Supporting Information

for

Microwave Assisted Synthesis of Cyclic Carbonates from Olefins with Sodium Bicarbonates as the C1 Source

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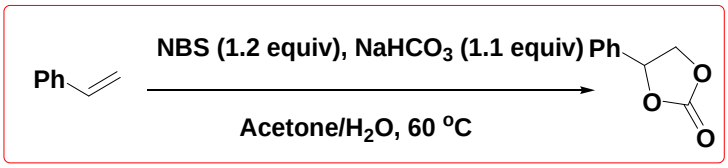
Table of Contents:

General Experimental Information:

All reactions in this project are not sensitive to air or moisture. Volumetric flasks were oven-dried and cooled in a desiccator prior to use. Anhydrous *N*-Bromosuccinimide (NBS), *N*,*N*-dimethylformamide (DMF), acetone and bicarbonates were purchased from Sigma-Aldrich and used without any further purification. All other commercial reagents or materials were used as received without purification: styrene (**1a**), 1-vinylnaphthalene (**1b**), 4-vinylanisole (**1c**), 4-acetoxystyrene (**1d**), 1-chloro-4-vinylbenzene (**1e**), 1-(trifluoromethyl)-3-vinylbenzene (**1f**), 4-fluorostyrene (**1g**), 3-vinylbenzaldehyde (**1h**), 1-octene (**1j**), hex-5-enenitrile (**1k**), methyl pent-4-enoate (**1l**), 4penten-1-ol (**1m**), hex-5-en-1-ol (**1n**), hex-5-en-2-one (**1o**), allyl phenyl ether (**1p**), cyclopentene (**1q**) and *trans*-3-hexene (**1r**). Thin layer chromatography (TLC) was performed on DC-Fertigplatten SIL G-25 UV_{254} pre-coated TLC plates. The developed chromatogram was visualized by UV lamp or stained using one of the following: aqueous potassium permanganate ($KMnO_4$) or ethanolic *para*-anisaldehyde. Selected purifications were performed using a Biotage Isolera One flash purification system, as noted in the experimental procedures.

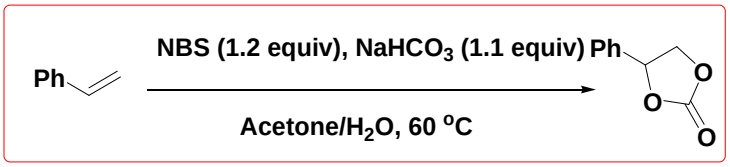
Proton nuclear magnetic resonance (^{1}H NMR) and carbon nuclear magnetic resonance (^{13}C NMR) spectra were recorded on a Varian Inova (500 MHz) spectrometers in deuterochloroform ($CDCl_3$) unless otherwise noted. Chemical shifts are recorded in parts per million (ppm) and are referenced to the centerline of deuterochloroform (δ 7.24 ppm ^{1}H NMR; δ 77.0 ppm ^{13}C NMR). Data was recorded as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad). Coupling constants (*J* values) are given in Hertz (Hz). Infrared (IR) spectra were recorded on an Agilent Cary 630 FTIR. High resolution mass spectra (HRMS) were obtained on a Bruker Daltonics APEXIV 4.7 Tesla Fourier Transform Ion Cyclotron Resonance Mass Spectrometer (FT-ICR-MS) by Li Li of the Massachusetts Institute of Technology Department of Chemistry Instrumentation Facility.

Representative Batch Procedure for Cyclic Carbonate Formation:



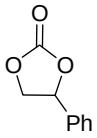
In a microwave-transparent tube (CEM Discover and Explorer SP 35ml tube) containing a stir bar, NBS (4.8 mmol, 1.2 equiv) was mixed with 4 mL of water and 4 mL of acetone immediately followed by the addition of sodium bicarbonate (4.4 mmol, 1.1 equiv) and styrene (4 mmol, 1 equiv). The tube was sealed and the reaction mixture was stirred and placed in oil bath. The temperature was maintained at 60 °C for 18 hours, and the mixture was cooled down to room temperature and depressurized. Ethyl acetate was used to extract any organic material. Further purification was performed using a Biotage Isolera One flash purification system to afford cyclic carbonate **2a** (360.9 mg, 55% yield).

Representative Microwave Assisted Synthesis Procedure for Cyclic Carbonate Formation:



In a microwave-transparent tube (CEM Discover and Explorer SP 35ml tube) containing a stir bar, NBS (4.8 mmol, 1.2 equiv) was mixed with 4 mL of water and 4mL of acetone followed by the addition of sodium bicarbonate (4.4 mmol, 1.1 equiv) and styrene (4 mmol, 1 equiv). The tube was put into the CEM Discover and Explorer SP reactor. The temperature measured by the fiber optic sensor was set up at rising from 24°C to 60 °C in 10 minutes and maintained at 60 °C in 17 hours and 50 minutes. The reactor was cooled down to room temperature and depressurized. Ethyl acetate was used to extract any organic material. Further purification was performed using a

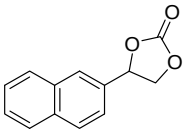
Biotage Isolera One flash purification system to afford cyclic carbonate **2a** (564.3 mg, 86% yield).



2a

4-Phenyl-1, 3-dioxolan-2-one (2a)

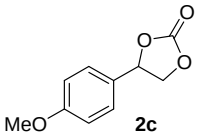
Styrene (458 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2a** was isolated and analysis of the final sample indicated 86% yield (564.3 mg). IR (neat): 1784, 1670, 1160, 1050 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.44-7.36 (m, 3H), 7.36-7.28 (m, 2H), 5.64 (t, *J* = 8.0 Hz, 1H), 4.78 (t, *J* = 8.4 Hz, 1H), 4.30 (dd, *J* = 8.6, 7.9 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 154.9, 135.8, 129.8, 129.3, 125.9, 78.0, 71.2. HRMS (DART) *m/z* calcd for $C_9H_{12}NO_3$ $[M+NH_4]^+$: 182.0812. Found: 182.0810.



2b

4-(Naphthalen-2-yl)-1,3-dioxolan-2-one (2b)

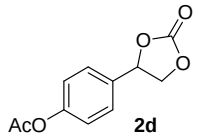
1-Vinylnaphthalene (0.616g, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2b** was isolated and analysis of the final sample indicated 74% yield (633.6mg). IR (neat): 2925, 2855, 1795, 1712, 1165, 1058 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.88 (d, *J* = 8.5Hz, 1H), 7.83 (m, 3H), 7.53 (m, 2H), 7.39(dd, *J* = 8.4 Hz, 2Hz, 1H), 5.79(t, *J* =8.0 Hz, 1H), 4.82(t, *J* = 8.5 Hz, 1H), 4.38(t, *J* = 8.0 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): 154.9, 133.5, 132.8, 132.8, 129.4, 128.0, 127.7, 127.0, 126.9, 125.7, 122.3, 78.1, 71.0. HRMS (DART) *m/z* calcd for $C_{13}H_{11}O_3$ $[M+H]^+$: 215.0708. Found: 215.0704.



2c

4-(4-Methoxyphenyl)-1,3-dioxolan-2-one (2c)

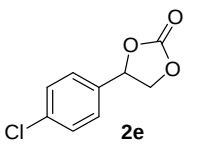
4-Vinylanisole (532 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2c** was isolated and analysis of the final sample indicated 68% yield (527.8mg). IR (solid film): 2962, 2925, 1783, 1250, 1161, 1050 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): 7.28 (m, 2H), 6.93 (m, 2H), 5.60 (t, *J* =8.0 Hz, 1H), 4.73 (dd, *J* =8.5, 8.0 Hz, 1H), 4.32 (t, *J* = 8.0 Hz, 1H), 3.80 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): 160.7, 154.9, 127.8, 127.3, 114.5, 78.1, 71.1, 55.4. HRMS (DART) *m/z* calcd for $C_{10}H_{14}NO_4$ $[M+NH_4]^+$: 212.0923. Found: 212.0918.



2d

4-(2-Oxo-1,3-dioxolan-4-yl)phenyl acetate (2d)

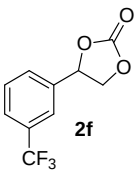
4-Acetoxystyrene (612 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2d** was isolated and analysis of the final sample indicated 82% yield (728.3mg). IR (solid film): 1781, 1748, 1510, 1370, 1193, 1157, 1068, 1012 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): 7.28 (d, *J* = 9 Hz, 2H), 6.93 (d, *J* = 9 Hz, 2H), 5.60 (t, *J* =8.0 Hz, 1H), 4.73 (dd, *J* = 9.0, 8.5 Hz, 1H), 4.33 (dd, *J* = 8.5, 8.0 Hz, 1H), 3.81 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): 169.1, 154.6, 151.3, 133.1, 127.1, 121.3, 77.3, 70.9, 20.9. HRMS (DART) *m/z* calcd for $C_{11}H_{14}NO_5$ $[M+NH_4]^+$: 240.0872. Found: 240.0863.



2e

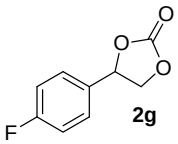
4-(3-Chlorophenyl)-1,3-dioxolan-2-one (2e)

1-Chloro-4-vinylbenzene (480 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2e** was isolated and analysis of the final sample indicated 78% yield (617.8mg). IR (solid film): 3577, 2966, 2126, 1789, 1489, 1162, 1048, 955 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.37 (m, 2H), 7.26 (m, 2H), 5.64 (t, *J* = 8.0 Hz, 1H), 4.78 (t, *J* = 8.0 Hz, 1H), 4.27 (t, *J* = 8.0 Hz, 1H). ^{13}C NMR (125MHz, $CDCl_3$): δ 154.5, 135.5, 134.2, 129.3, 127.2, 77.2, 70.9. HRMS (DART) *m/z* calcd for $C_9H_8ClO_3$ $[M+H]^+$: 199.0162. Found: 199.0156.



4-(3-(Trifluoromethyl)phenyl)-1,3-dioxolan-2-one (2f)

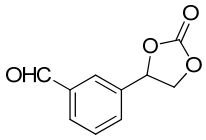
1-(Trifluoromethyl)-3-vinylbenzene (592 *u*L, 4 mmol) was added according to the representative microwave procedure and DMF/H_2O as co-solvent instead of acetone/H_2O to improve the reaction conversion. Following the general procedure, compound **2f** was isolated and analysis of the final sample indicated 70% yield (649.7mg). IR (solid film): 2923, 1793, 1326, 1066, 902 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.67(d, *J* = 7.0Hz, 1H), 7.56 (m, 3H), 5.74(t, *J* = 8.0 Hz, 1H), 4.85(t, *J* =8.5 Hz, 1H), 4.31 (t, *J* = 8.0 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 154.4, 136.9, 131.6 (q), 129.9, 129.0, 126.4, 123.5 (q), 122.6, 77.1, 70.9 (q). HRMS (DART) *m/z* calcd for $C_{10}H_7F_3NaO_3$ $[M+Na]^+$: 255.0245. Found: 255.0255.



4-(4-Fluorophenyl)-1,3-dioxolan-2-one (2g)

4-Fluorostyrene (475 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2g** was isolated and analysis of the final sample indicated 69% yield (502.4mg). IR (solid film): 1780,

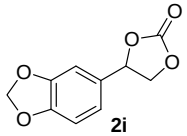
1602, 1507，1329，1215, 1158, 1052 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.33 (m, 2H), 7.08 (m, 2H), 5.64 (t, *J* = 8.5 Hz, 1H), 4.77 (t, *J* = 8.5 Hz, 1H), 4.28 (t, *J* = 8.5 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 164.2, 162.2, 154.6, 131.5, 128.0, 116.2, 77.4, 71.0. HRMS (DART) *m/z* calcd for $C_9H_{11}FNO_3$ $[M+NH_4]^+$: 200.0723. Found: 200.0707.



2h

3-(2-Oxo-1,3-dioxolan-4-yl)benzaldehyde (2h)

3-Vinylbenzaldehyde (505 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2h** was isolated and analysis of the final sample indicated 63% yield (483.9mg). IR (solid film): 1791, 1696，1607，1381，1161，1068 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 10.03 (s, 1H), 7.92 (m, 2H), 7.87 (s, 2H), 5.76 (t, *J* = 8.5 Hz, 1H), 4.86 (dd, *J* = 8.5, 8.0 Hz, 1H), 4.34 (dd, *J* =9.0, 8.0 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 191.4, 154.4, 137.1, 136.8, 131.5, 131.0, 130.0, 126.4, 77.3, 70.9. HRMS (DART) *m/z* calcd for $C_{10}H_9O_4$ $[M+H]^+$: 193.0501. Found: 193.0504.

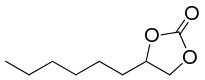


2i

4-(Benzo[d][1,3]dioxol-5-yl)-1,3-dioxolan-2-one (2i)

5-Vinylbenzo[d][1,3]dioxole (0.592 g, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2i** was isolated and analysis of the final sample indicated 52% yield (433.5mg). IR (solid film): 2920，1787，1447，1247，1162，1033，923 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 6.8 (m, 3H), 5.96 (s, 2H), 5.55 (t, *J* = 8.0 Hz, 1H), 4.71 (t, J = 8.5 Hz, 1H), 4.27 (t, *J* = 8.5 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 154.7, 148.7, 148.4, 129.1,

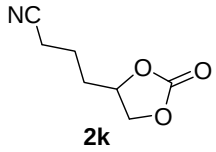
120.4, 108.5, 106.1, 101.5, 78.1, 71.0. HRMS (DART) *m/z* calcd for $C_{10}H_9O_5$ $[M+H]^+$: 209.0450. Found: 209.0447.



