Supporting Information for

A Proposal for the Mechanism-of-Action of Diazoparaquinone Natural Products.

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Moisture and oxygen sensitive reactions were carried out in flame-dried glassware under an argon or nitrogen atmosphere. Benzene was distilled from sodium benzophenone ketyl under an argon atmosphere, or passed through an activated alumina column immediately before use. Toluene was distilled from sodium 9-fluorenone ketyl under argon atmosphere, or passed through an activated alumina column immediately before use. Chlorobenzene, benzonitrile, anisole, m-xylene, 1,3-dimethoxybenzene, and 1,3-cyanobenzene were purged with nitrogen for 30 min prior to use (where applicable) and otherwise used as purchased. AIBN was recrystallized from ethyl alcohol. Bu_3SnH was distilled neat and stored under nitrogen. Purification of products via flash chromatography was performed with 32-63 μm silica gel or Analtech Uniplate 1000 micron preparative thin layer chromatography plates, with the solvent systems indicated. CH_2Cl_2, EtOAc and acetone used in flash chromatography were of HPLC grade or passed through an activated alumina column prior to use. Melting points are uncorrected. Low- and high-resolution mass spectra were obtained according to the specified technique and were performed at The Huck Institute of the Life Sciences – Proteomics and Mass Spectrometry Core Facility at The Pennsylvania State University, University Park, PA. Copies of ^{1}H and ^{13}C NMR spectra are supplied as criteria of purity.

General Procedure 1. Phenylation of Prekinamycin and Derivatives. AIBN (1.1 equiv) in benzene (0.06 M) was added via syringe pump addition over a period of 1 h to a stirring solution of diazoquinones **10a, 10b** or **10c** (1 equiv) and Bu_3SnH (1.1 equiv) in benzene (0.06 M) at 80 ^{o}C. When the addition was complete, the reaction solution was allowed to cool to room temperature. After reaching room temperature the reaction mixture was concentrated in vacuo. The resulting residue was purified by flash chromatography on silica gel using the specified eluent.

General Procedure 2. Aromatic Solvent Competition Experiments. AIBN (1.1 equiv) in an equimolar solution of benzene and the appropriate aromatic solvent (0.06 M) was added via syringe pump addition over a period of 1 h to a stirring solution of diazoquinone **10c** (1 equiv) and Bu_3SnH (1.1 equiv) also in an equimolar solution of benzene and the appropriate aromatic solvent (0.06 M) at 80 ^{o}C. When the addition was

complete, the reaction solution was allowed to cool to room temperature. After reaching room temperature the reaction mixture was diluted with CH_2Cl_2 and poured onto a silica gel column and purified eluting with CH_2Cl_2 with an increasing percentage of EtOAc from 0 % to 10 %. Purification furnished the clean benzene trapped product and in most cases a mixture of *o,m,p* or the 2,4,5 isomers of the given substituted aromatic trapped product. Relative rates were quantified by product mass comparison of the substituted aromatic adducts vs. the benzene addition product. Isolation of analytical samples of pure *o, m* or *p* (or the 2, 4 or 5 isomers) from chromatography permitted ^{1}H NMR identification. In cases where isomer separation was not achieved, the ratios were determined by inspection of ^{1}H NMR spectra of the mixtures.

General Procedure 3. Aromatic Solvent Competition Eeperiments. AIBN (1.1 equiv) in an equimolar solution of benzene and the appropriate aromatic solvent (0.06 M) was added via syringe pump addition over a period of 1 h to a stirring solution of diazoquinone **10c** (1 equiv) and Bu_3SnH (1.1 equiv) also in an equimolar solution of benzene and the appropriate solvent (0.06 M) at 80 ^{o}C. When the addition was complete, the reaction solution was allowed to cool to room temperature. After reaching room temperature the reaction mixture was diluted with CH_2Cl_2 and poured onto a silica gel column. Purification eluting with CH_2Cl_2 to remove tin residues, followed by an increase in polarity to 10% acetone in CH_2Cl_2 afforded a mixture of the benzene and substituted aromatic trapped products. Relative rates were quantified by ^{1}H NMR integration of the substituted aromatic adducts vs. the benzene addition product. Ratio determination was made through similar comparison of the pure *o,m,p* (or the 2,4,5) isomer(s) ^{1}H NMR spectra to that of the mixture.

General Procedure 4. Aromatic Solvent Competition Experiments with Varying Equivalents of Tin. General Proceeures 2 and 3 were both used varying only in the equivalents of Bu_3SnH as indicated in Figure 1.

4,5,9-Trihydroxy-2-Methyl-11-Phenyl-Benzo[b]fluoren-10-one (10a). Following General Proceedure 1, prekinamycin **1a** (18 mg, 0.057 mmol) was converted

into benzo[b]fluorenone **10a** (12.3 mg, 59%). mp 260 ^{o}C (dec); IR (neat): 3409, 1585 cm^{-1}; Presumably, due to the partial free radical nature of **10a** analogous to kinobscurinone,[1] **10a** appears to be "NMR silent" exhibiting neither a ^{1}H- nor a ^{13}C NMR signature; ESI m/*z* relative intensity 391(MNa^{+} 100); TOFHRMS (+ESI) Calcd for $C_{24}H_{16}O_4Na$: 391.0946, Found 391.0947.

Acetic Acid 9-Acetoxy-5-Hydroxy-2-Methyl-10-oxo-11-Phenyl-10H-Benzo[b]fluoren-4-yl Ester (10b). Following General Proceedure 1, diazoquinone **1b** (17.5 mg, 0.044 mmol) was converted into benzo[b]fluorenone **10b** (9.8 mg, 50%). mp 200 ^{o}C (dec); IR (neat): 3330, 1789, 1766 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.39 (s, 1H), 7.88 (d, *J* = 7.9 Hz, 1H), 7.56 (t, *J* = 8.0 Hz, 2H), 7.55 (d, *J* = 7.7 Hz, 1H), 7.41-7.50 (m, 3H), 7.06 (d, *J* = 8.0 Hz, 1H), 7.06 (s, 1H), 7.05 (s, 1H), 2.51 (s, 3H), 2.36 (s, 3H), 2.32 (s, 3H), ^{13}C NMR (100 MHz, $CDCl_3$) δ 180.2, 170.2, 166.9, 151.3, 149.9, 147.9, 144.4, 143.3, 138.5, 135.7, 133.9, 133.8, 129.7, 128.8, 128.7, 128.2, 126.5, 125.4, 123.3, 123.2, 123.0, 122.6, 114.6, 21.7, 21.6, 21.3; ESI m/*z* relative intensity 475 (MNa^{+} 100); TOFHRMS (+ESI) Calcd for $C_{28}H_{20}O_6Na$: 475.1158, Found 475.1142.

5-Hydroxy-4,9-dimethoxy-2-methyl-11-phenyl-benzo[b]fluoren-10-one (10c). Following General Proceedure 1, diazoquinone **1c** (10.5 mg, 0.032 mmol) was converted into benzo[b]fluorenone **10c** (10.0 mg, 79%). mp 220 ^{o}C (dec); IR (neat): 3181, 1633 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.76 (s, 1H), 7.58 (d, *J* = 7.6 Hz, 1H), 7.56 (d, *J* = 6.8 Hz, 2H), 7.48 (t, *J* = 8.2 Hz, 1H), 7.45 (t, *J* = 7.1 Hz, 2H), 7.39 (d, *J* = 7.2 Hz, 1H), 7.00 (d, *J* = 8.4 Hz, 1H), 6.81 (s, 1H), 6.67 (s, 1H), 4.09 (s, 3H), 3.90 (s, 3H), 2.32 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 182.0, 161.8, 151.9, 151.1, 146.6, 144.3, 138.7, 136.9, 135.0, 134.6, 130.0, 129.4, 128.4, 128.2, 128.1, 120.0, 119.2, 117.8, 115.0, 114.9, 115.2, 56.9, 56.6, 22.2; ESI m/*z* relative intensity 497 (MH^{+} 50); TOFHRMS (+ESI) Calcd for $C_{26}H_{21}O_4$: 397.1440, Found 397.1443.

Acetic Acid 4,5-Diacetoxy-2-Methyl-10-oxo-11-Phenyl-10H-benzo[b]fluoren-9-yl Ester (10d). From **10a**: Pyridine (0.26 mL, 3.1 mmol) and Ac_2O (0.31 mL, 3.1 mmol) were sequentially added to a mixture of **10a** (11.0 mg, 0.031 mmol) and DMAP

(1.0 mg, 0.008 mmol) in CH_2Cl_2 (1.0 mL) at room temperature. The dark purple mixture was stirred at room temperature for 30 min, turning to a dark red/orange color. At this time, the reaction solution was diluted with saturated aqueous $NaHCO_3$ (10 mL) and CH_2Cl_2 (10 mL). The layers were separated and the aqueous layer was extracted with CH_2Cl_2 (3x 10 mL). The combined organic layers were washed with water and brine, dried over Na_2SO_4, filtered and concentrated. The resulting dark red solid was purified by flash chromatography on silica gel (CH_2Cl_2) to yield the tri-acetate as a bright orange solid (8.1 mg, 52%).

From **10b**: Pyridine (0.070 mL, 0.90 mmol) and Ac_2O (0.85 mL, 0.90 mmol) were sequentially added to a mixture of **10b** (4.0 mg, 0.90 mmol) and DMAP (1.0 mg, 0.008 mmol) in CH_2Cl_2 (1.0 mL) at room temperature. The dark red mixture was stirred at room temperature for 30 min, changing to a dark red/orange color. At this time, the reaction solution was diluted with saturated aqueous $NaHCO_3$ (10 mL) and CH_2Cl_2 (10 mL). The layers were separated and the aqueous layer was extracted with CH_2Cl_2 (3X 10 mL). The combined organic layers were washed with water and brine, dried over Na_2SO_4, filtered and concentrated. The resulting dark red solid was purified by flash chromatography on silica gel (CH_2Cl_2). The tri-acetate was obtained as a orange solid (4.4 mg, 99%). mp 195 ^oC (dec); IR (neat): 1769, 1635 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$) δ 7.59 (d, J = 7.8 Hz, 1H), 7.58 (d, J = 7.3 Hz, 1H), 7.47-7.52 (m, 4H), 7.39 (d, J = 8.3 Hz, 1H), 7.01 (d, J = 7.7 Hz, 1H), 6.99 (s, 1H), 6.80 (s, 1H), 2.53 (s, 3H), 2.43 (s, 3H), 2.31 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 179.4, 169.6, 168.7, 167.6, 154.6, 151.4, 145.9, 145.2, 142.0, 141.1, 136.5, 133.8, 132.8, 129.4, 129.3, 129.3, 128.9, 128.0, 125.9, 125.3, 124.8, 124.2, 123.7, 121.8, 21.3, 21.2, 21.1, 20.9; ESI m/z relative intensity 517 (MNa^+ 100); TOFHRMS (+ESI) Calcd for $C_{30}H_{22}O_7Na$: 517.1263, Found 517.1245.

4,5,9-Trimethoxy-2-Methyl-11-Phenyl-Benzo[b]fluoren-10-one (10e). From **10a**: Methyl iodide (0.042 mL, 0.68 mmol) was added to a mixture of **10a** (25.0 mg, 0.068 mmol) and K_2CO_3 (93.0 mg, 0.068 mmol) in DMF (2.0 mL) at room temperature. The dark purple mixture was stirred at room temperature for 12 h, turning to a dark red color. The reaction solution was then diluted with saturated aqueous NH_4Cl (10 mL) and Et_2O (10 mL). The layers were separated and the aqueous layer was extracted with Et_2O

(3X 10 mL). The combined organic layers were washed with water and brine, dried over Na_2SO_4, filtered and concentrated. The resulting light red solid was purified by flash chromatography on silica gel (CH_2Cl_2). The tri-methylether was obtained as a bright red solid (11.5 mg, 41%).

From **10b**: Methyl iodide (0.031 mL, 0.50 mmol) was added to a mixture of **10b** (20.0 mg, 0.050 mmol) and K_2CO_3 (69.0 mg, 0.050 mmol) in DMF (1.0 mL) at room temperature. The dark red mixture was stirred at room temperature for 12 h, turning to a light red color. The reaction was then diluted with saturated aqueous NH_4Cl (10 mL) and Et_2O (10 mL). The layers were separated and the aqueous layer was extracted with Et_2O (3X 10 mL). The combined organic layers were washed with water and brine, dried over Na_2SO_4, filtered and concentrated. The resulting light red solid was purified by flash chromatography on silica gel (CH_2Cl_2). The tri-methylether was obtained as a bright red solid (12.0 mg, 59%). mp 210 ^oC (dec); IR (neat): 1643 cm^{-1}; ^1H NMR (300 MHz, $CDCl_3$) δ 7.50-7.60 (m, 2H), 7.40-7.50 (m, 5H), 6.96 (dd, J = 6.7, 2.7 Hz, 1H), 6.76 (s, 1H), 6.59 (s, 1H), 4.02 (s, 3H), 3.96 (s, 3H), 3.89 (s, 3H), 2.32 (s, 3H); ^{13}C NMR (75 MHz, $CDCl_3$) δ 181.5, 161.6, 155.2, 153.0, 151.7, 145.3, 140.3, 138.7, 134.3, 134.2, 130.1, 129.2, 128.3, 127.8, 126.8, 121.4, 118.3, 118.2, 117.4, 113.9, 113.6, 63.9, 56.1, 55.9, 21.7; ESI m/z relative intensity 411 (MH^+ 100); TOFHRMS (+ESI) Calcd for $C_{27}H_{22}O_4$: 411.1596, Found 411.1596.

5-Hydroxy-4,9-Dimethoxy-2-Methyl-11-p-Tolyl-Benzo[b]fluoren-10-one (11a). Following General Proceedure 2, diazoquinone **1c** (20.0 mg, 0.060 mmol) was converted into a 2.2:1 mixture of benzo[b]fluorenone **11a** (*o,m,p* = 62:23:15) (7.4 mg, 30%) and benzo[b]fluorenone **10c** (3.6 mg, 15%). (*o,m,p* mixture) IR (neat): 3190, 1633 cm^{-1}; (*o*-isomer) ^1H NMR (500 MHz, $CDCl_3$) δ 10.64 (s, 1H), 7.60 (d, J = 7.9 Hz, 1H), 7.50 (t, J = 8.1 Hz, 1H), 7.22-7.36 (m, 3H), 7.19 (d, J = 7.3 Hz, 1H), 7.01 (d, J = 8.3 Hz, 1H), 6.69 (s, 1H), 6.54 (s, 1H), 4.11 (s, 3H), 3.89 (s, 3H), 2.31 (s, 3H), 2.16 (s, 3H); (*o,m,p* mixture) ^1H NMR (500 MHz, $CDCl_3$) δ 10.76 (s, 0.4H, *m,p*), 10.68 (s, 0.6H, *o*) 7.60 (d, J = 7.7 Hz, 0.5H), 7.59 (d, J = 7.4 Hz, 0.5H), 7.47-7.51 (m, 1H), 7.33-7.36 (m, 1H), 7.22-7.30 (m, 2H), 7.19 (d, J = 6.8 Hz, 1H), 7.01 (d, J = 8.3 Hz, 1H), 6.85 (s, 0.25H), 6.79 (s, 0.25H), 6.69 (s, 1H), 6.54 (s, .5H), 4.11 (s, 1.8H, *o*), 4.10 (s, 1.2H, *m,p*),

3.90 (s, 1.2H, *m,p*) 3.89 (s, 1.8H, *o*), 2.35 (s, 1.8H, *m,*p), 2.31 (s, 1.8H, *o*), 2.16 (s, 3H); (*o,m,p* mixture) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.5, 161.3, 151.5, 150.6, 145.9, 144.2, 138.5, 136.7, 136.5, 135.1, 134.0, 129.9, 129.5, 128.5, 127.6, 126.6, 125.4, 121.3, 119.4, 118.9, 118.6, 117.4, 114.6, 114.4, 111.1, 56.53, 56.5, 56.5, 21.8, 21.7, 19.9; ESI m/*z* relative intensity 411 (MH^+ 30); TOFHRMS (+ESI) Calcd for $C_{27}H_{22}O_4$: 411.1596, Found 411.1611.

11-(4-Chloro-Phenyl)-5-Hydroxy-4,9-Dimethoxy-2-Methyl-Benzo[b]fluoren-10-one (11b). Following General Proceedure 2, diazoquinone **1c** (20.0 mg, 0.060 mmol) was converted into a 1.5:1 mixture of benzo[b]fluorenone **11b** (*o,m,p* = 48:32:20) (9.5 mg, 37%) and benzo[b]fluorenone **10c** (5.0 mg, 21%). **11b** isomers were separated via preparative TLC (20% EtOAc in benzene). (*o*-isomer) mp 280 ^{o}C (dec); (*o*-isomer) IR (neat): 3178, 1630 cm^{-1}; (*o*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.76 (s, 1H), 7.60 (d, *J* = 7.8 Hz, 1H), 7.50 (m, 2H), 7.33 (m, 3H), 7.02 (d, *J* = 8.2 Hz, 1H), 6.69 (s, 1H), 6.58 (s, 1H), 4.11 (s, 3H), 3.90 (s, 3H), 2.33 (s, 3H); (*m*-isomer) mp 260 ^{o}C (dec); (*m*-isomer) IR (neat): 3378, 1630 cm^{-1}; (*m*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.82 (s, 1H), 7.60 (d, *J* = 8.2 Hz, 1H), 7.51 (m, 2H), 7.44 (d, *J* = 6.8 Hz, 1H), 7.38 (t, *J* = 7.8 Hz, 1H), 7.37 (s, 1H), 7.30 (d, *J* = 8.3 Hz, 1H), 6.75 (s, 1H), 6.71 (s, 1H), 4.12 (s, 3H), 3.91 (s, 3H), 2.36 (s, 3H); (*p*-isomer) mp 240 ^{o}C (dec); (*p*-isomer) IR (neat): 3166, 1631 cm^{-1}; (*p*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.81 (s, 1H), 7.60 (d, *J* = 8.4 Hz, 1H), 7.52 (d, *J* = 8.6 Hz, 2H), 7.50 (t, *J* = 8.2 Hz, 1H), 7.42 (d, 8.6 Hz, 2H), 7.30 (d, *J* = 8.4 Hz, 1H), 6.79 (s, 1H), 6.71 (s, 1H), 4.12 (s, 3H), 3.92 (s, 3H), 2.35 (s, 3H); (*o,m,p*-mixture) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.6, 181.5, 181.3, 161.3, 151.5, 151.4, 151.3, 151.1, 144.5, 143.5, 143.3, 142.3, 138.5, 136.6, 136.5, 136.4, 134.1, 133.8, 133.7, 133.2, 131.1, 130.7, 130.3, 129.5, 129.2, 129.1, 128.9, 128.3, 128.1, 127.9, 126.5, 121.1, 119.6, 119.5, 119.3, 118.5, 118.4, 118.3, 117.5, 114.7, 114.4, 114.2, 111.2, 111.1, 56.6, 56.5, 56.2, 56.1, 21.8, 21.7; ESI m/*z* relative intensity 431 (MH^+ 100); TOFHRMS (+ESI) Calcd for $C_{26}H_{20}O_4Cl$: 431.1050, Found 431.1060.

