

Supporting Information

Continuous-Flow Step-Economic Synthesis of Thiuram Disulfides via Visible-Light Photocatalytic Aerobic Oxidation

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General Information

Reagents

Carbon disulfide (CAS 75-15-0) was purchased from Energy Chemical (99%). Diethylamine (CAS 109-89-7) was purchased from Aladdin (99%). Dimethylamine (CAS 124-40-3) was purchased from Merger (2

M in THF). Dibenzylamine (CAS 103-49-1) was purchased from Bidepharm (98.35%). Tetraethylthiuram disulfide (CAS 97-77-8) was purchased from Aladdin (97%). Tetramethylthiuram disulfide (CAS 137-26-8) was purchased from Macklin (97%). Tetrabenzylthiuram disulfide (CAS 10591-85-2) was purchased from Adamas-beta (98%). Eosin Y (CAS 152-75-0) was purchased from Macklin (AR 80%). Methylene Blue (CAS 61-73-4) was purchased from Adama-beta (>98%). Bromocresol Green sodium salt (CAS 62625-32-5) was purchased from Macklin. Bromocresol Purple (CAS 115-40-2) was purchased from General-Reagent. Rose Bengal sodium salt (CAS 632-69-9) was purchased from Shanghai Lingfeng Chemical Reagent Co., Ltd. Naphthalene (CAS 91-20-3) was purchased from Adama-beta (RG). Styrene (CAS 100-42-5) was purchased from Shanghai Lingfeng Chemical Reagent Co., Ltd. DMSO-*d*6 was purchased from CIL (99.9 atom% D). Ethanol (CAS 64-17-5) was purchased by Sinopharm Chemical Reagent Co., Ltd (AR, >99.7%). Methanol (CAS 67-56-1) was purchased from Sigma-Aldrich (HPLC grade, >99.9%). *N*-Ethylaniline (CAS 103-69-5) was purchased from Aladdin (99%). *N*-Methylaniline (CAS 100-61-8) was purchased from Aladdin. Dibutylamine (CAS 111-92-2) was purchased from Aladdin (99%). Piperidine (CAS 110-89-4) was purchased by Sinopharm Chemical Reagent Co., Ltd (AR, >99.5%). Dipropylamine (CAS 142-84-7) was purchased from Aladdin (99%). Morpholine (CAS 110-91-8) was purchased from Aladdin (AR 99%). Ethyl acetate (CAS 141-78-6) was purchased by Sinopharm Chemical Reagent Co., Ltd (AR). Petroleum ether (CAS 8032-32-4) was purchased by Nanjing Chemical Co., Ltd. Magnesium sulfate (CAS 7487-88-9) was purchased from Aladdin (>98%). Diphenylamine (CAS 122-39-4) was purchased from Aladdin (AR >99%, GC). Hydrochloric acid (7647-01-0) was purchased by Nanjing Chemical Co., Ltd (AR 36%~38%). Diisobutylamine (CAS 110-96-3) was purchased from Aladdin (99%). Silica gel (CAS 112926-00-8) was purchased by Qingdao Haiwan Specialty Chemical Co., Ltd. Silicon Dioxide (CAS 7631-8-9) was purchased from General-Reagent (AR). 1,3-diphenylisobenzofuran (CAS 5471-63-6) was purchased from Bidepharm (95%).

Instruments

Magnetic stirrer (C-MAG HS 7) was manufactured by IKA[®]. Back Pressure Regulator (model# P-786, 75 psi) was manufactured by IDEX. Tubing sleeves (model# CT210, 1/16" to 1/16", model# CT102, 1/8" to 1/16") was manufactured by IDEX. T-micromixer was manufactured by IDEX (model# CT-108, 1/16"). Microchannel (material# PTFE, 1/16") was manufactured by Zhejiang Jiari Fluoroplastic Co., Ltd. Mass-flow controller (model# YJ-700C) was manufactured by Guangxi Nanning Kongxin Instrument Co., Ltd. Plunger pump (model# TBP-5010) was manufactured by Shanghai Tauto Biotech Co., Ltd. Green LED strip lights (model# 2835, 13 W) was manufactured by Jingzheng Lighting Technology Co., Ltd.

Chromatography Conditions

HPLC analyses were performed on a Wufeng LC100 system with SHISEIDO CAPCELL PAK ADME S5 column (S-5 μm , 100 \AA , 4.6 mm I.D. \times 150 mm), at a detection wavelength of 254 nm and a flow rate of 0.5 mL/min, with water (pH = 3, adjusted with formic acid, as phase A) and methanol (as phase B) as the eluents. The isocratic eluents conditions were A:B = 1:9. Naphthalene was used as an internal standard.

NMR Spectra

¹H NMR spectra were collected on 400 MHz NMR spectrometers (Bruker AVANCE III). Chemical shifts

for protons are reported in parts per million (ppm) downfield and are referenced to residual protium in the NMR solvent (δ DMSO-*d*6 = 2.54). Data are presented as follows: chemical shift, multiplicity (*s* = singlet, *d* = doublet, *t* = triplet, *q* = quartet, *quint* = quintet, *m* = multiplet), coupling constants in Hertz (Hz), integration.

FT-IR

FT-IR was manufactured by Tianjin Gangdong Sci. & Tech. Development Co., Ltd. (model# FTIR-650, Spectrum range: 4000–400 cm^{-1}).

Mass Spectra

MS spectra were collected on the electrospray ionization (ESI) MS detection mode (SHIMADZU LCMS-2020).

UV-Vis Spectra

UV-Vis spectroscopy was recorded on UV-Vis spectrometer (SHIMADZU model# UV-2550) in 10 mm quartz cuvettes. Scan wavelength range was 300 to 700 nm.

Batch Reaction Procedures

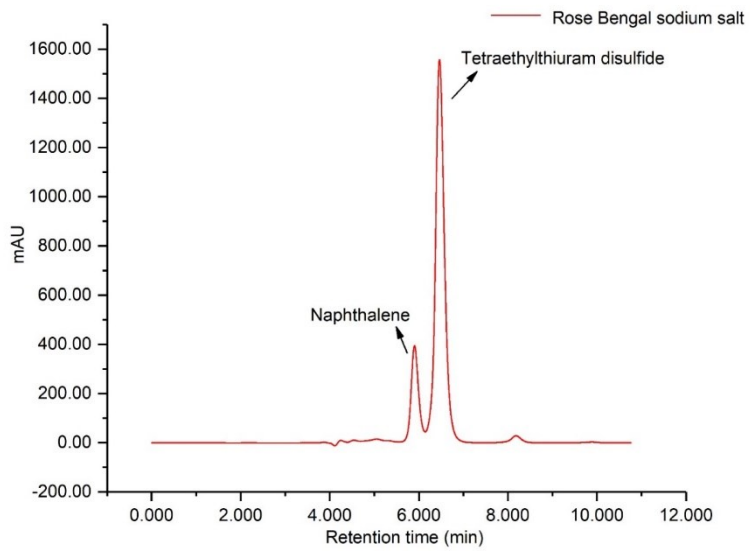
Procedure for Screening Light Sources in Batch

Carbon disulfide (66 μL , 1.1 mmol), ethanol (2 mL) and Eosin Y (1 mg, 0.002 mmol) were added in Vial **1**. Diethylamine (103 μL , 1 mmol) and ethanol (1 mL) were added in Vial **2**. The prepared solution in Vial **2** was added dropwise to Vial **1** upon stirring ([carbon disulfide] = 0.35 M, [dibenzylamine] = 0.32 M, [Eosin Y] = 0.00063 M). Vial **1** was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 3.5 h with irradiation from LED strip lights with green, blue and white colors. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, a small fraction (100 μL) of the resulting mixture was taken and diluted to 1.5 mL with ethanol, and added naphthalene (internal standard) for HPLC analysis.

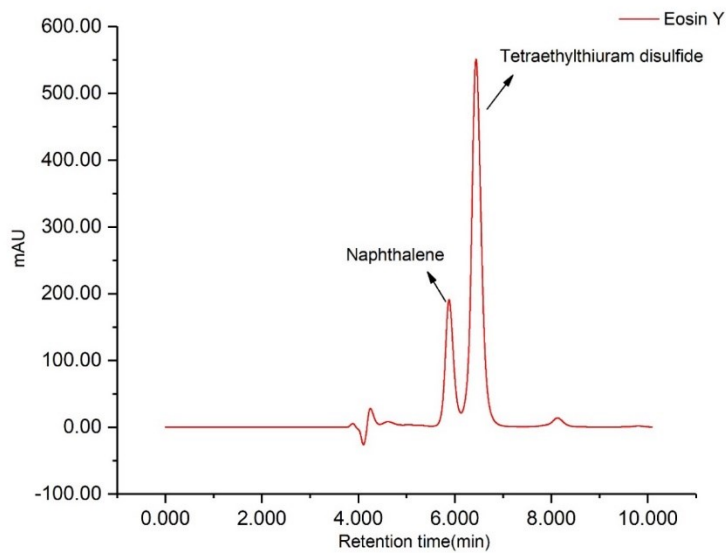
Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (2a) in Batch

Carbon disulfide (66 μL , 1.1 mmol), ethanol (2 mL) and the photocatalyst were added in a round-bottom flask. The investigated photocatalysts include methylene blue (1 mg, 0.002 mmol), bromocresol green (1 mg, 0.002 mmol), bromocresol purple (1 mg, 0.002 mmol), Eosin Y (1 mg, 0.002 mmol), rose bengal sodium salt (2 mg, 0.002 mmol). Then, diethylamine (103 μL , 1 mmol) and ethanol (1 mL) were added in a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [photocatalyst] = 0.00063 M). An oxygen balloon was attached to the flask and the mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 3.5 h with irradiation from a strip of 13 W green LED lights. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, a small fraction (100 μL) of the resulting mixture was taken and diluted to 1.5 mL with ethanol, and added naphthalene (internal standard)

for HPLC analysis.



retention time	height	area	concentration
5.907	403.060	5060.542	15.707
6.465	1563.740	22583.791	74.560



retention time	height	area	concentration
5.882	207.000	2994.227	19.818
6.440	564.020	8860.539	58.647

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Dipentamethylenethiuram Disulfide (2f) in Batch

Carbon disulfide (66 μL , 1.1 mmol), ethanol (2 mL) and Eosin Y (1 mg, 0.002 mmol) were added in Vial **1**. Piperidine (91 μL , 1 mmol) and ethanol (1 mL) were added in Vial **2**. The prepared solution in Vial **2** was added dropwise to Vial **1** upon stirring ([carbon disulfide] = 0.35 M, [piperidine] = 0.32 M, [Eosin Y] = 0.00063 M). An oxygen balloon was attached to Vial **1** and the mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) under irradiation from 13 W green LED strip lights at room temperature for 3.5 h. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, **2f** precipitated out as a reddish powder. After filtration and drying for 30 min at 50 °C, **2f** was isolated (0.122 g) with a yield of 76%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Dimorpholinethiuram Disulfide (2g) in Batch (with EtOH)

Carbon disulfide (66 μL , 1.1 mmol), ethanol (2 mL) and Eosin Y (1 mg, 0.002 mmol) were added in Vial **1**. Morpholine (87 μL , 1 mmol) and ethanol (1 mL) were added in Vial **2**. The prepared solution in Vial **2** was added dropwise to Vial **1** upon stirring ([carbon disulfide] = 0.35 M, [Morpholine] = 0.32 M, [Eosin Y] = 0.00063 M). An oxygen balloon was attached to Vial **1** and the mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) under irradiation from 13 W green LED strip lights at room temperature for 3.5 h. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, **2g** precipitated out as a white powder. After filtration and vacuum drying for 30 min at 50 °C, **2g** was isolated (0.103 g) with a yield of 64%. A small fraction (10 mg) of the product was taken for NMR and FT-IR analyses. ¹H NMR (400 MHz, CDCl₃) δ (ppm): 3.85 (t, 8H, J = 16 Hz), 4.31(s, 8H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Dimorpholinethiuram Disulfide (2g) in Batch (with MeOH)

Carbon disulfide (66 μL , 1.1 mmol), methanol (2 mL) and Eosin Y (1 mg, 0.002 mmol) were added in Vial **1**. Morpholine (87 μL , 1 mmol) and methanol (1 mL) were added in Vial **2**. The prepared solution in Vial **2** was added dropwise to Vial **1** upon stirring ([carbon disulfide] = 0.35 M, [morpholine] = 0.32 M, [Eosin Y] = 0.00063 M). An oxygen balloon was attached to Vial **1** and the mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) under irradiation from 13 W green LED strip lights at room temperature for 3.5 h. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, **2g** precipitated out as a white powder. After filtration and drying for 30 min at 50 °C, **2g** was isolated (0.055 g) with a yield of 34%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetrabenzylthiuram Disulfide (2h) in Batch (with EtOH)

Carbon disulfide (66 μL , 1.1 mmol), ethanol (2 mL) and Eosin Y (1 mg, 0.002 mmol) were added in

Vial 1. Dibenzylamine (192 μL , 1 mmol) and ethanol (1 mL) were added in Vial 2. The prepared solution in Vial 2 was added dropwise to Vial 1 upon stirring ([carbon disulfide] = 0.34 M, [dibenzylamine] = 0.31 M, [Eosin Y] = 0.00061 M). An oxygen balloon was attached to Vial 1 and the mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) under irradiation from 13 W green LED strip lights at room temperature for 3.5 h. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, **2h** precipitated out as a white powder. After filtration and drying for 30 min at 50 °C, **2h** was isolated (0.166 g) with a yield of 61%. A small fraction (10 mg) of the product was taken for NMR and FT-IR analyses. ¹H NMR (400 MHz, CDCl₃) δ (ppm): 7.34 (m, 20H), 5.36 (s, 4H), 5.19 (s, 4H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetrabenzylthiuram Disulfide (2h) in Batch (with MeOH)

Carbon disulfide (66 μL , 1.1 mmol), methanol (2 mL) and Eosin Y (1 mg, 0.002 mmol) were added in Vial 1. Dibenzylamine (192 μL , 1 mmol) and methanol (1 mL) were added in Vial 2. The prepared solution in Vial 2 was added dropwise to Vial 1 upon stirring ([carbon disulfide] = 0.34 M, [dibenzylamine] = 0.31 M, [Eosin Y] = 0.00061 M). An oxygen balloon was attached to Vial 1 and the mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) under irradiation from 13 W green LED strip lights at room temperature for 3.5 h. The distance between the reaction mixture and the light source was approximately 2 cm. Upon completion of the reaction, **2h** precipitated out as a white powder. After filtration and drying for 30 min at 50 °C, **2h** was isolated (0.142 g) with a yield of 52%.

Flow Reaction Procedures

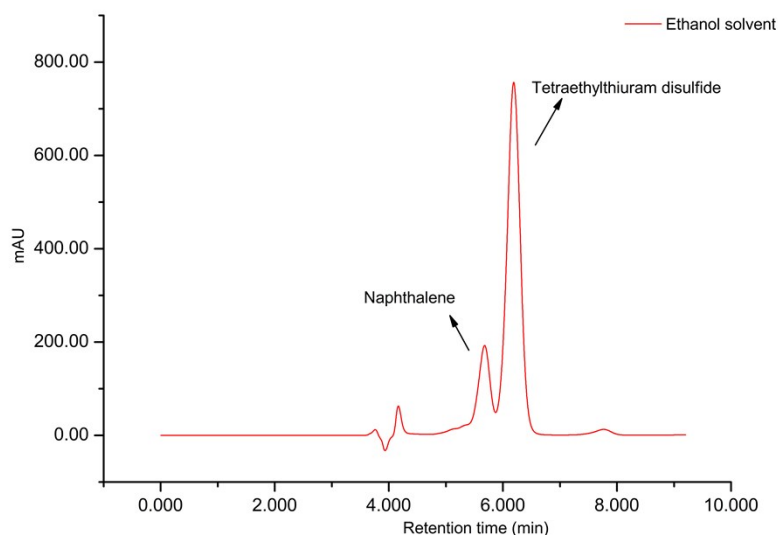
Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (2a) in Flow (Pressure Effect)

Carbon disulfide (265 μL , 4.4 mmol), ethanol (8 mL) and Eosin Y (6 mg, 0.008 mmol) were added in a round-bottom flask. Diethylamine (410 μL , 4 mmol) and ethanol (4 mL) were added in a vial. The prepared solution in the vial was added dropwise to the round-bottom flask upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution in the flask was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.2 MPa, 0.3 MPa, 0.4 MPa, 0.5 Mpa and 0.6 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, a small fraction (100 μL) of the resulting mixture was taken and diluted to 1.5 mL with ethanol, and added naphthalene (internal standard) for HPLC analysis.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (2a) in Flow (Retention Time Effect)

Carbon disulfide (265 μL , 4.4 mmol), ethanol (8 mL) and Eosin Y (6 mg, 0.008 mmol) were added in a

round-bottom flask. Diethylamine (410 μL , 4 mmol) and ethanol (4 mL) were added in a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution in the flask was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was adjusted to 1 min, 3 min, 5 min, 10 min, 20 min, 25 min and 30 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). A back-pressure regulator with 0.5 MPa was placed in a water bath of 50 $^{\circ}\text{C}$. Upon completion of the reaction, a small fraction (100 μL) of the resulting mixture was taken and diluted to 1.5 mL with ethanol, and added naphthalene (internal standard) for HPLC analysis.



retention time	height	area	concentration
5.680	212.090	4911.622	23.047
6.190	772.010	13550.590	63.584

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (2a) in Flow (the Optimized Conditions)

Carbon disulfide (1060 μL , 17.6 mmol), ethanol (32 mL) and Eosin Y (22 mg, 0.032 mmol) were added in a round-bottom flask (flask 1). To another flask (flask 2), diethylamine (1650 μL , 16 mmol) and ethanol (16 mL) were added. The prepared solution in flask 2 was added dropwise to flask 1 upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 $^{\circ}\text{C}$. Upon completion of

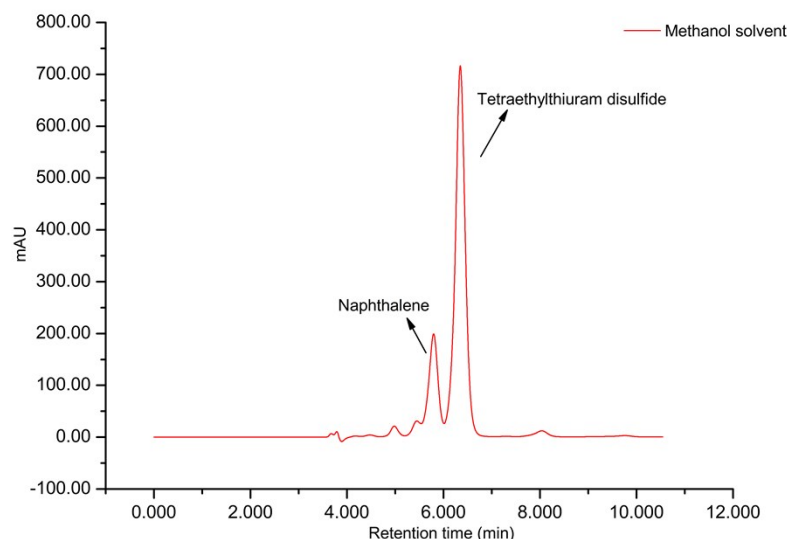
the reaction, a total of 36 mL reaction mixture was collected. Crude **2a** was obtained as a red crystal. After cold crystallization and filtration, **2a** was isolated as a red crystal. Washing with ethanol and drying for 30 min at 50 °C gave a colorless glassy crystal (1.590 g), with a yield of 94%. A small fraction (10 mg) of the products was taken for NMR, FT-IR and MS analyses. ¹H NMR (400 MHz, CDCl₃) δ (ppm): 4.03 (m, 8H), 1.30 (t, 6H, J = 8 Hz), 1.48 (t, 6H, J = 8 Hz).

