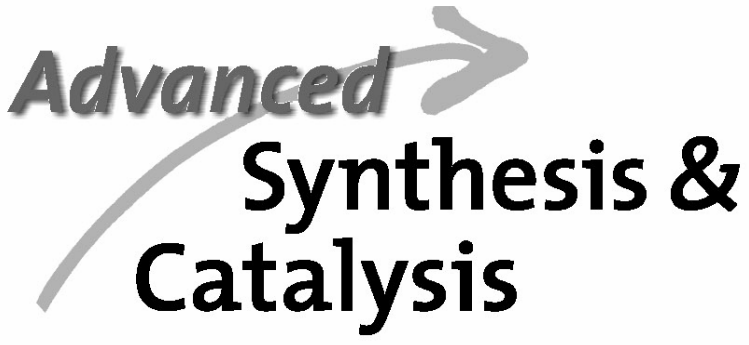

Supporting Information

Supplementary Information for

Organocatalytic Asymmetric Formal [3+3] Cycloaddition Reactions of α,β-Unsaturated Aldehydes with Nazarov Reagents

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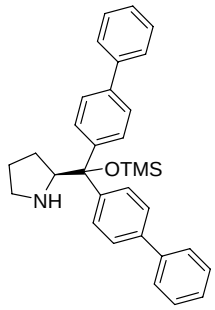
General Information: Chemicals and solvents were all purchased from commercial suppliers and purified by standard techniques. NMR spectra were recorded on a Bruker-400 MHz spectrometer. High-resolution mass spectra were recorded on a Bruker BIO TOF Q mass spectrometer. Optical rotations were measured on a Perkin-Elmer 241 Polarimeter at λ = 589 nm. Infrared spectra were recorded on a Nicolet MX-1E FT-IR spectromter. HPLC analysis was performed on Waters-Breeze (2487 Dual Absorbance Detector and 1525 Binary HPLC Pump). Chiralpak IA and OD columns were purchased from Daicel Chemical Industries, LTD.

Materials: Commercially available aldehydes and organocatalysts were used without further purification. The Nazarov reagent were synthesized according to literature procedures.[1] The catalysts **6a, 6b, 6f, 6h, 6i, 6j** were synthesized according to literature procedures.[2]

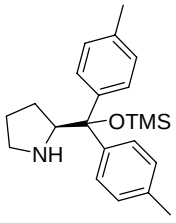
General procedure for the preparation of catalysts 6c-g: TMSOTf (8 mmol, 1.3 equiv) was added at 0 °C to a solution of the appropriate amino alcohol (6.1 mmol) and NEt_3 (8 mmol 1.3 equiv) in CH_2Cl_2 (50 mL). The reaction was then allowed to reach ambient temperature and was stirred for 1 h until full conversion of the starting material was confirmed by TLC analysis. The reaction was quenched with water. The product was extracted with CH_2Cl_2 and the combined organic solution was dried over anhydrous Na_2SO_4. The solvent was removed under the reduced pressure and the residue was purified through column chromatography on silica gel.

(S)-2-(dibiphenyl-4-yl(trimethylsilyloxy)methyl)pyrrolidine (6c): Yield: 93%. ^1H NMR (400



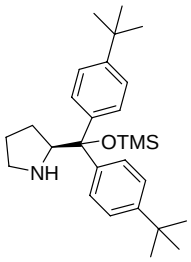
MHz, $CDCl_3$) δ (ppm) 7.32-7.62 (m, 18H, ArH), 4.14 (t, *J* =7.2 Hz, 1H, NCH), 2.98-3.04 (m, 1H, NCH_2) 2.84-2.92 (m, 1H, NCH_2), 1.64-1.80 (m, 4H, CH_2), -0.09 (s, 9H, $Si(CH3)_3$); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 140.8, 139.5, 139.4, 130.8, 129.1, 128.9, 128.6, 127.2, 126.9, 126.3, 126.0, 83.0, 65.6, 47.2, 27.7, 25.2, 2.2; IR (KBr) υ 3420, 2950, 1600, 1480, 1250, 1120, 1080, 841, 696 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{32}H_{35}NOSi)^+$; requires 477.2488 m/z, found, 477.2487 m/z.

(S)-2-(dip-tolyl(trimethylsilyloxy)methyl)pyrrolidine (6d): Yield: 93%. ^1H NMR (400 MHz,



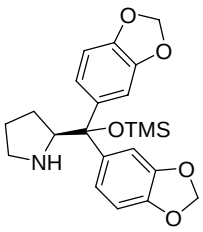
$CDCl_3$) δ (ppm) 7.30-7.32 (m, 2H, ArH), 7.21-7.26 (m, 2H, Ar), 7.04-7.08 (m, 4H, Ar), 3.96 (t, *J* = 7.4 Hz, 1H, NCH), 2.76-2.81 (m, 2H, NCH_2), 2.31 (s, 6H, $2CH_3$), 1.54-1.64 (m, 5H, CH_2), -0.10 (s, 9H, $Si(CH3)_3$); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 144.0, 143.0, 136.4, 136.3, 128.7, 128.3, 127.7, 125.8, 83.1, 65.6, 47.2, 27.7, 25.2, 21.1, 2.3; IR (KBr) υ 3430, 2970, 1600, 1480, 1280, 1130, 695 cm^{-1}; HRMS (ESI-MS) exact mass calcd for $(C_{22}H_{31}NOSi+H)^+$; requires 354.2248 m/z, found, 354.2241 m/z.

(S)-2-(bis(4-fluorophenyl)(trimethylsilyloxy)methyl)pyrrolidine (6e): Yield: 91%. ^1H NMR (400



MHz, $CDCl_3$) δ (ppm) 7.34-7.36 (m, 2H, ArH), 7.26-7.28 (m, 6H, Ar), 4.03 (t, *J* =7.6 Hz, 1H, NCH), 2.82 (m, 1H, NCH_2) 2.74-2.76 (m, 1H, NCH_2), 1.57-1.59 (m, 4H, CH_2), 1.27 (s, 9H, $3CH_3$), 1.29 (s, 9H, $3CH_3$), -0.12 (s, 9H, $Si(CH3)_3$); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 149.7, 149.6, 143.5, 142.6, 128.1, 127.4, 124.4, 124.4, 83.0, 65.7, 47.2, 31.5, 27.6, 25.2, 2.2; IR (KBr) υ 3430, 2970, 1400, 1270, 1240, 1110, 887, 833, 569 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{28}H_{43}NOSi)^+$; requires 437.3114 m/z, found, 437.3110 m/z.

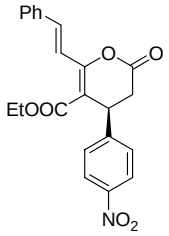
(S)-2-(dibenzo[d][1,3]dioxol-5-yl(trimethylsilyloxy)methyl)pyrrolidine (6g): Yield: 96%. ^1H



NMR (400 MHz, $CDCl_3$) δ (ppm) 6.94-6.95 (m, 2H, ArH), 6.82-6.87 (m, 2H, ArH), 6.99-6.73 (m, 2H, ArH), 5.92-5.93 (m, 4H, $2CH_2$), 3.87 (t, *J*= 6.9 Hz, 1H, NCH), 2.81-2.85 (m, 2H, NCH_2), 1.80-1.81 (brs, 1H, NH), 1.53-1.62 (m, 3H, CH_2), 1.40-1.46 (m, 1H, CH_2), -0.05 (s, 9H, $Si(CH_3)_3$); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 147.2, 146.5, 146.3, 141.1, 139.9, 121.5, 120.8, 109.5, 108.7, 107.3, 107.2, 101.0, 101.0, 83.0, 65.8, 47.2, 27.6, 25.1, 2.3; IR (KBr) υ 2950, 1480, 1250, 1040, 800, 656 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{27}NO_5Si)^+$; requires 413.1659 m/z, found, 413.1651 m/z.

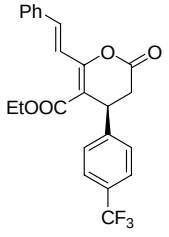
General procedure for the organocatalytic Asymmetric Formal [3+3] Cycloaddition of α, β-Unsaturated Aldehydes with Nazarov Reagents and oxidation to the corresponding 6-vinyl-3,4-dihydropyranones: The catalyst **6** (0.02 mmol, 10 mol%), 4-nitrobenzoic acid (0.02 mmol, 10 mol%) and the α, β-unsaturated aldehydes **4** (0.24 mmol, 1.2eq) were stirred at ambient temperature in CH_2Cl_2 (1.0 mL) for 30 min, then stirred at 0°C for 15 min before the addition of Nazarov Reagents **9** (0.2mmol). The reaction mixture was stirred for 6-36h. The solvent was removed under the reduced pressure and the residue was purified through column chromatography on silica gel. The products were stirred at ambient temperature in CH_2Cl_2 (3 mL) for 10 min, then oxidated using PCC (1.0 mmol, 5eq) for 4h. The solvent was removed under the reduced pressure and the residue was purified through column chromatography on silica gel.

(S,E)-ethyl 4-(4-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 77%.



$[\alpha]_D^{20}$= +208 (c= 0.036, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.18 (d, *J*= 8.7 Hz, 2H, ArH), 8.03 (d, *J*= 16.0 Hz, 1H, CH), 7.57 (d, *J*= 8.7 Hz, 2H, ArH), 7.51 (d, *J*= 16.0 Hz, 1H, CH), 7.36-7.41 (m, 5H, ArH), 4.51 (dd, *J*= 7.5 Hz, *J*= 1.9 Hz, 1H, CH), 4.17-4.25 (m, 2H, OCH_2), 3.07 (dd, *J*= 16.0 Hz, *J*= 7.6 Hz, 1H, CH_2), 2.88 (dd, *J*= 16.0 Hz, *J*= 2.0 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.2, 164.9, 158.2, 148.1, 147.5, 137.9, 135.6, 129.8, 129.0, 128.0, 127.9, 124.5, 117.8, 108.6, 61.4, 38.5, 35.9, 14.2; IR (KBr) υ 2980, 1700, 1520, 1350, 1130, 694 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{19}NO_6)^+$; requires 393.1212 m/z, found, 393.1205 m/z; Enantiomeric excess: 95%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 26.19 min; t_{Rmajor}= 30.08 min.

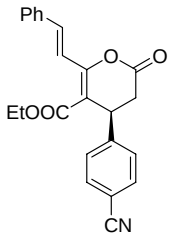
(S,E)-ethyl 2-oxo-6-styryl-4-(4-(trifluoromethyl)phenyl)-3,4-dihydro-2H-pyran-5-carboxylate: yield: 41%.



$[\alpha]_D^{20}$= +138 (c= 0.072, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.02 (d, *J*= 16.0 Hz, 1H, CH), 7.57-7.59 (m, 4H, ArH), 7.49 (d, *J*= 16.0 Hz, 1H, CH), 7.30-7.41 (m, 5H, ArH), 4.46 (dd, *J*= 7.2 Hz, *J*= 1.7 Hz, 1H, CH), 4.18-4.24 (m, 2H, OCH_2), 3.03 (dd, *J*= 16.0 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.87 (dd, *J*= 16.0 Hz, *J*= 2.2 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.4, 165.3, 157.9, 144.7, 137.5, 135.8, 130.2, 129.7, 129.1, 128.5, 128.2, 127.6, 127.3, 126.2, 118.0, 109.2, 61.4, 38.5, 36.2, 14.2; IR (KBr) υ 2920, 1700, 1520, 1330, 1130, 696 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{19}O_4F_3)^+$; requires 416.1235 m/z, found, 416.1234 m/z; Enantiomeric excess: 96%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm,

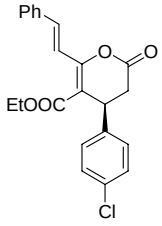
flow rate 1.0 mL/min, t_{Rminor}= 9.05 min; t_{Rmajor}= 10.55 min.

(S,E)-ethyl 4-(4-cyanophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-



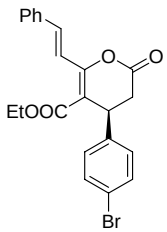
carboxylate: yield: 47%. $[\alpha]_D^{20}$= +263 (c= 0.024, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.01 (d, *J*= 16.0 Hz, 1H, CH), 7.61 (d, *J*= 8.3 Hz, 2H, ArH), 7.56 (d, *J*= 8.2 Hz, 2H, ArH), 7.49 (d, *J*= 16.0 Hz, 1H, CH), 7.30-7.42 (m, 5H, ArH), 4.45 (dd, *J*= 7.4 Hz, *J*= 1.9 Hz, 1H, CH), 4.18-4.24 (m, 2H, OCH_2), 3.04 (dd, *J*= 16.0 Hz, *J*= 7.5 Hz, 1H, CH_2), 2.86 (dd, *J*= 16.0 Hz, *J*= 2.0 Hz, 1H, CH_2), 1.24 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.3, 165.0, 158.2, 146.1, 137.9, 135.7, 133.1, 129.8, 129.0, 128.0, 127.7, 118.5, 117.9, 111.8, 108.7, 61.4, 38.7, 36.0, 14.2; IR (KBr) υ 2980, 1700, 1530, 1330, 1120, 791 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{19}NO_4)^+$; requires 373.1314 m/z, found, 373.1311 m/z; Enantiomeric excess: 95%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 13.00 min; t_{Rmajor}= 14.98 min.

(S,E)-ethyl 4-(4-chlorophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-



carboxylate: yield: 44%. $[\alpha]_D^{20}$= +247 (c= 0.034, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.00 (d, *J*= 16.0 Hz, 1H, CH), 7.56 (d, *J*= 8.2 Hz, 2H, ArH), 7.47 (d, *J*= 16.0 Hz, 1H, CH), 7.34-7.39 (m, 3H, ArH), 7.26-7.29 (m, 2H, ArH), 7.11 (d, *J*= 8.4 Hz, 2H, ArH), 4.38 (dd, *J*= 7.3 Hz, *J*= 1.9 Hz, 1H, CH), 4.18-4.23 (m, 2H, OCH_2), 3.01 (dd, *J*= 15.9 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.84 (dd, *J*= 15.9 Hz, *J*= 2.2 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.5, 165.5, 157.7, 139.2, 137.3, 135.9, 133.6, 129.6, 129.4, 129.0, 128.2, 127.9, 118.1, 109.7, 61.3, 38.1, 36.4, 14.2; IR (KBr) υ 2980, 1770, 1690, 1490, 1310, 1140, 1060, 825, 694 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{19}O_4Cl)^+$; requires 382.0972 m/z, found, 382.0968 m/z; Enantiomeric excess: 90%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 9.78 min; t_{Rmajor}= 11.09 min.

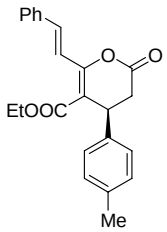
(S,E)-ethyl 4-(4-bromophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-



carboxylate: yield: 58%. $[\alpha]_D^{20}$= +181 (c= 0.056, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.01 (d, *J*= 16.0 Hz, 1H, CH), 7.56 (d, *J*= 8.5 Hz, 2H, ArH), 7.47 (d, *J*= 16.0 Hz, 1H, CH), 7.36-7.45 (m, 5H, ArH), 7.05 (d, *J*= 8.5 Hz, 2H, ArH), 4.36 (dd, *J*= 7.4 Hz, *J*= 2.0 Hz, 1H, CH), 4.16-4.23 (m, 2H, OCH_2), 2.98 (dd, *J*= 16.0 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.84 (dd, *J*= 15.9 Hz, *J*= 2.2 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.5, 165.5, 157.7, 139.7, 137.3, 135.8, 132.3, 129.6, 129.0, 128.6, 127.9,

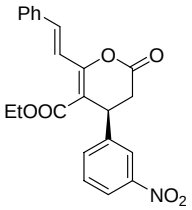
121.6, 118.1, 109.6, 61.3, 38.1, 36.3, 14.2; IR (KBr) υ 2980, 1770, 1690, 1350, 1180, 1060, 694 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{19}O_4Br)^+$; requires 426.0467 m/z, found, 426.0459 m/z; Enantiomeric excess: 84%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 10.12 min; t_{Rmajor}= 11.49 min.

(S,E)-ethyl 2-oxo-6-styryl-4-p-tolyl-3,4-dihydro-2H-pyran-5-carboxylate:



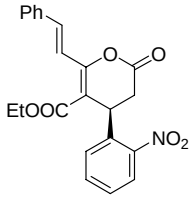
yield: 41%. $[\alpha]_D^{20}$= +83 (c= 0.406, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.00 (d, *J*= 16.0 Hz, 1H, CH), 7.50 (d, *J*= 8.5 Hz, 2H, ArH), 7.46 (d, *J*= 16.0 Hz, 1H, CH), 7.33-7.39 (m, 3H, ArH), 7.05-7.12 (m, 4H, ArH), 4.36 (dd, *J*= 7.2 Hz, *J*= 2.1 Hz, 1H, CH), 4.17-4.23 (m, 2H, OCH_2), 2.97 (dd, *J*= 15.9 Hz, *J*= 7.2 Hz, 1H, CH_2), 2.86 (dd, *J*= 15.9 Hz, *J*= 2.3 Hz, 1H, CH_2), 2.30(s, 3H, CH_3), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 166.0, 165.8, 157.3, 137.6, 137.3, 136.7, 136.0, 129.9, 129.5, 128.8, 127.9, 126.7, 118.4, 110.5, 61.2, 38.2, 36.6, 21.1, 14.2; IR (KBr) υ 2980, 1770, 1690, 1370, 1180, 1130, 694 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{22}O_4)^+$; requires 362.1518 m/z, found, 362.1516 m/z; Enantiomeric excess: 83%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 7.91 min; t_{Rmajor}= 8.90 min.

(S,E)-ethyl 4-(3-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 71%.



$[\alpha]_D^{20}$= +296 (c= 0.034, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.10-8.14 (m, 2H, ArH), 8.03 (d, *J*= 16.0 Hz, 1H, CH), 7.55-7.59 (m, 2H, ArH), 7.51-7.52 (m, 3H), 7.36-7.41 (m, 3H, ArH), 4.52 (dd, *J*= 7.4 Hz, *J*= 1.6 Hz, 1H, CH), 4.20-4.25 (m, 2H, OCH_2), 3.07 (dd, *J*= 16.0 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.92 (dd, *J*= 16.1 Hz, *J*= 1.9 Hz, 1H, CH_2), 1.26 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.2, 165.0, 158.3, 148.8, 142.9, 138.0, 135.7, 132.6, 130.3, 129.8, 129.0, 128.0, 122.8, 122.3, 117.9, 108.6, 61.5, 38.3, 36.1, 14.2; IR (KBr) υ 2980, 1690, 15230, 1350, 1060, 692 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{19}NO_6)^+$; requires 393.1212 m/z, found, 393.1219 m/z; Enantiomeric excess: 94%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 19.63 min; t_{Rmajor}= 29.65 min.

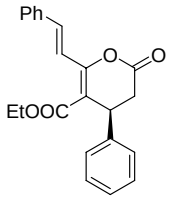
(S,E)-ethyl 4-(2-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 58%.



$[\alpha]_D^{20}$= +375 (c= 0.048, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.09 (d, *J*= 16.0 Hz, 1H, CH), 7.91 (m, 1H, ArH), 7.58-7.61 (m, 4H), 7.37-7.40 (m, 4H), 7.26-7.28 (m, 1H, ArH), 4.92 (dd, *J*= 7.2 Hz, *J*= 2.8 Hz, 1H, CH), 4.04-4.12 (m,

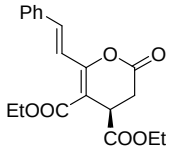
2H, OCH_2), 3.08-3.19 (m, 2H, CH_2), 1.10 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.2, 164.9, 158.9, 149.1, 137.9, 135.7, 135.6, 133.9, 129.8, 129.0, 128.7, 128.3, 128.0, 125.2, 117.8, 108.7, 61.3, 35.3, 34.3, 13.9; IR (KBr) υ 2980, 1770, 1530, 1240, 1060, 791 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{19}NO_6)^+$; requires 393.1212 m/z, found, 393.1216 m/z; Enantiomeric excess: 91%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 11.90 min; t_{Rmajor}= 21.58 min.

(S,E)-ethyl 2-oxo-4-phenyl-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate:



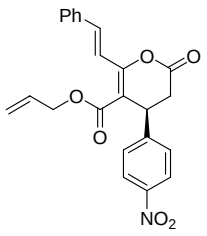
yield: 77%. $[\alpha]_D^{20}$= +229 (c= 0.016, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.01 (d, *J*= 16.0 Hz, 1H, CH), 7.56-7.58 (m, 2H, ArH), 7.47 (d, *J*= 16.0 Hz, 1H, CH), 7.19-7.38 (m, 6H), 7.17-7.19(m, 2H, ArH), 4.40 (dd, *J*= 7.3 Hz, *J*= 2.2 Hz, 1H, CH), 4.16-4.22 (m, 2H, OCH_2), 2.99 (dd, *J*= 15.9 Hz, *J*= 7.3 Hz, 1H, CH_2), 2.88 (dd, *J*= 15.9 Hz, *J*= 2.3 Hz, 1H, CH_2), 1.24 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.9, 165.7, 157.4, 140.6, 136.9, 136.0, 129.5, 129.2, 128.9, 127.9, 127.7, 126.8, 118.3, 110.2, 61.2, 38.6, 36.5, 14.2; IR (KBr) υ 2980, 1770, 1630, 1290, 1230, 1060, 694 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{20}O_4)^+$; requires 348.1362 m/z, found, 348.1363 m/z; Enantiomeric excess: 84%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 8.36 min; t_{Rmajor}= 9.89 min.

(R,E)-diethyl 2-oxo-6-styryl-3,4-dihydro-2H-pyran-4,5-dicarboxylate:



yield: 63%. $[\alpha]_D^{20}$= +124 (c= 0.14, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 7.92 (d, *J*= 16.0 Hz, 1H, CH), 7.52 (m, 2H, ArH), 7.44 (d, *J*= 16.0 Hz, 1H, CH), 7.29-7.39 (m, 3H, ArH), 4.29-4.36 (m, 2H, OCH_2), 4.15-4.21 (m, 2H, OCH_2), 4.06 (dd, *J*= 7.0 Hz, *J*= 2.1 Hz, 1H, CH), 3.07 (dd, *J*= 16.4 Hz, *J*= 2.3 Hz, 1H, CH_2), 2.73 (dd, *J*= 16.3 Hz, *J*= 7.2 Hz, 1H, CH_2), 1.37 (t, 3H, CH_3), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 170.9, 165.2, 164.8, 158.1, 137.7, 135.8, 129.7, 128.9, 128.0, 118.0, 105.4, 62.0, 61.4, 38.8, 30.9, 14.3, 14.1; IR (KBr) υ 2970, 1790, 1620, 1340, 1240, 1060, 694, 521 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{19}H_{20}O_6)^+$; requires 344.1260 m/z, found, 344.1263 m/z; Enantiomeric excess: 97%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 11.25 min; t_{Rmajor}= 14.46 min.

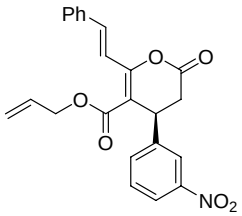
(S,E)-allyl 4-(4-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 51%.