4-(5-Hydroxy-4,9-Dimethoxy-2-Methyl-10-oxo-10H-Benzo[b]fluoren-11-yl)-Benzonitrile (11c). Following General Proceedure 2, diazoquinone **1c** (20.0 mg, 0.060

mmol) was converted into a 2.2:1 mixture of benzo[b]fluorenone **11c** (*o,m,p* = 43:25:32) (13.0 mg, 51%) and benzo[b]fluorenone **10c** (5.6 mg, 23%). **11c** isomers were separated via preparative TLC (20% EtOAc in benzene). (*o*-isomer) mp 265 ^{o}C (dec); (*o*-isomer) IR (neat): 3394, 2232, 1631 cm^{-1}; (*o*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.87 (s, 1H), 7.77 (d, *J* = 7.6 Hz, 1H), 7.66 (t, *J* = 7.7 Hz, 1H), 7.61 (d, *J* = 7.9 Hz, 1H), 7.52 (t, *J* = 8.2 Hz, 1H), 7.49 (d, *J* = 7.8 Hz, 1H), 7.46 (t, *J* = 7.7 Hz, 1H), 7.03 (d, *J* = 8.2 Hz, 1H), 6.71 (s, 1H), 6.58 (s, 1H), 4.13 (s, 3H), 3.92 (s, 3H), 2.34 (s, 3H); (*m*-isomer) mp 265 ^{o}C (dec); (*m*-isomer) IR (neat): 3412, 2216, 1633 cm^{-1}; (*m*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.88 (s, 1H), 7.82 (d, *J* = 8.0 Hz, 1H), 7.81 (s, 1H), 7.67 (d, *J* = 7.7 Hz, 1H), 7.61 (d, *J* = 7.8 Hz, 1H), 7.54 (t, *J* = 8.0 Hz, 1H) 7.47 (t, *J* = 8.1 Hz, 1H), 7.04 (d, *J* = 7.7 Hz, 1H), 6.72 (s, 1H), 6.70 (s, 1H), 4.13 (s, 3H), 3.93 (s, 3H), 2.37 (s, 3H); (*p*-isomer) mp 265 ^{o}C (dec); (*p*-isomer) IR (neat): 3412, 2223, 1631 cm^{-1}; (*p*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.92 (s, 1H), 7.73 (d, *J* = 8.4 Hz, 2H), 7.66 (d, *J* = 8.5 Hz, 2H), 7.61 (d, *J* = 7.8 Hz, 1H), 7.52 (t, *J* = 8.2 Hz, 1H), 7.04 (d, *J* = 8.3 Hz, 1H), 6.72 (s, 1H), 6.71 (s, 1H), 4.13 (s, 3H), 3.92 (s, 3H), 2.36 (s, 3H); (*o,m,p*-mixture) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.7, 181.6, 181.4, 161.5, 161.4, 152.4, 152.1, 151.6, 151.5, 143.1, 143.0, 142.9, 139.9, 139.6, 138.7, 138.6, 138.5, 136.4, 136.3, 136.2, 134.4, 133.0, 132.9, 132.3, 131.7, 131.5, 130.8, 130.4, 130.0, 129.7, 128.8, 127.9, 121.0, 119.5, 118.3, 118.1, 118.0, 117.9, 117.8, 115.2, 114.4, 114.3, 114.2, 113.1, 112.1, 111.4, 111.3, 111.3, 56.6, 56.5, 56.3, 56.3, 56.2, 21.8; ESI m/*z* relative intensity 444 (MNa^+ 100); TOFHRMS (+ESI) Calcd for $C_{27}H_{19}NO_4Na$: 444.1212, Found 444.1215.

5-Hydroxy-4,9-Dimethoxy-11-(4-Methoxy-Phenyl)-2-Methyl-Benzo[b]fluoren-10-one (11d). Following General Proceedure 2, diazoquinone **1c** (20.0 mg, 0.060 mmol) was converted into a 3.2:1 mixture of benzo[b]fluorenone **11d** (*o,m,p* = 76:16:12) (14.5 mg, 57%) and benzo[b]fluorenone **10c** (4.3 mg, 18%). (*o*-isomer) mp 210 ^{o}C (dec); (*o*-isomer) IR (neat): 3182, 1632 cm^{-1}; (*o*-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.70 (s, 1H), 7.58, (d, *J* = 7.9 Hz, 1H), 7.48 (t, *J* = 8.1 Hz, 1H), 7.36 (t, *J* = 7.6 Hz, 1H), 7.34 (d, *J* = 7.7 Hz, 1H), 7.03 (t, *J* = 7.5 Hz, 1H), 7.01 (d, *J* = 8.2 Hz, 1H), 7.0 (d, *J* = 8.3 Hz, 1H), 6.66 (s, 1H), 6.65 (s, 1H), 4.10 (s, 3H), 3.89 (s, 3H), 3.73 (s, 3H), 2.32 (s, 3H); (*o*-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.3, 161.2, 157.4, 151.4, 150.4,

144.0, 142.8, 138.1, 136.5, 133.8, 130.7, 130.0, 129.2, 124.3, 121.6, 120.4, 119.4, 118.7, 117.3, 114.7, 114.6, 111.3, 110.9, 56.5, 56.1, 55.7, 21.8; (*m,p*-isomer) IR (neat): 3178, 2216, 1622 cm^{-1}; (*m,p*-isomer) ^1H NMR (500 MHz, $CDCl_3$) δ 10.78 (s, 0.43H, *p*), 10.76 (s, 0.57H, *m*), 7.59 (d, *J* = 7.3 Hz, 1H), 7.58 (d, *J* = 8.4 Hz, 1H), 7.49 (t, *J* = 8.0 Hz, 1H), 7.37 (t, *J* = 8.0 Hz, 1H), 7.14 (d, *J* = 7.6 Hz, 0.5H), 6.98-7.06 (m, 2H), 6.93 (d, *J* = 8.6 Hz, 0.5H), 6.88 (s, 0.5H), 6.82 (s, 0.5H), 6.69 (s, 1H), 4.10 (s, 3H), 3.91 (s, 3H), 3.88 (s, 1.5H), 3.88 (s, 1.5H), 2.35 (s, 1.5H), 2.34 (s, 1.5H); (*p*-isomer) IR (neat): 3412, 2223, 1631 cm-1; (*m,p*-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.6, 181.3, 161.4, 161.2, 159.6, 159.2, 157.4, 151.4, 150.8, 150.4, 150.2, 149.4, 146.2, 145.8, 144.0, 142.8, 138.6, 138.2, 136.5, 136.4, 136.2, 136.1, 134.0, 133.8, 133.7, 131.2, 130.7, 130.0, 129.2, 128.9, 128.7, 128.3, 126.6, 124.3, 122.1, 122.0, 121.7, 121.6, 120.4, 119.8, 119.4, 118.9, 118.8, 118.7, 117.4, 117.3, 114.8, 114.7, 114.6, 114.4, 113.7, 113.6, 113.2, 111.3, 111.1, 110.9, 110.5, 56.5, 56.4, 56.1, 56.0, 55.7, 55.3, 55.2, 21.8, 21.7; ESI m/*z* relative intensity 449 (MNa^+ 85); TOFHRMS (+ESI) Calcd for $C_{27}H_{22}O_5Na$: 449.1365, Found 449.1346.

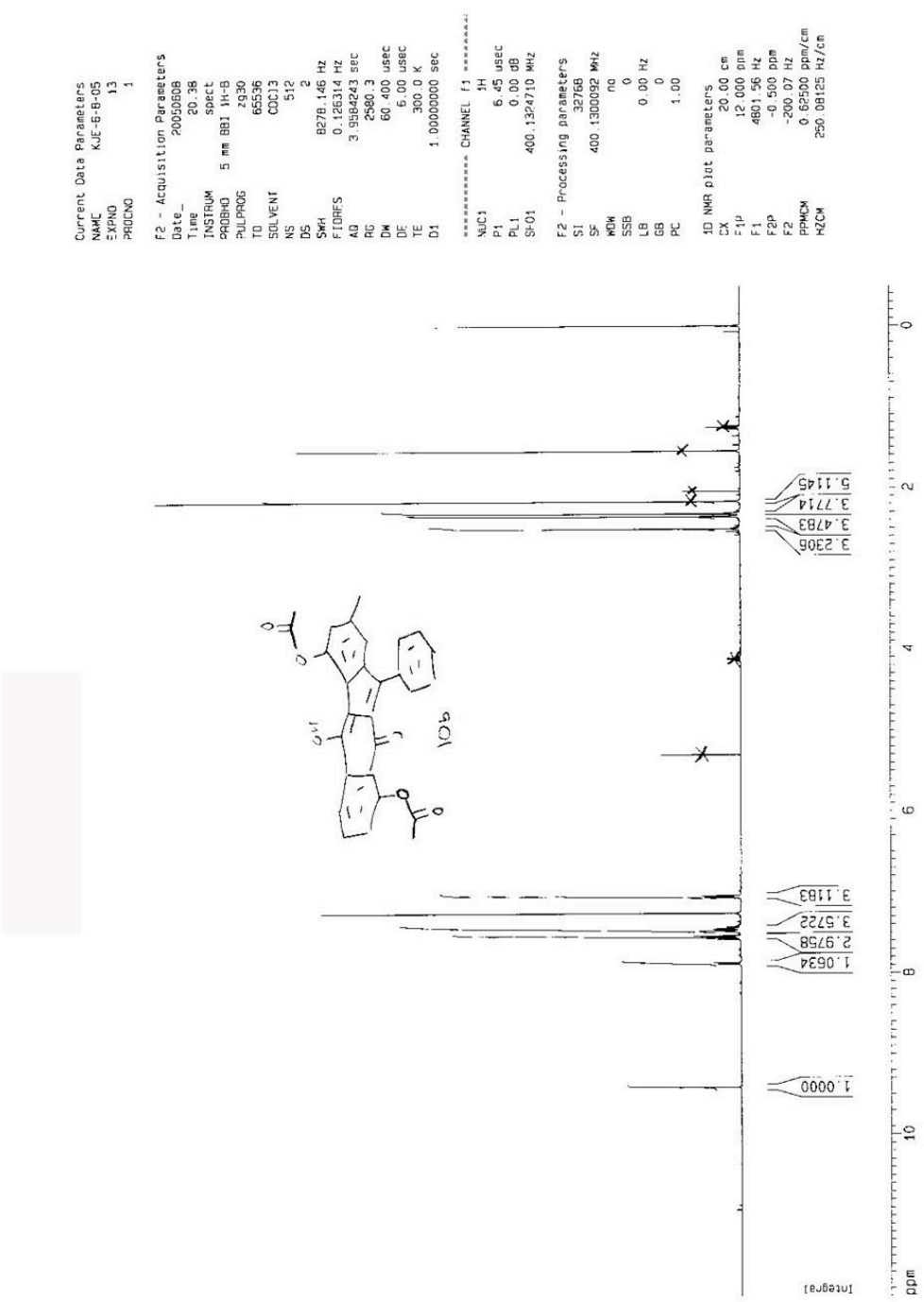
11-(3,5-Dimethyl-phenyl)-5-Hydroxy-4,9-Dimethoxy-2-Methyl-Benzo[b]fluoren-10-one (11e). Following General Proceedure 2, diazoquinone **1c** (20.0 mg, 0.060 mmol) was converted into a 3.14:1 mixture of benzo[b]fluorenone **11e** (2:4:5 = 50:50:0) (11.5 mg, 44%) and benzo[b]fluorenone **10c** (3.4 mg, 14%). **11e** isomers were separated via preparative TLC (1% EtOAc in CH_2Cl_2). (4-isomer) mp 220 °C (dec); (4-isomer) IR (neat): 3195, 1633 cm^{-1}; (4-isomer) ^1H NMR (500 MHz, $CDCl_3$) δ 10.67 (s, 1H), 7.59 (d, *J* = 7.3 Hz, 1H), 7.49 (t, *J* = 8.0 Hz, 1H), 7.12 (s, 1H), 7.09 (d, *J* = 7.7 Hz, 1H), 7.05 (d, *J* = 7.7 Hz, 1H), 7.00 (d, *J* = 8.2 Hz, 1H), 6.68 (s, 1H), 6.58 (s, 1H), 4.11 (s, 3H), 3.89 (s, 3H), 2.37 (s, 3H), 2.30 (s, 3H), 2.13 (s, 3H); (4-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.5, 161.3, 151.4, 150.4, 146.1, 144.3, 138.4, 137.1, 136.5, 136.5, 133.9, 131.9, 130.8, 129.9, 128.4, 126.1, 121.4, 119.4, 118.6, 117.3, 114.5, 114.4, 111.1, 56.5, 56.1, 21.7, 21.3, 19.8; (2-isomer) mp 250 °C (dec); (2-isomer) IR (neat): 3194, 1633 cm^{-1}; (2-isomer) ^1H NMR (500 MHz, $CDCl_3$) δ 10.64 (s, 1H), 7.60 (d, *J* = 7.5 Hz, 1H), 7.49 (t, *J* = 7.8 Hz, 1H), 7.18 (t, *J* = 8.1 Hz, 1H), 7.10 (d, *J* = 7.6 Hz, 2H), 7.01 (d, J = 8.1 Hz, 1H), 6.69 (s, 1H), 6.45 (s, 1H), 4.12 (s, 3H), 3.89 (s, 3H), 2.30 (s, 3H), 2.04 (s, 6H); (2-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.5, 161.3, 151.5, 150.3, 145.9, 143.3,

138.6, 136.6, 135.9, 134.8, 134.0, 130.8, 130.0, 127.1, 127.0, 121.1, 119.5, 118.0, 117.3, 114.5, 111.2, 56.4, 56.1, 20.7 20.1; ESI m/*z* relative intensity 425 (MH^+ 50); TOFHRMS (+ESI) Calcd for $C_{28}H_{25}O_4$: 425.1753, Found 425.1740.

11-(3,5-Dimethoxy-Phenyl)-5-Hydroxy-4,9-Dimethoxy-2-Methyl-Benzo[b]fluoren-10-one (11f). Following General Proceedure 2, diazoquinone **1c** (20.0 mg, 0.060 mmol) was converted into a 4.2:1 mixture of benzo[b]fluorenone **11f** (2:4:5 = 31:69:0) (16.2 mg, 59%) and benzo[b]fluorenone **10c** (3.4 mg, 14%). (4-isomer) mp 190 ^oC (dec); (4-isomer) IR (neat): 3195, 1633 cm^{-1}; (4-isomer) ^1H NMR (500 MHz, $CDCl_3$) δ 10.68 (s, 1H), 7.57 (d, *J* = 7.6 Hz, 1H), 7.46 (t, *J* = 8.2 Hz, 1H), 7.31 (d, *J* = 8.9 Hz, 1H), 6.99 (d, *J* = 8.3 Hz, 1H), 6.70 (s, 1H), 6.65 (s, 1H), 6.59 (m, 2H), 4.08 (s, 3H), 3.89 (s, 3H), 3.87 (s, 3H), 3.72 (s, 3H), 2.32 (s, 3H); (4-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.3, 161.2, 160.9, 158.9, 151.4, 150.0, 144.1, 142.8, 138.0, 136.5, 133.6, 131.5, 128.3, 121.8, 119.5, 118.8, 117.2, 116.8, 114.7, 114.5, 110.9, 104.5, 99.0, 56.5, 56.1, 55.6, 55.4, 21.8; (2-isomer) mp 180 ^oC (dec); (2-isomer) IR (neat): 3190, 1633 cm^{-1}; (2-isomer) ^1H NMR (500 MHz, $CDCl_3$) δ 10.80 (s, 1H), 7.58 (d, *J* = 8.1 Hz, 1H), 7.47 (t, *J* = 8.1 Hz, 1H), 7.30 (t, *J* = 8.3 Hz, 1H), 6.99 (d, *J* = 8.2 Hz, 1H), 6.65 (d, *J* = 8.5 Hz, 2H) 6.64 (s, 1H), 6.57 (s, 1H), 4.08 (s, 3H), 3.89 (s, 3H), 3.68 (s, 6H), 2.30 (s, 3H); (2-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.1, 161.1, 158.5, 151.5, 150.0. 144.0, 130.4, 138.1, 136.7, 136.3, 133.6, 129.1, 121.6, 119.5, 118.5, 117.2, 114.9, 114.5, 113.7, 113.3, 110.9, 110.6, 104.3, 56.2, 56.1, 56.0, 21.8; ESI m/*z* relative intensity 457 (MH^+ 30); TOFHRMS (+ESI) Calcd for $C_{28}H_{25}O_6$: 457.1651, Found 457.1653.

5-(5-Hydroxy-4,9-Dimethoxy-2-Methyl-10-oxo-10H-Benzo[b]fluoren-11-yl)-Isophthalonitrile (11g). Due to the insolubility of 1,3-dicyanobenzene in benzene at 80 ^oC, the following experiment was run at a 13:1 ratio of benzene : 1,3-dicyanobenzene. Solid AIBN (11.0 mg, 0.066 mmol) was added portionwise over a period of 1 h to a stirring solution of diazoquinone **10c** (20.0 mg, 0.060 mmol), 1,3-dicyanobenzene (0.11g, .86 mmol) and Bu_3SnH (0.018 mL, 0.066 mmol) in benzene (1.0 mL, 11 mmol) at 80 ^oC. When the addition was complete, the reaction solution was allowed to cool to room temperature. After reaching room temperature the reaction mixture was diluted with