Scale-up Experiment for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (2a) in Flow

Carbon disulfide (5980 μL, 99 mmol), ethanol (180 mL) and Eosin Y (126 mg, 0.18 mmol) were added in a round-bottom flask (flask **1**). To another flask (flask **2**), diethylamine (9270 μL, 90 mmol) and ethanol (90 mL) were added. The prepared solution in flask **2** was added dropwise to flask **1** upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [Eosin Y] = 0.00063 M). The solution was continuously stirred on a magnetic stirrer (IKA®-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, a total of 250 mL reaction mixture was collected in 25 h. Crude **2a** was obtained as a red crystal. After cold crystallization and filtration, **2a** was isolated as a red crystal. Washing with ethanol and drying at 50 °C for 30 min gave a colorless glassy crystal (11.240 g), with a yield of 96%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (2a) in Flow (with MeOH, Retention Time Effect)

Carbon disulfide (265 μL, 4.4 mmol), methanol (8 mL) and Eosin Y (6 mg, 0.008 mmol) were added in a round-bottom flask. Diethylamine (410 μL, 4 mmol) and methanol (4 mL) were added in a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA®-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was adjusted to 10 min, 15 min, 20 min, 25 min and 30 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator with 0.5 MPa was placed in a water bath of 50 °C. Upon completion of the reaction, a small fraction (100 μL) of the resulting mixture was taken and diluted to 1.5 mL with ethanol, and added naphthalene (internal standard) for HPLC analysis.



retention time	height	area	concentration
5.798	205.050	2946.570	18.300
6.348	720.750	10860.107	67.448

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraethylthiuram Disulfide (**2a**) in Flow (with MeOH, Optimized Retention Time)

Carbon disulfide (1060 μL , 17.6 mmol), methanol (32 mL) and Eosin Y (22 mg, 0.032 mmol) were added in a round-bottom flask (flask **1**). To another flask (flask **2**), diethylamine (1650 μL , 16 mmol) and methanol (16 mL) were added. The prepared solution in flask **2** was added dropwise to flask **1** upon stirring ([carbon disulfide] = 0.35 M, [diethylamine] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, a total of 12 mL reaction mixture was collected. Crude **2a** was obtained as a red crystal. After cold crystallization and filtration, **2a** was isolated as a red crystal. Washing with methanol and drying for 30 min at 50 °C gave a colorless glassy crystal (0.505 g), with a yield of 90%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetramethylthiuram Disulfide (**2b**) in Flow (with EtOH)

Carbon disulfide (1060 μL , 17.6 mmol), ethanol (32 mL) and Eosin Y (22 mg, 0.032 mmol) were added in a round-bottom flask (flask **1**). To another flask (flask **2**), dimethylamine (8 mL, 16 mmol) and ethanol (16 mL) were added. The prepared solution in flask **2** was added dropwise to flask **1** upon stirring ([carbon

disulfide] = 0.31 M, [dimethylamine] = 0.28 M, [Eosin Y] = 0.00056 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 5 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, a total of 33 mL reaction mixture was collected, and **2b** was obtained as a red powder. Evaporation of solvent by rotary evaporator and vacuum drying for 30 min at 50 °C gave **2b** as a red powder (0.585 g), with a yield of 53%. A small fraction (10 mg) of **2b** was taken for NMR, FT-IR and MS analyses. ¹H NMR (400 MHz, CDCl₃) δ (ppm): 3.61 (s, 6H), 3.64 (s, 6H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetramethylthiuram Disulfide (2b) in Flow (with MeOH)

Carbon disulfide (1060 μL, 17.6 mmol), methanol (32 mL) and Eosin Y (22 mg, 0.032 mmol) were added in a round-bottom flask (flask **1**). To another flask (flask **2**), dimethylamine (8 mL, 16 mmol) and methanol (16 mL) were added. The prepared solution in flask **2** was added dropwise to flask **1** upon stirring ([carbon disulfide] = 0.31 M, [dimethylamine] = 0.28 M, [Eosin Y] = 0.00056 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 6.5 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 7.5 mL of the resulting mixture was collected, and **2b** was obtained as a red powder. Evaporation of solvent by rotary evaporator and vacuum drying for 30 min at 50 °C gave **2b** as a reddish powder (0.108 g), with a yield of 43%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetrapropylthiuram Disulfide (2c) in Flow (with EtOH)

Carbon disulfide (396 μL, 6.6 mmol), ethanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Dipropylamine (822 μL, 6 mmol) and ethanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M, [dipropylamine] = 0.31 M, [Eosin Y] = 0.00062 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The resulting mixture was washed with H₂O (3 × 5 mL) and dried over MgSO₄. The solvent was removed under vacuum, and **2c** was obtained as a reddish powder (0.176 g) with a yield of 64%. A small fraction (10 mg) of the product was taken for NMR, FT-IR

and MS analyses. ^1H NMR (400 MHz, CDCl_3) δ (ppm): 0.93 (t, 6H, J = 6 Hz), 1.03 (t, 6H, J = 8 Hz), 1.79 (t, 4H, J = 6 Hz), 1.94 (t, 4H, J = 8 Hz), 3.90 (m, 8H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetrapropylthiuram Disulfide (2c) in Flow (with MeOH)

Carbon disulfide (396 μL , 6.6 mmol), methanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Dipropylamine (822 μL , 6 mmol) and methanol (6 mL) were added to a Vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M, [dipropylamine] = 0.31 M, [Eosin Y] = 0.00062 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The mixture was washed with H_2O (3 \times 5 mL) and dried over MgSO_4 . The solvent was removed under vacuum, and **2c** was obtained as a reddish powder (0.189 g) with a yield of 69%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetrabutylthiuram Disulfide (2d) in Flow (with EtOH)

Carbon disulfide (396 μL , 6.6 mmol), ethanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Dibutylamine (1011 μL , 6 mmol) and ethanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M, [dibutylamine] = 0.31 M, [Eosin Y] = 0.00062 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. Crude **2d** was purified by column chromatography over silica gel. The solvent was removed under vacuum, and **2d** was obtained as a yellowish liquid (0.190 g) with a yield of 60%. A small fraction (10 mg) of the product was taken for NMR, FT-IR and MS analyses. ^1H NMR (400 MHz, CDCl_3) δ (ppm): 0.94 (t, 6H, J = 8 Hz), 1.01 (d, 6H, J = 8 Hz), 3.94 (m, 8H), 1.89 (m, 4H), 1.73 (m, 4H), 1.45 (m, 4H), 1.35 (m, 4H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetrabutylthiuram Disulfide (2d) in Flow (with MeOH)

Carbon disulfide (396 μL , 6.6 mmol), methanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Dibutylamine (1011 μL , 6 mmol) and methanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M,

[dibutylamine] = 0.31 M, [Eosin Y] = 0.00062 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. Crude **2d** was purified by column chromatography over silica gel. The solvent was removed under vacuum, and **2d** was obtained as a yellowish liquid (0.228 g) with a yield of 72%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraisobutylthiuram Disulfide (2e) in Flow (with EtOH)

Carbon disulfide (396 μ L, 6.6 mmol), ethanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Diisobutylamine (1047 μ L, 6 mmol) and ethanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M, [diisobutylamine] = 0.31 M, [Eosin Y] = 0.00062 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. Crude **2e** was purified by column chromatography over silica gel. The solvent was removed under vacuum, and **2e** was obtained as a yellowish powder (0.123 g) with a yield of 39%. A small fraction (10 mg) of the product was taken for NMR, FT-IR and MS analyses. ¹H NMR (400 MHz, CDCl₃) δ (ppm): 0.93 (d, 12H, J = 8 Hz), 1.04 (d, 12H, J = 8 Hz), 3.85 (t, 8H, J = 8 Hz), 2.50 (m, 4H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Tetraisobutylthiuram Disulfide (2e) in Flow (with MeOH)

Carbon disulfide (396 μ L, 6.6 mmol), methanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Diisobutylamine (1047 μ L, 6 mmol) and methanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M, [diisobutylamine] = 0.31 M, [Eosin Y] = 0.00062 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. Crude **2e** was purified by column chromatography over silica gel. The solvent was removed under vacuum, and **2e** was obtained as a yellowish powder (0.146

g) with a yield of 46%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Dipentamethylenethiuram Disulfide (2f) in Flow

Carbon disulfide (396 μL , 6.6 mmol), methanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. Piperidine (547 μL , 6 mmol) and methanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.35 M, [piperidine] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The mixture was condensed under vacuum and the residue was dissolved in CH_2Cl_2 . The solution was washed with 0.2 M HCl (3 \times 5 mL) and dried over MgSO_4 . The solvent was removed under vacuum to give a reddish powder **2f** (0.168 g), with a yield of 66%. A small fraction (10 mg) of the product was taken for NMR, FT-IR and MS analyses. ¹H NMR (400 MHz, CDCl_3) δ (ppm): 1.77 (s, 12H), 4.22 (s, 8H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to *N,N'*-Dimethyldiphenylthiuram Disulfide (2i) in Flow (with EtOH)

Carbon disulfide (396 μL , 6.6 mmol), ethanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. *N*-Methylaniline (650 μL , 6 mmol) and ethanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.35 M, [*N*-methylaniline] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The resulting mixture was condensed under vacuum and the residue was dissolved in CH_2Cl_2 . The solution was washed with 0.2 M HCl (3 \times 5 mL) and dried over MgSO_4 . The solvent was removed under vacuum to give a reddish powder **2i** (0.033 g), with a yield of 12%. A small fraction (10 mg) of the product was taken for NMR, FT-IR and MS analyses. ¹H NMR (400 MHz, CDCl_3) δ (ppm): 3.82 (s, 6H), 7.48 (m, 10H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to *N,N'*-Dimethyldiphenylthiuram Disulfide (2i) in Flow (with MeOH)

Carbon disulfide (396 μL , 6.6 mmol), methanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. *N*-Methylaniline (650 μL , 6 mmol) and methanol (6 mL) were added to a vial. The

prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.35 M, [*N*-methylaniline] = 0.32 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The mixture was condensed under vacuum and the residue was dissolved in CH₂Cl₂. The solution was washed with 0.2 M HCl (3 × 5 mL) and dried over MgSO₄. The solvent was removed under vacuum to give a reddish powder **2i** (0.043 g), with a yield of 15%.

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Diethyldiphenylthiuram Disulfide (2j) in Flow (with EtOH)

Carbon disulfide (396 µL, 6.6 mmol), ethanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. *N*-Ethylaniline (755 µL, 6 mmol) and ethanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.34 M, [*N*-ethylaniline] = 0.31 M, [Eosin Y] = 0.00063 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 25 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The mixture was condensed under vacuum and the residue was dissolved in CH₂Cl₂. The solution was washed with 0.2 M HCl (3 × 5 mL) and dried over MgSO₄. The solvent was removed under vacuum to give a reddish powder **2j** (0.026 g), with a yield of 9%. A small fraction (10 mg) of the product was taken for NMR and FT-IR analyses. ¹H NMR (400 MHz, CDCl₃) δ (ppm): 1.28 (t, 6H, J = 8 Hz), 4.35 (q, 4H, J = 8 Hz), 7.45 (m, 10H).

Procedure for the Photocatalytic Aerobic Oxidation of Thiols to Diethyldiphenylthiuram Disulfide (2j) in Flow (with MeOH)

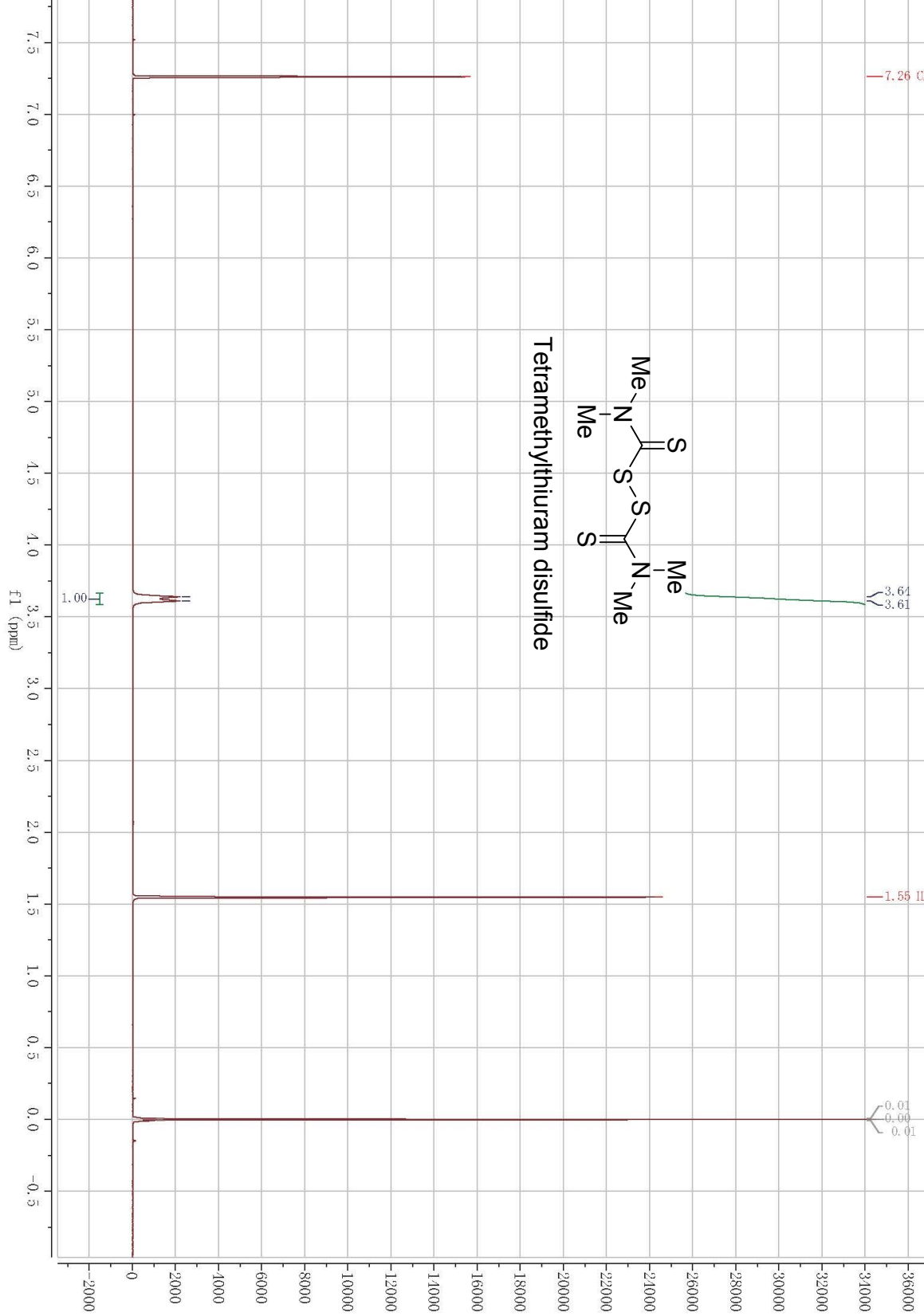
Carbon disulfide (396 µL, 6.6 mmol), methanol (12 mL) and Eosin Y (8 mg, 0.012 mmol) were added in a round-bottom flask. *N*-Ethylaniline (755 µL, 6 mmol) and methanol (6 mL) were added to a vial. The prepared solution in the vial was added dropwise to the flask upon stirring ([carbon disulfide] = 0.367 M, [*N*-ethylaniline] = 0.333 M, [Eosin Y] = 0.000667 M). The mixture was continuously stirred on a magnetic stirrer (IKA[®]-C-MAG HS 7) at room temperature for 30 min. The solution was introduced into the microreactor set-up with a plunger pump (model# TBP-5010). The pump and the mass-flow controller were operated at a volume ratio of liquid/oxygen of 1:2. The retention time was 20 min. The liquid hold-up of microchannel was 10 mL. The microchannel was irradiated with green LED light strips (13 W). The back-pressure regulator was adjusted to 0.5 MPa, and was placed in a water bath of 50 °C. Upon completion of the reaction, 5 mL of the resulting mixture was collected. The mixture was condensed under vacuum and the