$[\alpha]_D^{20}$= +211 (c= 0.07, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.18 (d, *J*= 8.7

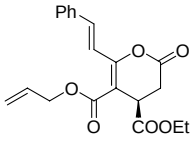
Hz, 2H, ArH), 8.03 (d, *J*= 16.0 Hz, 1H, CH), 7.52-7.59 (m, 3H), 7.36-7.41 (m, 5H, ArH), 5.84 (m, 1H, $CH=CH_2$), 5.23 (d, *J*= 1.2 Hz, 1H, OCH_2), 5.19 (dd, *J*= 6.5 Hz, *J*= 1.4 Hz, 1H, OCH_2), 4.64 (m, 2H, $CH=CH_2$), 4.53 (dd, *J*= 7.4 Hz, *J*= 1.6 Hz, 1H, CH), 3.07 (dd, *J*= 16.0 Hz, *J*= 7.6 Hz, 1H, CH_2), 2.89 (dd, *J*= 16.0 Hz, *J*= 2.0 Hz, 1H, CH_2); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 164.9, 164.8, 158.6, 147.9, 147.6, 138.3, 135.6, 131.6, 129.9, 129.0, 128.1, 127.9, 124.5, 118.9, 117.8, 108.3, 65.9, 38.5, 36.0; IR (KBr) υ 2920, 1790, 1520, 1350, 1220, 1050, 696 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{19}NO_6)^+$; requires 405.1212 m/z, found, 405.1207 m/z; Enantiomeric excess: 94%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 12.39 min; t_{Rmajor}= 14.90 min.

(S,E)-allyl 4-(3-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 56%.



$[\alpha]_D^{20}$= +183 (c= 0.68, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.10-8.14 (m, 2H, ArH), 8.04 (d, *J*= 16.0 Hz, 1H, CH), 7.51-7.59 (m, 5H), 7.36-7.40 (m, 3H, ArH), 5.84 (m, 1H, $CH=CH_2$), 5.24 (d, *J*= 1.0 Hz, 1H, OCH_2), 5.19 (m, 1H, OCH_2), 4.65 (m, 2H, $CH=CH_2$), 4.54 (dd, *J*= 7.4 Hz, *J*= 1.8 Hz, 1H, CH), 3.08 (dd, *J*= 16.0 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.92 (dd, *J*= 16.0 Hz, *J*= 2.0 Hz, 1H, CH_2); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 164.9, 164.9, 158.6, 148.8, 142.7, 138.2, 135.6, 132.6, 131.6, 130.3, 129.9, 129.0, 128.0, 122.9, 122.3, 118.9, 117.8, 108.3, 65.9, 38.3, 36.1; IR (KBr) υ 2930, 1690, 1530, 1350, 1140, 1050, 692 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{19}NO_6)^+$; requires 405.1212 m/z, found, 405.1207 m/z; Enantiomeric excess: 94%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 10.64 min; t_{Rmajor}= 15.58 min.

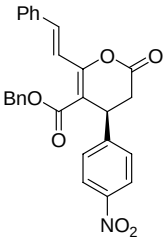
(R,E)-5-allyl 4-ethyl 2-oxo-6-styryl-3,4-dihydro-2H-pyran-4,5-dicarboxylate:



yield: 57%. $[\alpha]_D^{20}$= +231 (c= 0.014, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 7.93 (d, *J*= 16.0 Hz, 1H, CH), 7.54 (m, 2H, ArH), 7.45 (d, *J*= 16.0 Hz, 1H, CH), 7.33-7.39 (m, 3H, ArH), 5.99 (m, 1H, $CH=CH_2$), 5.38 (dd, *J*= 17.2 Hz, *J*= 1.4 Hz, 1H, OCH_2), 5.29 (dd, *J*= 10.5 Hz, *J*= 1.2 Hz, 1H, OCH_2), 4.73-4.79 (m, 2H, $CH=CH_2$), 4.15-4.20 (m, 2H, OCH_2), 4.08 (dd, *J*= 7.1 Hz, *J*= 2.2 Hz, 1H, CH), 3.07 (dd, *J*= 16.3 Hz, *J*= 2.2 Hz, 1H, CH_2), 2.74 (dd, *J*= 16.3 Hz, *J*= 7.1 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 170.8, 164.8, 164.7, 158.5, 137.9, 135.7, 131.8, 129.7, 128.9, 128.0, 118.7, 117.9, 105.0, 65.9, 62.0, 38.8, 30.8, 14.1; IR (KBr) υ 2980, 1790, 1700, 1370, 1240, 1060, 692 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{20}H_{20}O_6)^+$; requires 356.1260 m/z, found, 356.1252 m/z; Enantiomeric excess: 96%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94),

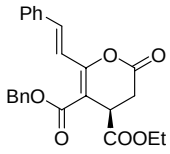
UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 11.20 min; t_{Rmajor}= 14.48 min.

(S,E)-benzyl 4-(4-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 48%.



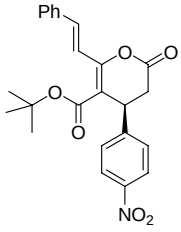
$[\alpha]_D^{20}$= +187 (c= 0.048, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.13 (d, *J*= 8.8 Hz, 2H, ArH), 7.95 (d, *J*= 15.9 Hz, 1H, CH), 7.43 (d, *J*= 16.0 Hz, 1H, CH), 7.42-7.43 (m, 2H, ArH), 7.31-7.35 (m, 8H, ArH), 7.21-7.24 (m, 2H, ArH), 5.12-5.23 (m, 2H, OCH_2), 4.51 (dd, *J*= 7.5 Hz, *J*= 1.9 Hz, 1H, CH), 3.05 (dd, *J*= 16.0 Hz, *J*= 7.6 Hz, 1H, CH_2), 2.87 (dd, *J*= 16.0 Hz, *J*= 2.1 Hz, 1H, CH_2); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.1, 164.8, 158.5, 148.0, 147.5, 138.2, 135.5, 135.2, 129.9, 129.0, 128.8, 128.7, 128.5, 128.0, 127.9, 124.5, 117.8, 108.4, 67.4, 38.6, 35.9; IR (KBr) υ 2930, 1790, 1520, 1340, 1220, 1060, 858, 696 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{27}H_{21}NO_6)^+$; requires 455.1369 m/z, found, 455.1365 m/z; Enantiomeric excess: 92%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 17.25 min; t_{Rmajor}= 25.71 min.

(R,E)-5-benzyl 4-ethyl 2-oxo-6-styryl-3,4-dihydro-2H-pyran-4,5-dicarboxylate:



yield: 45%. $[\alpha]_D^{20}$= +128 (c= 0.04, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 7.87 (d, *J*= 16.0 Hz, 1H, CH), 7.39-7.46 (m, 8H), 7.31-7.33 (m, 3H, ArH), 5.22 (m, 2H, OCH_2), 4.09-4.16 (m, 3H), 3.06 (dd, *J*= 16.4 Hz, *J*= 2.3 Hz, 1H, CH_2), 2.72 (dd, *J*= 16.4 Hz, *J*= 7.1 Hz, 1H, CH_2), 1.19 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 170.8, 165.1, 164.7, 158.4, 137.9, 135.6, 135.5, 129.7, 128.9, 128.8, 128.6, 128.5, 128.0, 118.0, 105.1, 67.3, 62.0, 38.8, 30.8, 14.0; IR (KBr) υ 2980, 1790, 1720, 1210, 1060, 694, 528 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{24}H_{22}O_6)^+$; requires 406.1416 m/z, found, 406.1415 m/z; Enantiomeric excess: 97%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 17.35 min; t_{Rmajor}= 21.56 min.

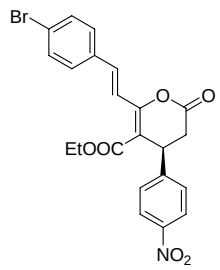
(S,E)-tert-butyl 4-(4-nitrophenyl)-2-oxo-6-styryl-3,4-dihydro-2H-pyran-5-carboxylate: yield: 43%.



$[\alpha]_D^{20}$= +163 (c= 0.344, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.18 (d, *J*= 8.8 Hz, 2H, ArH), 7.98 (d, *J*= 16.0 Hz, 1H, CH), 7.56-7.59 (m, 2H, ArH), 7.48 (d, *J*= 16.0 Hz, 1H, CH), 7.35-7.40 (m, 5H, ArH), 4.44 (dd, *J*= 7.6 Hz, *J*= 2.3 Hz, 1H, CH), 3.05 (dd, *J*= 16.0 Hz, *J*= 7.6 Hz, 1H, CH_2), 2.85 (dd, *J*= 16.4 Hz, *J*= 2.3 Hz, 1H, CH_2), 1.43 (s, 9H, $3CH_3$); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.1, 164.4, 157.5, 148.5, 147.5, 137.4, 135.8, 129.7, 129.0, 127.9, 127.9, 124.5, 118.0, 110.1, 82.5, 39.0, 36.0, 28.2; IR (KBr) υ 2980, 1780, 1520, 1350, 1060, 696 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{24}H_{23}NO_6)^+$;

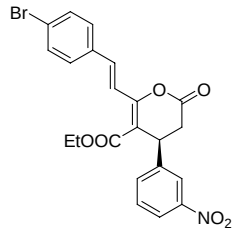
requires 421.1525 m/z, found, 421.1523 m/z; Enantiomeric excess: 96%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 8.67 min; t_{Rmajor}= 10.18 min.

(S,E)-ethyl 6-(4-bromostyryl)-4-(4-nitrophenyl)-2-oxo-3,4-dihydro-2H-pyran-5-Carboxylate:



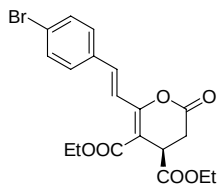
yield: 72%. $[\alpha]_D^{20}$= +141 (c= 0.528, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.18 (d, *J*= 8.8 Hz, 2H, ArH), 8.03 (d, *J*= 16.0 Hz, 1H, CH), 7.52 (d, *J*= 8.5 Hz, 2H, ArH), 7.42-7.47 (m, 3H, ArH), 7.35 (d, *J*= 8.6 Hz, 2H, ArH), 4.51 (dd, *J*= 7.5 Hz, *J*= 1.9 Hz, 1H, CH), 4.17-4.25 (m, 2H, OCH_2), 3.06 (dd, *J*= 16.0 Hz, *J*= 7.5 Hz, 1H, CH_2), 2.88 (dd, *J*= 16.1 Hz, *J*= 2.1 Hz, 1H, CH_2), 1.24 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.1, 164.8, 157.9, 147.9, 147.6, 136.5, 134.6, 132.2, 129.3, 127.9, 124.5, 124.0, 118.4, 109.1, 61.5, 38.5, 35.9, 14.2; IR (KBr) υ 2980, 1690, 1520, 1490, 1350, 1130, 1060, 818, 702 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{18}NO_6Br)^+$; requires 471.0317 m/z, found, 471.0314 m/z; Enantiomeric excess: 93%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 9/ 91), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 25.77 min; t_{Rmajor}= 31.95 min.

(S,E)-ethyl 6-(4-bromostyryl)-4-(3-nitrophenyl)-2-oxo-3,4-dihydro-2H-pyran-5-carboxylate:



yield: 58%. $[\alpha]_D^{20}$= +196 (c= 0.054, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.12-8.16 (m, 1H, ArH), 8.09 (m, 1H, ArH), 8.03 (d, *J*= 16.0 Hz, 1H, CH), 7.51-7.53 (m, 4H), 7.42-7.47 (m, 3H), 4.52 (dd, *J*= 7.4 Hz, *J*= 1.7 Hz, 1H, CH), 4.18-4.25 (m, 2H, OCH_2), 3.07 (dd, *J*= 16.1 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.92 (dd, *J*= 16.1 Hz, *J*= 2.0 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.1, 164.8, 158.0, 148.8, 142.7, 136.6, 134.6, 132.6, 132.2, 130.4, 129.3, 124.0, 122.9, 122.3, 118.5, 109.1, 61.5, 38.4, 36.0, 14.2; IR (KBr) υ 2930, 1790, 1690, 1530, 1350, 1130, 1060, 814, 731 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{18}NO_6Br)^+$; requires 471.0317 m/z, found, 471.0318 m/z; Enantiomeric excess: 91%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 14.53 min; t_{Rmajor}= 24.66 min.

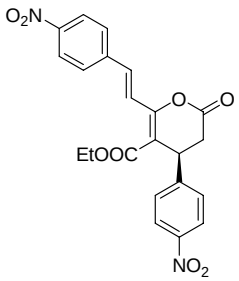
(R,E)-diethyl 6-(4-bromostyryl)-2-oxo-3,4-dihydro-2H-pyran-4,5-dicarboxylate:



yield: 78%. $[\alpha]_D^{20}$= +10 (c= 0.694, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 7.91 (d, *J*= 16.0 Hz, 1H, CH), 7.48-7.51 (m, 2H, ArH), 7.36-7.41 (m, 3H), 4.26-4.37 (m, 2H, OCH_2), 4.15-4.20 (m, 2H, OCH_2), 4.06 (dd, *J*= 7.1 Hz, *J*= 2.3

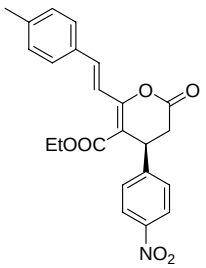
Hz, 1H, CH), 3.06 (dd, *J*= 16.4 Hz, *J*= 2.3 Hz, 1H, CH_2), 2.73 (dd, *J*= 16.4 Hz, *J*= 7.1 Hz, 1H, CH_2), 1.36 (t, 3H, CH_3), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 170.7, 165.1, 164.6, 157.8, 136.2, 134.7, 132.1, 129.3, 123.7, 118.6, 105.8, 62.0, 61.4, 38.8, 30.8, 14.3, 14.1; IR (KBr) υ 2970, 1710, 1580, 1370, 1240, 1060, 820, 525 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{19}H_{19}O_6Br)^+$; requires 422.0365 m/z, found, 422.0370 m/z; Enantiomeric excess: 96%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 6/ 94), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 15.74 min; t_{Rmajor}= 23.36 min.

(S,E)-ethyl 4-(4-nitrophenyl)-6-(4-nitrostyryl)-2-oxo-3,4-dihydro-2H-pyran-5-carboxylate:



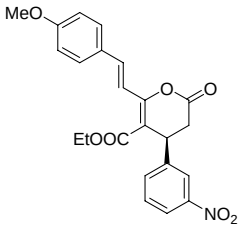
yield: 57%. $[\alpha]_D^{20}$= +149 (c= 0.02, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.17-8.26 (m, 5H), 7.69 (d, *J*= 8.7 Hz, 2H, ArH), 7.51 (d, *J*= 16.0 Hz, 1H, CH), 7.37 (d, *J*= 8.7 Hz, 2H, ArH), 4.55 (dd, *J*= 7.4 Hz, *J*= 1.5 Hz, 1H, CH), 4.19-4.27 (m, 2H, OCH_2), 3.10 (dd, *J*= 16.1 Hz, *J*= 7.6 Hz, 1H, CH_2), 2.92 (dd, *J*= 16.1 Hz, *J*= 2.0 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 164.8, 164.4, 157.1, 148.1, 147.6, 147.6, 141.9, 134.8, 128.4, 127.8, 124.6, 124.3, 121.9, 110.9, 61.7, 38.6, 35.8, 14.2; IR (KBr) υ 2930, 1690, 1520, 1490, 1340, 1060, 858, 698 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{18}N_2O_8)^+$; requires 438.1063 m/z, found, 438.1059 m/z; Enantiomeric excess: 92%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 42.60 min; t_{Rmajor}= 46.50 min.

(S,E)-ethyl 6-(4-methylstyryl)-4-(4-nitrophenyl)-2-oxo-3,4-dihydro-2H-pyran-5-carboxylate:



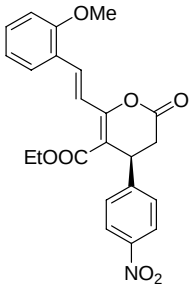
yield: 51%. $[\alpha]_D^{20}$= +238 (c= 0.036, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.17 (d, *J*= 8.7 Hz, 2H, ArH), 7.98 (d, *J*= 16.0 Hz, 1H, CH), 7.48-7.53 (m, 3H), 7.36 (d, *J*= 8.7 Hz, 2H, ArH), 7.19 (d, *J*= 7.9 Hz, 2H, ArH), 4.50 (dd, *J*= 7.4 Hz, *J*= 1.7 Hz, 1H, CH), 4.18-4.24 (m, 2H, OCH_2), 3.06 (dd, *J*= 16.0 Hz, *J*= 7.6 Hz, 1H, CH_2), 2.88 (dd, *J*= 16.0 Hz, *J*= 2.0 Hz, 1H, CH_2), 2.36 (s, 3H, CH_3), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.2, 164.9, 158.4, 148.1, 147.4, 140.2, 138.0, 132.8, 129.7, 127.9, 127.8, 124.4, 116.7, 108.0, 61.3, 38.4, 35.9, 21.4, 14.1; IR (KBr) υ 2920, 1680, 1520, 1490, 1350, 11230, 1060, 858 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{21}NO_6)^+$; requires 407.1374 m/z, found, 407.1369 m/z; Enantiomeric excess: 81%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 14.33 min; t_{Rmajor}= 17.73 min.

(S,E)-ethyl 6-(4-methoxystyryl)-4-(3-nitrophenyl)-2-oxo-3,4-dihydro-2H-pyran-5-carboxylate:



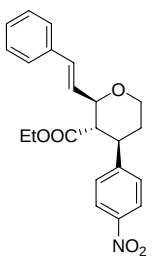
yield: 36%. $[\alpha]_D^{20}$= +114 (c= 0.246, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.09-8.14 (m, 2H, ArH), 7.91 (d, *J*= 15.9 Hz, 1H, CH), 7.47 (m, 6H), 6.91-6.93 (d, *J*= 8.8 Hz, 2H, ArH), 4.51 (dd, *J*= 7.2 Hz, *J*= 1.8 Hz, 1H, CH), 4.19-4.24 (m, 2H, OCH_2), 3.85 (s, 3H, OCH_3), 3.06 (dd, *J*= 16.0 Hz, *J*= 7.4 Hz, 1H, CH_2), 2.90 (dd, *J*= 16.1 Hz, *J*= 2.1 Hz, 1H, CH_2), 1.25 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.4, 165.2, 161.2, 158.8, 148.8, 143.1, 137.8, 132.6, 130.3, 129.6, 128.5, 122.8, 122.4, 115.6, 114.5, 107.4, 61.3, 55.5, 38.3, 36.2, 14.3; IR (KBr) υ 2930, 1790, 1680, 1530, 1350, 1130, 1060, 822, 690 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{21}NO_7)^+$; requires 423.1318 m/z, found, 423.1321 m/z; Enantiomeric excess: 93%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 15.88 min; t_{Rmajor}= 32.27 min.

(S,E)-ethyl 6-(2-methoxystyryl)-4-(4-nitrophenyl)-2-oxo-3,4-dihydro-2H-pyran-5-carboxylate:



yield: 32%. $[\alpha]_D^{20}$= +209 (c= 0.452, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.17 (d, *J*= 8.8 Hz, 2H, ArH), 8.06 (d, *J*= 16.1 Hz, 1H, CH), 7.85 (d, *J*= 16.1 Hz, 1H, CH), 7.60-7.62 (m, 1H, ArH), 7.34-7.39 (m, 3H, ArH), 6.92-6.98 (m, 2H, ArH), 4.50 (dd, *J*= 7.5 Hz, *J*= 2.0 Hz, 1H, CH), 4.18-4.23 (m, 2H, OCH_2), 3.91 (s, 3H, OCH_3), 3.05 (dd, *J*= 15.9 Hz, *J*= 7.5 Hz, 1H, CH_2), 2.87 (dd, *J*= 16.0 Hz, *J*= 2.1 Hz, 1H, CH_2), 1.23 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 165.4, 165.1, 158.8, 158.2, 148.3, 147.5, 133.2, 131.1, 128.2, 127.9, 124.7, 124.4, 120.9, 118.2, 111.2, 108.1, 61.3, 55.6, 38.6, 36.1, 14.2; IR (KBr) υ 2930, 1790, 1520, 1350, 1110, 1060, 856, 754 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{23}H_{21}NO_7)^+$; requires 423.1318 m/z, found, 423.1316 m/z; Enantiomeric excess: 92%, determined by HPLC (Daicel Chiralpak IA, i-PrOH/ Hexane= 9/ 91), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 28.30 min; t_{Rmajor}= 32.29 min.

(2R,3S,4R)-ethyl 4-(4-nitrophenyl)-6-oxo-2-styryltetrahydro-2H-pyran-3-carboxylate: yield: 43%. $[\alpha]_D^{20}$= -8.5 (c= 0.46, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm) 8.16 (d, *J*= 8.8 Hz, 2H, ArH), 7.40 (m, 2H, ArH), 7.24-7.37 (m, 5H, ArH), 6.64 (d, *J*= 15.9 Hz, 1H, CH), 6.13 (dd, *J*= 15.9 Hz, *J*= 7.2 Hz, 1H, CH), 4.19 (m, 1H, CH), 3.76-3.85 (m, 3H), 3.31 (m, 1H, CH), 2.69 (dd, *J*= 11.4 Hz, *J*= 9.8 Hz, 1H, CH), 1.84-1.91 (m, 2H, OCH_2), 0.87 (t, 3H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ (ppm) 171.5, 149.9, 147.1, 136.3, 133.2, 128.6, 128.4, 128.1, 126.7, 126.6, 124.0, 80.0, 67.7, 60.5, 54.7, 45.0, 32.3, 14.1; IR

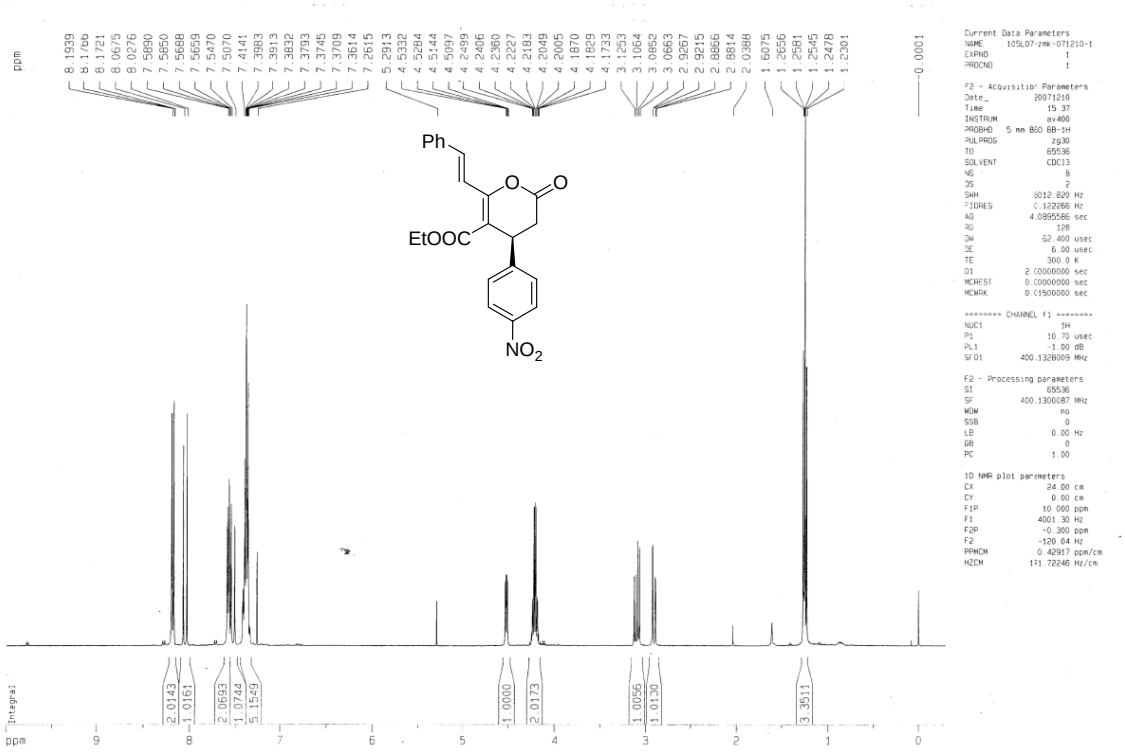


(KBr) υ 2940, 1730, 1520, 1350, 1180, 1110, 854, 694, 521 cm^{-1}; HRMS (EI-MS) exact mass calcd for $(C_{22}H_{23}NO_5)^+$; requires 381.1576 m/z, found, 381.1573 m/z; Enantiomeric excess: 93%, determined by HPLC (Daicel Chiralpak OD, i-PrOH/ Hexane= 15/ 85), UV 254 nm, flow rate 1.0 mL/min, t_{Rminor}= 11.66 min; t_{Rmajor}= 14.03 min.