CH_2Cl_2 and purified with flash column chromatography, eluting with an increasing percentage of EtOAc from 0 % to 10 % in CH_2Cl_2. Purification furnished a 1:2.2 mixture of benzo[b]fluorenone **11g** (2:4:5 = 24:76:0) (6.5 mg, 24%) and benzo[b]fluorenone **10c** (12.4 mg, 52%). The ratio of **11g** : **10c**, ratioed up to equimolar amounts of benzene and 1,3-dicyanobenzene, is calculated to be 6.0:1. **11g** isomers were separated via preparative TLC (20% EtOAc in benzene). (4-isomer) mp 270 ^{o}C (dec); (4-isomer) IR (neat): 3213, 2526, 1633 cm^{-1}; (4-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.97 (s, 1H), 8.04 (s, 1H), 7.91 (d, *J* = 8.1 Hz, 1H), 7.63 (d, *J* = 8.1 Hz, 1H), 7.61 (d, *J* = 7.3 Hz, 1H), 7.53 (t, *J* = 8.1 Hz, 1H), 7.06 (d, *J* = 8.1 Hz, 1H), 6.72 (s, 1H), 6.54 (s, 1H), 4.13 (s, 3H), 3.93 (s, 3H), 2.35 (s, 3H); (4-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 181.4, 161.5, 153.7, 151.7, 144.6, 141.8, 138.9, 137.4, 136.2, 136.2, 135.3, 134.8, 131.4, 131.3, 120.58, 119.6, 118.1, 117.2, 117.1, 116.2, 115.6, 115.0, 114.0, 112.3, 111.5, 56.6, 56.3, 21.8; (2-isomer) mp 290 ^{o}C (dec); (2-isomer) IR (neat): 3213, 2238, 1631 cm^{-1}; (2-isomer) ^{1}H NMR (500 MHz, $CDCl_3$) δ 10.99 (s, 1H), 7.96 (d, *J* = 8.0 Hz, 1H), 7.62 (d, *J* = 8.2 Hz, 1H), 7.60 (t, *J* = 7.9 Hz, 1H), 7.53 (d, *J* = 8.2 Hz, 1H), 7.06 (d, *J* = 8.4 Hz, 2H) 6.72 (s, 1H), 6.48 (s, 1H), 4.13 (s, 3H), 3.93 (s, 3H), 2.34 (s, 3H); (2-isomer) ^{13}C NMR (125 MHz, $CDCl_3$) δ 161.5, 153.9, 151.7, 144.4, 141.5, 138.8, 136.5, 136.3, 135.0, 134.8, 132.2, 131.9, 128.4, 120.5, 119.6, 118.2, 117.1, 116.4, 115.5, 115.0, 114.1, 111.6, 56.6, 56.4, 21.9; ESI m/*z* relative intensity 469 (MNa^+ 100); TOFHRMS (+ESI) Calcd for $C_{28}H_{18}N_2O_4Na$: 469.1164, Found 469.1156.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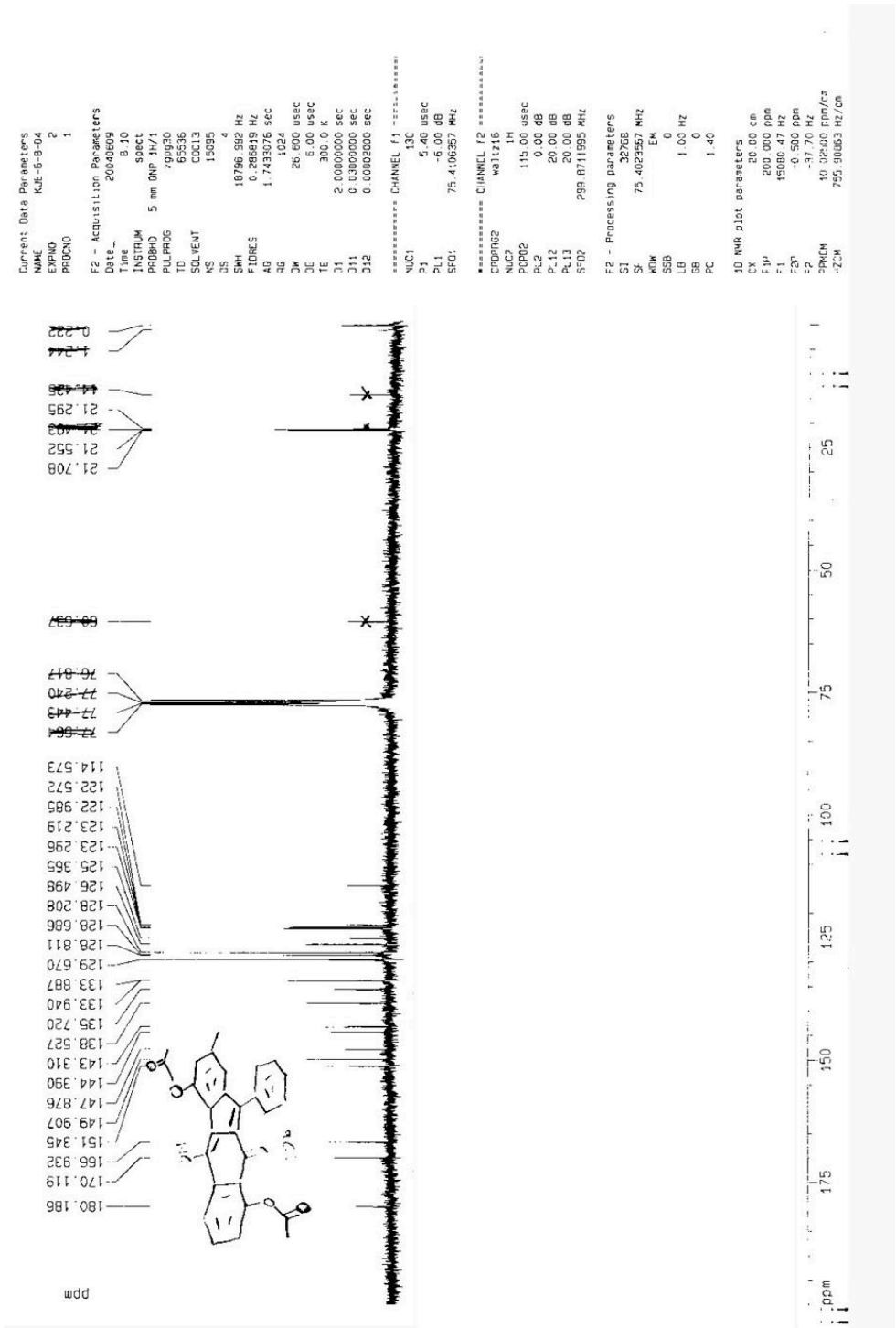
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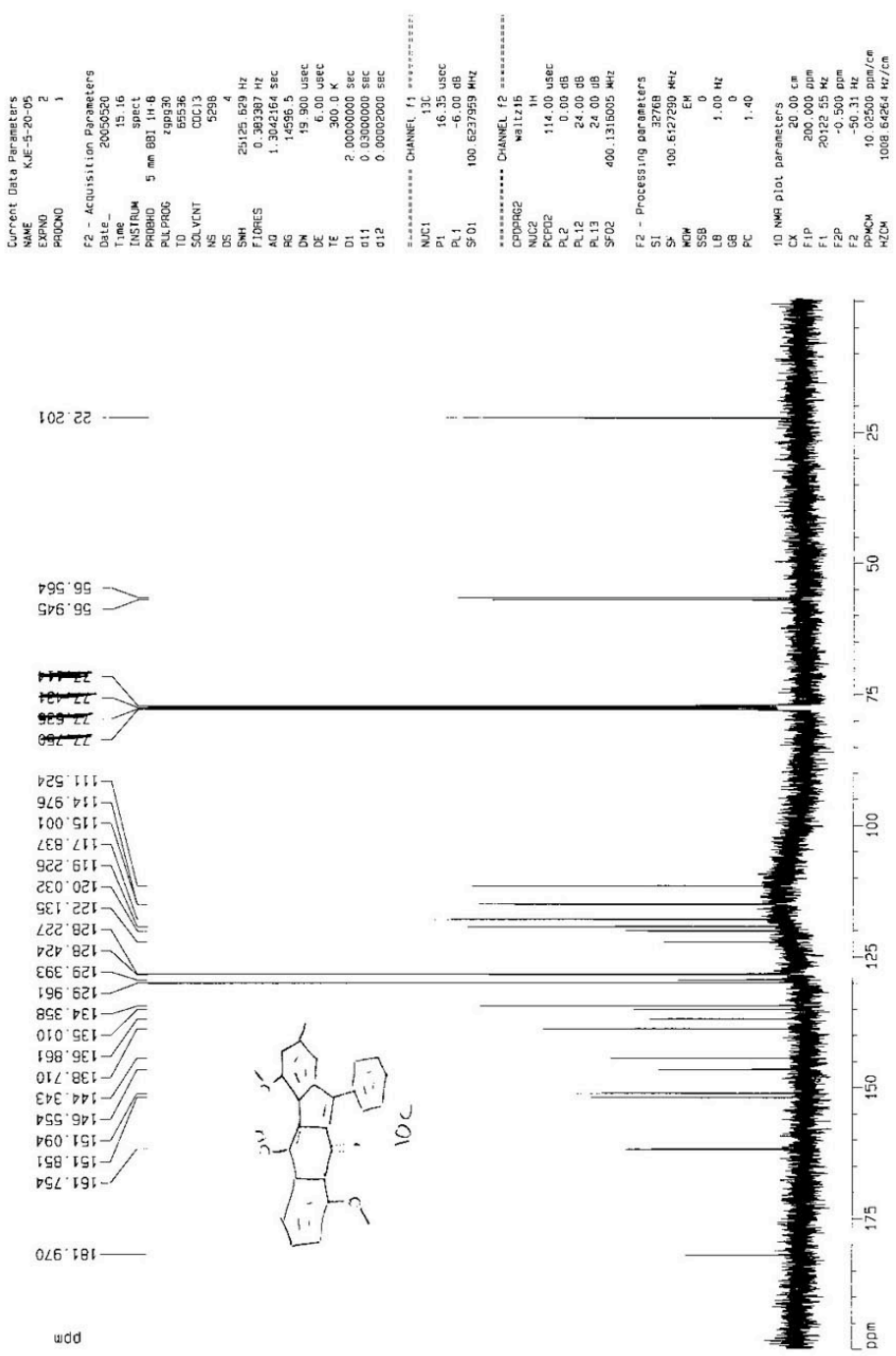
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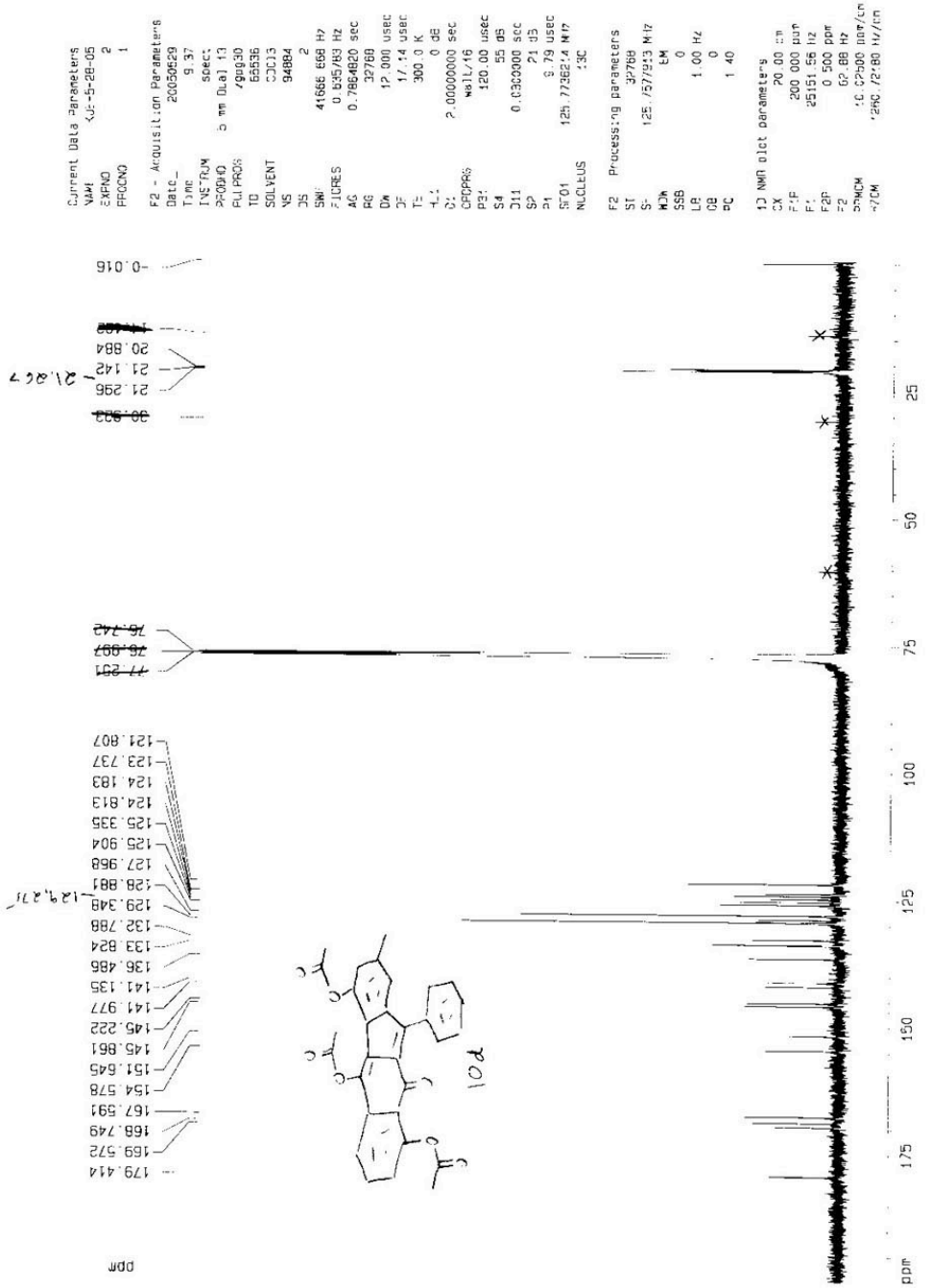

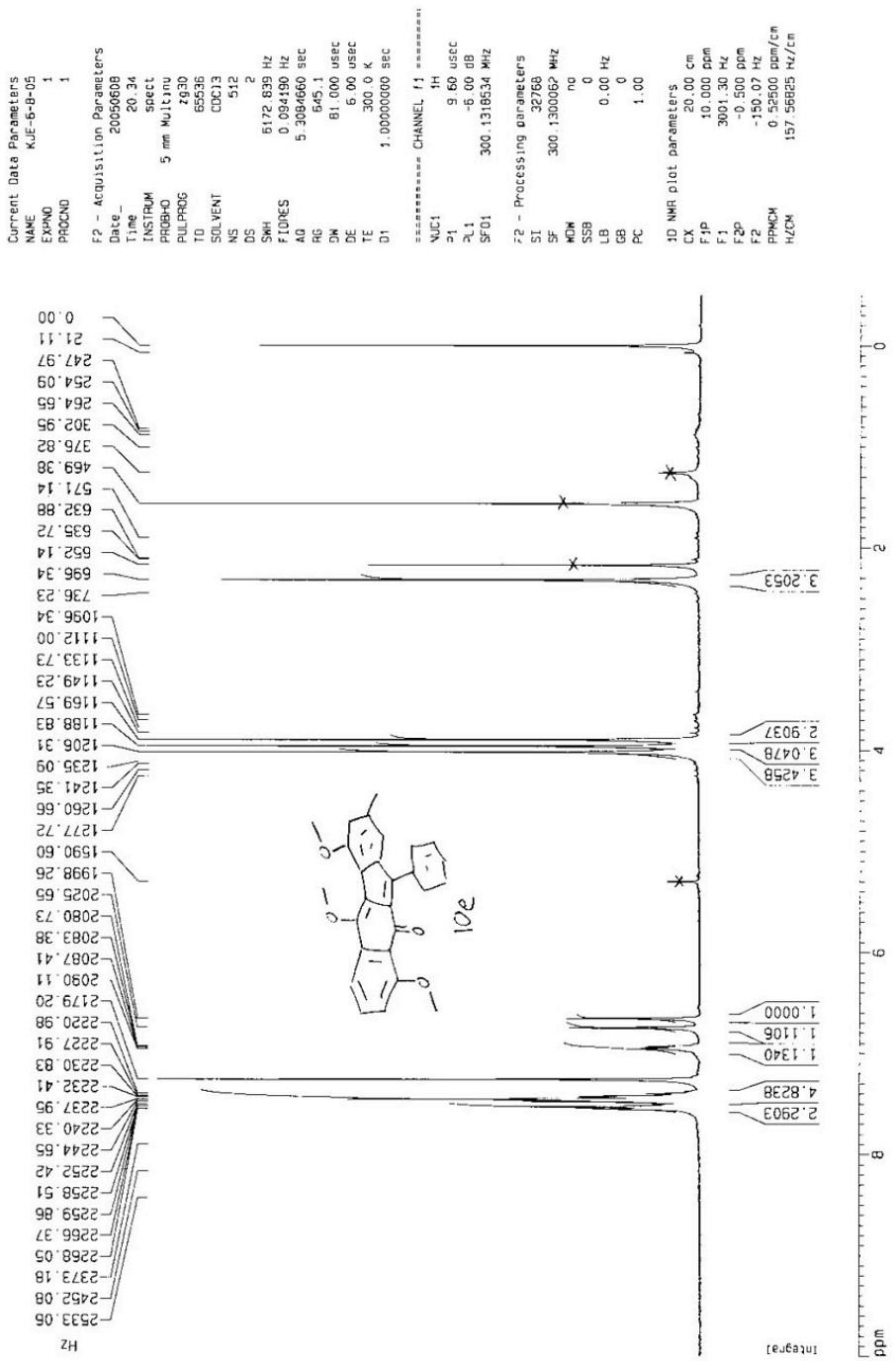
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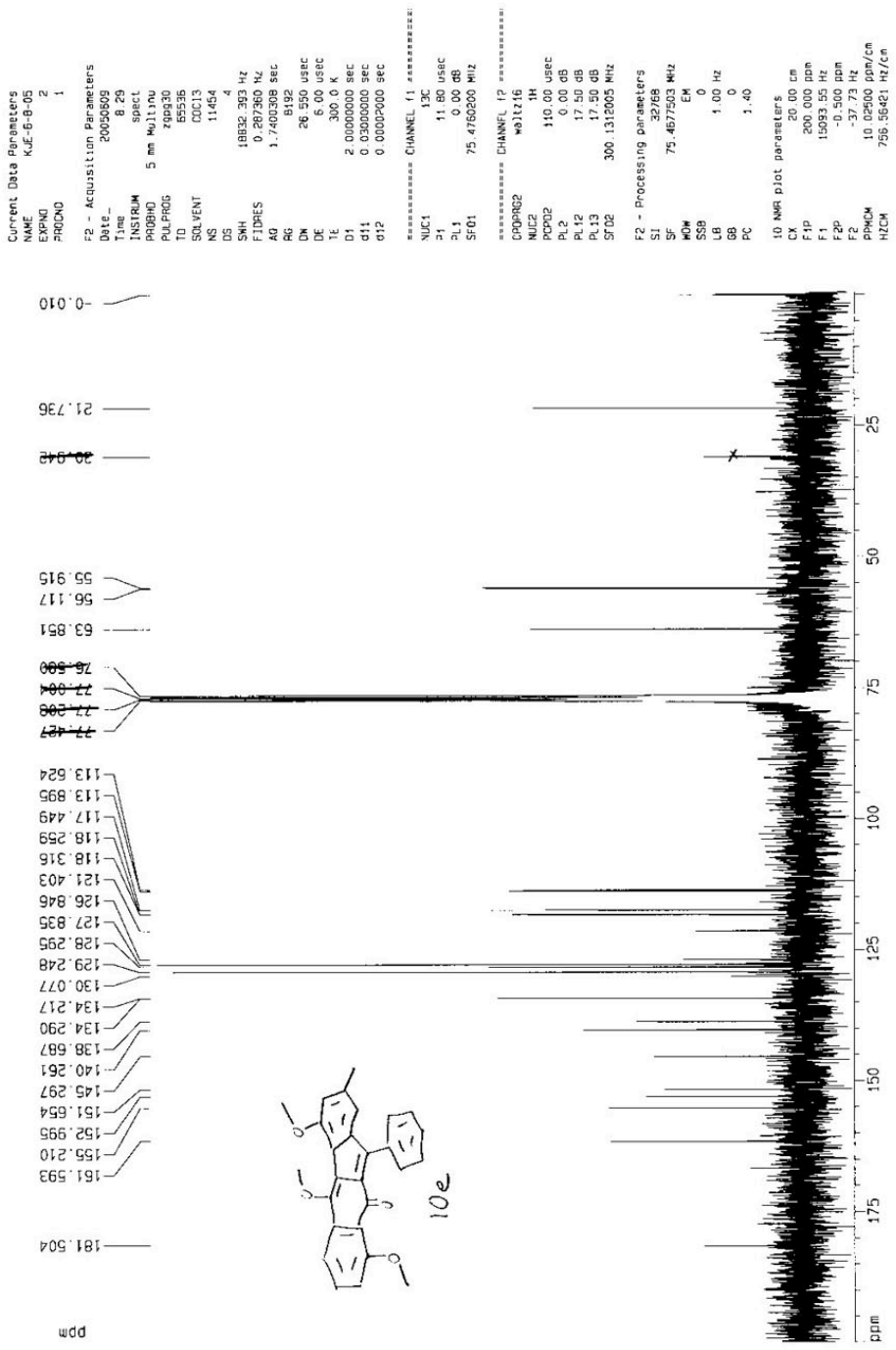
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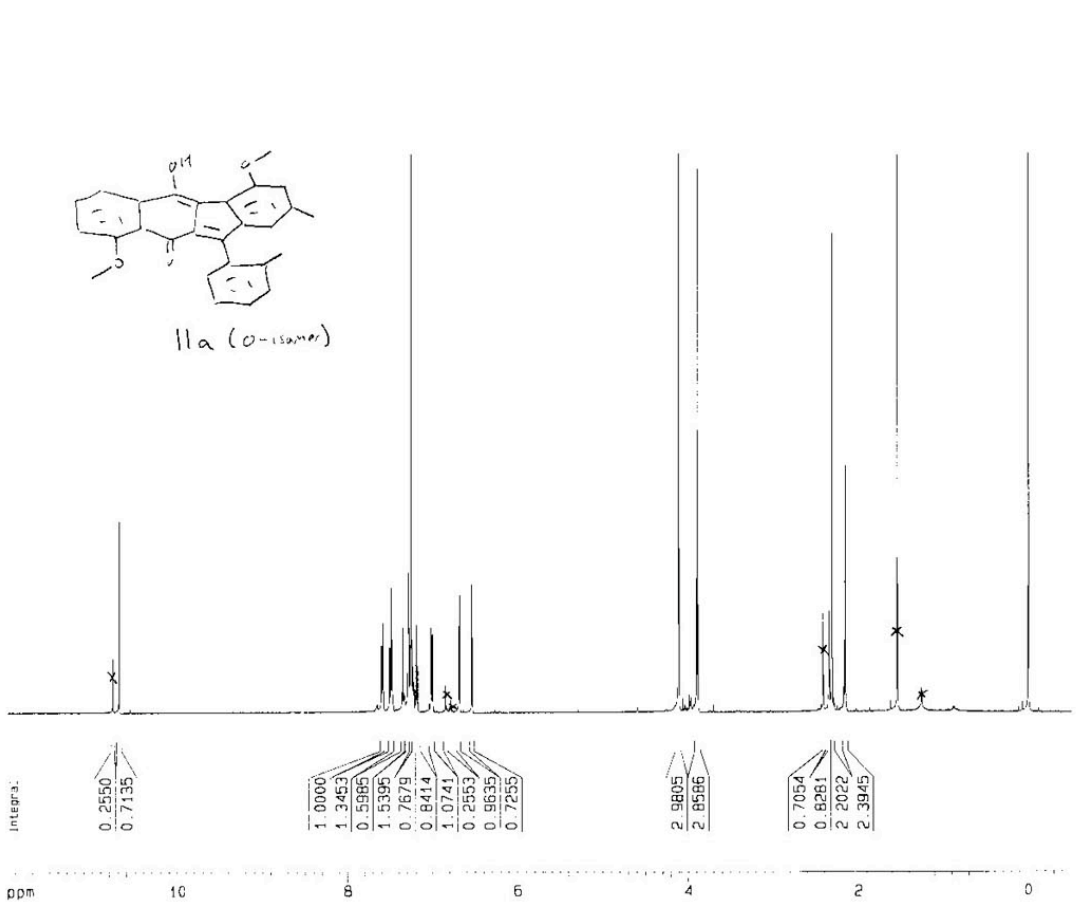
175
10e