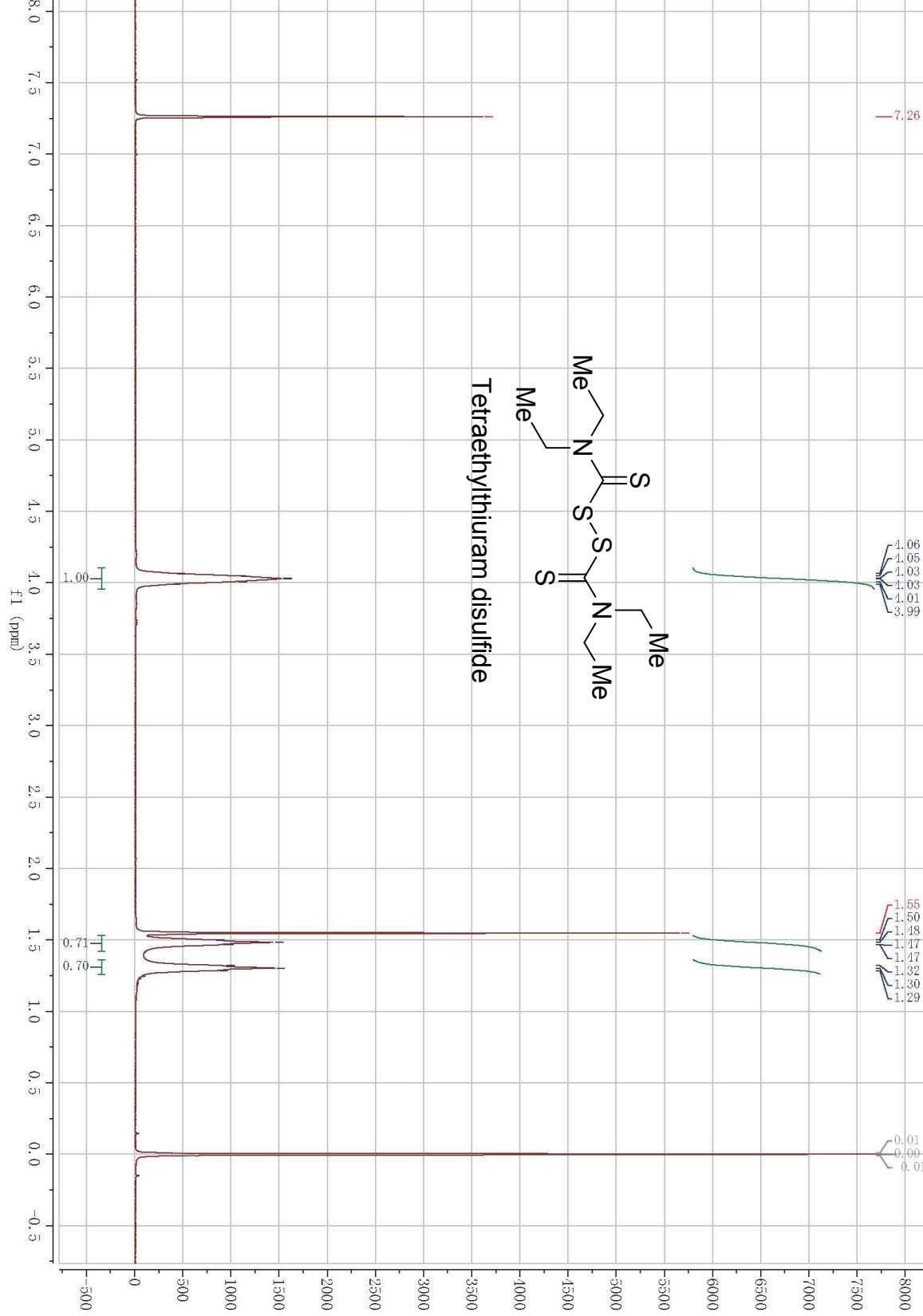
residue was dissolved in CH₂Cl₂. The solution was washed with 0.2 M HCl (3 × 5 mL) and dried over MgSO₄. The solvent was removed under vacuum to give a reddish powder **2j** (0.065 g), with a yield of 21%.

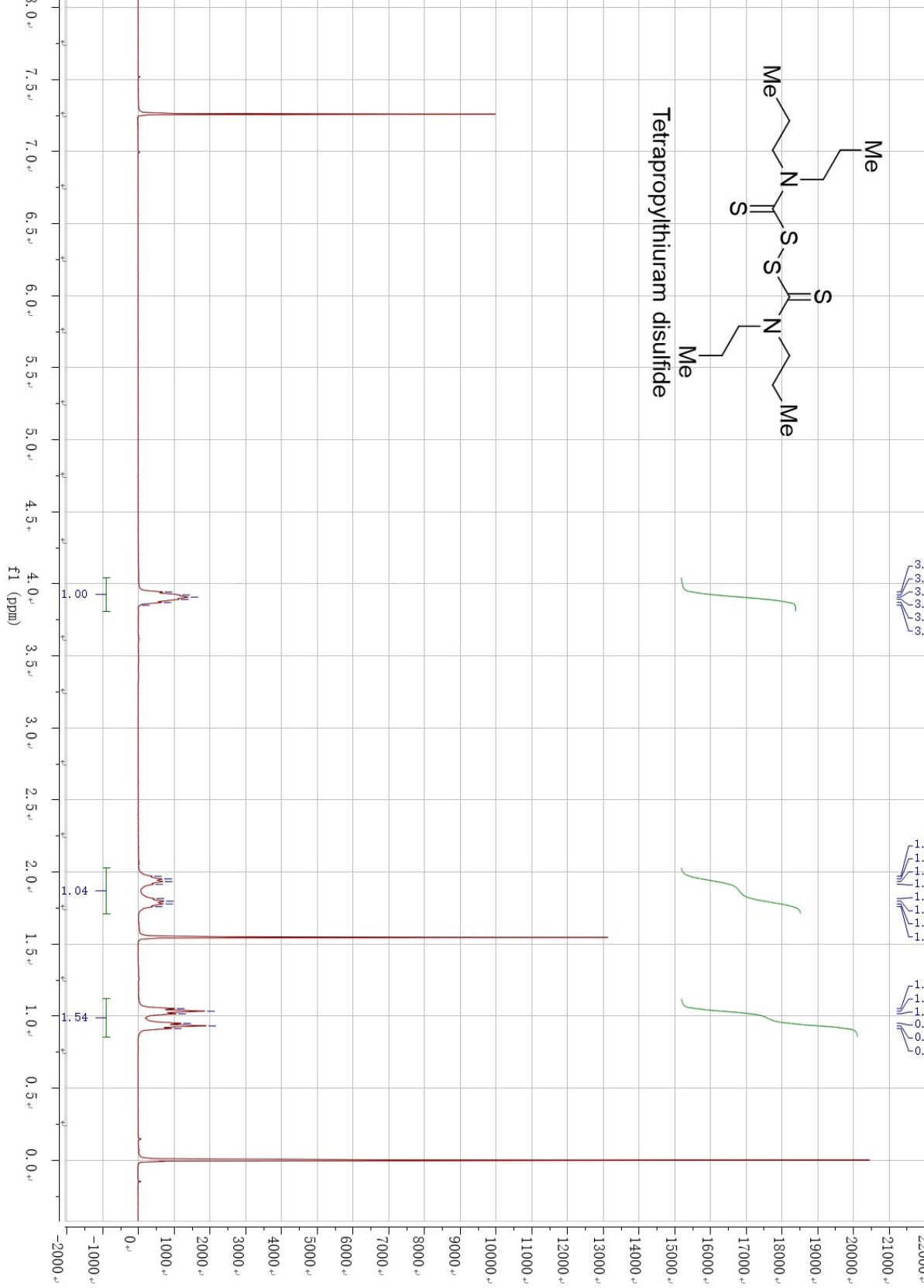
Singlet Oxygen (¹O₂) Trapping Experiment

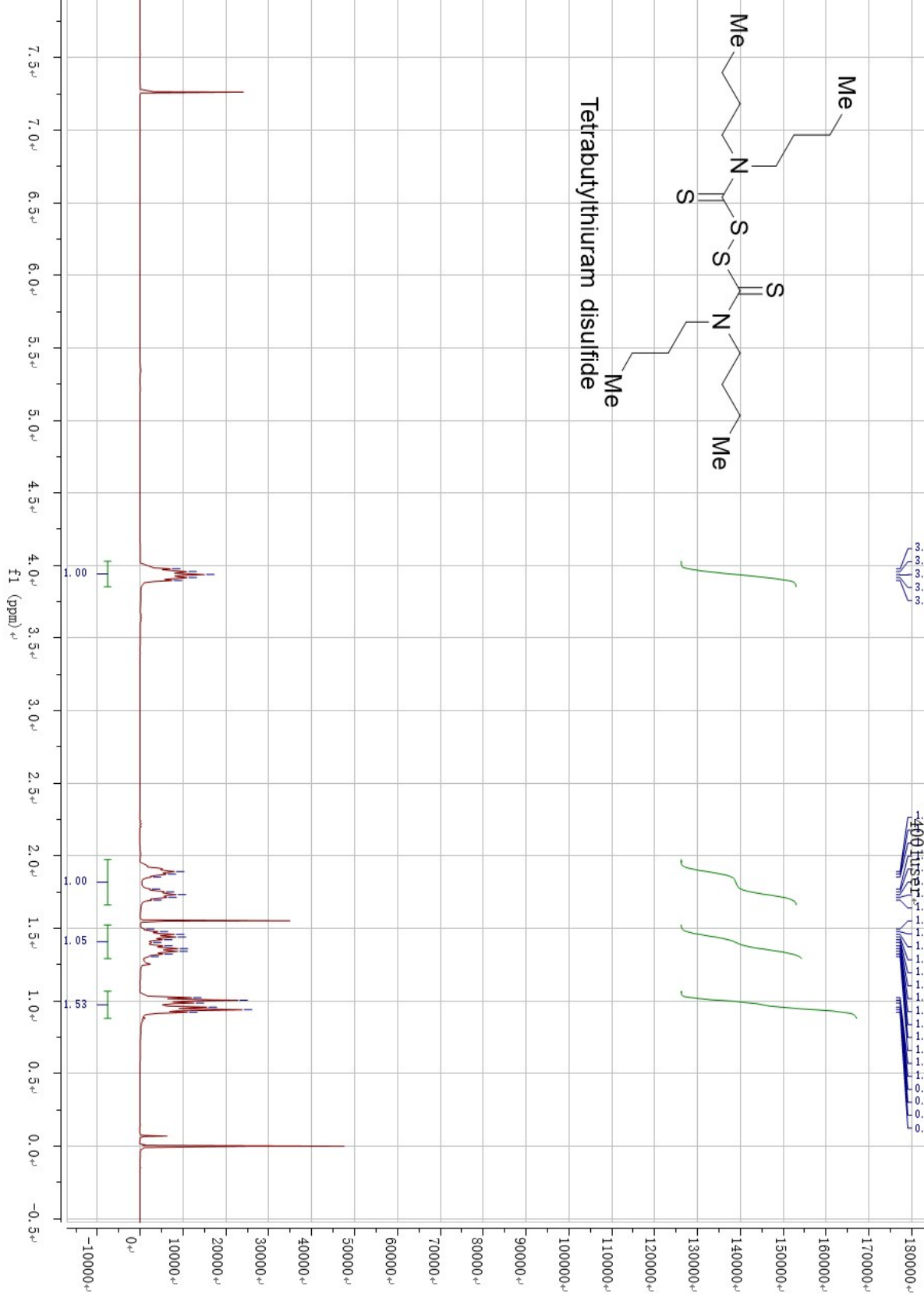
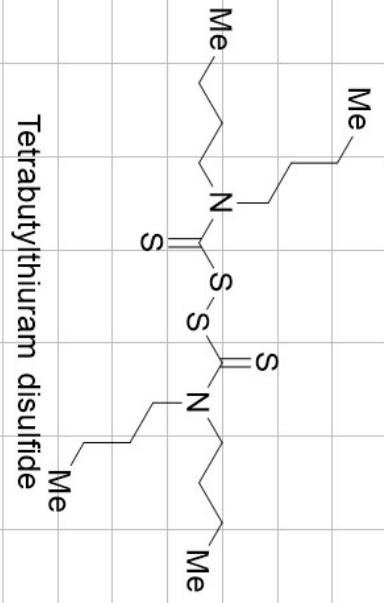
Eosin Y (14 mg, 0.02 mmol), 1,3-diphenylisobenzofuran (DPBF, 5 mg, 0.02 mmol) and ethanol (3 mL) were added in a vial upon stirring on a magnetic stirrer (IKA[®]-C-MAG HS 7) under irradiation from 13 W green LED strip lights at room temperature for 3.5 h ([Eosin Y] = 0.0066 M, [DPBF] = 0.0066 M). An oxygen balloon was attached to the vial. The distance between the reaction mixture and the light source was approximately 2 cm. A small fraction (100 μL) of the reaction mixture was taken for UV-Vis (SHIMADZU #UV-2550) analyses at reaction times of 0 min, 60 min, 120 min and 210 min.

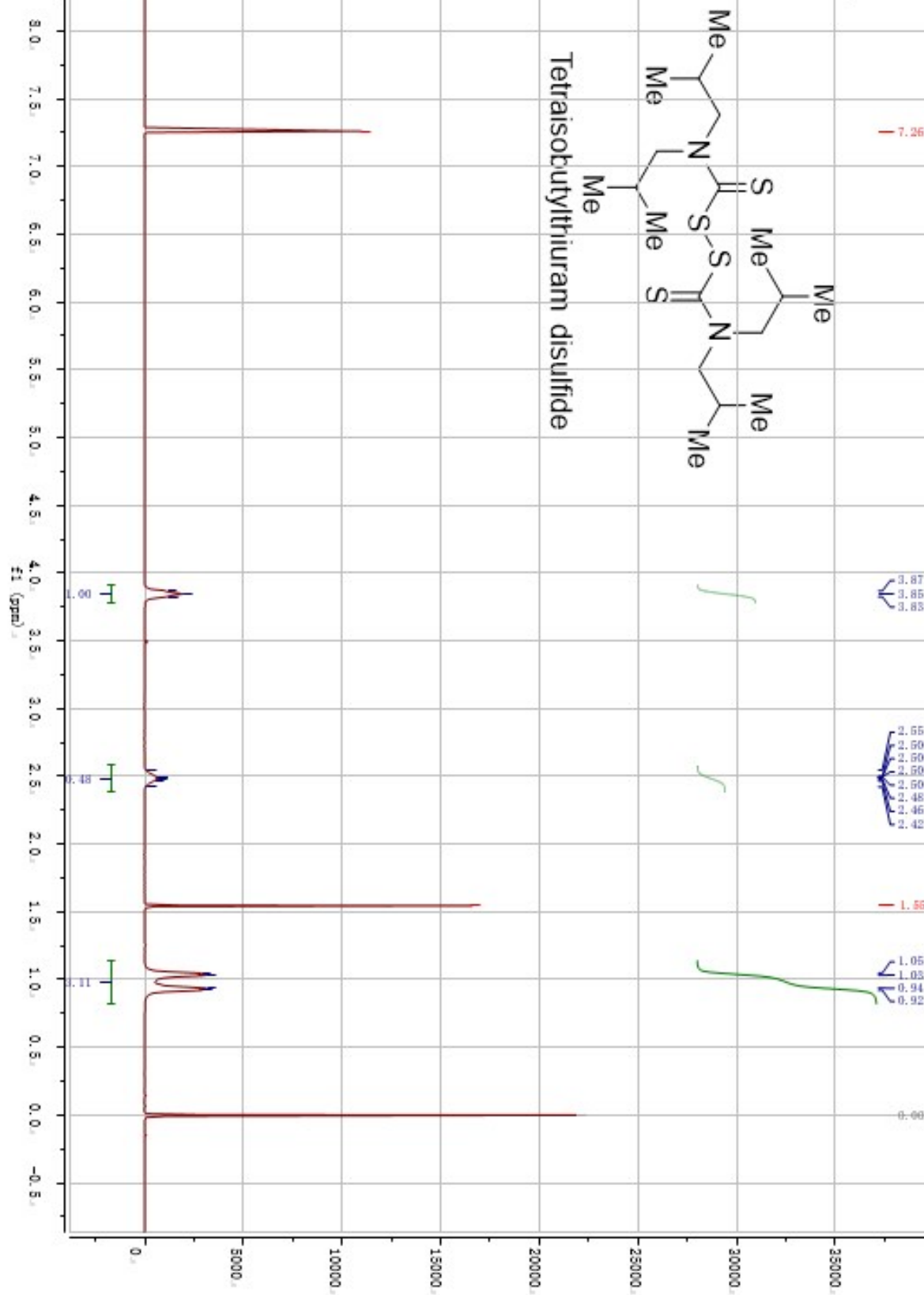
NMR Spectra (see next page)