References:

[1]. R. Zibuch, J. Streiber, Organic Syntheses Coll. Vol. *9*, **1998**, p. 432; Vol. *71*, **1993**, p. 236.

[2]. M. Marigo, T. C. Wabnitz, D. Fielenbach,and K. A. Jøgensen, *Angew. Chem. Int. Ed*. **2005**, *44*, 794 –797.

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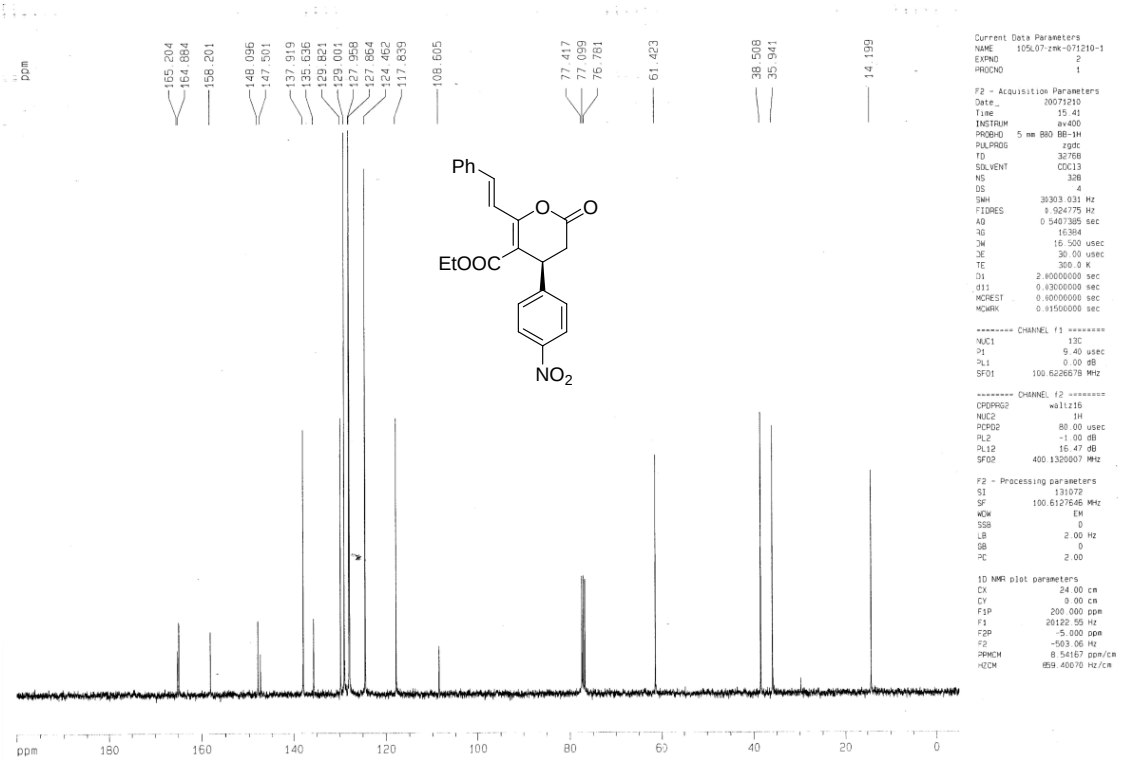


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SOLVENT          CDCl3
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DS                   4
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FIDRES        1.924775 Hz
AQ            0.5407385 sec
RG                16384
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TE              300.0 K
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MCREST       0.00000000 sec
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F2 - Processing parameters
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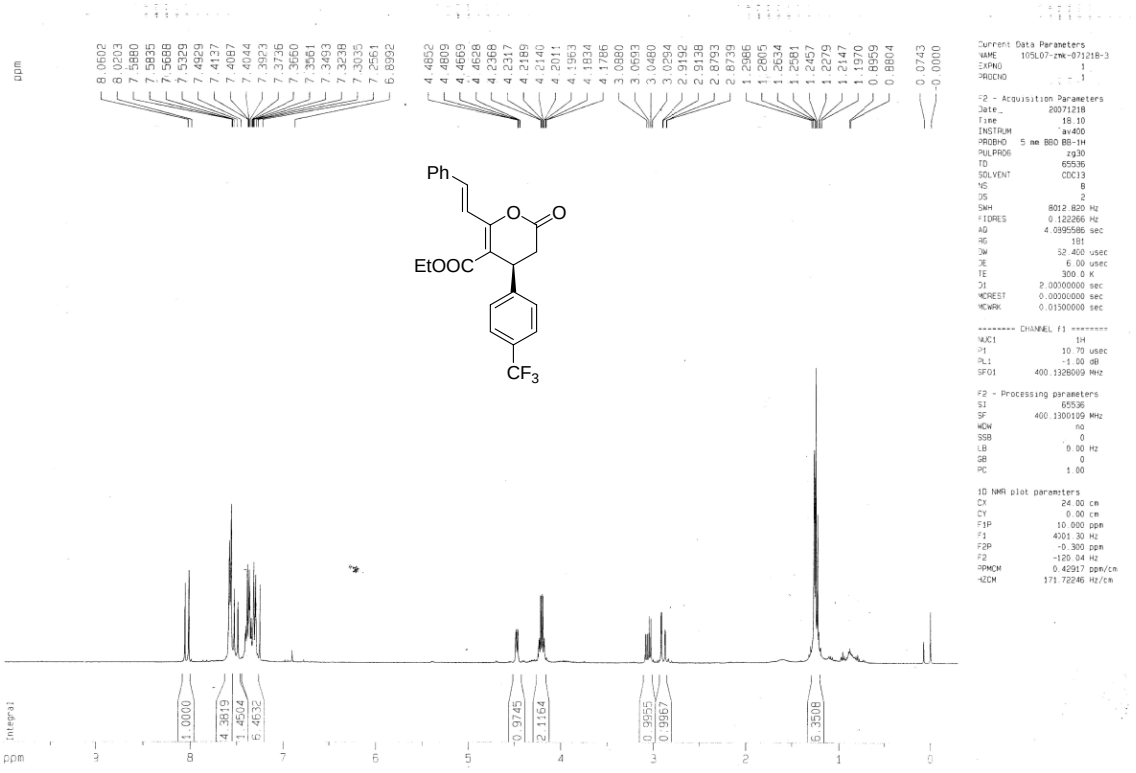
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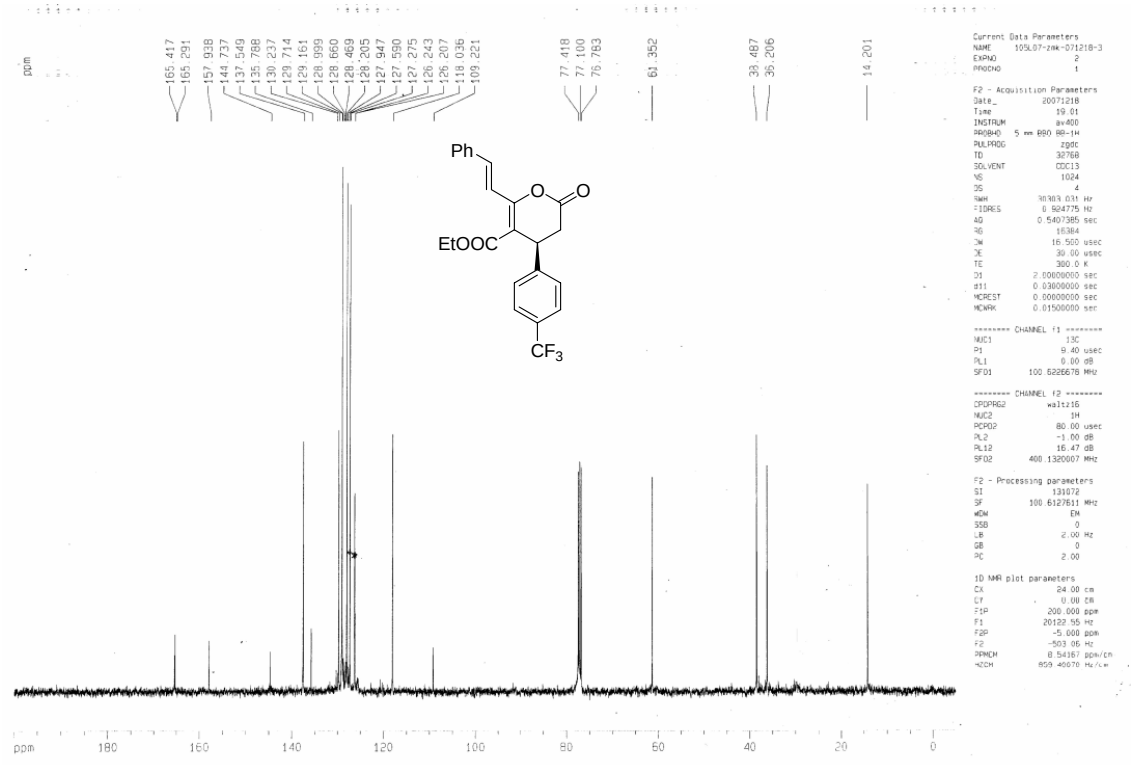
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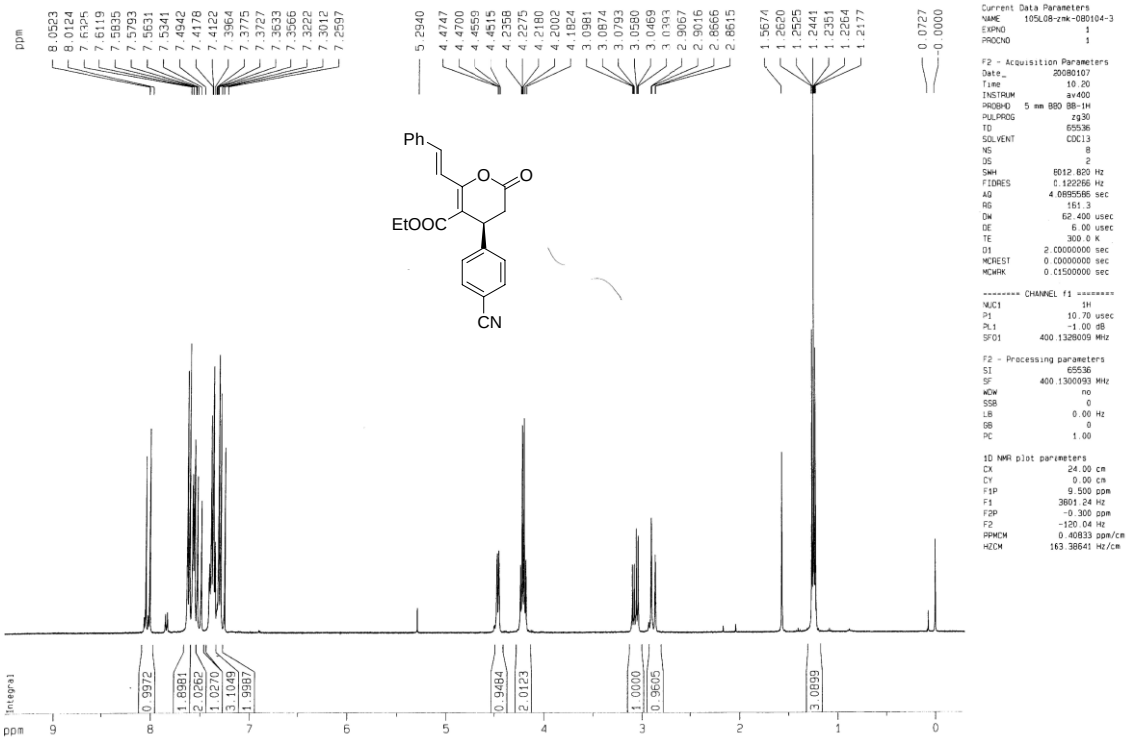


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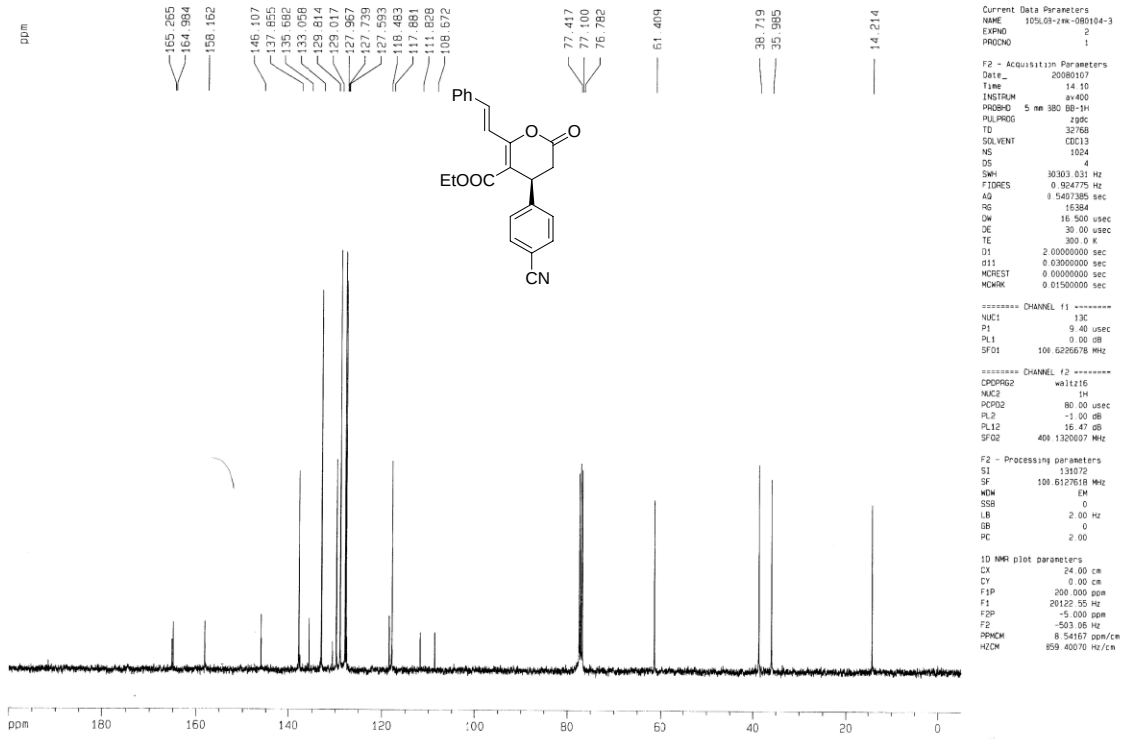


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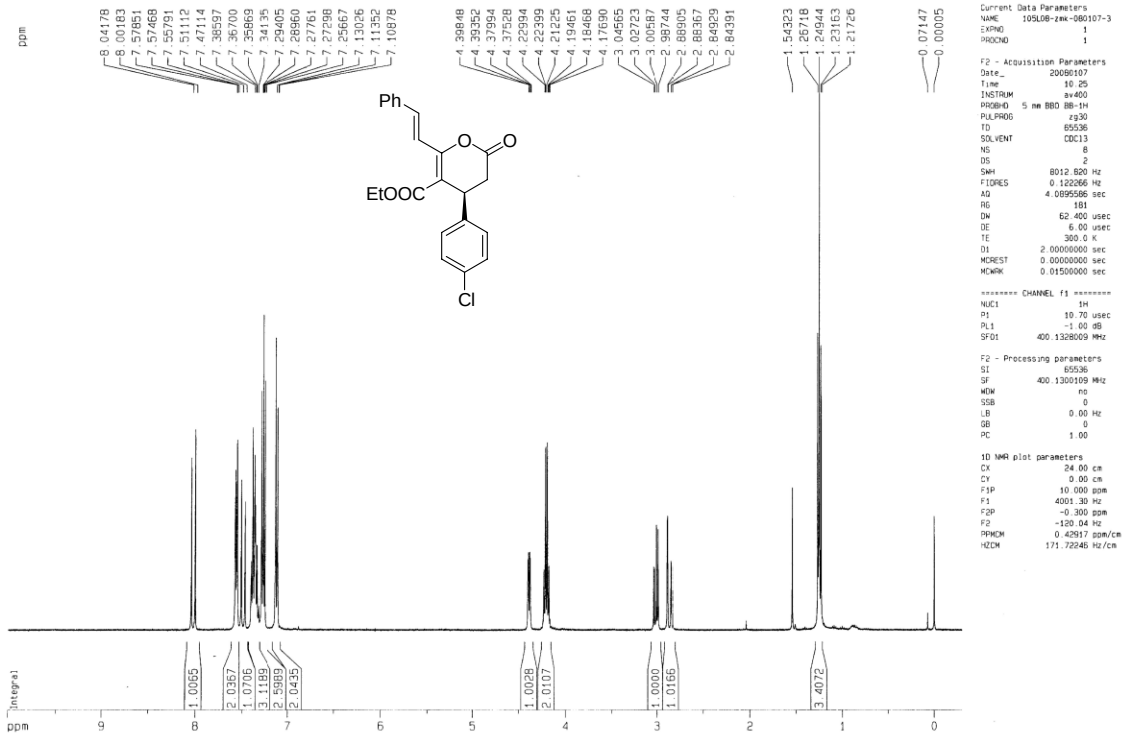
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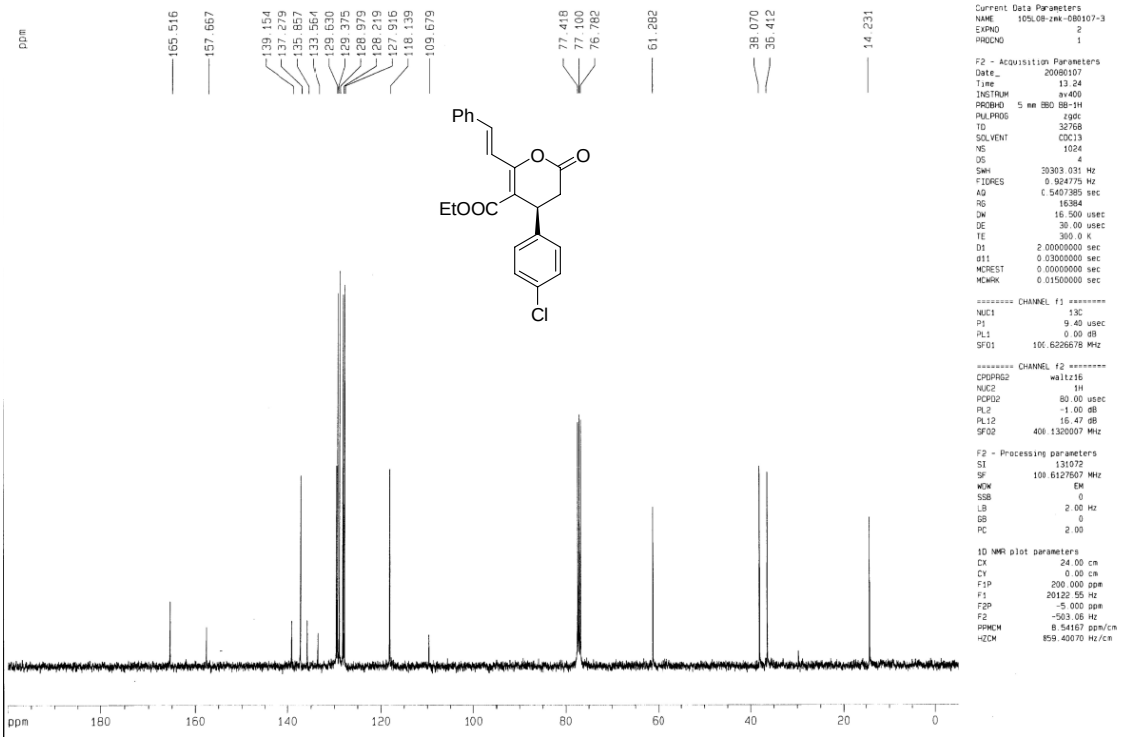
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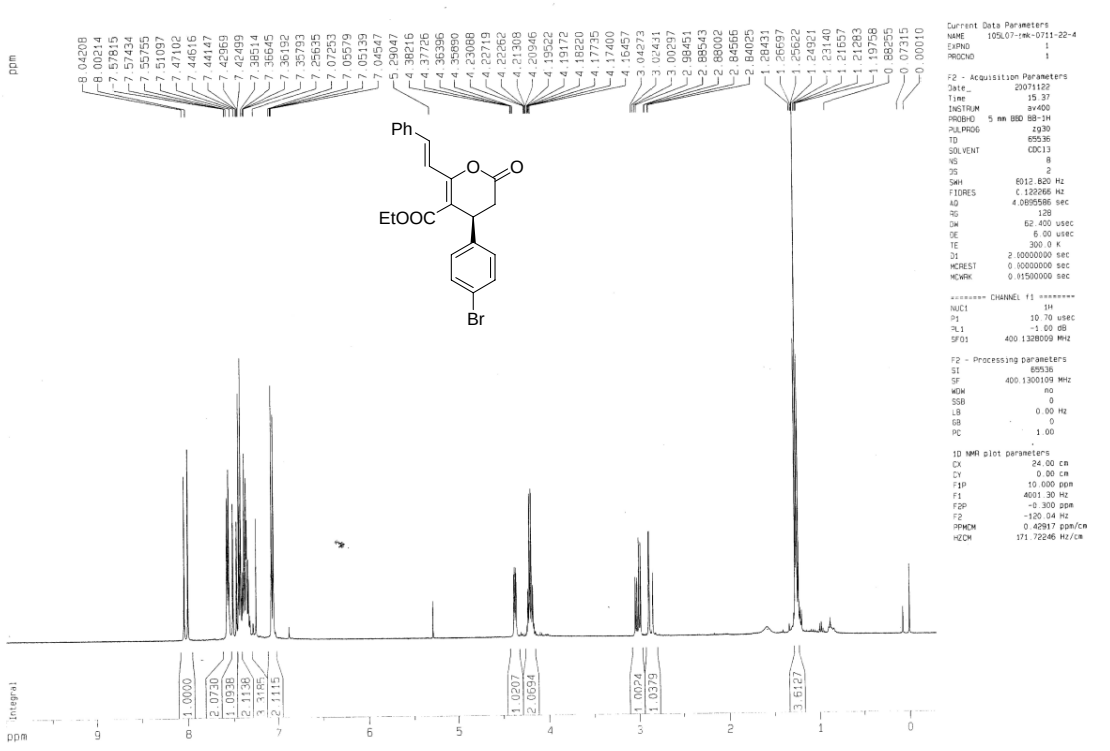
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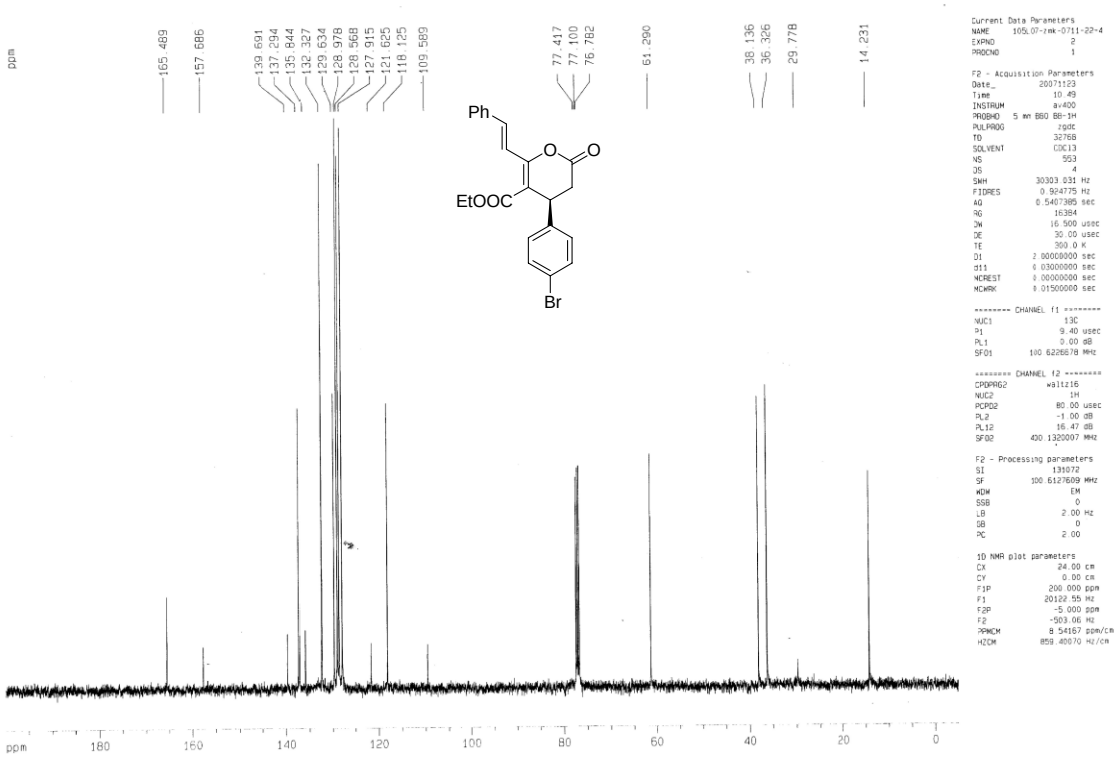
Br
Integral
1.0000
2.0730
1.0938
2.1138
3.3185
2.1115
1.0207
2.0694
1.0024
1.0379
3.6127
ppm
9
8
7
6
5
4
3
2
1
0
Current Data Parameters
NAME 105L07-tmk-0711-22-4
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071122
Time 15.37
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 6012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 128
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz
F2 - Processing parameters
SI 65536
SF 400.1300109 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm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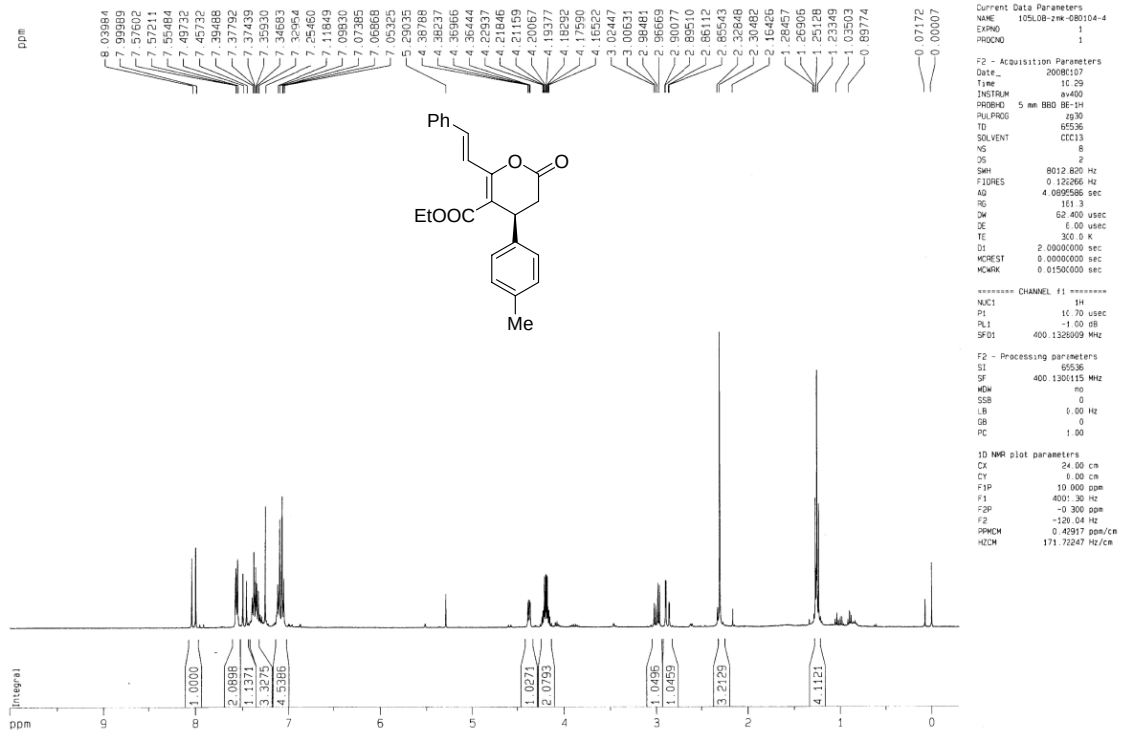
157.686
139.691
137.294
135.844
132.327
129.634
128.978
128.568
127.915
121.625
118.125
109.589
77.417
77.100
76.782
61.290
38.136
36.326
29.778
14.231
Ph
O
O
EtOOC
Br
ppm
180
160
140
120
100
80
60
40
20
0
Current Data Parameters
NAME 105L07-tmk-0711-22-4
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071123
Time 10.49
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 553
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6226678 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz
F2 - Processing parameters
SI 131072
SF 100.6127609 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm

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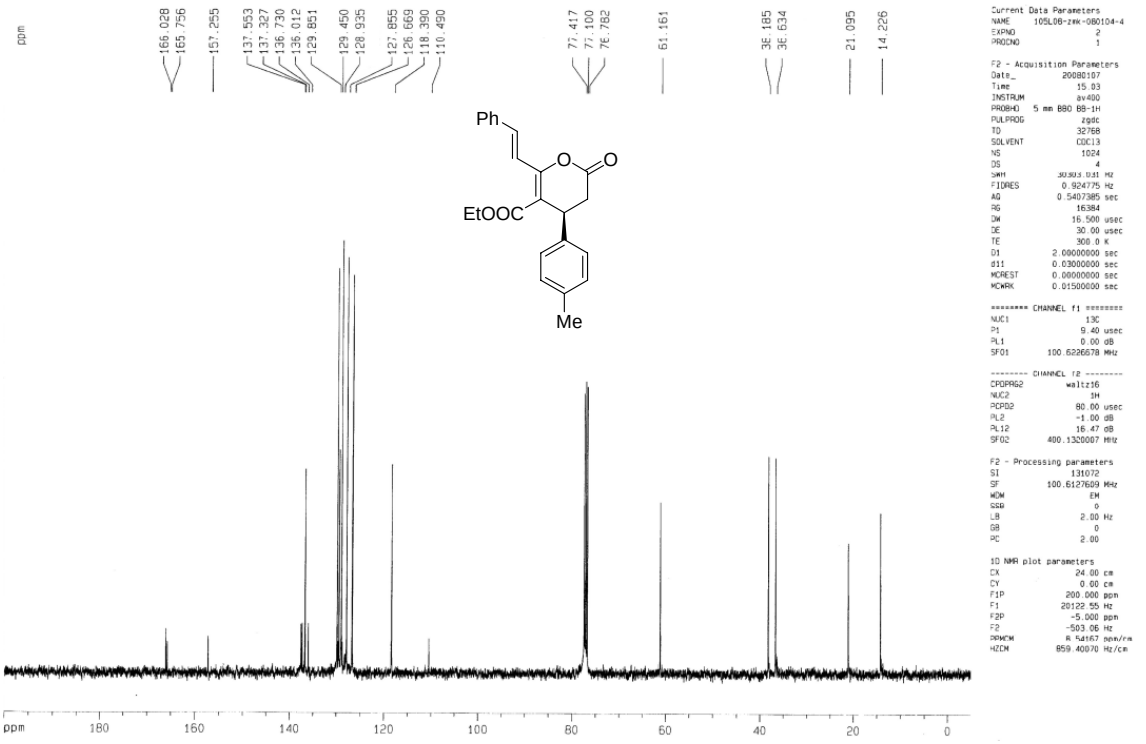
Current Data Parameters
NAME      105L08-zmk-080104-4
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_               20080107
Time                   10.29
INSTRUM                av400
PROBHD  5 mm BBO BE-1H
PULPROG                zg30
TD                    65536
SOLVENT                CDCl3
NS                         8
DS                         2
SWH                8012.820 Hz
FIDRES            0.122266 Hz
AQ                4.0899586 sec
RG                     161.3
DW                   62.400 usec
DE                    6.00 usec
TE                   300.0 K
D1                2.00000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                       1H
P1                      10.70 usec
PL1                     -1.00 dB
SFO1              400.1326009 MHz

F2 - Processing parameters
SI                         65536
SF                400.1300115 MHz
WDW                           no
SSB                            0
LB                          0.00 Hz
GB                             0
PC                          1.00

1D NMR plot parameters
CX                         24.00 cm
CY                          0.00 cm
F1P                       10.000 ppm
F1                       4001.30 Hz
F2P                       -0.300 ppm
F2                       -120.04 Hz
PPMCM                  0.42917 ppm/cm
HZCM                 171.72247 Hz/cm
```

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Current Data Parameters
NAME      105L08-zmk-080104-4
EXPNO                       2
PROCNO                      1

F2 - Acquisition Parameters
Date_               20080107
Time                   15.03
INSTRUM                av400
PROBHD  5 mm BBO BB-1H
PULPROG                zgdc
TD                    32768
SOLVENT                CDCl3
NS                      1024
DS                         4
SWH               30303.031 Hz
FIDRES            0.924775 Hz
AQ                0.5407385 sec
RG                     16384
DW                   16.500 usec
DE                   30.00 usec
TE                   300.0 K
D1                2.00000000 sec
d11               0.03000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                      13C
P1                       9.40 usec
PL1                      0.00 dB
SFO1              100.6226678 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                   80.00 usec
PL2                     -1.00 dB
PL12                    16.47 dB
SFO2              400.1320007 MHz

F2 - Processing parameters
SI                        131072
SF                100.6127689 MHz
WDW                           EM
SSB                            0
LB                          2.00 Hz
GB                             0
PC                          2.00

1D NMR plot parameters
CX                         24.00 cm
CY                          0.00 cm
F1P                       200.000 ppm
F1                      20122.55 Hz
F2P                       -5.000 ppm
F2                       -503.06 Hz
PPMCM                  8.54167 ppm/cm
HZCM                 859.40070 Hz/cm
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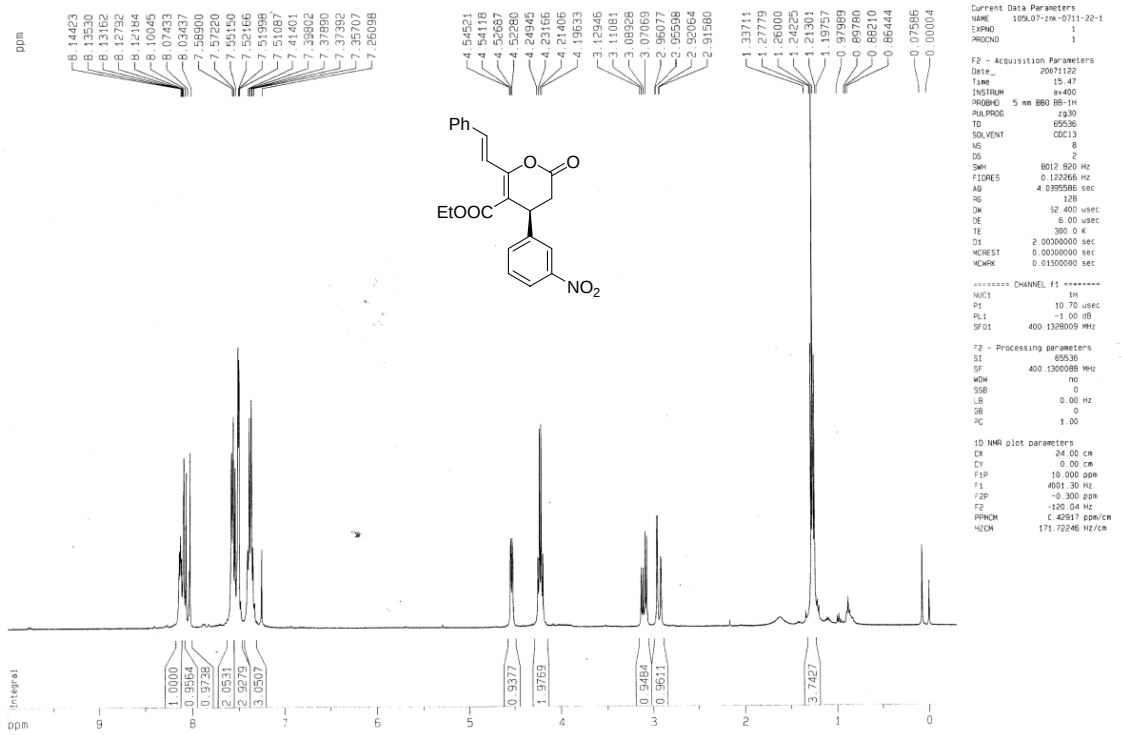


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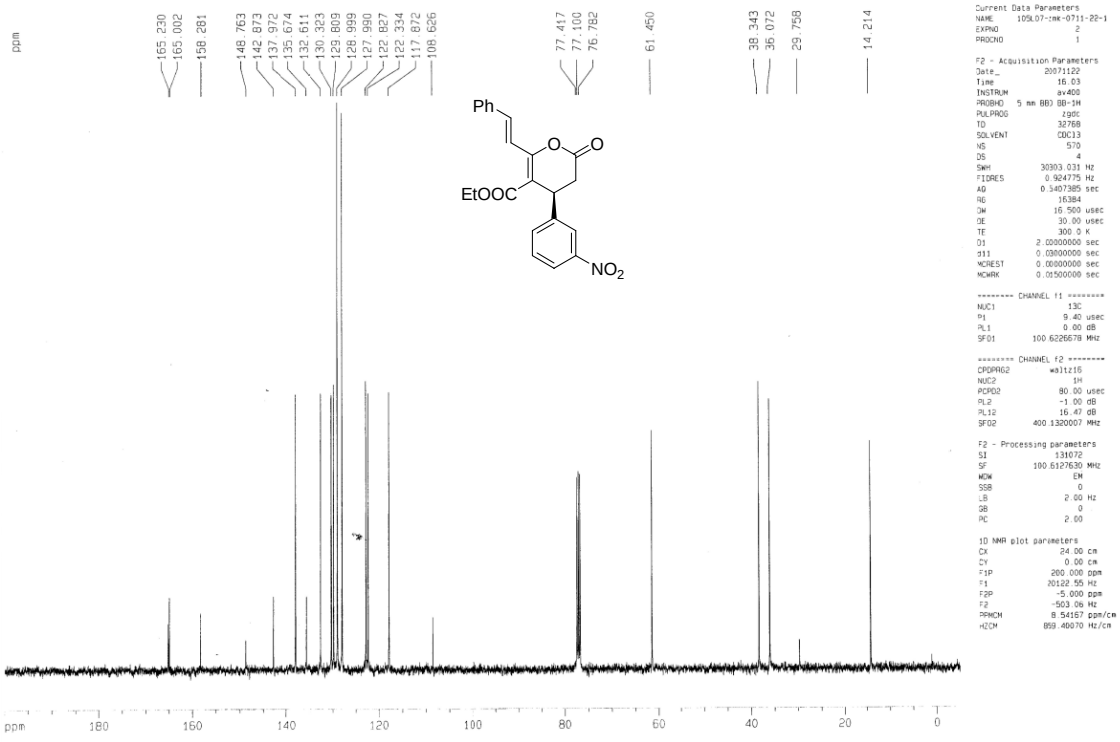
Current Data Parameters
NAME      105L07-znk-0711-22-1
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_              20071122
Time                  15.47
INSTRUM                av400
PROBHD  5 mm BBO BB-1H
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                        8
DS                        2
SWH                8012.820 Hz
FIDRES            0.122266 Hz
AQ                4.0995586 sec
RG                       128
DW                  52.400 usec
DE                   6.00 usec
TE                   300.0 K
D1                2.00000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                       1H
P1                      10.70 usec
PL1                     -1.00 dB
SFO1             400.1328009 MHz

F2 - Processing parameters
SI                        65536
SF               400.1300088 MHz
WDW                          no
SSB                           0
LB                         0.00 Hz
GB                            0
PC                         1.00

1D NMR plot parameters
CX                        24.00 cm
CY                         0.00 cm
F1P                      10.000 ppm
F1                     4001.30 Hz
F2P                     -0.300 ppm
F2                     -120.04 Hz
PPMCM                  0.42917 ppm/cm
HZCM                 171.72246 Hz/cm
```

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Current Data Parameters
NAME      105L07-znk-0711-22-1
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameters
Date_              20071122
Time                  16.03
INSTRUM                av400
PROBHD  5 mm BBO BB-1H
PULPROG              zgdc
TD                    32768
SOLVENT               CDCl3
NS                      570
DS                        4
SWH               30303.031 Hz
FIDRES            0.924775 Hz
AQ                0.3407385 sec
RG                      16384
DW                  16.500 usec
DE                   30.00 usec
TE                   300.0 K
D1                2.00000000 sec
d11               0.03000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                      13C
P1                      9.40 usec
PL1                     0.00 dB
SFO1             100.6226678 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                 80.00 usec
PL2                     -1.00 dB
PL12                    16.47 dB
SFO2             400.1320007 MHz

F2 - Processing parameters
SI                       131072
SF               100.6127630 MHz
WDW                          EM
SSB                           0
LB                         2.00 Hz
GB                            0
PC                         2.00

1D NMR plot parameters
CX                        24.00 cm
CY                         0.00 cm
F1P                     200.000 ppm
F1                    20122.55 Hz
F2P                    -5.000 ppm
F2                     -503.06 Hz
PPMCM                 8.54167 ppm/cm
HZCM                859.40070 Hz/cm
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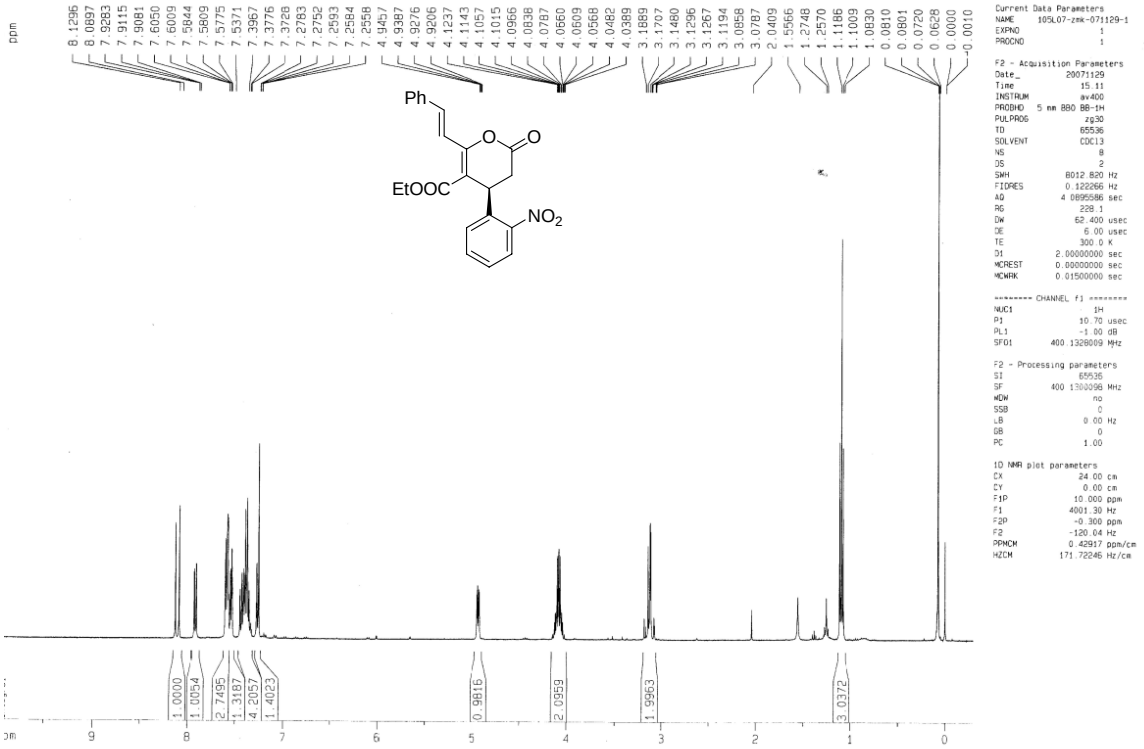


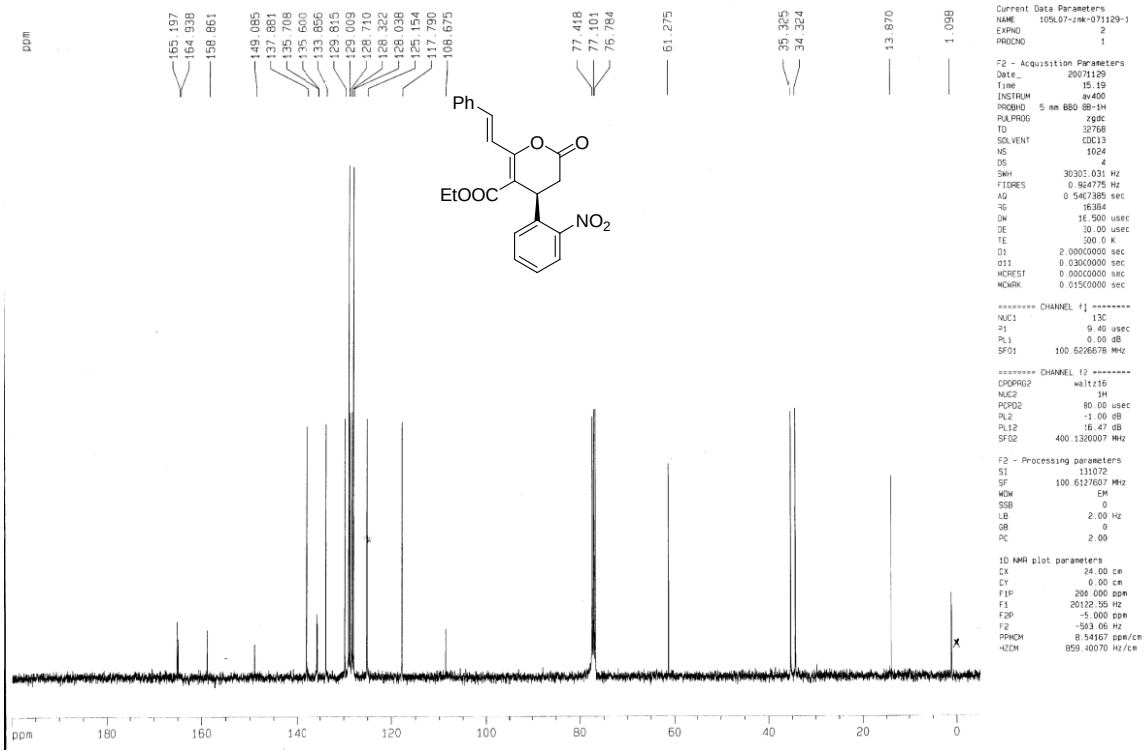

```
Current Data Parameters
NAME          105L07-zmk-071129-1
EXPNO                           1
PROCNO                          1

F2 - Acquisition Parameters
Date_                    20071129
Time                        15.11
INSTRUM                      av400
PROBHD    5 mm BBO BB-1H
PULPROG                     zg30
TD                         65536
SOLVENT                    CDCl3
NS                             8
DS                             2
SWH                     8012.820 Hz
FIDRES                  0.122266 Hz
AQ                      4.0895586 sec
RG                         228.1
DW                        62.400 usec
DE                         6.00 usec
TE                        300.0 K
D1                     2.00000000 sec
MCREST                 0.00000000 sec
MCWRK                  0.01500000 sec

======== CHANNEL f1 ========
NUC1                          1H
P1                         10.70 usec
PL1                        -1.00 dB
SFO1                400.1328009 MHz

F2 - Processing parameters
SI                         65536
SF                  400.1300098 MHz
WDW                           no
SSB                            0
LB                          0.00 Hz
GB                             0
PC                          1.00

1D NMR plot parameters
CX                         24.00 cm
CY                          0.00 cm
F1P                        10.000 ppm
F1                       4001.30 Hz
F2P                       -0.300 ppm
F2                       -120.04 Hz
PPMCM                   0.42917 ppm/cm
HZCM                  171.72246 Hz/cm
```