2j

4-Hexyl-1,3-dioxolan-2-one (2j)

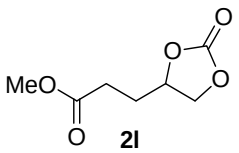
1-Octene (1.56 mL, 10 mmol, 1 equiv) was added according to the representative microwave procedure. Following the general procedure, compound **2j** was isolated and analysis of the final sample indicated 69% yield (320.3mg). IR (neat): 2928, 2859, 1788, 1384, 1165, 1059, 774 cm^{-1}. ^1H NMR (500 MHz, $CDCl_3$): δ 4.67 (dd, *J* = 7.5, 5.5 Hz, 1H), 4.50 (t, *J* = 8.1 Hz, 1H), 4.04 (dd, *J* = 8.3, 7.3 Hz, 1H), 1.79-1.73 (m, 1H), 1.68-1.61 (m, 1H), 1.45-1.27 (m, 8H), 0.86 (t, *J* = 6.9 Hz, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 155.1, 77.1, 69.4, 33.9, 31.5, 28.8, 24.3, 22.5. HRMS (DART) *m/z* calcd for $C_9H_{20}NO_3$ $[M+NH_4]^+$: 190.1438. Found: 190.1438.



2k

4-(2-Oxo-1,3-dioxolan-4-yl)butanenitrile (2k)

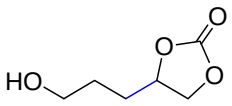
Hex-5-enenitrile (454 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2k** was isolated and analysis of the final sample indicated 83% yield (514.8mg). IR (solid film): 2927，2247，1781，1390，1164，1057 cm^{-1}. ^1H NMR (500 MHz, $CDCl_3$): δ 4.71 (m,1H), 4.55(t, *J* = 8.5 Hz, 1H), 4.06 (t, *J* =7.0 Hz, 1H)，2.42 (m, 2H), 1.85(m, 3H), 1.74 (m, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 154.6, 118.9, 75.9, 69.0, 32.5, 20.8, 16.6. HRMS (DART) *m/z* calcd for $C_7H_{10}NO_3$ $[M+H]^+$: 156.0661. Found: 156.0661.



2l

Methyl 3-(2-oxo-1,3-dioxolan-4-yl)propanoate (2l)

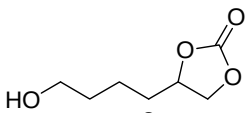
Methyl pent-4-enoate (0.456 g, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2l** was isolated and analysis of the final sample indicated 85% yield (591.8mg). IR (solid film): 1786, 1729, 1360, 1158, 1059, 980 cm^{-1}. ^{1}H NMR (300 MHz, $CDCl_3$): δ 4.77 (m, 1H), 4.54 (t, *J* = 8.1 Hz, 1H), 4.07 (dd, *J* = 6.9, 15.6 Hz, 1H), 3.67 (s, 3H), 2.51 (m, 2H), 2.03 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 172.4, 154.6, 75.8, 69.2, 51.8, 28.9. HRMS (DART) *m/z* calcd for $C_7H_{14}NO_5$ $[M+NH_4]^+$: 192.0872. Found: 192.0855.



2m

4-(3-Hydroxypropyl)-1,3-dioxolan-2-one (2m)

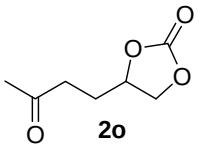
4-Penten-1-ol (395 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2m** was isolated and analysis of the final sample indicated 65% yield (379.8mg). IR (solid film): 2922, 1780, 1707, 1388, 1171, 1053cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): 4.77 (m, 1H), 4.55(t, *J* = 8.0 Hz, 1H), 4.09 (t, *J* = 7.0 Hz, 1H), 3.71 (m, 2H), 1.87 (m, 2H), 1.68 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3$): 155.0, 76.9, 69.4, 61.7, 30.6, 27.4. HRMS (DART) *m/z* calcd for $C_6H_{14}NO_4$ $[M+NH_4]^+$: 164.0923. Found: 164.0926.



2n

4-(4-Hydroxybutyl)-1,3-dioxolan-2-one (2n)

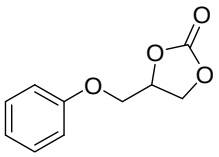
Hex-5-en-1-ol (480 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2n** was isolated and analysis of the final sample indicated 84% yield (537.8mg). IR (solid film): 3414, 2932, 2868, 1775, 1165, 1055 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): 4.70 (m, 1H), 4.51(t, *J* = 8.0 Hz, 1H), 4.06 (t, *J* = 7.0 Hz, 1H), 3.64 (t, *J* = 5.5 Hz, 2H), 1.81 (m, 1H), 1.73 (m, 1H), 1.64 (br, 1H), 1.56(m, 3H), 1.46(m, 1H). ^{13}C NMR (125 MHz, $CDCl_3$):155.2, 77.0, 69.3, 61.9, 33.4, 31.8, 20.7. HRMS (DART) *m/z* calcd for $C_7H_{16}NO_4$ $[M+NH_4]^+$: 178.1079. Found: 178.1070.



2o

4-(3-Oxobutyl)-1,3-dioxolan-2-one (2o)

Hex-5-en-2-one (480 mL, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2o** was isolated and analysis of the final sample indicated 83% yield (524.8mg). IR (solid film): 2920, 1782, 1394, 1159, 1055 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 4.72 (m, 1H), 4.52 (dd, *J* = 8.5, 8.0 Hz, 1H), 4.04 (dd, *J* = 9.0, 7.0 Hz, 1H), 2.64 (t, *J* = 7.0Hz, 2H), 2.14 (s, 3H), 2.01 (m, 1H), 1.87 (m, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 206.8, 154.7, 76.0, 69.4, 38.0, 29.9, 27.6. HRMS (DART) *m/z* calcd for $C_7H_{14}NO_4$ $[M+NH_4]^+$: 176.0923. Found: 176.0914.

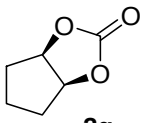


2p

4-(Phenoxymethyl)-1,3-dioxolan-2-one (2p)

Allyl phenyl ether (545 *u*L, 4 mmol) was added according to the representative microwave procedure and DMF/H_2O as co-solvent instead of acetone/H_2O to improve the reaction conversion. Following the general procedure, compound **2p** was

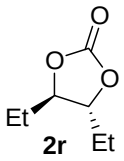
isolated and analysis of the final sample indicated 55% yield (426.9mg). IR (solid film): 2927, 1783, 1600, 1490, 1396, 1161, 1081, 1009 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.34-7.20 (m, 2H), 7.03-6.94 (m, 1H), 6.93-6.82 (m, 2H), 5.04-4.98 (m, 1H), 4.60 (t, *J* = 8.4 Hz, 1H), 4.51 (dd, *J* = 8.5, 5.9, 1H), 4.21 (dd, *J* = 10.6, 4.2 Hz, 1H), 4.12 (dd, *J* = 10.6, 3.6 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 157.8, 154.7, 129.7, 122.0, 114.6, 74.1, 66.9, 66.3. HRMS (DART) *m/z* calcd for $C_{10}H_{14}NO_4$ $[M+NH_4]^+$: 212.0917. Fou/nd: 212.0916.



2q

***Cis*-hexahydrobenzo[d][1,3]dioxol-2-one (2q)**

Cyclopentene (404 *u*L, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound 2q was isolated and analysis of the final sample indicated 49% yield (251.0mg). IR (solid film): 2970，1784，1717，1373，1165，1043，929 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): 5.08 (dd, *J* = 4.0, 2.0 Hz, 1H), 2.14 (m, 2H), 1.78 (m, 2H), 1.64 (m, 2H). ^{13}C NMR (125 MHz, $CDCl_3$): 155.4, 81.8, 33.2, 21.5. HRMS (DART) m/z calcd for $C_6H_{12}NO_3$ $[M+NH_4]^+$: 146.0817. Found: 146.0817.



2r

***trans*-4,5-Diethyl-1,3-dioxolan-2-one (2r)**

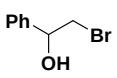
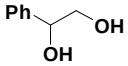
trans-3-Hexene (480 mL, 4 mmol) was added according to the representative microwave procedure. Following the general procedure, compound **2r** was isolated and analysis of the final sample indicated 86% yield (495.6mg). IR (solid film): 2936, 2864, 1786, 1200, 1052, 965 cm^{-1}. ^{1}H NMR (500 MHz, $CDCl_3$): δ 4.10 (s, 2H), 1.88 (m, 2H), 1.75 (m, 2H), 1.63 (m, 2H), 1.5 (m, 3H), 1.38 (m, 1H). ^{13}C NMR (125 MHz,

$CDCl_3$): δ 154.6, 83.2, 74.4, 35.4, 24.4, 22.2. HRMS (DART) *m/z* calcd for $C_8H_{13}O_3$ $[M+NH_4]^+$: 157.0865. Found: 157.0859.

Experiments of Reaction Mechanism Analysis

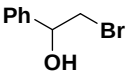
In order to understand the reaction process, we investigated the product distribution at different time and temperature scales. The experiment results were summarized Table S1 and Table S2.

Table S1 The influence of reaction time (in Acetone/H_2O, 60 °C)

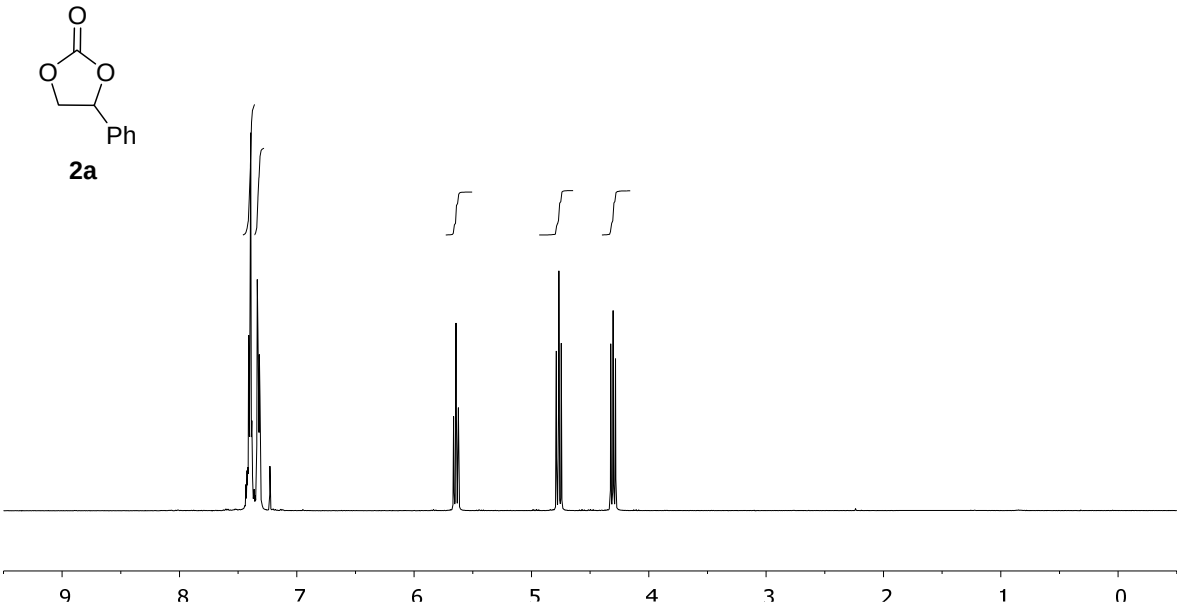
Entry	Condition	Time	Product Yield			
						
A1	Microwave	10min	73%	15%	9%	0%
A2	Oil bath	10min	95%	0%	0%	0%
B1	Microwave	30min	51%	28%	20%	0%
B2	Oil bath	30min	63%	23%	11%	0%
C1	Microwave	60min	10%	40%	48%	0%
C2	Oil bath	60min	33%	41%	24%	0%
D1	Microwave	180min	5%	30%	62%	0%
D2	Oil bath	180min	8%	47%	36%	0%
E1	Microwave	450min	0%	11%	78%	0%
E2	Oil bath	450min	0%	45%	37%	5%
F1	Microwave	1080min	0%	0%	86%	0%
F2	Oil bath	1080min	0%	31%	48%	12%

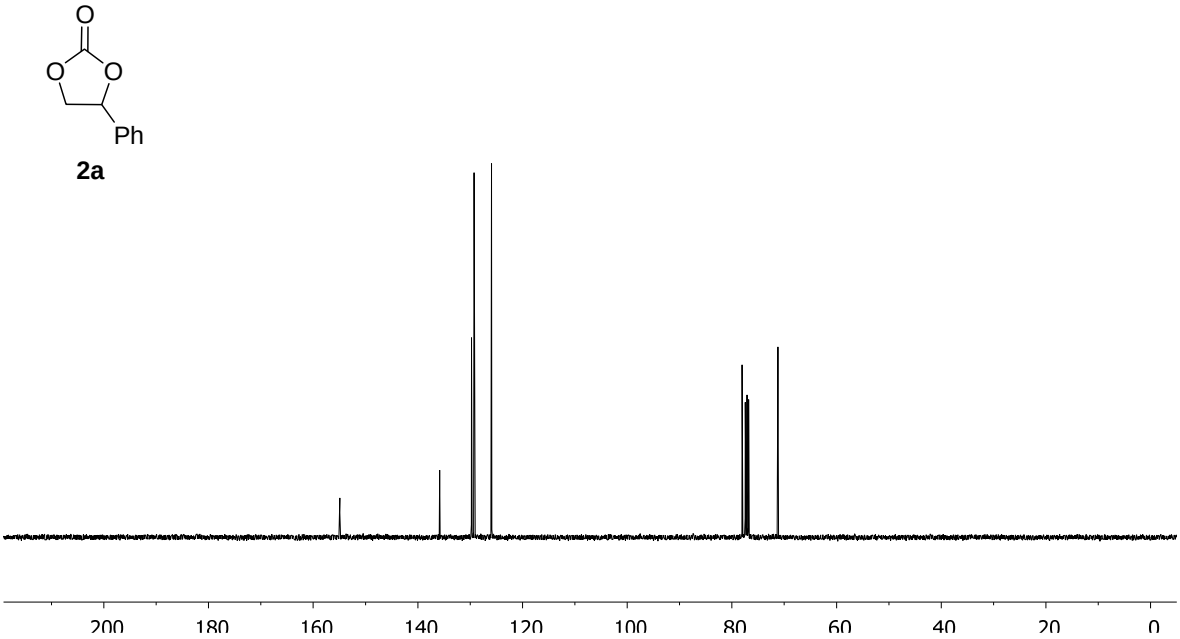
G	No heating （24 ºC）	360min	85%	10%	3%	0%
H	No heating （24 ºC）	30min	100%	0%	0%	0%