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Current Data Parameters
NAME          KJ-5-19-05
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20050519
Time               9.46
INSTRUM            spect
PROBHD     5 mm Dual 13
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   256
DS                     2
SWH          10416.667 Hz
FIDRES        0.317891 Hz
AQ            1.5729140 sec
RG                  4096
DW               48.000 usec
DE               6.50 usec
TE               300.0 K
D1               1.00000000 sec
P1               11.75 usec
SFO1         500.1330885 MHz
NUCLEUS             1H

F2 - Processing parameters
SI                 16384
SF         500.1300140 MHz
WDW                   no
SSB                    0
LB                0.00 Hz
GB                     0
PC                  1.00

1D NMR plot parameters
CX                20.00 cm
F1P              12.000 ppm
F1               6001.56 Hz
F2P              -0.500 ppm
F2               -250.07 Hz
PPMCM          0.62500 ppm/cm
HZCM          312.58124 Hz/cm
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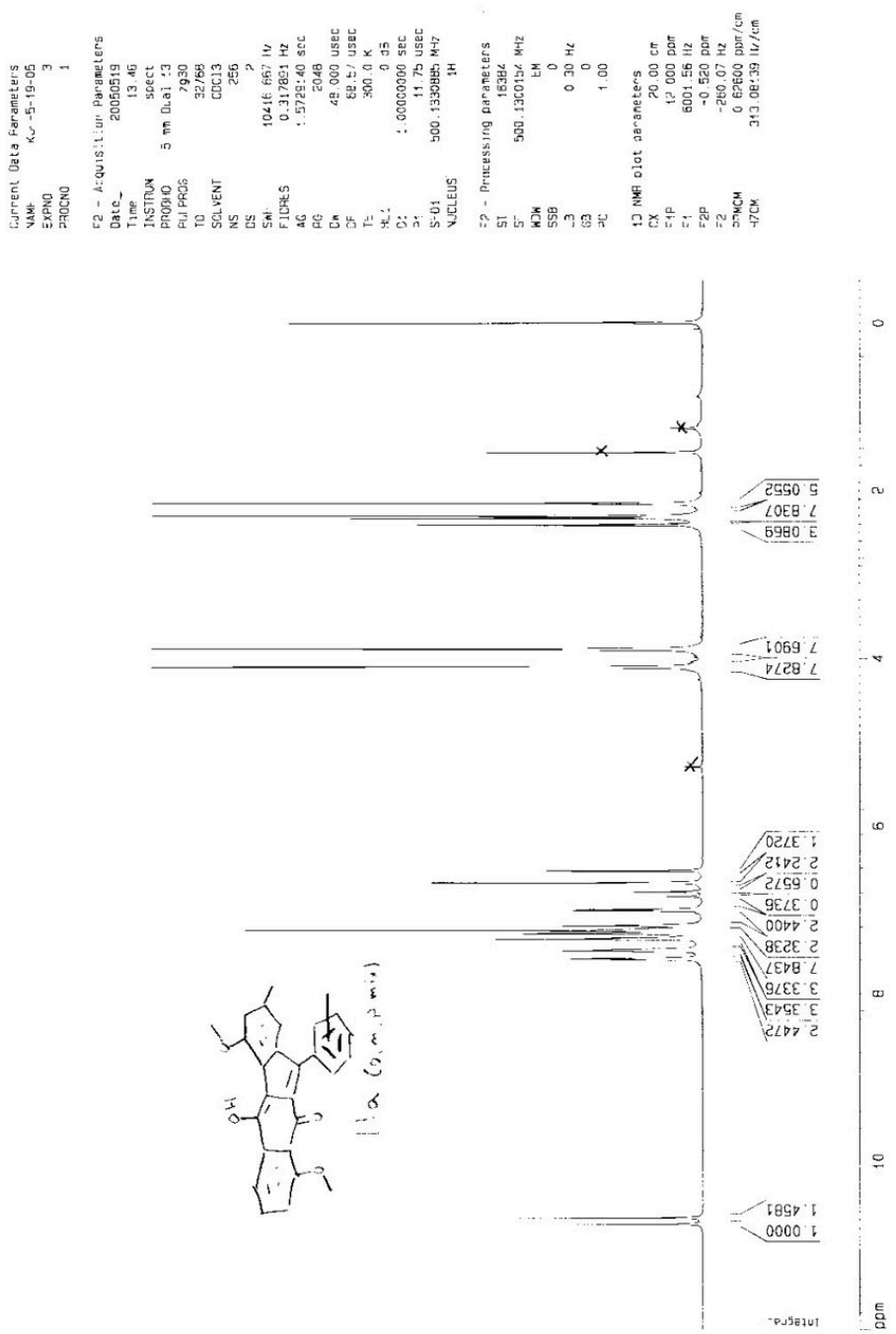
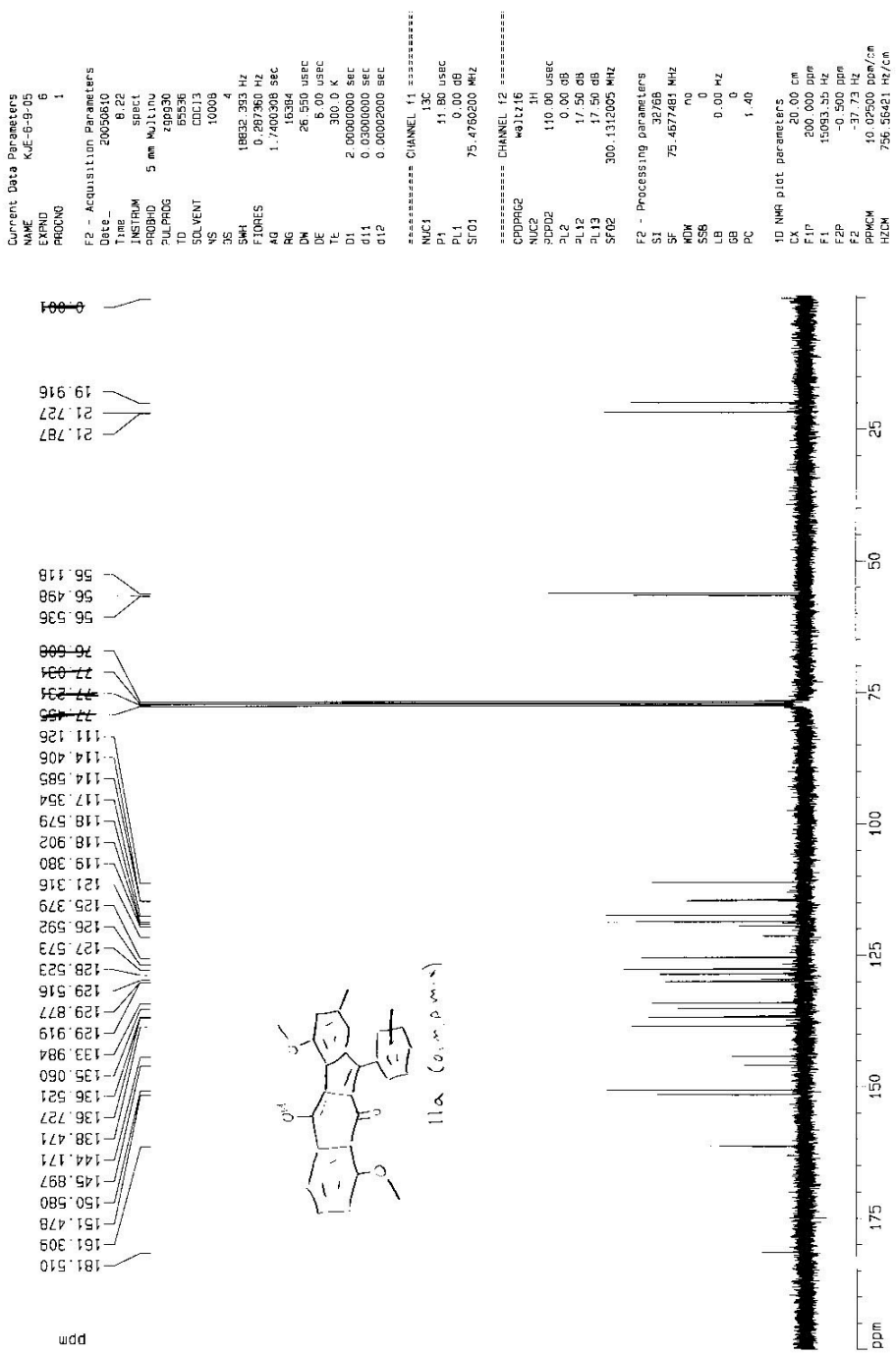
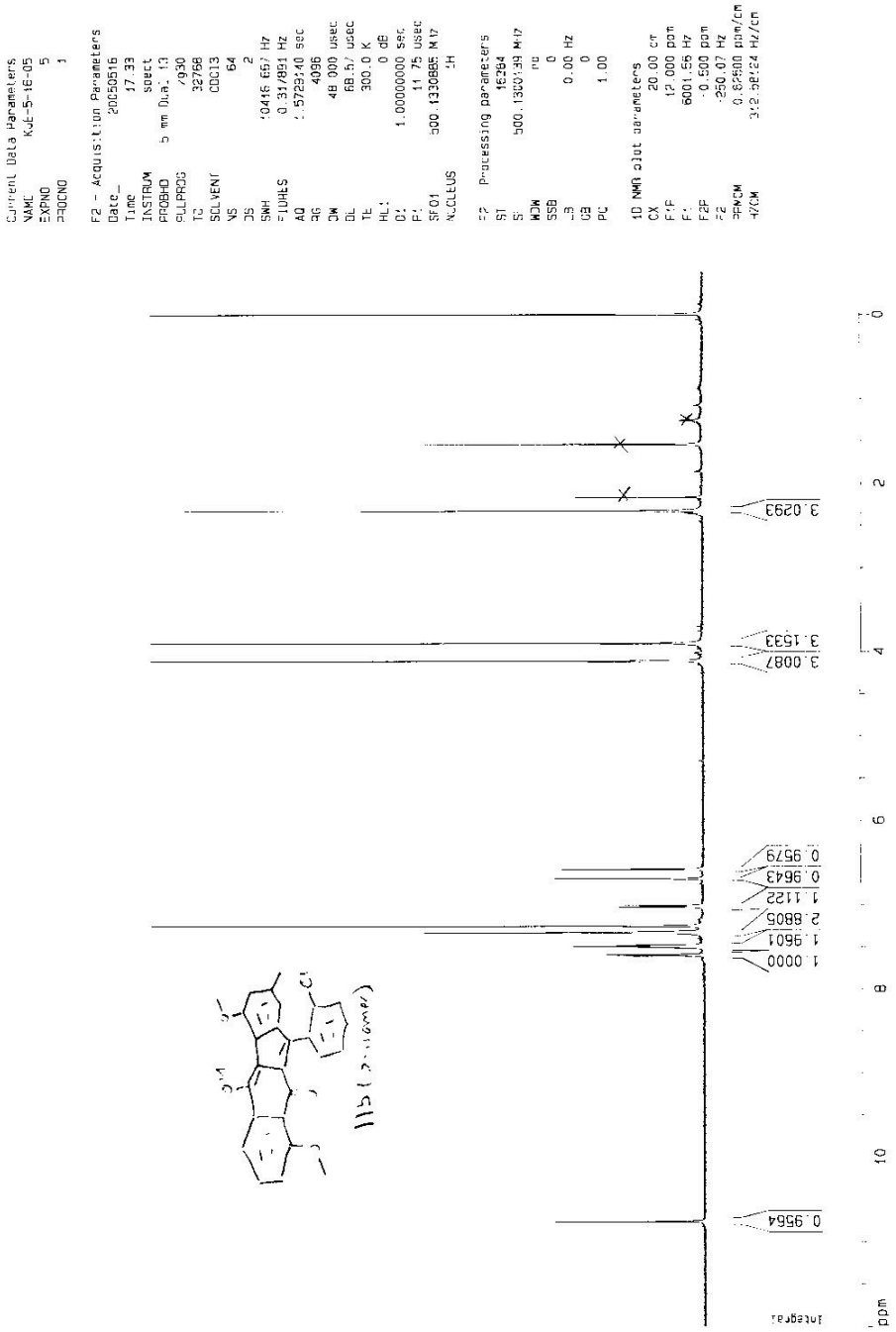
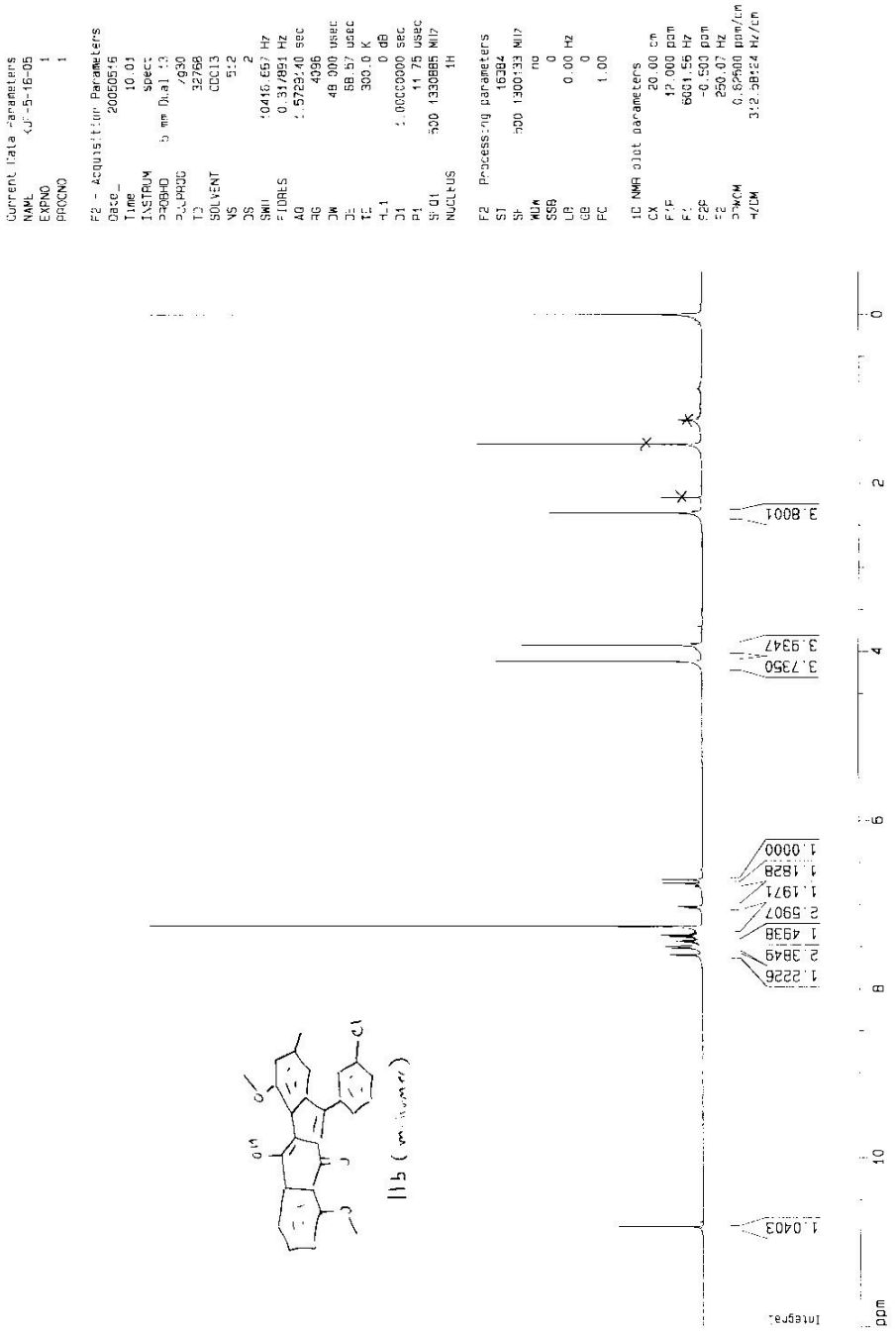
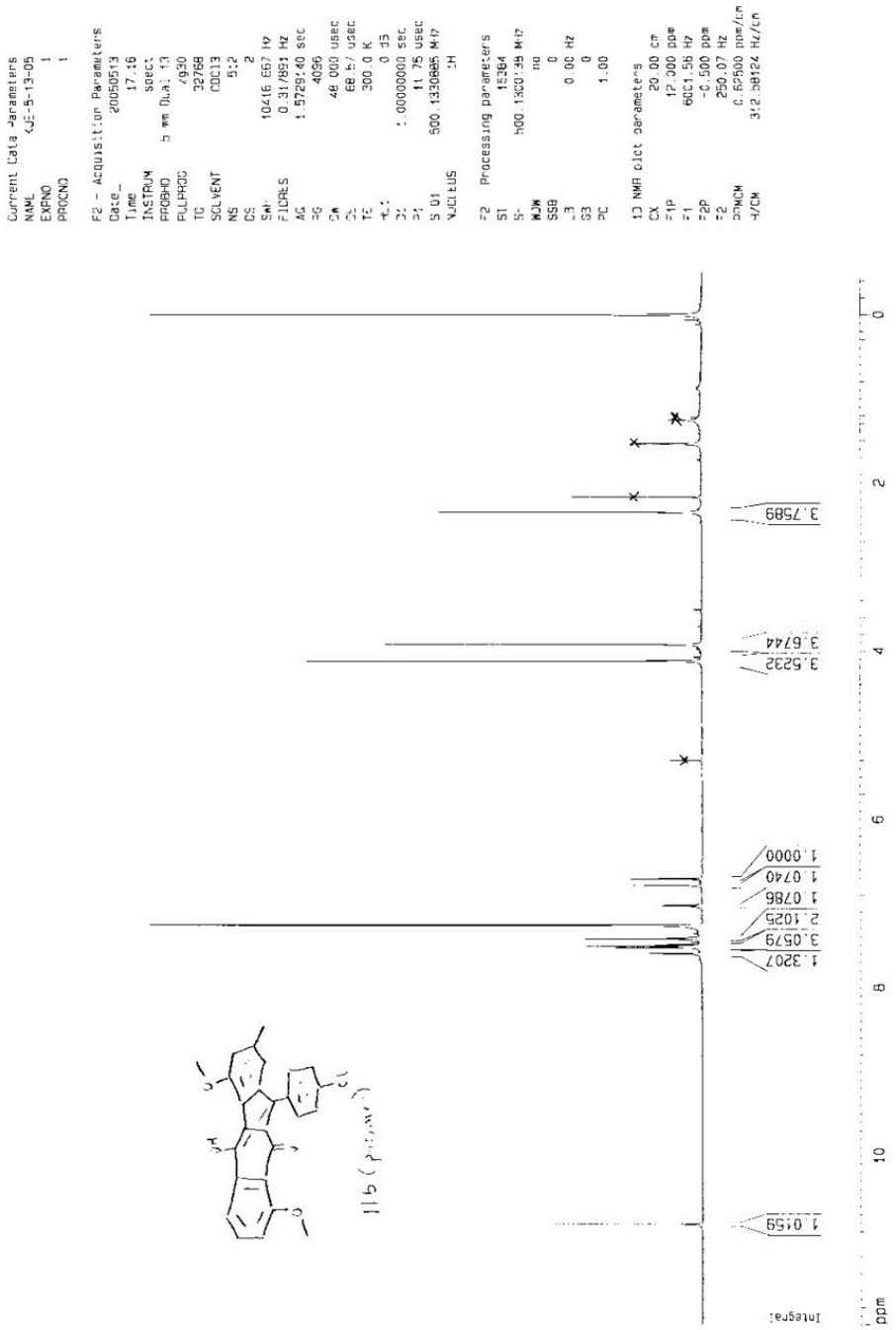
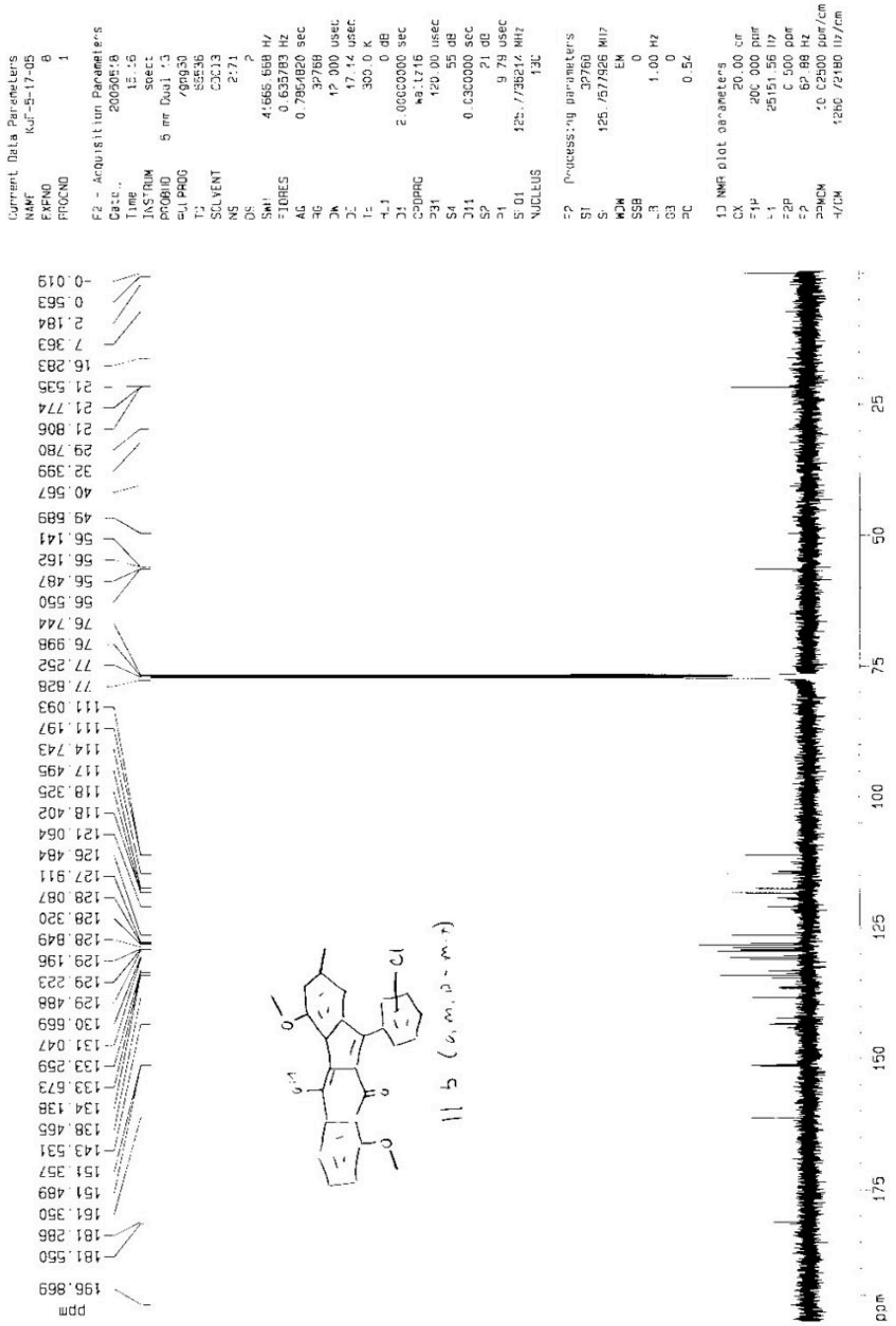