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Current Data Parameters
NAME          105L07-zmk-071129-1
EXPNO                           2
PROCNO                          1

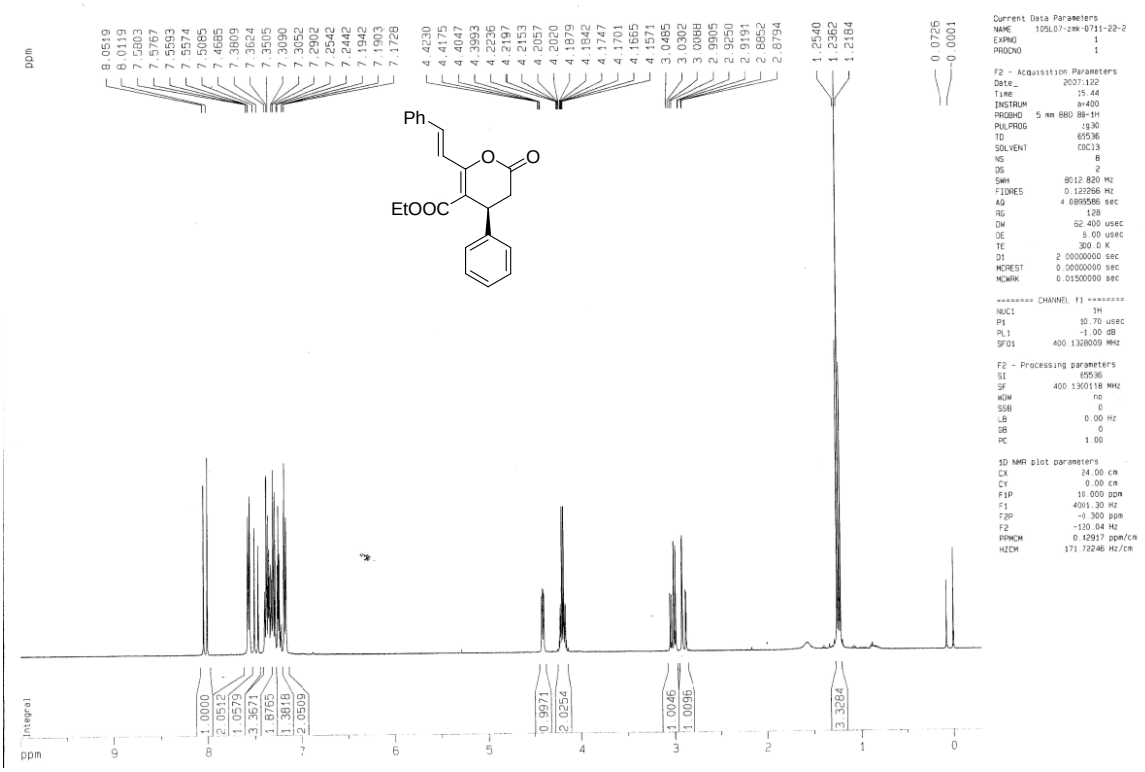
F2 - Acquisition Parameters
Date_                    20071129
Time                        15.19
INSTRUM                      av400
PROBHD    5 mm BBO BB-1H
PULPROG                   zgdc
TD                         32768
SOLVENT                    CDCl3
NS                          1024
DS                             4
SWH                    30303.031 Hz
FIDRES                  0.924775 Hz
AQ                      0.5407385 sec
RG                         16384
DW                        16.500 usec
DE                         10.00 usec
TE                        300.0 K
D1                     2.00000000 sec
d11                    0.03000000 sec
MCREST                 0.00000000 sec
MCWRK                  0.01500000 sec

======== CHANNEL f1 ========
NUC1                          13C
P1                          9.40 usec
PL1                         0.00 dB
SFO1                100.6226678 MHz

======== CHANNEL f2 ========
CPDPRG2                 waltz16
NUC2                          1H
PCPD2                      80.00 usec
PL2                        -1.00 dB
PL12                       16.47 dB
SFO2                400.1320007 MHz

F2 - Processing parameters
SI                        131072
SF                  100.6127607 MHz
WDW                           EM
SSB                            0
LB                          2.00 Hz
GB                             0
PC                          2.00

1D NMR plot parameters
CX                         24.00 cm
CY                          0.00 cm
F1P                       200.000 ppm
F1                      20122.55 Hz
F2P                        -5.000 ppm
F2                       -503.06 Hz
PPMCM                   8.54167 ppm/cm
HZCM                  859.40070 Hz/cm
```



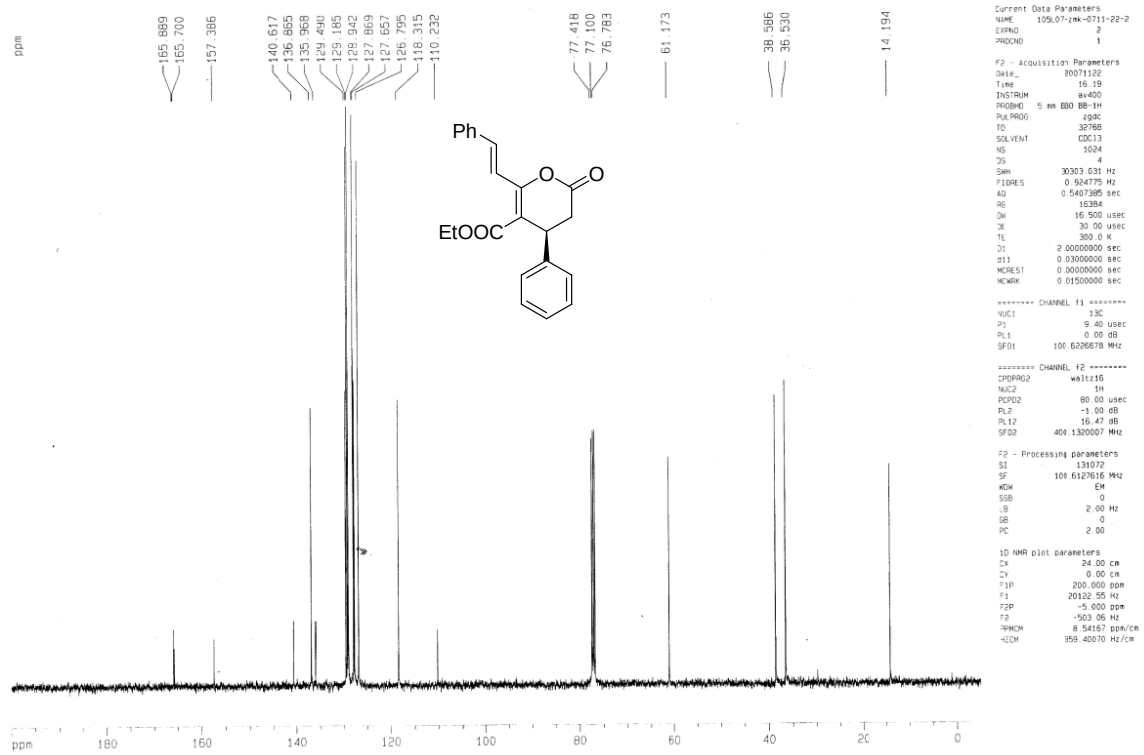

```
Current Data Parameters
NAME            105L07-zmk-0711-22-2
EXPNO                              1
PROCNO                             1

F2 - Acquisition Parameters
Date_                       20071122
Time                           15.44
INSTRUM                        av400
PROBHD   5 mm BBO BB-1H
PULPROG                        zg30
TD                             65536
SOLVENT                        CDCl3
NS                                 8
DS                                 2
SWH                        8012.820 Hz
FIDRES                     0.122266 Hz
AQ                         4.0895586 sec
RG                               128
DW                            52.400 usec
DE                             6.00 usec
TE                            300.0 K
D1                         2.00000000 sec
MCREST                     0.00000000 sec
MCWRK                      0.01500000 sec

======== CHANNEL f1 ========
NUC1                              1H
P1                             10.70 usec
PL1                            -1.00 dB
SFO1                   400.1328009 MHz

F2 - Processing parameters
SI                             65536
SF                     400.1300118 MHz
WDW                               no
SSB                                0
LB                              0.00 Hz
GB                                 0
PC                              1.00

1D NMR plot parameters
CX                             24.00 cm
CY                              0.00 cm
F1P                           10.000 ppm
F1                           4001.30 Hz
F2P                           -0.300 ppm
F2                            -120.04 Hz
PPMCM                       0.42917 ppm/cm
HZCM                      171.72246 Hz/cm
```

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Current Data Parameters
NAME            105L07-zmk-0711-22-2
EXPNO                              2
PROCNO                             1

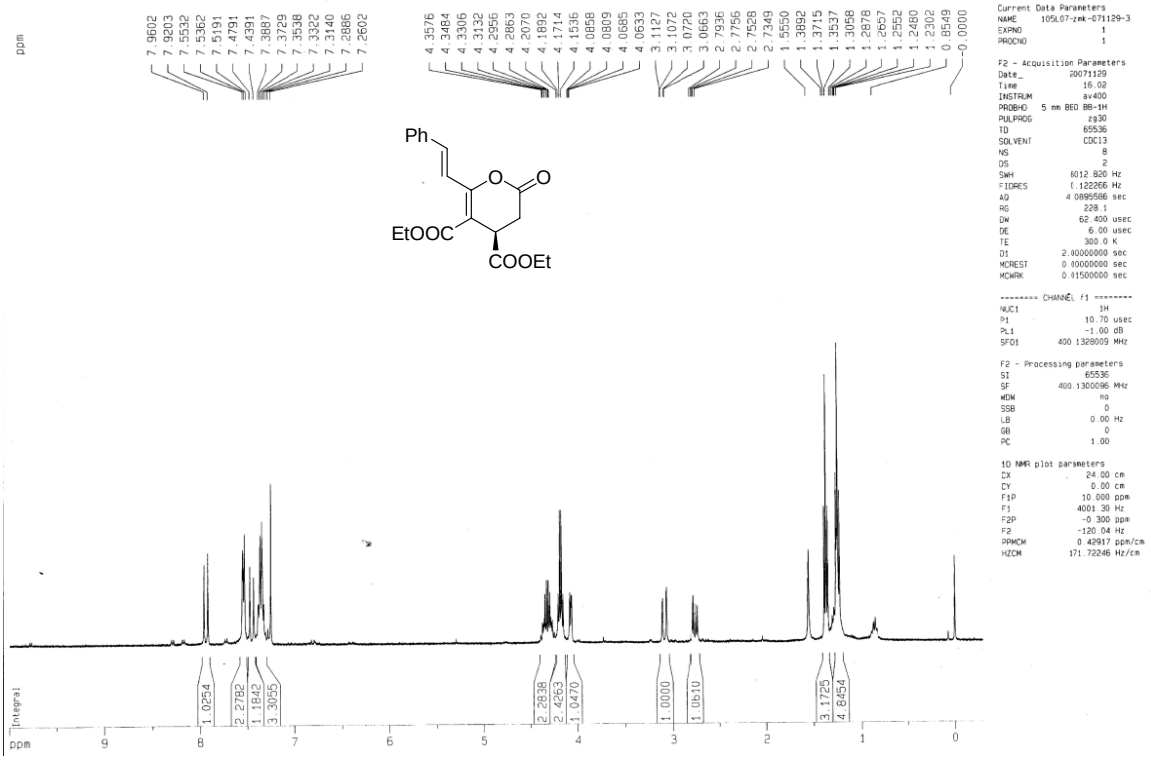
F2 - Acquisition Parameters
Date_                       20071122
Time                           16.19
INSTRUM                        av400
PROBHD   5 mm BBO BB-1H
PULPROG                        zgdc
TD                             32768
SOLVENT                        CDCl3
NS                              1024
DS                                 4
SWH                        30303.031 Hz
FIDRES                     0.924775 Hz
AQ                         0.5407385 sec
RG                               16384
DW                            16.500 usec
DE                             30.00 usec
TE                            300.0 K
D1                         2.00000000 sec
D11                        0.03000000 sec
MCREST                     0.00000000 sec
MCWRK                      0.01500000 sec

======== CHANNEL f1 ========
NUC1                              13C
P1                              9.40 usec
PL1                             0.00 dB
SFO1                   100.6226678 MHz

======== CHANNEL f2 ========
CPDPRG2                     waltz16
NUC2                              1H
PCPD2                          80.00 usec
PL2                            -1.00 dB
PL12                           16.47 dB
SFO2                   400.1320007 MHz

F2 - Processing parameters
SI                            131072
SF                     100.6127616 MHz
WDW                               EM
SSB                                0
LB                              2.00 Hz
GB                                 0
PC                              2.00

1D NMR plot parameters
CX                             24.00 cm
CY                              0.00 cm
F1P                           200.000 ppm
F1                          20122.55 Hz
F2P                           -5.000 ppm
F2                            -503.06 Hz
PPMCM                       8.54167 ppm/cm
HZCM                      859.40870 Hz/cm
```



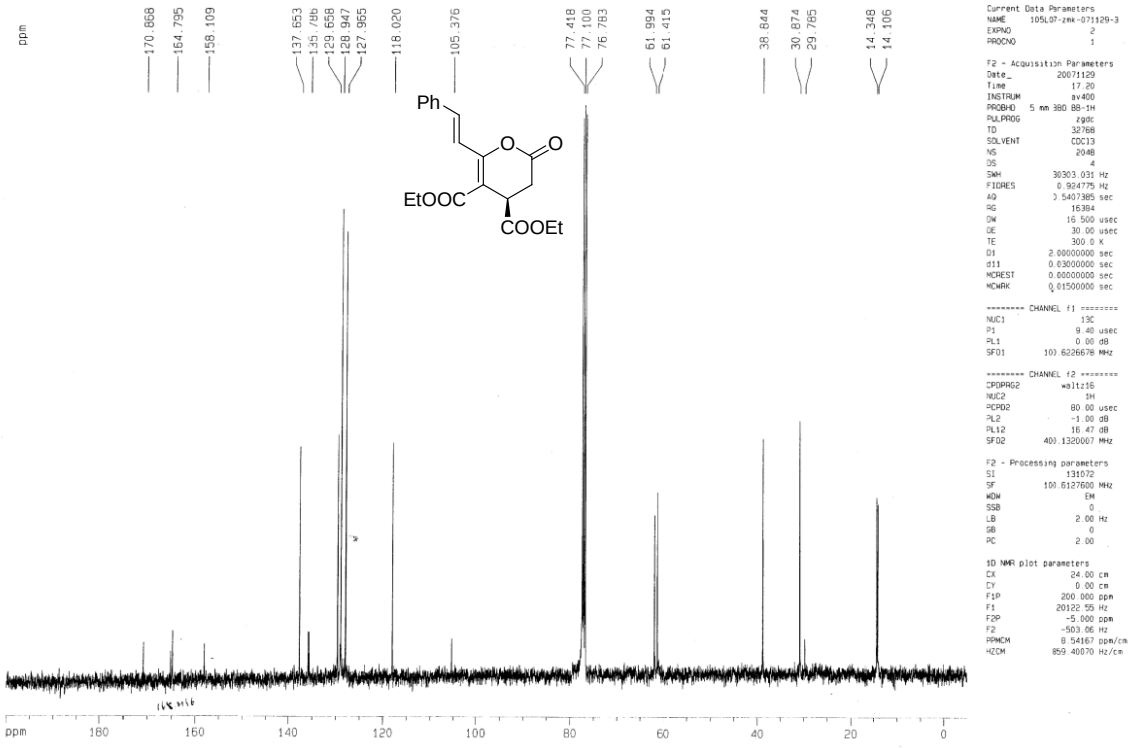
Current Data Parameters
NAME 105L07-zmk-071129-3
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20071129
Time 16.02
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 6012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 228.1
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

-------- CHANNEL f1 --------
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz

F2 - Processing parameters
SI 65536
SF 400.1300096 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm



Current Data Parameters
NAME 105L07-zmk-071129-3
EXPNO 2
PROCNO 1

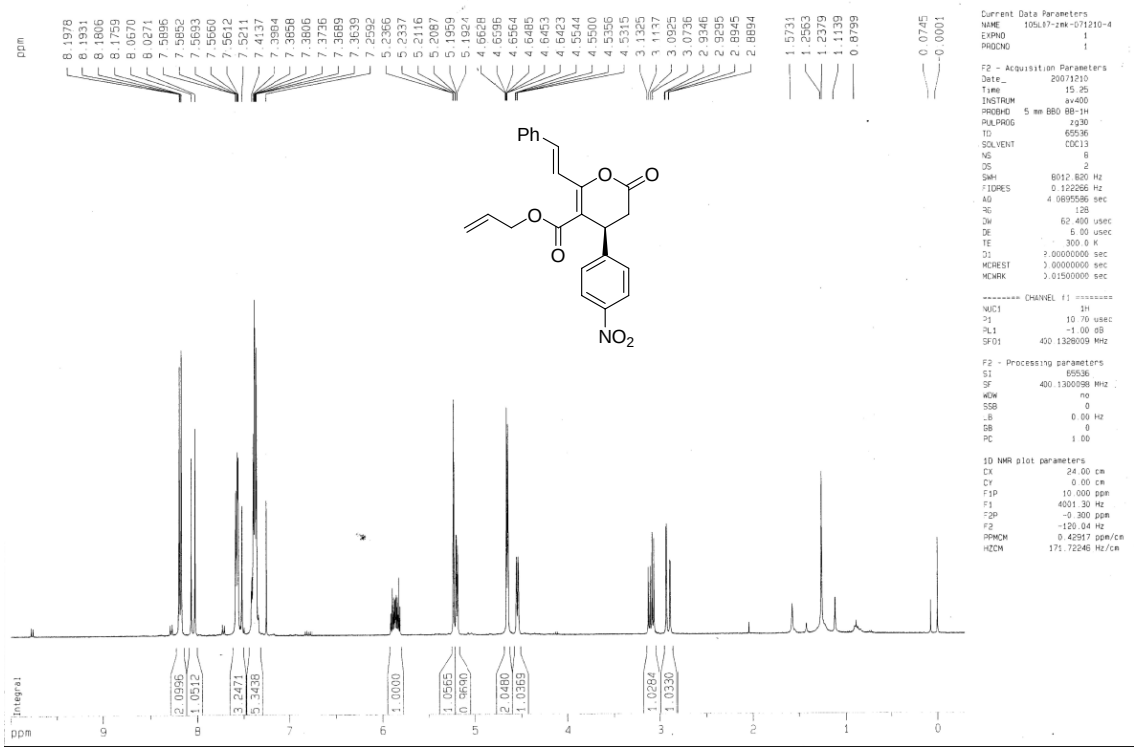
F2 - Acquisition Parameters
Date_ 20071129
Time 17.20
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 2048
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

-------- CHANNEL f1 --------
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6226678 MHz

-------- CHANNEL f2 --------
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz

F2 - Processing parameters
SI 131072
SF 100.6127600 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm


ppm
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8.1806
8.1759
8.0670
8.0271
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7.5852
7.5693
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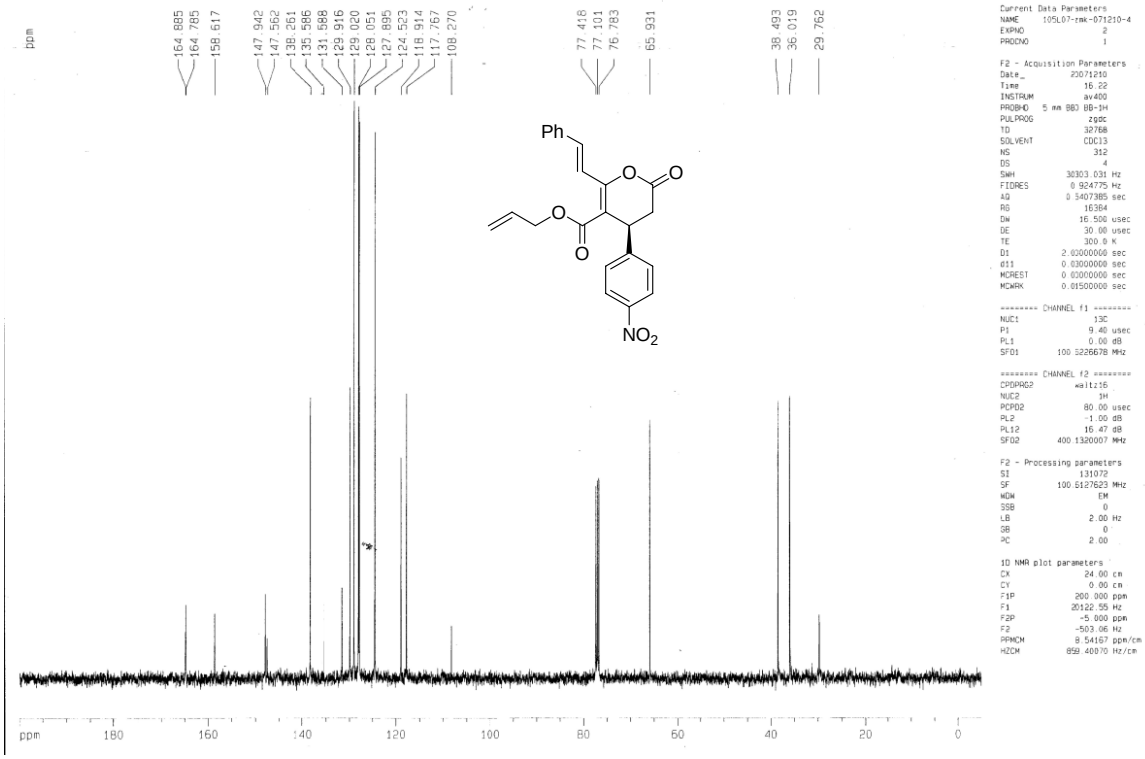
7.5211
7.4137
7.3984
7.3858
7.3806
7.3736
7.3689
7.3639
7.2592
5.2366
5.2337
5.2116
5.2087
5.1959
5.1924
4.6628
4.6595
4.6564
4.6485
4.6453
4.6423
4.5544
4.5500
4.5356
4.5315
3.1325
3.1137
3.0925
3.0736
2.9346
2.9295
2.8945
2.8894
1.5731
1.2563
1.2379
1.1139
0.8799
0.0745
-0.0001
Ph
O
O
O
O
NO2
Integral
2.0996
1.0512
3.2471
5.3438
1.0000
1.0565
0.9690
2.0480
1.0369
1.0284
1.0330
ppm
Current Data Parameters
NAME 105L07-zmk-071210-4
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071210
Time 15.25
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 128
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 3.00000000 sec
MCWRK 3.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz
F2 - Processing parameters
SI 65536
SF 400.1300098 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm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164.885
164.785
158.617
147.942
147.562
136.261
135.586
131.588
129.916
129.020
128.051
127.895
124.523
118.914
117.767
108.270
77.418
77.101
76.783
65.931
38.493
36.019
29.762
Ph
O
O
O
O
NO2
ppm
180
160
140
120
100
80
60
40
20
0
Current Data Parameters
NAME 105L07-zmk-071210-4
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071210
Time 16.22
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 312
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.5226678 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz
F2 - Processing parameters
SI 131072
SF 100.5127623 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm