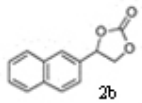
Table S2 The influence of reaction temperature (in DMF/H_2O, 60 min)

Entry	**Condition**	**Temp.**	**Product Yield** 		
A	Microwave	30 ^{0}C	89%	5%	6%
B	Microwave	60 ^{0}C	20%	29%	45%
C	Microwave	60 ^{0}C	20%	29%	45%
D	Microwave	80 ^{0}C	10%	10%	65%
E	Microwave	100 ^{0}C	20%	0%	70%
F	No heating	24 ^{0}C	0%	60%	0%

^{1}H and ^{13}C NMR Spectra:







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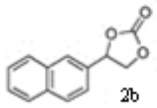

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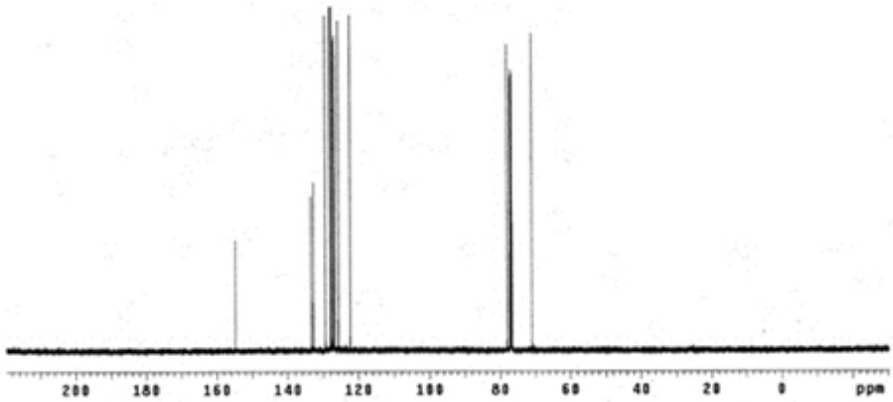

