Supplementary Material (ESI) for Organic & Biomolecular Chemistry

Synthesis of Telluroamino Acid Derivatives With Remarkable GPx Like Behavior

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SUPPORTING INFORMATION

General. ^{1}H and ^{13}C NMR spectra were recorded at 400 and 100 MHz respectively with tetramethylsilane as internal standard. High resolution mass spectra were recorded on a Brucker BioApex 70e FT-ICR (Bruker Daltonics, Billerica, USA) instrument in ESI-mode. GPx reaction was monitored by a Hitachi U-2001 UV Spectrophotometer. GC runs were made on a Shimadzu GC, QP 2010 model, with Rtx-5MS 30m x 0.25mm ID, 0.25um column, injector temperature (260 °C), initial oven temperature (200 °C) and heating rates of 5 °C / min, until 280 °C. Column chromatography was performed using Merck Silica Gel (230-400 mesh) following the methods described by Still.[1] Thin layer chromatography (TLC) was performed using Merck Silica Gel GF_{254}, 0.25 mm thickness. For visualization, TLC plates were either placed under ultraviolet light, or stained with iodine vapor, or acidic vanillin. THF was dried over sodium benzophenone ketyl and distilled prior to use. Chloroform was distilled from phosphorus pentoxide. All other solvents were used as purchased unless otherwise noted.

General procedure for the synthesis of 6. Under argon atmosphere, N-methylmorpholine (50 mg, 0.5 mmol) was added to a solution of bromocarboxylic acid (0.5 mmol) in chloroform (5 mL) at 0 ^{o}C. After stirring for 15 minutes at this temperature, ethyl chloroformate (54 mg, 0.5 mmol) was added and stirring was prolonged for additional 45 minutes at 0 ^{o}C before addition of **5a-e** (0.5 mmol) and N-methylmorpholine (50 mg, 0.5 mmol). The resulting reaction mixture was stirred at 0 ^{o}C for 1 h and then at room temperature for 16 h. After this time it was diluted with chloroform and washed with 1M NaOH (2 x 10 mL), brine (1 x 10 mL), 1M HCl (2 x 10 mL) and brine (1 x 10 mL). The combined organic layers were dried with $MgSO_4$, filtered and concentrated. The crude product was purified by flash chromatography, when required, eluting with a mixture of hexanes/ethyl acetate (80:20).

(S)-methyl 2-(3-bromopropanamido)-3-methylbutanoate 6a. Yield 83%; α_D^{20}= +5 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 6.24 (br, 1H), 4.64-4.61 (m, 1H), 3.76 (s, 3H), 3.72-3.59 (m, 2H), 2.92-2.76 (m, 2H), 2.23-2.15 (m, 1H), 0.98-0.91 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.40, 169.73, 57.03, 52.03, 39.31, 31.10, 27.20, 18.78, 17.63; HRMS *m/z* calcd. for $C_9H_{16}BrNO_3 + Na^+$ 288.0211, found 288.0205.

(S)-methyl 2-(4-bromobutanamido)-3-methylbutanoate 6b. Yield: 76%; α_D^{20}= +1 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.08 (d, *J* = 8.8 Hz, 1H), 4.55-4.51 (m, 1H), 3.74 (s, 3H), 3.63-3.47 (m, 2H), 2.50-2.46 (m, 2H), 2.21-2.10 (m, 3H), 0.96-0.92 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.09, 171.72, 56.73, 51.47, 43.85, 32.31, 30.30, 27.76, 18.40, 17.37; HRMS *m/z* calcd. for $C_{10}H_{18}BrNO_3 + Na^+$ 302.0368, found 302.0374.

(S)-methyl 2-(3-bromopropanamido)-3-phenylpropanoate 6c. Yield: 81%; α_D^{20}= +70 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.32-7.25 (m, 3H), 7.12-7.10 (m, 2H), 6.07 (br, 1H), 4.95-4.90 (m, 1H), 3.74 (s, 3H), 3.66-3.55 (m, 2H), 3.18 (dd, J^1 = 14.0 Hz, J^2 = 6.0 Hz, 1H), 3.12 (dd, J^1 = 14.0 Hz, J^2 = 5.6 Hz, 1H), 2.84-2.69 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ =

171.78, 169.17, 135.60, 129.18, 128.44, 127.03, 53.12, 52.25, 39.22, 37.72, 26.87; HRMS *m/z* calcd. for $C_{13}H_{16}BrNO_3 + Na^+$ 336.0211, found 336.0205.

(S)-methyl 2-(4-bromobutanamido)-3-phenylpropanoate 6d. Yield: 85%; α_D^{20}= +26 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.34-7.25 (m, 3H), 7.11-7.09 (m, 2H), 5.98 (br, 1H), 4.92-4.87 (m, 1H), 3.74 (s, 3H), 3.58-3.34 (m, 2H), 3,17 (dd, J^1 = 14.0 Hz, J^2 = 5.6 Hz, 1H), 3.06 (dd, J^1 = 14.0 Hz, J^2 = 6.0 Hz, 1H), 2.36 (t, *J* = 5.8 Hz, 2H), 2.16-2.06 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.72, 171.12, 135.70, 128.71, 128.02, 126.52, 52.77, 51.82, 37.26, 33.53, 32.76, 27.78; HRMS *m/z* calcd. for $C_{14}H_{18}BrNO_3 + Na^+$ 350.0368, found 350.0380.

(S)-methyl 2-(3-bromopropanamido)propanoate 6e. Yield 59%; α_D^{20}= -5 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 6.57-6.56 (m, 1H), 4.67-4.60 (m, 1H), 3.76 (s, 3H), 3.69-3.59 (m, 2H), 2.85-2.80 (m, 2H), 1.43 (d, *J* = 7.2 Hz, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 173.26, 169.21, 52.39, 48.01, 39.22, 26.99, 18.22; HRMS *m/z* calcd. for $C_7H_{12}BrNO_3 + Na^+$ 259.9898, found 259.988.

(S)-methyl 2-(3-bromopropanamido)-4-methylpentanoate 6f. Yield 88%; α_D^{20}= -7 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 6.60-6.59 (m, 1H), 4.70-4.65 (m, 1H), 3.74 (s, 3H), 3.69-3.59 (m, 2H), 2.90-2.77 (m, 2H), 1.72-1.62 (m, 2H), 1.60-1.54 (m, 1H), 0.96-0.93 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 173.35, 169.51, 52.15, 50.61, 41.29, 39.21, 27.06, 24.63, 22.61, 21.69; HRMS *m/z* calcd. for $C_{10}H_{18}BrNO_3 + Na^+$ 302.0368, found 302.0354.

(S)-dimethyl 2-(3-bromopropanamido)succinate 6g. Yield 77%; α_D^{20}= +25 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 6.99 (d, *J* = 8.0 Hz, 1H), 4.93-4.88 (m, 1H), 3.77 (s, 3H), 3.69 (s, 3H), 3.66-3.62 (m, 2H), 3.03 (dd, J^1 = 17.6 Hz, J^2 = 4.8 Hz, 1H), 2.93-2.81 (m, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.22, 170.82, 169.49, 52.60, 51.84, 48.37, 38.95, 35.80, 26.90; HRMS *m/z* calcd. for $C_9H_{14}BrNO_5 + Na^+$ 317.9953, found 317.9942.

General procedure for the synthesis of 7. Under argon atmosphere, sodium borohydride was added to a solution of the diaryl ditelluride (0.55 mmol) in THF (4 mL). Ethanol (2 mL) was then dropwise added and the clear solution formed was stirred at room temperature for 10 minutes. After this time a THF (1mL) solution of **6a-g** (1 mmol) was added dropwise. After stirring for 24 h at room temperature, the reaction mixture was quenched with aqueous saturated NH_4Cl (10 mL) and extracted with CH_2Cl_2 (3 x 15 mL). The combined organic layers were dried with $MgSO_4$, filtered and concentrated. The crude product was purified by flash chromatography first eluting with hexanes and then with a mixture of hexanes/ethyl acetate (80:20).

(S)-methyl 3-methyl-2-(3-(phenyltellanyl)propanamido)butanoate 7a. Yield: 82%; α_D^{20}= -7 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.75-7.73 (m, 2H), 7.31-7.19 (m, 3H), 6.04 (br, 1H), 4.59-4.56 (m, 1H), 3.73 (s, 3H), 3.06 (t, *J* = 7.1 Hz, 2H), 2.89-2.79 (m, 2H), 2.19-2.12 (m, 1H), 0.97-0.89 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.45, 172.08, 138.42, 129.14, 127.64, 112.04, 56.94, 52.06, 38.30, 31.24, 18.85, 17.79, 1.22; HRMS *m/z* calcd. for $C_{15}H_{21}NO_3Te$ + OMe 424.0768, found 424.0767.