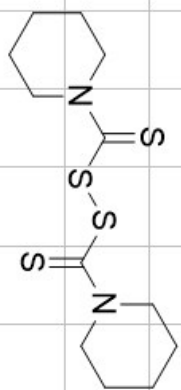




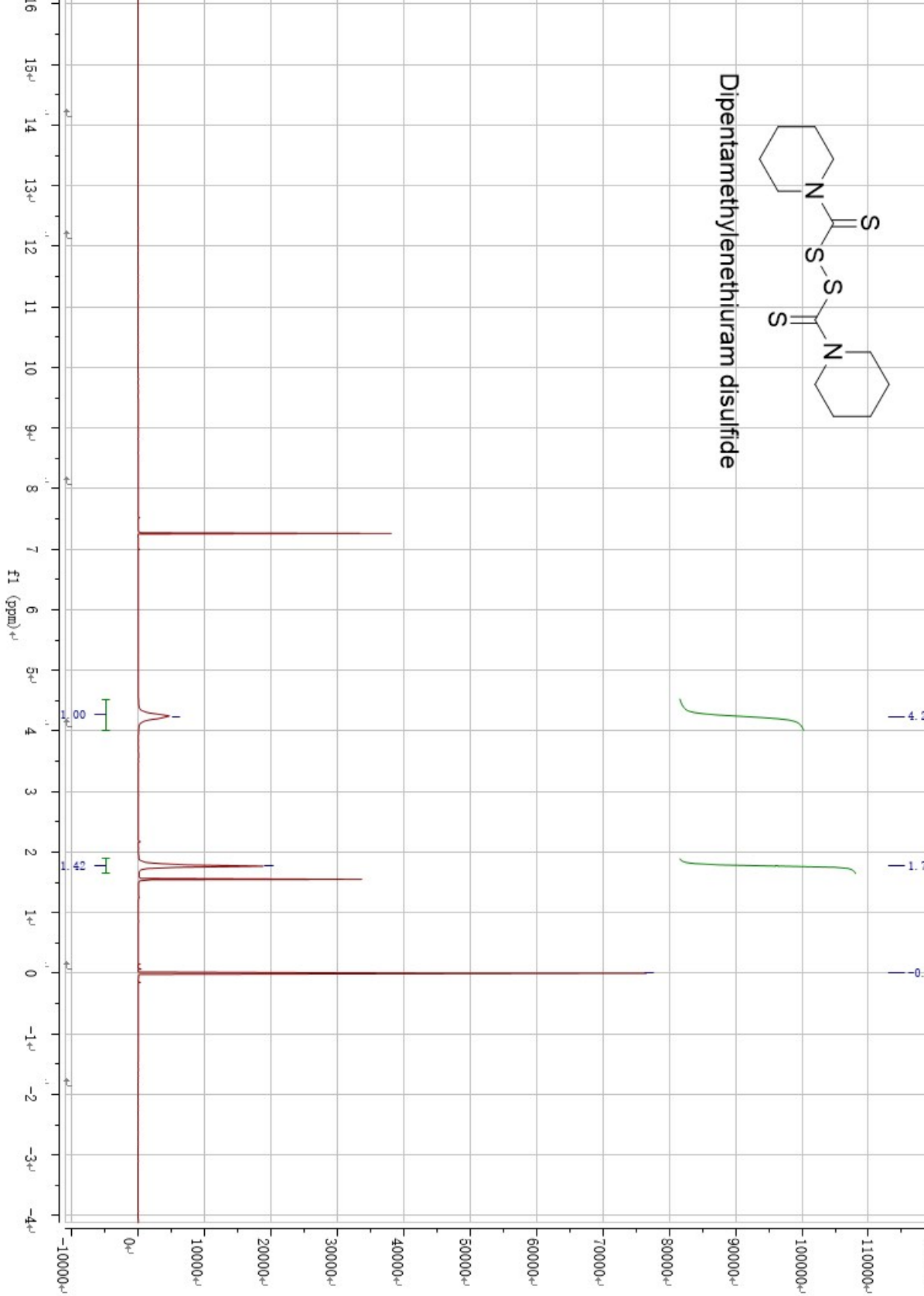


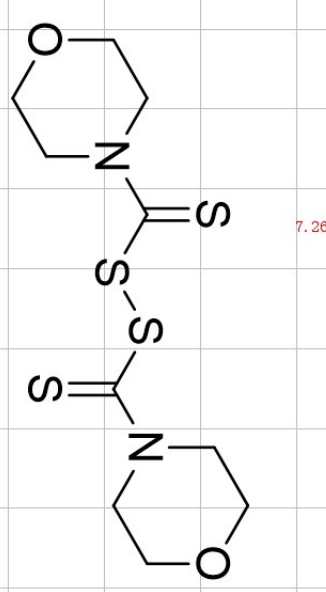




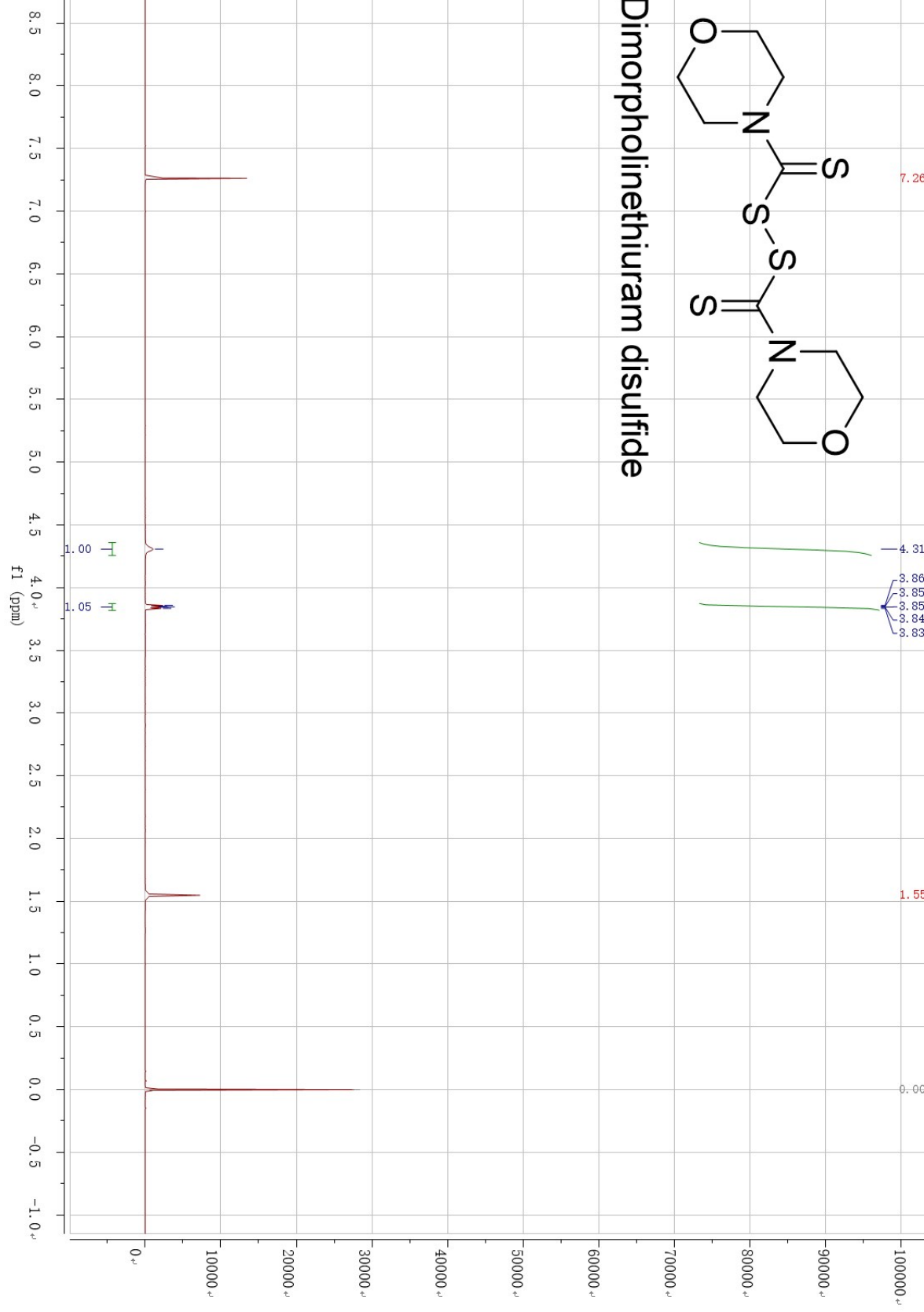


Dipentamethylenethiuram disulfide

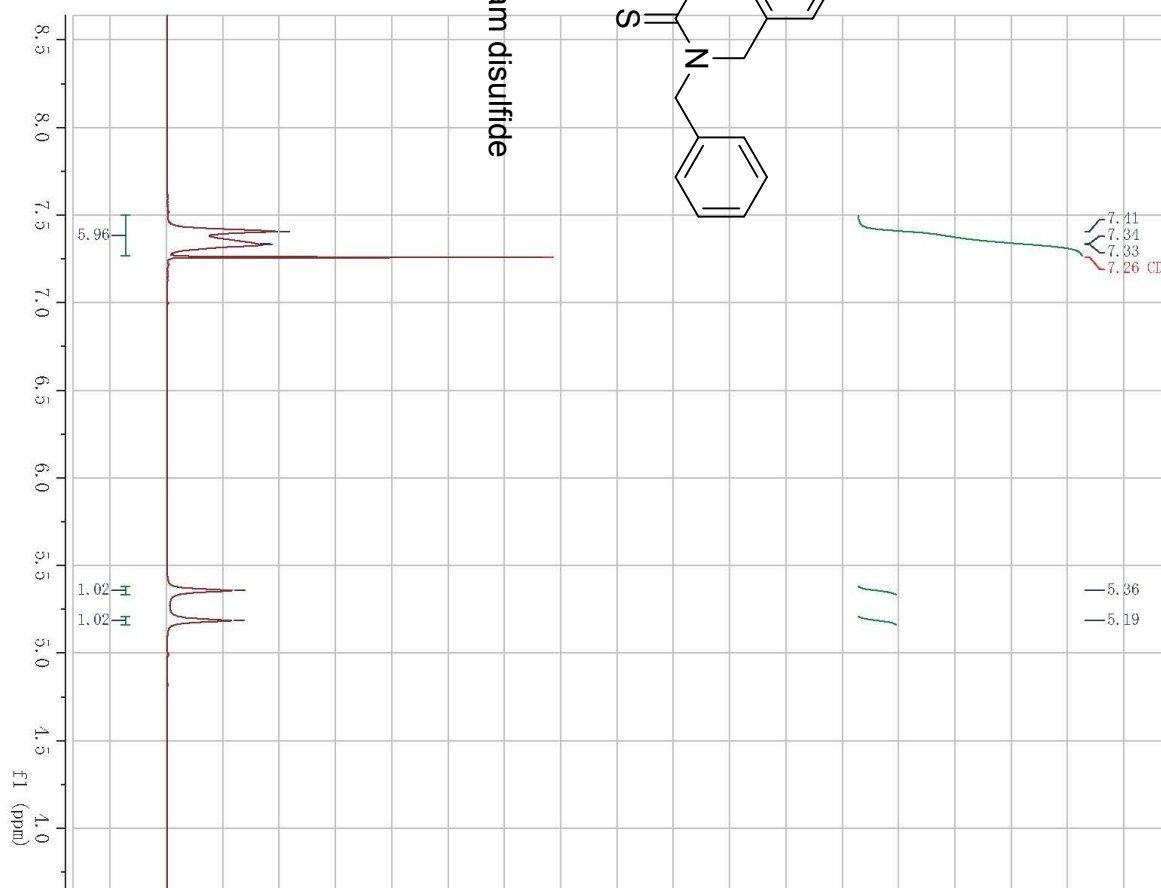
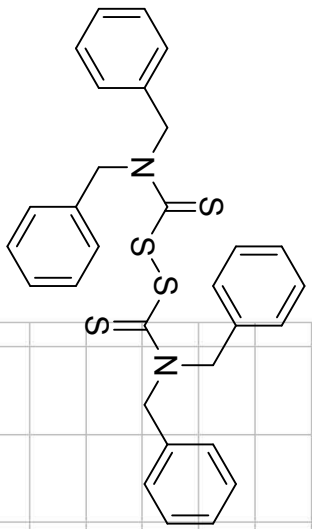




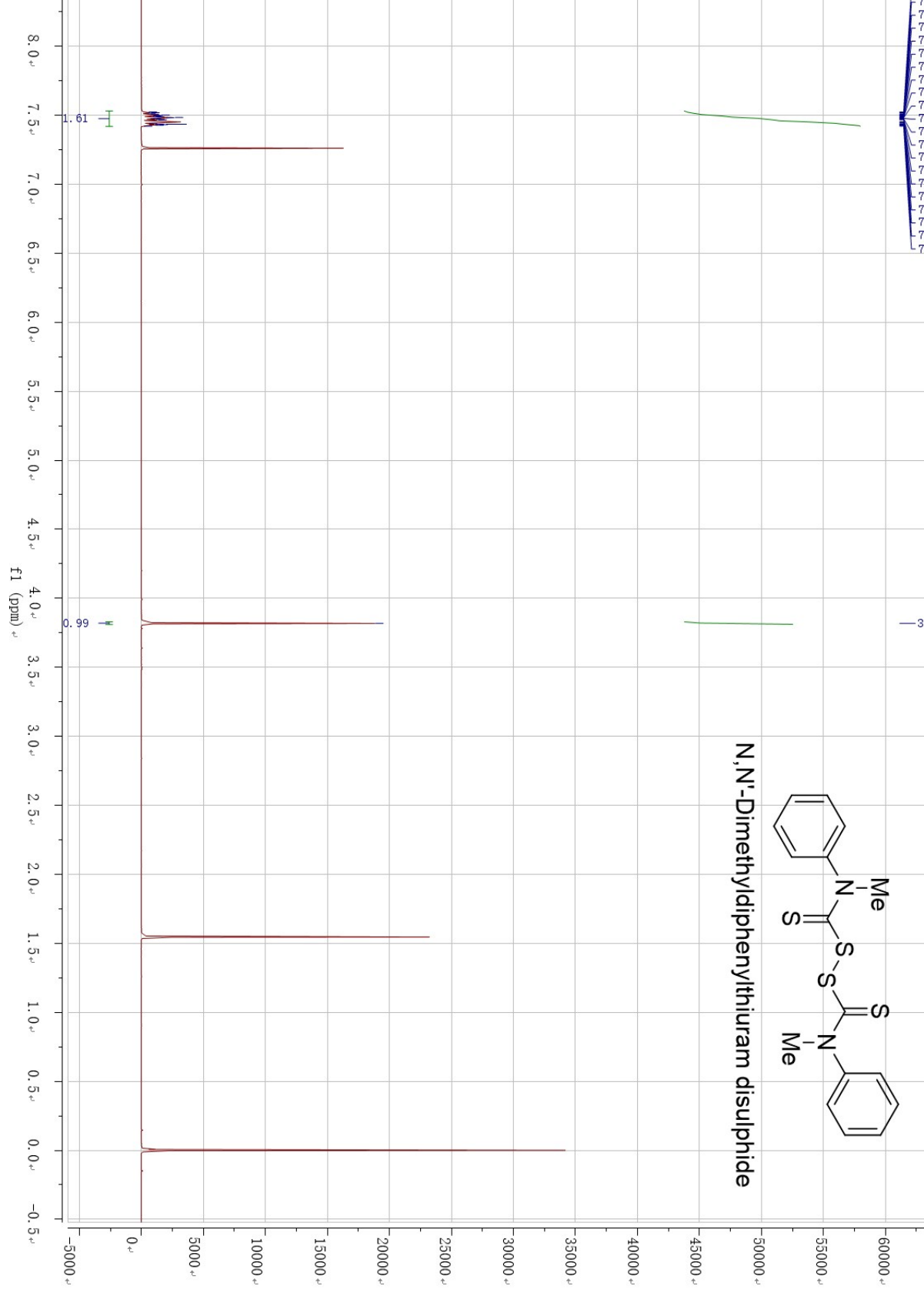
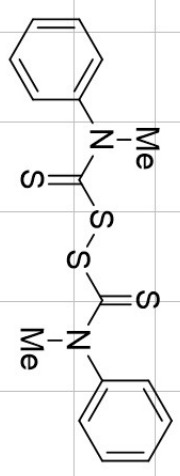
Dimorpholinethiuram disulfide