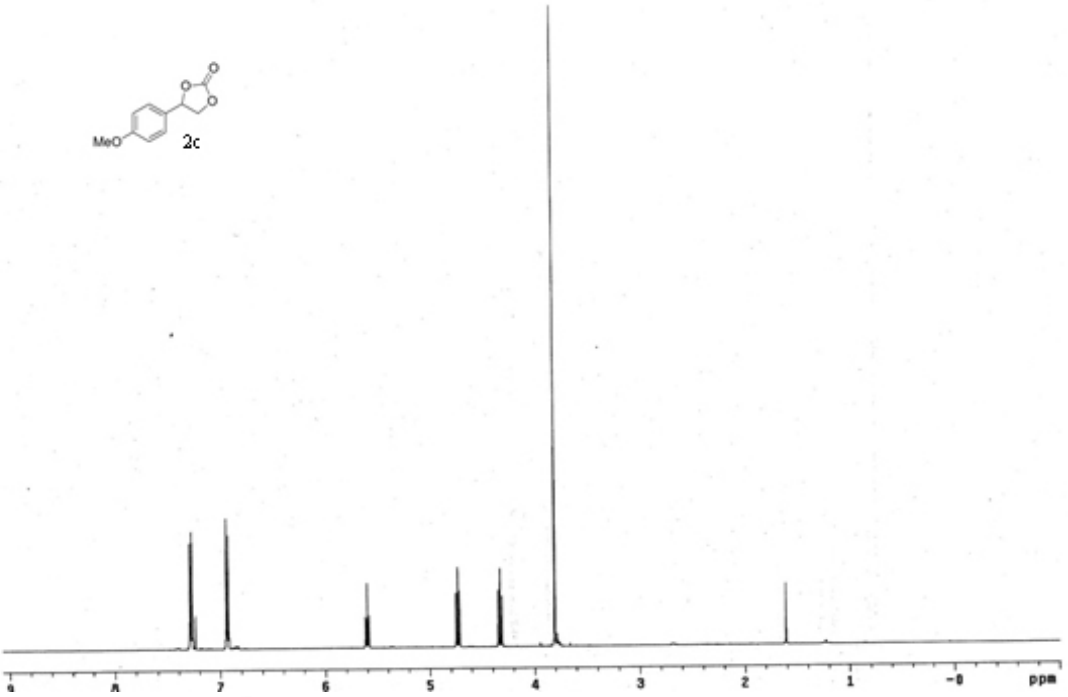
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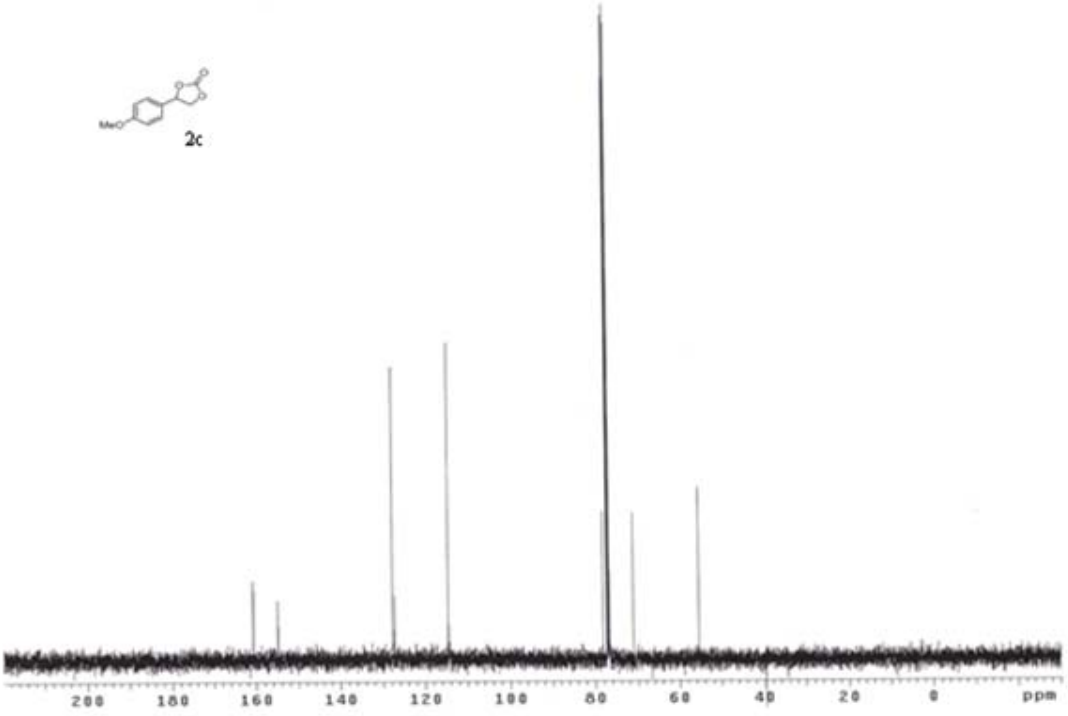
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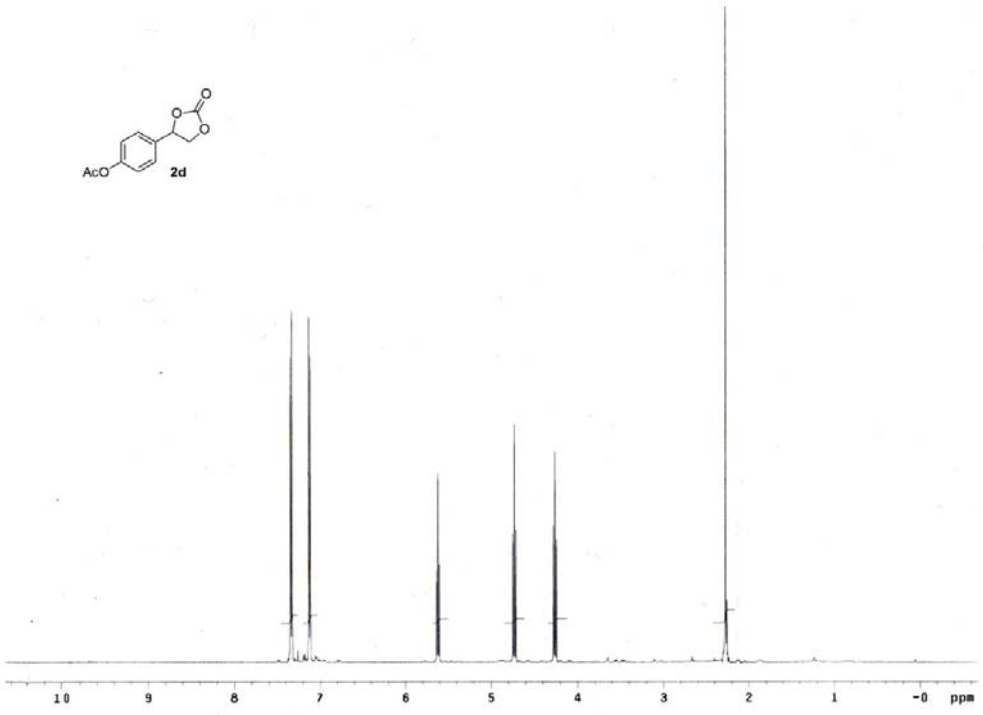
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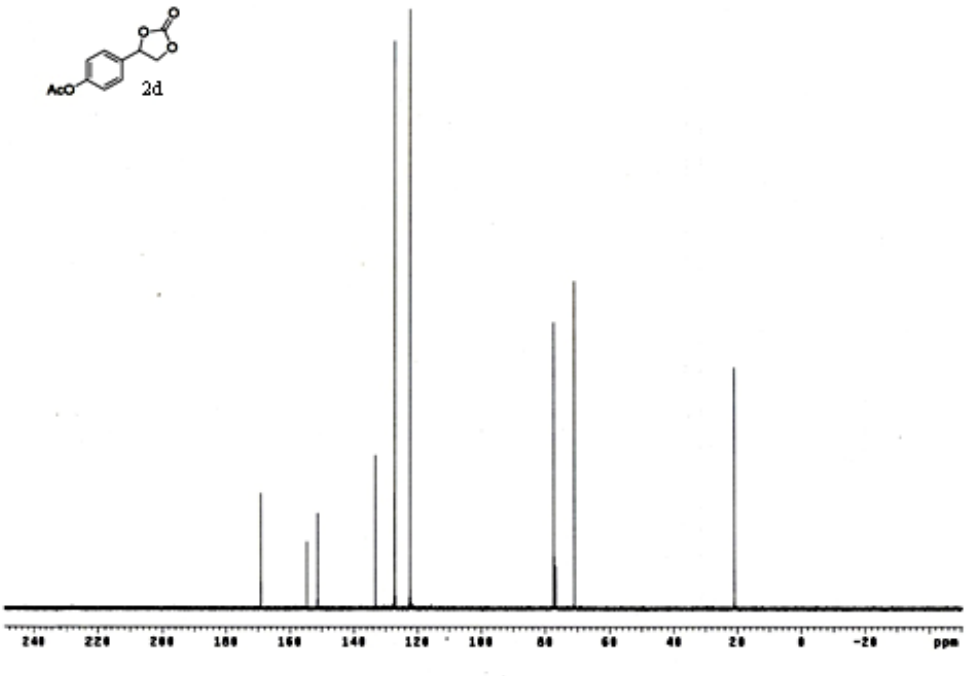
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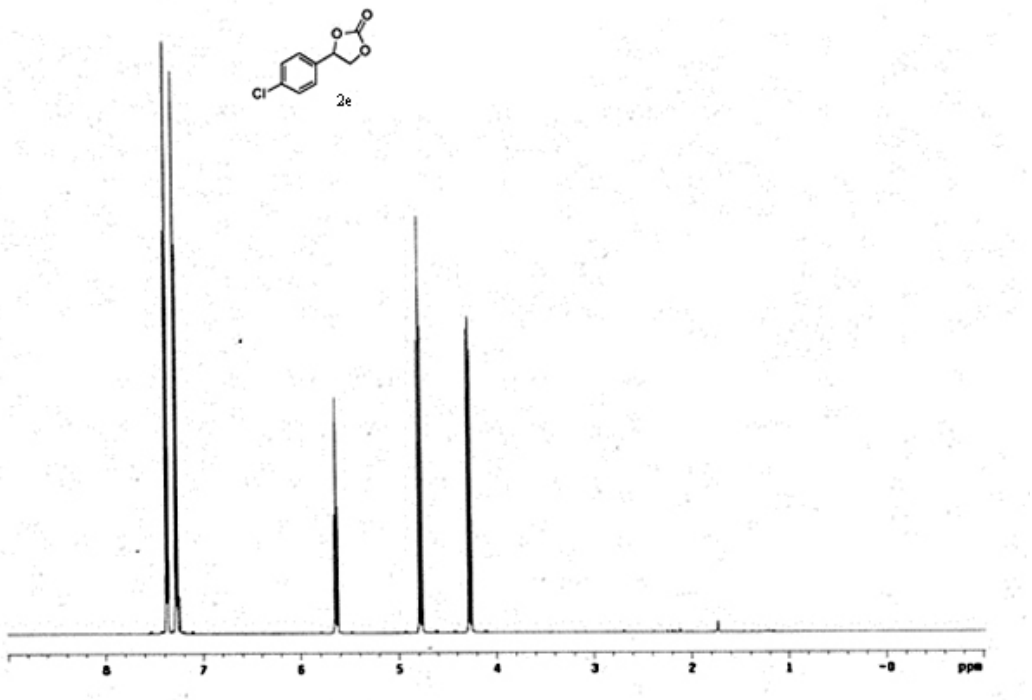
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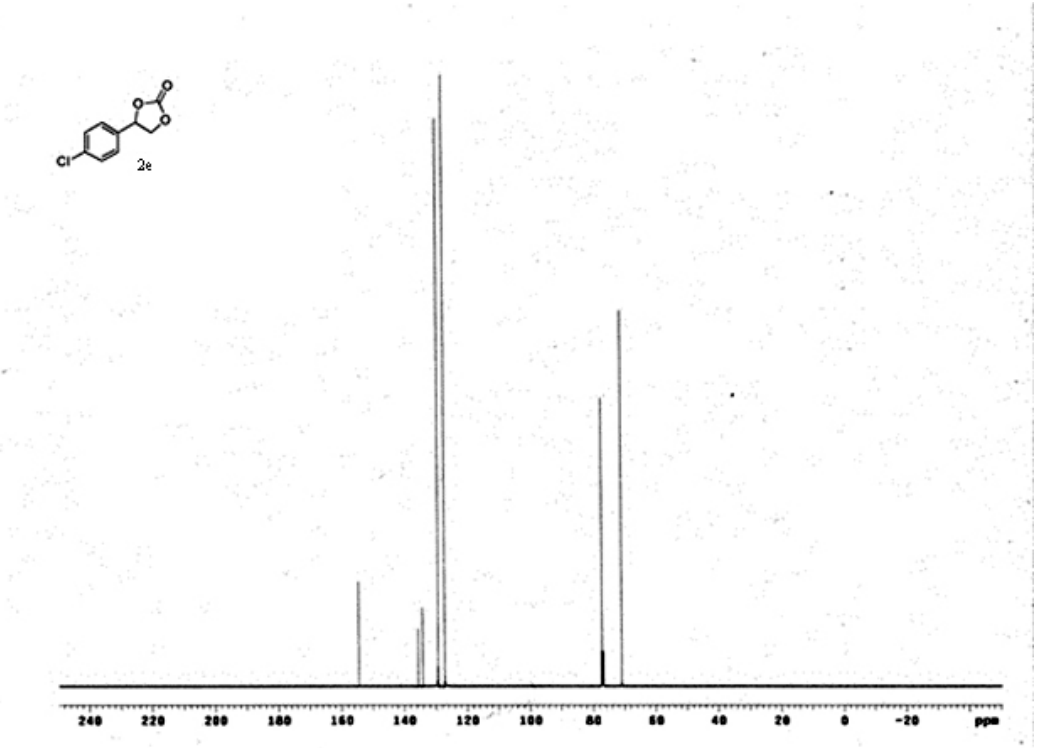
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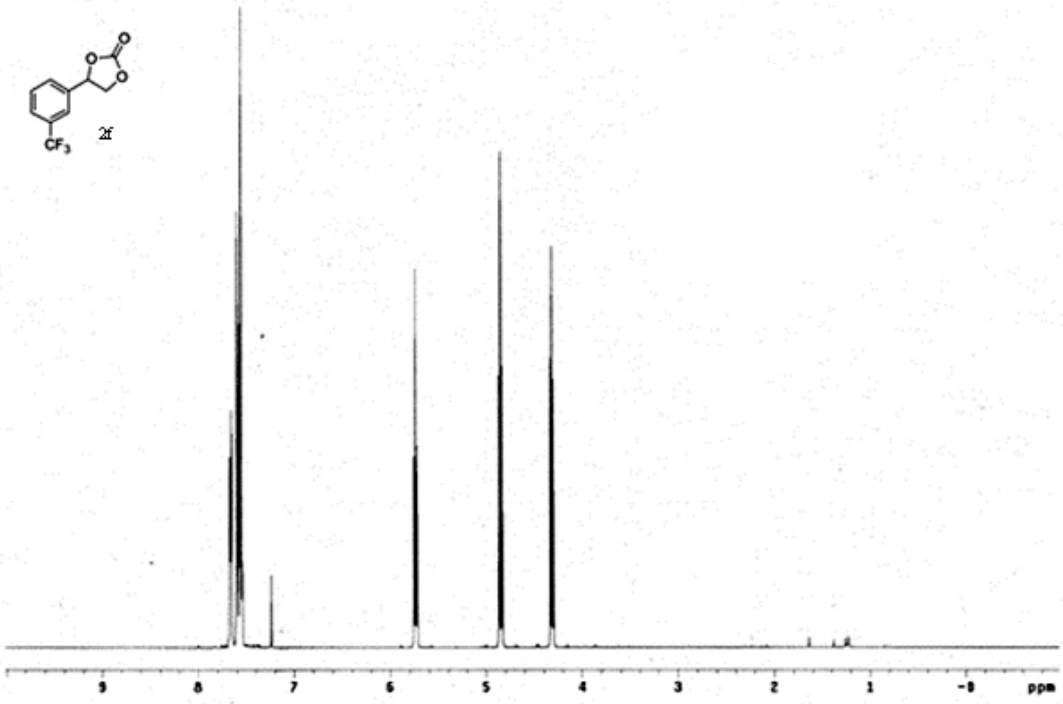