(S)-methyl 3-methyl-2-(4-(phenyltellanyl)butanamido)butanoate 7b. Yield: 87%; α_D^{20}= +1 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.73-7.71 (m, 2H), 7.29-7.18 (m, 3H), 5.94 (br, 1H), 4.57-4.53 (m, 1H), 3.73 (s, 3H), 2.92 (t, *J* = 7.2 Hz, 2H), 2.35 (t, *J* = 7.6 Hz, 2H), 2.17-2.07 (m, 3H), 0.94-0.88 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.28, 171.72, 137.99, 128.86, 127.29, 111.06, 56.67, 51.72, 37.69, 30.74, 27.18, 18.65, 17.60, 7.36; HRMS *m/z* calcd. for $C_{16}H_{23}NO_3Te$ + OMe 438.0924, found 438.0924.

(S)-methyl 3-phenyl-2-(3-(phenyltellanyl)propanamido)propanoate 7c. Yield: 86%; α_D^{20}= +50 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.72-7.69 (m, 2H), 7.29-7.18 (m, 6H), 7.10-7.08 (m, 2H), 6.03 (br, 1H), 4.90-4.85 (m, 1H), 3.71 (s, 3H), 3.14 (dd, J^1 = 14.0 Hz, J^2 = 6.0 Hz, 1H), 3.07 (dd, J^1 = 14.0 Hz, J^2 = 5.6 Hz, 1H), 3.01 (t, *J* = 7.2 Hz, 2H), 2.81-2.69 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.80, 171.72, 138.14, 135.61, 129.05, 128.99, 128.31, 127.46, 126.87, 111.99, 52.91, 52.10, 37.92, 37.56, 0.99; HRMS *m/z* calcd. for $C_{19}H_{21}NO_3Te$ + OMe 472.0768, found 472.0767.

(S)-methyl 3-phenyl-2-(4-(phenyltellanyl)butanamido)propanoate 7d. Yield: 86%; α_D^{20}= +24 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.71-7.69 (m, 2H), 7.29-7.18 (m, 6H), 7.08-7.06 (m, 2H), 5.90 (d, *J* = 7.6 Hz, 1H), 4.90-4.85 (m, 1H), 3.71 (s, 3H), 3.14 (dd, J^1 = 14.0 Hz, J^2 = 5.6 Hz, 1H), 3.04 (dd, J^1 = 14.0 Hz, J^2 = 6.4 Hz, 1H), 2.83-2.80 (m, 2H), 2.26 (t, *J* = 6.9 Hz, 2H), 2.07-2.02 (m, 2H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.01, 171.43, 138.35, 135.75, 129.13, 128.50, 127.60, 127.05, 111.20, 52.86, 52.24, 37.88, 37.78, 27.16, 7.47; HRMS *m/z* calcd. for $C_{20}H_{23}NO_3Te$ + OMe 486.0924, found 486.0924.

(S)-methyl 2-(3-(phenyltellanyl)propanamido)propanoate 7e. Yield: 86%; α_D^{20}= +7 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.73-7.70 (m, 2H), 7.32-7.14 (m, 3H), 6.52 (d, *J* = 7.2 Hz, 1H), 4.59-4.52 (m, 1H), 3.71 (s, 3H), 3.06-3.01 (m, 2H), 2.82-2.75 (m, 2H), 1.37 (d, *J* = 7.2 Hz, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 173.19, 171.73, 138.14, 128.93, 127.41, 111.99, 52.15, 47.75, 37.89, 18.01, 1.02; HRMS *m/z* calcd. for $C_{13}H_{17}NO_3Te$ + OMe 396.0455, found 396.0458.

(S)-methyl 4-methyl-2-(3-(phenyltellanyl)propanamido)pentanoate 7f. Yield: 89%; α_D^{20}= -10 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.74-7.71, (m, 2H), 7.29-7.16 (m, 3H), 6.19-6.12 (m, 1H), 4.66-4.60 (m, 1H), 3.71 (s, 3H), 3.07-3.02 (m, 2H), 2.86-2.74 (m, 2H), 1.69-1.59 (m, 2H), 1.57-1.48 (m, 1H), 0.96-0.92 (m 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 173.45, 171.98, 138.32, 129.11, 127.56, 112.00, 52.12, 50.54, 41.47, 38.12, 24.68, 22.62, 21.82, 1.09; HRMS *m/z* calcd. for $C_{16}H_{23}NO_3Te$ + H^+ 408.0818, found 408.0803.

(S)-dimethyl 2-(3-(phenyltellanyl)propanamido)succinate 7g. Yield: 78%; α_D^{20}= +17 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.80-7.72 (m, 2H), 7.30-7.15 (m, 3H), 6.60 (d, *J* = 8,0 Hz, 1H), 4.87-4.83 (m, 1H), 3.75 (s, 3H), 3.68 (s, 3H), 3.09-2.97 (m, 3H), 2.89-2.73 (m, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.98, 171.41, 170.97, 138.51, 129.12, 127.67, 111.86, 52.69, 51.93, 48.37, 38.03, 35.93, 1.01; HRMS *m/z* calcd. for $C_{15}H_{19}NO_5Te$ + H^+ 424.0404, found 424.0390.

(S)-dimethyl 2-(3-(p-tolyltellanyl)propanamido)succinate 7i. Yield: 67%; α_D^{20}= +23 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.64 (d, *J* = 8.0 Hz, 2H), 7.03 (d, *J* = 7.6 Hz, 2H), 6.55 (d, *J* = 8.0 Hz, 1H), 4.86-4.82 (m, 1H), 3.75 (s, 3H), 3.69 (s, 3H), 3.05-2.99 (m, 3H), 2.88-2.71 (m, 3H), 2.34 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.07, 171.48, 171.01, 139.07, 137.87, 130.11, 107.46, 52.73, 51.96, 48.38, 38.12, 35.97, 21.12, 0.95; HRMS *m/z* calcd. for $C_{16}H_{21}NO_5Te$ + OMe, found 468.0686.

(S)-dimethyl 2-(3-(o-tolyltellanyl)propanamido)succinate 7j. Yield: 70%; α_D^{20}= +19 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.67 (d, *J* = 7.6 Hz, 1H), 7.27-7.14 (m, 3H), 6.05 (d, *J* = 8.0 Hz, 1H), 4.86-4.84 (m, 1H), 3.75 (s, 3H), 3.68 (s, 3H), 3.11-3.01 (m, 3H), 2.90-2.73, (m, 3H), 2.44 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.01, 171.48, 171.01, 142.56, 137.47, 129.07, 127.95, 126.51, 116.31, 52.76, 51.97, 48.41, 38.00, 35.98, 26.51, 0.13; HRMS *m/z* calcd. for $C_{16}H_{21}NO_5Te$ + OMe 468.0666, found 468.0682.

(S)-dimethyl 2-(3-(4-methoxyphenyltellanyl)propanamido)succinate 7k. Yield: 62%; α_D^{20}= +24 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.72-7.67 (m, 2H), 6.78-6.73 (m, 2H), 6.50 (d, *J* = 7.6 Hz, 1H), 4.86-4.82 (m, 1H), 3.80 (s, 3H), 3.76 (s, 3H), 3.69 (s, 3H), 3.11-2.66 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.09, 171.56, 171.06, 141.06, 141.32, 140.27, 115.22, 100.60, 55.16, 52.84, 52.00, 48.42, 38.14, 36.02, 1.20; HRMS *m/z* calcd. for $C_{16}H_{21}NO_6Te$ 453.0431, found 453.0431.

(S)-dimethyl 2-(3-(4-chlorophenyltellanyl)propanamido)succinate 7l. Yield: 77%; α_D^{20}= +13 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.67-7.65 (m, 2H), 7.19-7.16 (m, 2H), 6.54 (d, *J* = 8.0 Hz, 1H), 4.86-4.82 (m, 1H), 3.76 (s, 3H), 3.69 (s, 3H), 3.56-3.00 (m, 3H), 2.87-2.78 (m, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.84, 170.96, 140.04, 134.31, 129.41, 109.68, 52.79, 52.01, 48.43, 37.92, 35.97, 1.54; HRMS *m/z* calcd. for $C_{15}H_{18}NO_5Te$ + OMe 488.0114, found 488.0136.