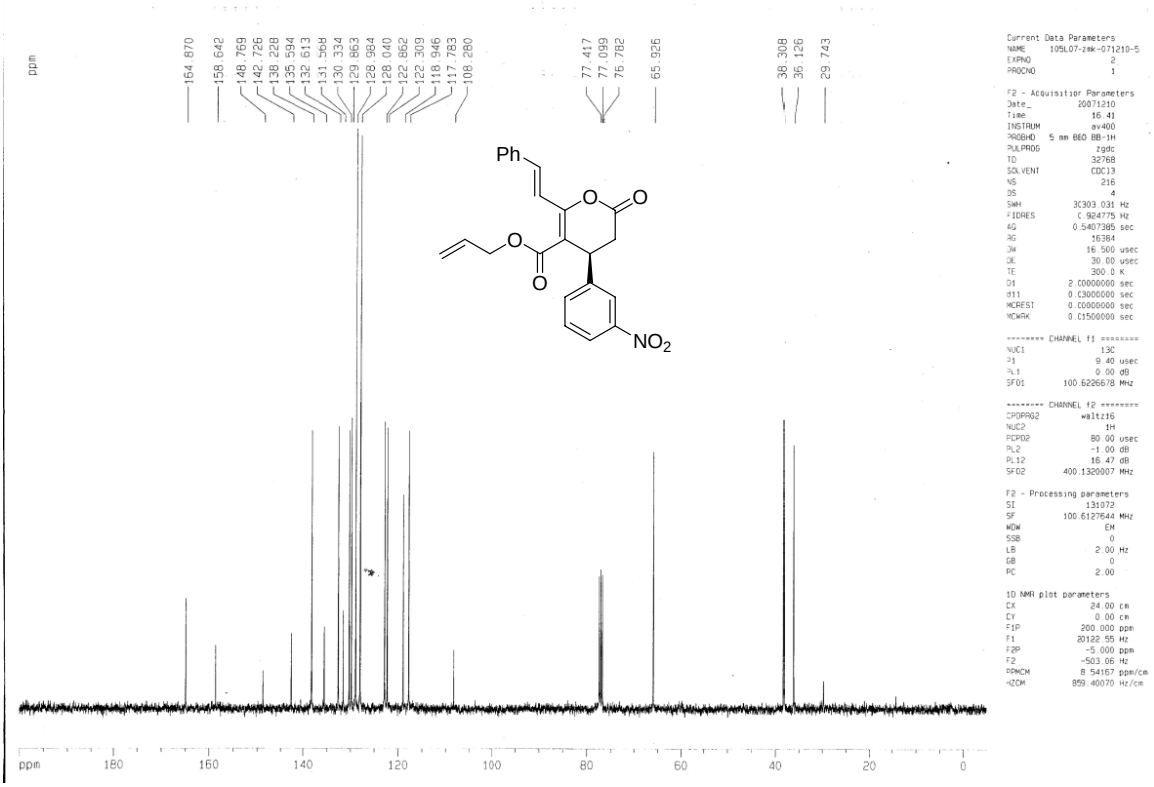
Current Data Parameters
NAME 105L07-zmk-071210-5
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20071210
Time 15.21
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 80.6
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.03000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 3.42917 ppm/cm
HZCM 171.72246 Hz/cm



Current Data Parameters
NAME 105L07-zmk-071210-5
EXPNO 2
PROCNO 1

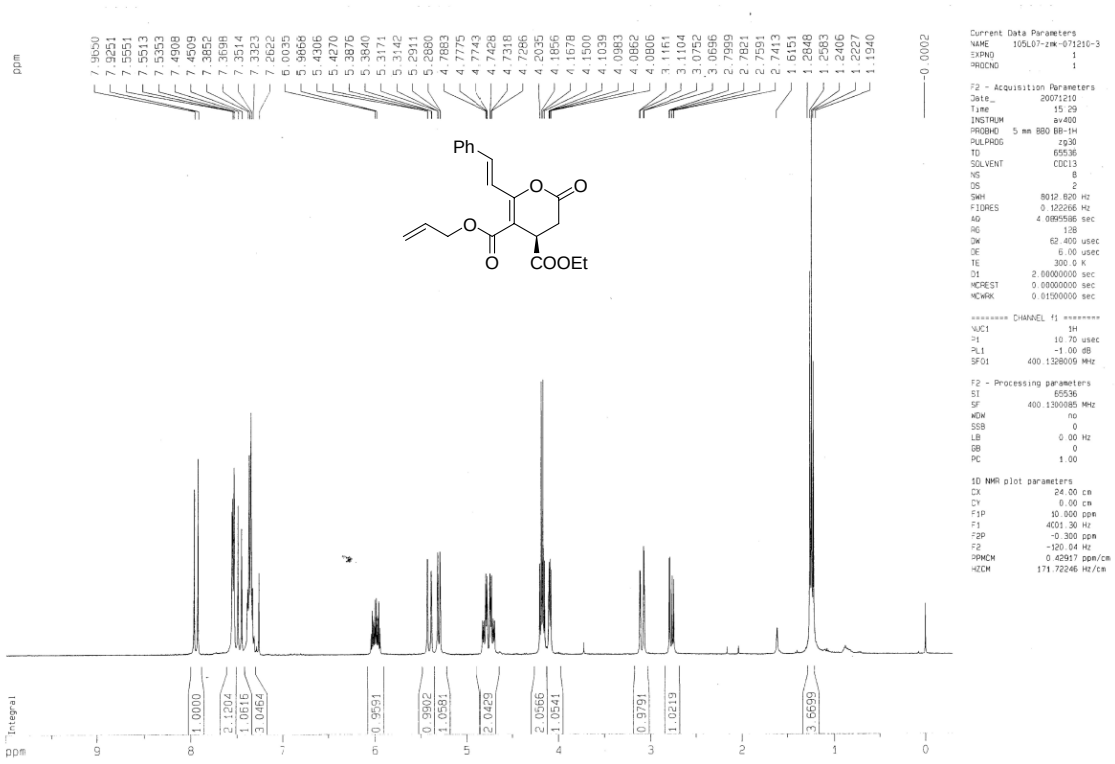
F2 - Acquisition Parameters
Date_ 20071210
Time 16.41
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 216
DS 4
SWH 23303.031 Hz
FIDRES 0.724775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6226678 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz

F2 - Processing parameters
SI 131072
SF 100.6127644 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm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O
O
O
O
COOEt
ppm
Integral
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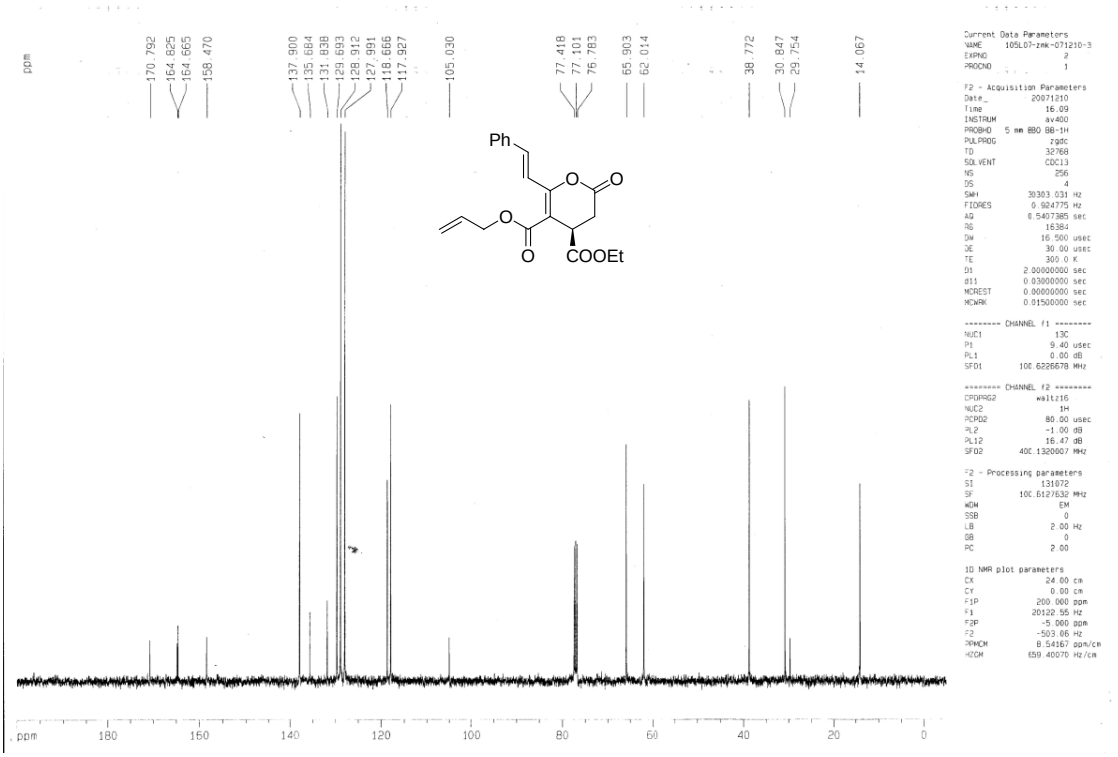
3.0464
0.9691
0.9902
1.0581
2.0429
2.0566
1.0541
0.9791
1.0219
3.6699
Current Data Parameters
NAME 105L07-zmk-071210-3
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071210
Time 15.29
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 128
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz
F2 - Processing parameters
SI 65536
SF 400.1300085 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm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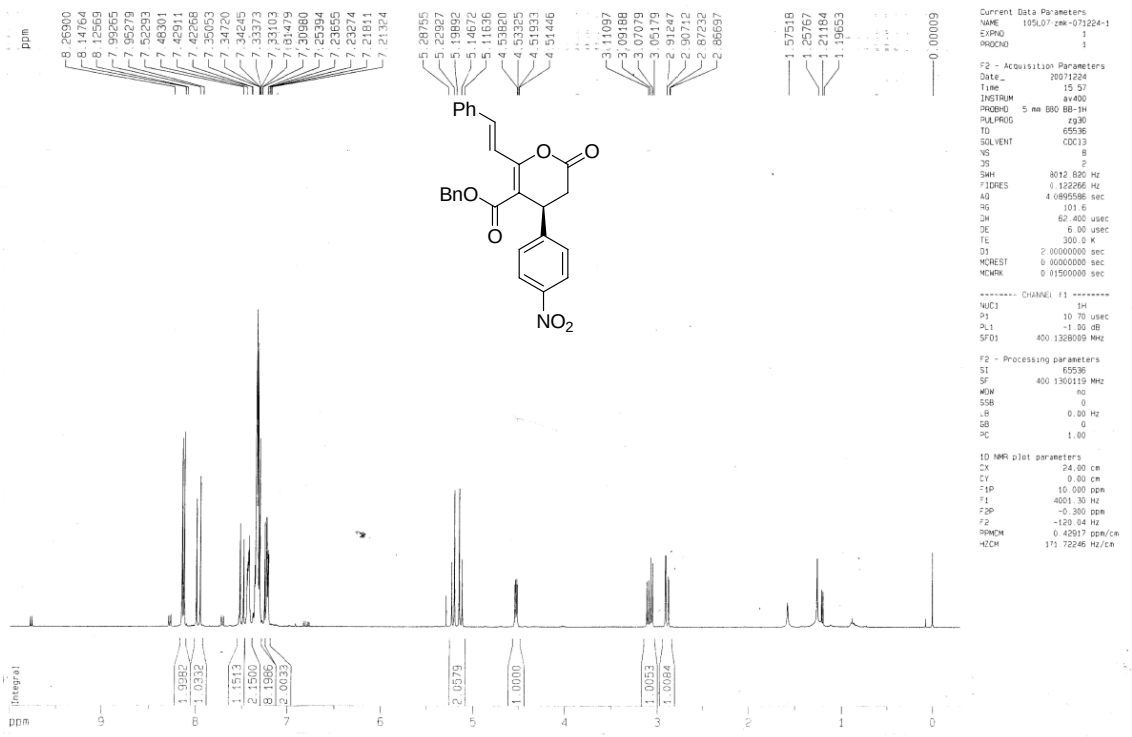
O
O
O
COOEt
ppm
Current Data Parameters
NAME 105L07-zmk-071210-3
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071210
Time 16.09
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 256
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6228678 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz
F2 - Processing parameters
SI 131072
SF 100.6127632 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 659.40070 Hz/cm


Ph
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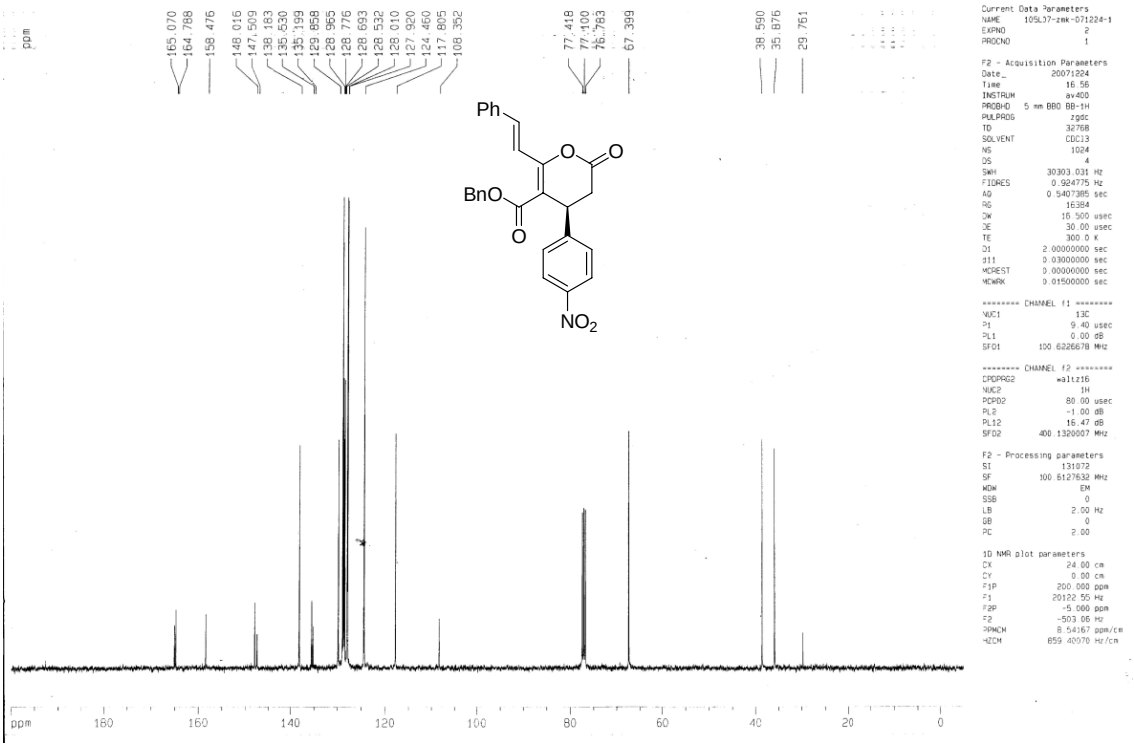
O
BnO
O
NO2
ppm
Integral


Ph
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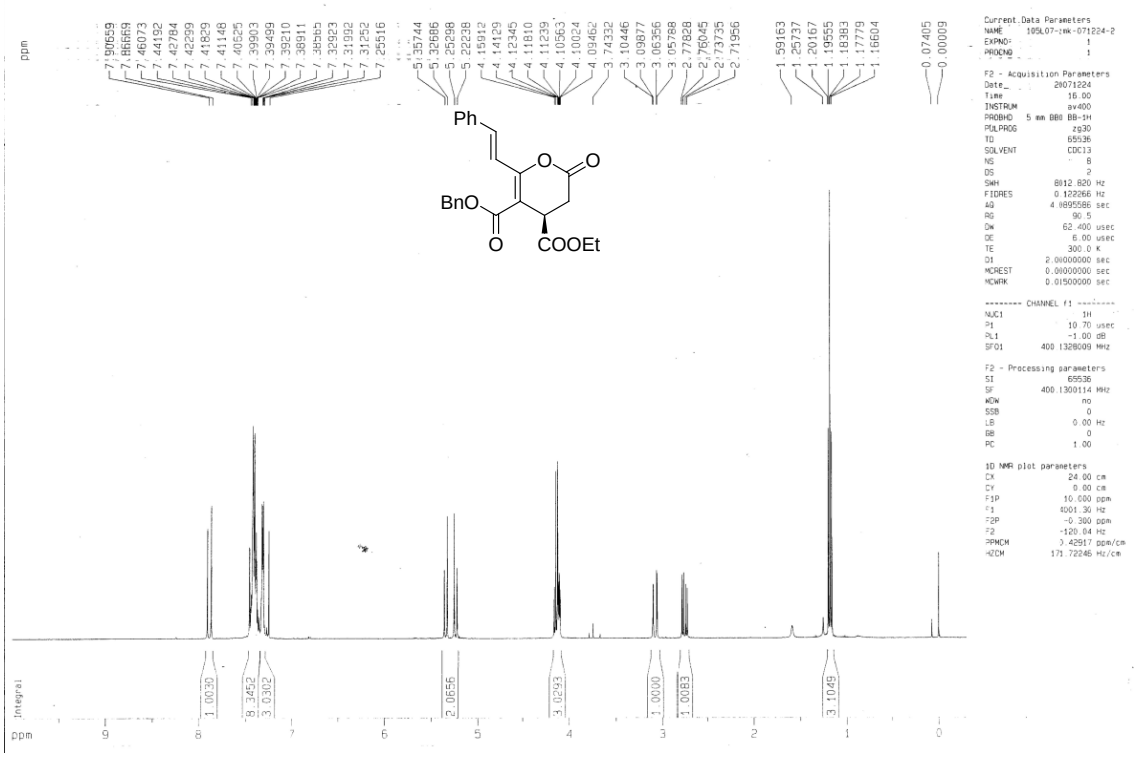
O
BnO
O
NO2
ppm


Ph
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O
BnO
O
COOEt
ppm
Integral
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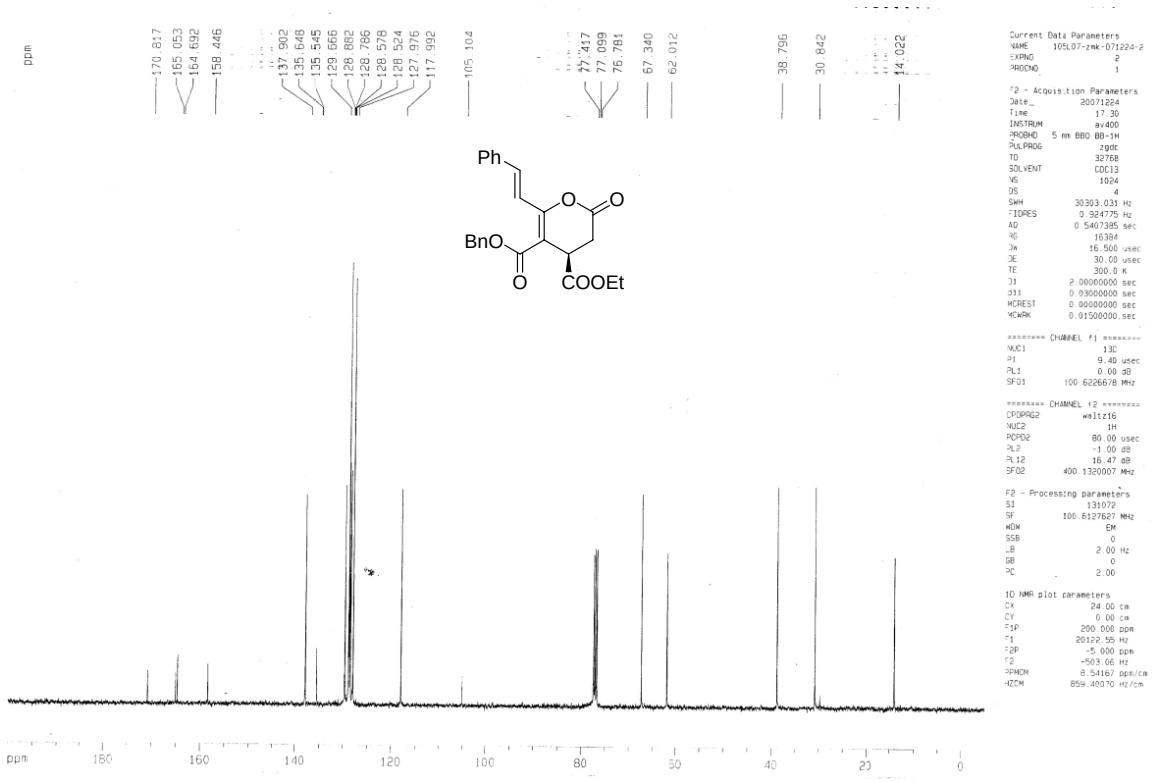
3.0302
2.0656
3.0293
1.0000
1.0083
3.1049
Current Data Parameters
NAME 105L07-zmk-071224-2
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071224
Time 16.00
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 90.5
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz
F2 - Processing parameters
SI 65536
SF 400.1300114 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm