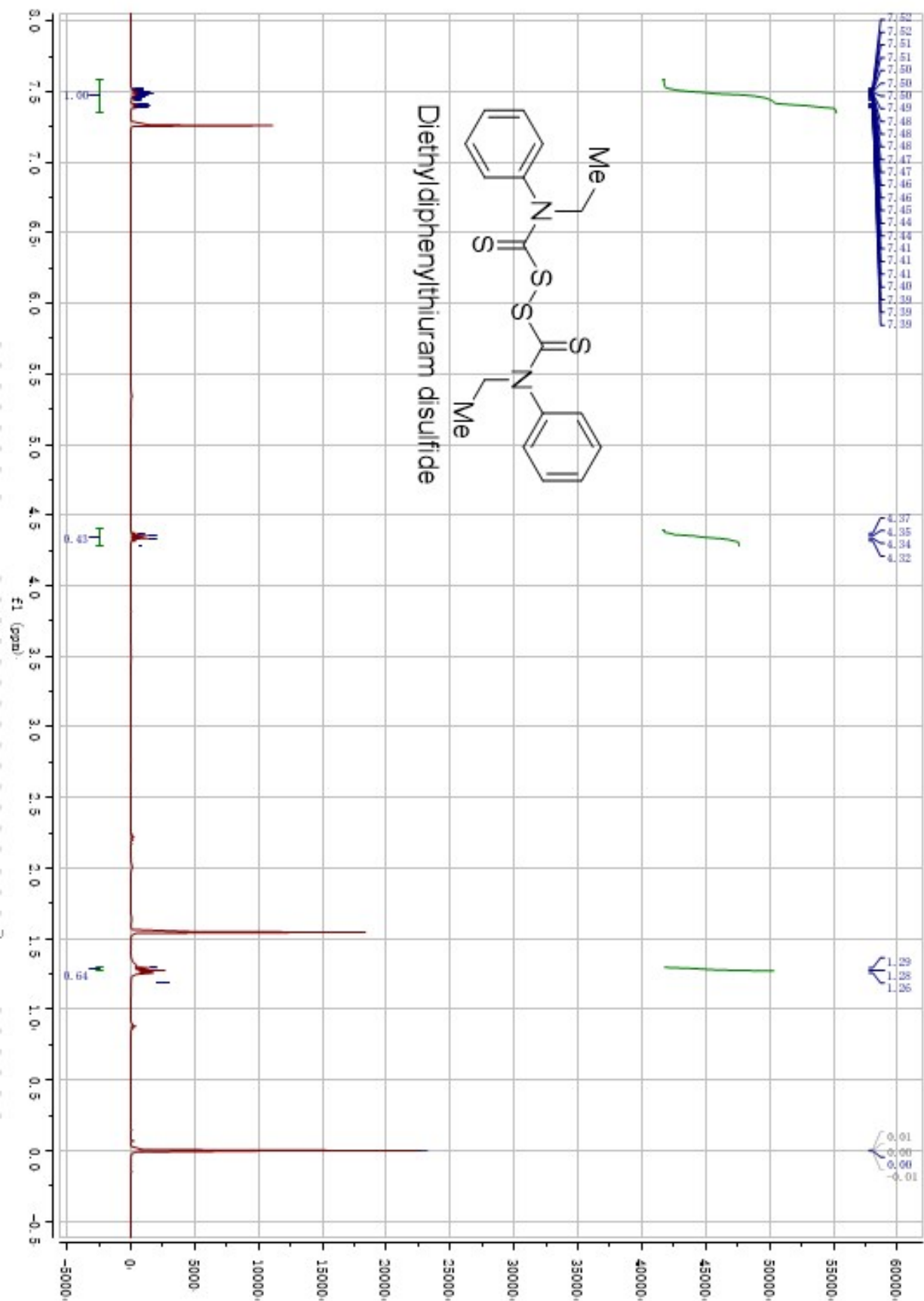


Tetrabenzylthiuram disulfide



N,N'-Dimethyldiphenylthiuram disulphide

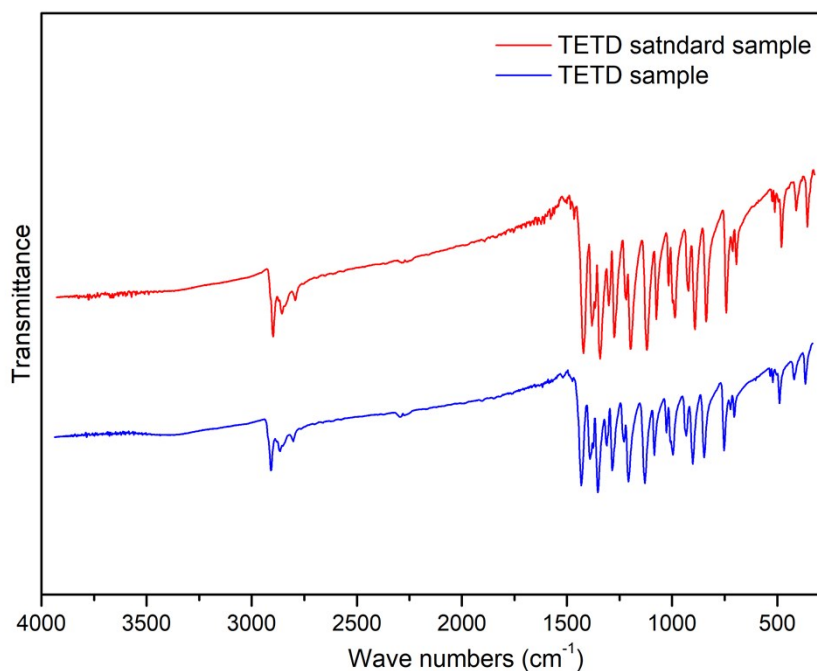




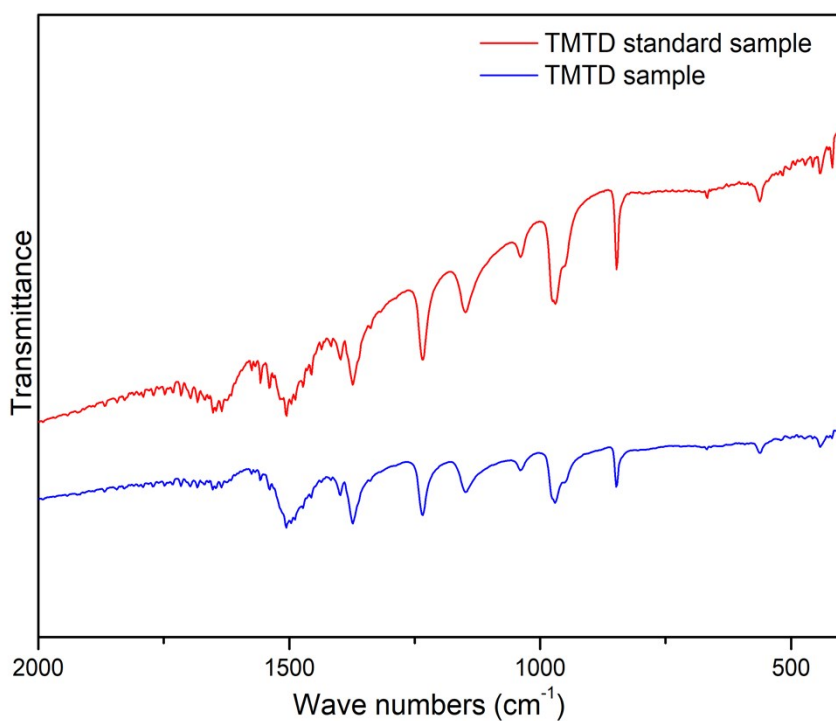
FT-IR

Characteristic wave number (cm^{-1}) for R-S-S-R: 705~570 & 520~500 (weak); for Ar-S-S-Ar: 500~430 (weak ~ medium).

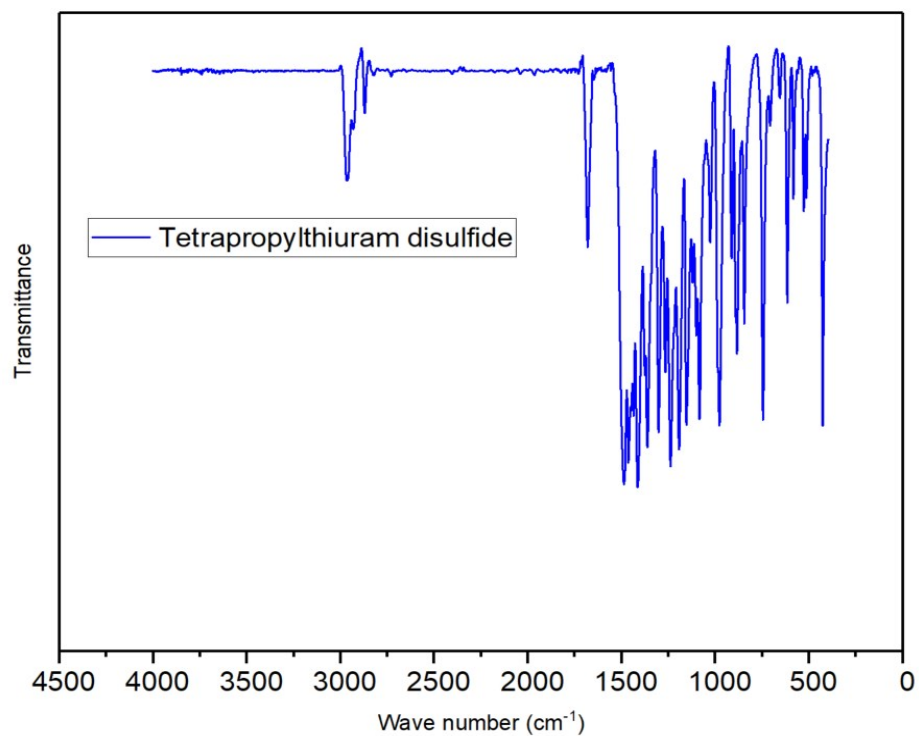
Tetraethylthiuram Disulfide (TETD) (2a)



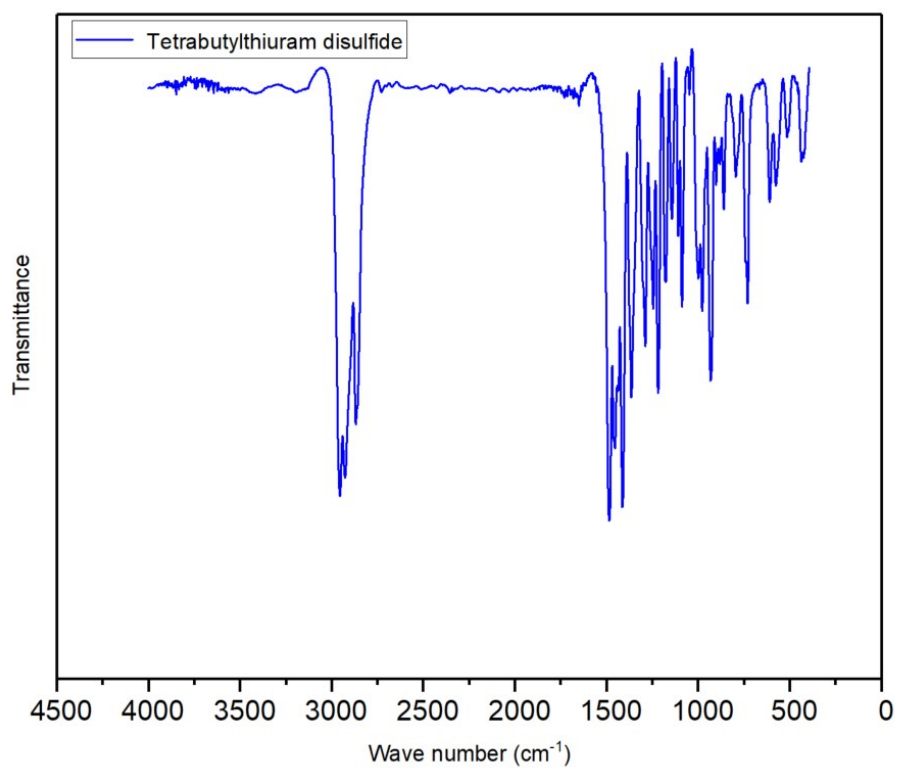
Tetramethylthiuram Disulfide (TMTD) (2b)



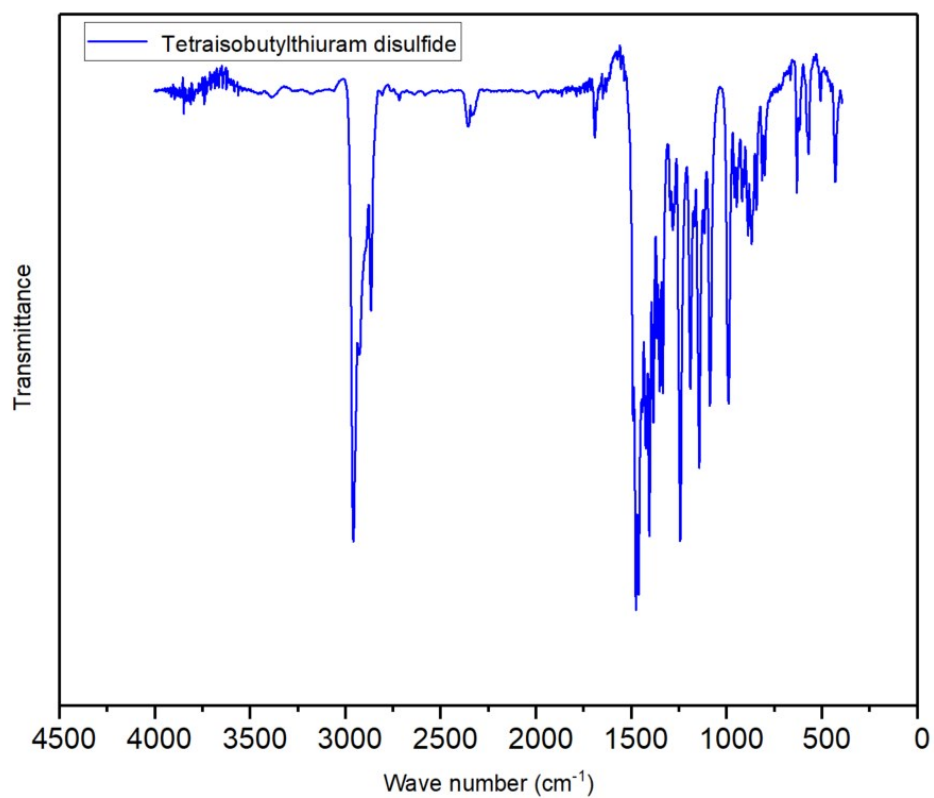
Tetrapropylthiuram Disulfide (2c):



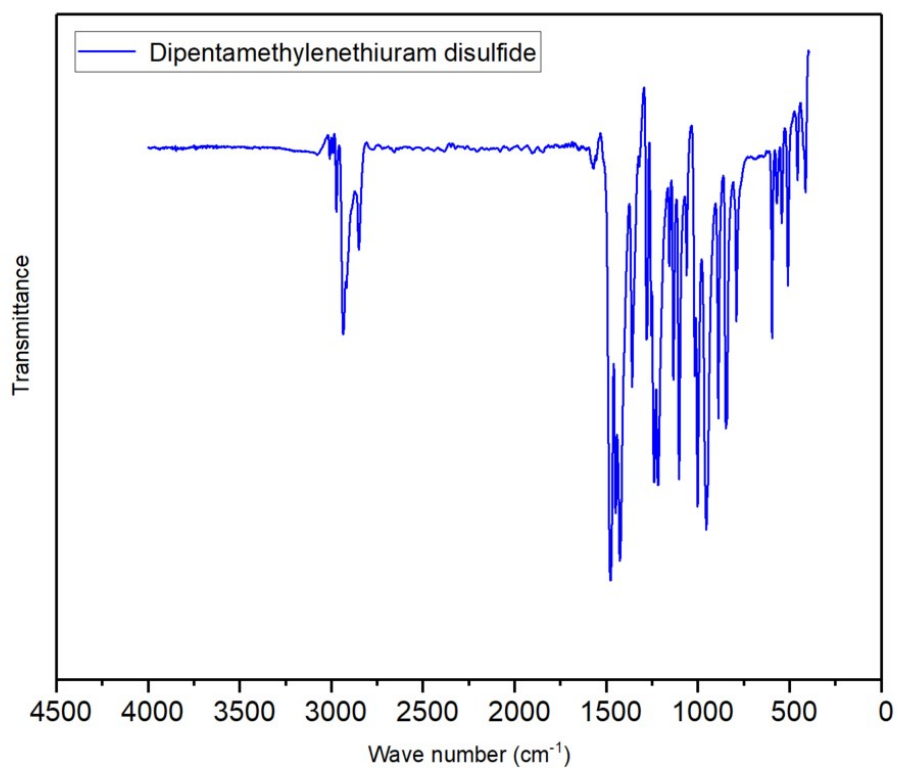
Tetrabutylthiuram Disulfide (2d):