Current Data Parameters
NAME Ku -5-19-05
EXPNO 3
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050519
Time 13.46
INSTRUM spect
PROBHD 5 mm Dual 13
PULPROG 7930
TD 32768
SOLVENT CDCl3
NS 256
DS 2
SWH 10416.667 Hz
FIDRES 0.317821 Hz
AQ 1.5728640 sec
RG 2048
DW 48.000 usec
DE 68.20 usec
TE 300.0 K
D1 1.00000000 sec
P1 11.75 usec
SFO1 500.1330885 MHz
NUCLEUS 1H
F2 - Processing parameters
SI 16384
SF 500.1300154 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 12.000 ppm
F1 6001.56 Hz
F2P -0.520 ppm
F2 -260.07 Hz
PPMCM 0.62600 ppm/cm
HZCM 313.08139 Hz/cm
7.8274
7.6901
7.8307
5.0552
3.0869
1.4581
1.0000
2.4472
3.3543
3.3376
7.8437
2.3238
2.4400
0.3736
0.8572
2.2412
1.3720
Integra-
ppm

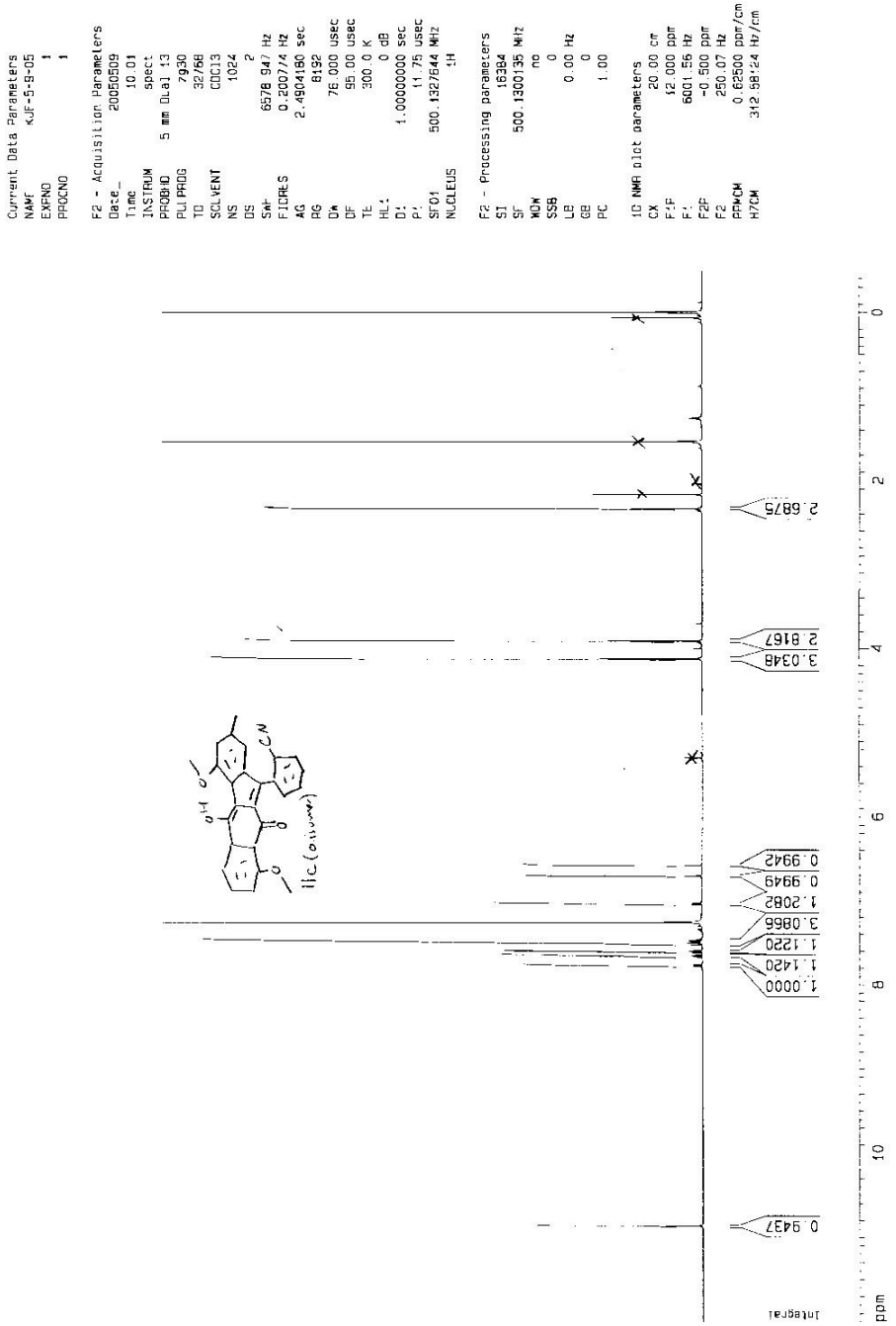

Current Data Parameters
NAME KJE-6-9-05
EXPNO 6
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050610
Time 8.22
INSTRUM spect
PROBHD 5 mm Multinu
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1000
DS 4
SWH 18832.393 Hz
FIDRES 0.287360 Hz
AQ 1.7400308 sec
RG 16384
DW 26.550 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
CHANNEL f1
NUC1 13C
P1 11.80 usec
PL1 0.00 dB
SFO1 75.4760200 MHz
CHANNEL f2
CPDPRG2 waltz16
NUC2 1H
PCPD2 110.00 usec
PL2 0.00 dB
PL12 17.50 dB
PL13 17.50 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677481 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -0.500 ppm
F2 -37.73 Hz
PPMCM 10.02500 ppm/cm
HZCM 756.56421 Hz/cm
181.510
161.309
151.478
150.580
145.897
144.171
138.471
136.727
136.521
135.060
133.984
129.919
129.877
129.516
128.523
127.573
126.592
125.379
121.316
119.380
118.902
118.579
117.354
114.585
114.406
111.126
77.455
77.231
77.031
76.808
56.536
56.498
56.118
21.787
21.727
19.916
11a (0.1 mmol)
ppm
25
50
75
100
125
150
175
ppm

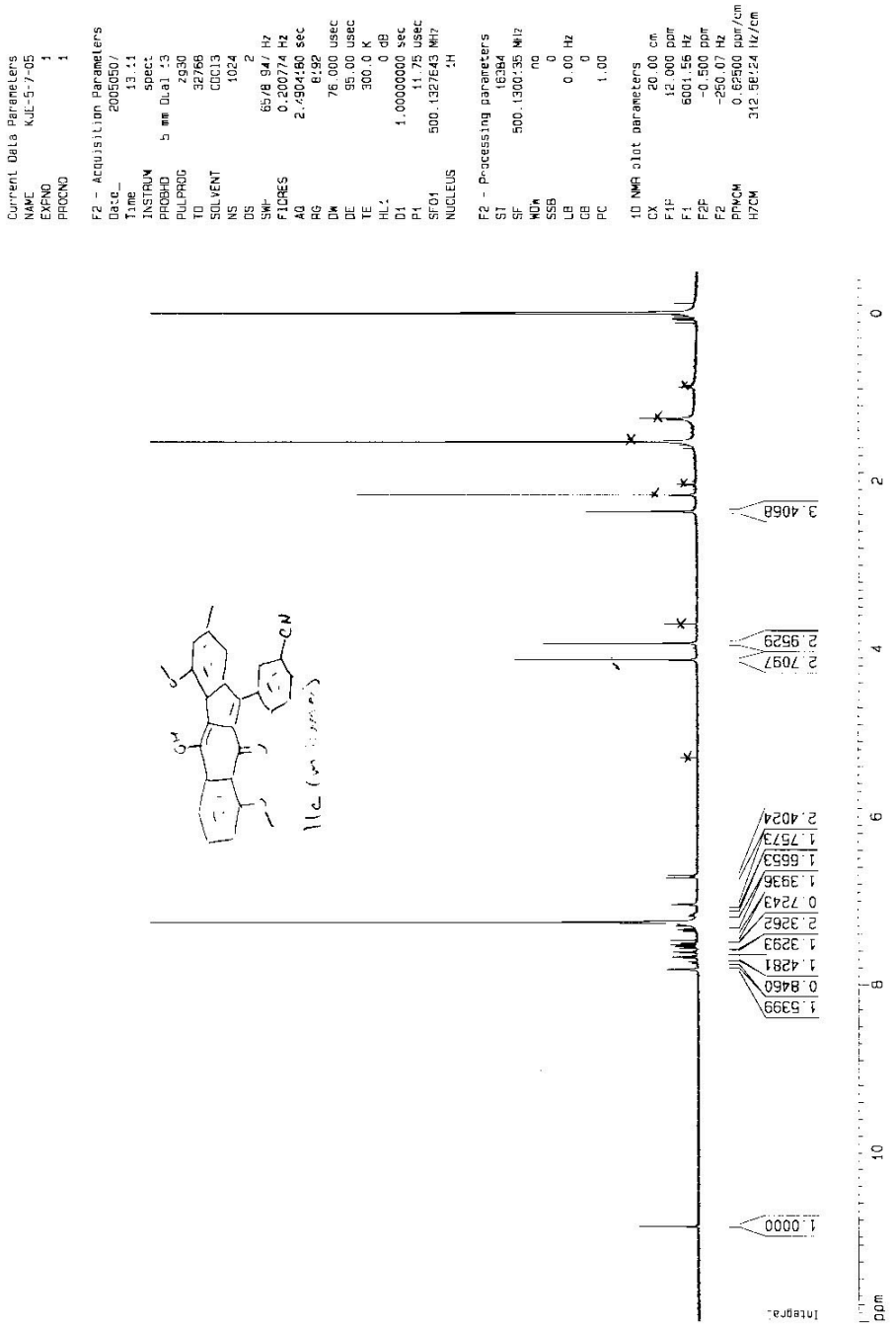

3.0293
3.1533
3.0087
0.9579
0.9643
1.1122
2.8805
1.9601
1.0000
0.9564
integral
ppm

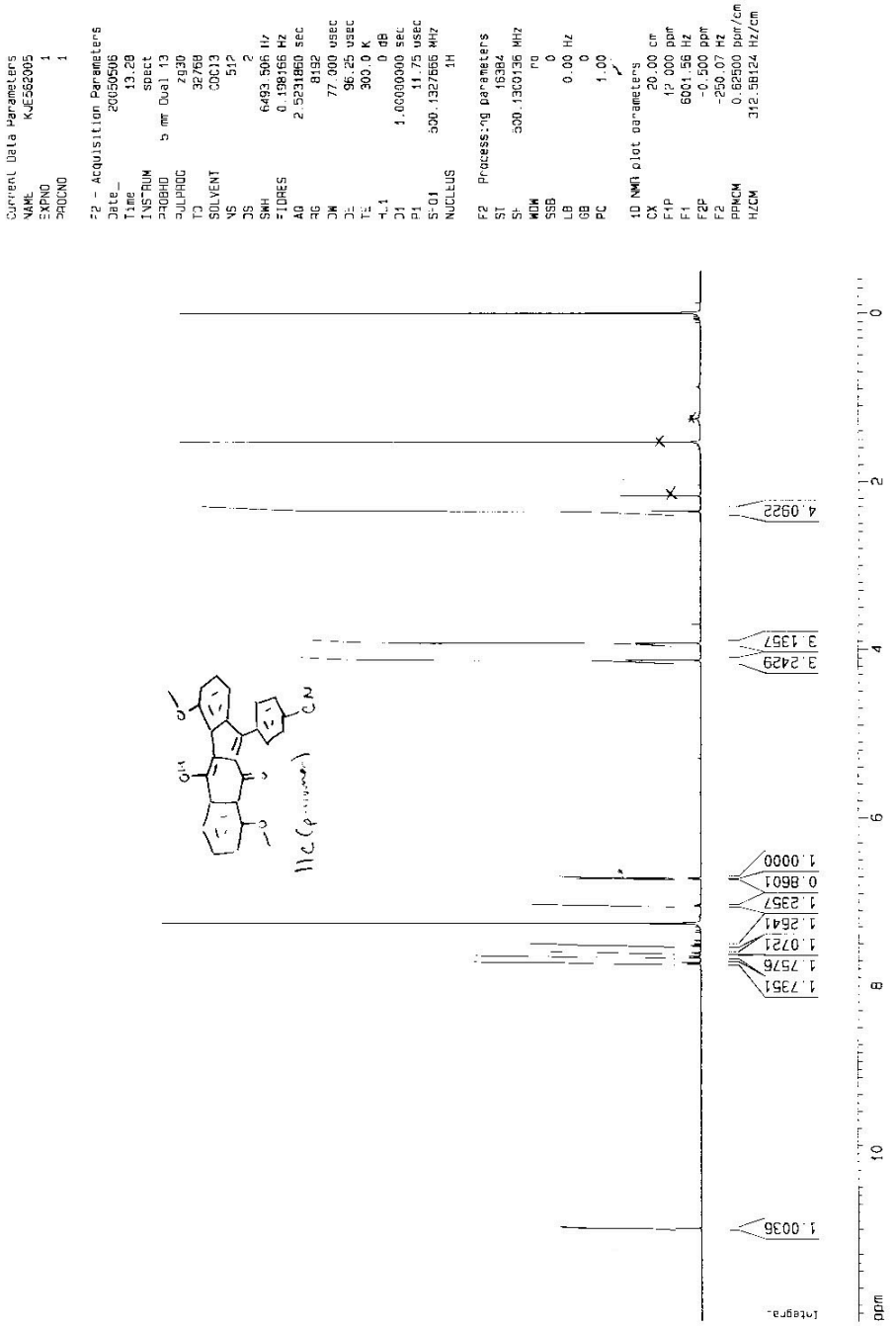

Current Data Parameters
NAME XJF-5-16-05
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050516
Time 10.01
INSTRUM spect
PROBHD 5 mm Dual 13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 10416.667 Hz
FIDRES 0.317891 Hz
AQ 1.5728140 sec
RG 4096
DW 48.000 usec
DE 6.50 usec
TE 303.0 K
D1 1.0000000 sec
P1 11.75 usec
SF01 500.1330885 MHz
NUCLEUS 1H
F2 Processing parameters
SI 16384
SF 500.1300133 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 250.07 Hz
PPM/CM 0.69600 ppm/cm
HZ/CM 348.24 Hz/cm
1.0403
3.8001
3.7350
3.9347
1.0000
1.1828
1.1971
2.5907
1.4938
2.3849
1.2226
Integral
ppm
10
8
6
4
2
0