Ph
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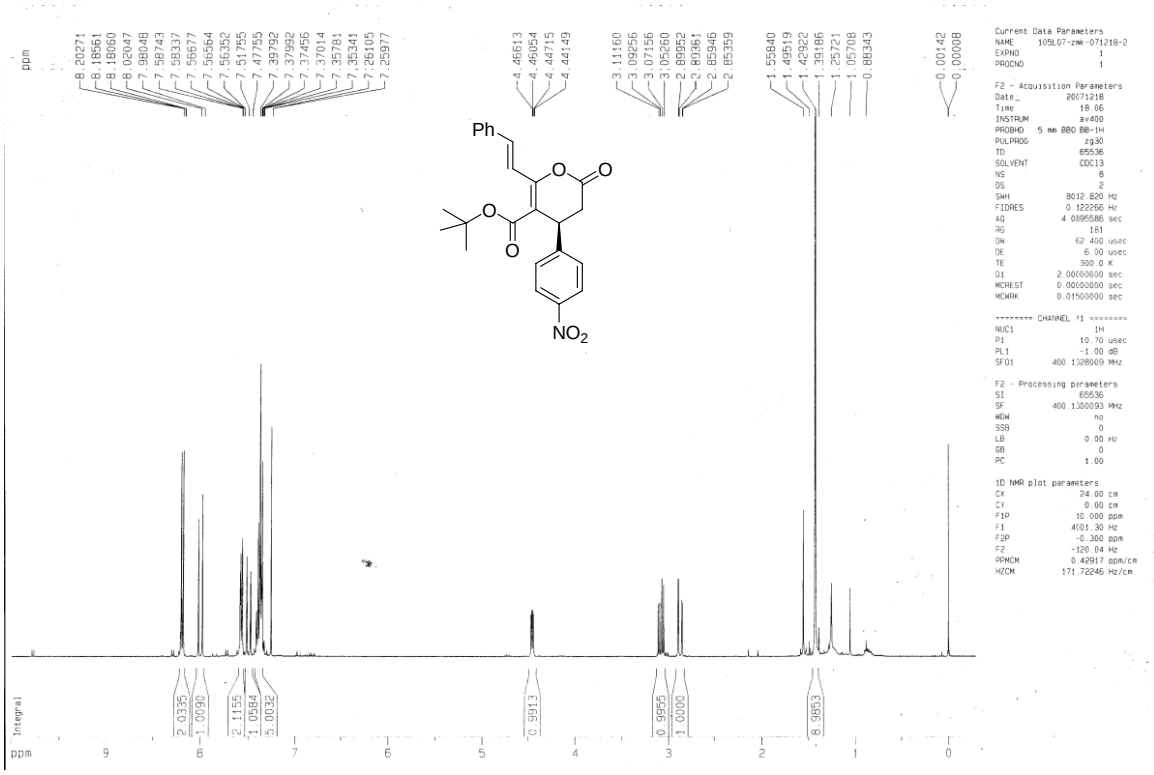
O
BnO
O
COOEt
ppm
Current Data Parameters
NAME 105L07-zmk-071224-2
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071224
Time 17.30
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgpg
TD 32768
SOLVENT CDCl3
NS 1024
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6226678 MHz
======== CHANNEL f2 ========
DECPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz
F2 - Processing parameters
SI 131072
SF 100.6127627 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm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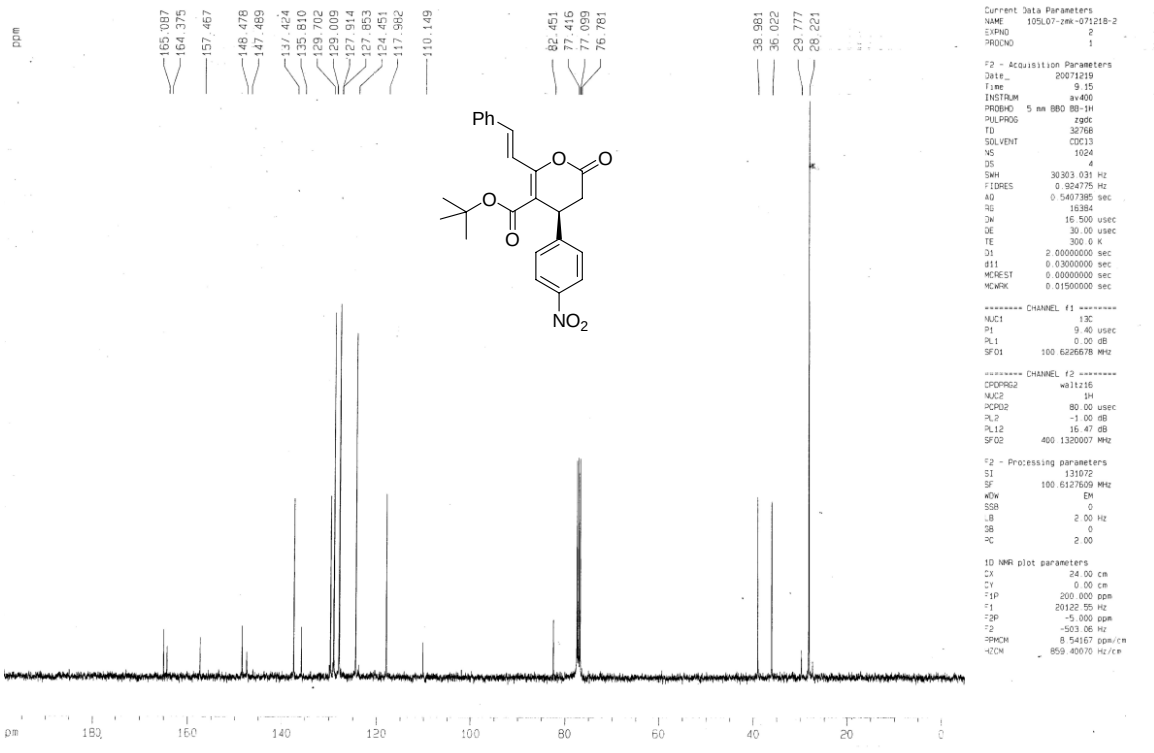
7.58337
7.56677
7.56564
7.56352
7.51755
7.47755
7.39792
7.37992
7.37456
7.37014
7.35781
7.35341
7.26105
7.25977
4.46613
4.46054
4.44715
4.44149
3.11160
3.09256
3.07156
3.05260
2.89952
2.89361
2.85946
2.85359
1.55840
1.49519
1.42922
1.39186
1.25721
1.05708
0.88343
0.00142
0.00008
Ph
O
O
O
O
NO2
Integral
2.0335
1.0090
2.1155
1.0584
5.0032
0.9913
0.9955
1.0000
8.9853
ppm
Current Data Parameters
NAME 105L07-zmk-071218-2
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071218
Time 18.06
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 181
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz
F2 - Processing parameters
SI 65536
SF 400.1300093 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm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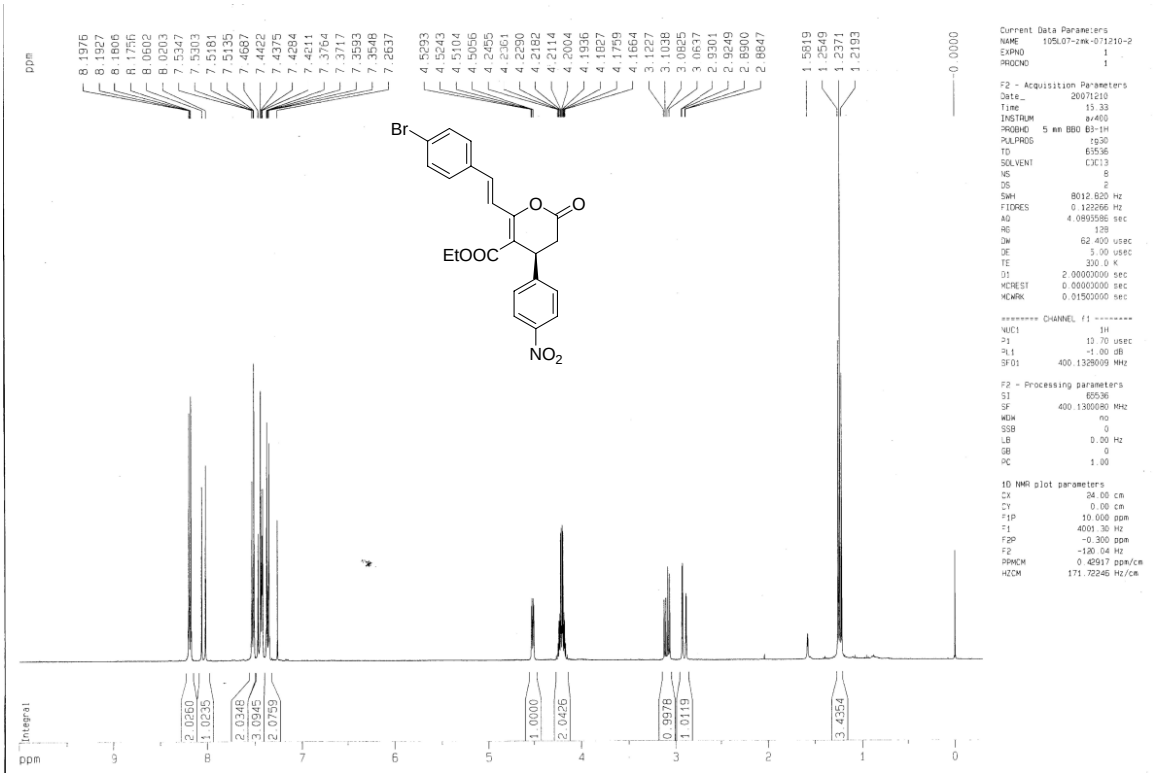
165.087
164.375
157.467
148.478
147.489
137.424
135.810
129.702
129.009
127.914
127.853
124.451
117.982
110.149
82.451
77.416
77.099
76.781
38.981
36.022
29.777
28.221
Ph
O
O
O
O
NO2
pm
180
160
140
120
100
80
60
40
20
0
Current Data Parameters
NAME 105L07-zmk-071218-2
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071219
Time 9.15
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgdc
TD 32768
SOLVENT CDCl3
NS 1024
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6226678 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz
F2 - Processing parameters
SI 131072
SF 100.6127609 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm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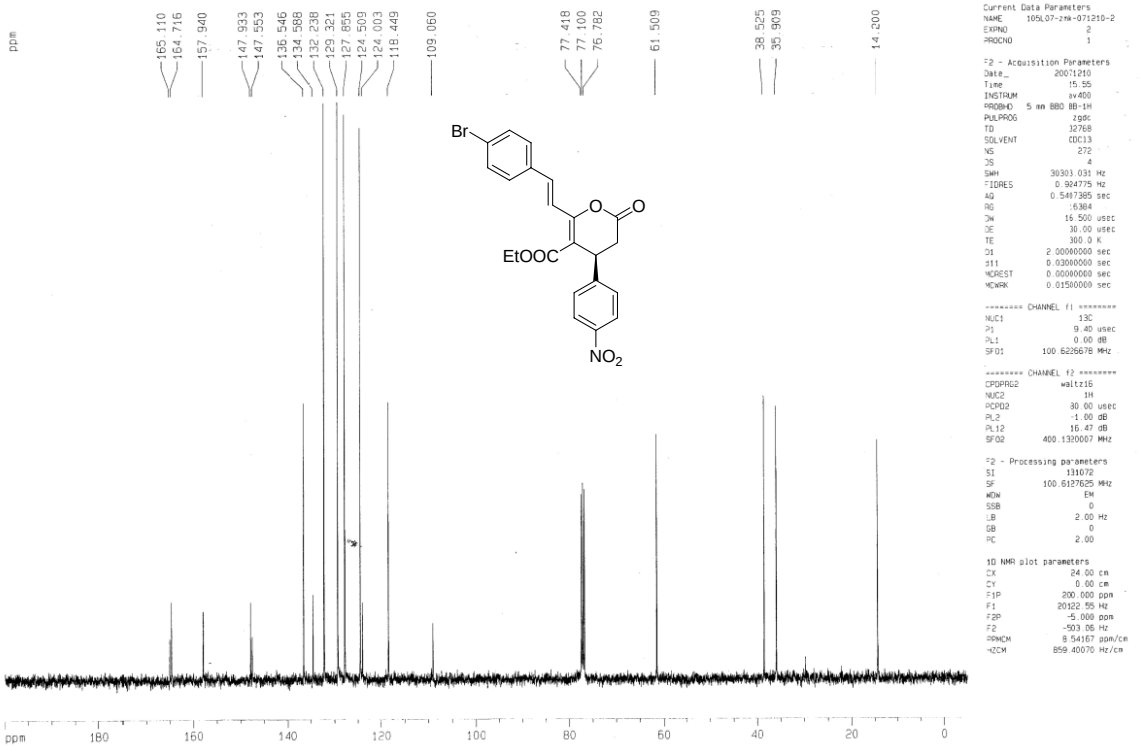
8.0602
8.0203
7.5347
7.5303
7.5181
7.5135
7.4687
7.4422
7.4375
7.4284
7.4211
7.3764
7.3717
7.3593
7.3548
7.2637
4.5293
4.5243
4.5104
4.5056
4.2455
4.2361
4.2290
4.2182
4.2114
4.2004
4.1936
4.1827
4.1759
4.1664
3.1227
3.1038
3.0825
3.0637
2.9301
2.9249
2.8900
2.8847
1.5619
1.2549
1.2371
1.2193
0.0000
Br
O
O
EtOOC
NO2
Integral
2.0260
1.0235
2.0348
3.0945
2.0759
1.0000
2.0426
0.9978
1.0119
3.4354
ppm
Current Data Parameters
NAME 105L07-znk-071210-2
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071210
Time 15.33
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0899586 sec
RG 128
DW 62.400 usec
DE 5.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SF01 400.1328009 MHz
F2 - Processing parameters
SI 65536
SF 400.1300080 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm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147.553
136.546
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132.238
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127.855
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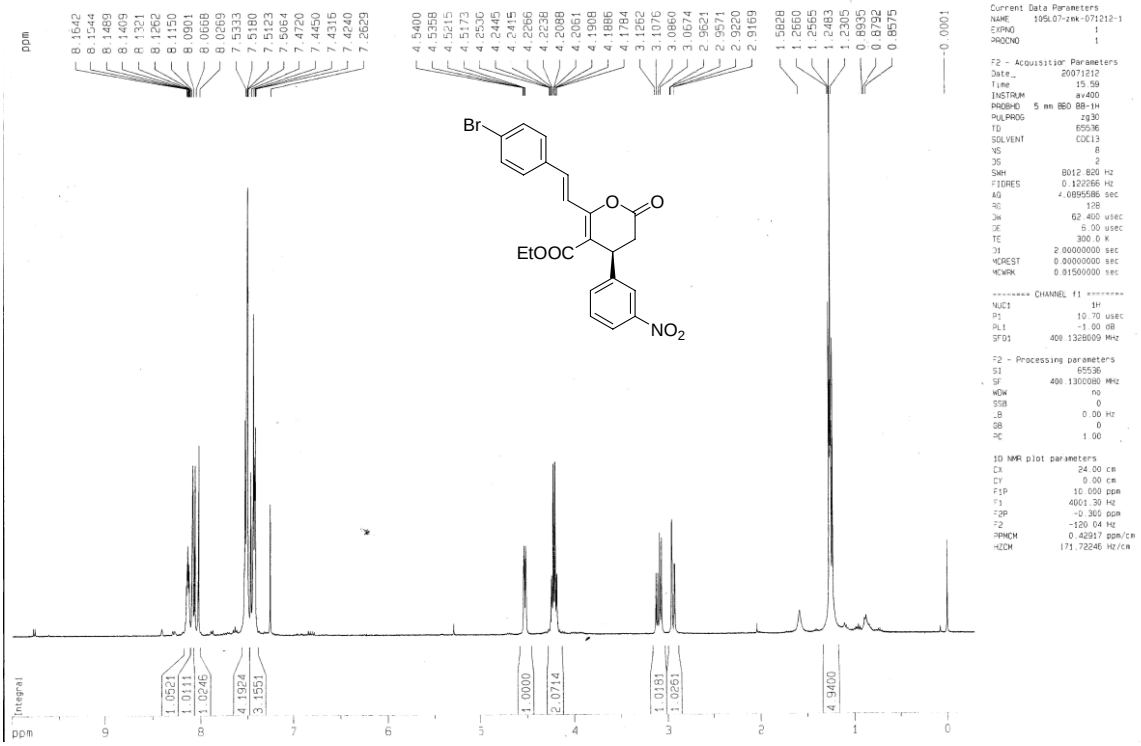
109.060
77.418
77.100
76.782
61.509
38.525
35.909
14.200
Br
O
O
EtOOC
NO2
ppm
Current Data Parameters
NAME 105L07-znk-071210-2
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20071210
Time 15.55
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgpg
TD 32768
SOLVENT CDCl3
NS 272
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SF01 100.6226678 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SF02 400.1320007 MHz
F2 - Processing parameters
SI 131072
SF 100.6127625 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00
1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm

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Current Data Parameters
NAME        105L07-zmk-071212-1
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_              20071212
Time                  15.59
INSTRUM                av400
PROBHD  5 mm BBO BB-1H
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                        8
DS                        2
SWH               8012.820 Hz
FIDRES               0.122266 Hz
AQ                4.0895586 sec
RG                       128
DW                  62.400 usec
DE                   6.00 usec
TE                  300.0 K
D1                2.00000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                      1H
P1                     10.70 usec
PL1                    -1.00 dB
SFO1          400.1328009 MHz

F2 - Processing parameters
SI                    65536
SF          400.1300080 MHz
WDW                      no
SSB                       0
LB                     0.00 Hz
GB                        0
PC                     1.00

1D NMR plot parameters
CX                    24.00 cm
CY                     0.00 cm
F1P                  10.000 ppm
F1                 4001.30 Hz
F2P                -0.360 ppm
F2                 -120.04 Hz
PPMCM              0.42917 ppm/cm
HZCM             171.72246 Hz/cm
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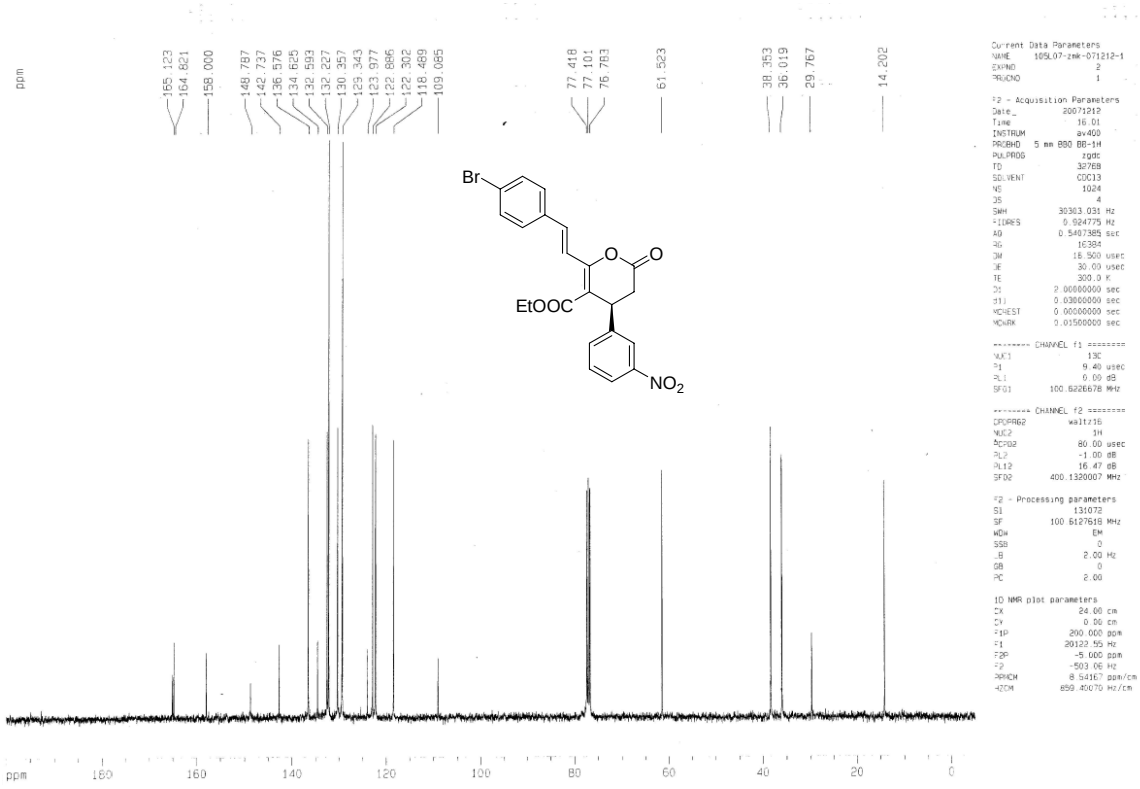


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Current Data Parameters
NAME        105L07-zmk-071212-1
EXPNO                         2
PROCNO                        1

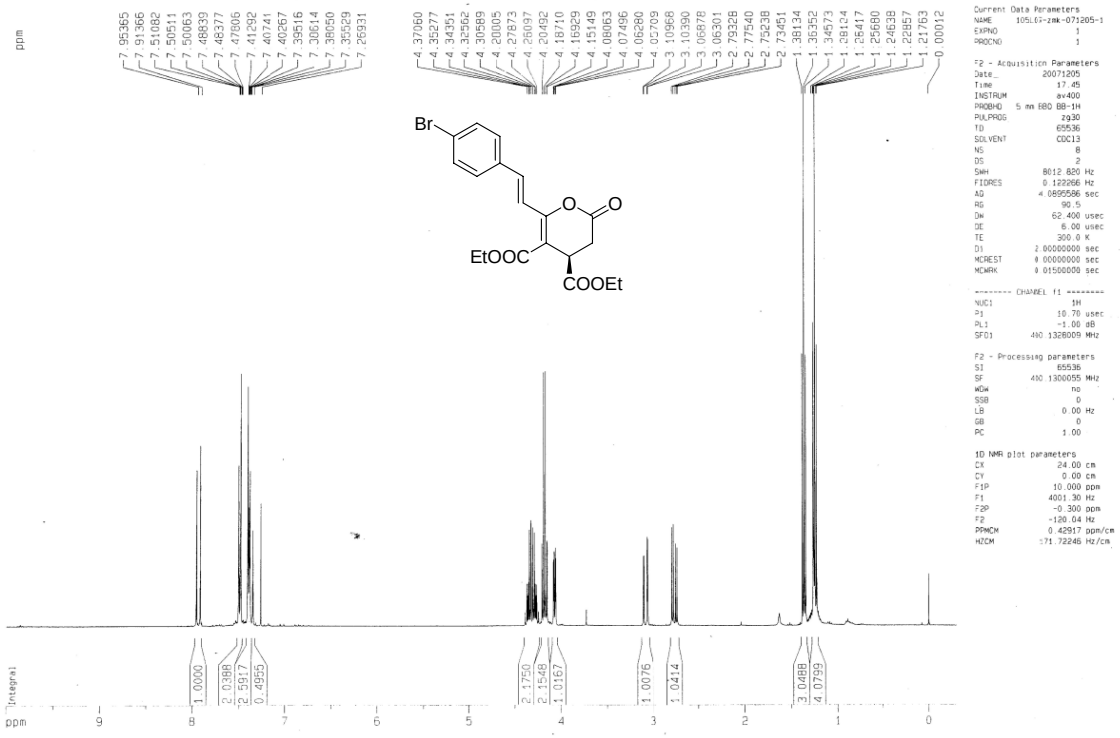
F2 - Acquisition Parameters
Date_              20071212
Time                  16.01
INSTRUM                av400
PROBHD  5 mm BBO BB-1H
PULPROG               zgdc
TD                    32768
SOLVENT               CDCl3
NS                     1024
DS                        4
SWH              30363.031 Hz
FIDRES               0.924775 Hz
AQ                0.5407385 sec
RG                     16384
DW                  16.500 usec
DE                   6.00 usec
TE                  300.0 K
D1                2.00000000 sec
D11               0.03000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                      13C
P1                     9.40 usec
PL1                    0.00 dB
SFO1          100.6226678 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                      1H
PCPD2                 80.00 usec
PL2                    -1.00 dB
PL12                   16.47 dB
SFO2          400.1320007 MHz

F2 - Processing parameters
SI                   131072
SF          100.6127618 MHz
WDW                      EM
SSB                       0
LB                     2.00 Hz
GB                        0
PC                     2.00

