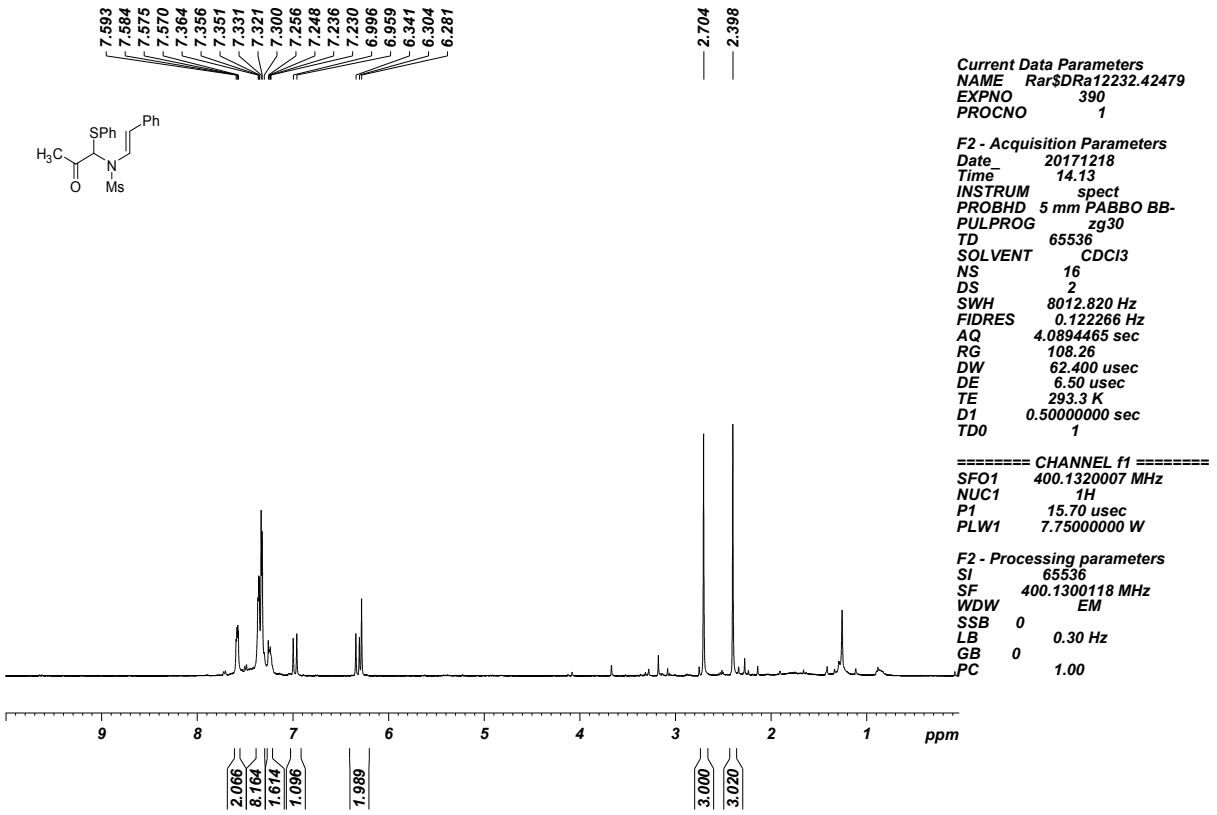
======== CHANNEL f1 ====
SFO1          100.6228289 MHz
NUC1               13C
P1                9.25 usec
PLW1          47.00000000 W

======== CHANNEL f2 ====
SFO2          400.1316005 MHz
NUC2               1H
CPDPRG[2       waltz16
PCPD2             90.00 usec
PLW2           7.75000000 W
PLW12          0.23583999 W
PLW13          0.11863000 W

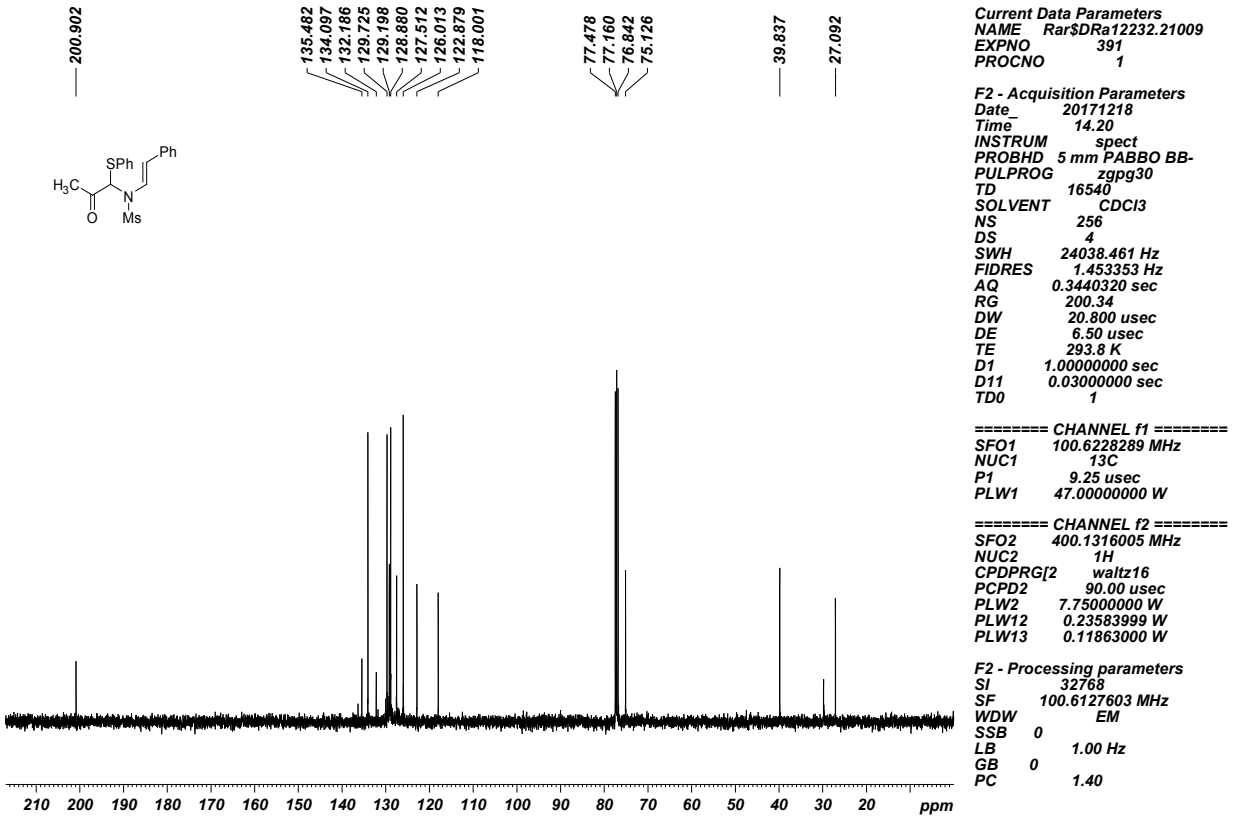
F2 - Processing parameters
SI               32768
SF            100.6127607 MHz
WDW                EM
SSB      0
LB                1.00 Hz
```

Enamide 4d

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

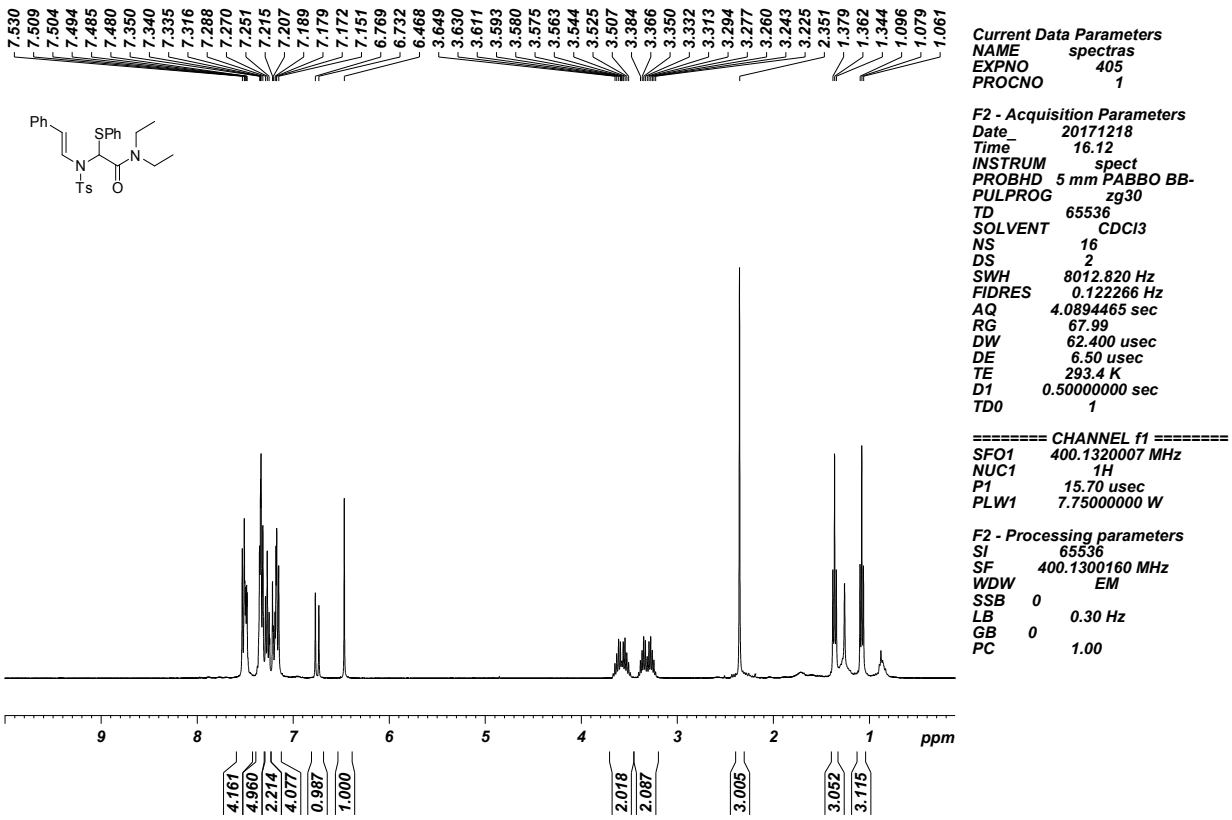


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

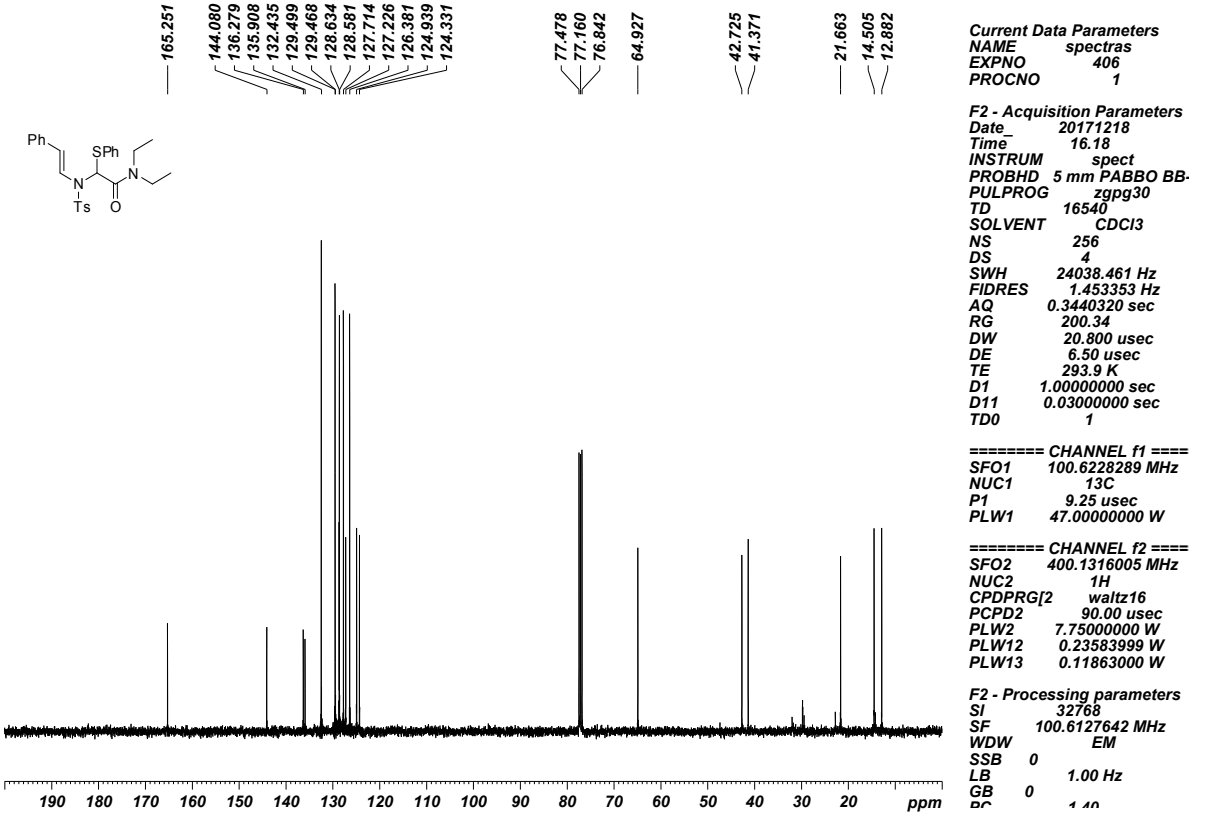


Enamide 4e

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

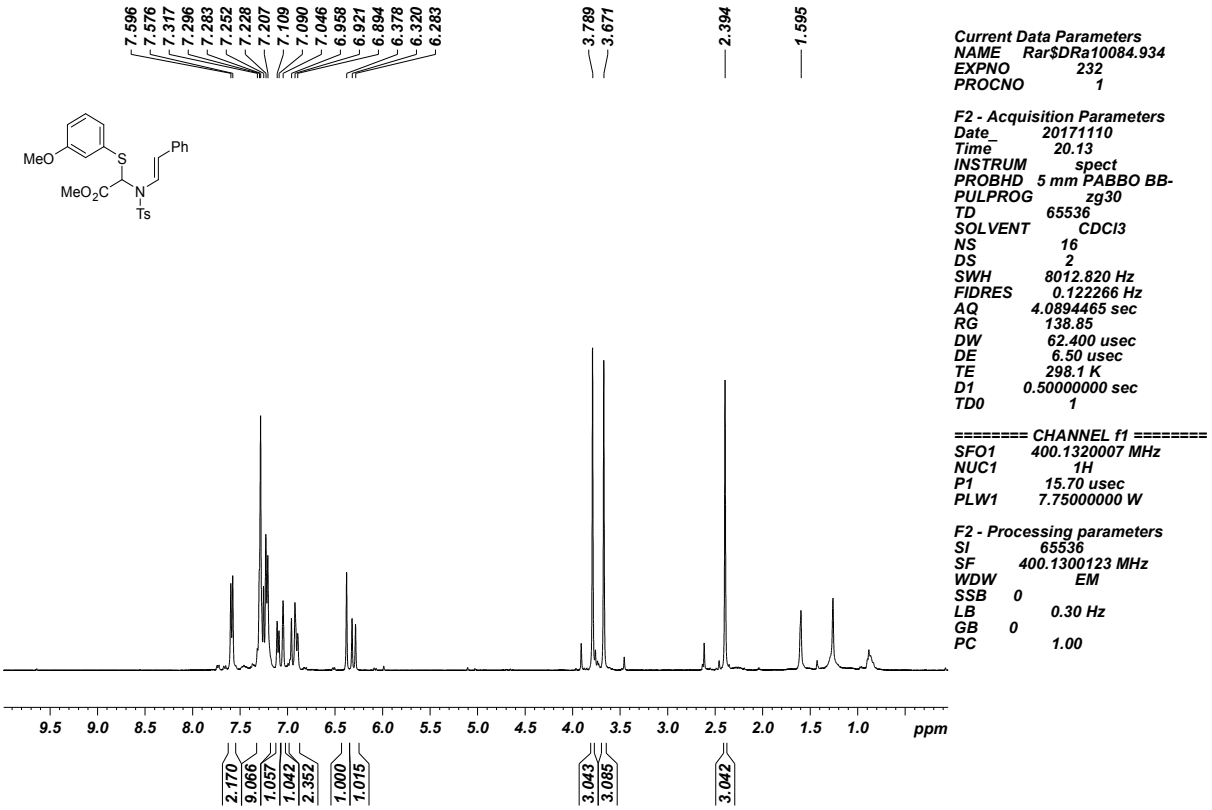


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

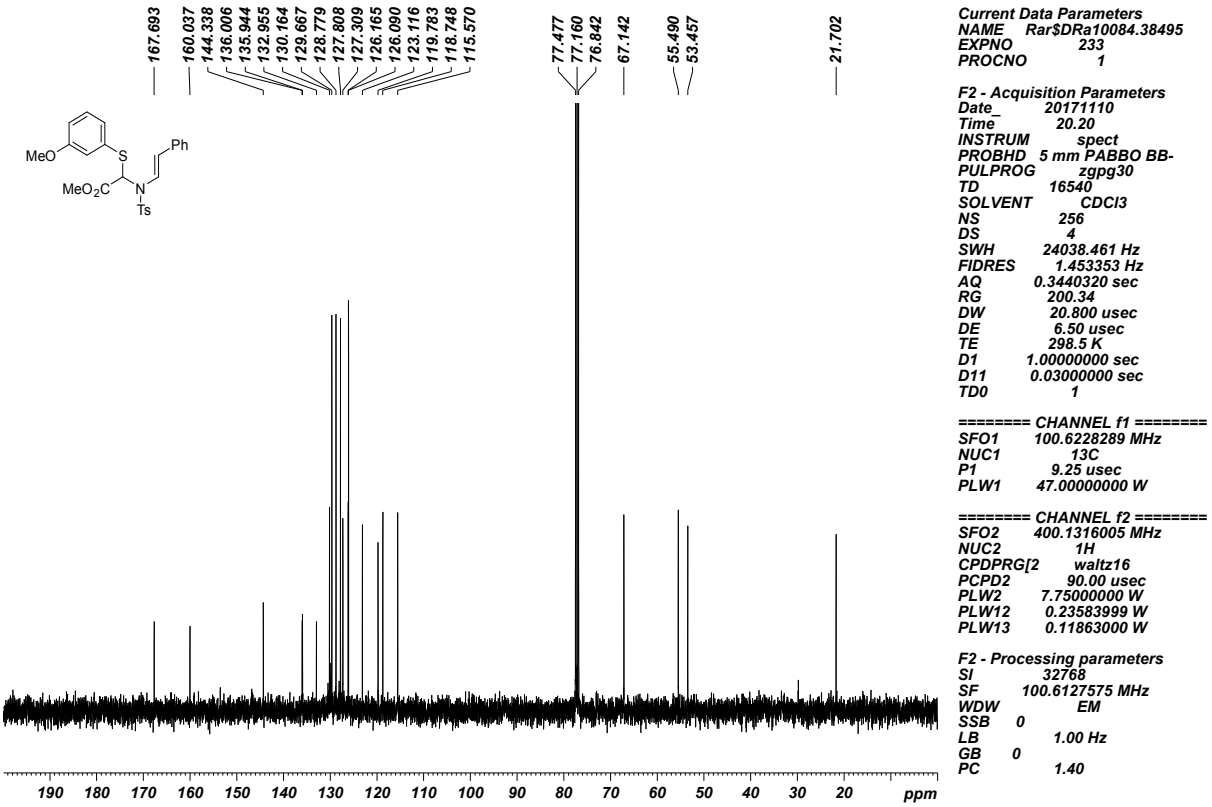


Enamide 4h

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

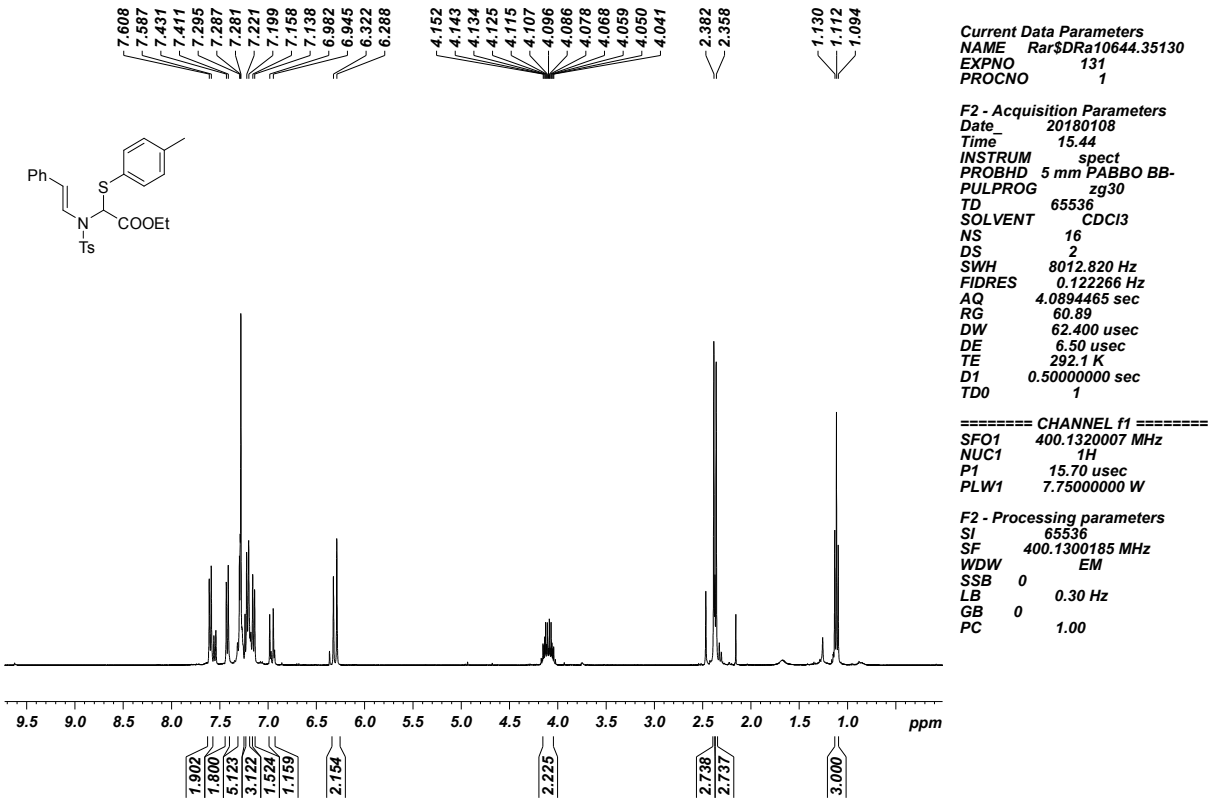


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4i

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



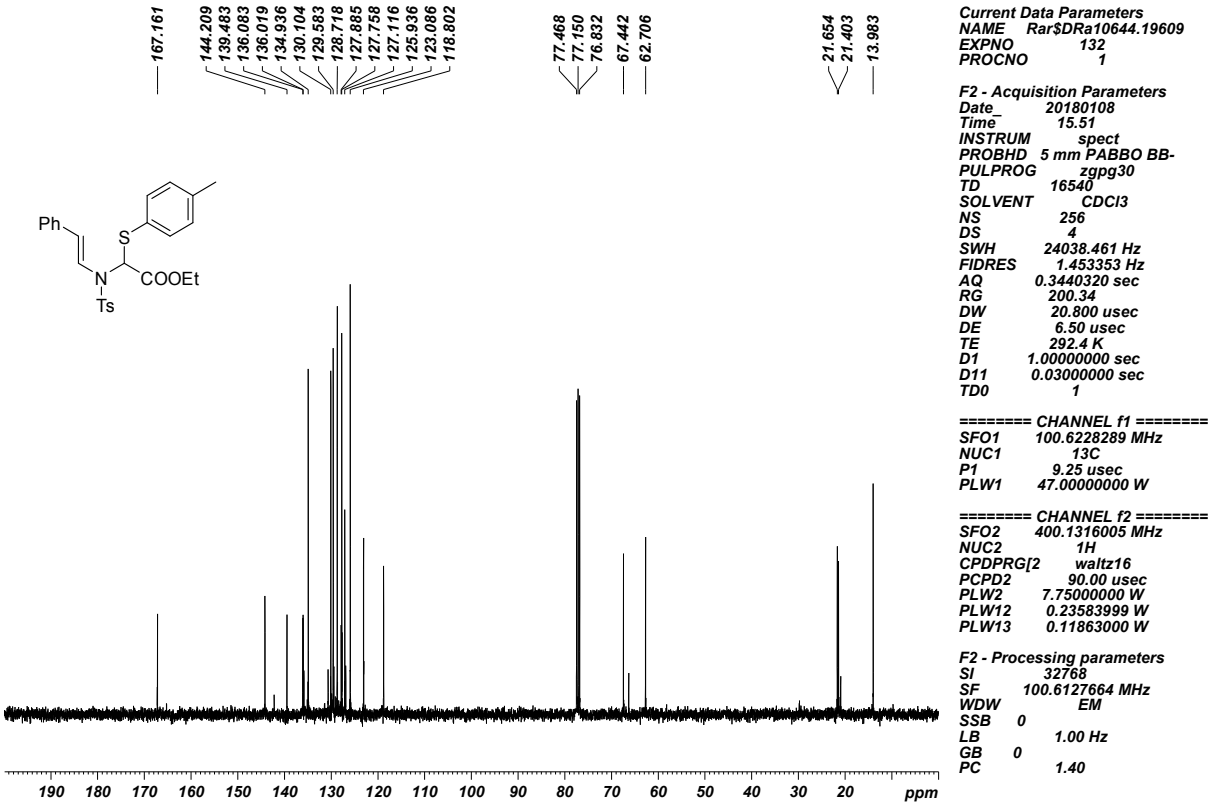
Current Data Parameters
NAME Rar$DRa10644.35130
EXPNO 131
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180108
Time 15.44
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 60.89
DW 62.400 usec
DE 6.50 usec
TE 292.1 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300185 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Current Data Parameters
NAME Rar$DRa10644.19609
EXPNO 132
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180108
Time 15.51
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 292.4 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

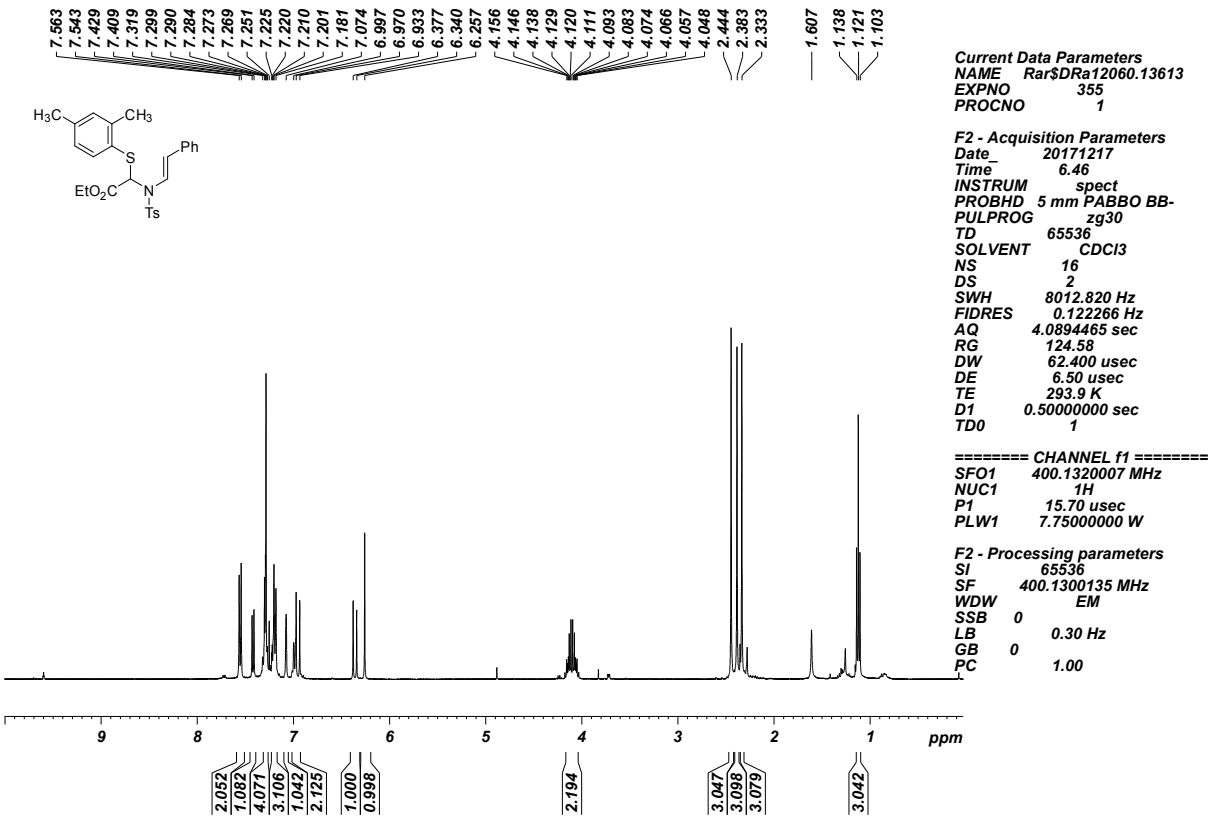
======== CHANNEL f1 ========
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ========
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

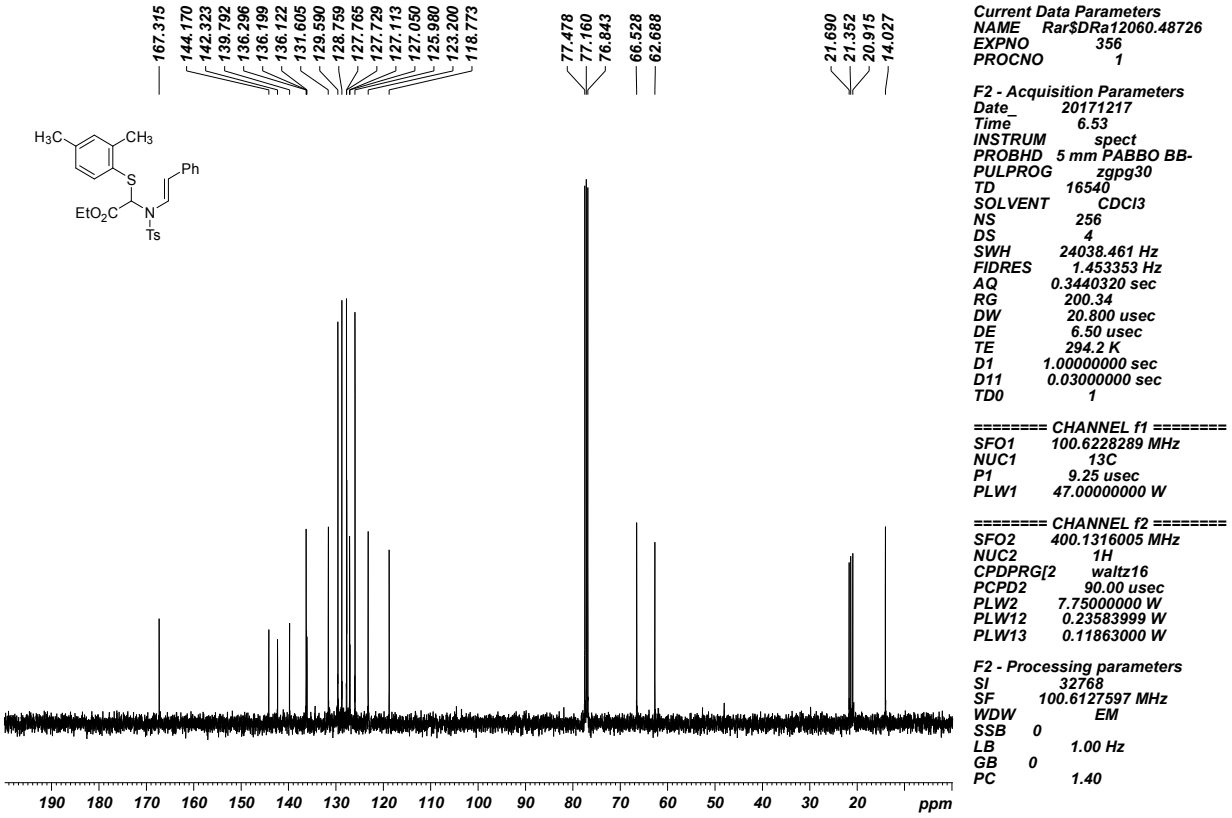
F2 - Processing parameters
SI 32768
SF 100.6127664 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Enamide 4j

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

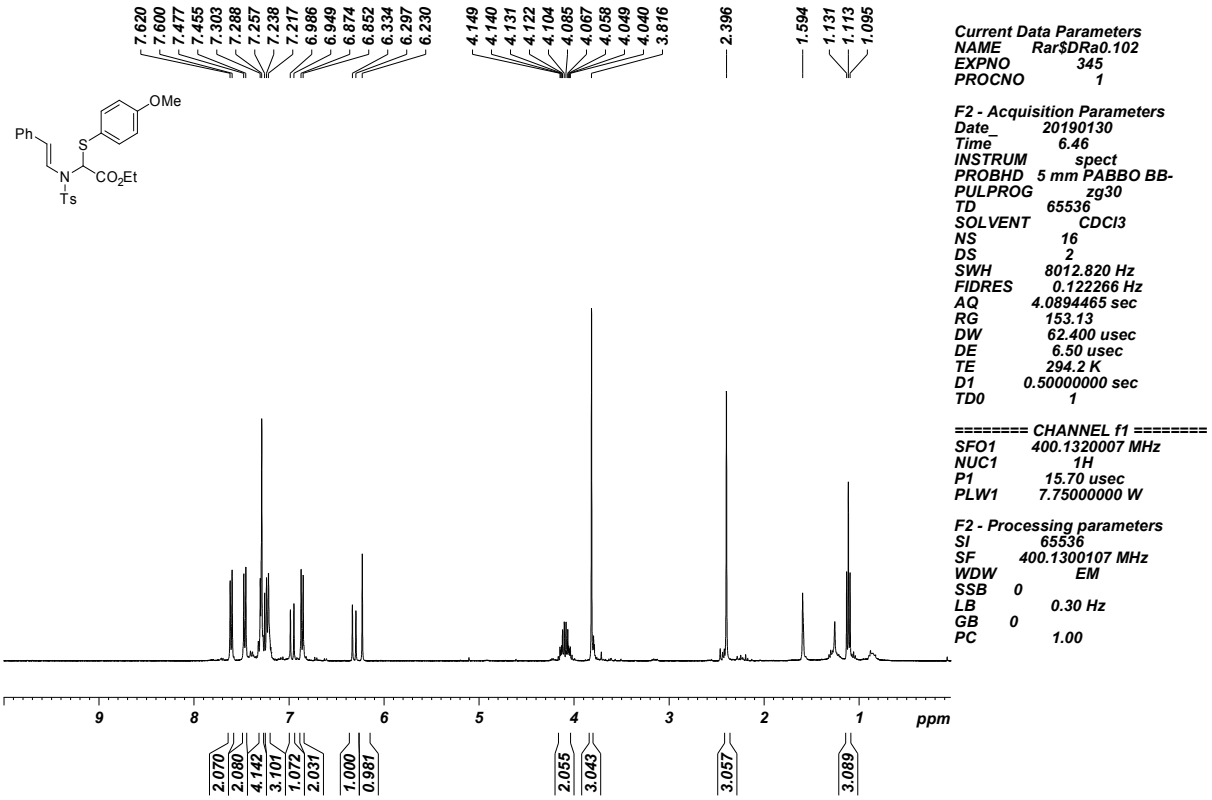


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

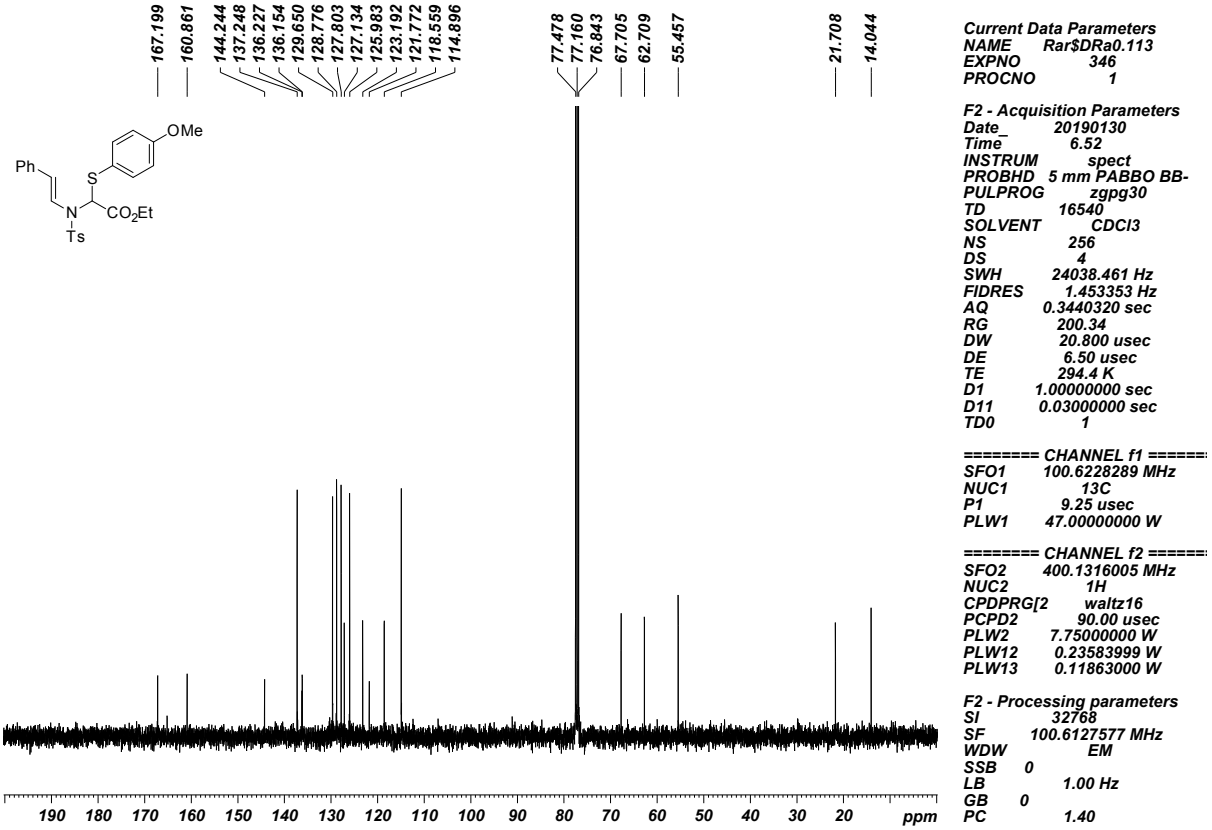


Enamide 4k

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

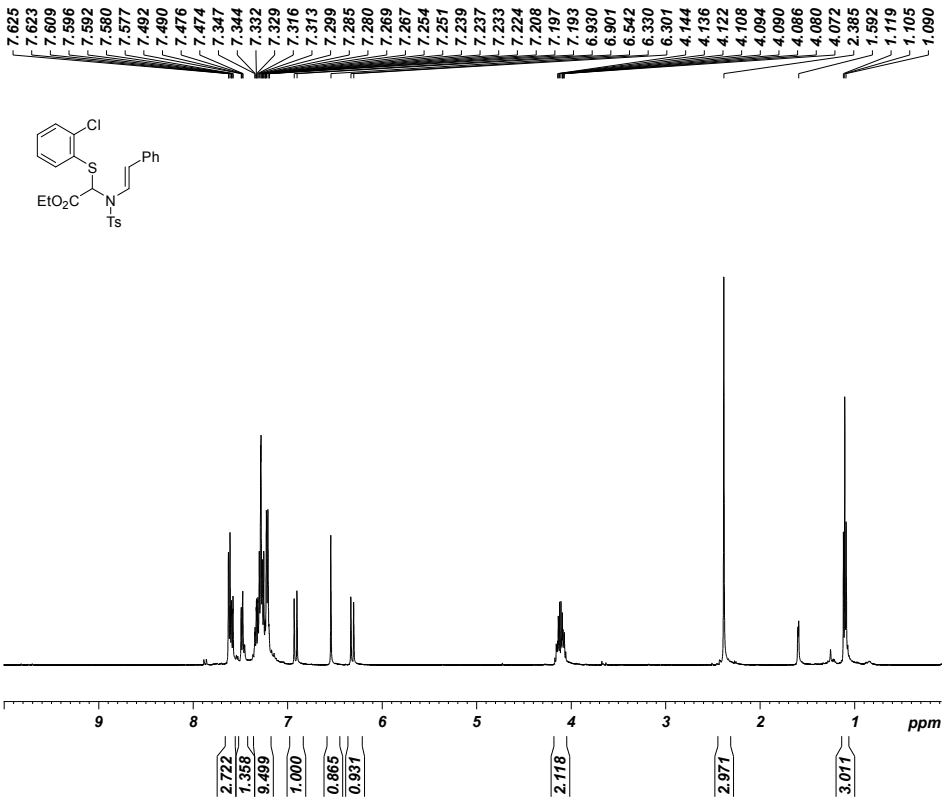


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4l

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



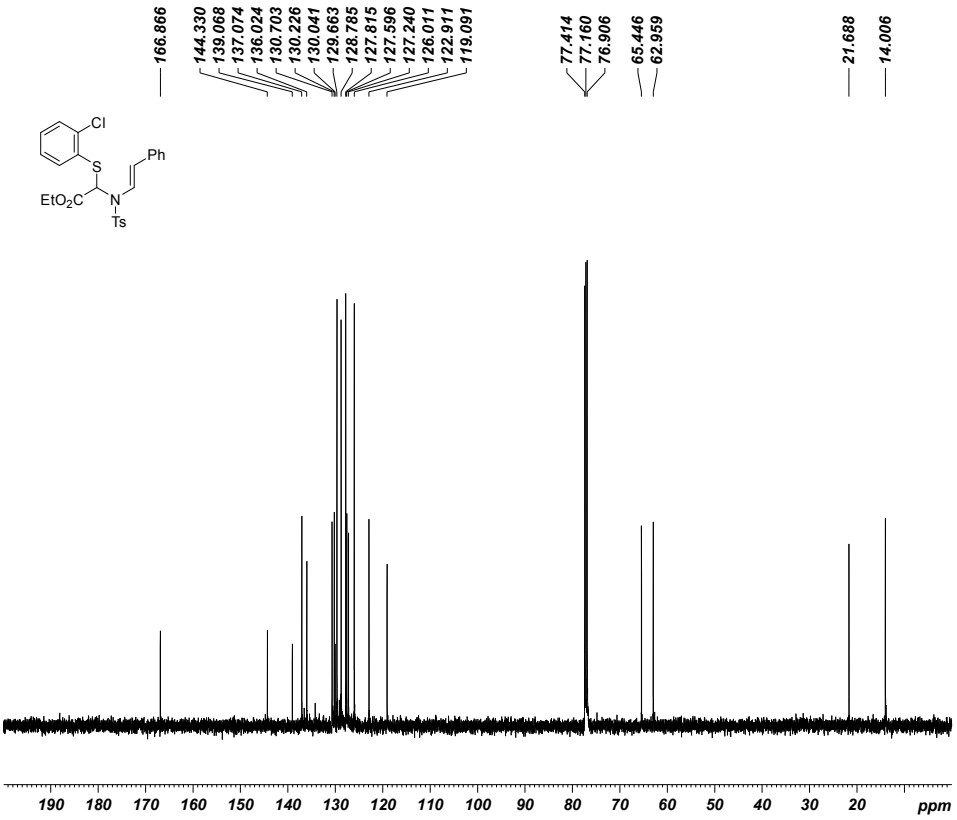