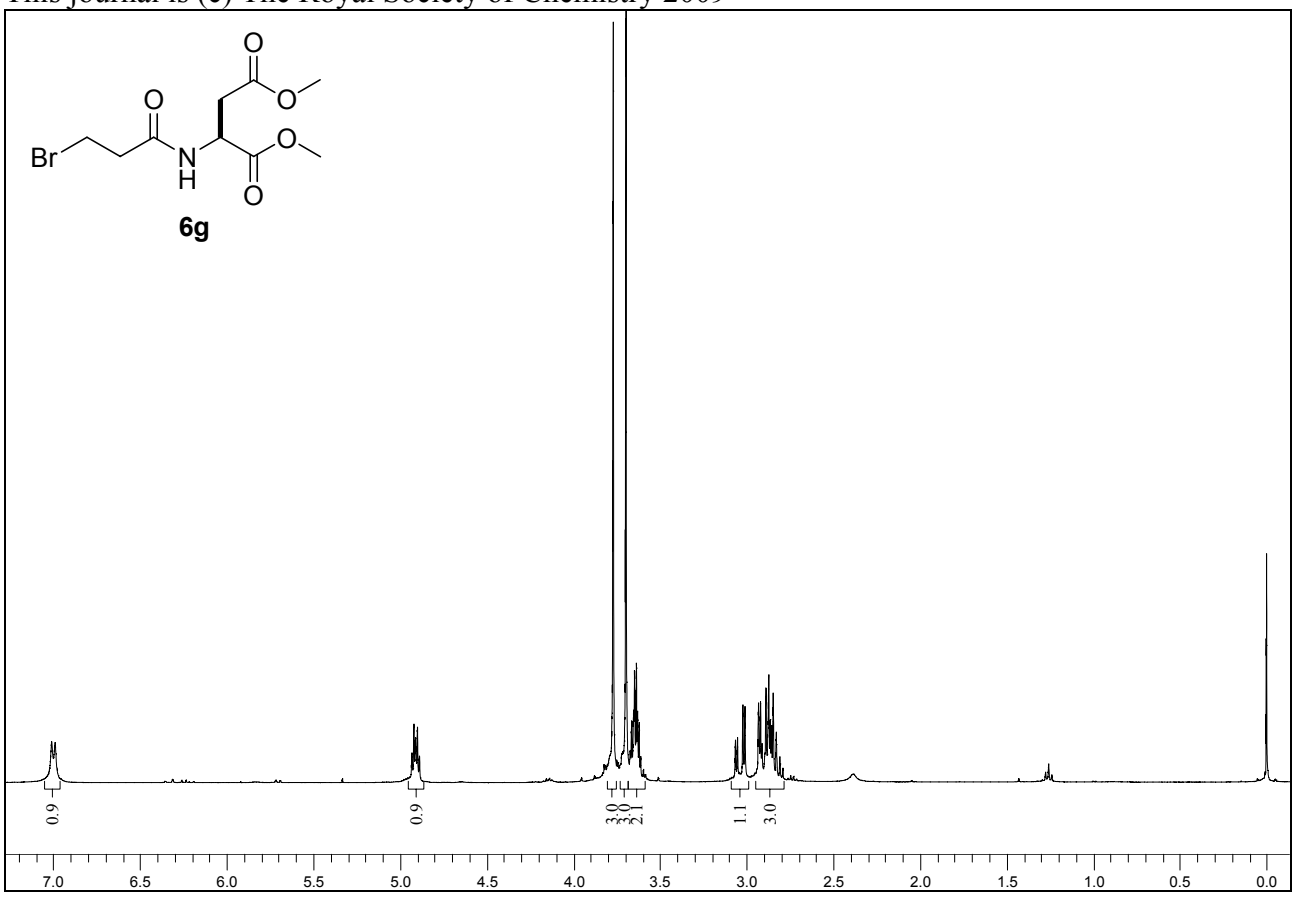
(S)-dimethyl 2-(3-(2-chlorophenyltellanyl)propanamido)succinate 7m. Yield: 60%; α_D^{20}= +17 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 7.54-7.51 (m, 1H), 7.35-7.33 (m, 1H), 7.20-7.09 (m, 2H), 6.60 (d, *J* = 8.0 Hz, 1H), 4.88-4.84 (m, 1H), 3.76 (s, 3H), 3.69 (s, 3H), 3.12-2.83 (m, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.98, 171.50, 170.97, 138.71, 135.84, 128.76, 128.42, 127.26, 116.94, 52.81, 52.03, 48.48, 37.53, 35.97, 0.97; HRMS *m/z* calcd. for $C_{15}H_{18}NO_5Te$ + OMe 488.0114, found 488.0097.

(S)-dimethyl 2-(3-(naphthalen-2-yltellanyl)propanamido)succinate 7n. Yield: 75%; α_D^{20}= +16 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 8.25 (s, 1H), 7.80-7.74 (m, 3H), 7.67-7.65 (m, 1H), 7.50-7.43 (m, 2H), 6.55 (d, *J* = 7.6 Hz, 1H), 4.86-4.79 (m, 1H), 3.73 (s, 3H), 3.66 (s, 3H), 3.13-2.97 (m 3H), 2.90-2.74 (m, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 171.96, 171.44, 170.95, 138.18, 135.17, 134.02, 128.28, 127.64, 127.18, 126.27, 109.26, 52.71, 51.95, 48.39, 38.07, 35.95, 1.15; HRMS *m/z* calcd. for $C_{19}H_{221}NO_5Te$ + OMe 504.0660, found 504.0681.

(S)-dimethyl 2-(3-(naphthalen-1-yltellanyl)propanamido)succinate 7o. Yield: 46%; α_D^{20}= +12 (*c* = 1.0, CH_2Cl_2); ^{1}H NMR ($CDCl_3$, 400 MHz): δ = 8.27 (d, *J* = 8.0 Hz, 1H), 8.13-8.10 (m, 1H), 7.84-7.78 (m, 2H), 7.57-7.48 (m, 2H), 7.33-7.29 (m, 1H), 6.46 (d, *J* = 8.0 Hz, 1H), 4.86-4.82 (m, 1H), 3.75 (s, 3H), 3.67 (s, 3H), 3.11-3.00 (m 3H), 2.88-2.69 (m, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ = 172.12, 171.54, 171.02, 139.42, 139.42, 132.41, 130.16, 129.49, 128.85, 126.24, 111.17, 52.81, 52.03, 48.44, 38.08, 36.02, 1.18; HRMS *m/z* calcd. for $C_{19}H_{21}NO_5Te$ + OMe 504.0660, found 504.0648.

Determination of GPX-like activity. Catalytic GPX model reaction (H_2O_2 + 2PhSH → 2H_2O + PhSSPh) was initiated by the addition of H_2O_2 (40 μL of a 125 mM solution, final concentration = 5 mmol/L) to a methanol solution of PhSH (200 μL of a 25 mM solution, final concentration = 5 mmol/L) containing the catalyst (50 μL of a 2 mM solution, final concentration = 0.1 mmol/L) at 30 ºC. The reaction was monitored by UV spectroscopy at 305 nm, (6 min), at least more than three times under the same conditions.