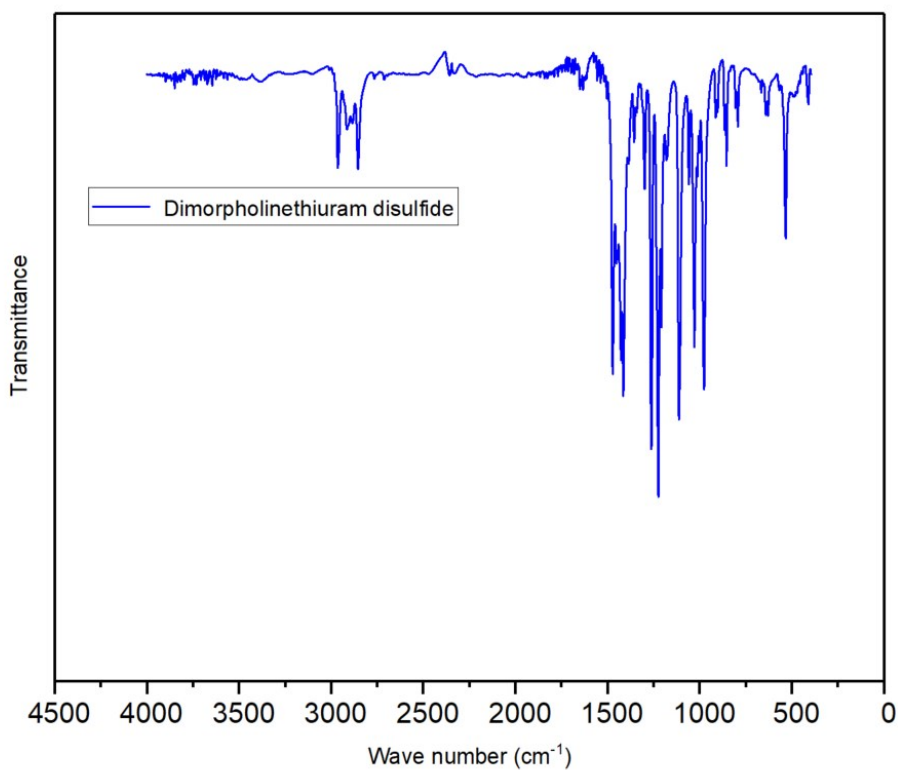
Tetraisobutylthiuram Disulfide (2e):



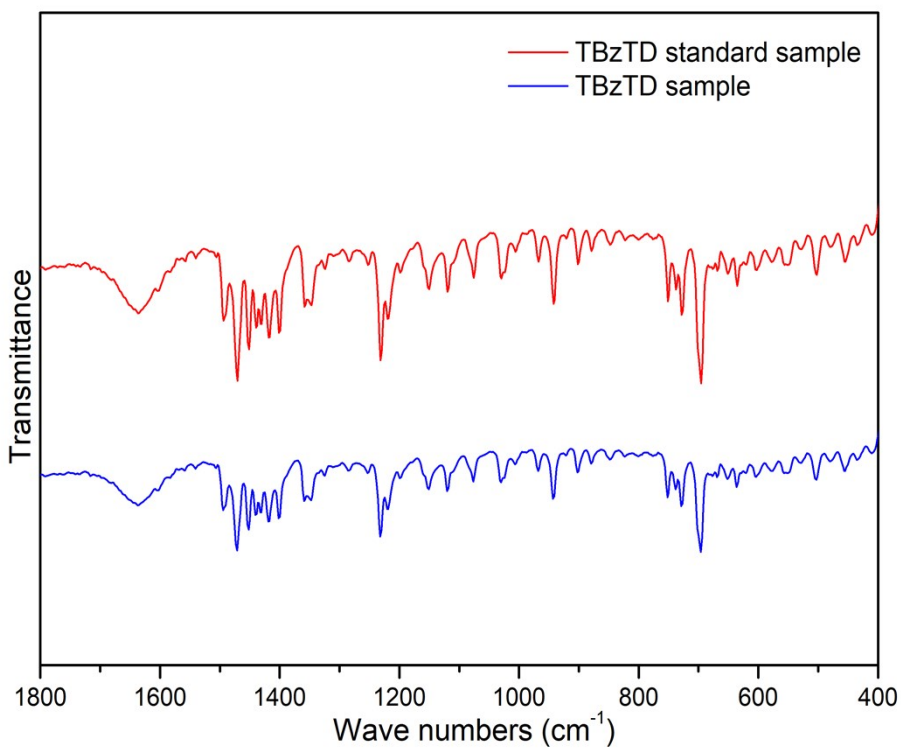
Dipentamethylenethiuram Disulfide (2f):



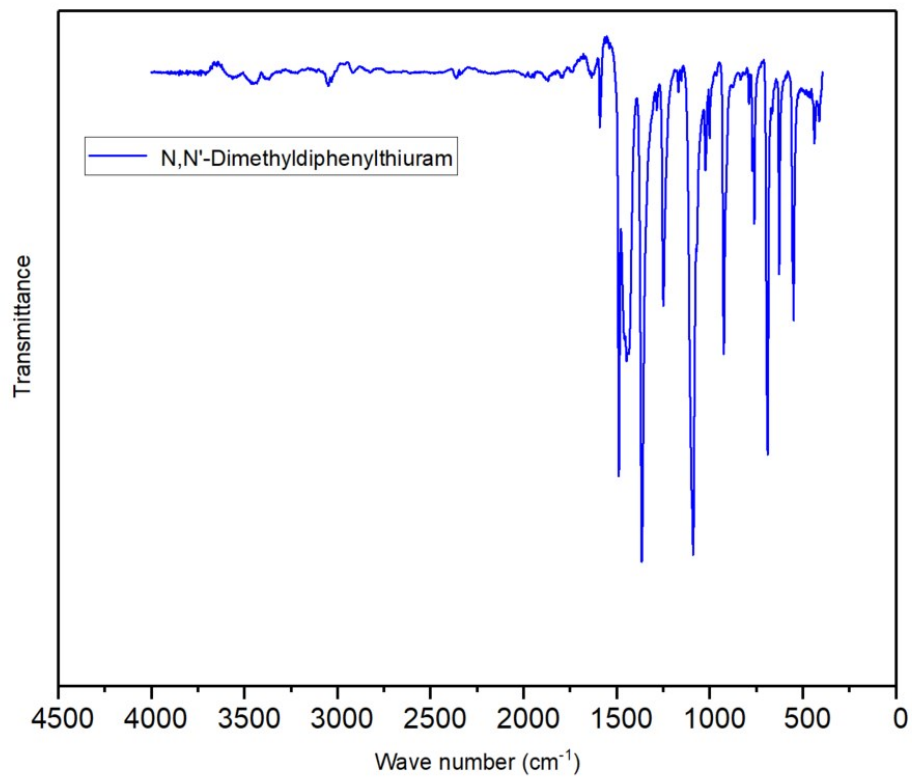
Dimorpholinethiuram Disulfide (2g):



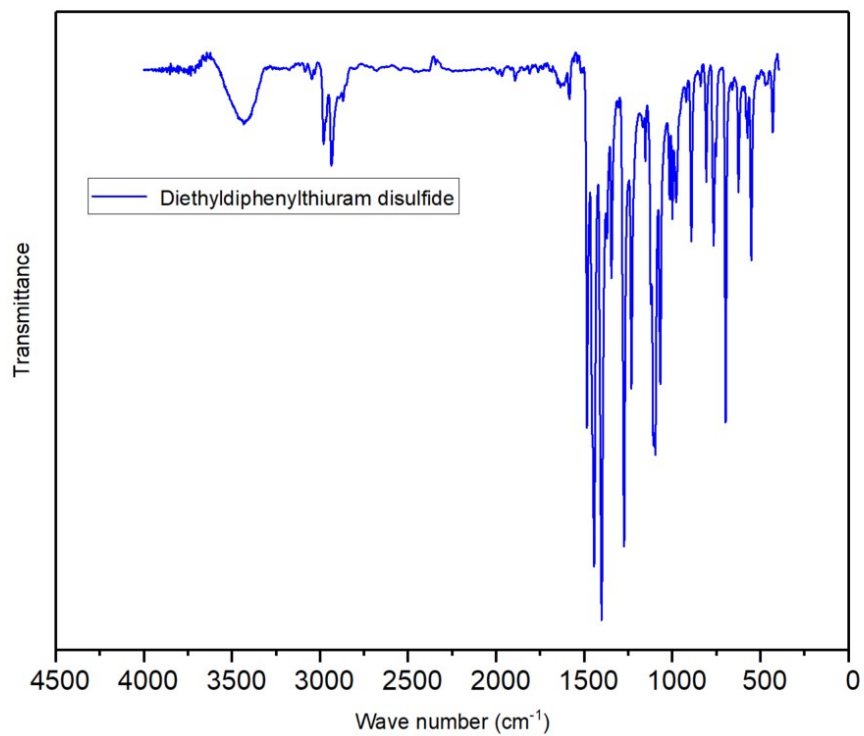
Tetrabenzylthiuram Disulfide (TBzTD) (2h):



***N,N'*-Dimethyldiphenylthiuram (2i):**



Diethyldiphenylthiuram disulfide (2j):



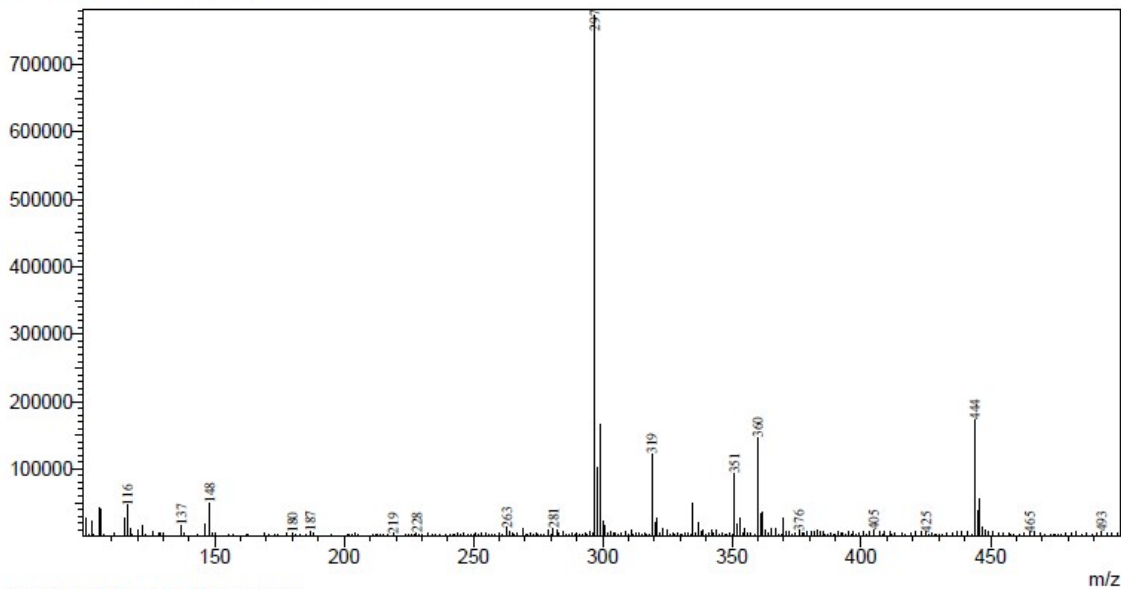
Mass spectra

Tetraethylthiuram Disulfide (2a): exact mass= 296.0

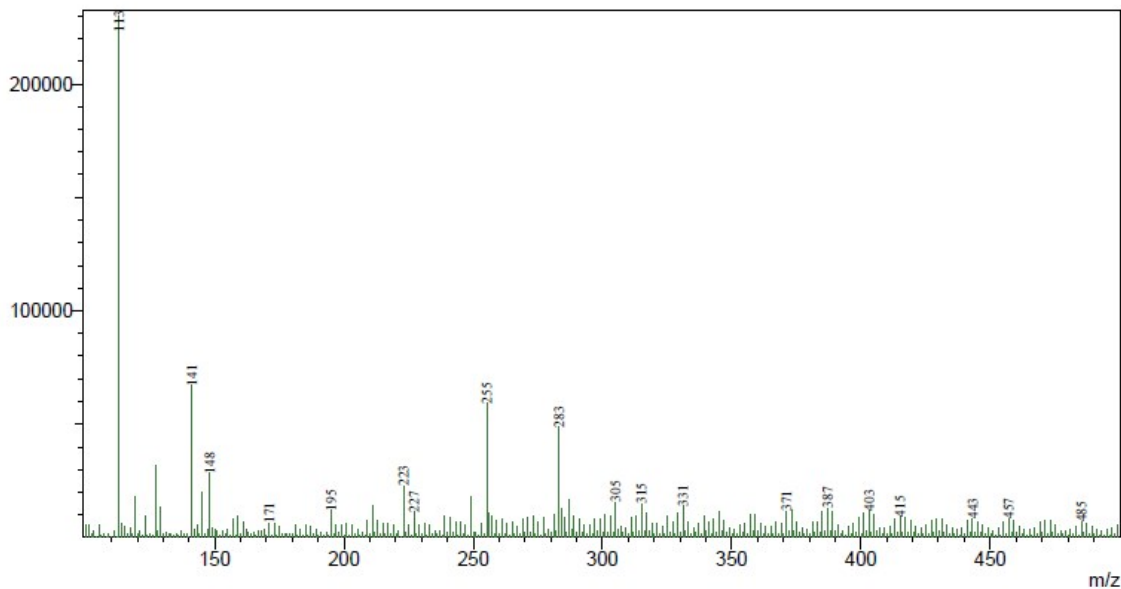
==== Shimadzu LabSolutions Data Report ====

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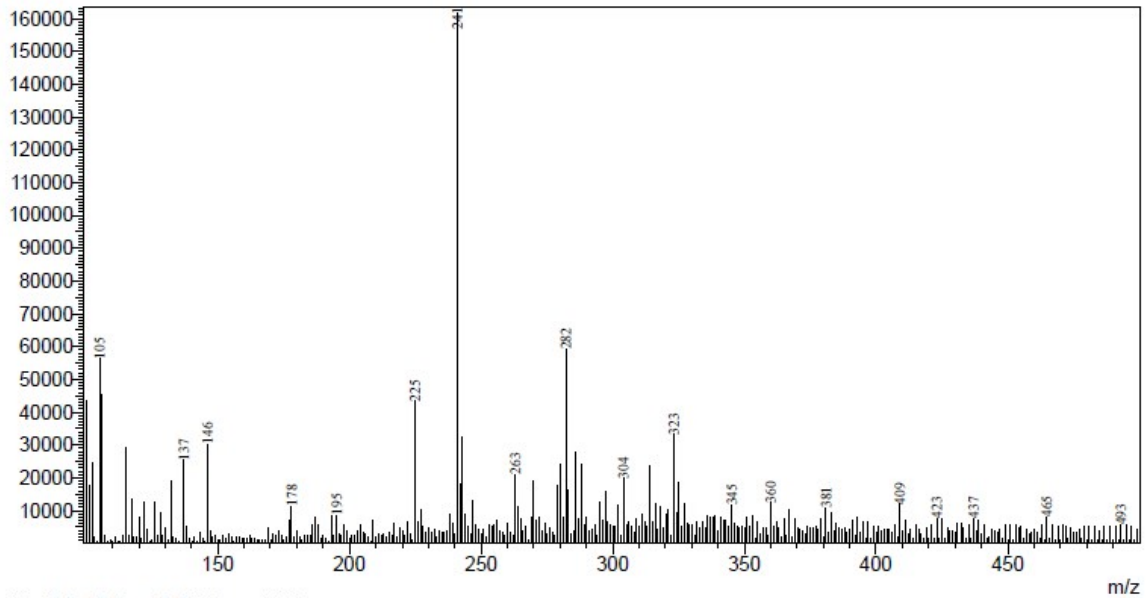


Tetramethylthiuram Disulfide (2b): exact mass = 239.9

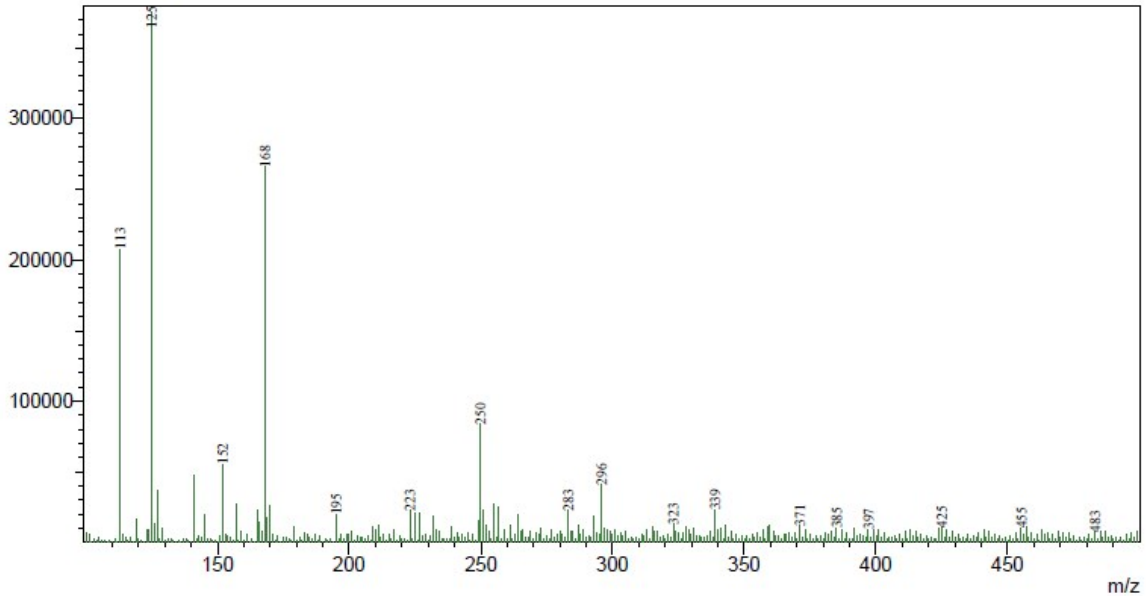
==== Shimadzu LabSolutions Data Report ====