```
Current Data Parameters
NAME          spectras
EXPNO           49
PROCNO           1

F2 - Acquisition Parameters
Date_         20171211
Time            15.10
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                 32
DS                  2
SWH         10000.000 Hz
FIDRES          0.305176 Hz
AQ           1.6384000 sec
RG              71.49
DW              50.000 usec
DE               6.50 usec
TE              297.0 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        500.1525008 MHz
NUC1               1H
P1               12.75 usec
PLW1        15.30000019 W

F2 - Processing parameters
SI              65536
SF          500.1500163 MHz
WDW                EM
SSB     0
LB               0.30 Hz
GB      0
PC               1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME          spectras
EXPNO           50
PROCNO           1

F2 - Acquisition Parameters
Date_         20171211
Time            15.18
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              20480
SOLVENT          CDCl3
NS                256
DS                 4
SWH         29761.904 Hz
FIDRES          1.453218 Hz
AQ           0.3440640 sec
RG              202.34
DW              16.800 usec
DE               6.50 usec
TE              297.5 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

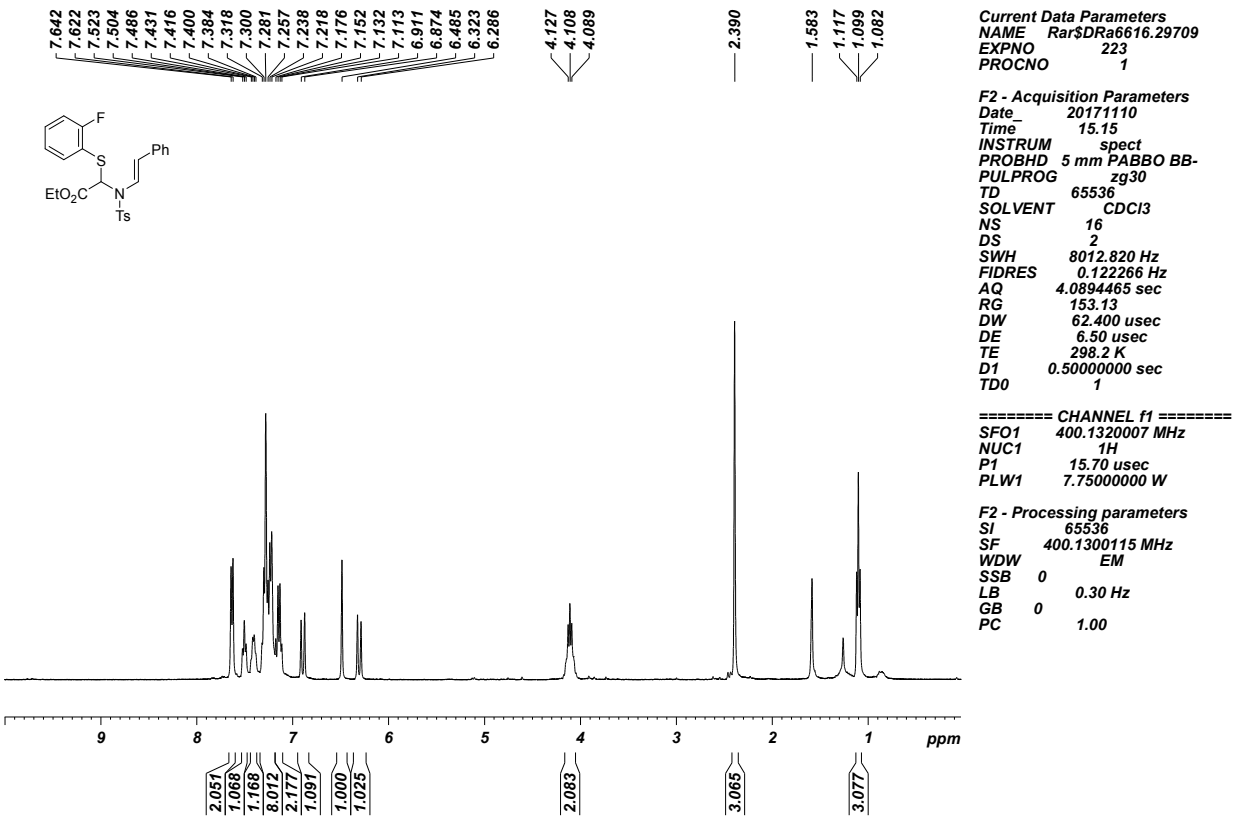
======== CHANNEL f1 ========
SFO1        125.7753932 MHz
NUC1               13C
P1               9.88 usec
PLW1        103.00000000 W