NMR Spectra of New Compounds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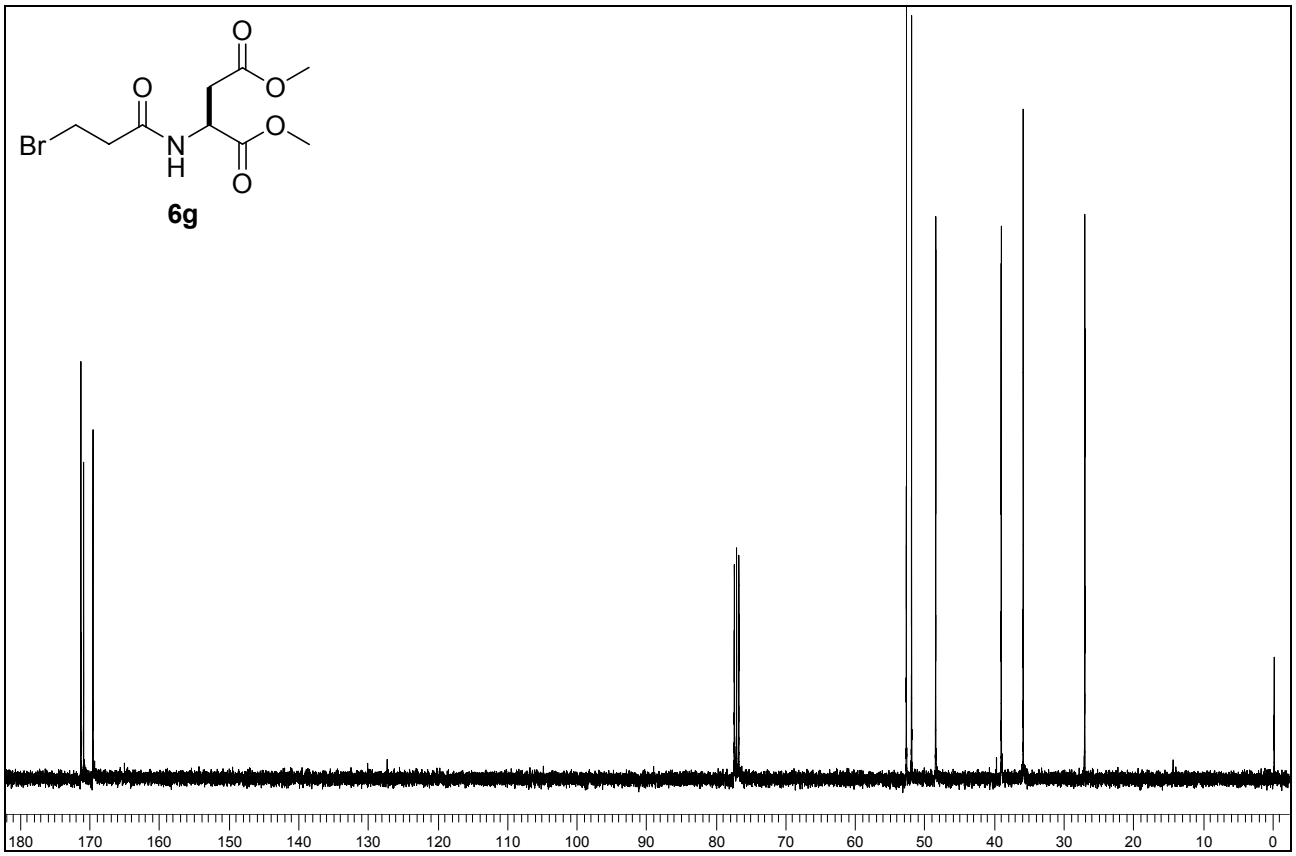
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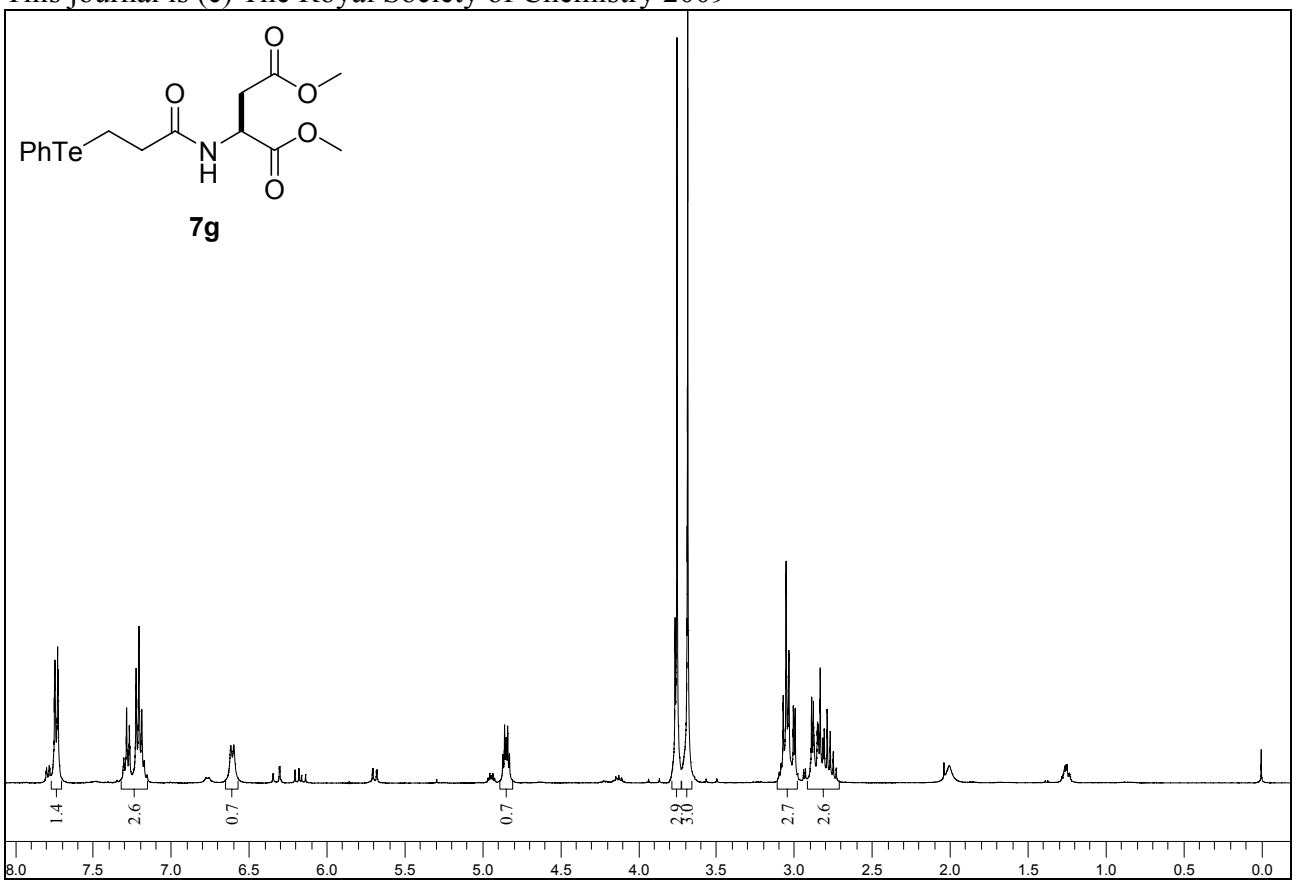
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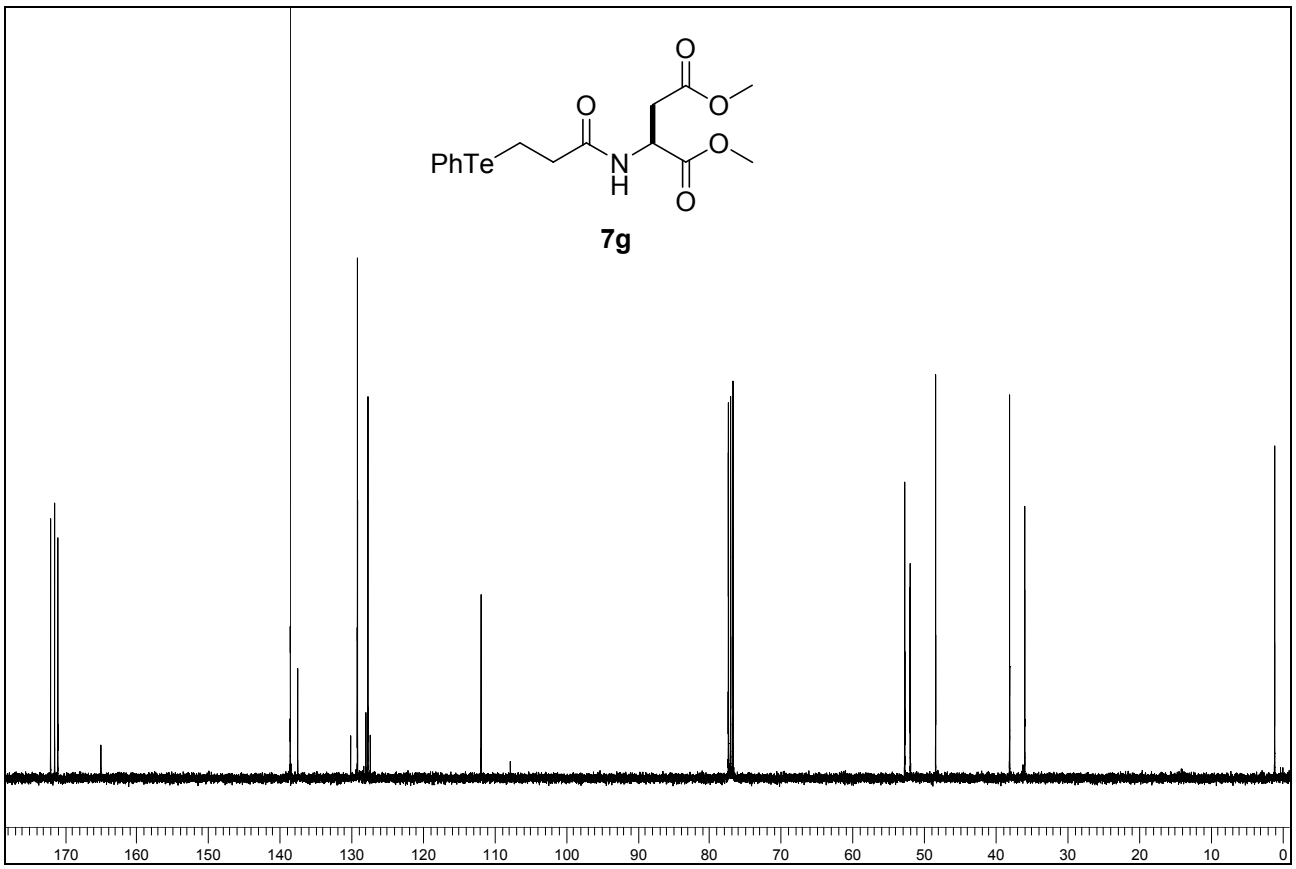
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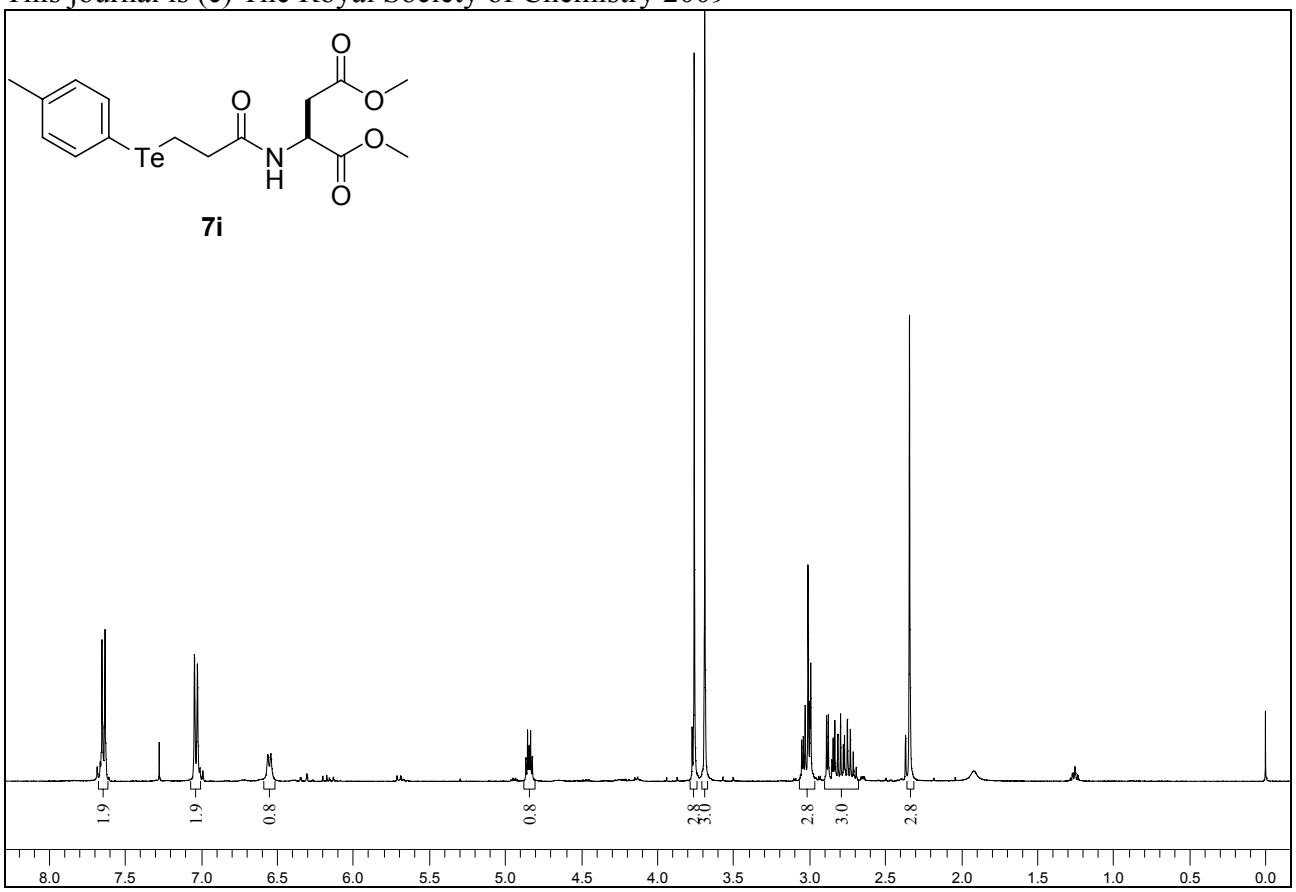
O
O
O
Te
O
N
H
O
7i
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1.9
0.8
0.8