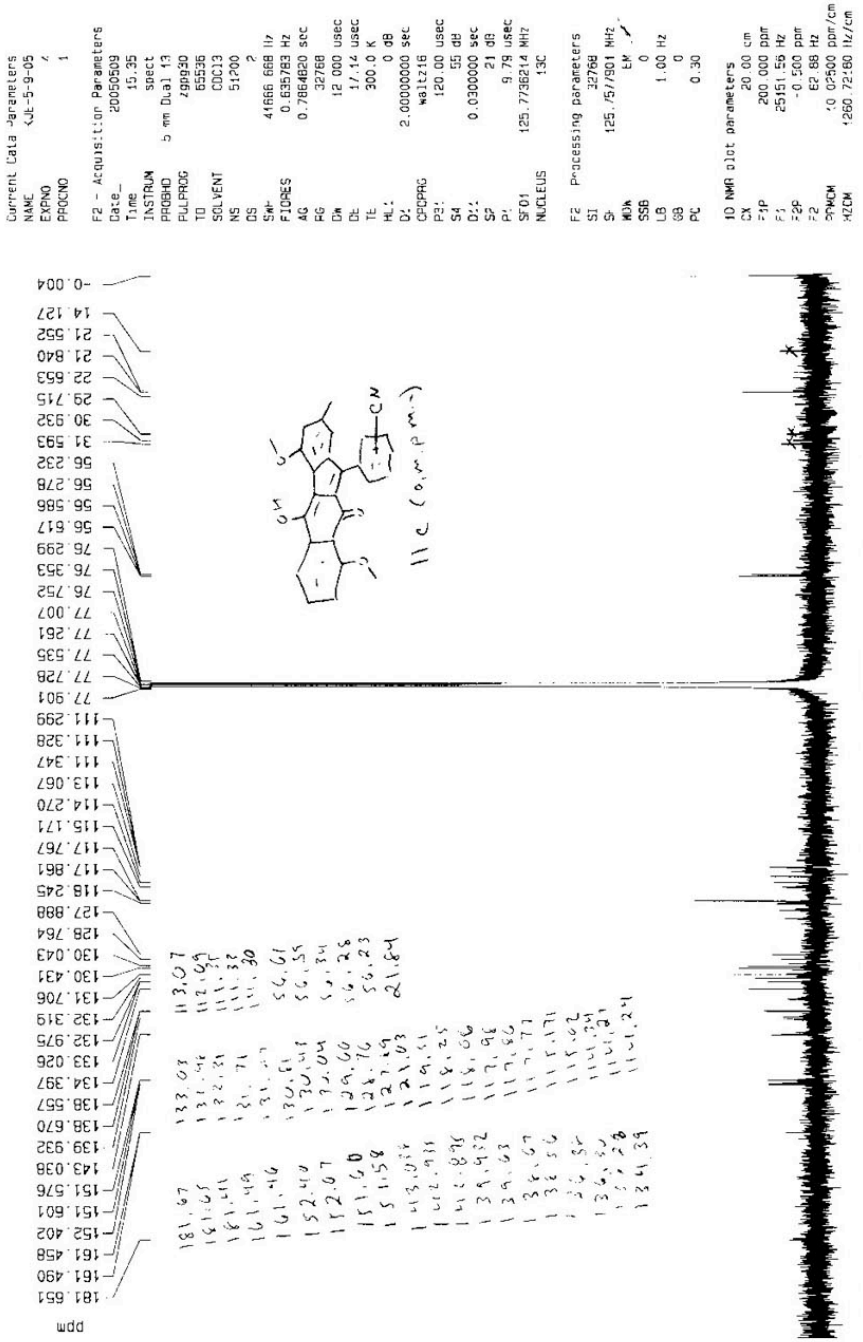

3.7589
3.6744
3.5232
1.0000
1.0740
1.0786
2.1025
3.0579
1.3207
1.0159
ppm



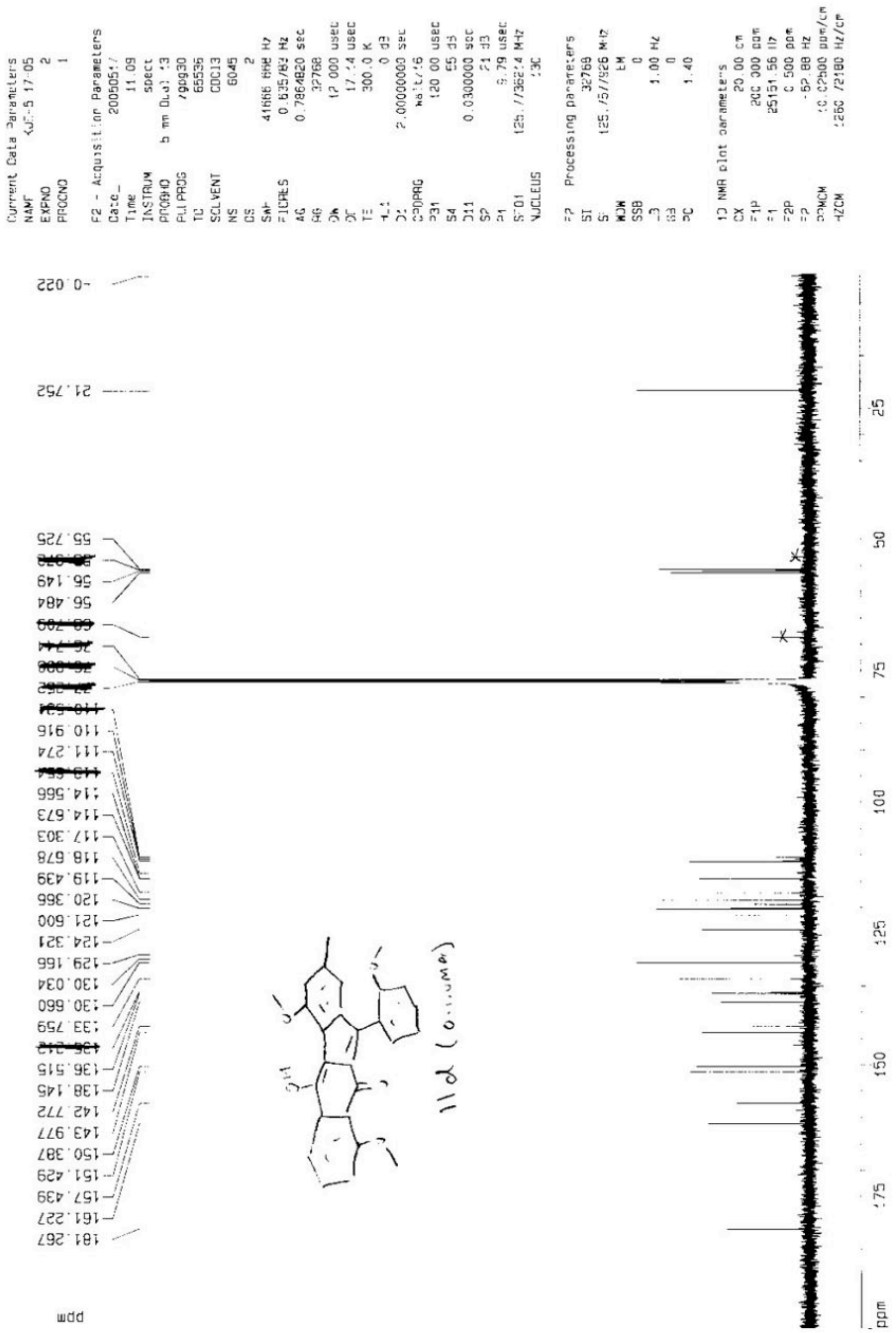

Current Data Parameters
NAME KJF-5-8-05
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050509
Time 10.01
INSTRUM spect
PROBHD 5 mm Dual 13
PULPROG 2g30
TD 32768
SOLVENT CDCl3
NS 1024
DS 2
SWH 6578.947 Hz
FIDRES 0.200774 Hz
AQ 2.4904190 sec
RG 8192
DW 76.000 usec
DE 95.00 usec
TE 300.0 K
HL1 0 dB
D1 1.00000000 sec
P1 11.75 usec
SFO1 500.1327644 MHz
NUCLEUS 1H
F2 - Processing parameters
SI 16384
SF 500.1300135 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 250.07 Hz
PPMCM 0.62500 ppm/cm
HZCM 312.98124 Hz/cm
2.6875
3.0348
2.8167
0.9437
1.0000
1.1420
1.1220
3.0866
1.2082
0.9949
0.9942
Integral
ppm

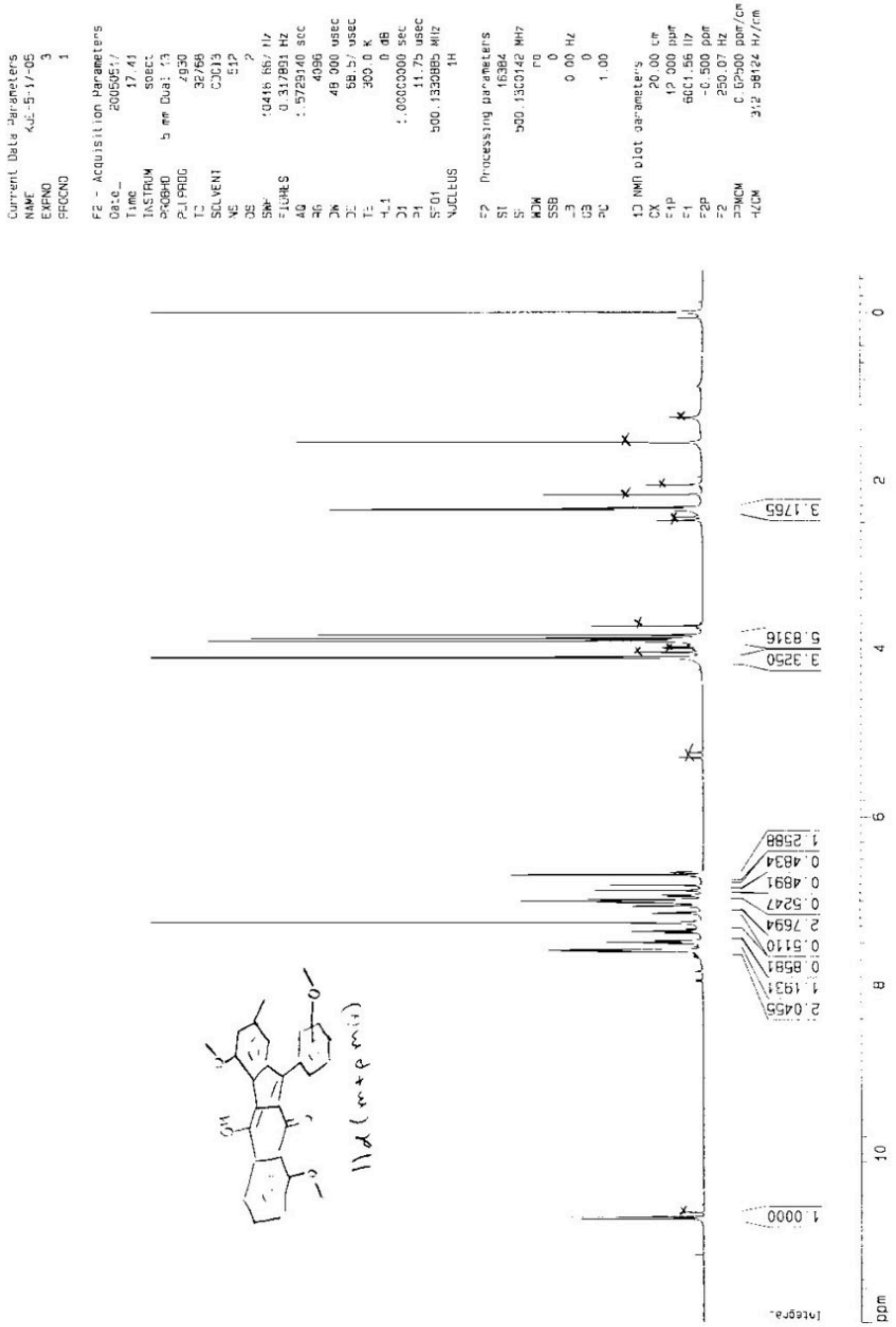

Current Data Parameters
NAME KJE-5-7-05
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050507
Time 13.11
INSTRUM spect
PROBHD 5 mm DUal 13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 1024
DS 2
SWH 6578.947 Hz
FIDRES 0.200774 Hz
AQ 2.4904180 sec
RG 6192
DW 76.000 usec
DE 95.00 usec
TE 300.0 K
HL1 0 dB
D1 1.00000000 sec
P1 11.75 usec
SFO1 500.1327643 MHz
NUCLEUS 1H
F2 - Processing parameters
SI 16384
SF 500.1300135 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 -250.07 Hz
PPMCM 0.62500 ppm/cm
HZCM 312.58124 Hz/cm
Integral
1.0000
3.4068
2.7097
2.9529
1.5399
0.8460
1.4281
1.3293
2.3262
0.7243
1.3936
1.6553
1.7573
2.4024
ppm
0
2
4
6
8
10

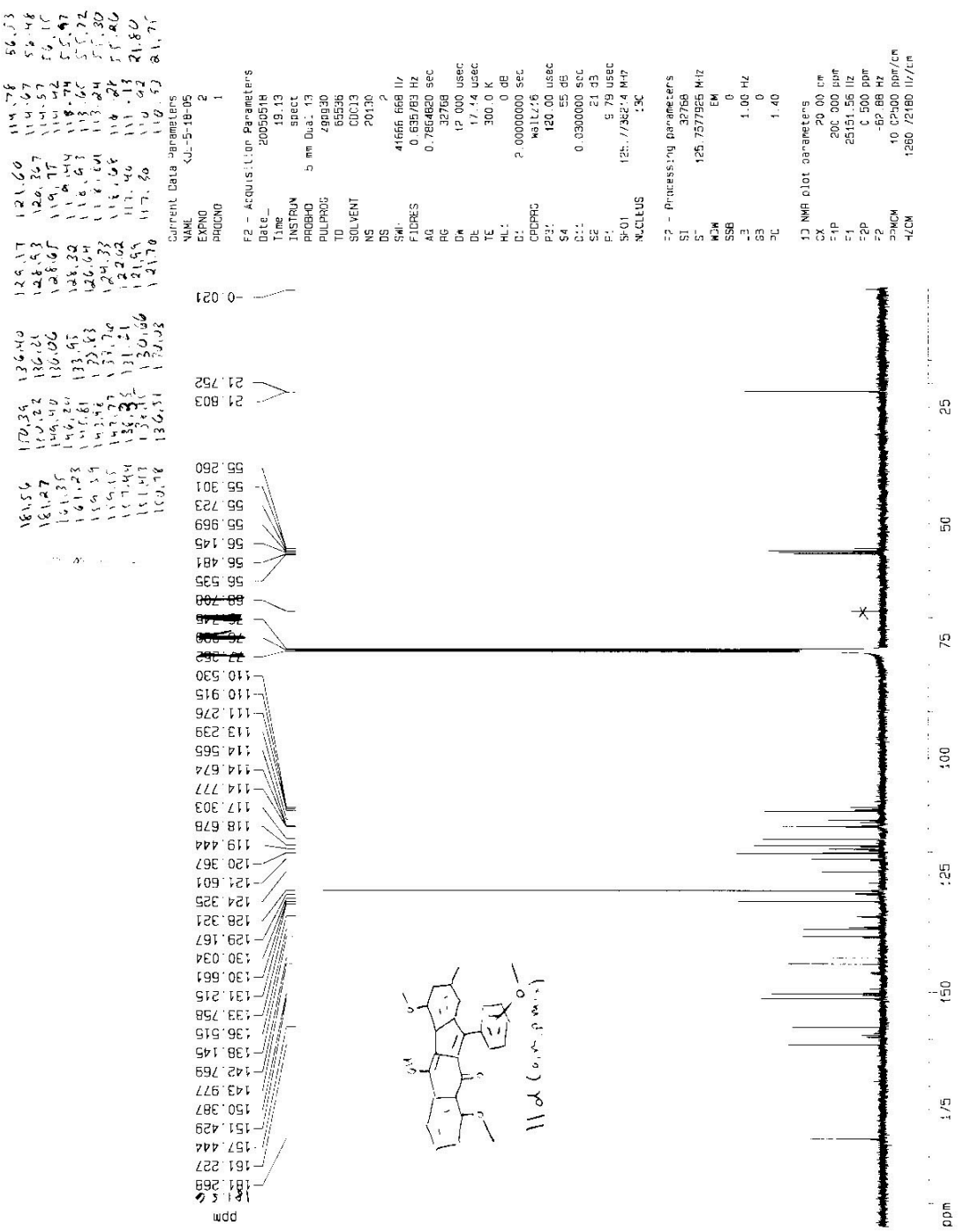

4.0922
3.1357
3.2429
1.0000
0.8601
1.2357
1.2641
1.0721
1.7576
1.7351
1.0036
ppm


Current Data Parameters
NAME KK-5-9-05
EXPNO 4
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050509
Time 15.35
INSTRUM spect
PROBHD 5 mm Dual 13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512OO
DS 2
SWH 41666.668 Hz
FIDRES 0.635783 Hz
AQ 0.7864320 sec
RG 32768
DW 12.000 usec
DE 17.14 usec
TE 300.0 K
HL: 0 dB
D1: 2.00000000 sec
CPDPRG waltz16
P2: 120.00 usec
SI 55 dB
D1: 0.0300000 sec
SP 21 dB
P1: 9.79 usec
SF01 125.7736214 MHz
NUCLEUS 13C
F2 Processing parameters
SI 32768
SF 125.7577901 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 0.30
1D NMR plot parameters
CX 20.00 cm
F1P 200.000 ppm
F1 25151.59 Hz
F2P -0.500 ppm
F2 62.88 Hz
PPMCM 10.07500 ppm/cm
HZCM 1260.72180 Hz/cm
11c (o,m,p mix)
ppm
181.651
161.490
161.458
152.402
151.601
151.576
143.038
139.932
138.670
138.557
134.397
133.026
132.975
132.319
131.706
130.431
130.043
128.764
127.888
118.245
117.861
117.767
115.171
114.270
113.067
111.347
111.328
111.299
77.901
77.728
77.535
77.261
77.007
76.752
76.353
76.299
56.617
56.586
56.278
56.232
31.593
30.932
29.715
22.653
21.840
21.552
14.127
-0.004
181.67
161.05
161.41
161.49
161.46
152.40
152.07
151.60
151.58
133.09
132.46
132.31
131.71
130.69
130.44
129.66
128.76
127.49
121.03
119.41
118.25
116.06
114.98
113.07
112.09
111.32
111.30
54.61
56.35
56.26
56.23
21.84
ppm
175
150
125
100
75
50
25

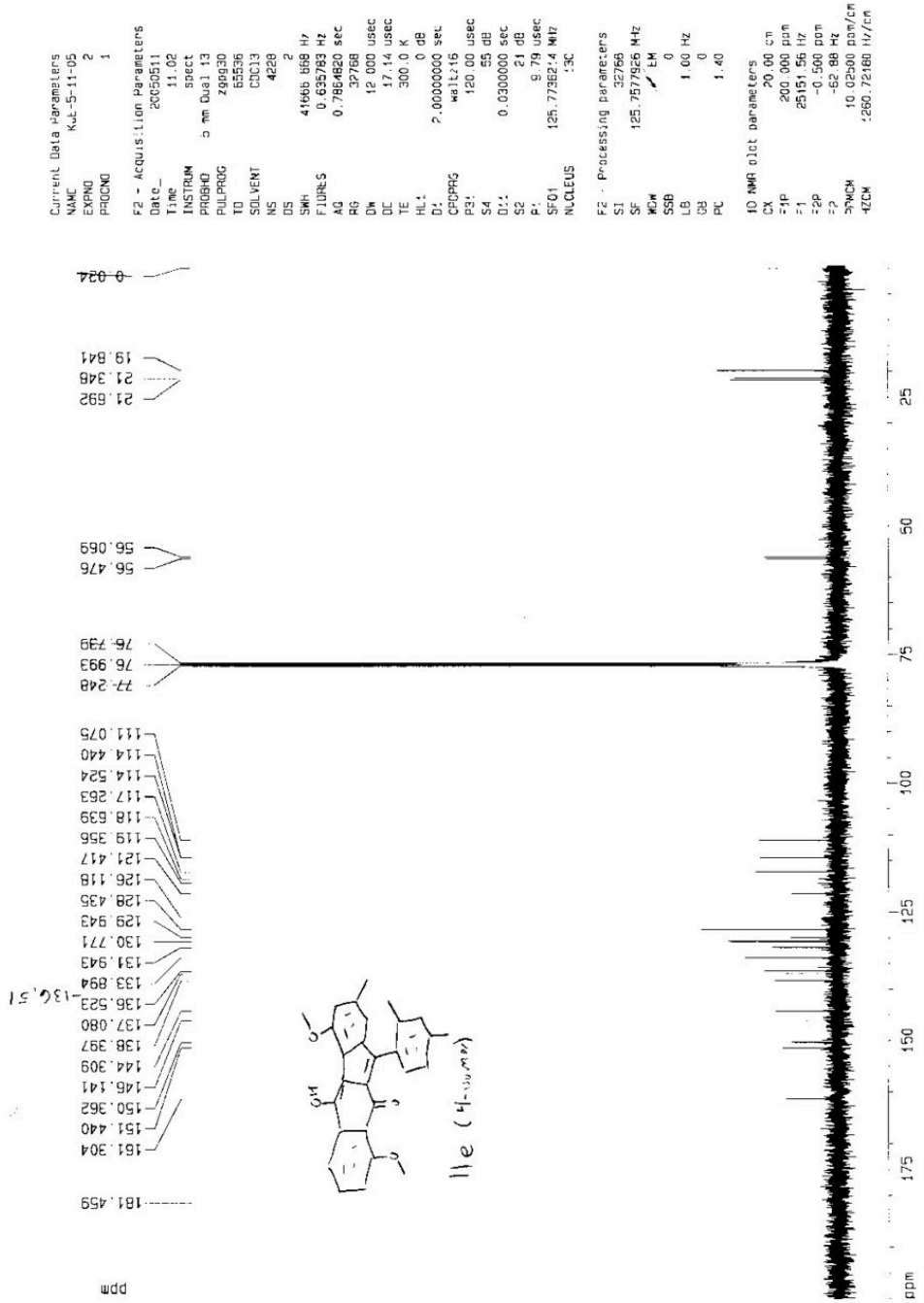
Current Data Parameters
NAME XJL-5-17-05
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050517
Time 9.21
INSTRUM spect
PROBHD 5 mm Dual 13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 128
DS 2
SWH 10416.667 Hz
FIDRES 0.317891 Hz
AQ 1.5729740 sec
RG 2048
DW 48.000 usec
DE 68.57 usec
TE 300.0 K
D1 1.00000000 sec
P1 11.75 usec
SF01 500.1330885 MHz
NUCLEUS 1H
F2 Processing parameters
SI 16384
SF 500.1300044 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 250.07 Hz
PPMCM 0.62500 ppm/cm
HZCM 312.58224 Hz/cm
0.9023
2.9816
2.9800
3.0093
2.9404
1.8555
3.0890
1.9444
1.0209
1.0000
Integral
ppm