======== CHANNEL f2 ========
SFO2        500.1520006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2           80.00 usec
PLW2        15.30000019 W
PLW12        0.38863000 W
PLW13        0.19548000 W

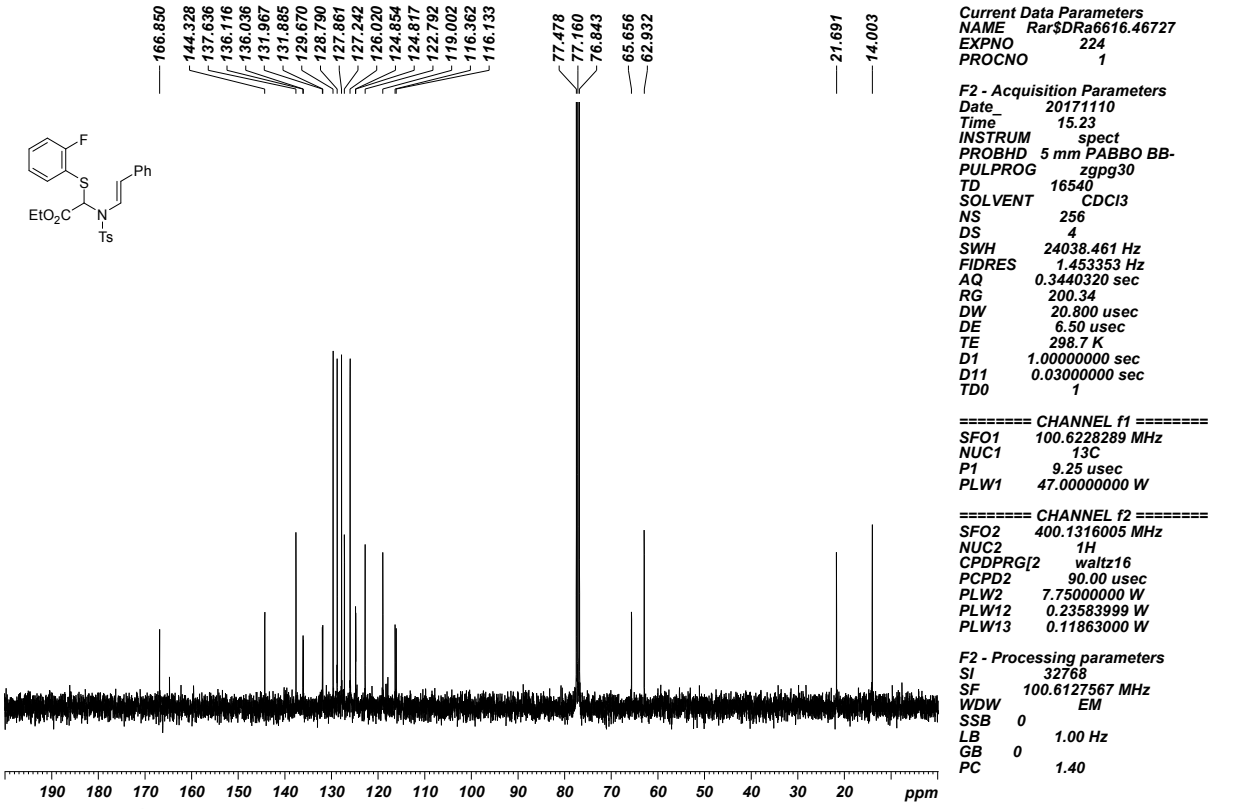
F2 - Processing parameters
SI              32768
SF          125.7628052 MHz
WDW                EM
SSB     0
LB               1.00 Hz
GB      0
PC               1.40
```

Enamide 4m

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

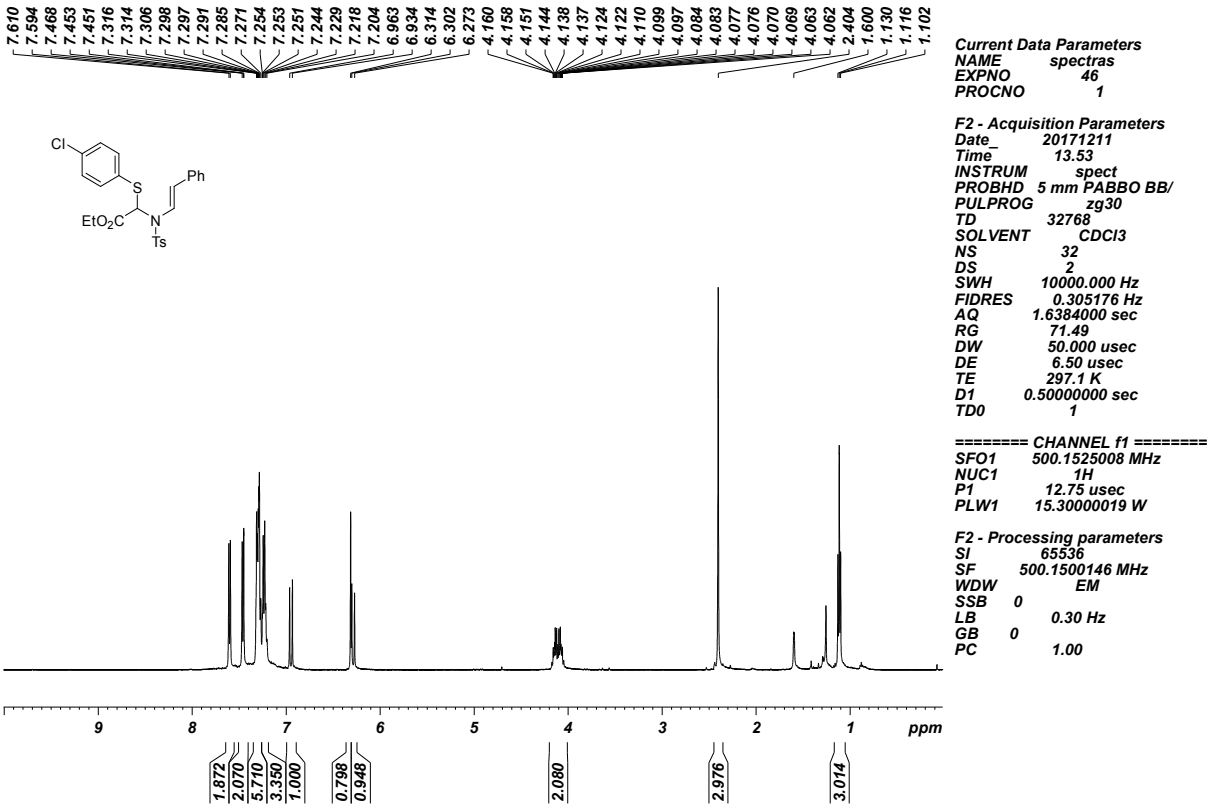


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

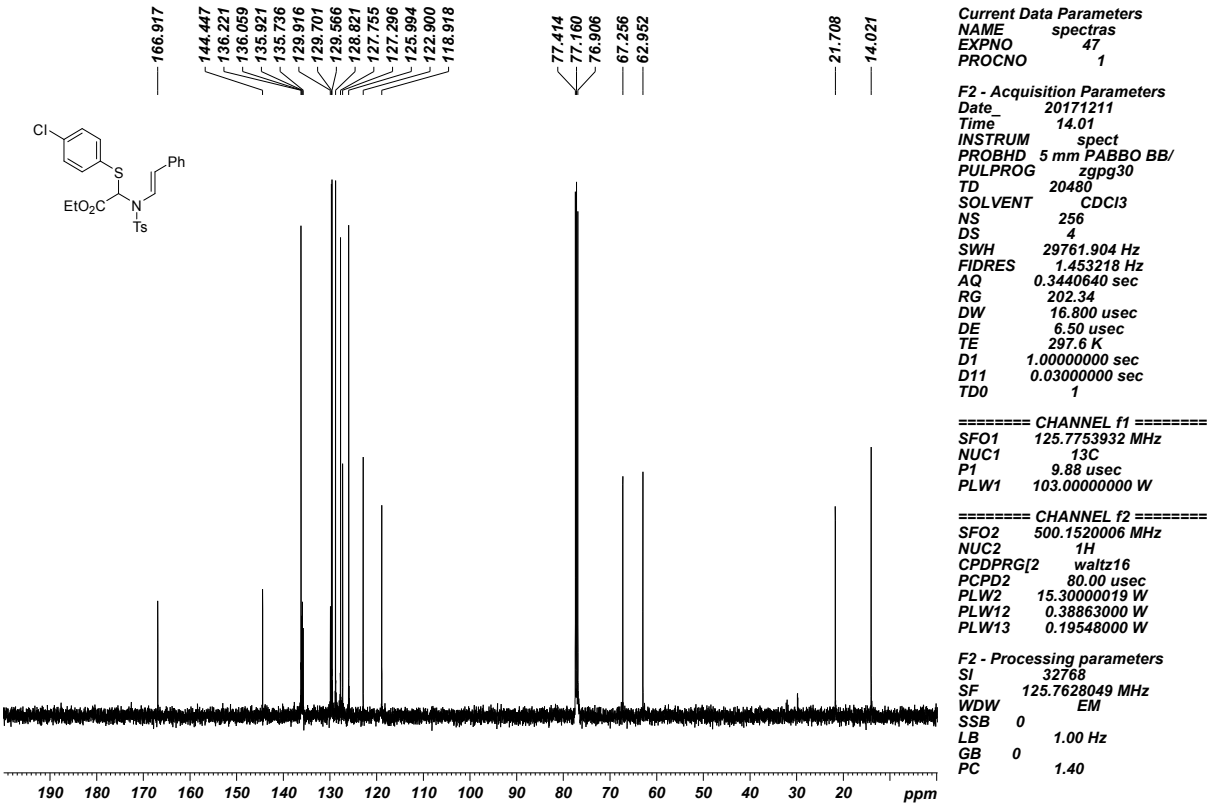


Enamide 4n

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

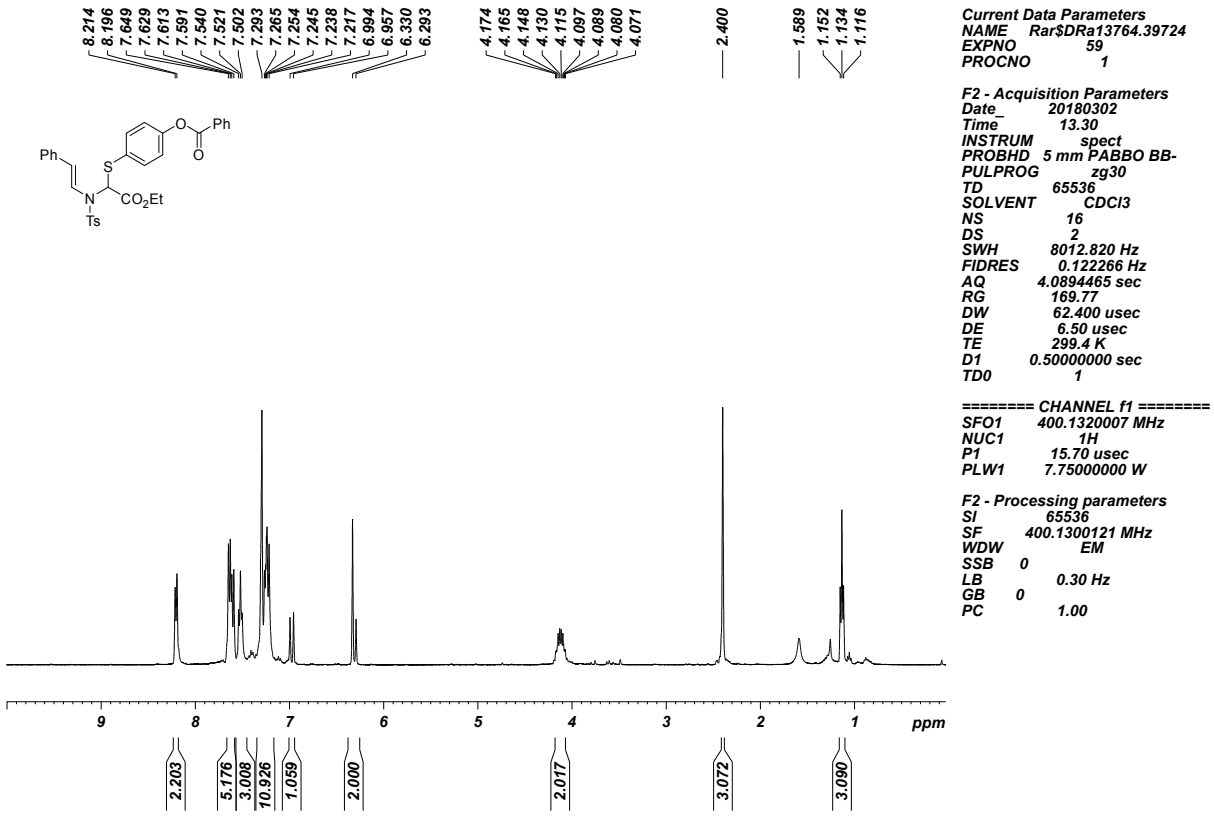


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4o

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

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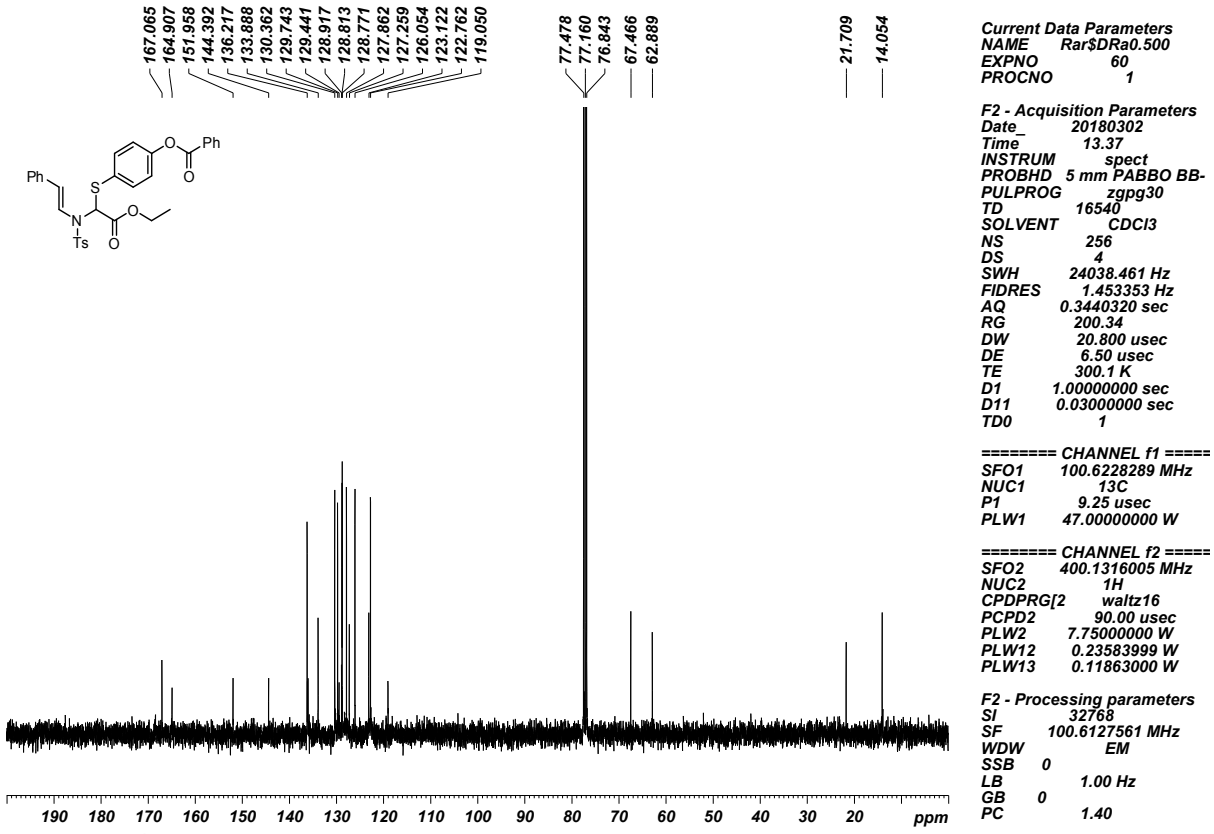
Current Data Parameters
NAME      Rar$DRa13764.39724
EXPNO             59
PROCNO             1

F2 - Acquisition Parameters
Date_          20180302
Time              13.30
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD               65536
SOLVENT           CDCl3
NS                  16
DS                   2
SWH            8012.820 Hz
FIDRES          0.122266 Hz
AQ             4.0894465 sec
RG               169.77
DW               62.400 usec
DE                6.50 usec
TE               299.4 K
D1            0.50000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1          400.1320007 MHz
NUC1                1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI               65536
SF            400.1300121 MHz
WDW                 EM
SSB      0
LB               0.30 Hz
GB       0
PC               1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

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Current Data Parameters
NAME      Rar$DRa0.500
EXPNO             60
PROCNO             1

F2 - Acquisition Parameters
Date_          20180302
Time              13.37
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD               16540
SOLVENT           CDCl3
NS                 256
DS                   4
SWH           24038.461 Hz
FIDRES          1.453353 Hz
AQ             0.3440320 sec
RG               200.34
DW               20.800 usec
DE                6.50 usec
TE               300.1 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0                  1

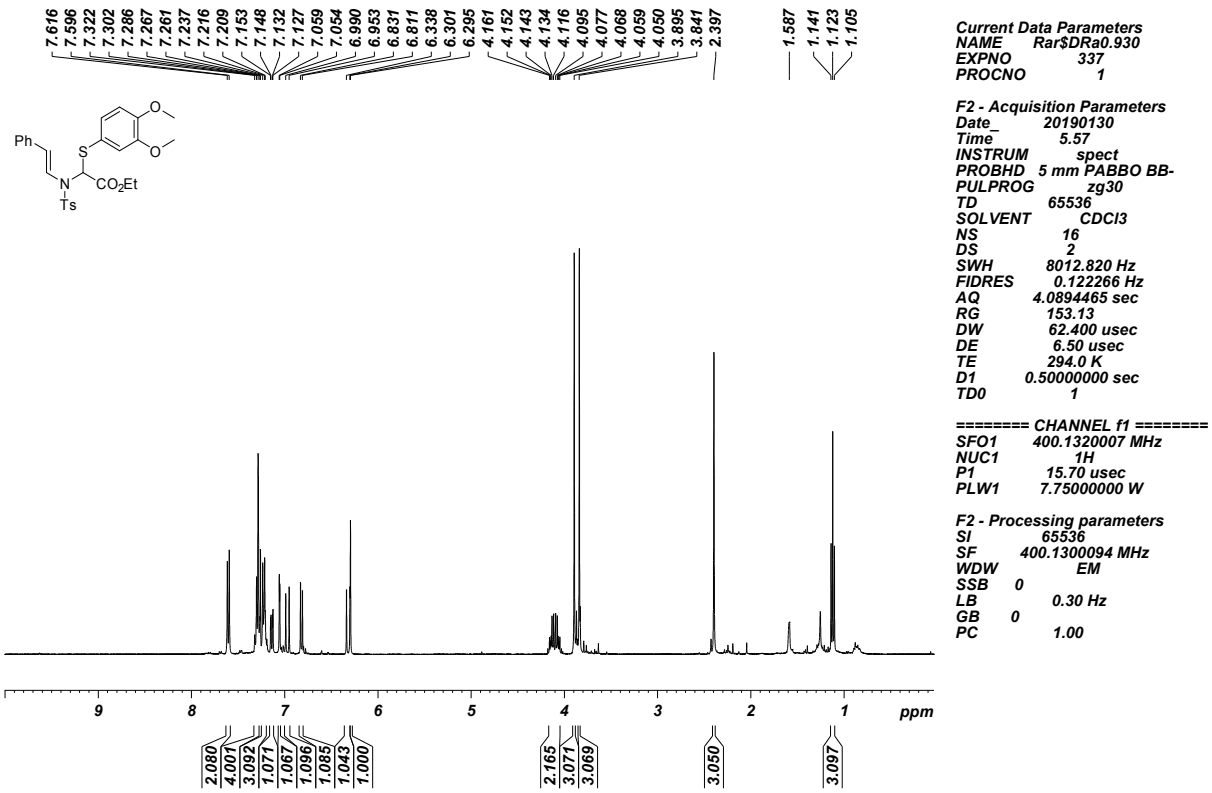
======== CHANNEL f1 =====
SFO1          100.6228289 MHz
NUC1                13C
P1                9.25 usec
PLW1          47.00000000 W

======== CHANNEL f2 =====
SFO2          400.1316005 MHz
NUC2                1H
CPDPRG[2        waltz16
PCPD2           90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

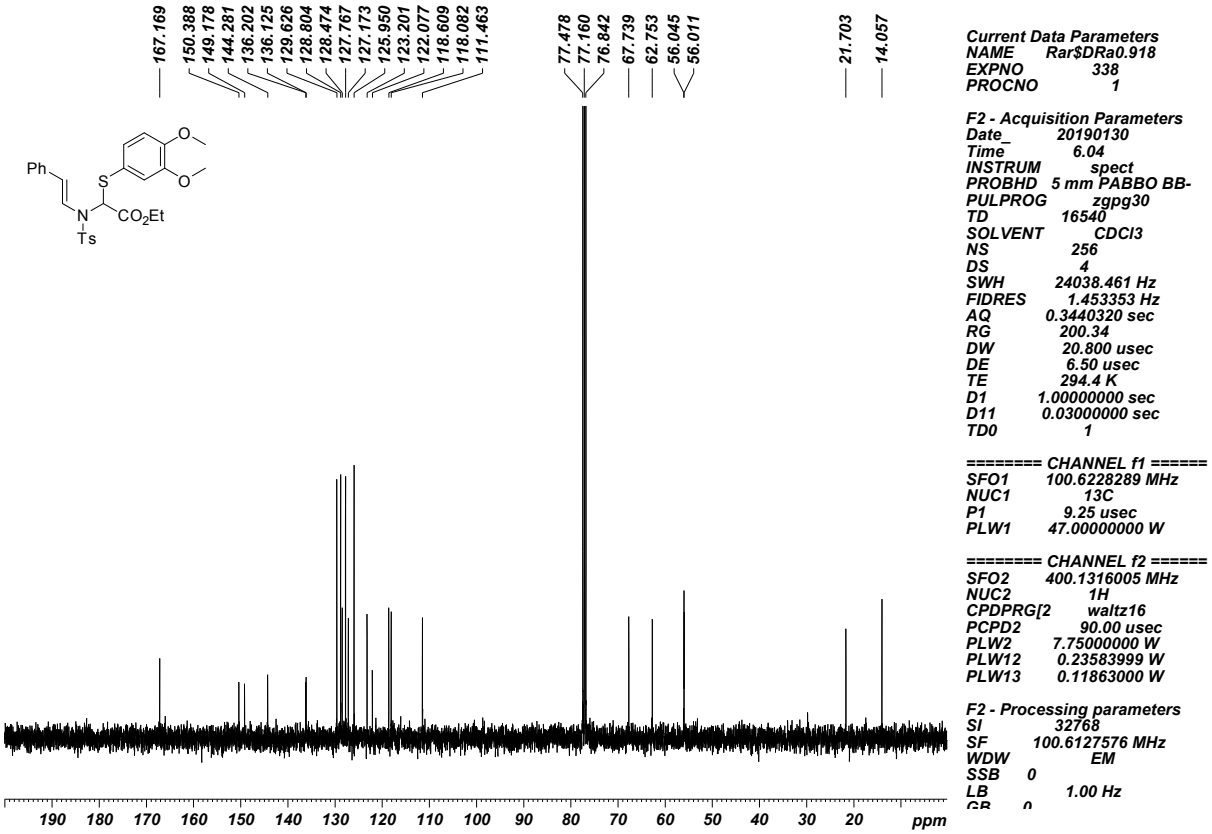
F2 - Processing parameters
SI               32768
SF            100.6127561 MHz
WDW                 EM
SSB      0
LB               1.00 Hz
GB       0
PC               1.40
```