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3.0
2.8
3.0
2.8
8.0
7.5
7.0
6.5
6.0
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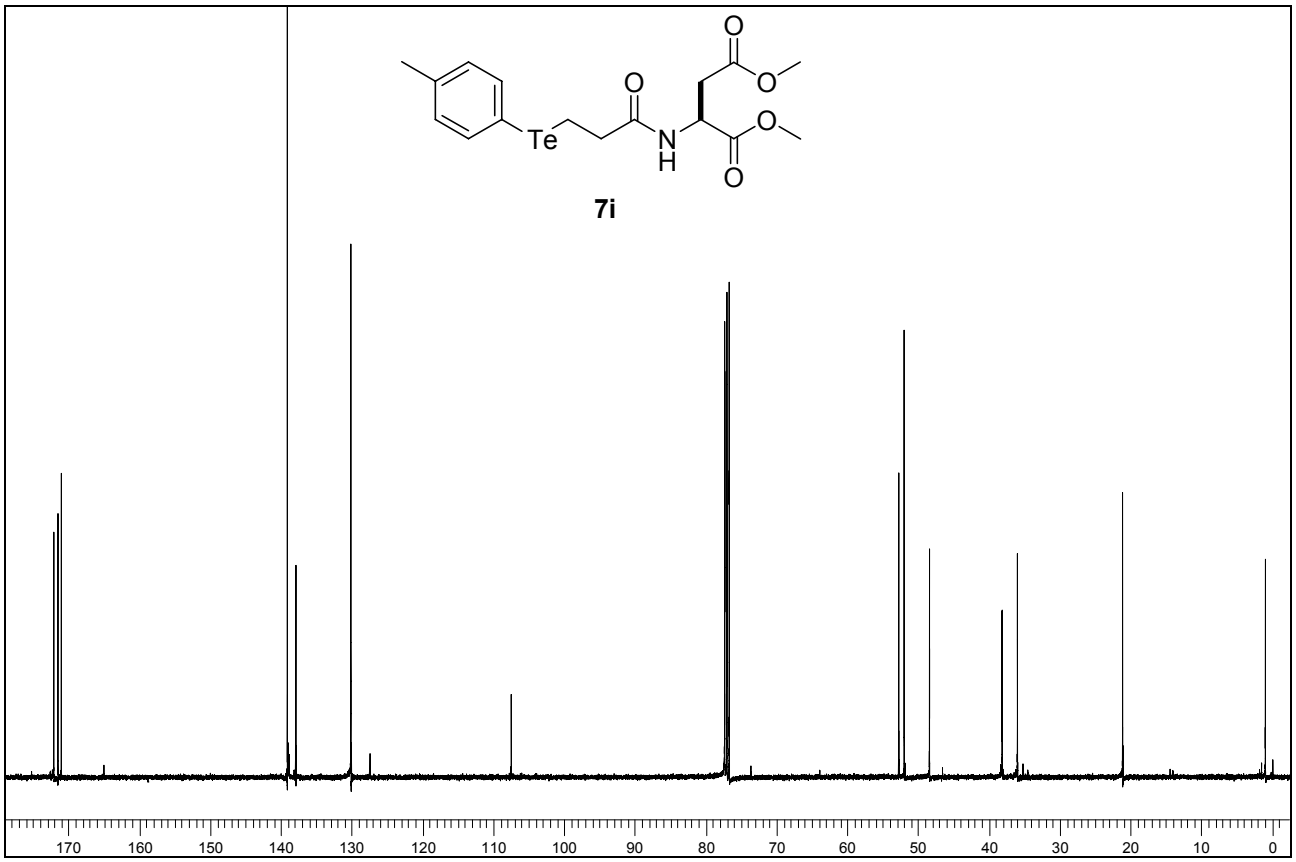
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O
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O
N
H
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7i
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30
20
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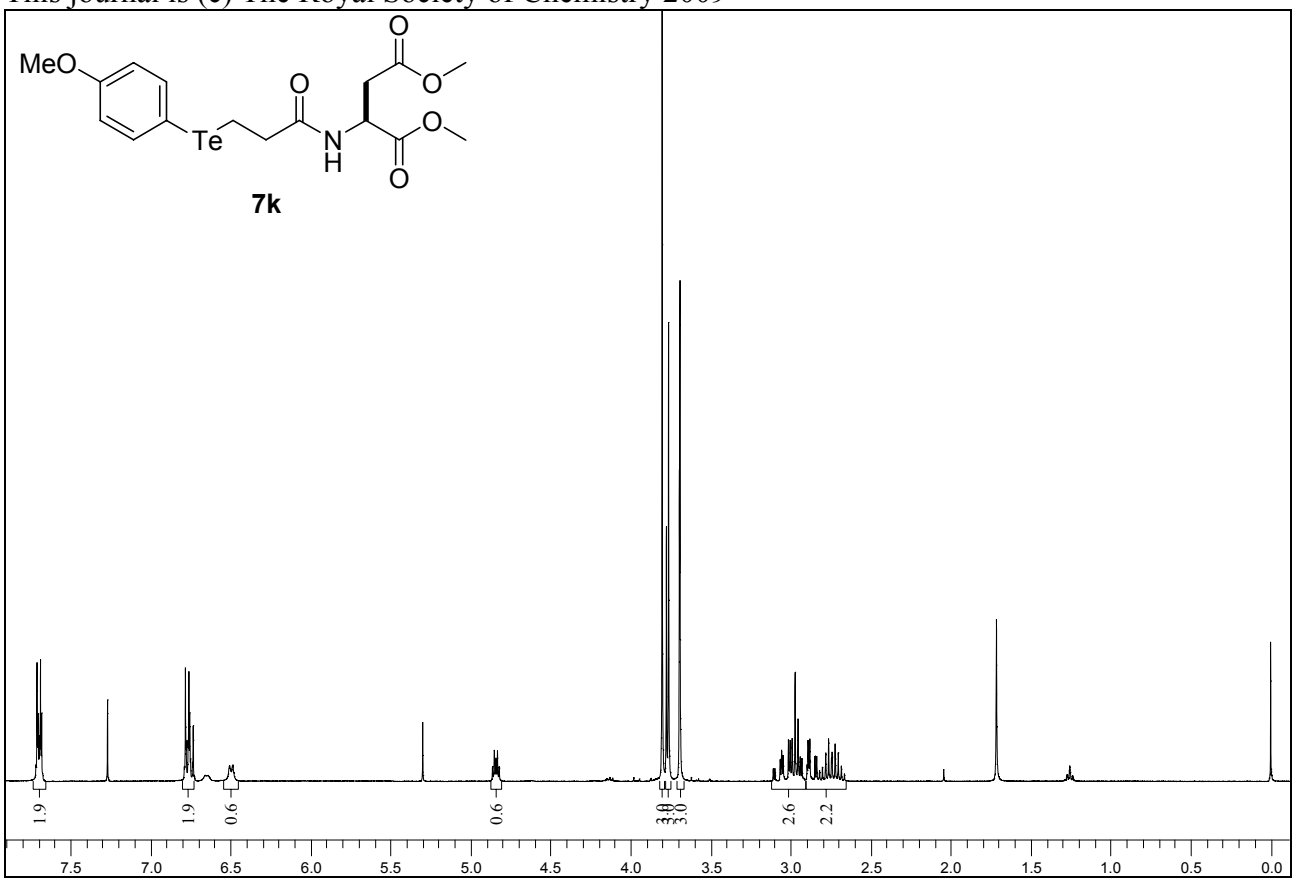