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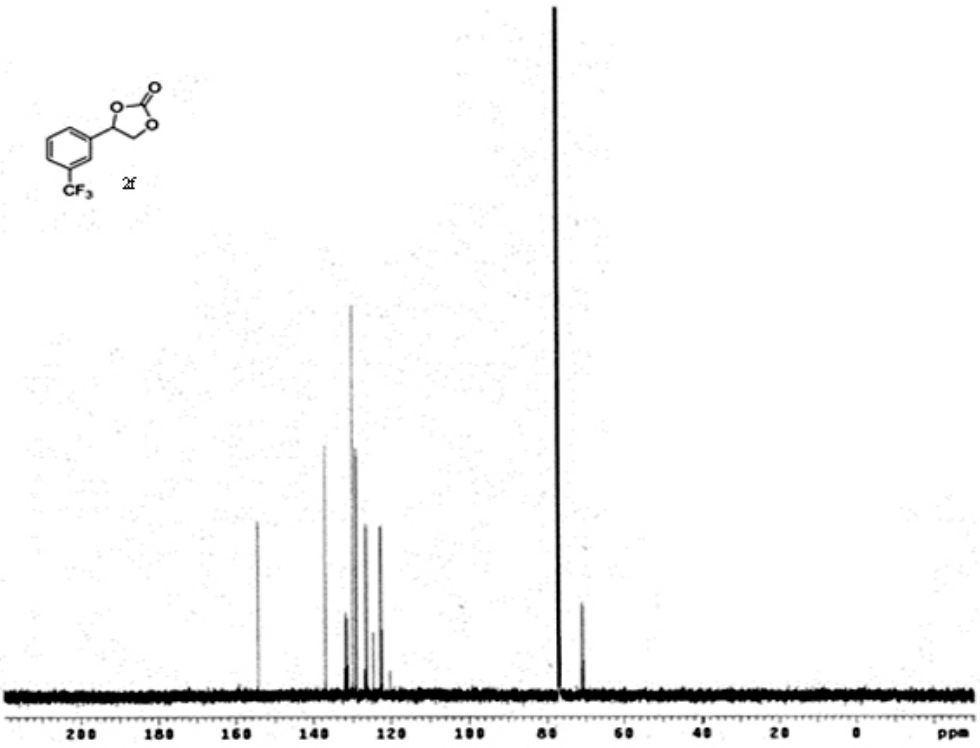
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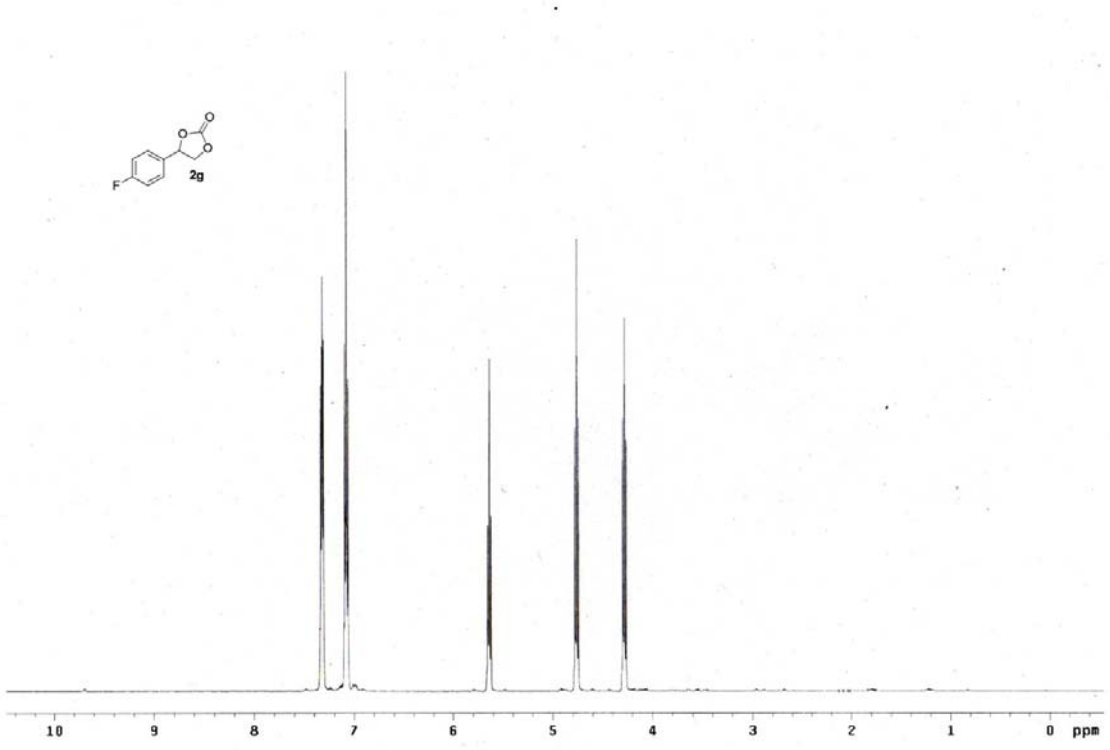
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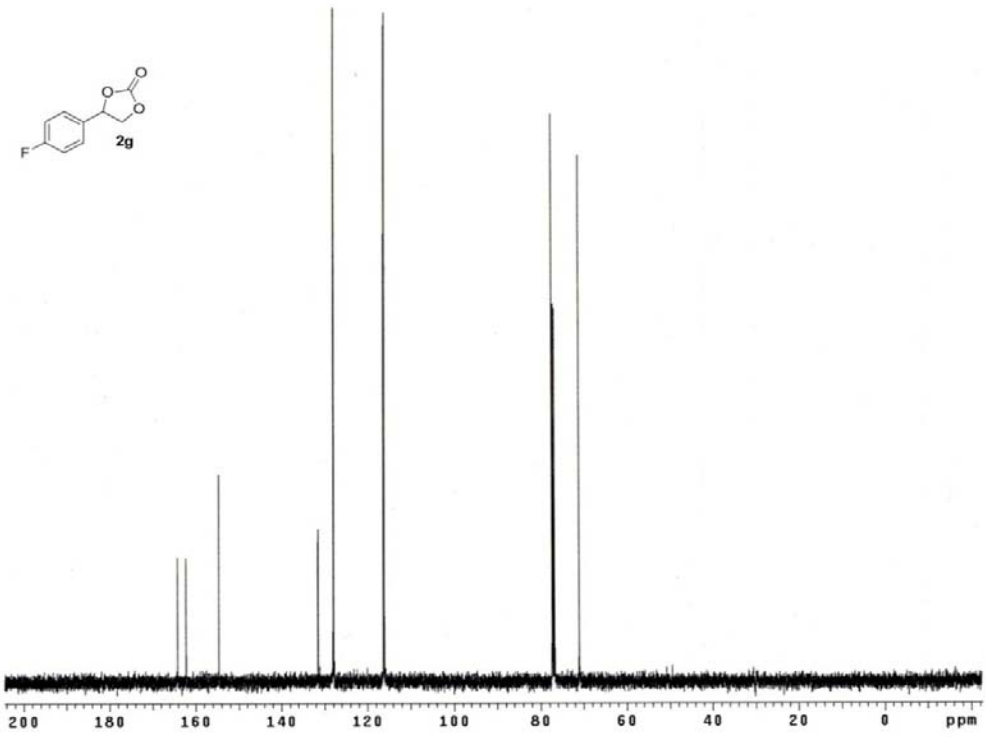
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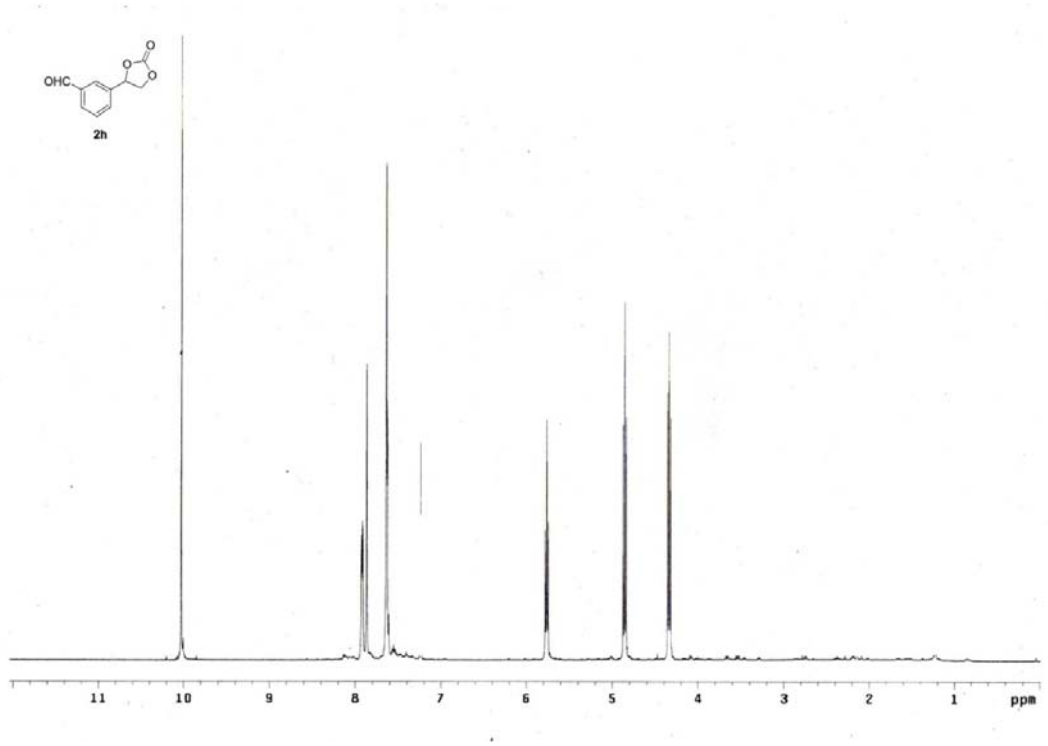
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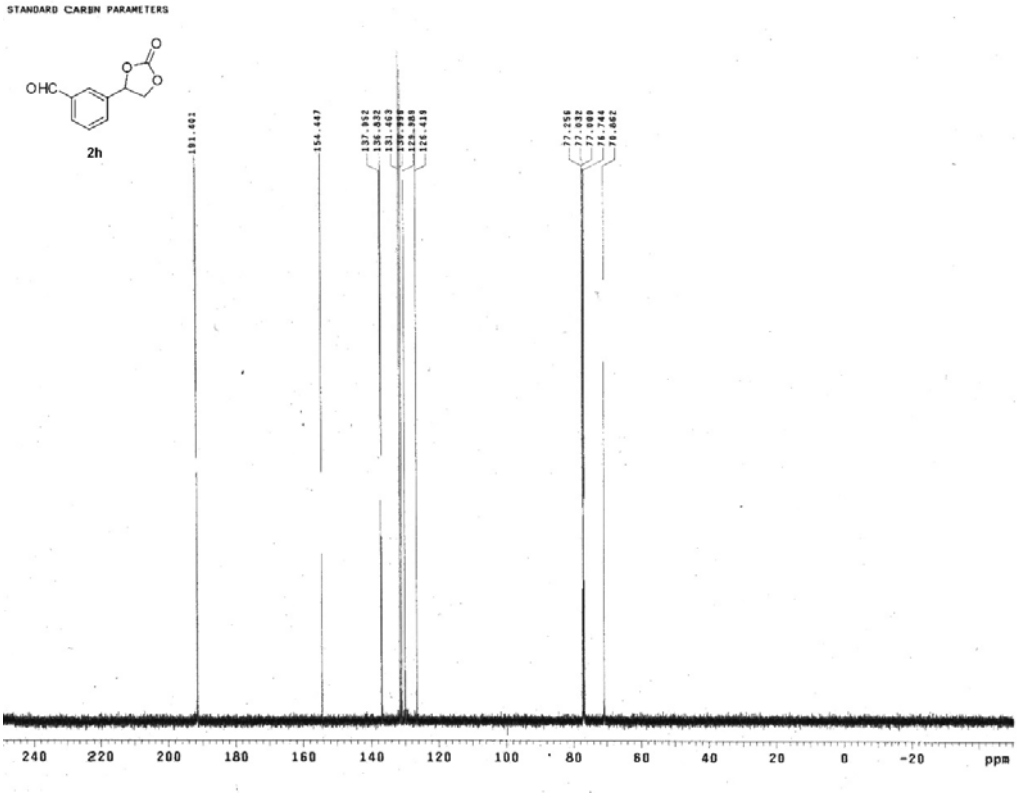
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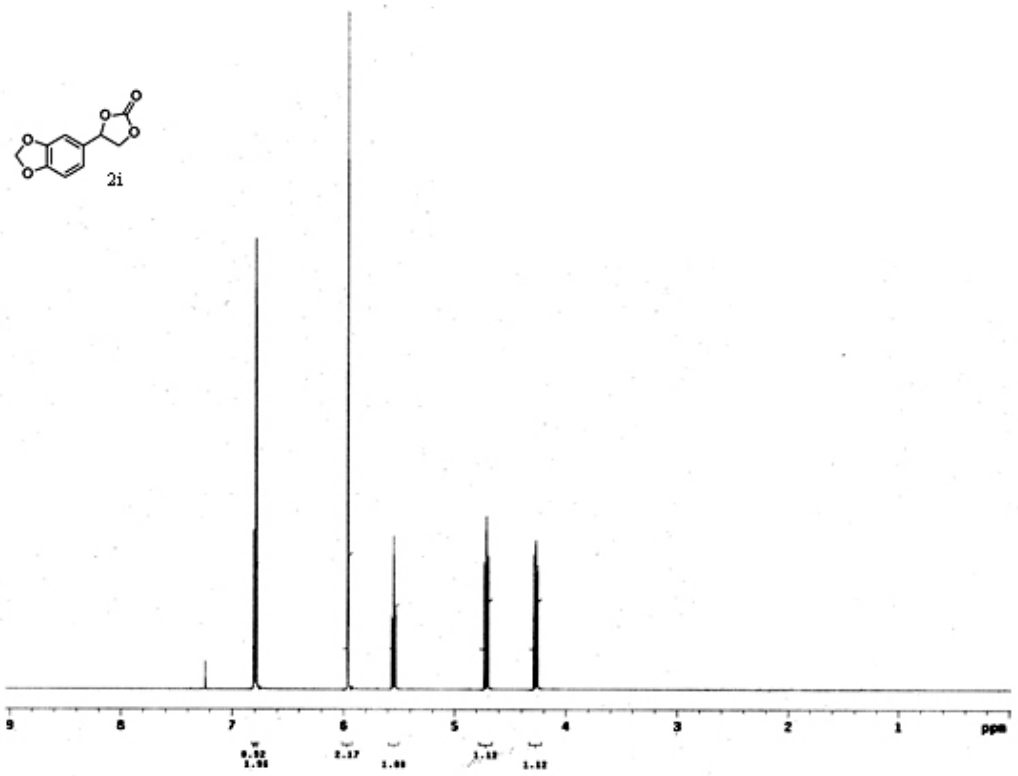
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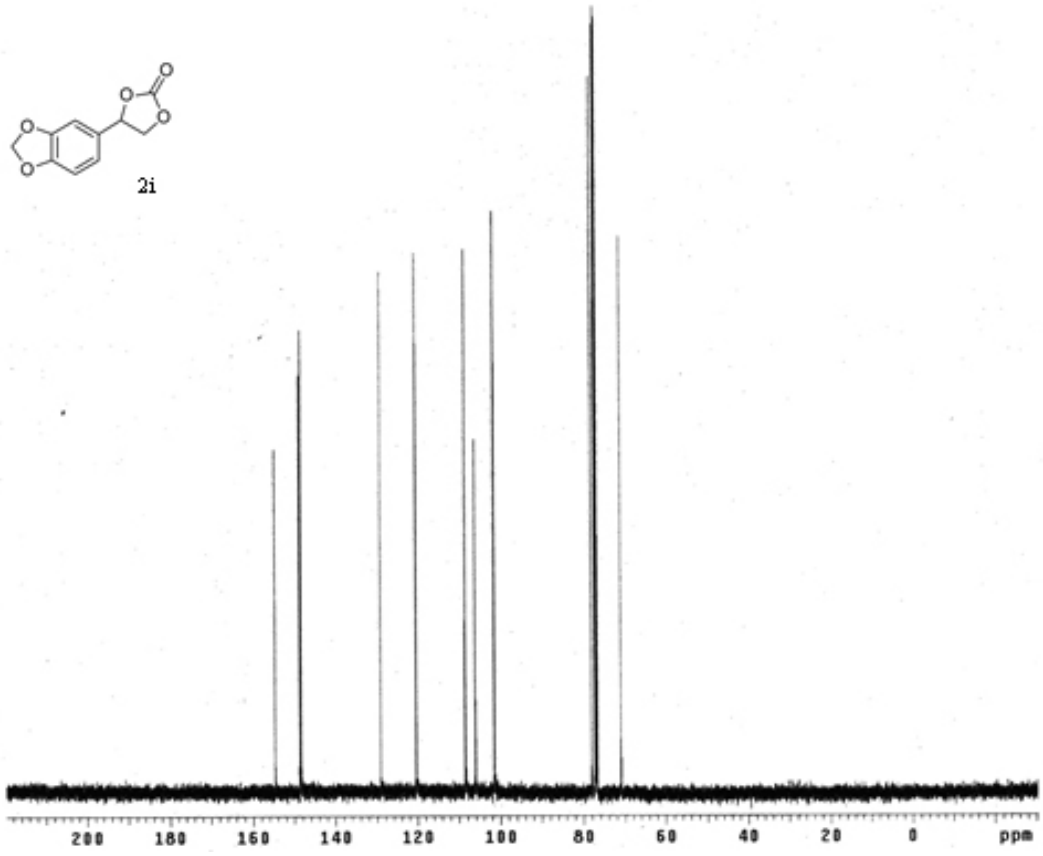