Enamide 4p

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

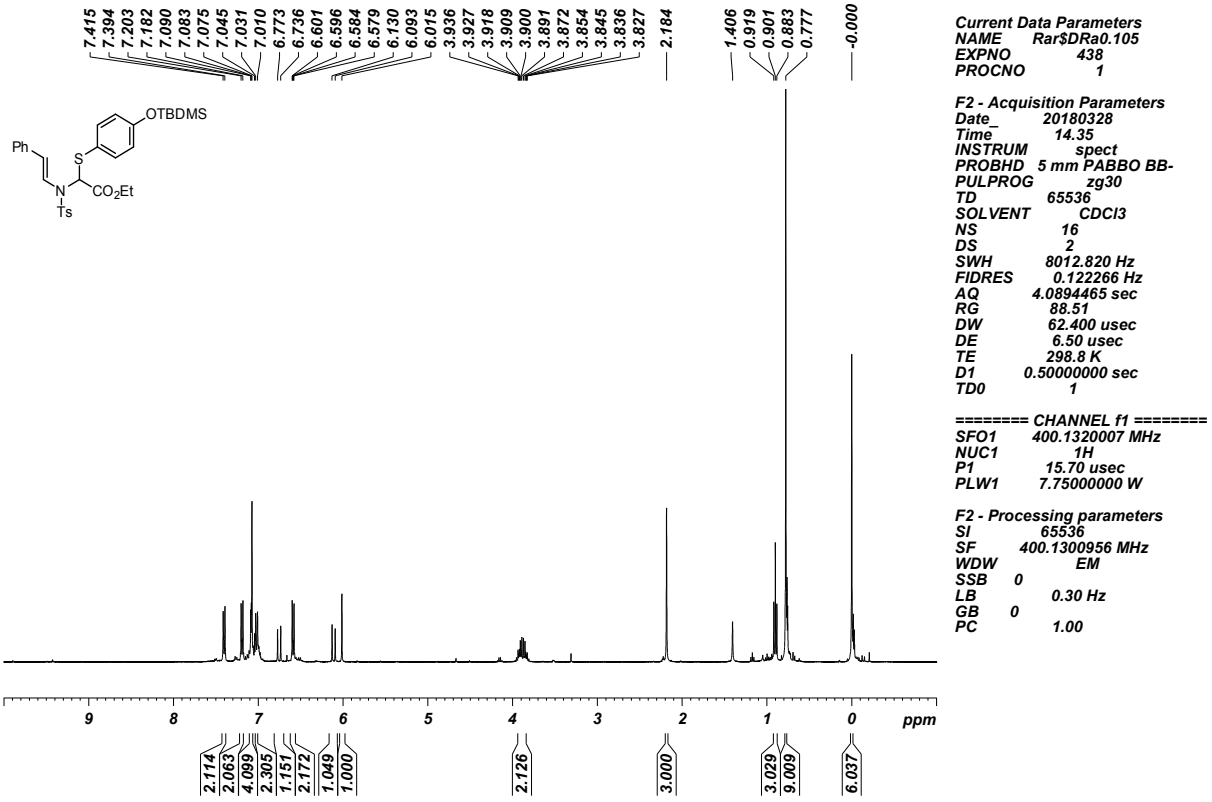


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

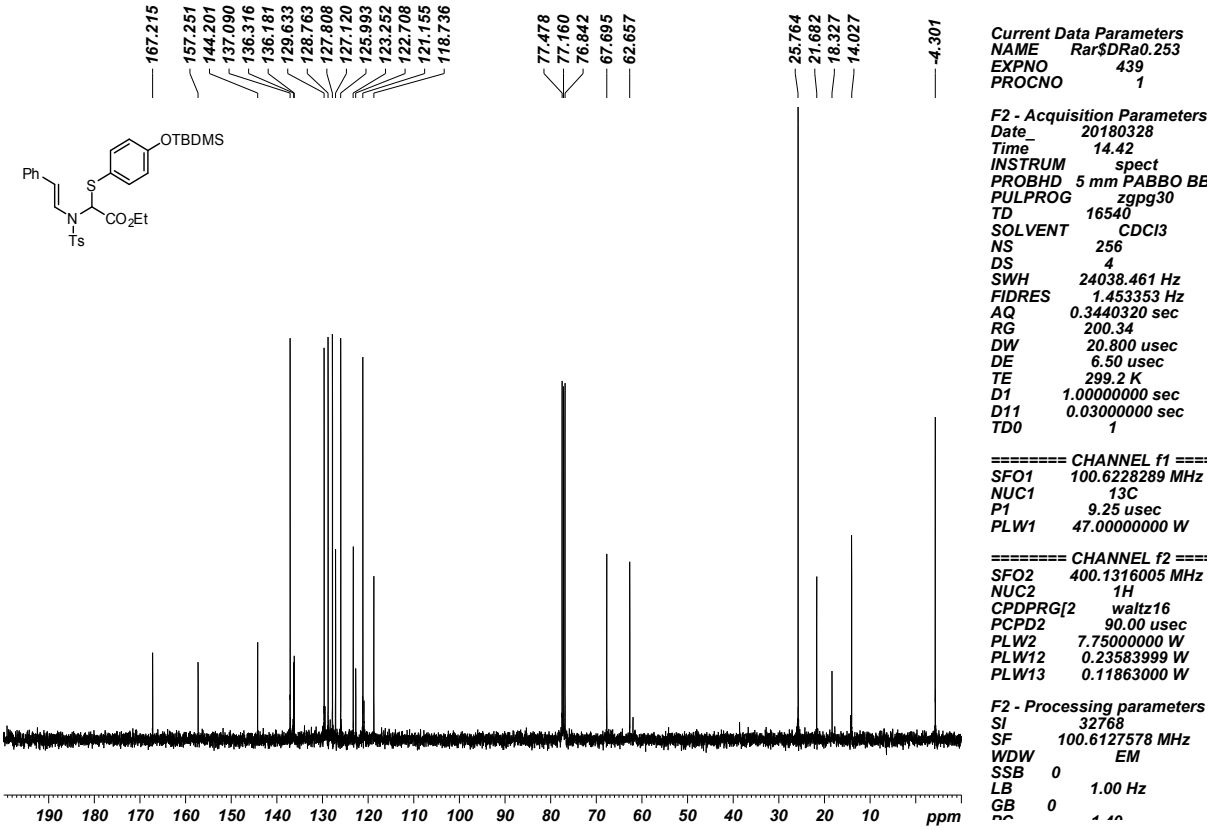


Enamide 4q

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

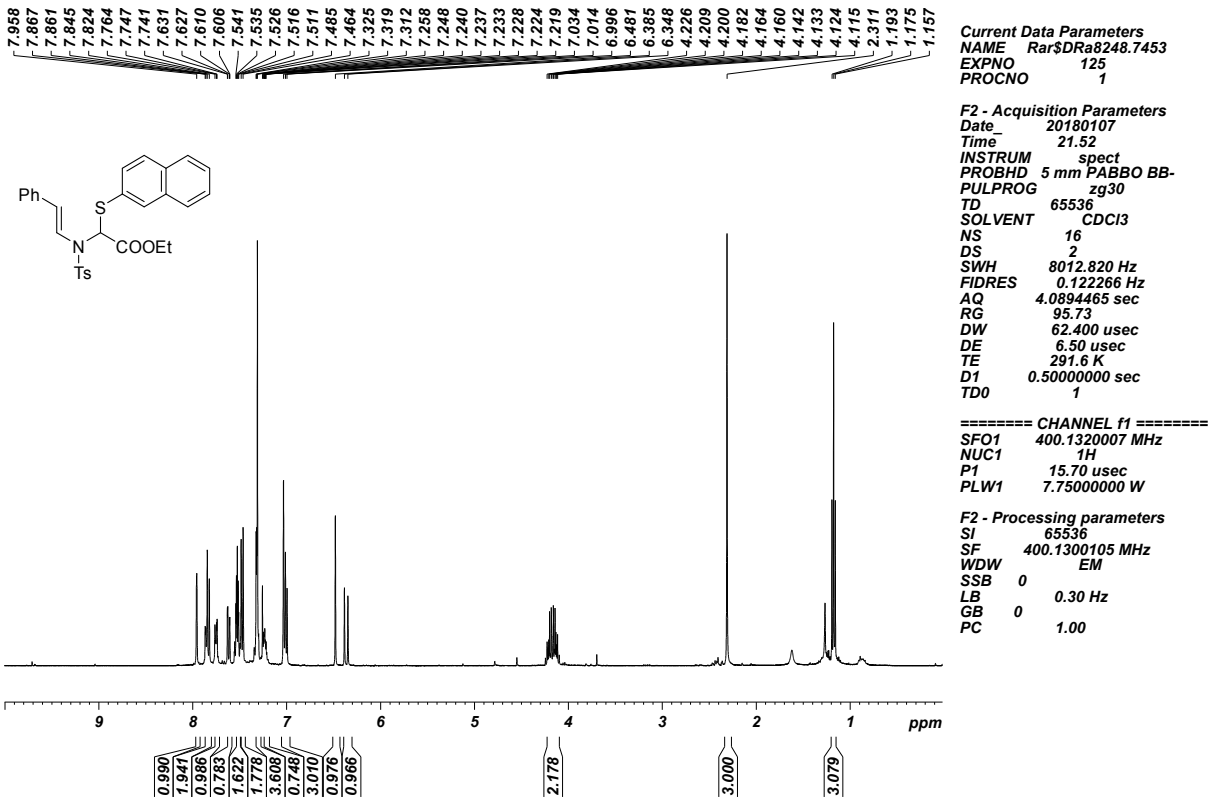


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

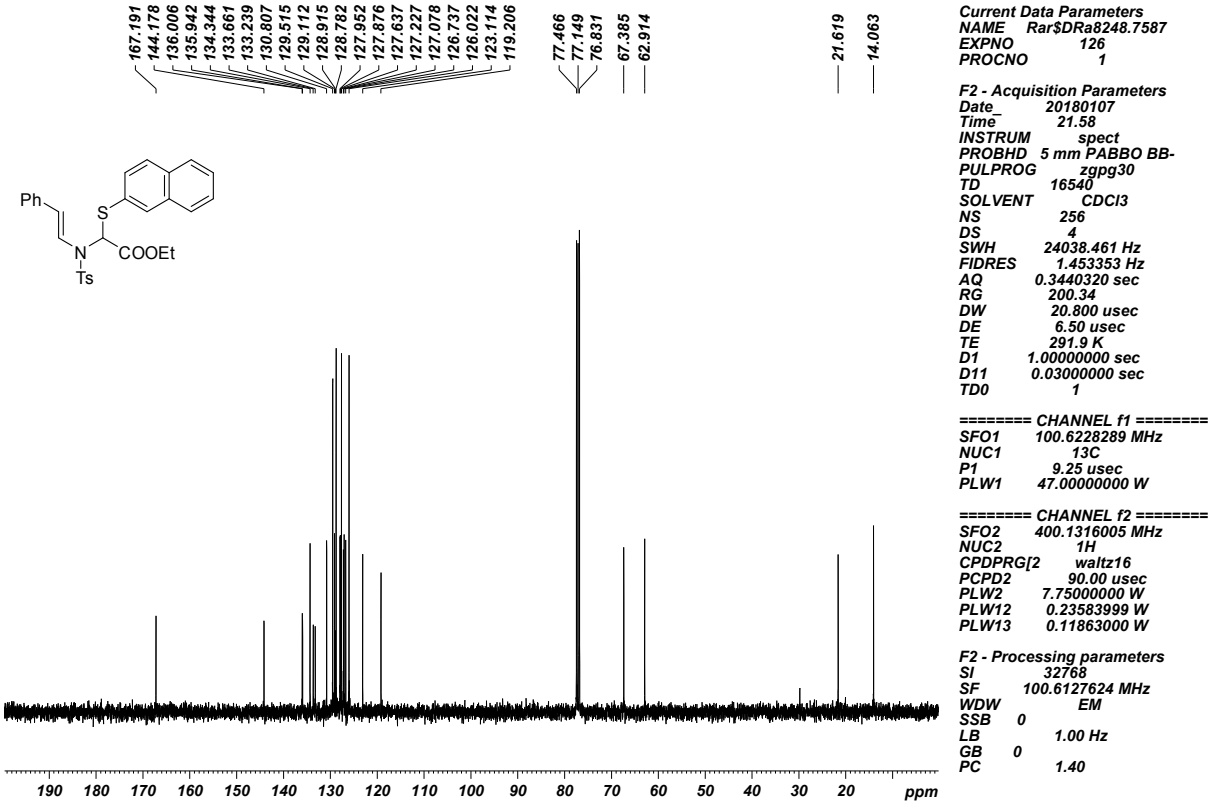


Enamide 4r

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

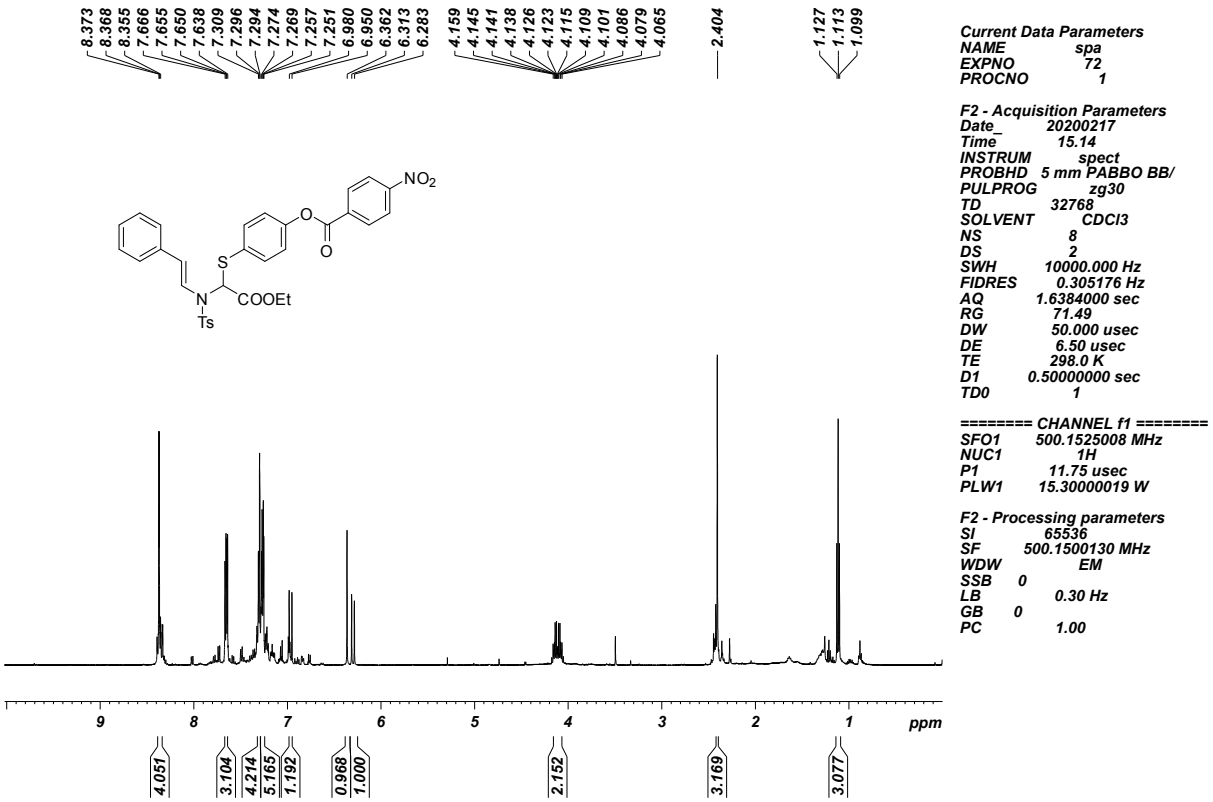


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

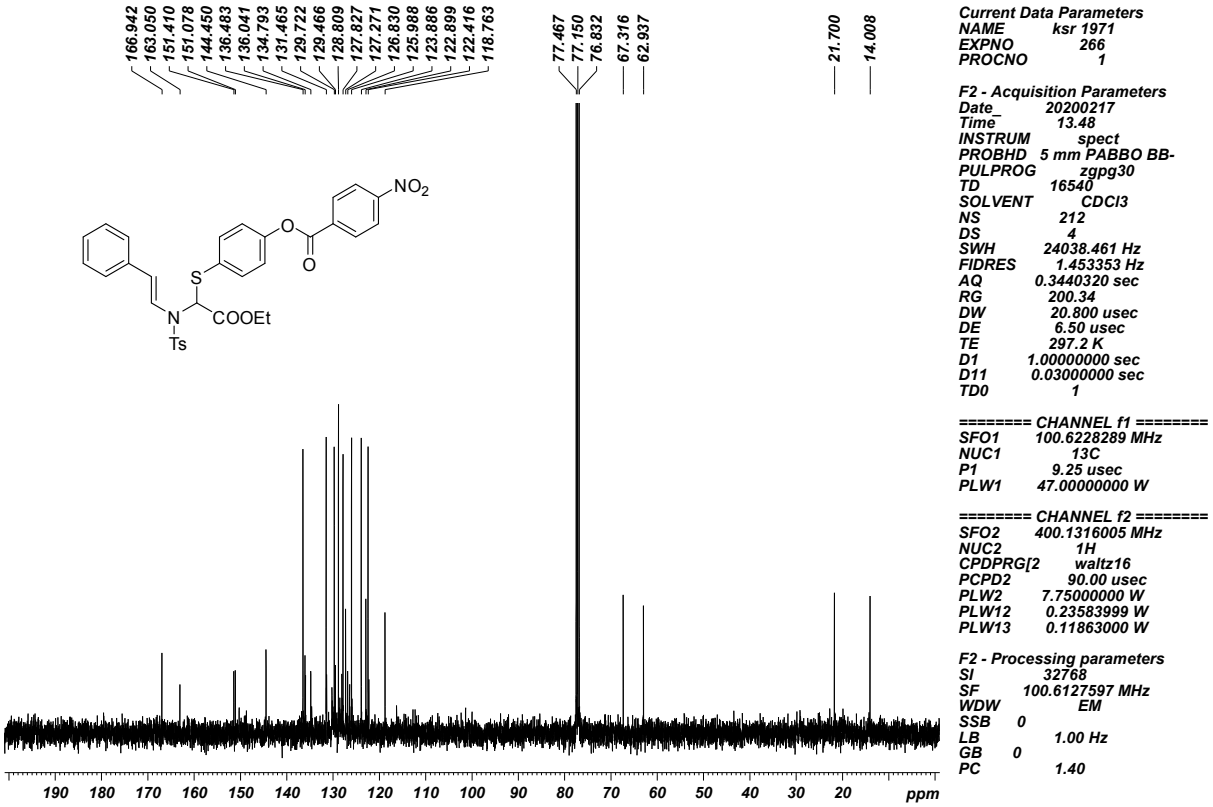


Enamide 4s

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

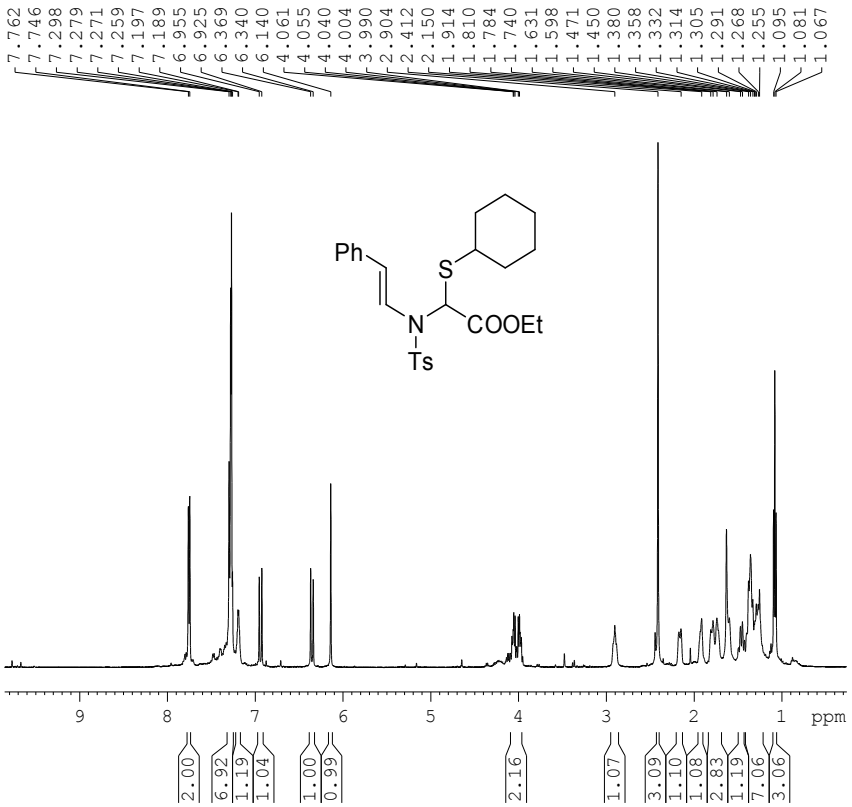


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4t

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C)



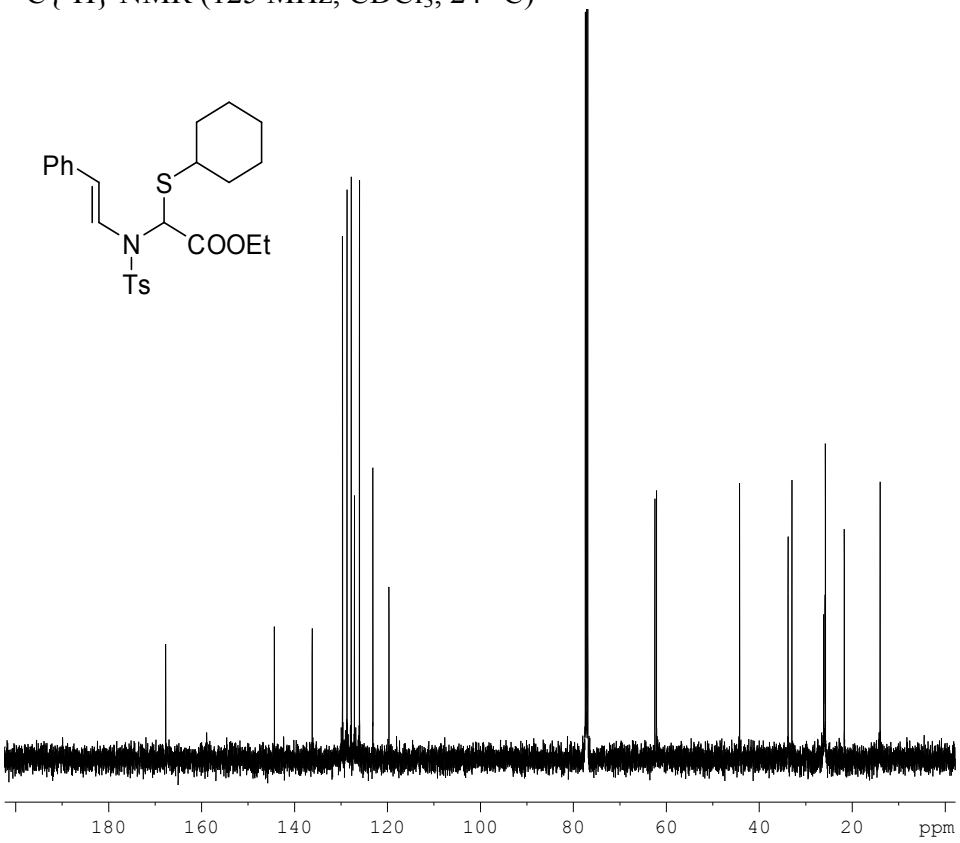

```
Current Data Parameters
NAME            spa50320
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20200302
Time               9.37
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   15
DS                    2
SWH           10000.000 Hz
FIDRES         0.305176 Hz
AQ            1.6384000 sec
RG                   64
DW               50.000 usec
DE                6.50 usec
TE                298.0 K
D1           0.50000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1         500.1525008 MHz
NUC1                   1H
P1                 11.75 usec
PLW1         15.30000019 W

F2 - Processing parameters
SI                 65536
SF          500.1500131 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

$^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C)