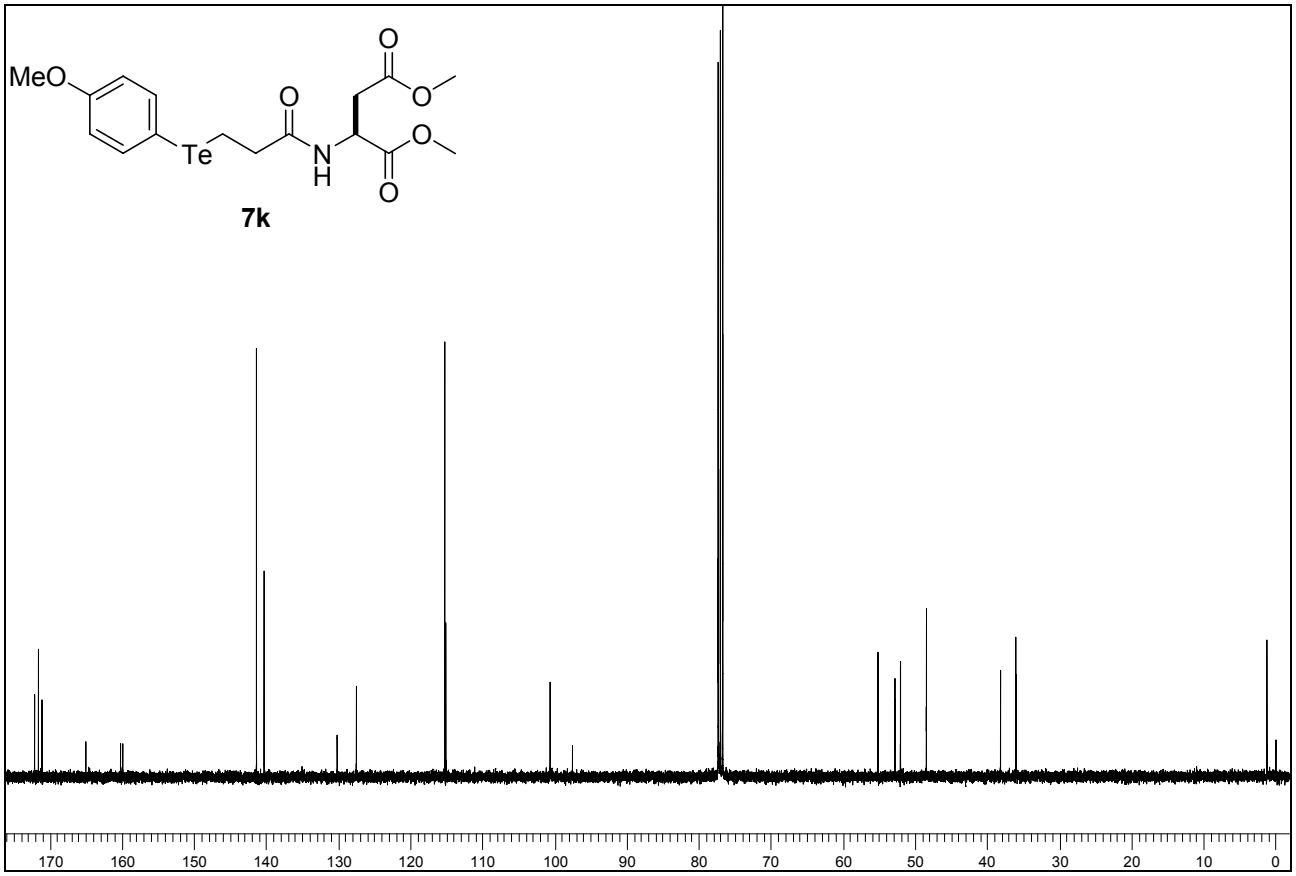

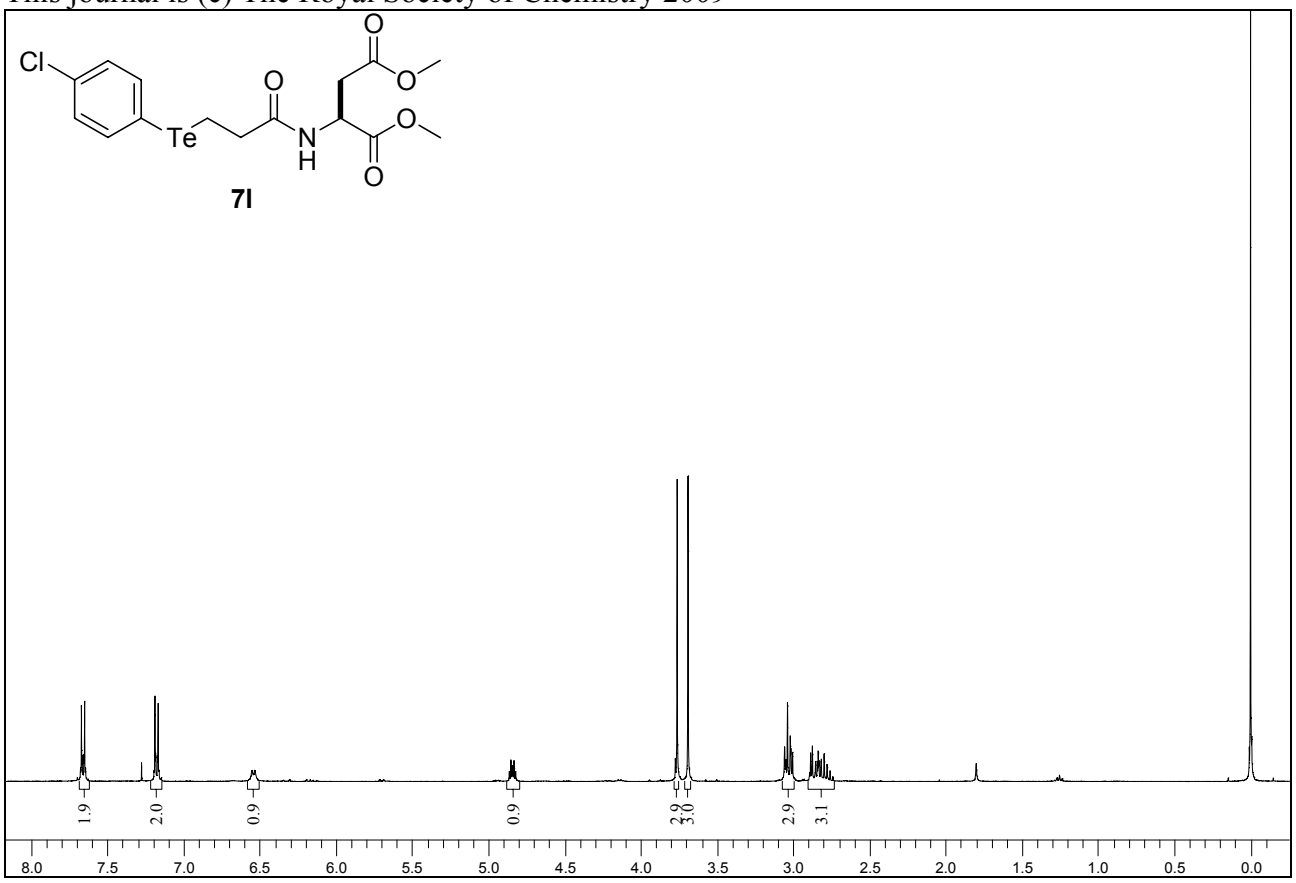

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