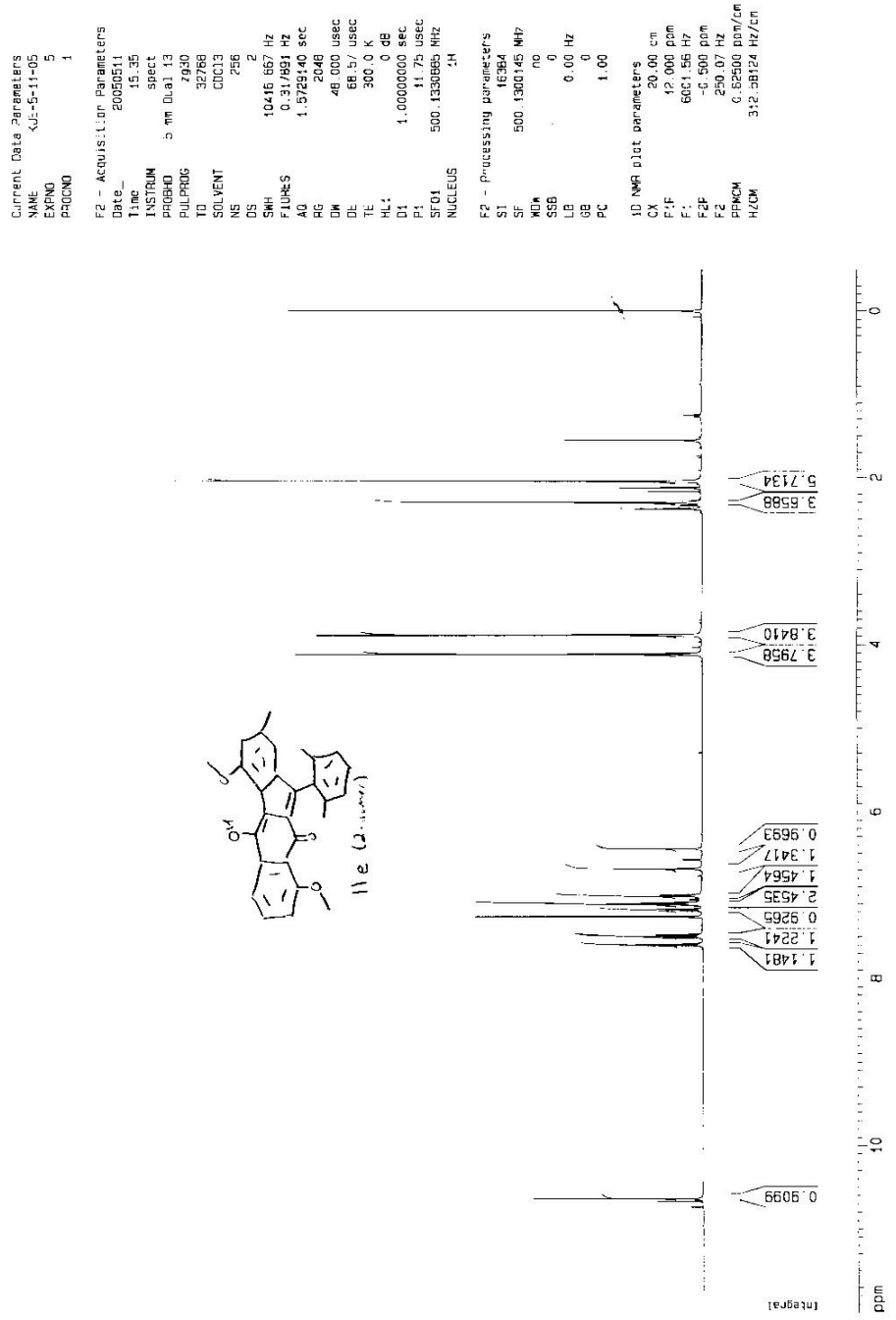


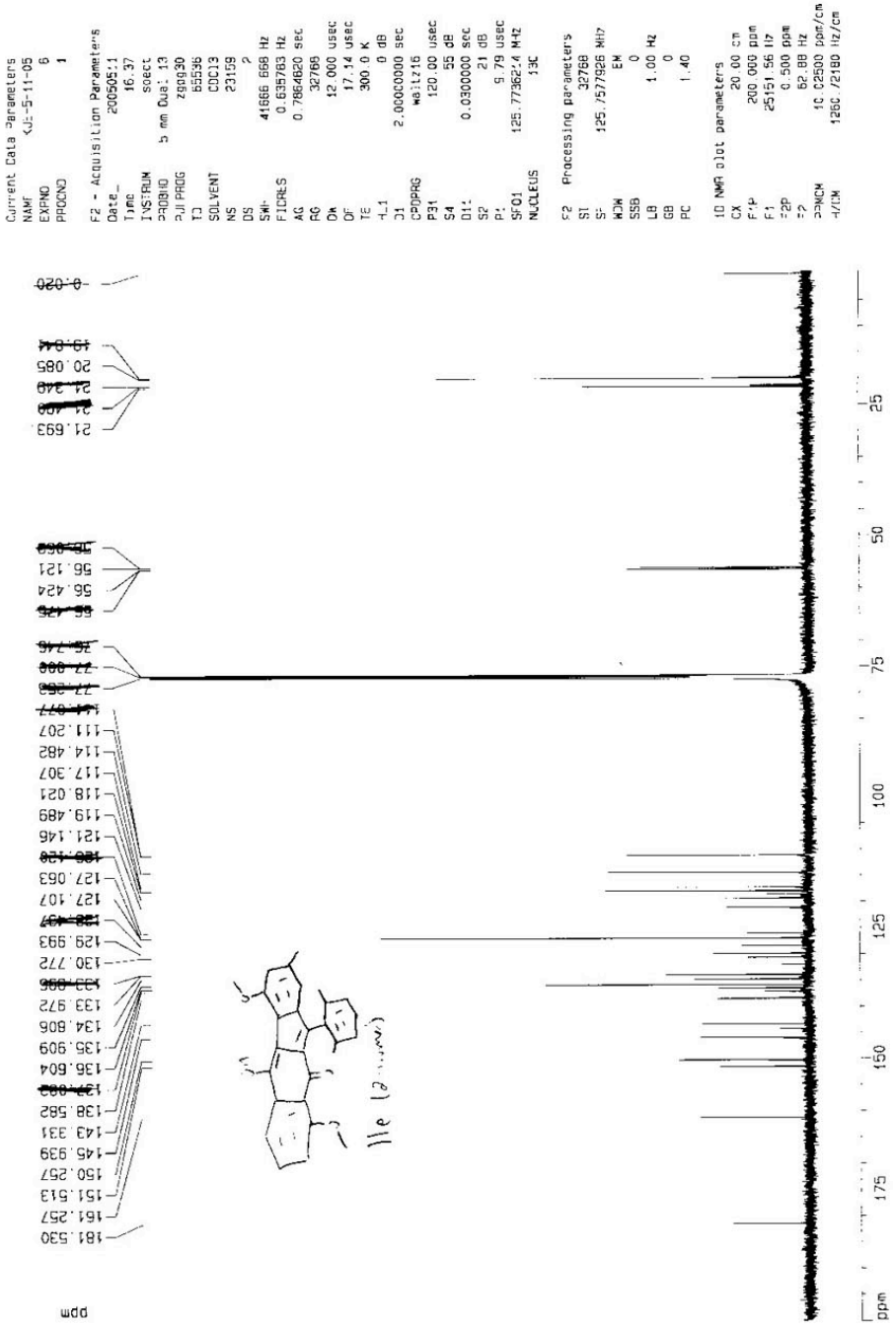

3.1765
5.8316
3.3250
1.2588
0.4834
0.4891
0.5247
2.7694
0.5110
0.8581
1.1931
2.0455
1.0000
ppm

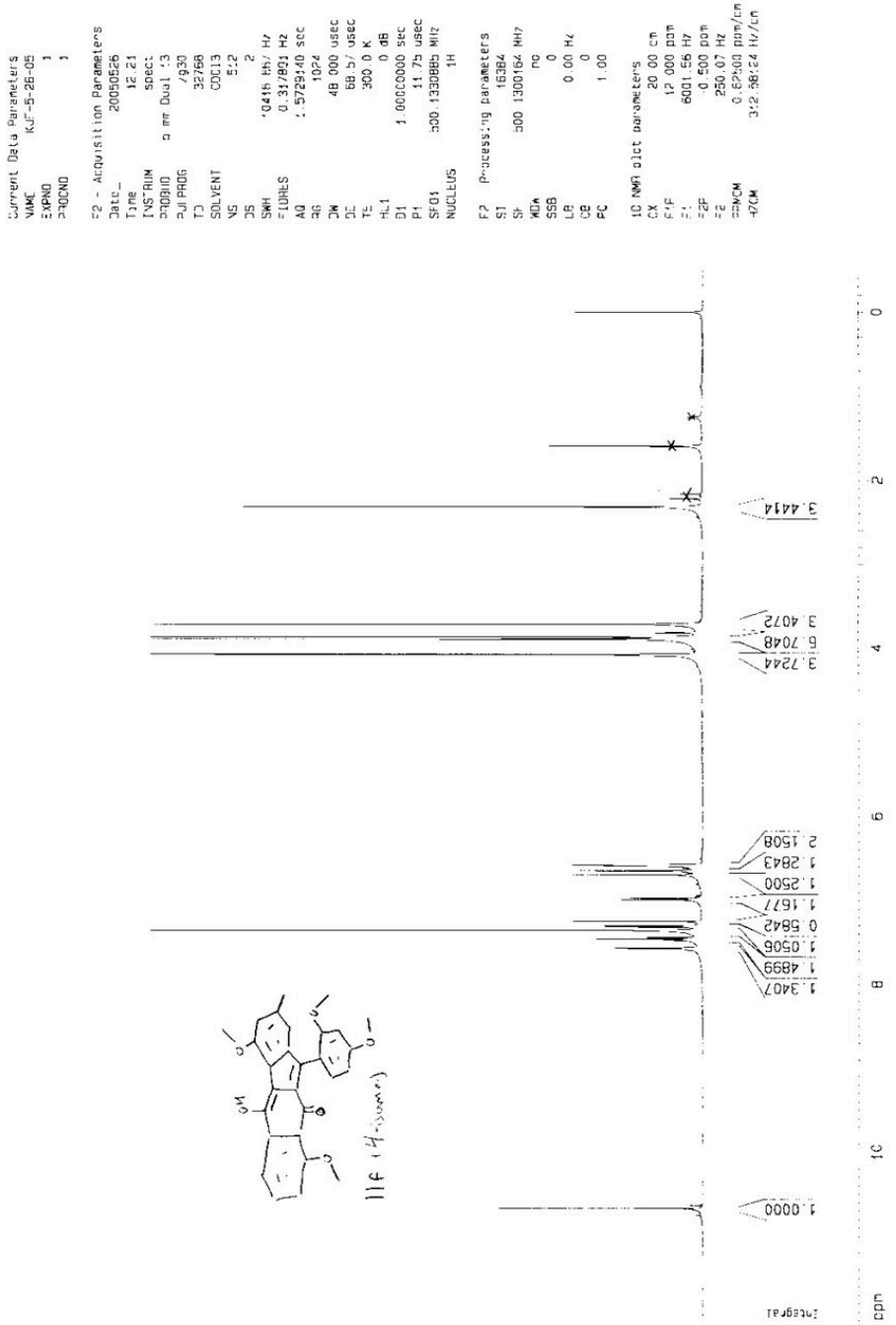


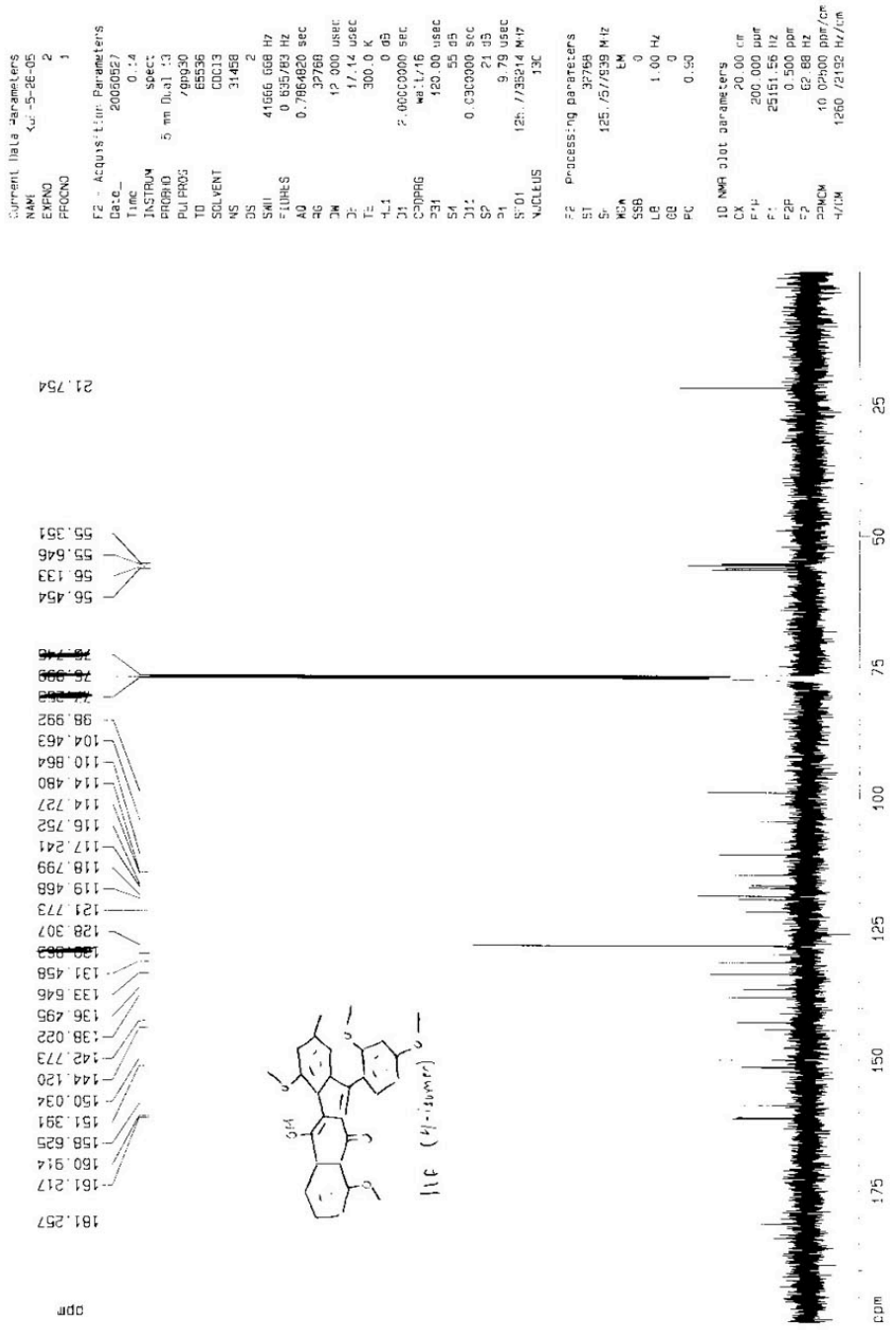
Current Data Parameters
NAME Kul-5-11-05
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050511
Time 9.56
INSTRUM spect
PROBHD 5 mm Dua: 13
PULPROG /g30
TD 32768
SOLVENT CDCl3
NS 512
DS 2
SWH 10416.667 Hz
FIDRES 0.317891 Hz
AQ 1.5729140 sec
RG 4096
DW 48.000 usec
DE 68.57 usec
TE 300.0 K
HL1 0 dB
CY 1.00000000 sec
P1 11.75 usec
SFO1 500.1330885 MHz
NUCLEUS 1H
F2 Processing parameters
SI 16384
SF 500.1300139 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 -250.07 Hz
PPMCM 0.62500 ppm/cm
HZCM 312.80124 Hz/cm
0.9649
1.0224
2.6973
0.9123
0.9878
0.9149
3.0045
2.8093
2.8105
3.3353
2.7214
1.1290
Integral
ppm