```
Current Data Paramete
NAME            spa503
EXPNO
PROCNO

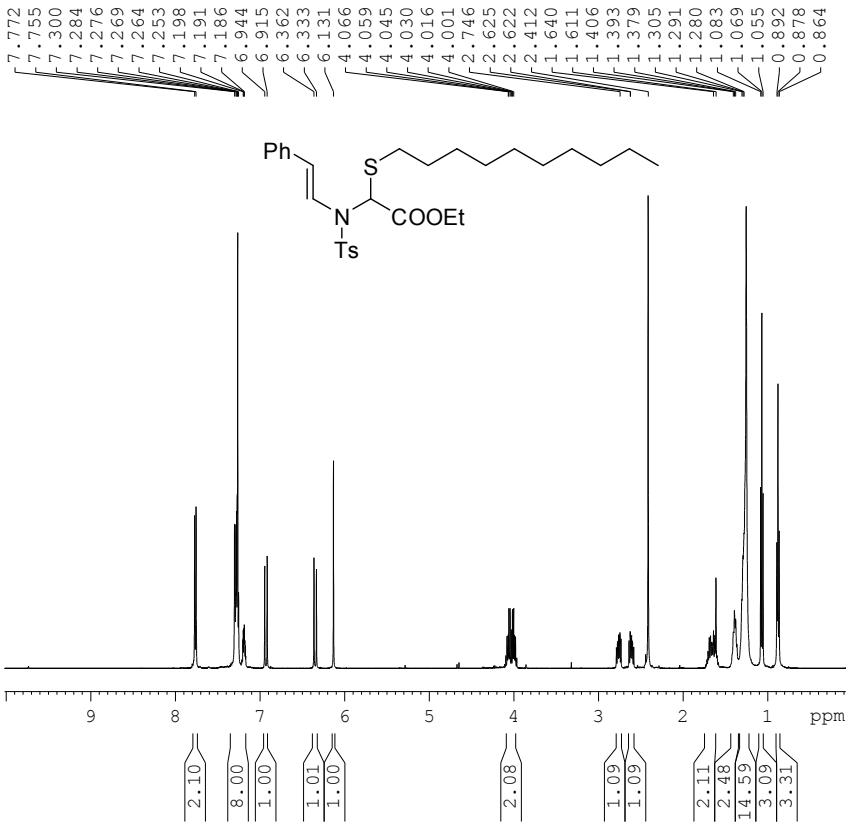
F2 - Acquisition Para
Date_           202003
Time               9.
INSTRUM           spe
PROBHD   5 mm PABBO B
PULPROG          zgpg
TD                204
SOLVENT           CDC
NS                  1
DS
SWH           29761.9
FIDRES         1.4532
AQ            0.34406
RG               202.
DW               16.8
DE                 6.
TE                300
D1           1.000000
D11          0.030000
TD0

======== CHANNEL f1 =
SFO1         125.77539
NUC1                1
P1                 10.
PLW1        103.000000

======== CHANNEL f2 =
SFO2         500.15200
NUC2
CPDPRG[2         waltz
PCPD2              80.
```

Enamide 4u

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C)



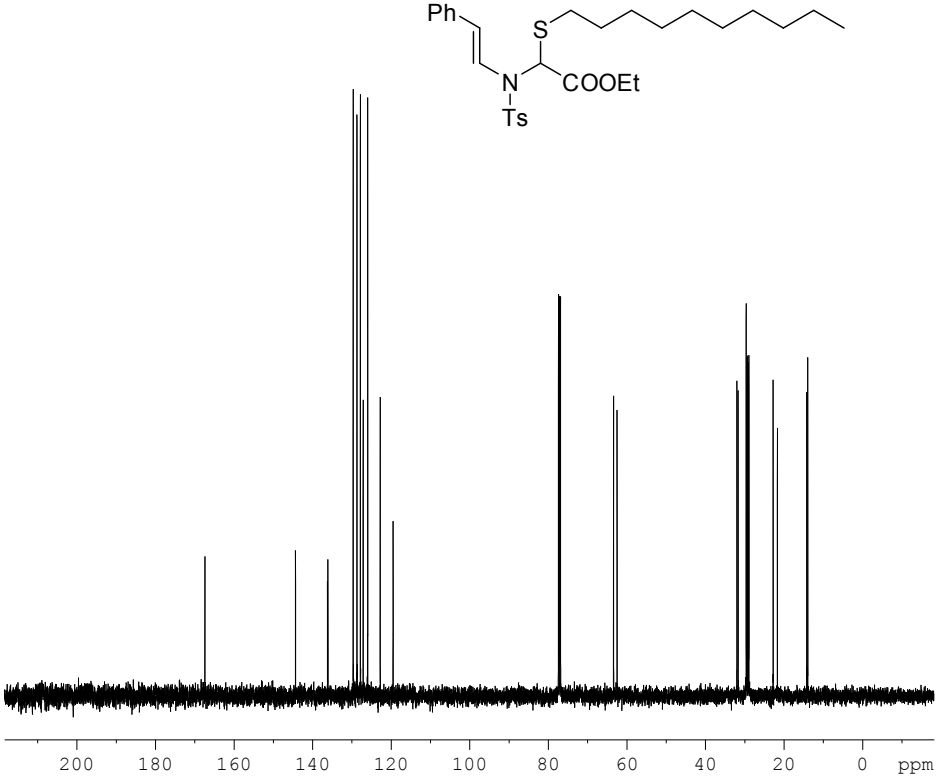

```
Current Data Parameters
NAME            spa50320
EXPNO                 11
PROCNO                 1

F2 - Acquisition Parameters
Date_           20200303
Time               15.03
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     2
SWH           10000.000 Hz
FIDRES         0.305176 Hz
AQ            1.6384000 sec
RG                 31.24
DW               50.000 usec
DE                6.50 usec
TE                298.0 K
D1            0.50000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1         500.1525008 MHz
NUC1                   1H
P1                 11.75 usec
PLW1         15.30000019 W

F2 - Processing parameters
SI                 65536
SF          500.1500146 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
```

$^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C)




```
Current Data Paramete
NAME            spa503
EXPNO
PROCNO

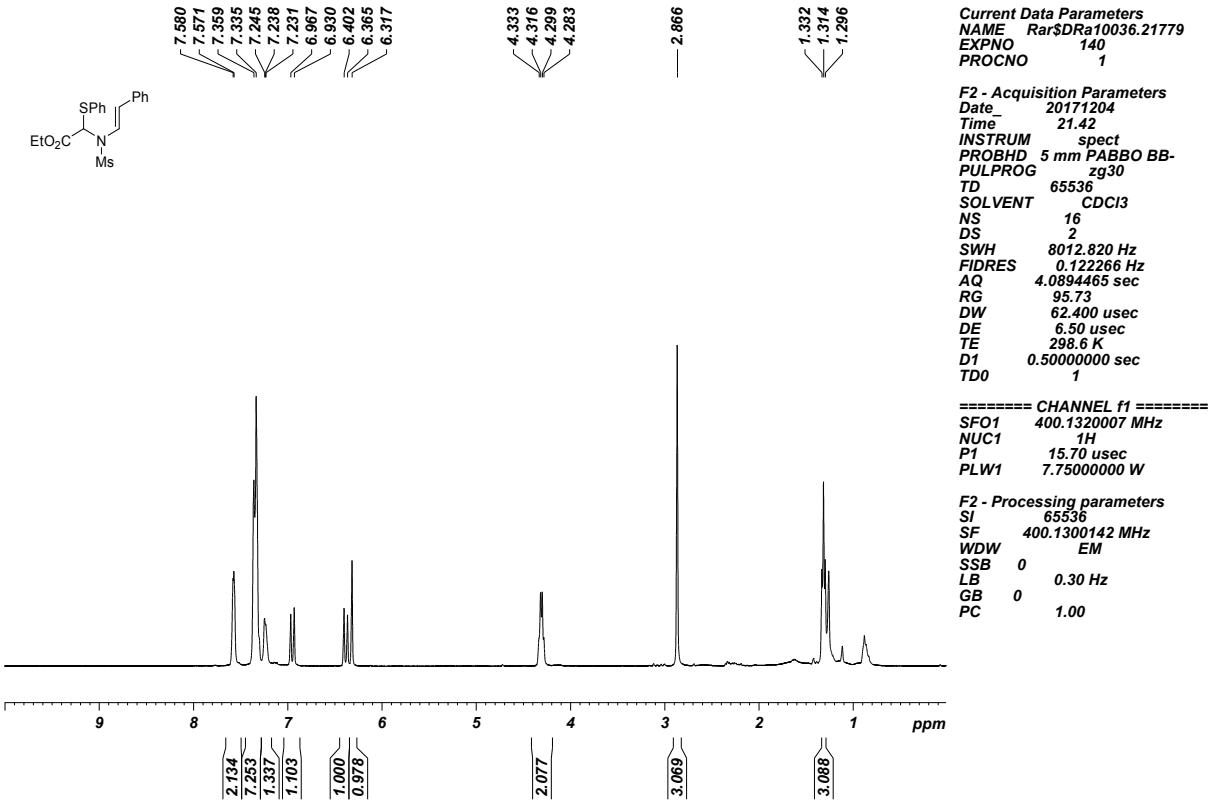
F2 - Acquisition Para
Date_           202003
Time               15.
INSTRUM            spe
PROBHD   5 mm PABBO B
PULPROG           zgpg
TD                 204
SOLVENT            CDC
NS                   2
DS
SWH            29761.9
FIDRES          1.4532
AQ             0.34406
RG                202.
DW                16.8
DE                  6.
TE                300
D1            1.000000
D11           0.030000
TD0

======== CHANNEL f1 =
SFO1         125.77539
NUC1                 1
P1                 10.
PLW1        103.000000

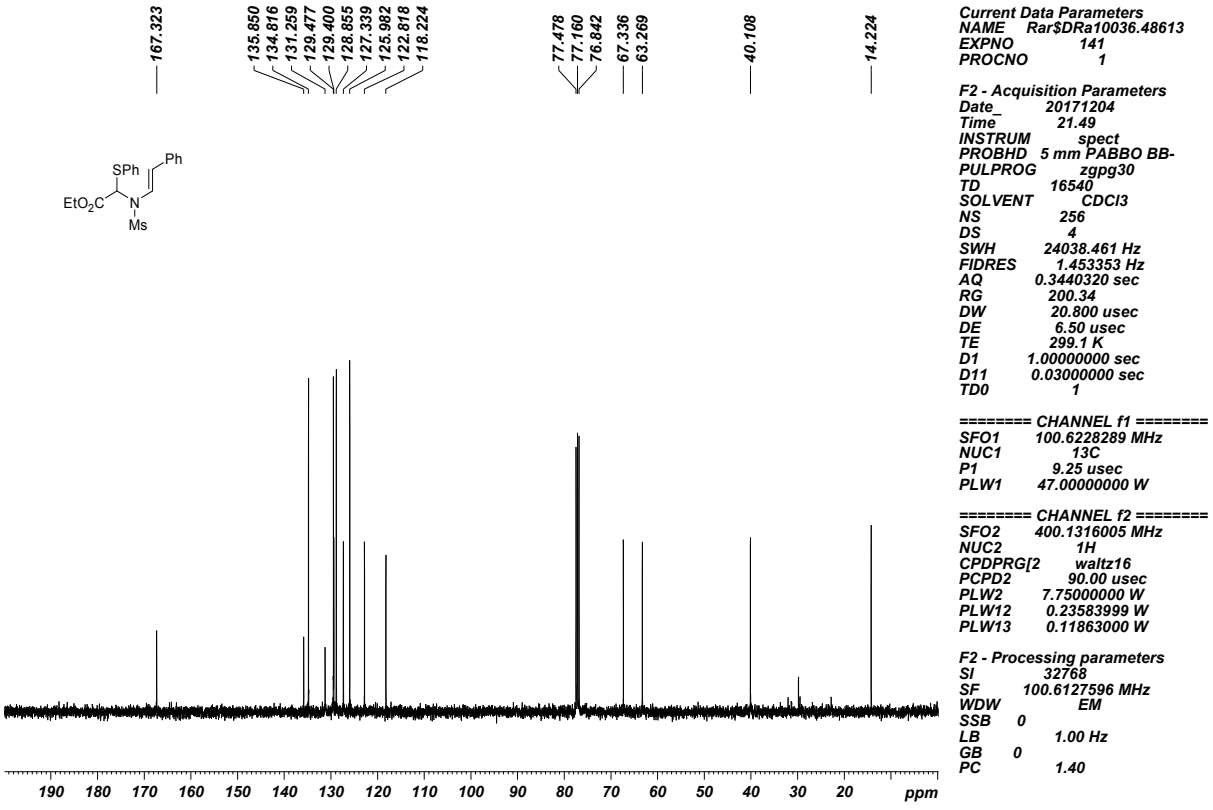
======== CHANNEL f2 =
SFO2         500.15200
NUC2
CPDPRG[2         waltz
PCPD2              80.
PLW2          15.300000
```

Enamide 4v

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

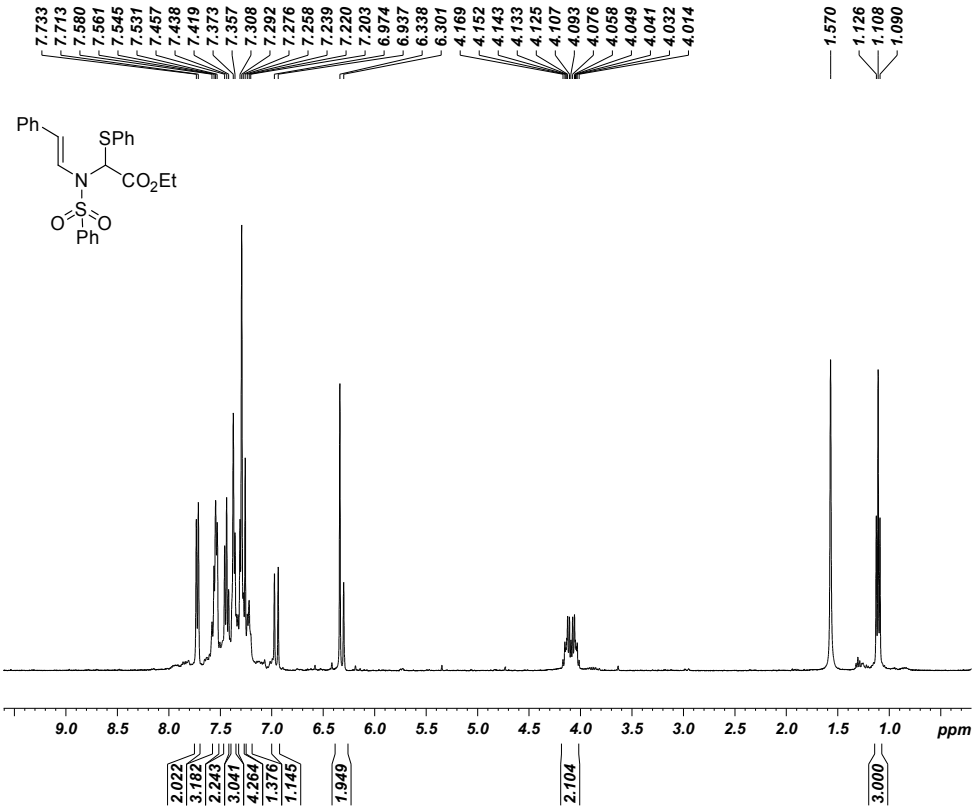


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4w

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



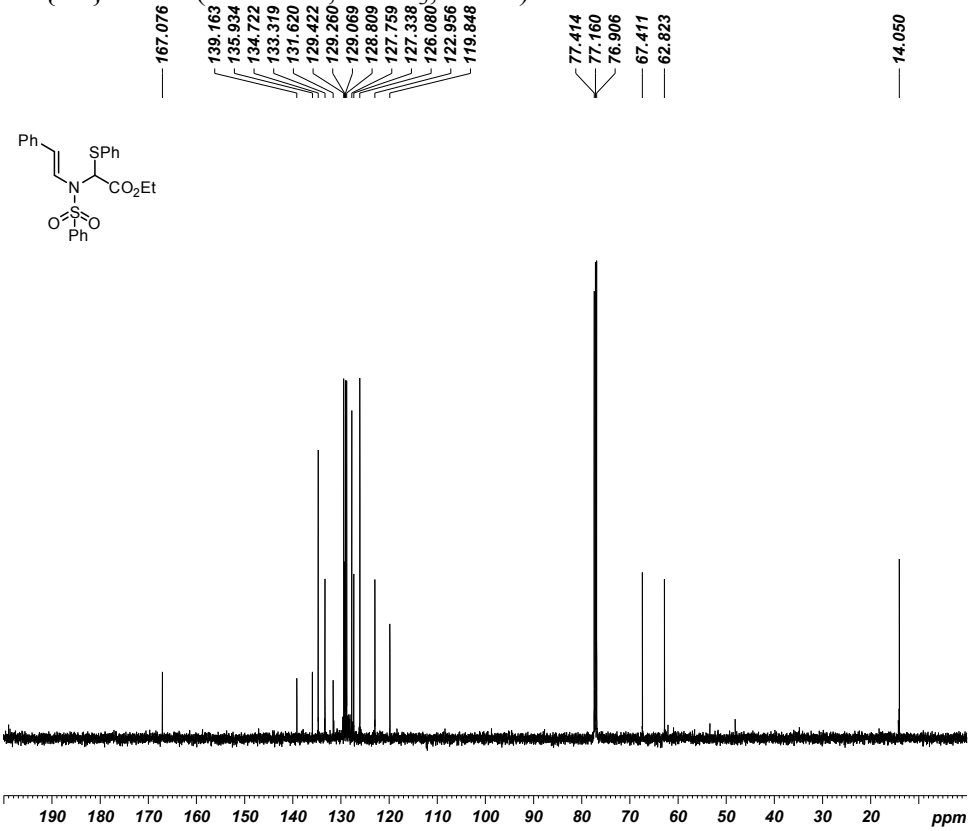

```
Current Data Parameters
NAME          msr Ph
EXPNO            389
PROCNO             1

F2 - Acquisition Parameters
Date_         20200131
Time              8.06
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT         CDCl3
NS                 16
DS                  2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW           62.400 usec
DE            6.50 usec
TE             297.7 K
D1          0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1               1H
P1             15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI              65536
SF          400.1300109 MHz
WDW                EM
SSB     0
LB           0.30 Hz
GB      0
PC              1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME             spa1
EXPNO             159
PROCNO              1

F2 - Acquisition Parameters
Date_         20180125
Time             10.37
INSTRUM          spect
PROBHD   5 mm PABBO BB
PULPROG         zgpg30
TD              20480
SOLVENT         CDCl3
NS                256
DS                  4
SWH          29761.904 Hz
FIDRES        1.453218 Hz
AQ           0.3440640 sec
RG              202.34
DW           16.800 usec
DE            6.50 usec
TE             299.8 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0                1

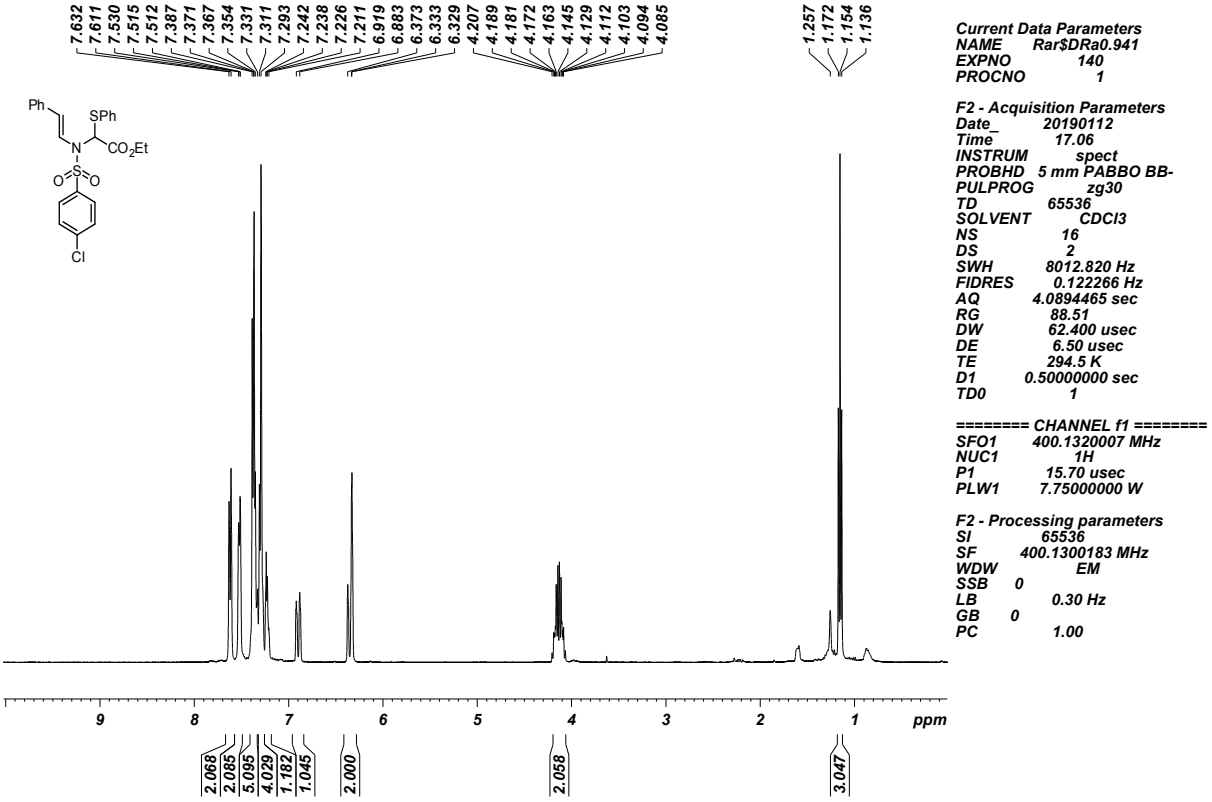
======== CHANNEL f1 ====
SFO1        125.7753932 MHz
NUC1               13C
P1             9.88 usec
PLW1        103.00000000 W

======== CHANNEL f2 ====
SFO2        500.1520006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2          80.00 usec
PLW2        15.30000019 W
PLW12        0.38863000 W
PLW13        0.19548000 W