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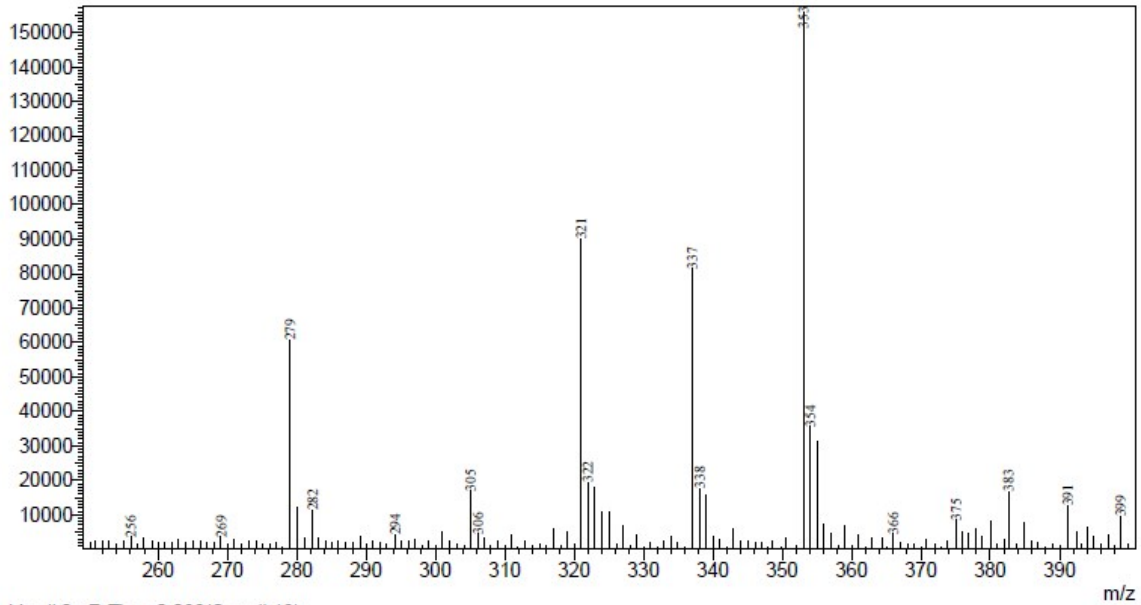


Tetrapropylthiuram Disulfide (2c): exact mass = 352.1

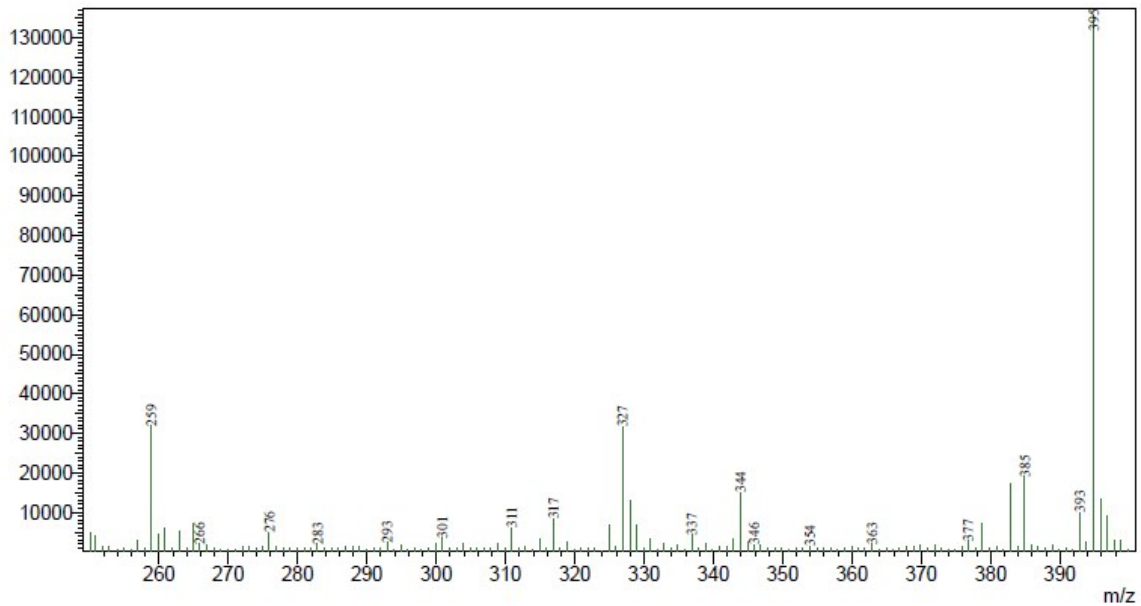
==== Shimadzu LabSolutions Data Report ====

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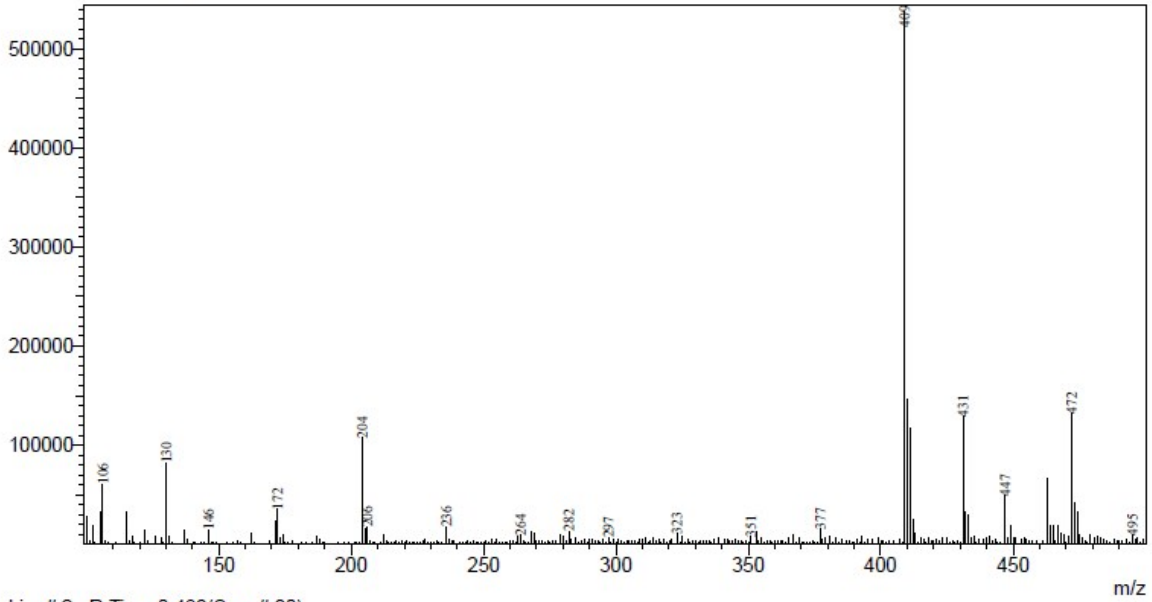


Tetrabutylthiuram Disulfide (2d): exact mass = 408.1

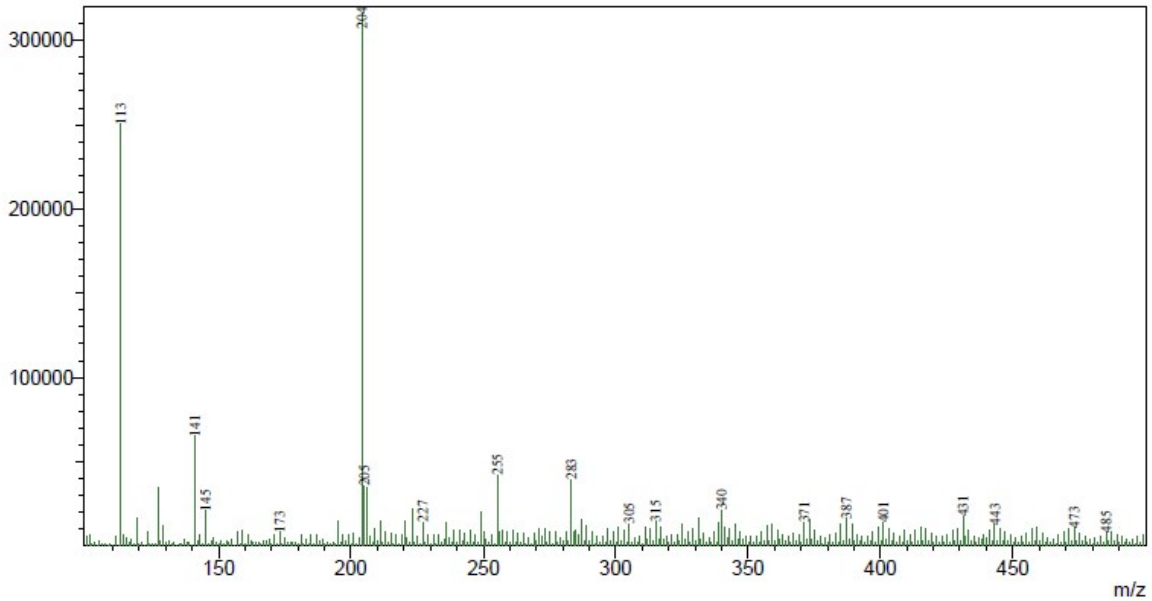
==== Shimadzu LabSolutions Data Report ====

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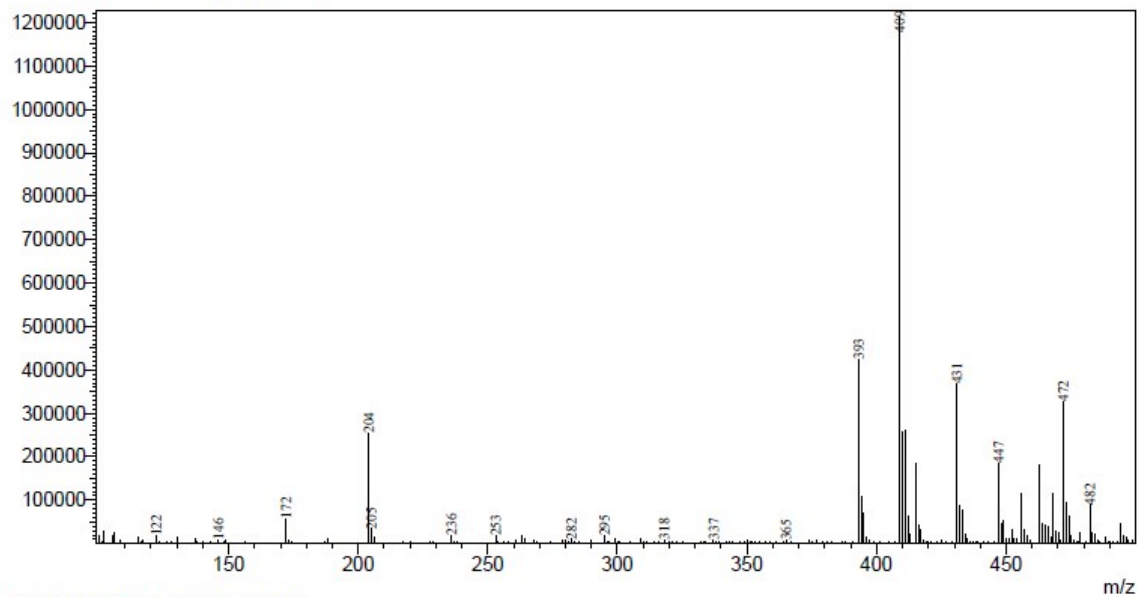


Tetraisobutylthiuram Disulfide (2e): exact mass = 408.1

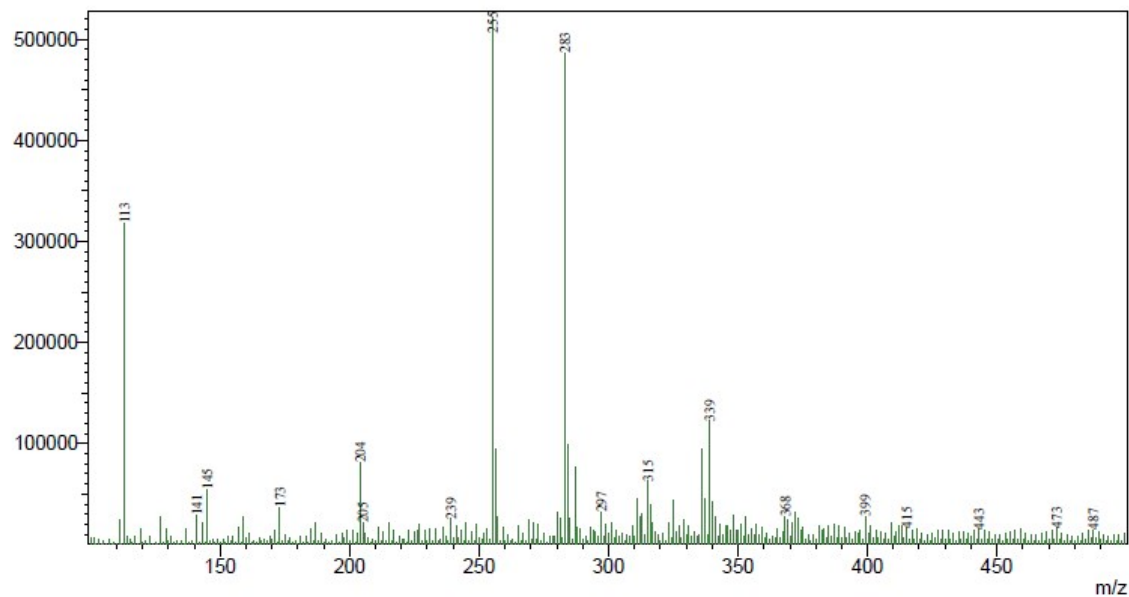
==== Shimadzu LabSolutions Data Report ====

<Spectrum>

Line#:1 R.Time:0.267(Scan#:17)
MassPeaks:400
RawMode:Single 0.267(17) BasePeak:409(1214702)
BG Mode:None Segment 1 - Event 1



Line#:2 R.Time:0.283(Scan#:18)
MassPeaks:400
RawMode:Single 0.283(18) BasePeak:255(522239)
BG Mode:None Segment 1 - Event 2

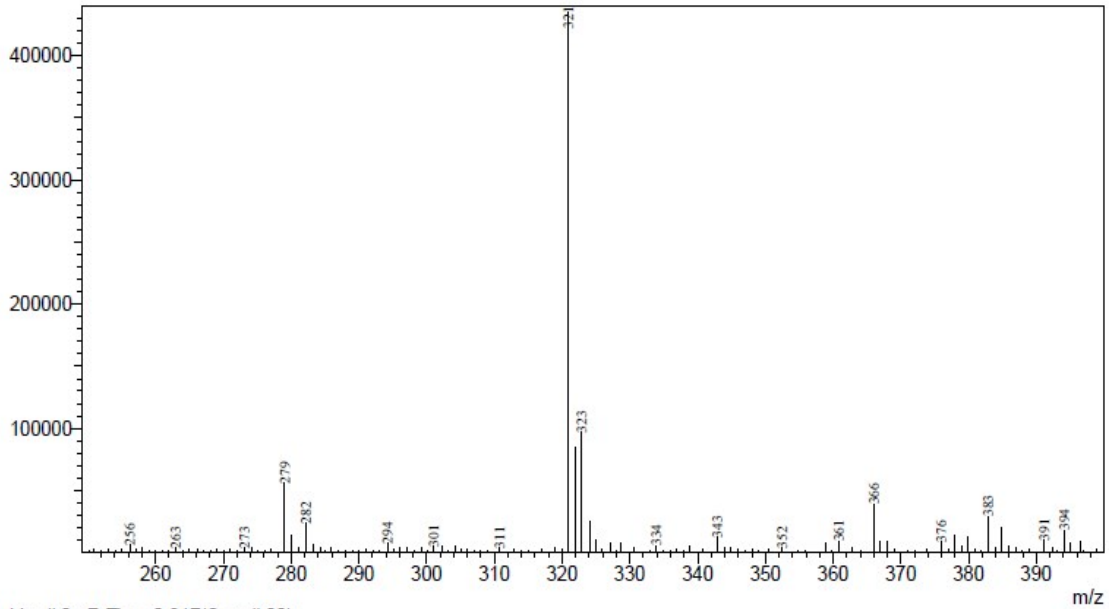


Dipentamethylenethiuram Disulfide (2f): exact mass = 320.0

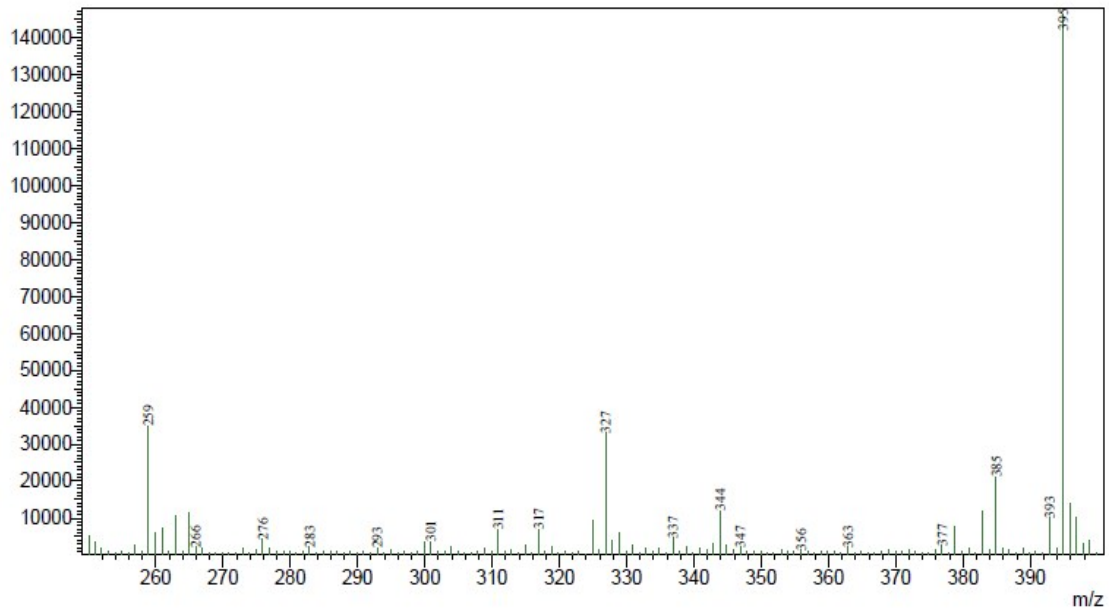
==== Shimadzu LabSolutions Data Report ====