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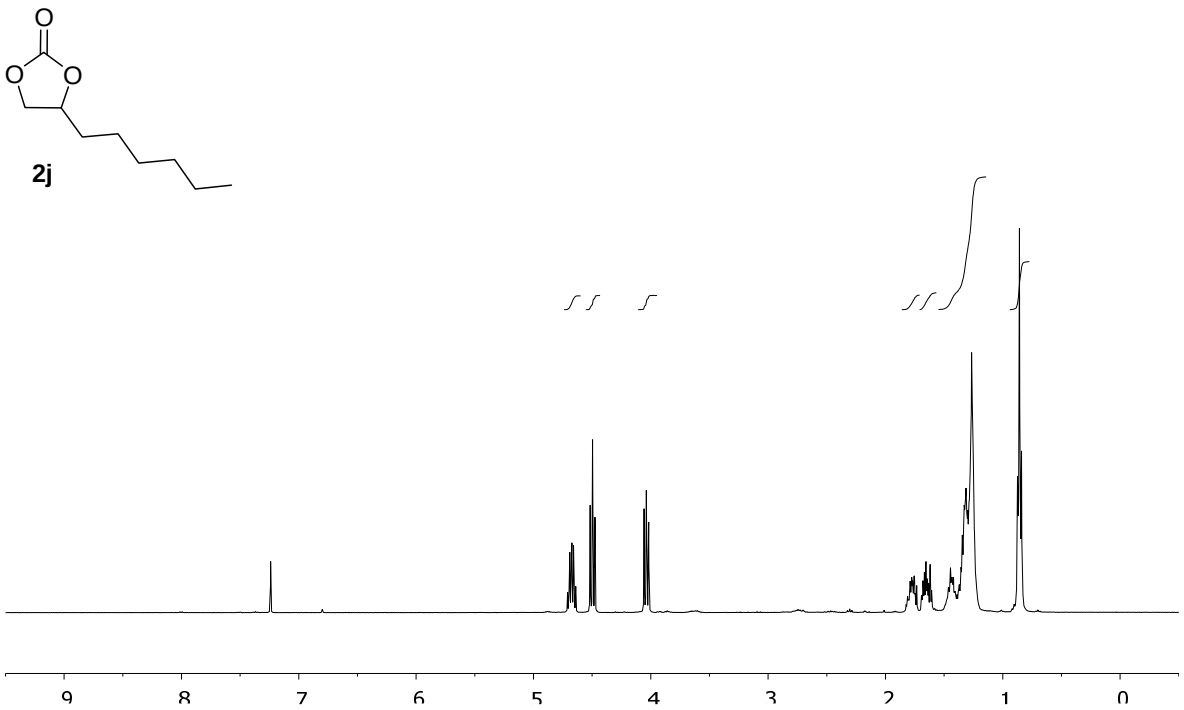
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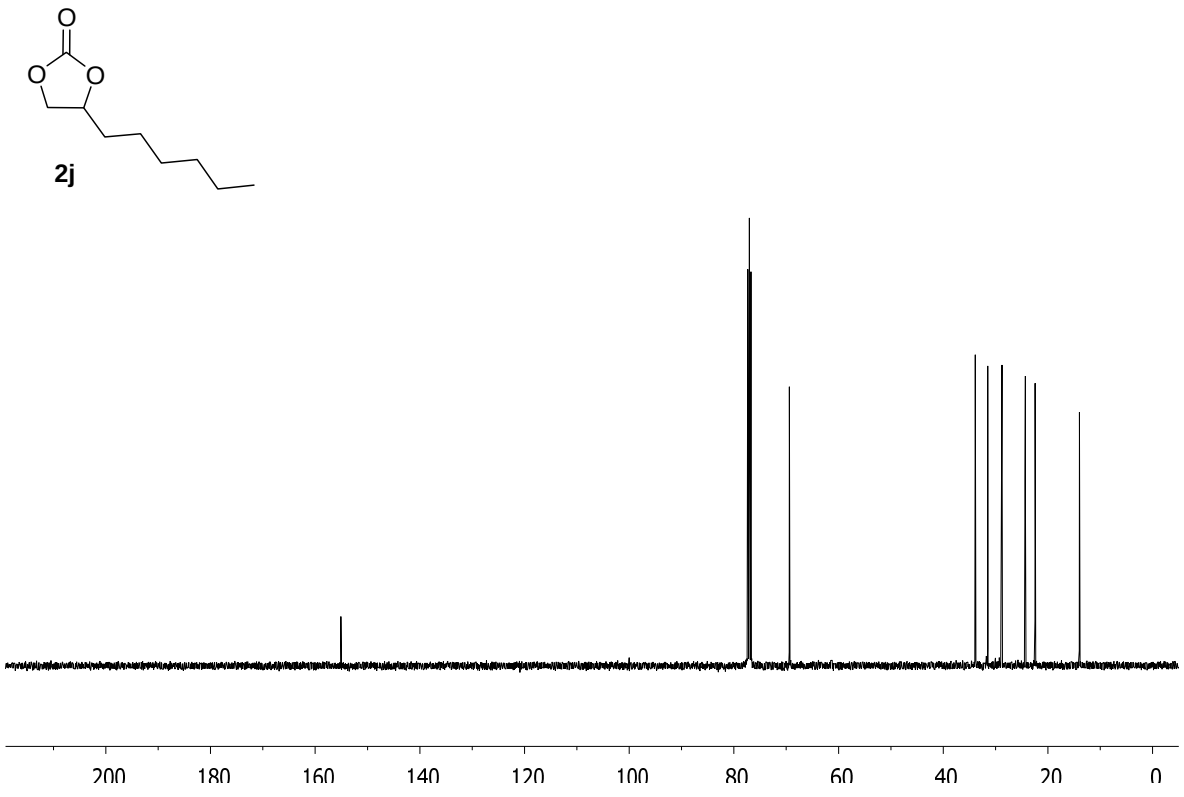
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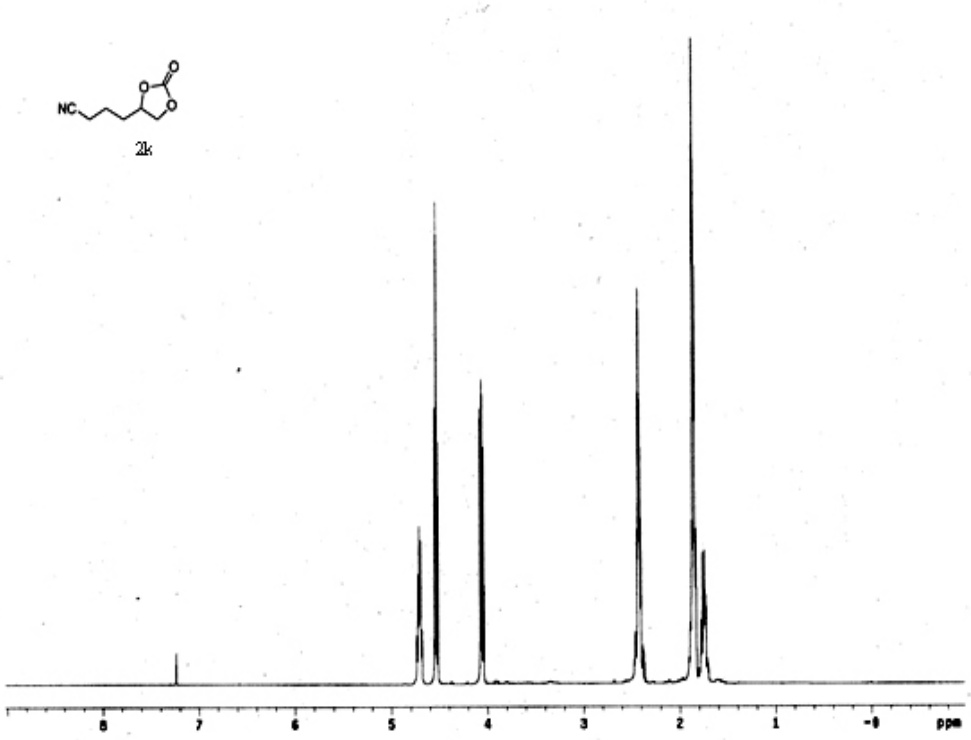
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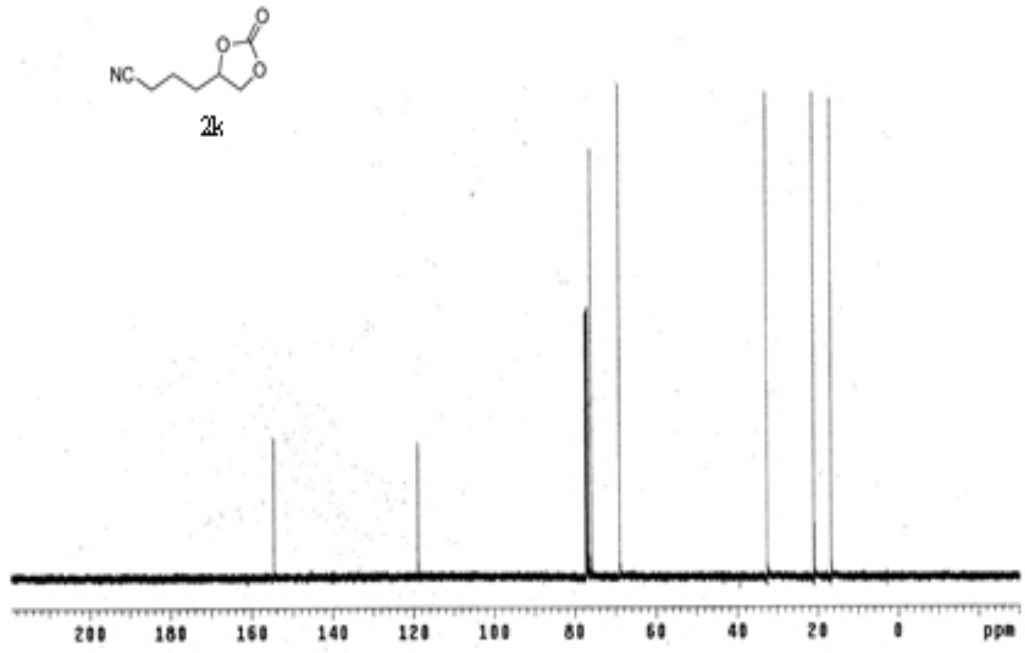
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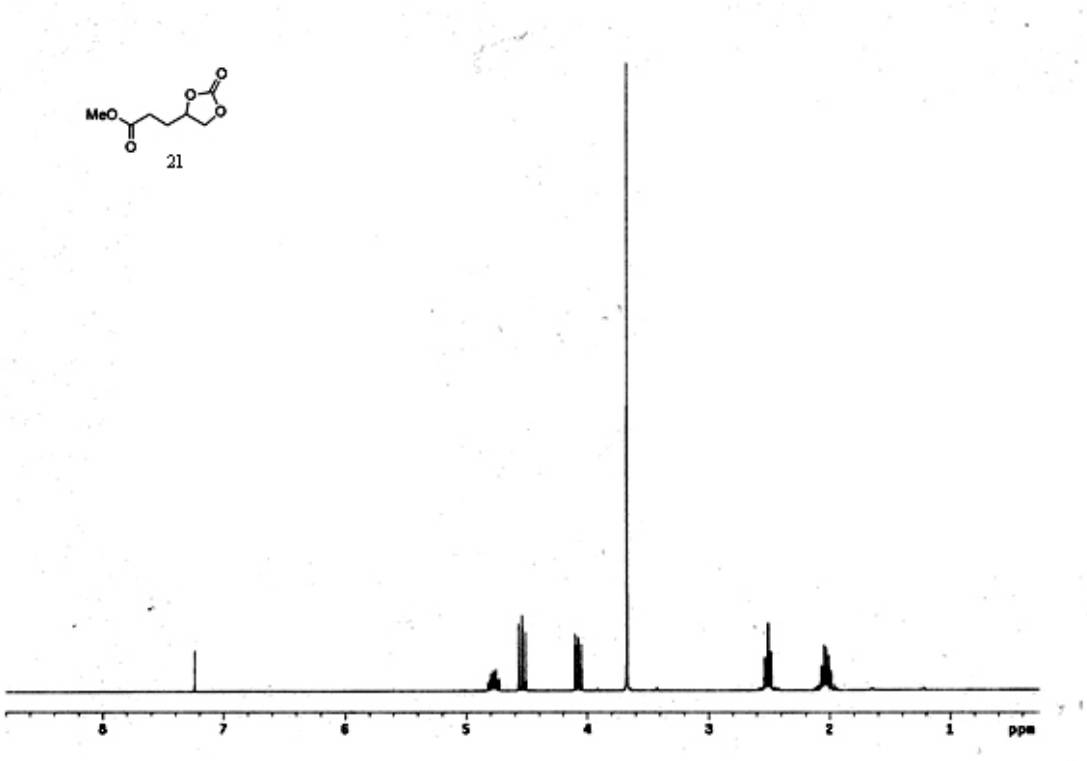
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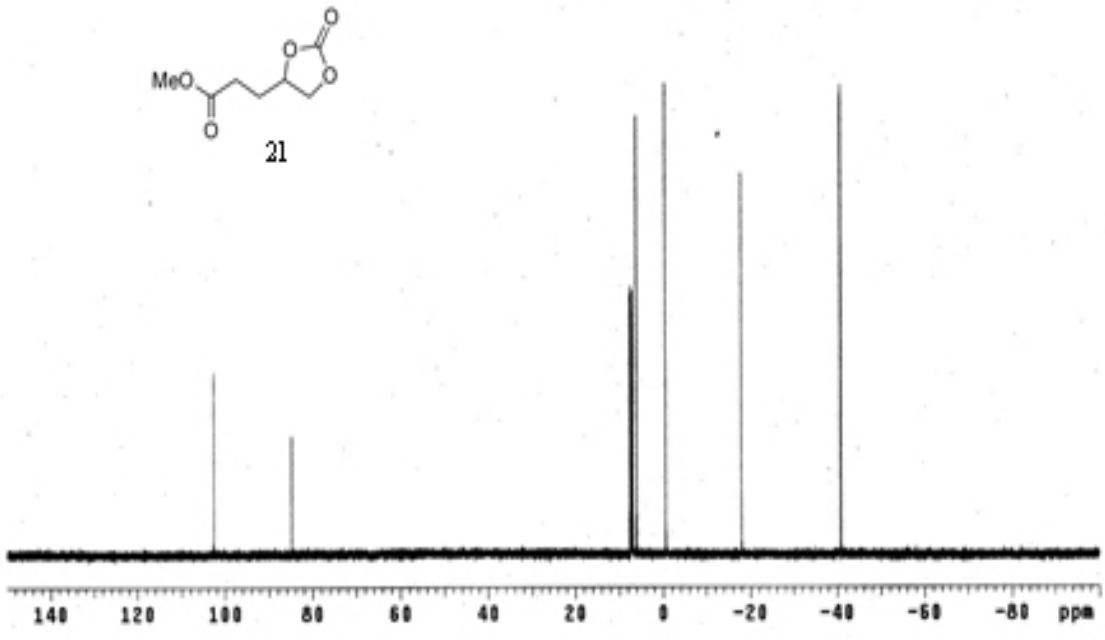