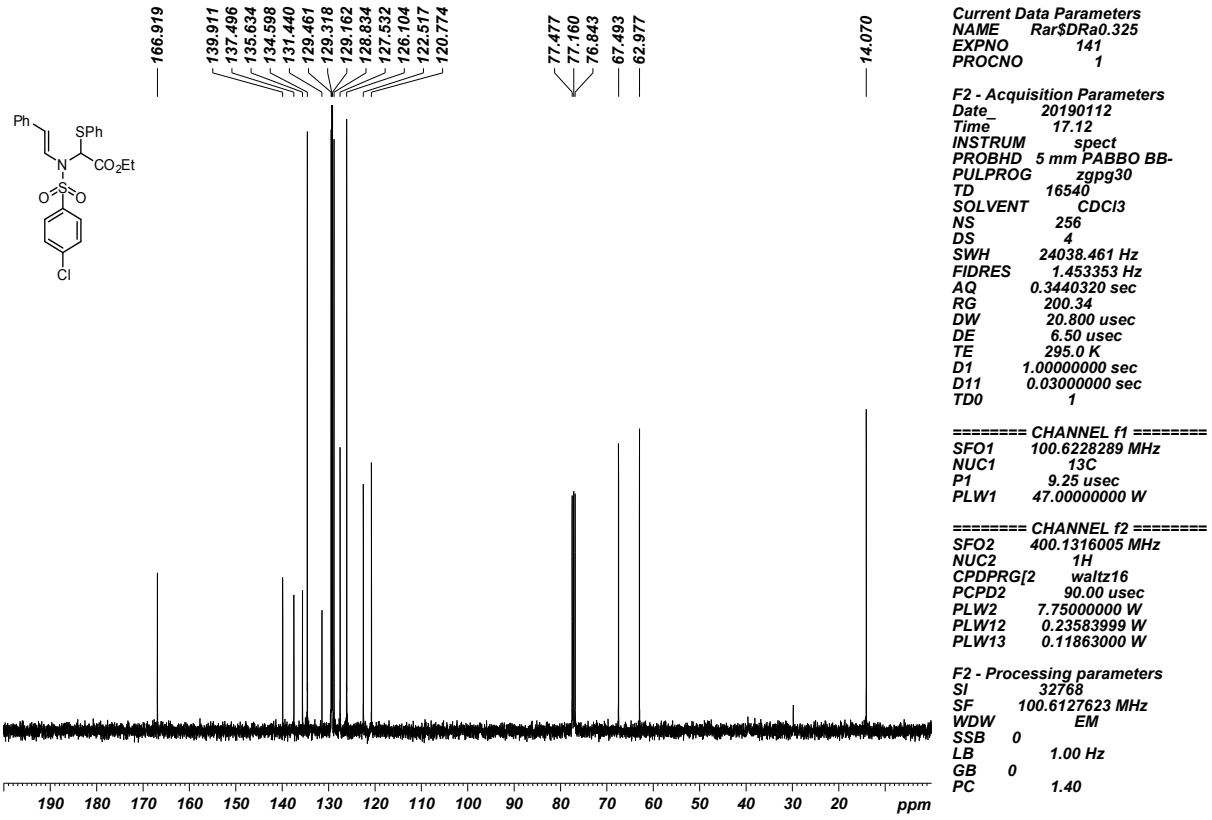
F2 - Processing parameters
SI              32768
SF          125.7628036 MHz
WDW                EM
SSB     0
LB           1.00 Hz
GB      0
```

Enamide 4x

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

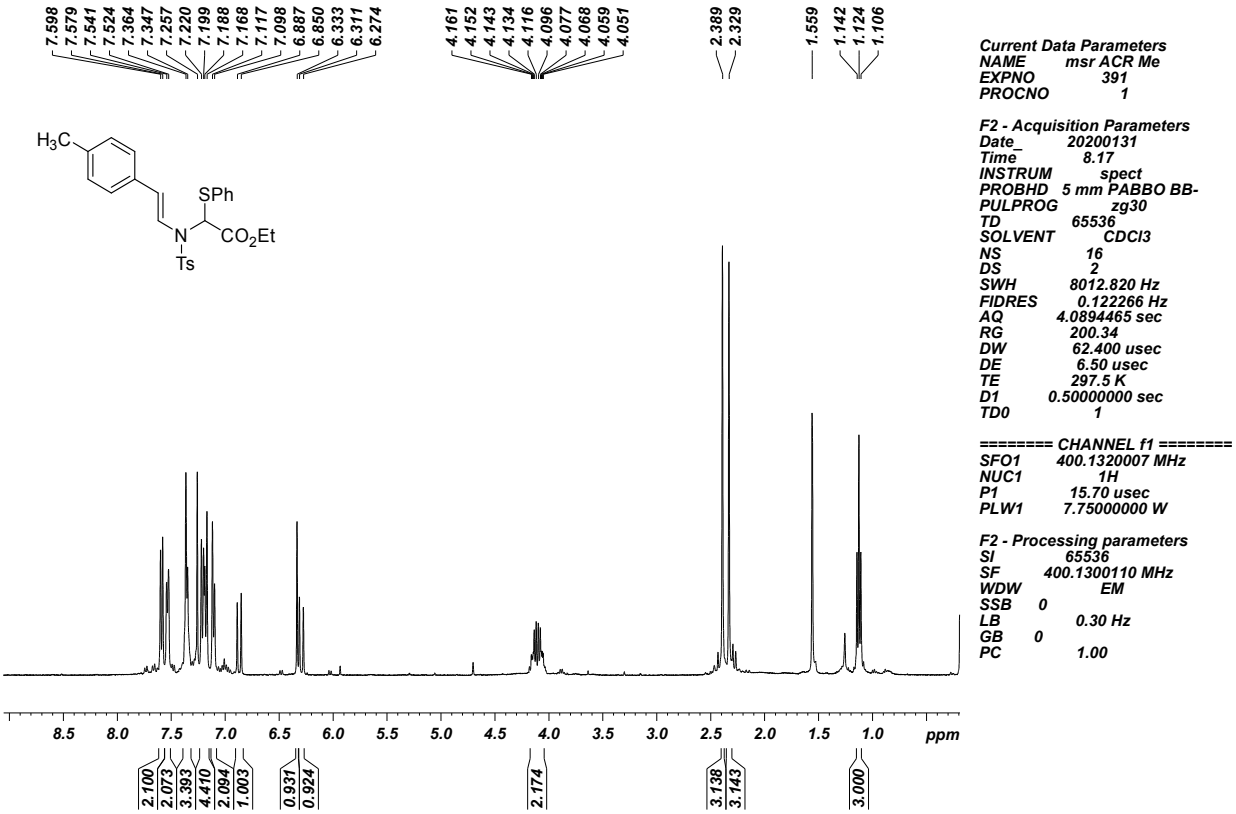


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

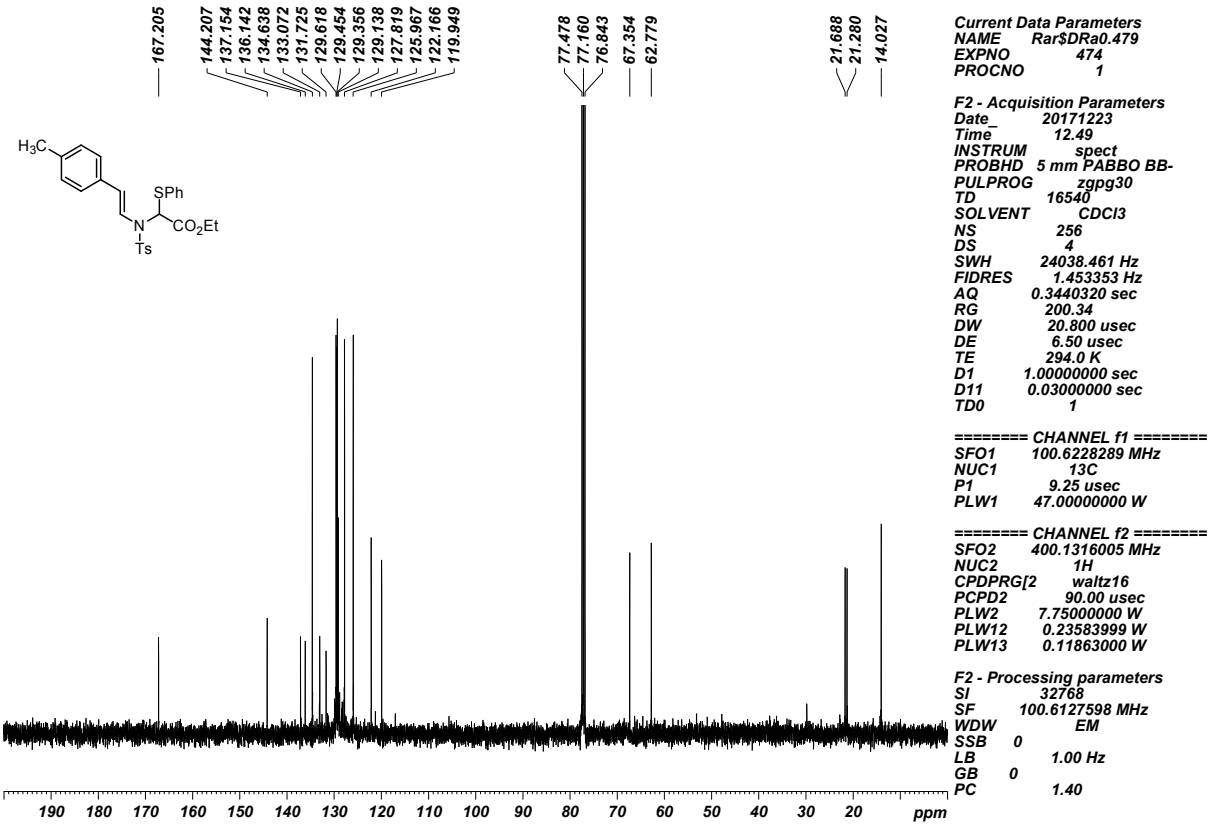


Enamide 4y

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

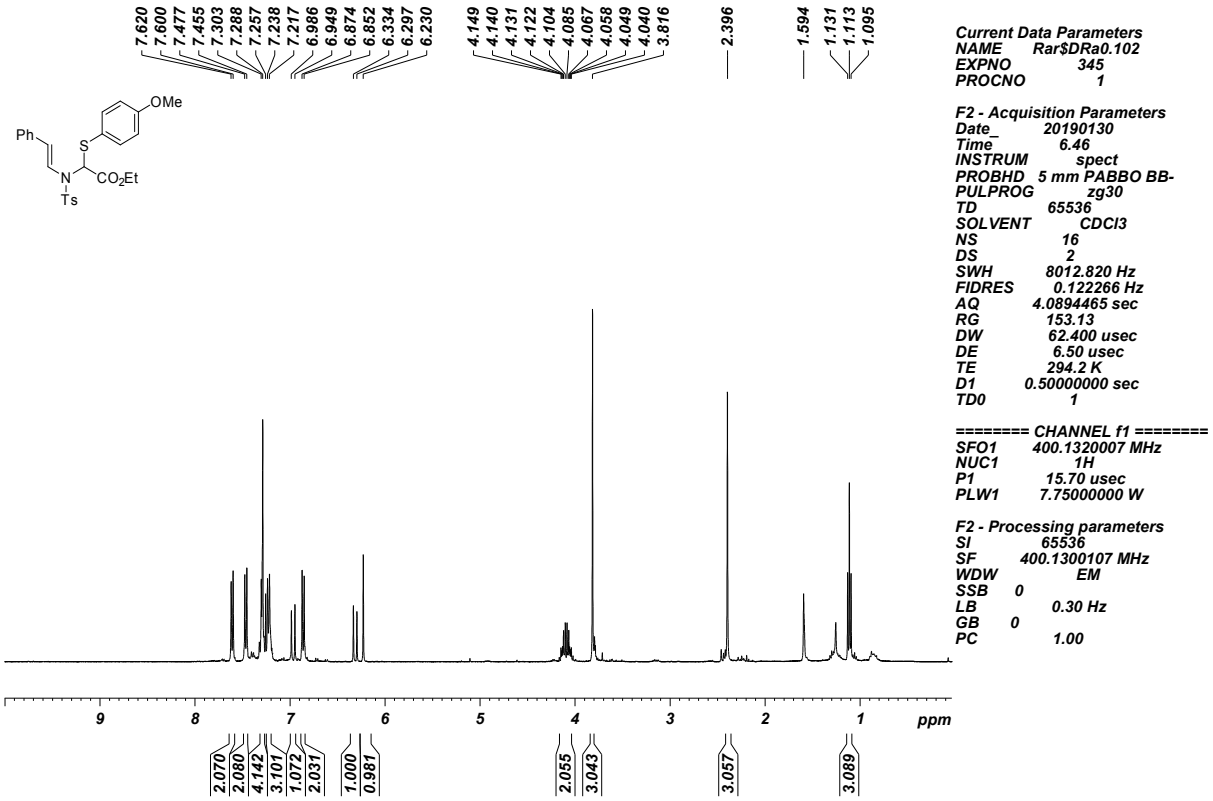


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

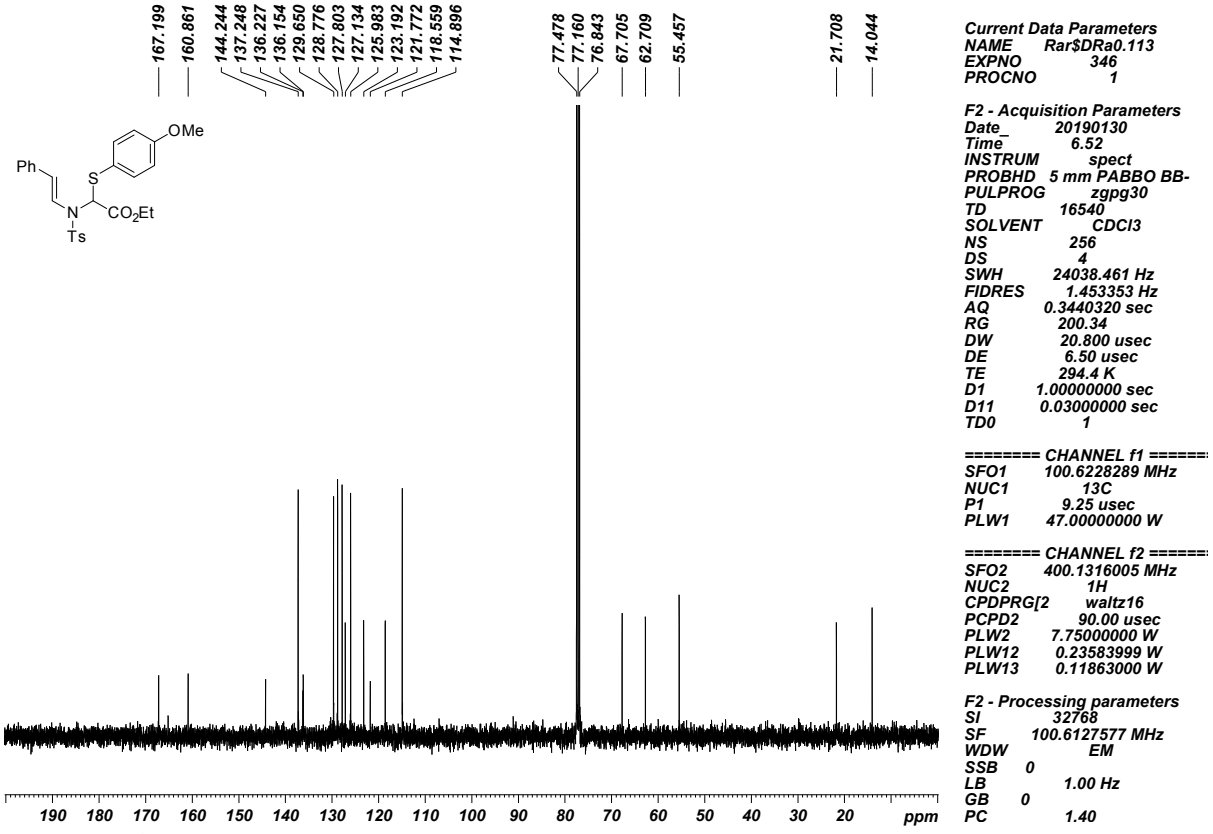


Enamide 4z

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

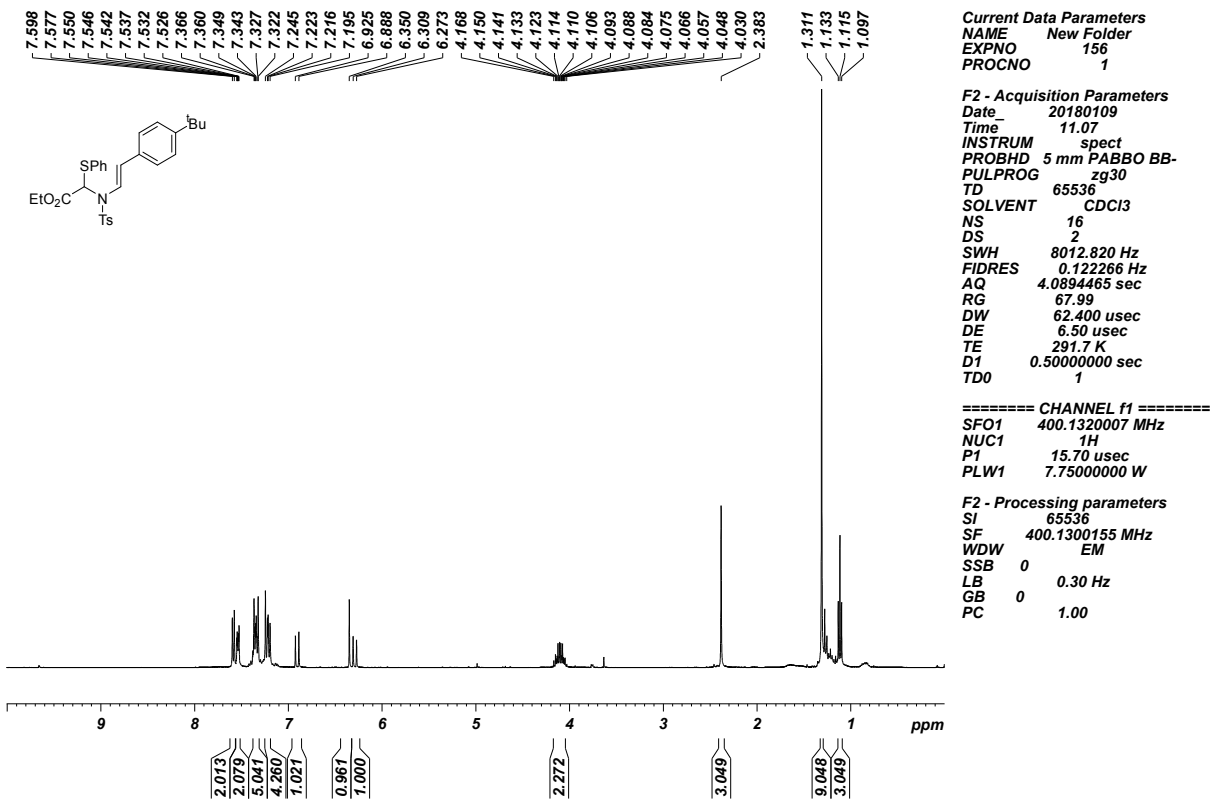


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4aa

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)



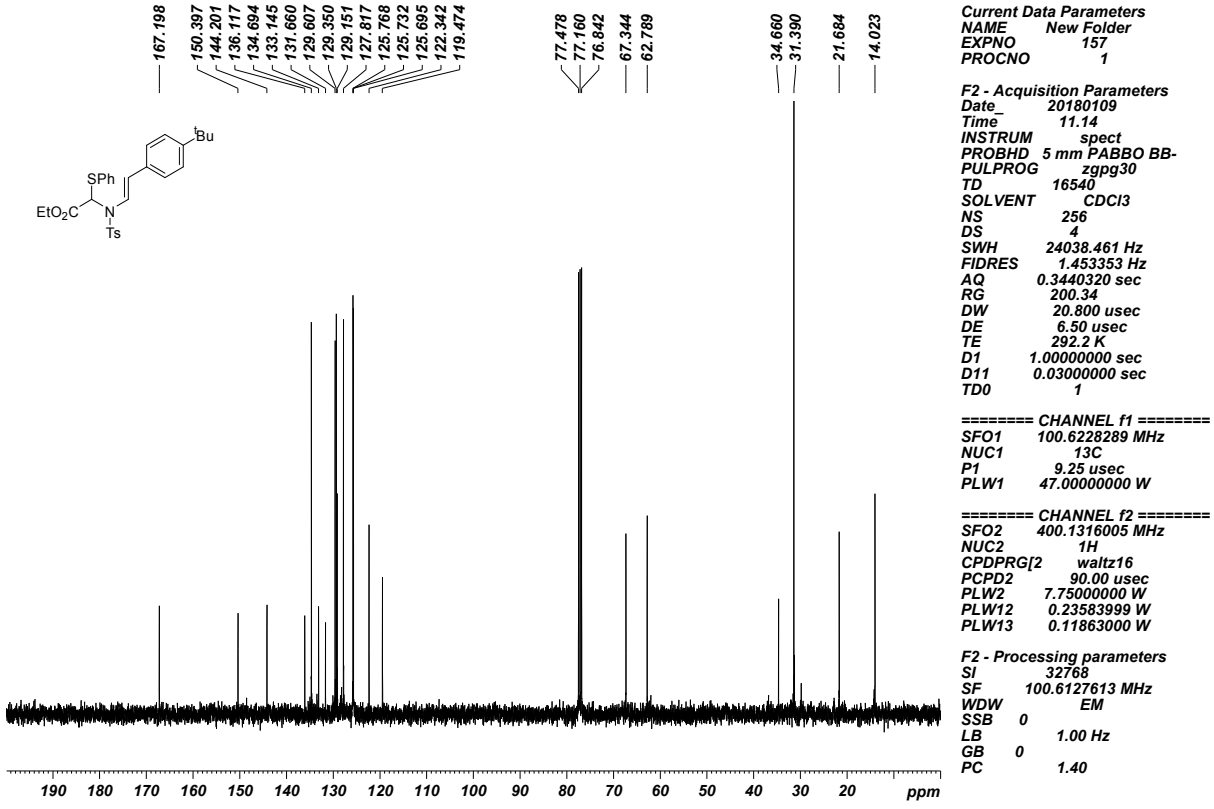

```
Current Data Parameters
NAME        New Folder
EXPNO          156
PROCNO           1