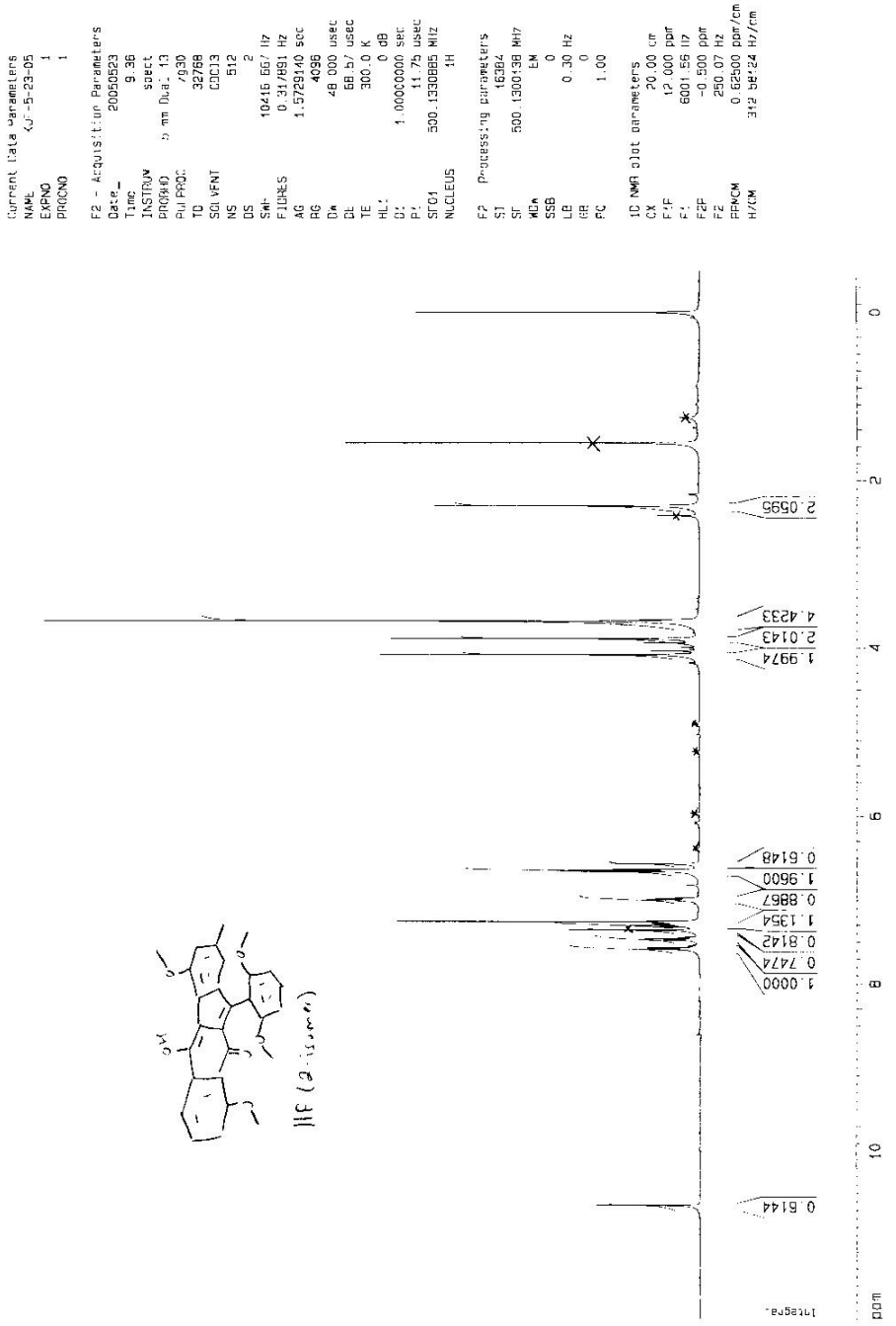


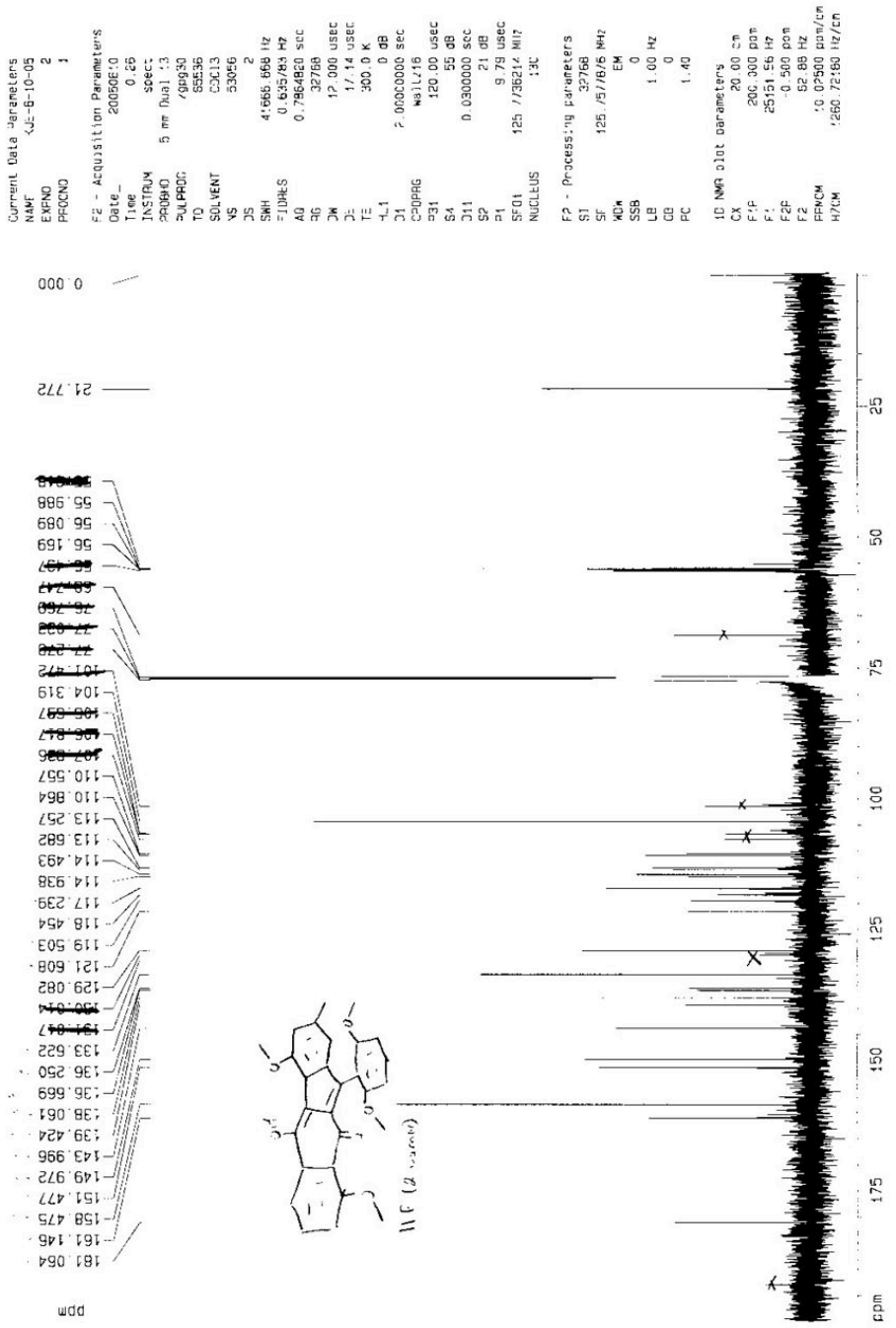

Current Data Parameters
NAME KJ-5-11-05
EXPNO 5
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050511
Time 15.35
INSTRUM spect
PROBHD 5 mm DUal 13
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 256
DS 2
SWH 10416.667 Hz
FIDRES 0.317891 Hz
AQ 1.5729140 sec
RG 2048
DW 48.000 usec
DE 68.57 usec
TE 300.0 K
HL1 0 dB
D1 1.00000000 sec
P1 11.75 usec
SFO1 500.1330885 MHz
NUCLEUS 1H
F2 - Processing parameters
SI 16384
SF 500.1300145 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 250.07 Hz
PPMCM 0.62500 ppm/cm
HZCM 312.58124 Hz/cm
11e (2.1mM)
5.7134
3.8588
3.7958
3.8410
1.4481
1.2241
0.9265
2.4535
1.4564
1.3417
0.9693
0.9099
Integral
ppm

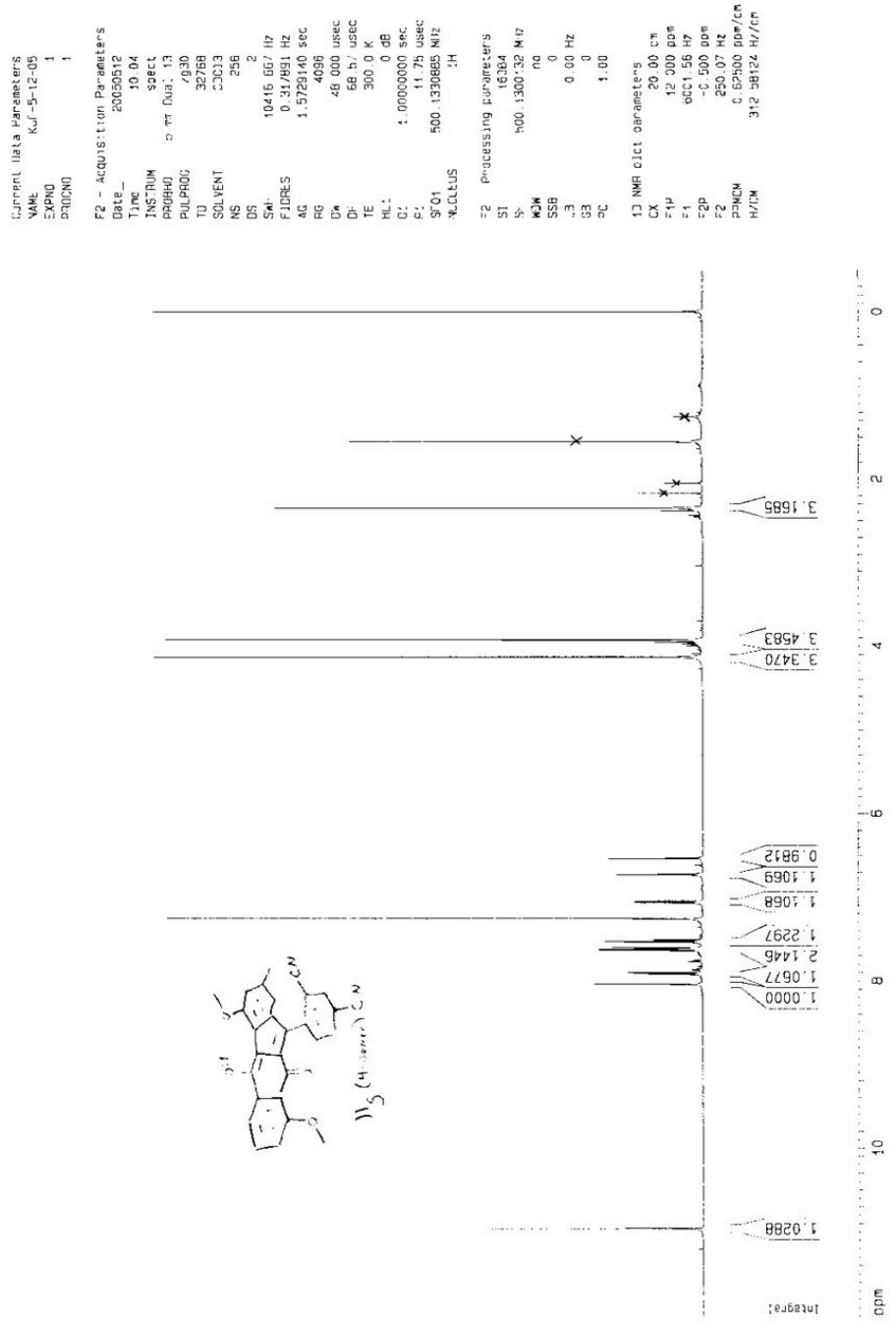

Current Data Parameters
NAME KJS-5-11-05
EXPNO 6
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050511
Time 16.37
INSTRUM spect
PROBHD 5 mm Dual 13
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 23159
DS 2
SWH 41666.668 Hz
FIDRES 0.635783 Hz
AQ 0.7864320 sec
RG 32766
DW 12.000 usec
DE 17.14 usec
TE 300.0 K
D1 2.00000000 sec
CPDPRG waltz16
P31 120.00 usec
SI 55 dB
D11 0.03000000 sec
SF 21 dB
P1 9.79 usec
SFO1 125.7736214 MHz
NUCLEUS 13C
F2 - Processing parameters
SI 32768
SF 125.7577926 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
F1P 200.000 ppm
F1 25151.56 Hz
F2P 0.500 ppm
F2 62.88 Hz
PPMCM 10.02500 ppm/cm
HZCM 1260.72180 Hz/cm
ppm

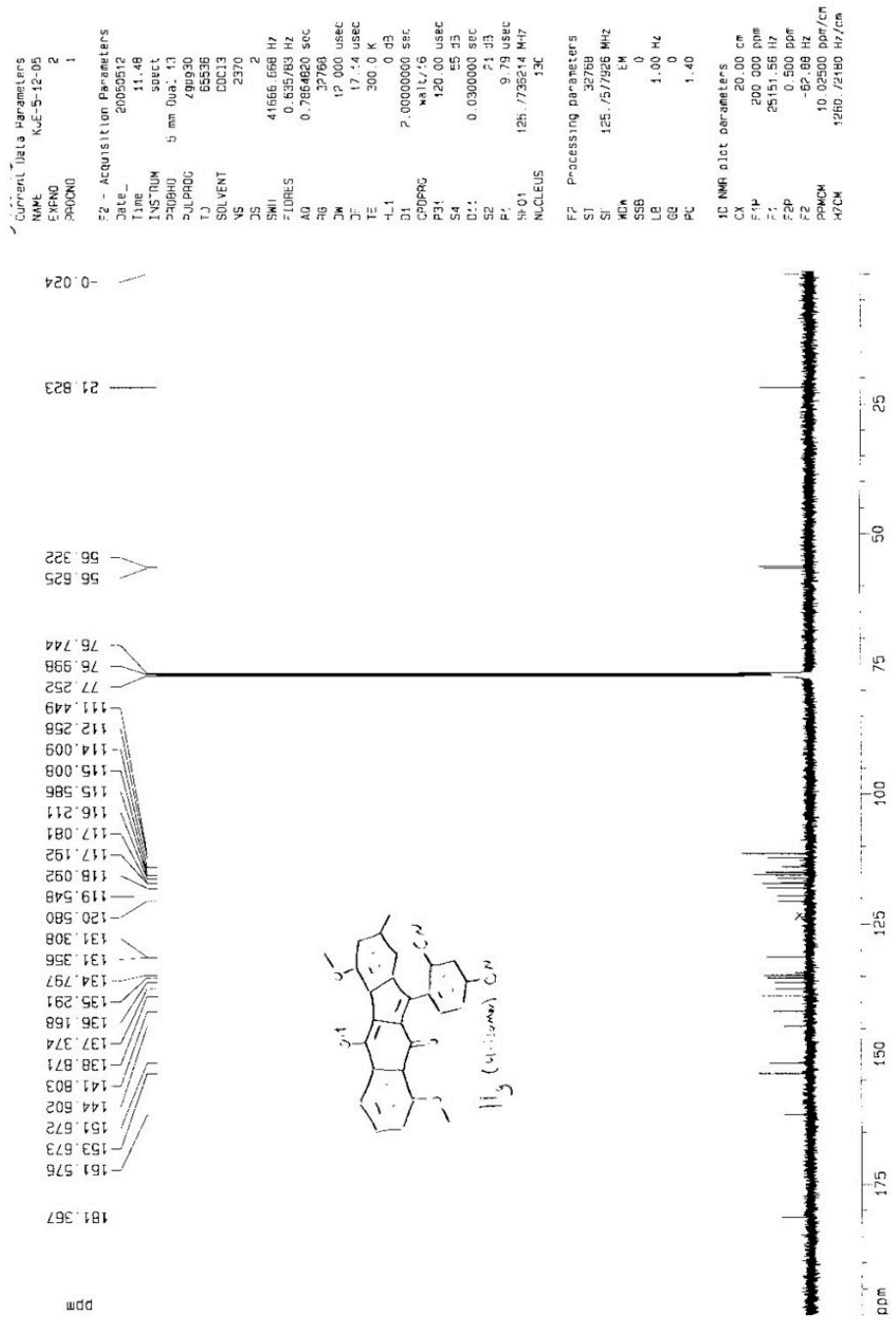

3.4414
3.4072
6.7048
3.7244
2.1508
1.2843
1.2500
1.1677
0.5842
1.0506
1.4899
1.3407
1.0000
integral
ppm

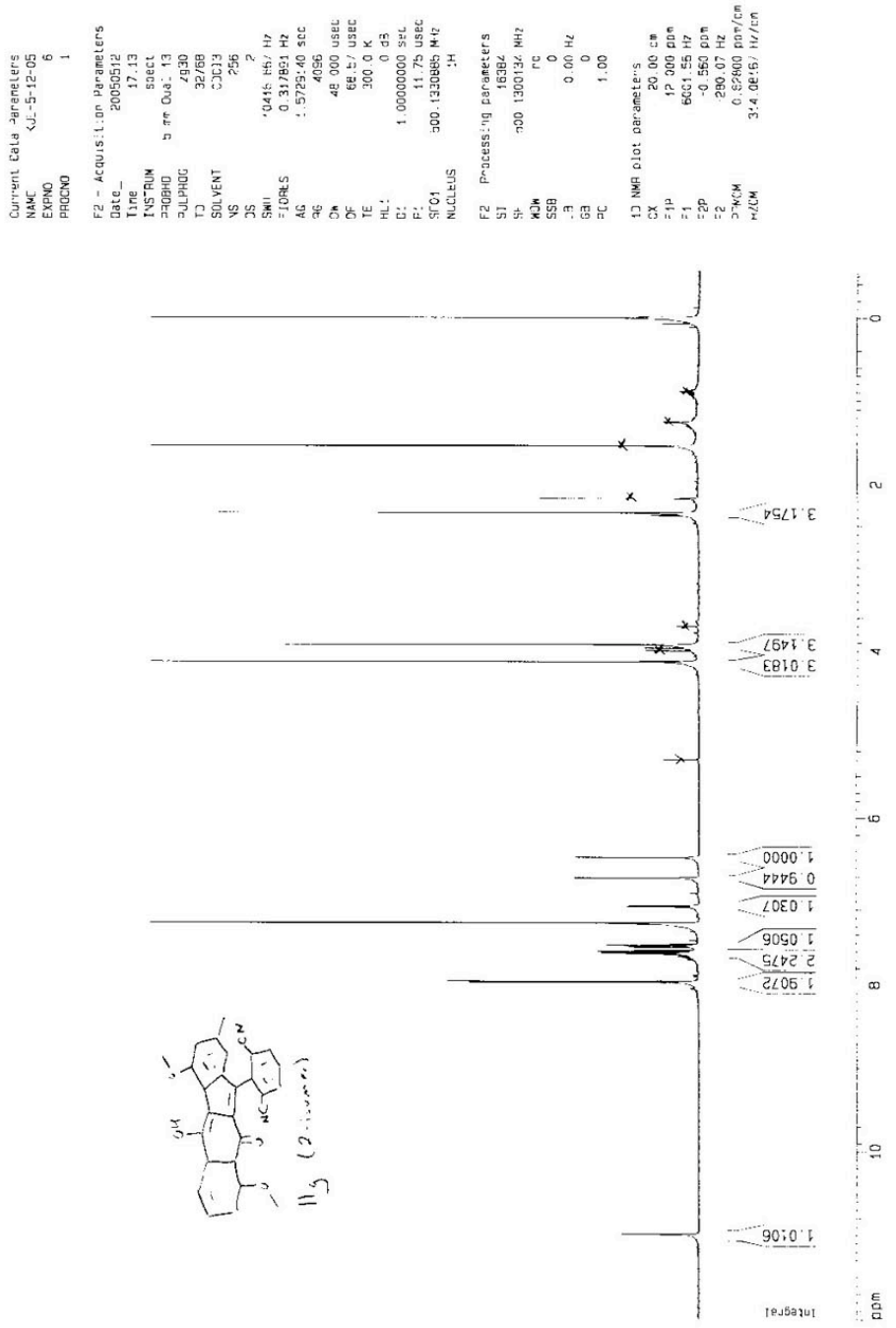


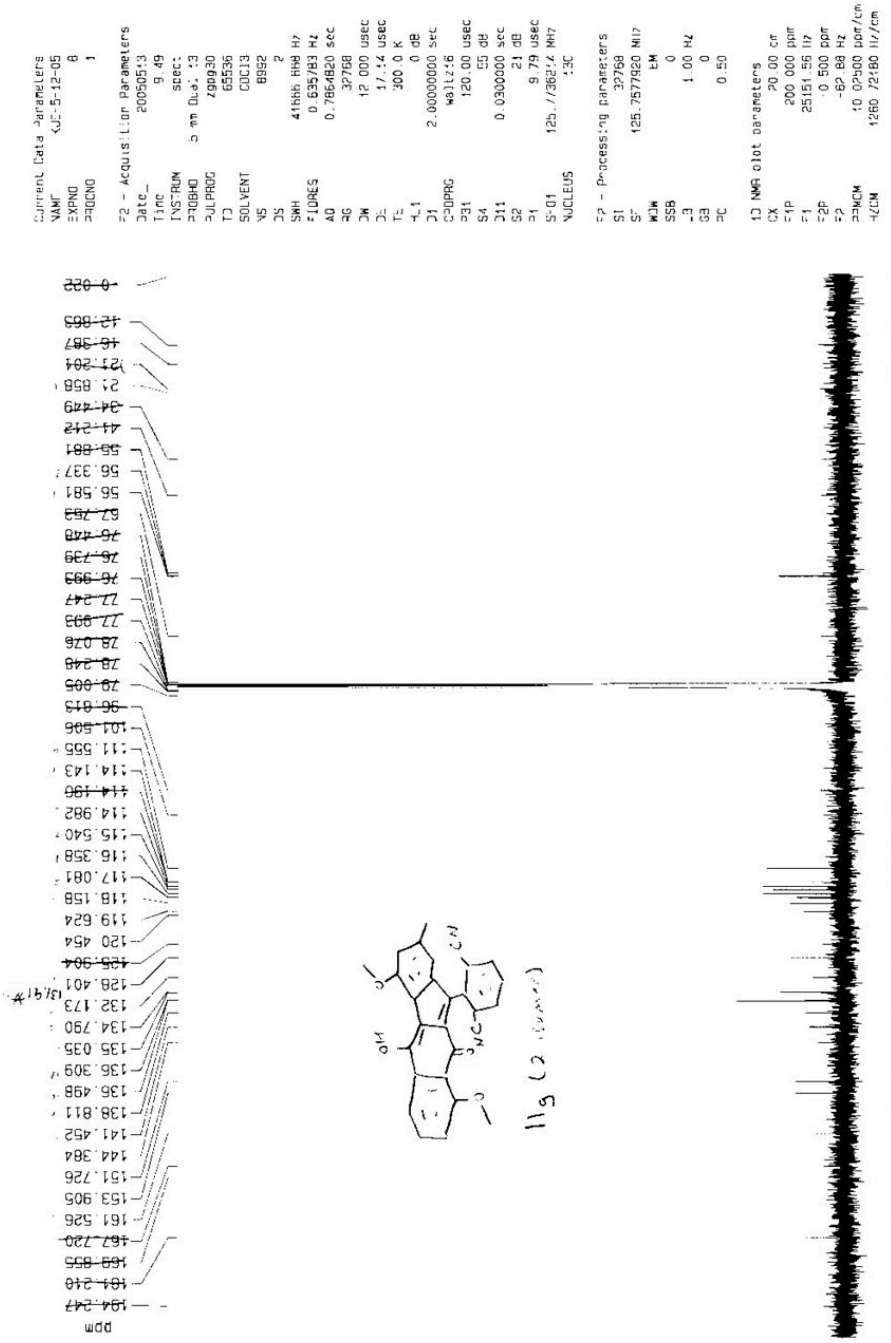





Current Data Parameters
NAME KuF-5-12-05
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20050512
Time 10.04
INSTRUM spect
PROBHD 5 mm Dua: 13
PULPROG /g30
TD 32768
SOLVENT CDCl3
NS 256
DS 2
SWH 10416.667 Hz
FIDRES 0.317891 Hz
AQ 1.5729140 sec
RG 4096
DW 48.000 usec
DE 6.50 usec
TE 300.0 K
D1 1.00000000 sec
P1 11.75 usec
SFO1 500.1330885 MHz
NUCLEUS 1H
F2 Processing parameters
SI 16384
SF 500.1300132 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
F1P 12.000 ppm
F1 6001.56 Hz
F2P -0.500 ppm
F2 250.07 Hz
PPMCM 0.62500 ppm/cm
HZCM 312.58124 Hz/cm
3.1685
3.4583
3.3470
0.9812
1.1069
1.1068
1.2297
2.1446
1.0677
1.0000
1.0288
Integral
ppm
0
2
4
6
8
10




3.1754
3.0183
3.1497
1.0000
0.9444
1.0307
1.0506
2.2475
1.9072
1.0106
integral
ppm



References

(1) Gould, S. J.; Melville, C. R. *Tetrahedron Lett.* **1997**, *38*, 1473-1476