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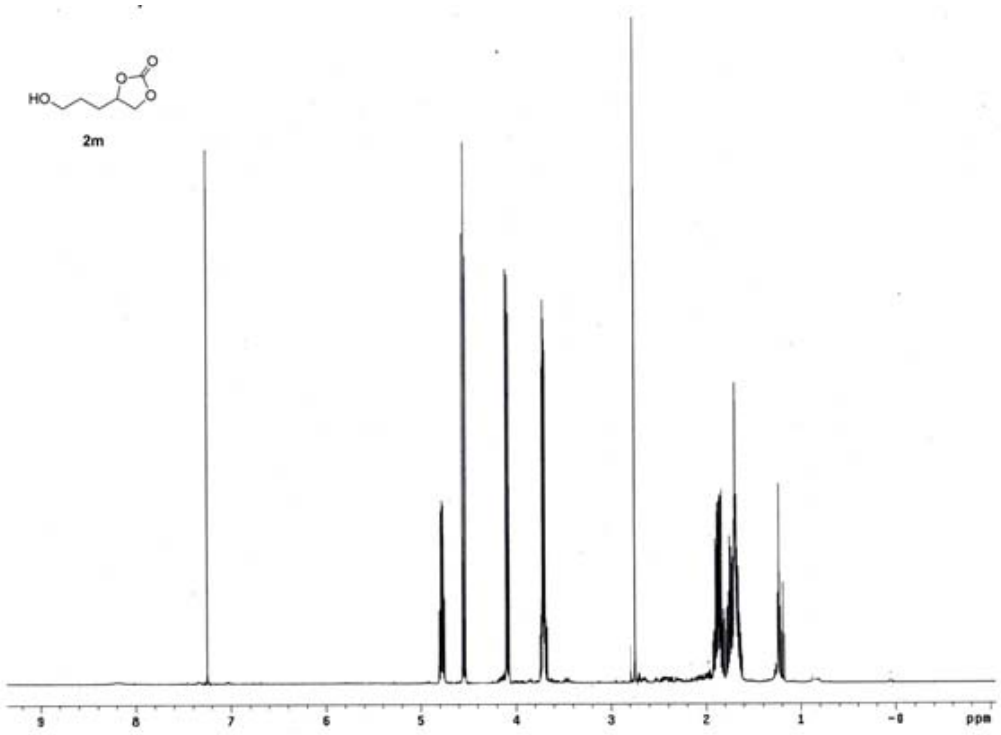
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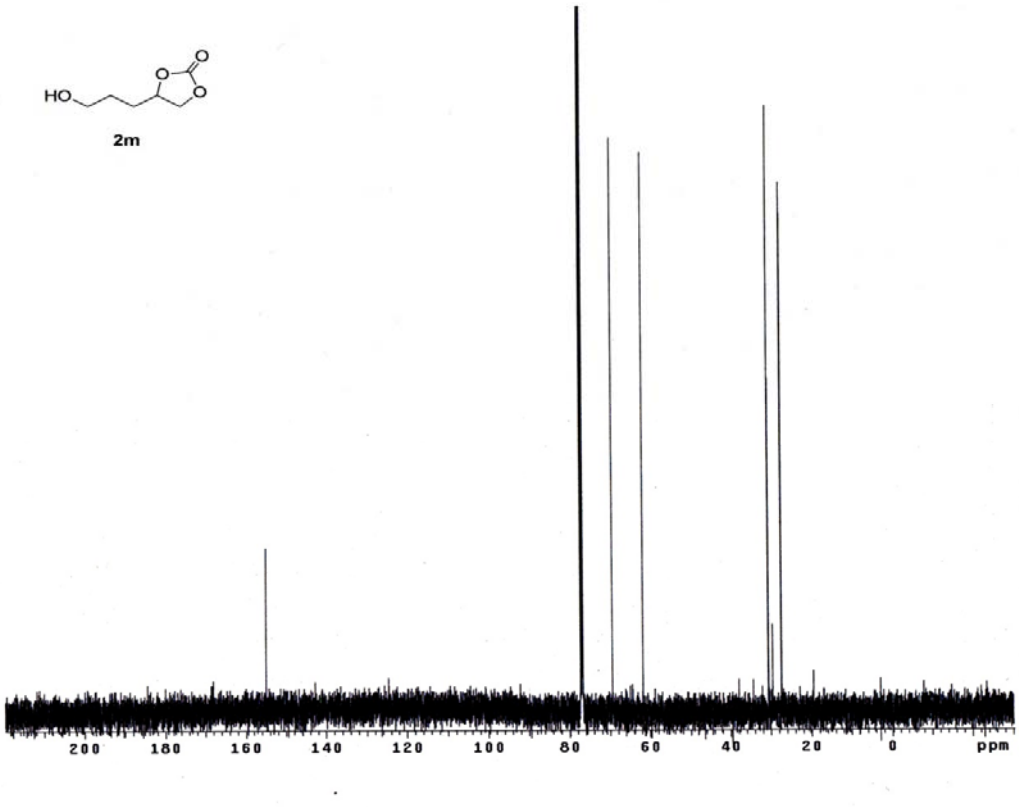
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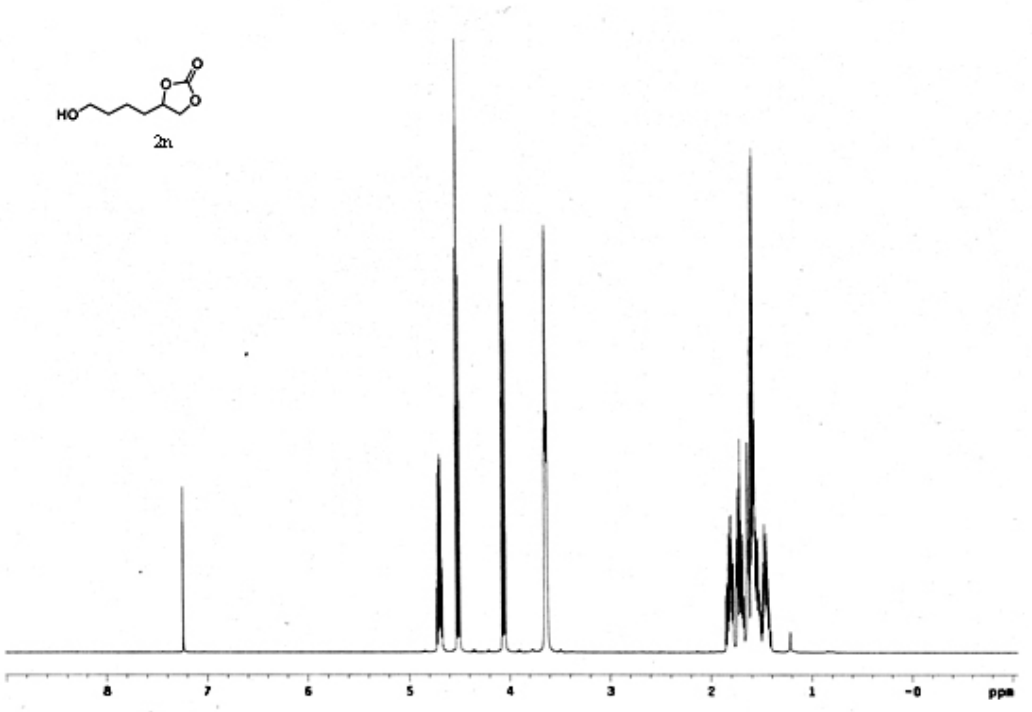
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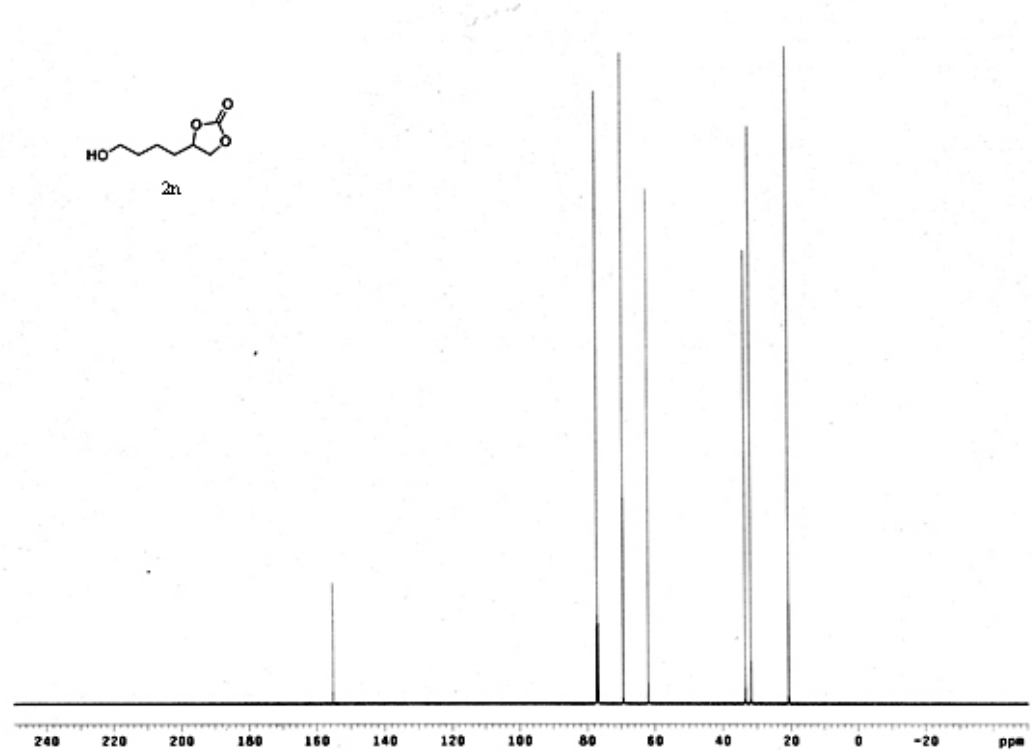
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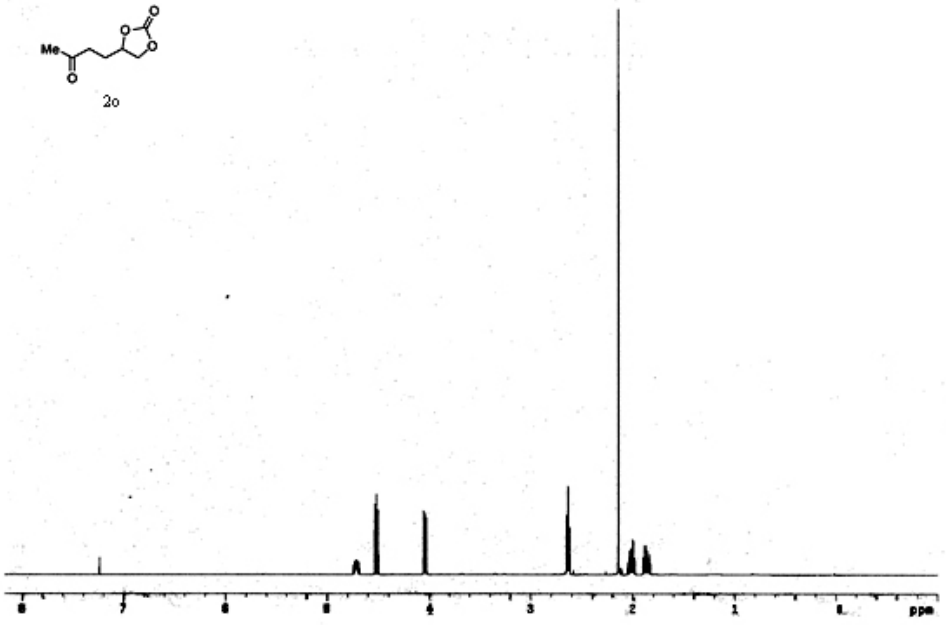
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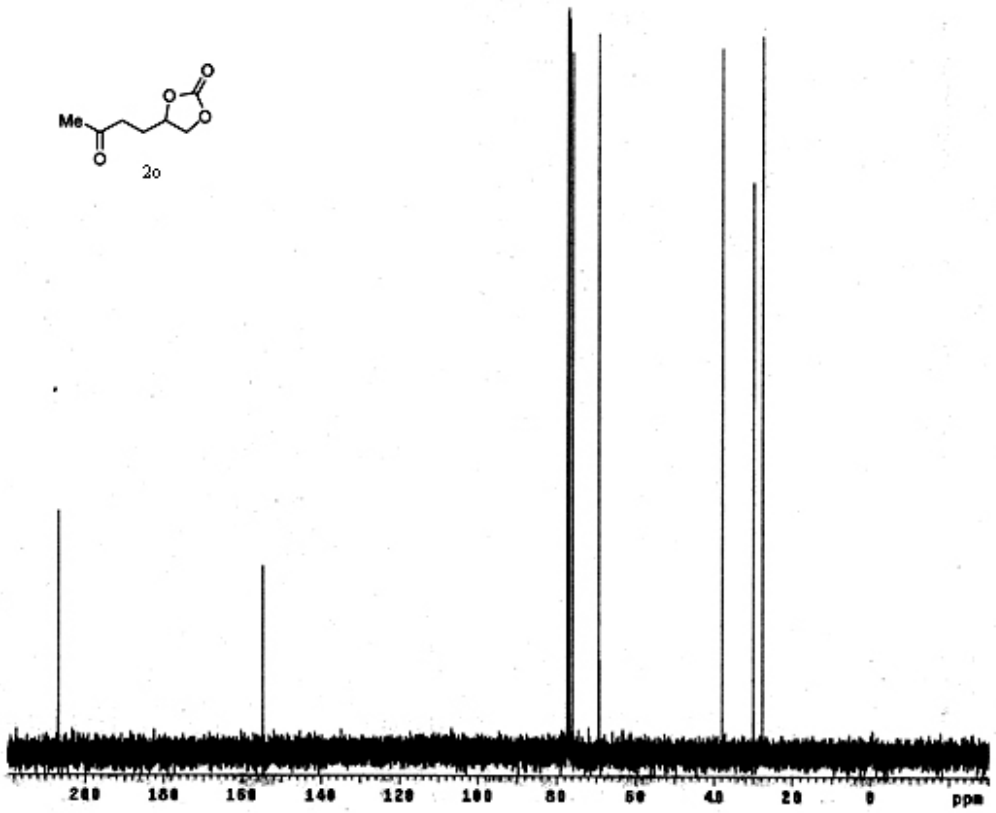
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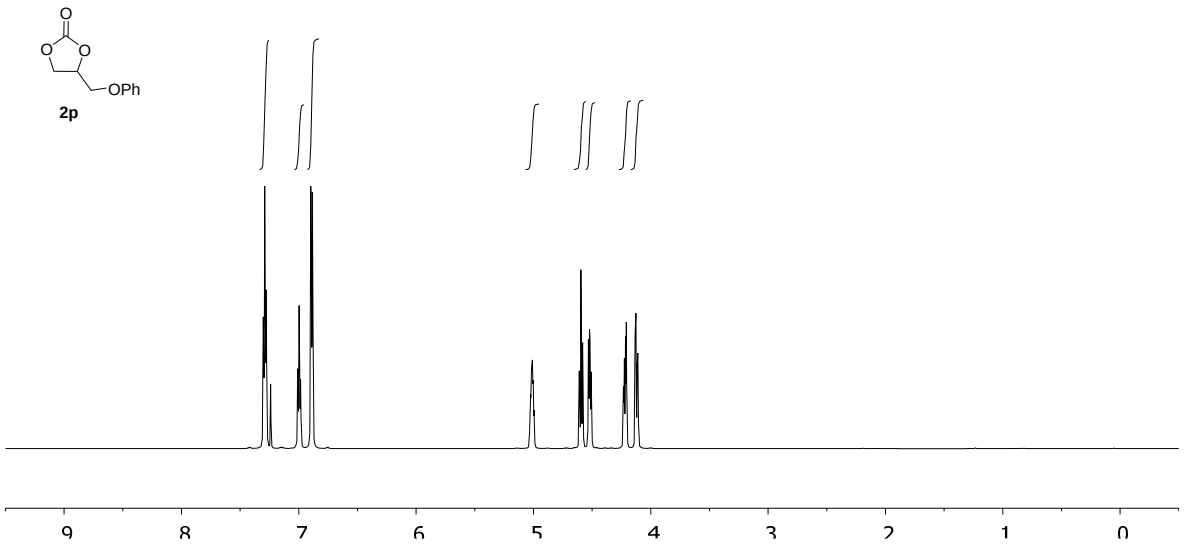