F2 - Acquisition Parameters
Date_       20180109
Time           11.07
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH         8012.820 Hz
FIDRES       0.122266 Hz
AQ          4.0894465 sec
RG               67.99
DW               62.400 usec
DE                6.50 usec
TE              291.7 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1            1H
P1             15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300155 MHz
WDW              EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)




```
Current Data Parameters
NAME        New Folder
EXPNO          157
PROCNO           1

F2 - Acquisition Parameters
Date_       20180109
Time           11.14
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ          0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              292.2 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

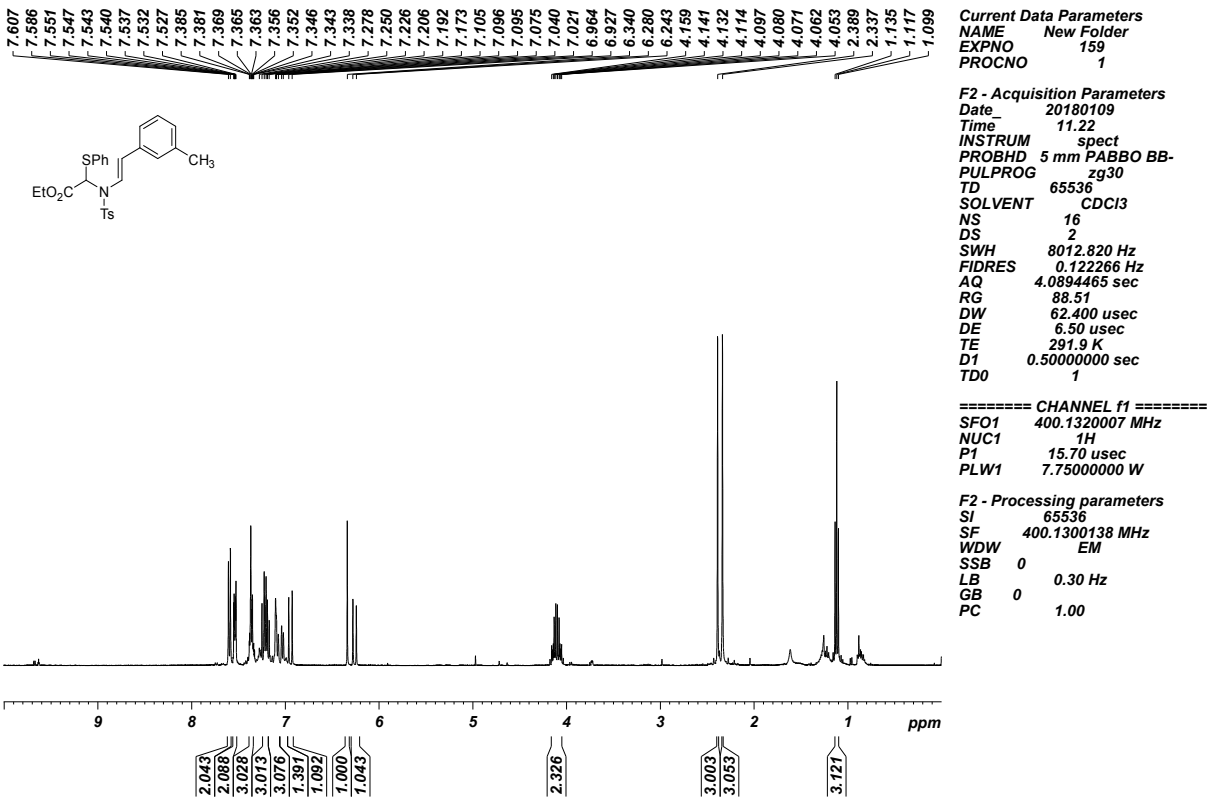
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1            13C
P1              9.25 usec
PLW1       47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2            1H
CPDPRG[2        waltz16
PCPD2           90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.11863000 W

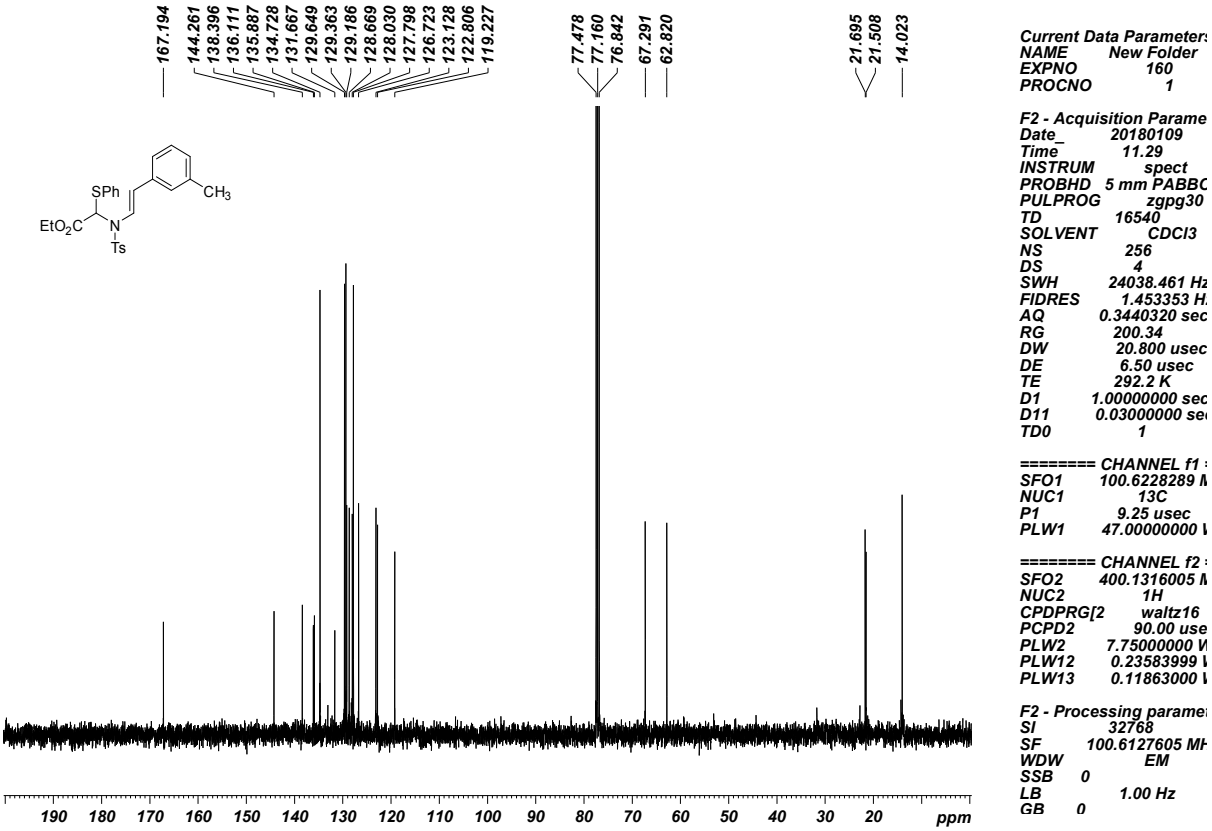
F2 - Processing parameters
SI             32768
SF         100.6127613 MHz
WDW              EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Enamide 4ab

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

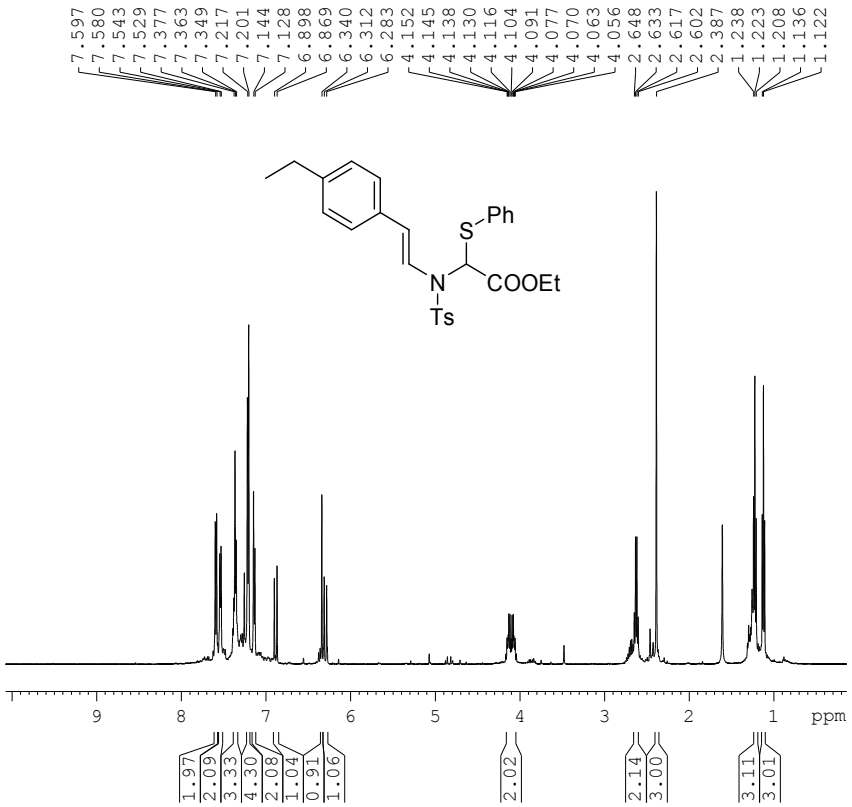


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)



Enamide 4ac

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

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Current Data Parameters
NAME            spa50220
EXPNO                148
PROCNO                 1

F2 - Acquisition Parameters
Date_           20200228
Time                6.06
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    32
DS                     2
SWH           10000.000 Hz
FIDRES         0.305176 Hz
AQ            1.6384000 sec
RG                 79.04
DW                50.000 usec
DE                 6.50 usec
TE                298.0 K
D1           0.50000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1        500.1525008 MHz
NUC1                   1H
P1                 11.75 usec
PLW1        15.30000019 W

F2 - Processing parameters
SI                 65536
SF          500.1500156 MHz
WDW                   EM
SSB       0
LB                 0.30 Hz
GB        0
PC                 1.00
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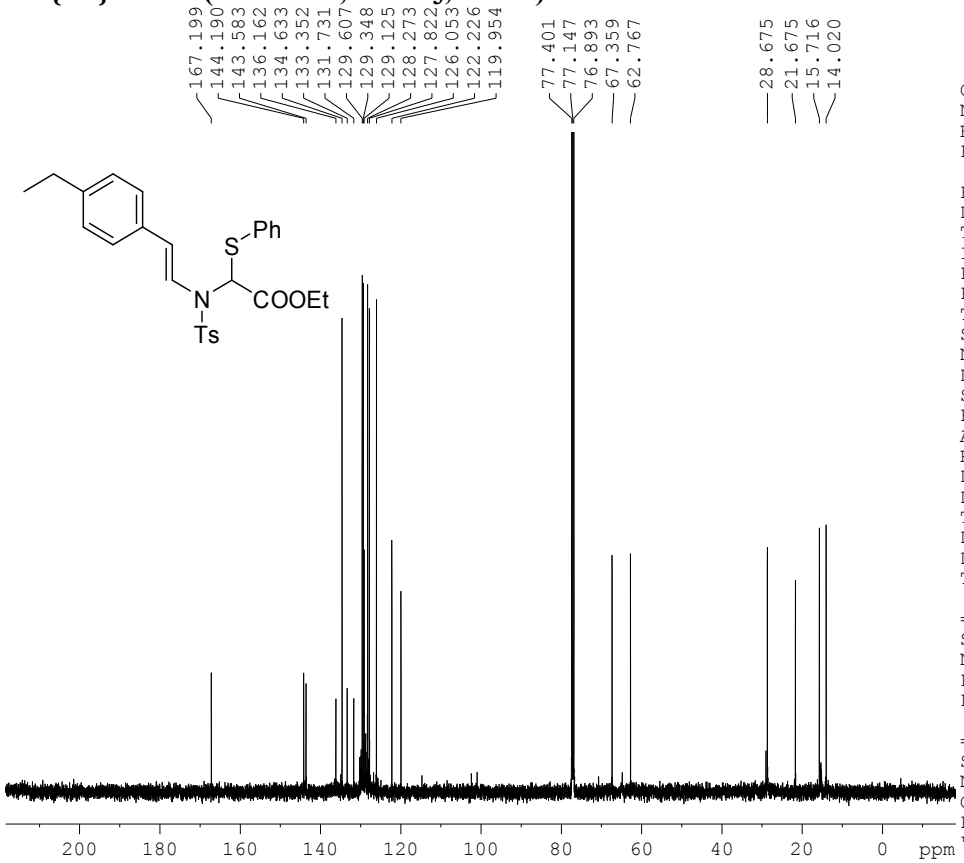
$^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C)

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Current Data Paramete
NAME            spa502
EXPNO                1
PROCNO

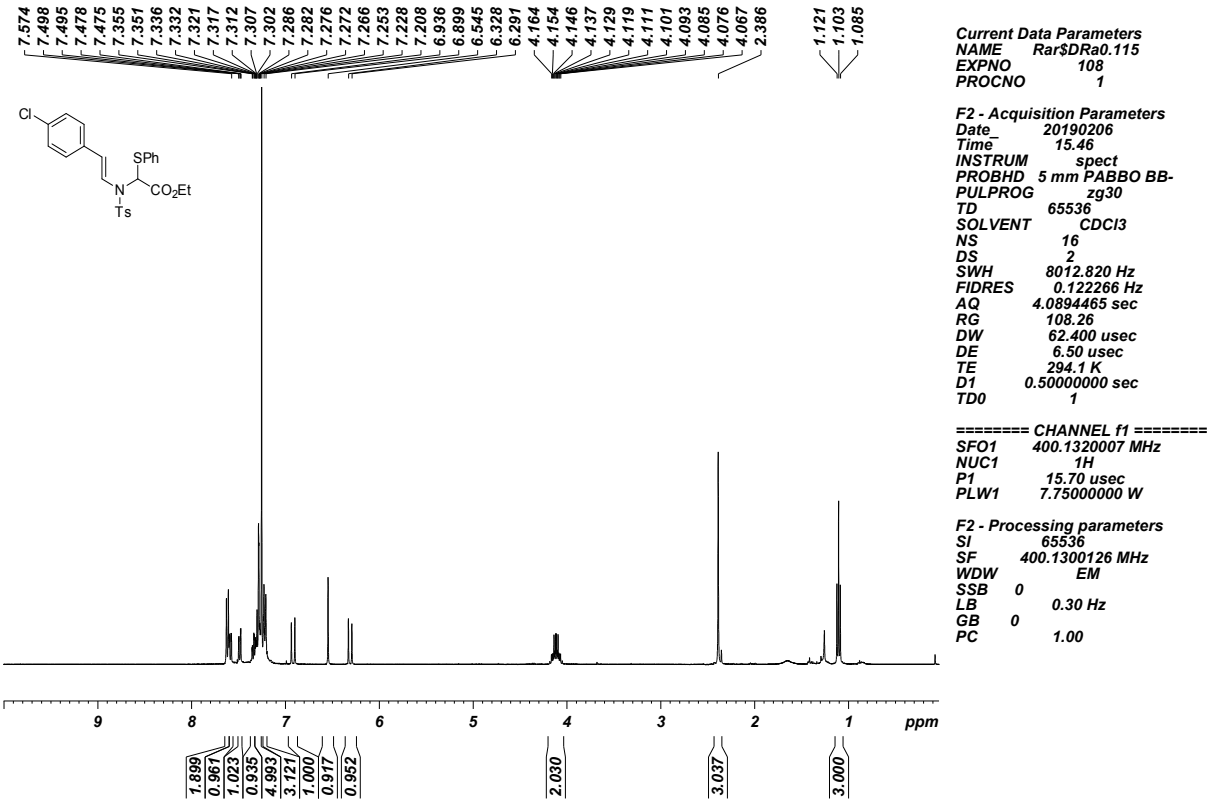
F2 - Acquisition Para
Date_           202002
Time                6.
INSTRUM            spe
PROBHD   5 mm PABBO B
PULPROG           zgpg
TD                 204
SOLVENT            CDC
NS                   5
DS
SWH            29761.9
FIDRES          1.4532
AQ             0.34406
RG                202.
DW                16.8
DE                  6.
TE                300
D1           1.000000
D11          0.030000
TD0

======== CHANNEL f1 =
SFO1         125.77539
NUC1                 1
P1                 10.
PLW1        103.000000

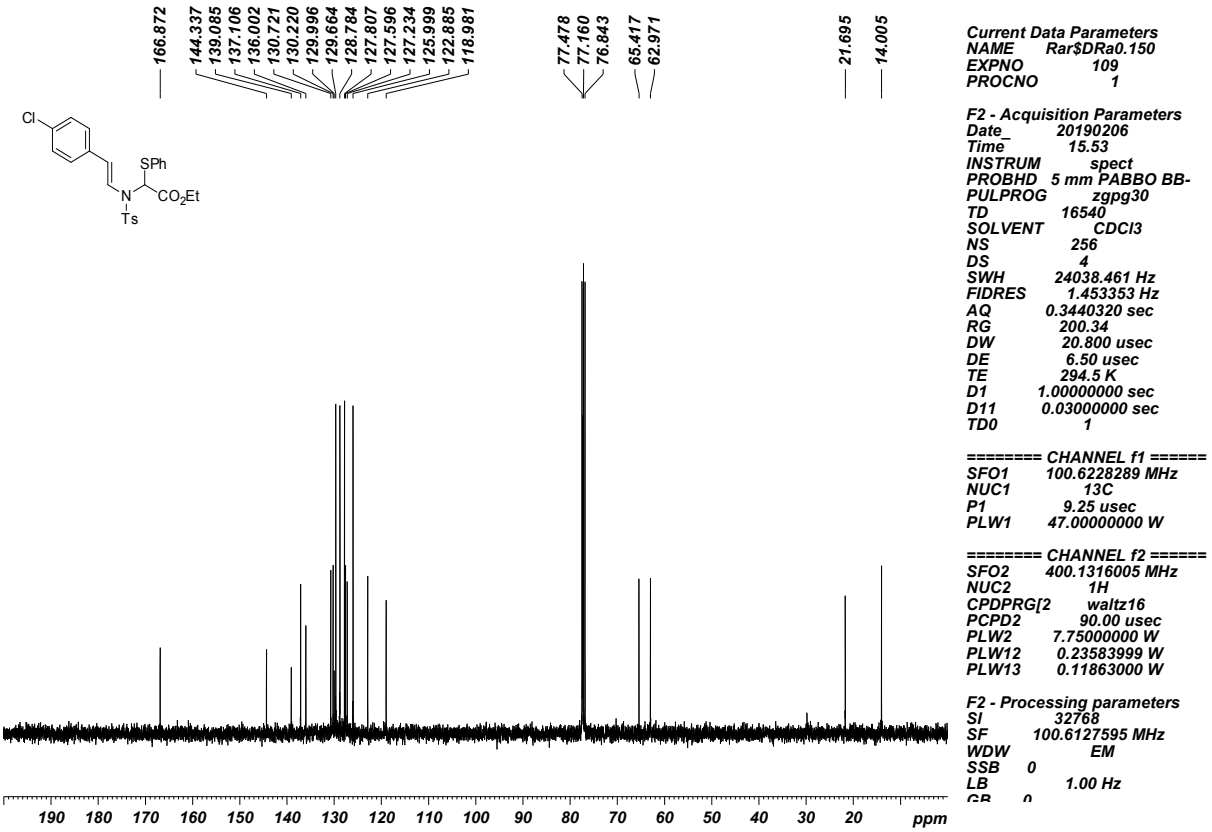
======== CHANNEL f2 =
SFO2         500.15200
NUC2
CPDPRG[2         waltz
PCPD2             80.
```