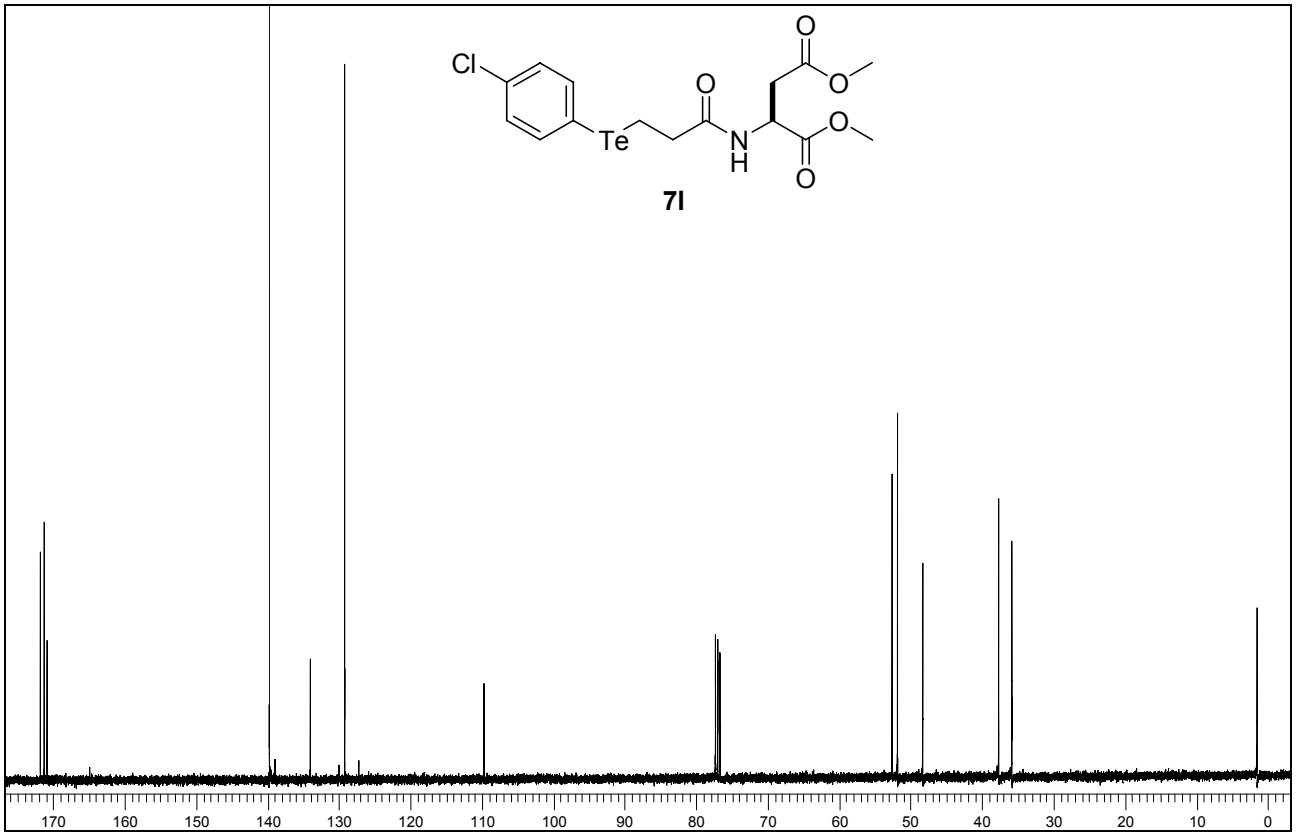
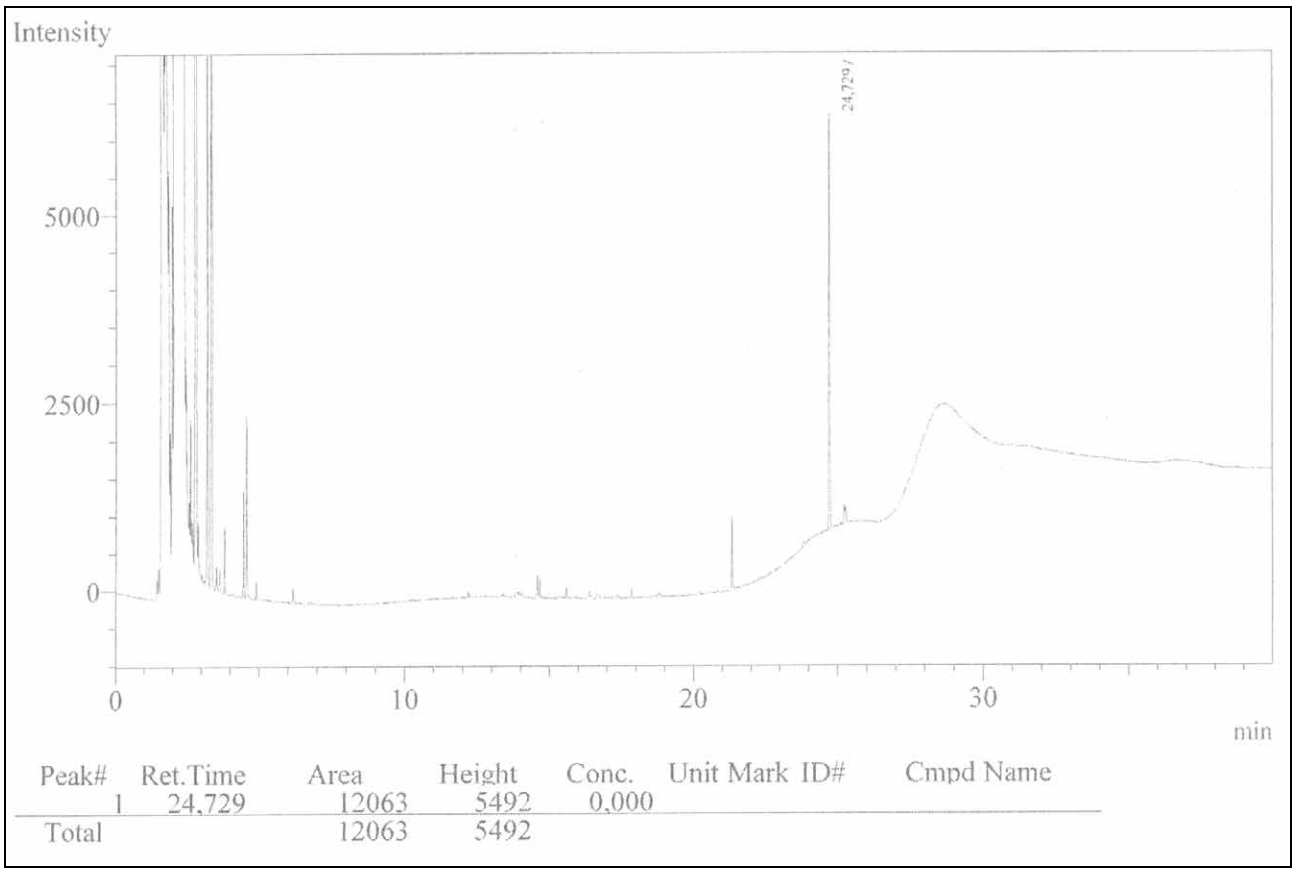
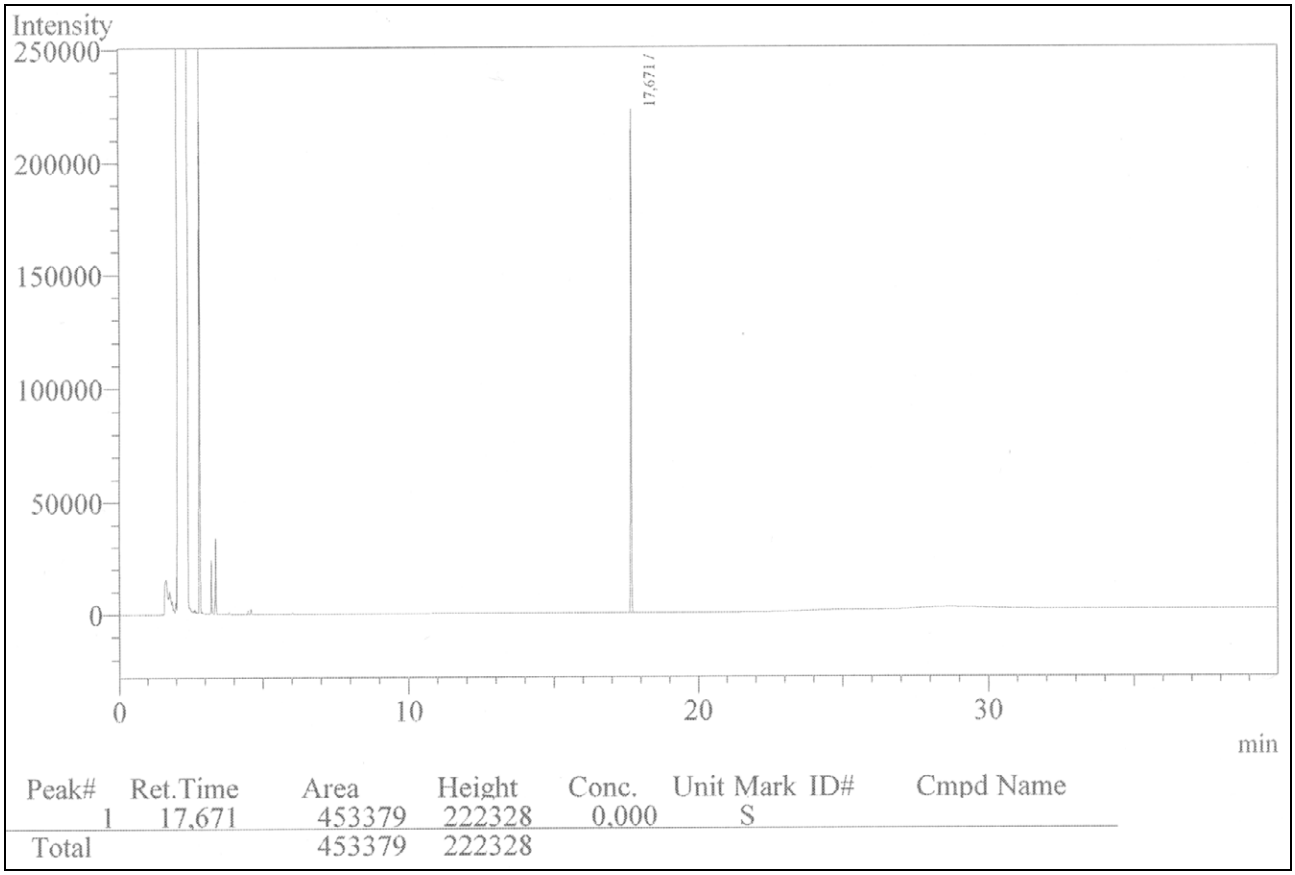