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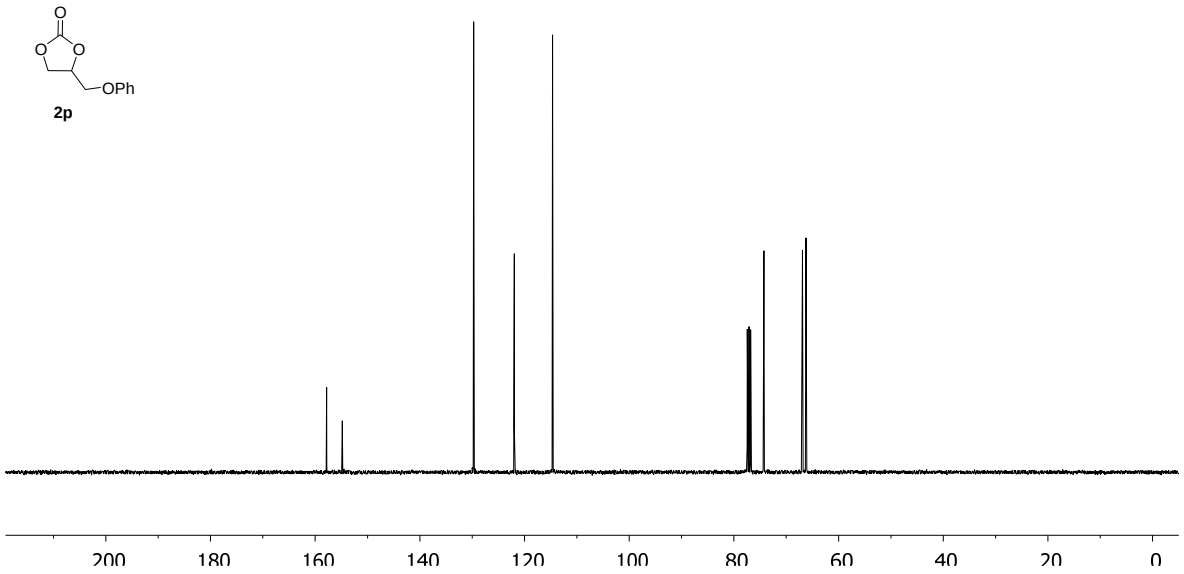
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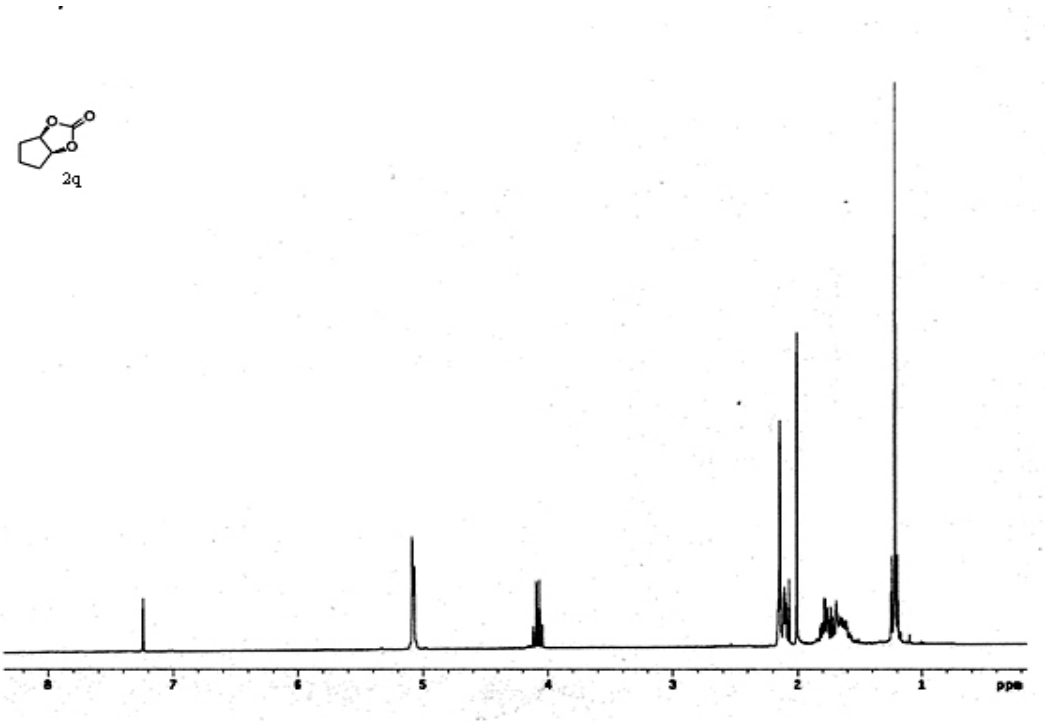
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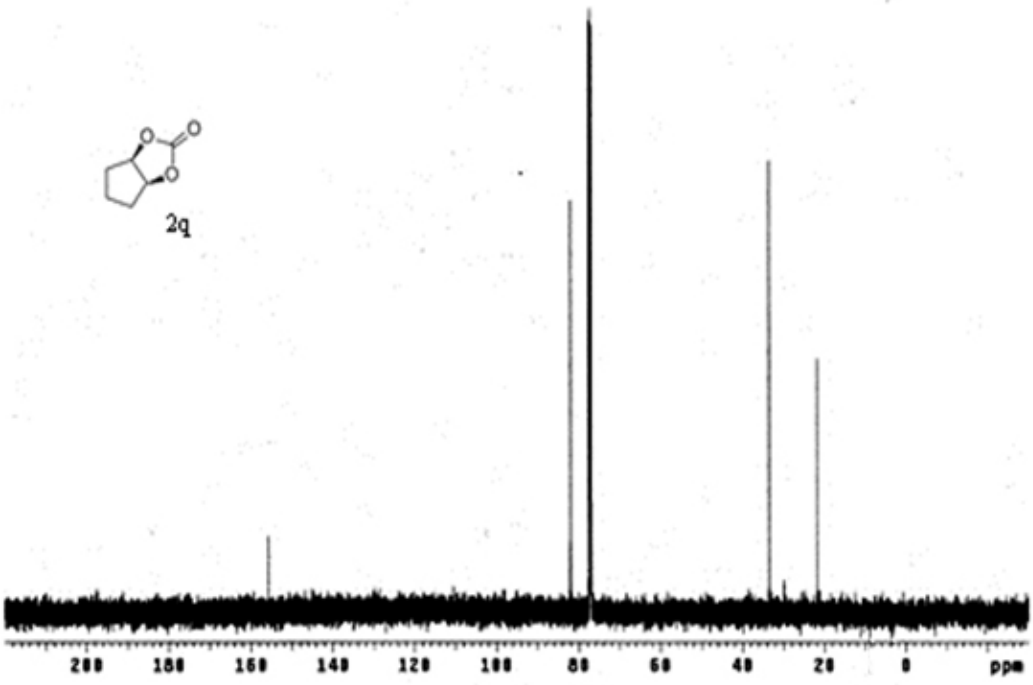
ppm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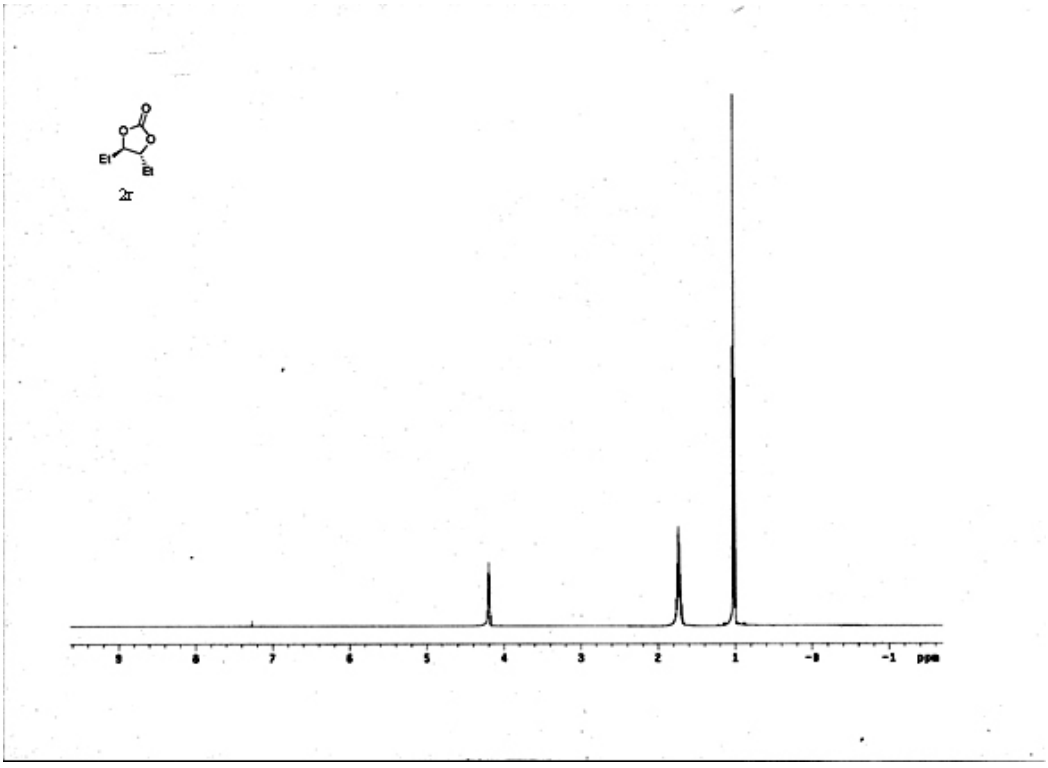
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Et
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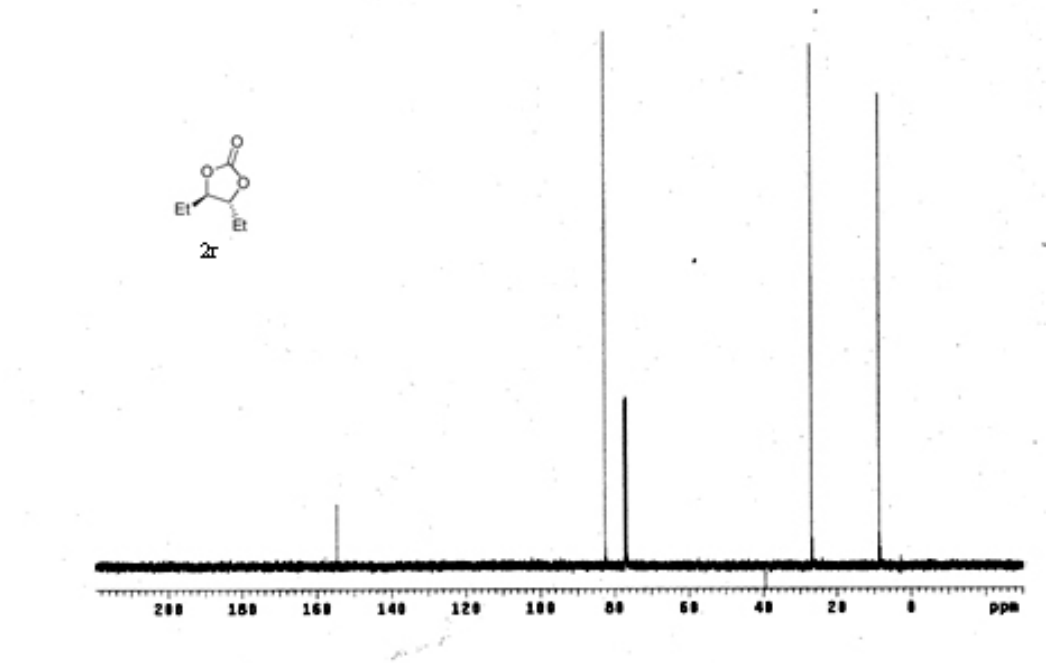
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ppm