<Spectrum>

Line#:1 R.Time:0.300(Scan#:19)
MassPeaks:150
RawMode:Single 0.300(19) BasePeak:321(435235)
BG Mode:None Segment 1 - Event 1



Line#:2 R.Time:0.317(Scan#:20)
MassPeaks:151
RawMode:Single 0.317(20) BasePeak:395(146331)
BG Mode:None Segment 1 - Event 2

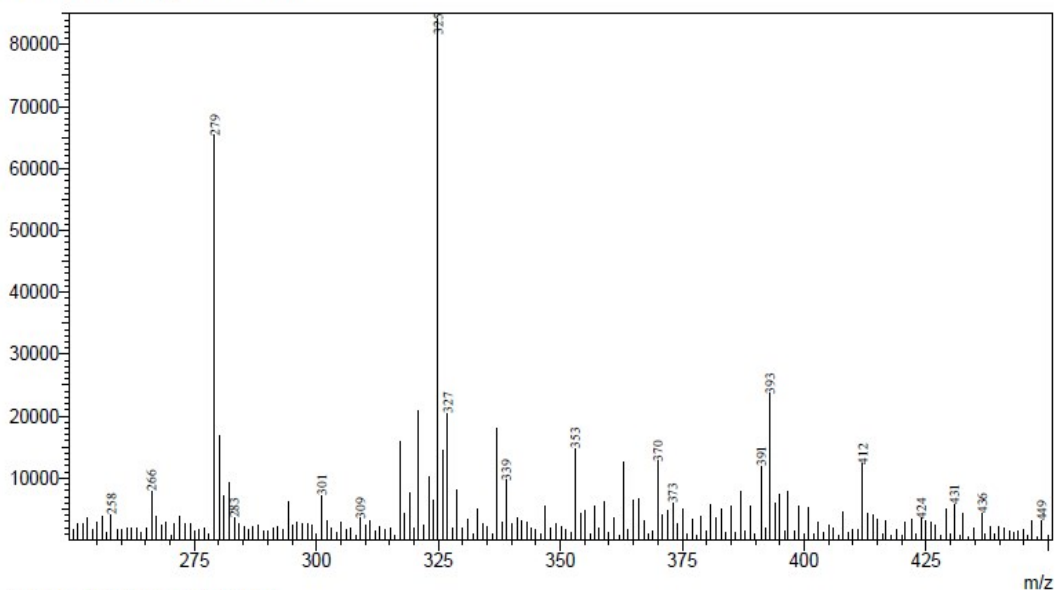


Dimorpholinethiuram Disulfide (2g): exact mass = 324.0

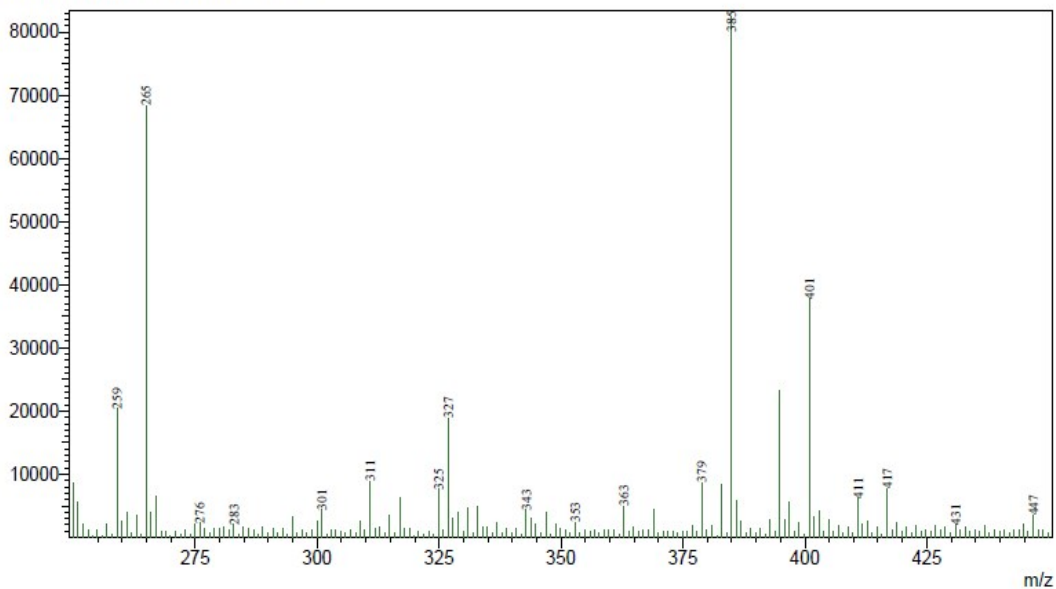
==== Shimadzu LabSolutions Data Report ====

<Spectrum>

Line# 1 R.Time:0.367(Scan#:23)
MassPeaks:201
RawMode:Single 0.367(23) BasePeak:325(84167)
BG Mode:None Segment 1 - Event 1



Line# 2 R.Time:0.383(Scan#:24)
MassPeaks:201
RawMode:Single 0.383(24) BasePeak:385(82487)
BG Mode:None Segment 1 - Event 2

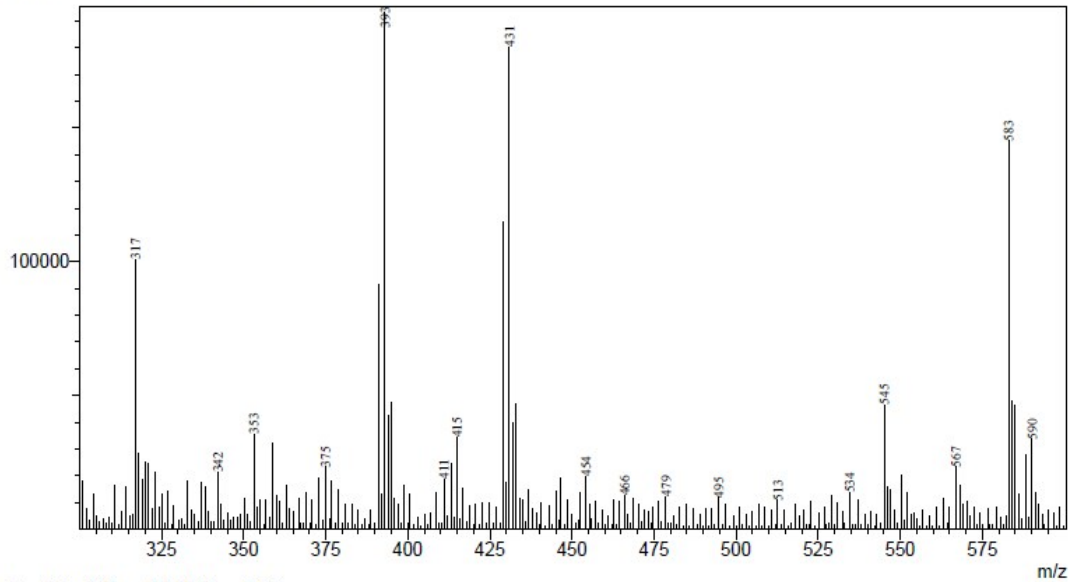


Tetrabenzylthiuram Disulfide (2h): exact mass = 544.1

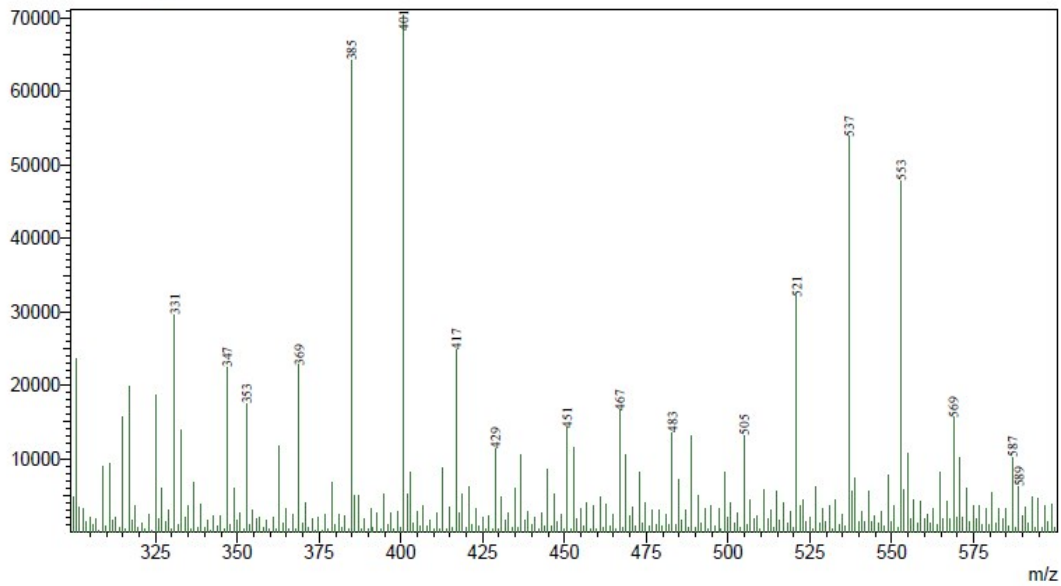
==== Shimadzu LabSolutions Data Report ====

<Spectrum>

Line#1 R.Time:0.233(Scan#:15)
MassPeaks:298
RawMode:Single 0.233(15) BasePeak:393(193341)
BG Mode:None Segment 1 - Event 1



Line#2 R.Time:0.250(Scan#:16)
MassPeaks:301
RawMode:Single 0.250(16) BasePeak:401(70457)
BG Mode:None Segment 1 - Event 2

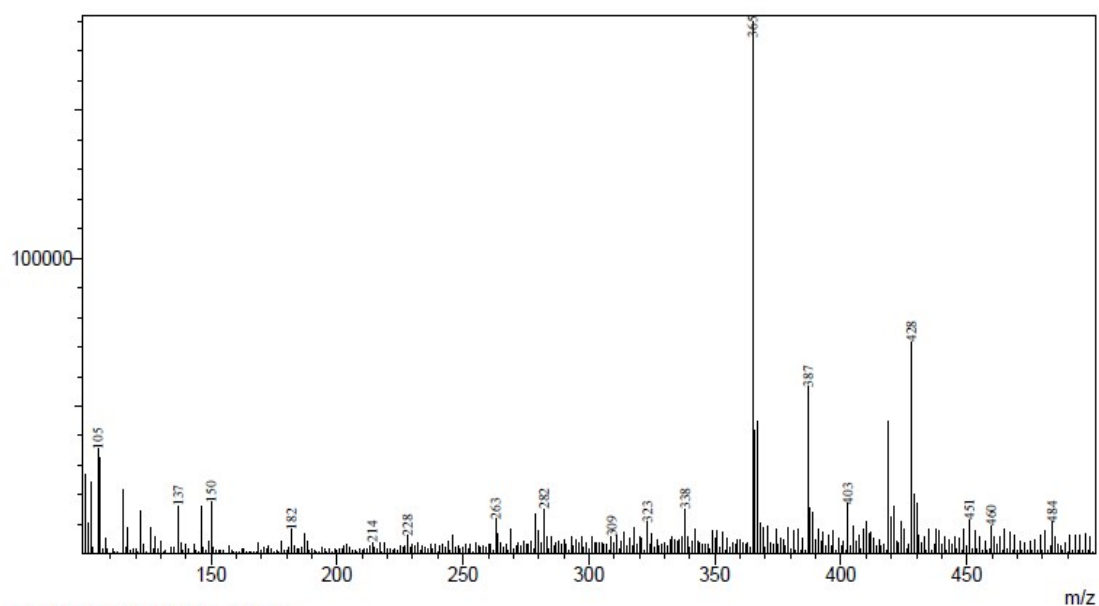


N,N'-Dimethyldiphenylthiuram Disulfide (2i): exact mass = 364.0

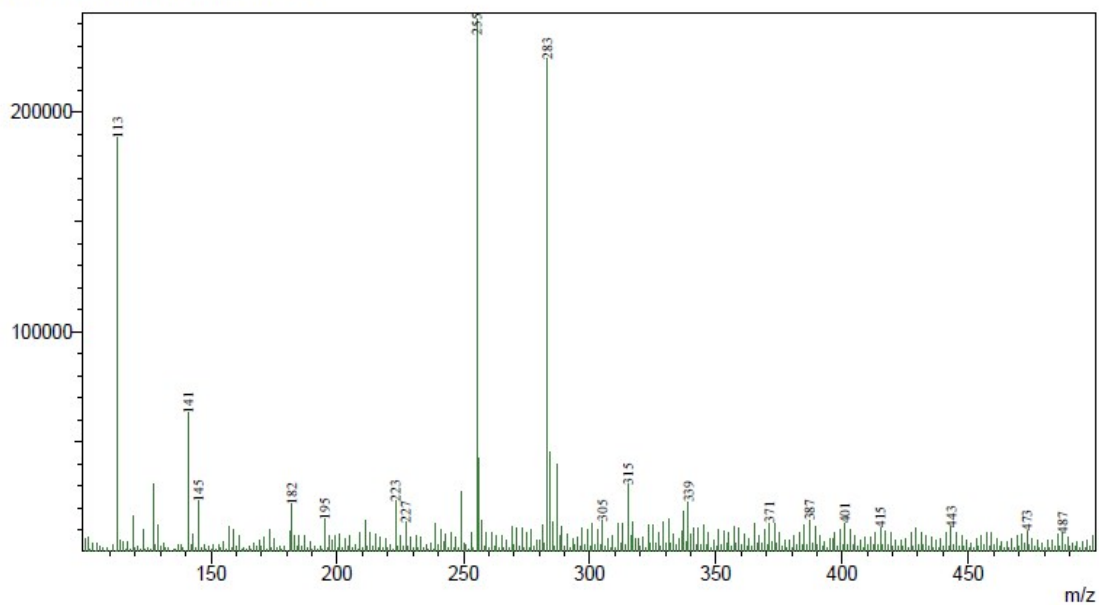
==== Shimadzu LabSolutions Data Report ====

<Spectrum>

Line#:1 R.Time:0.400(Scan#:25)
MassPeaks:401
RawMode:Single 0.400(25) BasePeak:365(180094)
BG Mode:None Segment 1 - Event 1



Line#:2 R.Time:0.416(Scan#:26)
MassPeaks:400
RawMode:Single 0.416(26) BasePeak:255(242490)
BG Mode:None Segment 1 - Event 2

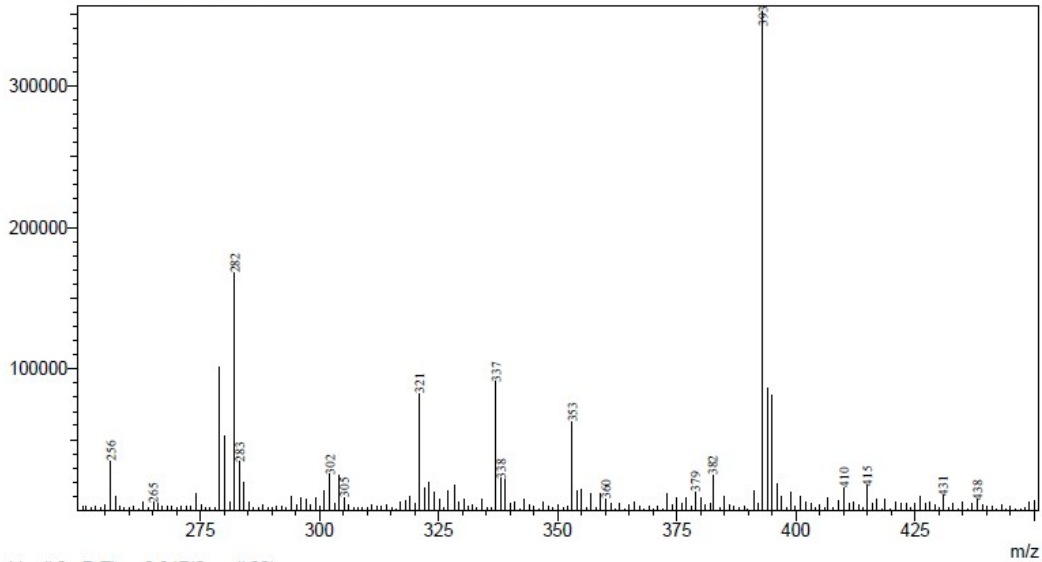


Diethyldiphenylthiuram Disulfide (2j): exact mass = 392.0

==== Shimadzu LabSolutions Data Report ====

<Spectrum>

Line#:1 R.Time:0.300(Scan#:19)
MassPeaks:201
RawMode:Single 0.300(19) BasePeak:393(352550)
BG Mode:None Segment 1 - Event 1



Line#:2 R.Time:0.317(Scan#:20)
MassPeaks:201
RawMode:Single 0.317(20) BasePeak:395(155966)
BG Mode:None Segment 1 - Event 2