7l

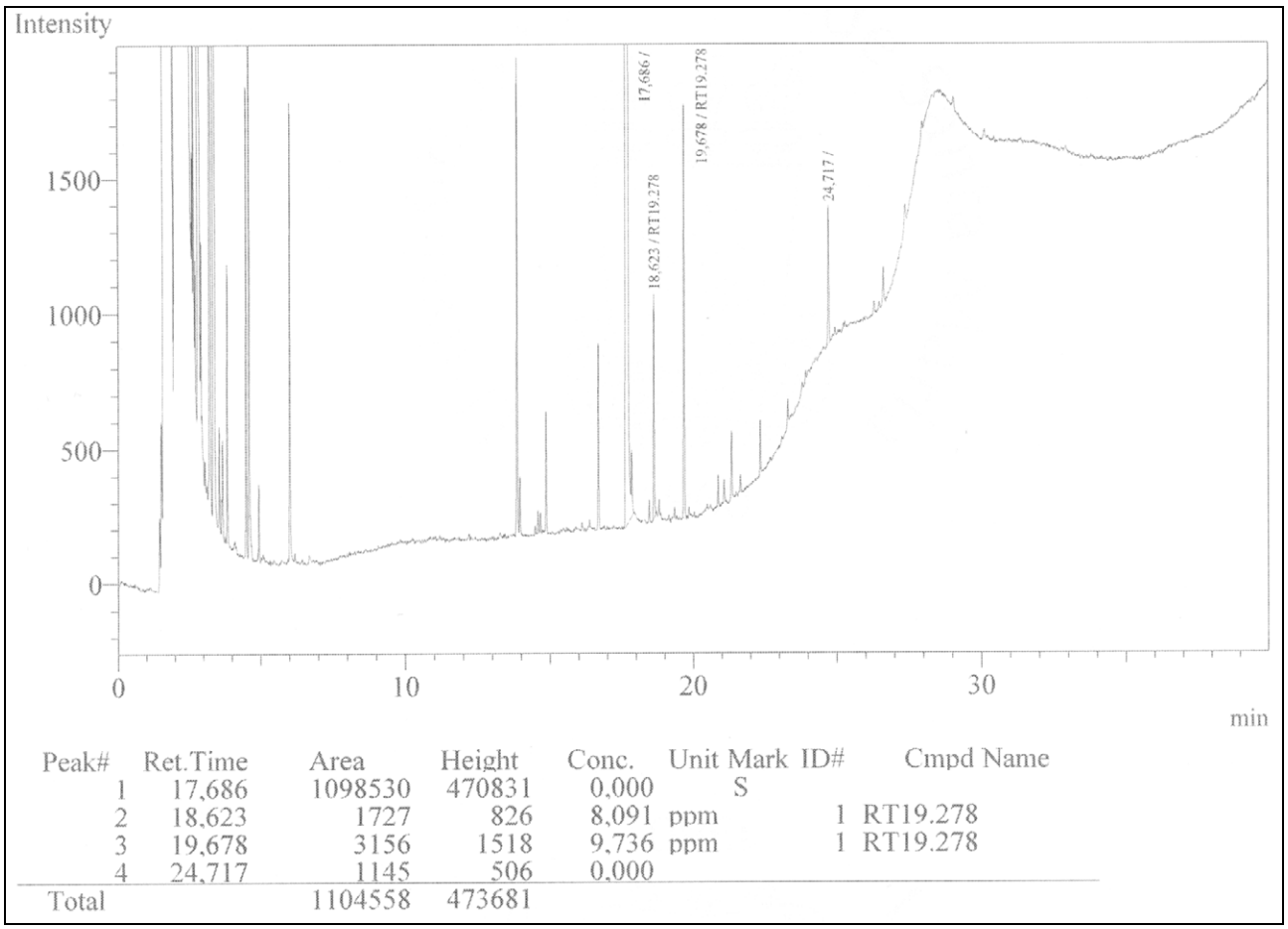
GC Analysis



GC run of compound **7g**

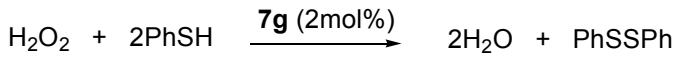


GC run of PhSSPh



Peak#	Ret.Time	Area	Height	Conc.	Unit	Mark	ID#	Cmpd Name
1	17.686	1098530	470831	0.000		S		
2	18.623	1727	826	8.091	ppm		1	RT19.278
3	19.678	3156	1518	9.736	ppm		1	RT19.278
4	24.717	1145	506	0.000				
Total		1104558	473681					

GC run of standard GPx like reaction:



[1] Still, W. C.; Kahn, M.; Mitra, A. *J. Org. Chem*. **1978**, *43*, 2923.