Enamide 4ad

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

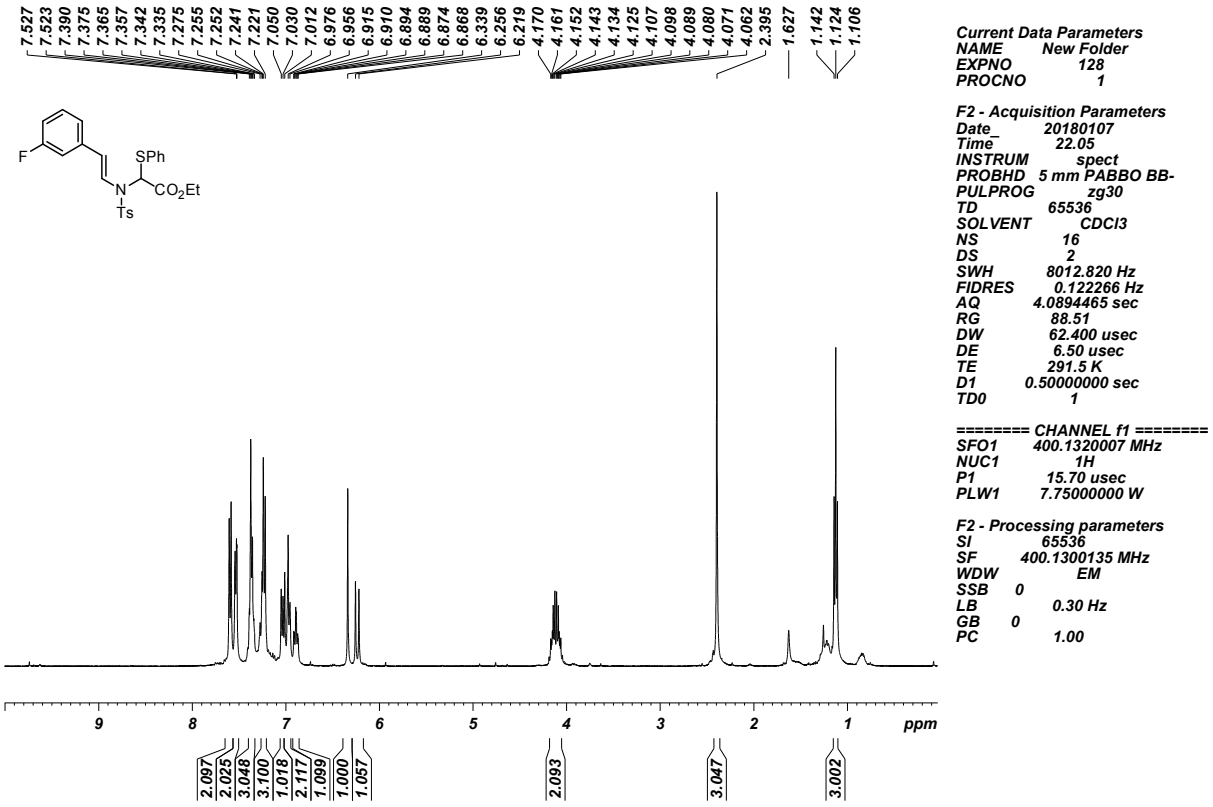


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

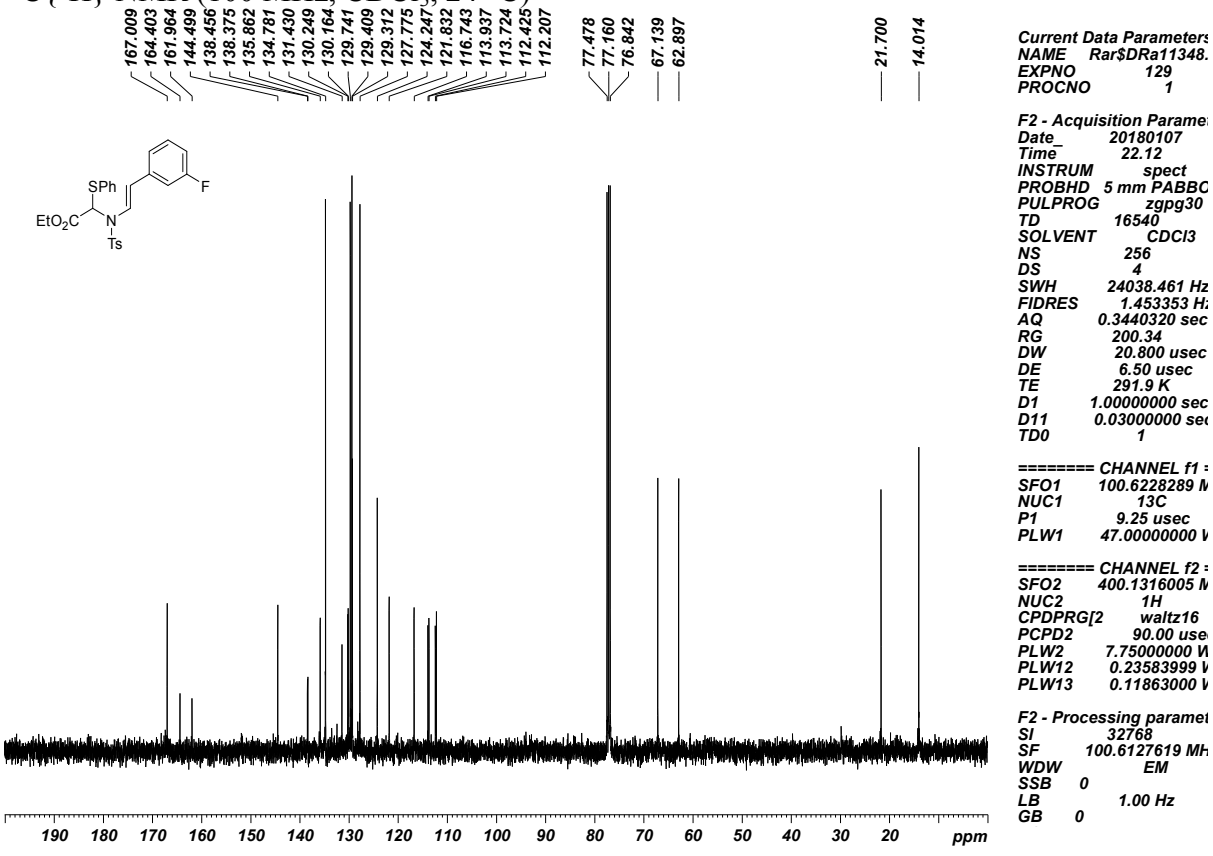


Enamide 4ae

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

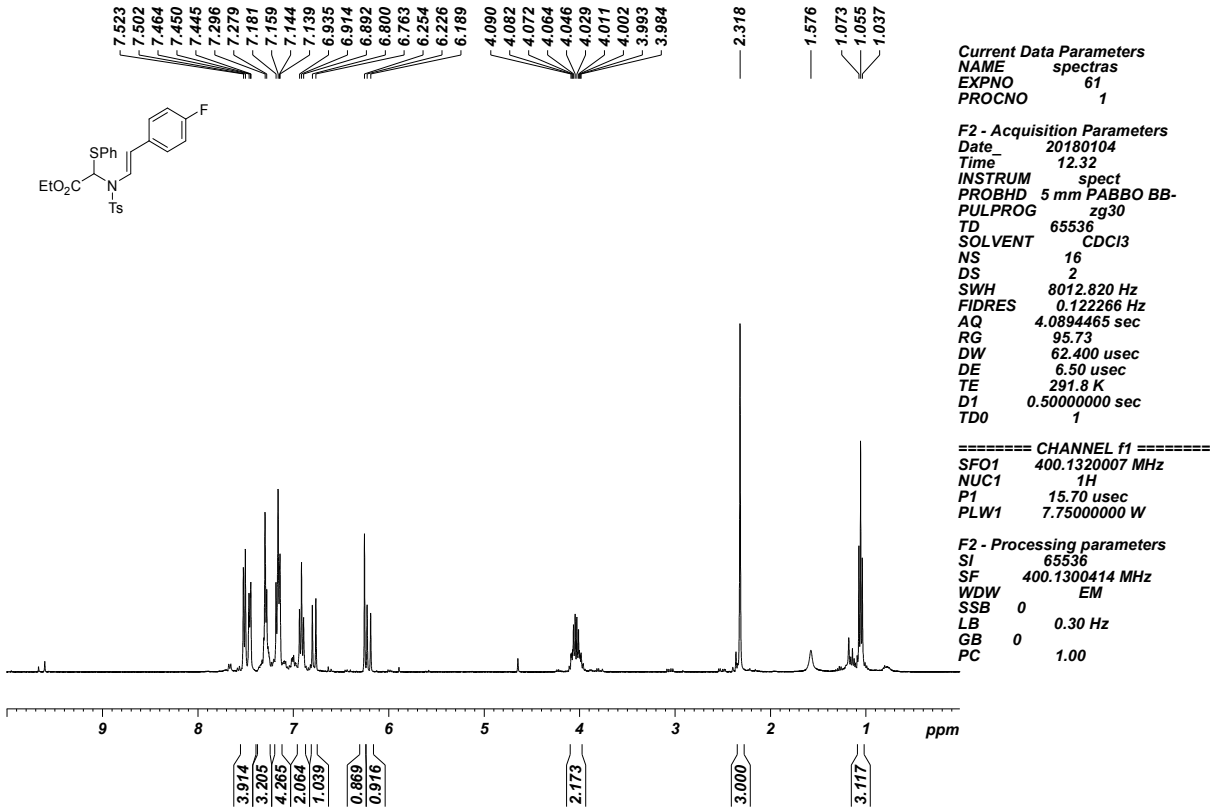


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

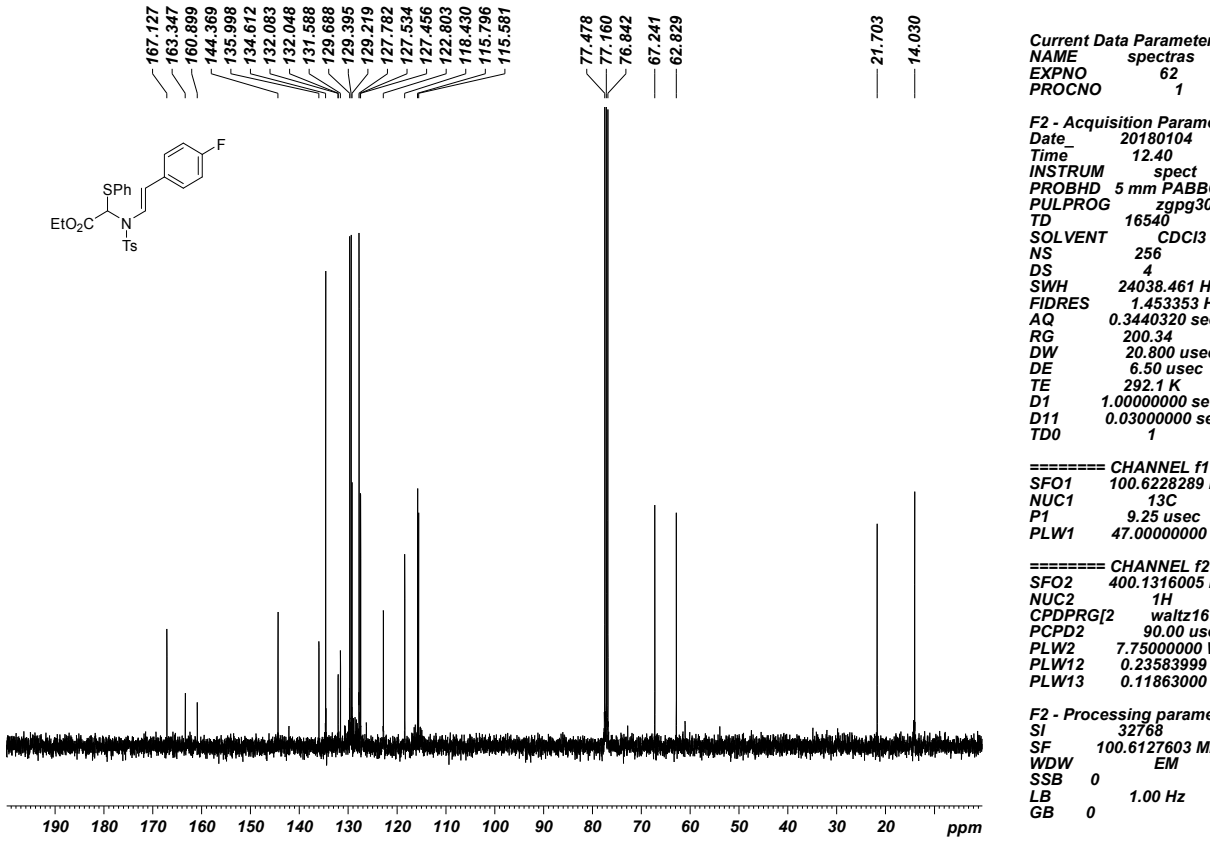


Enamide 4af

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

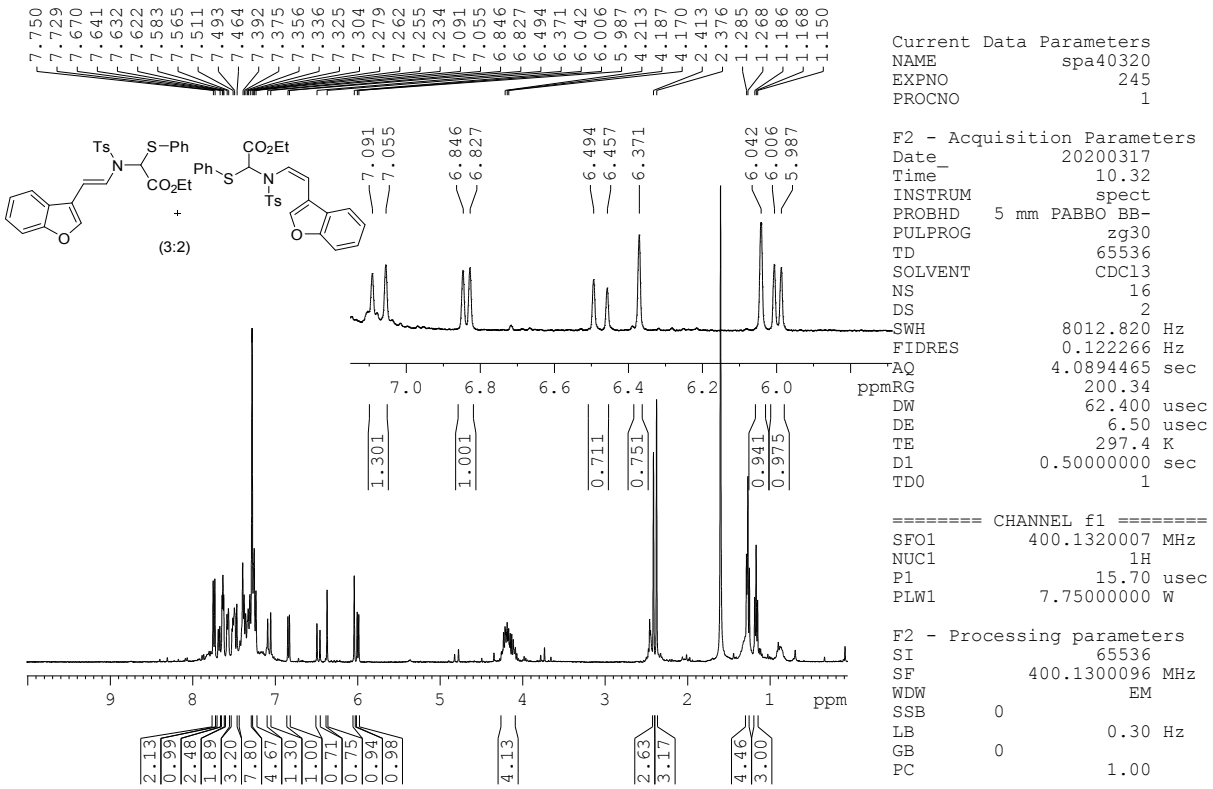


$^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C)

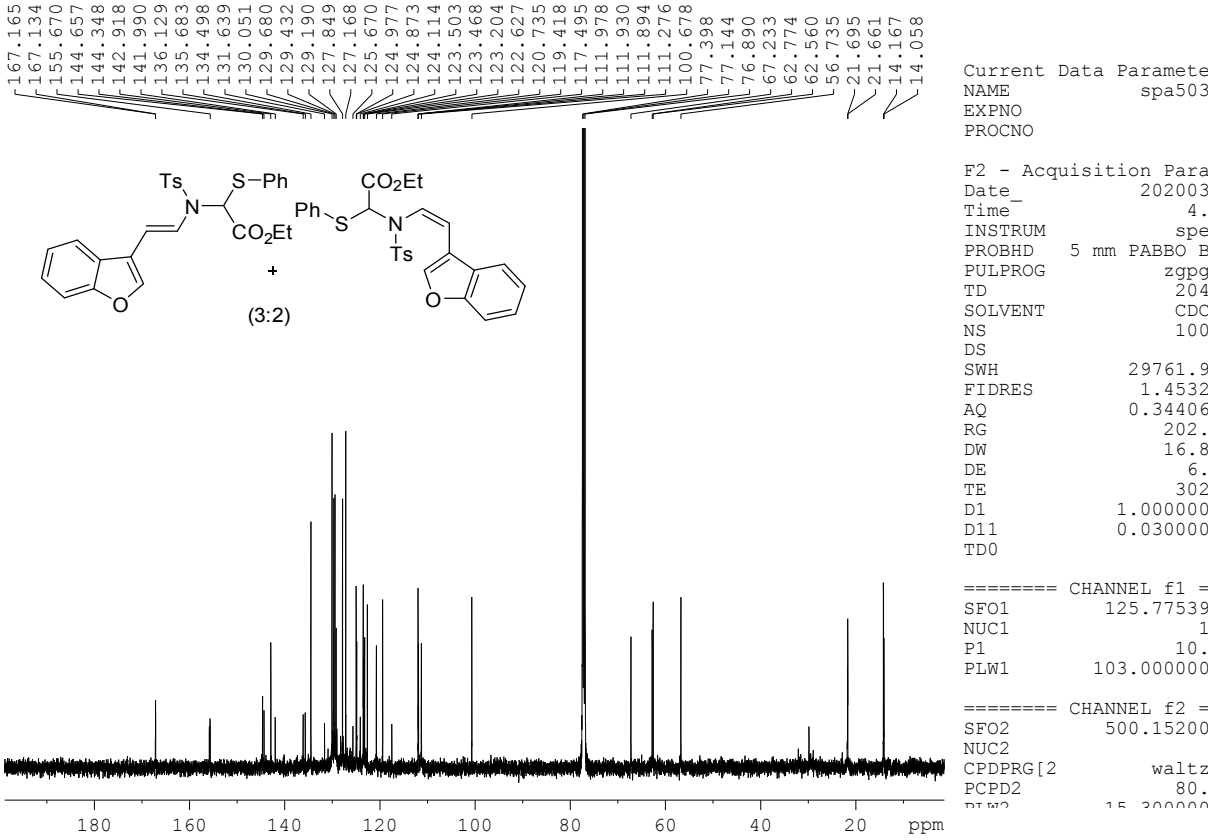


Enamide 4ag

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

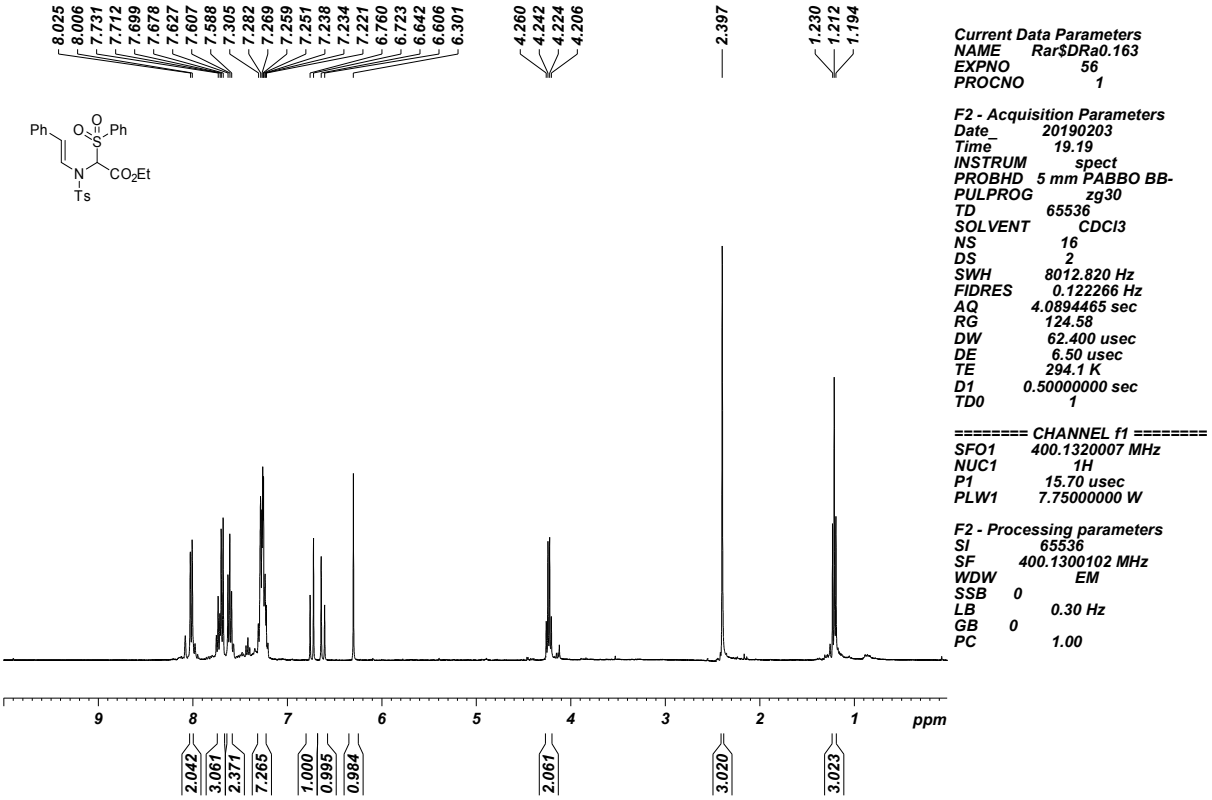


$^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C)

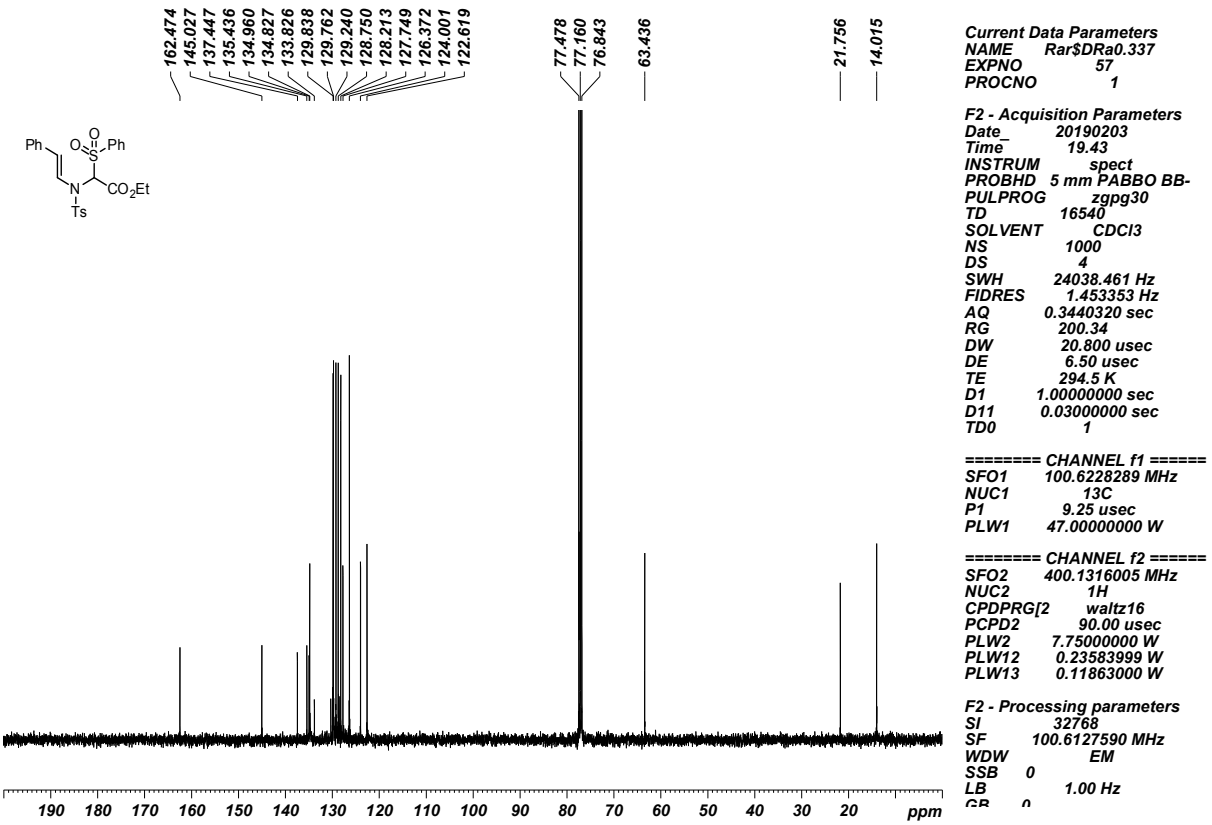


Sulfone 5

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C)

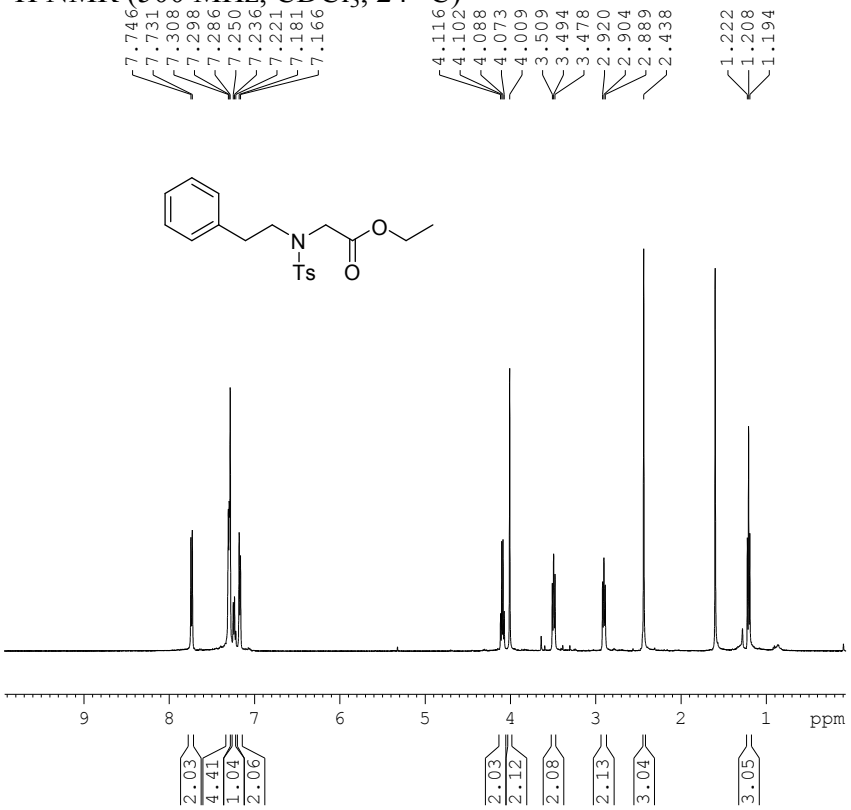


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C)



Compound 6

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C)

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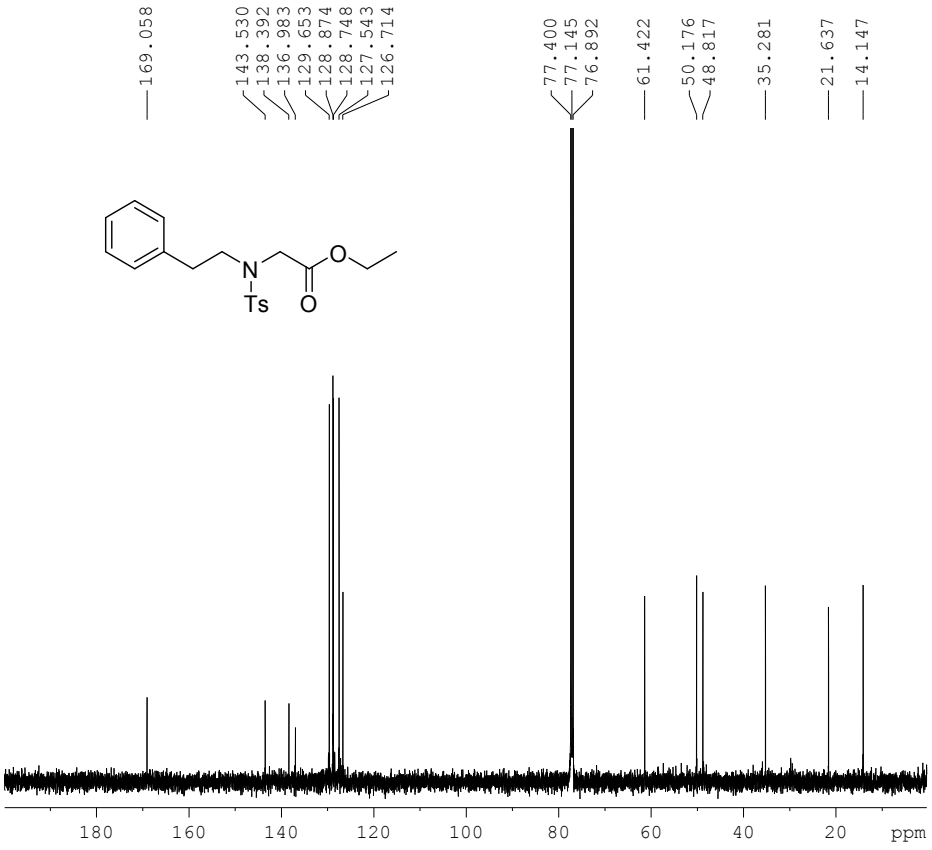
Current Data Parameters
NAME           spa50320
EXPNO                23
PROCNO                1

F2 - Acquisition Parameters
Date_          20200306
Time              10.22
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   16
DS                    2
SWH           10000.000 Hz
FIDRES         0.305176 Hz
AQ            1.6384000 sec
RG               138.53
DW               50.000 usec
DE                6.50 usec
TE                298.0 K
D1           0.50000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1        500.1525008 MHz
NUC1                  1H
P1                11.75 usec
PLW1        15.30000019 W

F2 - Processing parameters
SI                65536
SF          500.1500120 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C)




```
Current Data Paramete
NAME           spa503
EXPNO
PROCNO

F2 - Acquisition Para
Date_          202003
Time               9.
INSTRUM          spe
PROBHD   5 mm PABBO B
PULPROG          zgpg
TD                204
SOLVENT           CDC
NS                  5
DS
SWH           29761.9
FIDRES         1.4532
AQ            0.34406
RG               202.
DW              16.8
DE                6.
TE               300
D1          1.000000
D11         0.030000
TD0

======== CHANNEL f1 =
SFO1        125.77539
NUC1                1
P1                10.
PLW1       103.000000

======== CHANNEL f2 =
SFO2        500.15200
NUC2
CPDPRG[2         waltz
PCPD2             80.
PLW2        15.300000
```