1D NMR plot parameters
CX                    24.00 cm
CY                     0.00 cm
F1P                  200.000 ppm
F1                 20122.55 Hz
F2P                -5.000 ppm
F2                 -503.06 Hz
PPMCM              8.54167 ppm/cm
HZCM             859.40079 Hz/cm
```



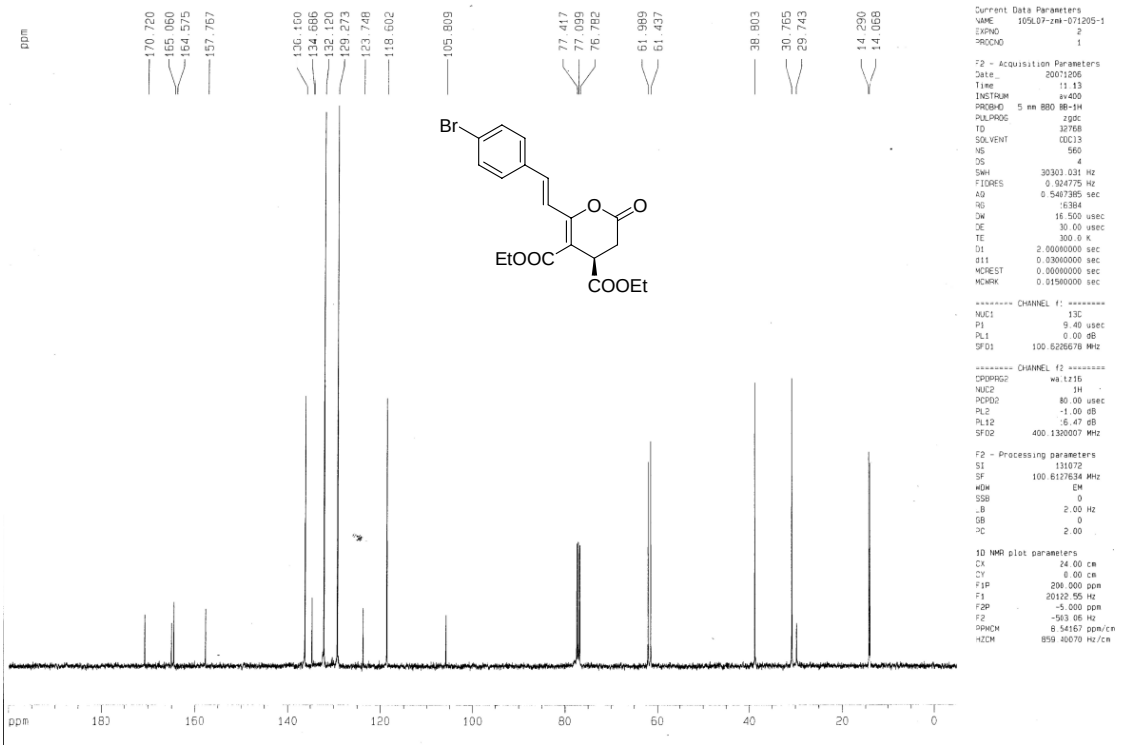
Current Data Parameters
NAME 105L07-zmk-071205-1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20071205
Time 17.45
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 90.5
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

-------- CHANNEL f1 --------
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz

F2 - Processing parameters
SI 65536
SF 400.1300055 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72246 Hz/cm



Current Data Parameters
NAME 105L07-zmk-071205-1
EXPNO 2
PROCNO 1

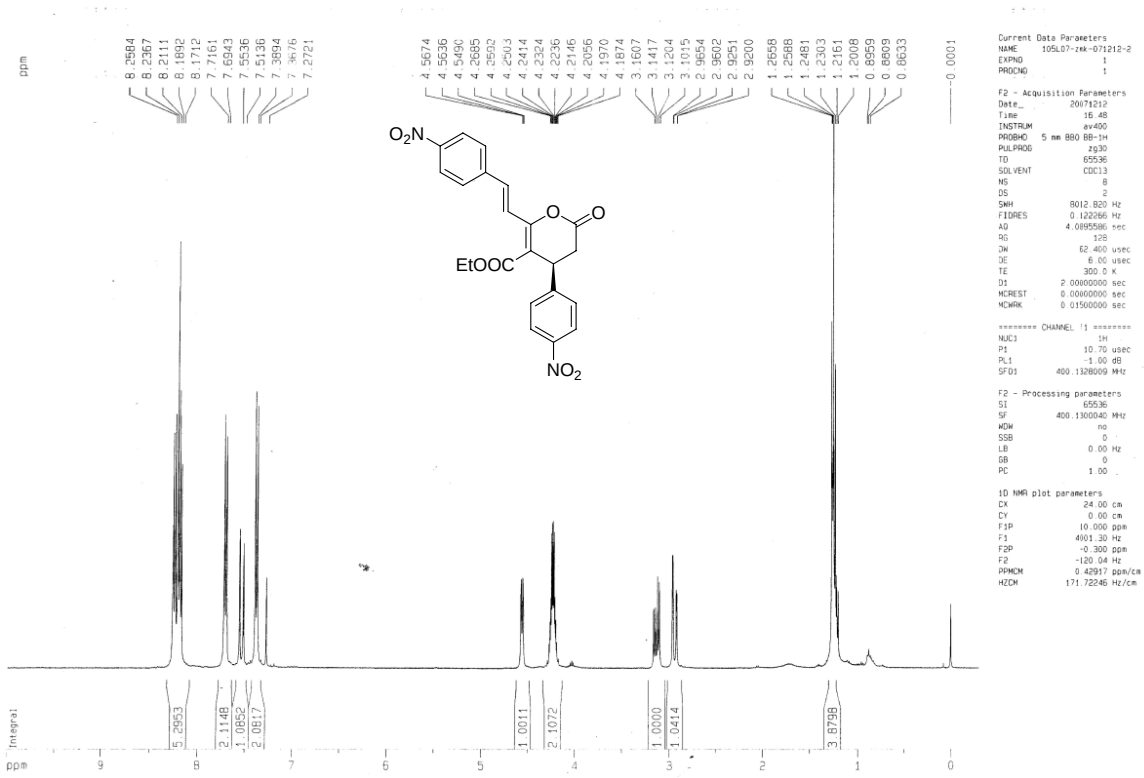
F2 - Acquisition Parameters
Date_ 20071206
Time 11.13
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgpg
TD 32768
SOLVENT CDCl3
NS 560
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

-------- CHANNEL f1 --------
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.6228678 MHz

-------- CHANNEL f2 --------
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz

F2 - Processing parameters
SI 131072
SF 100.6127634 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00

1D NMR plot parameters
CX 24.00 cm
CY 8.00 cm
F1P 206.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm



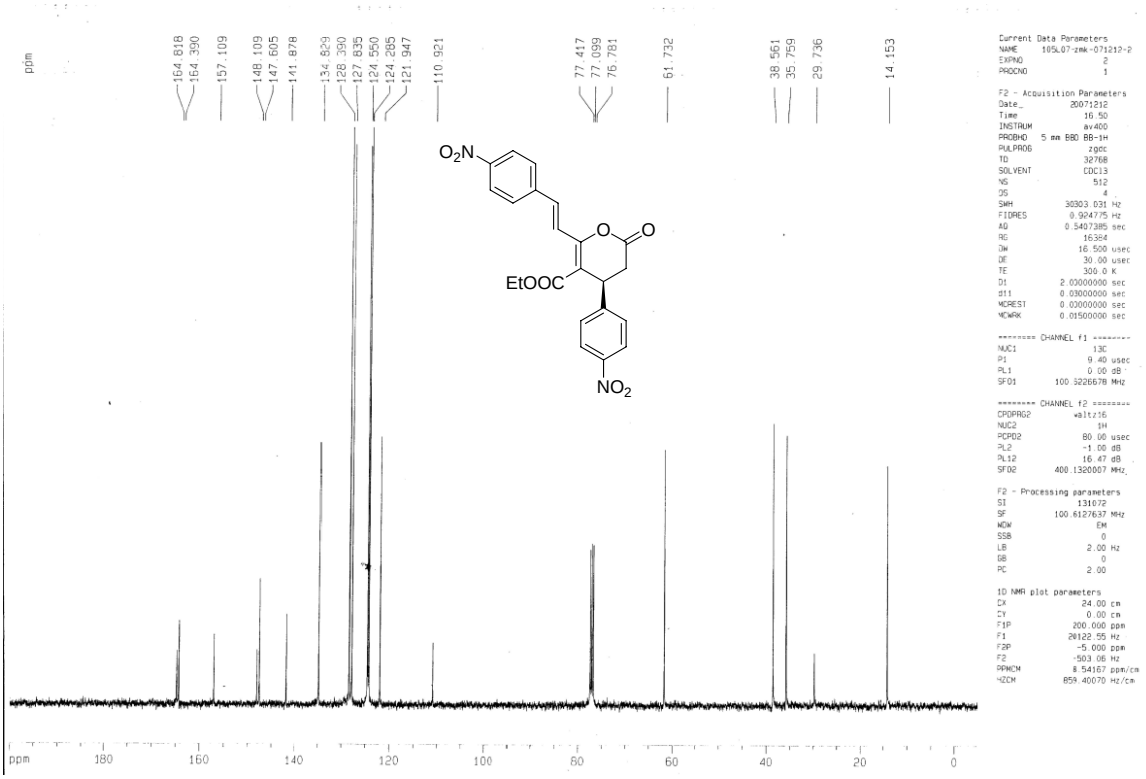
Current Data Parameters
NAME 105L07-zmk-071212-2
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20071212
Time 16.48
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 8
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0895586 sec
RG 128
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 2.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 1H
P1 10.70 usec
PL1 -1.00 dB
SFO1 400.1328009 MHz

F2 - Processing parameters
SI 65536
SF 400.1300040 MHz
WDW no
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 10.000 ppm
F1 4001.30 Hz
F2P -0.300 ppm
F2 -120.04 Hz
PPMCM 0.42917 ppm/cm
HZCM 171.72245 Hz/cm



Current Data Parameters
NAME 105L07-zmk-071212-2
EXPNO 2
PROCNO 1

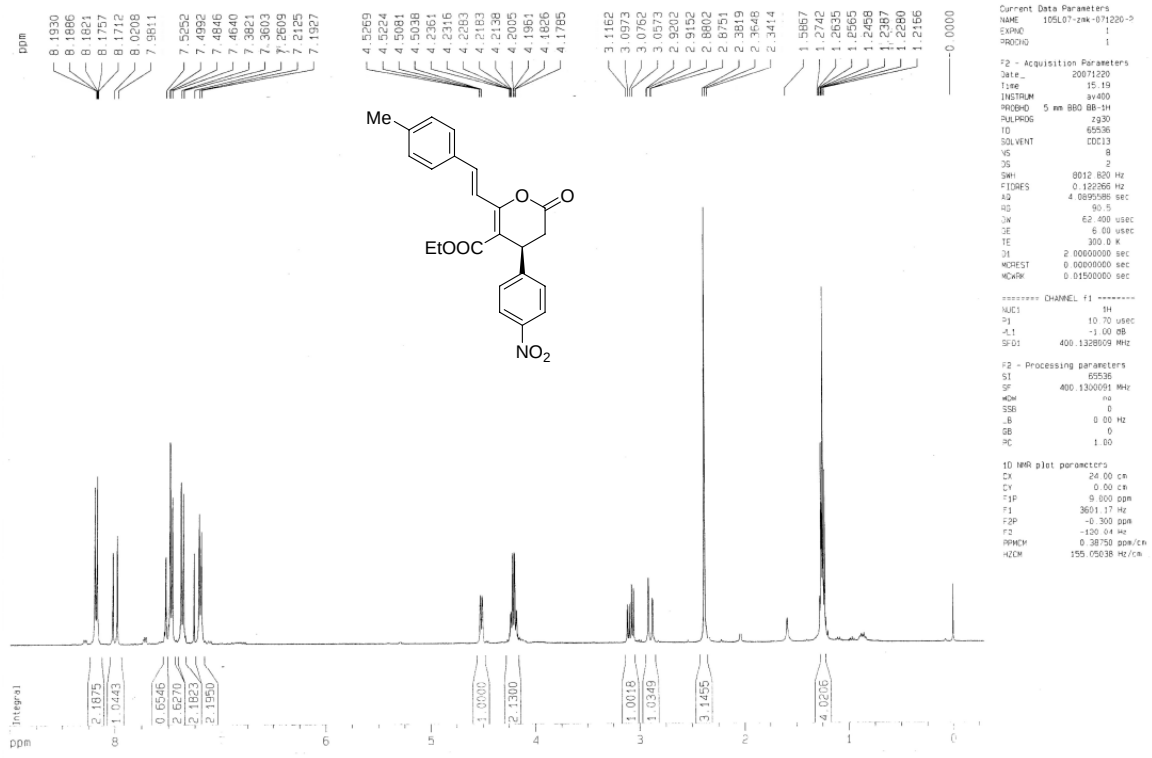
F2 - Acquisition Parameters
Date_ 20071212
Time 16.50
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG zgpg
TD 32768
SOLVENT CDCl3
NS 512
DS 4
SWH 30303.031 Hz
FIDRES 0.924775 Hz
AQ 0.5407385 sec
RG 16384
DW 16.500 usec
DE 30.00 usec
TE 300.0 K
D1 2.00000000 sec
D11 0.03000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

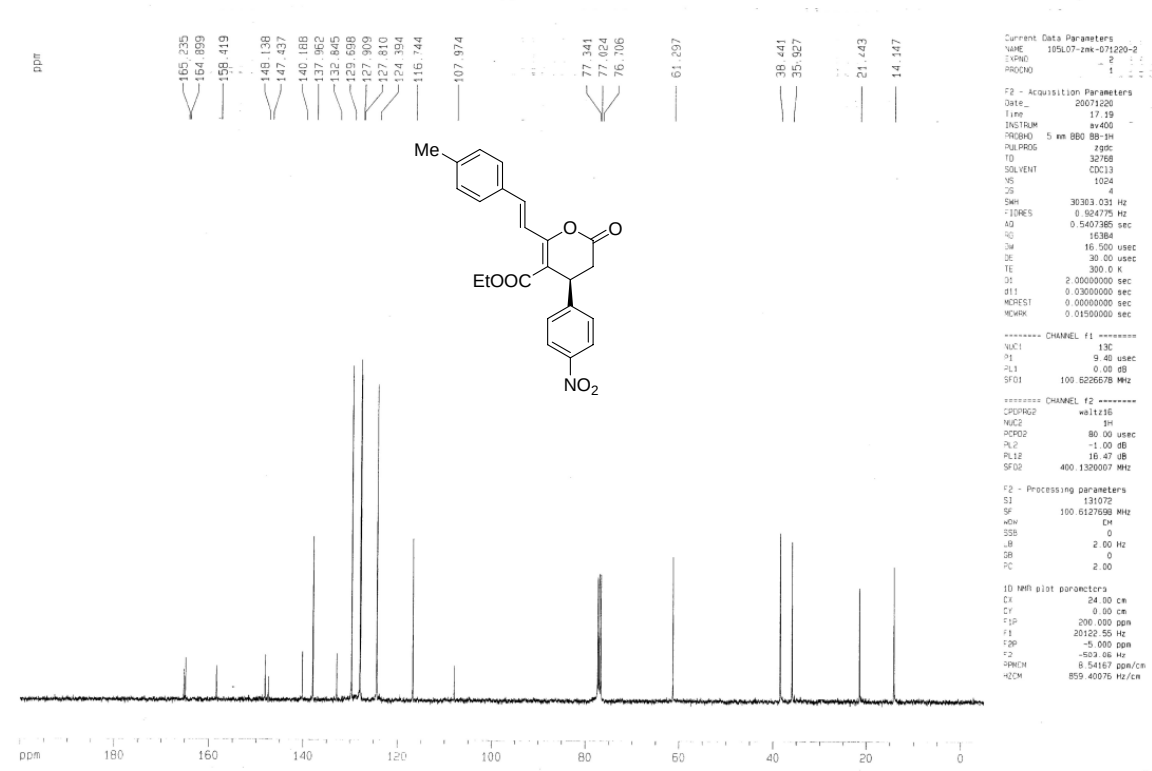
======== CHANNEL f1 ========
NUC1 13C
P1 9.40 usec
PL1 0.00 dB
SFO1 100.5226678 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -1.00 dB
PL12 16.47 dB
SFO2 400.1320007 MHz

F2 - Processing parameters
SI 131072
SF 100.6127637 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 2.00

1D NMR plot parameters
CX 24.00 cm
CY 0.00 cm
F1P 200.000 ppm
F1 20122.55 Hz
F2P -5.000 ppm
F2 -503.06 Hz
PPMCM 8.54167 ppm/cm
HZCM 859.40070 Hz/cm


Me
O
O
EtOOC
NO2
ppm
Integral
2.1875
1.0443
0.6546
2.6270
2.1823
2.1950
1.0000
2.1300
1.0018
1.0349
3.1455
4.0206


Me
O
O
EtOOC
NO2
ppm
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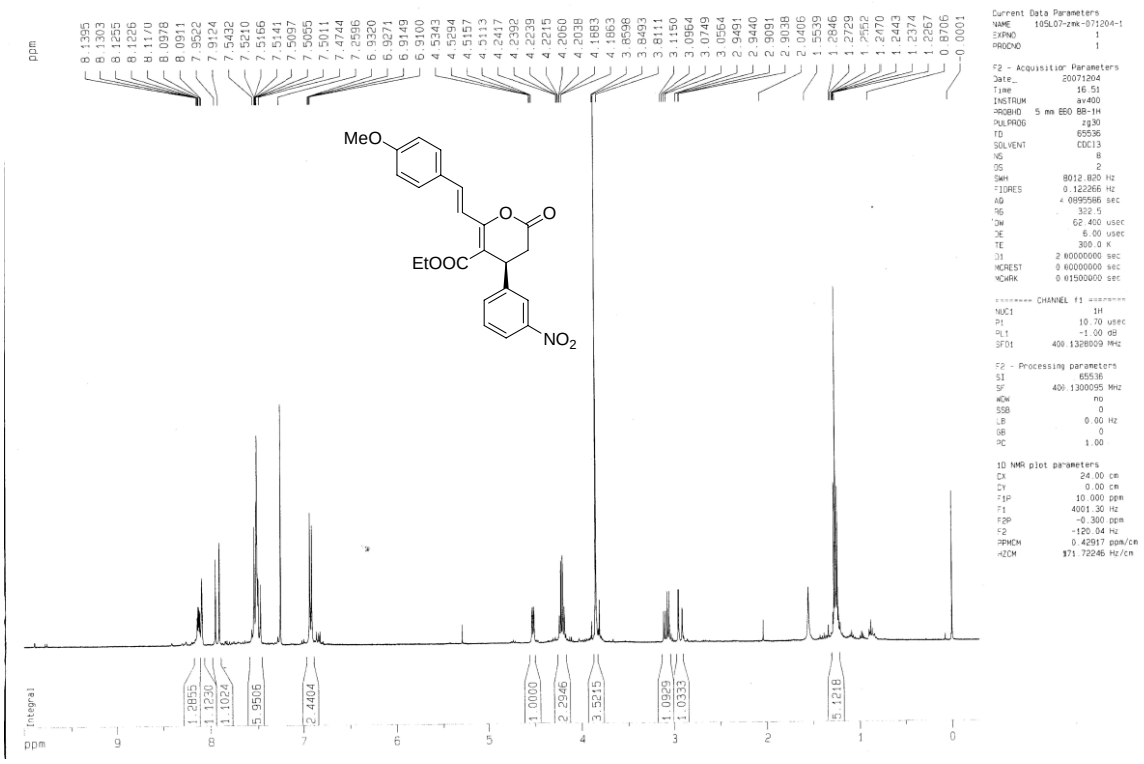
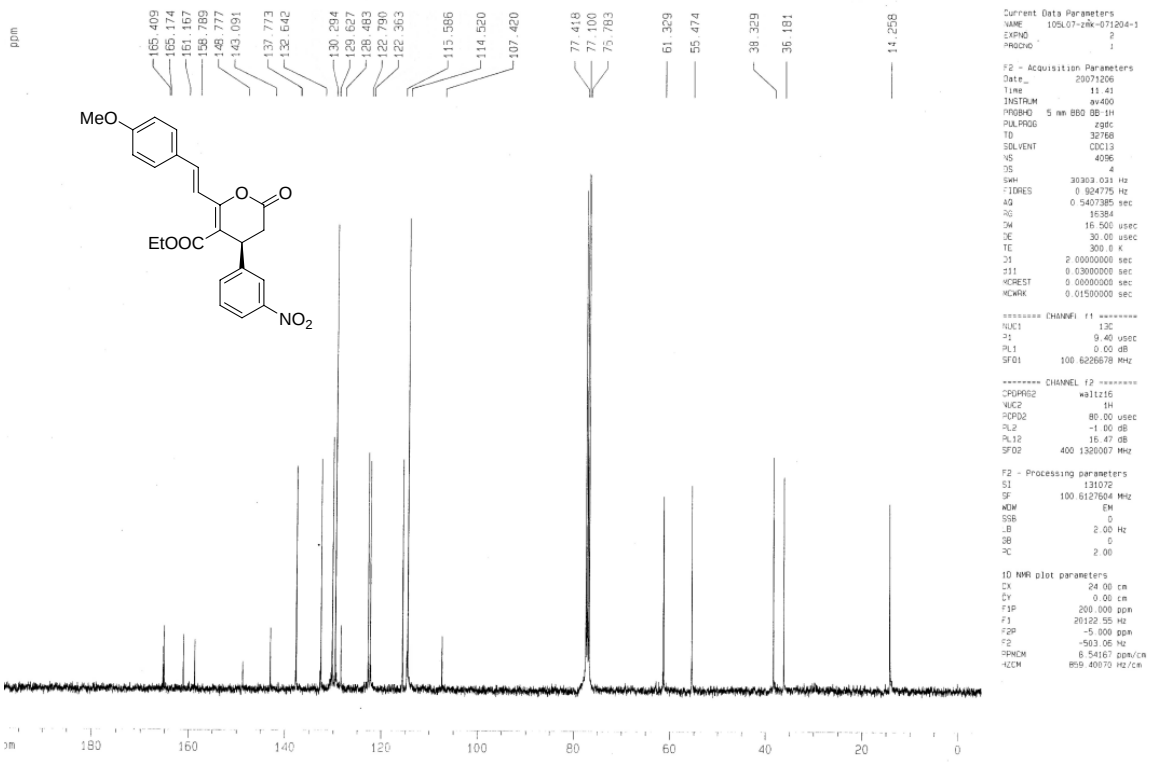
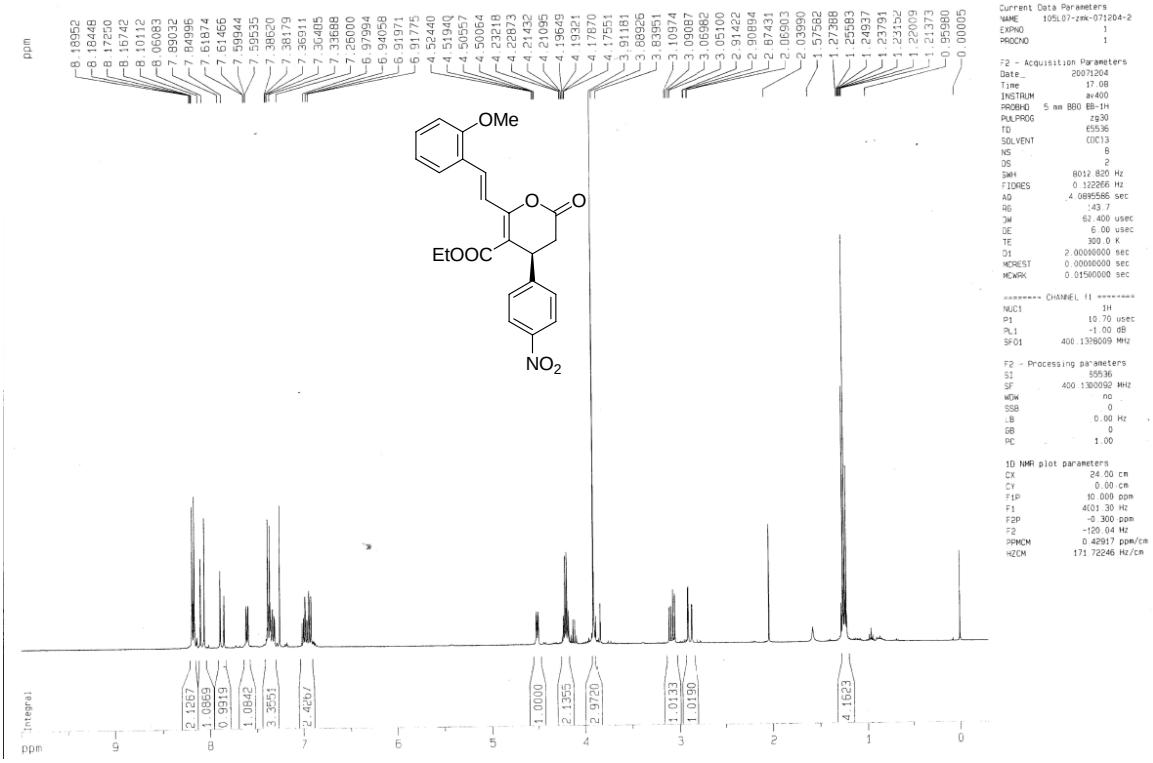
164.899
158.419
148.138
147.437
140.188
137.962
132.845
129.698
127.909
127.810
124.994
116.744
107.974
77.341
77.024
76.706
61.297
38.441
35.927
21.443
14.147


MeO
O
O
EtOOC
NO2
ppm
Integral


MeO
O
O
EtOOC
NO2
ppm


OMe
O
O
EtOOC
NO2
ppm
Integral
2.1267
1.0869
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1.0842
3.3551
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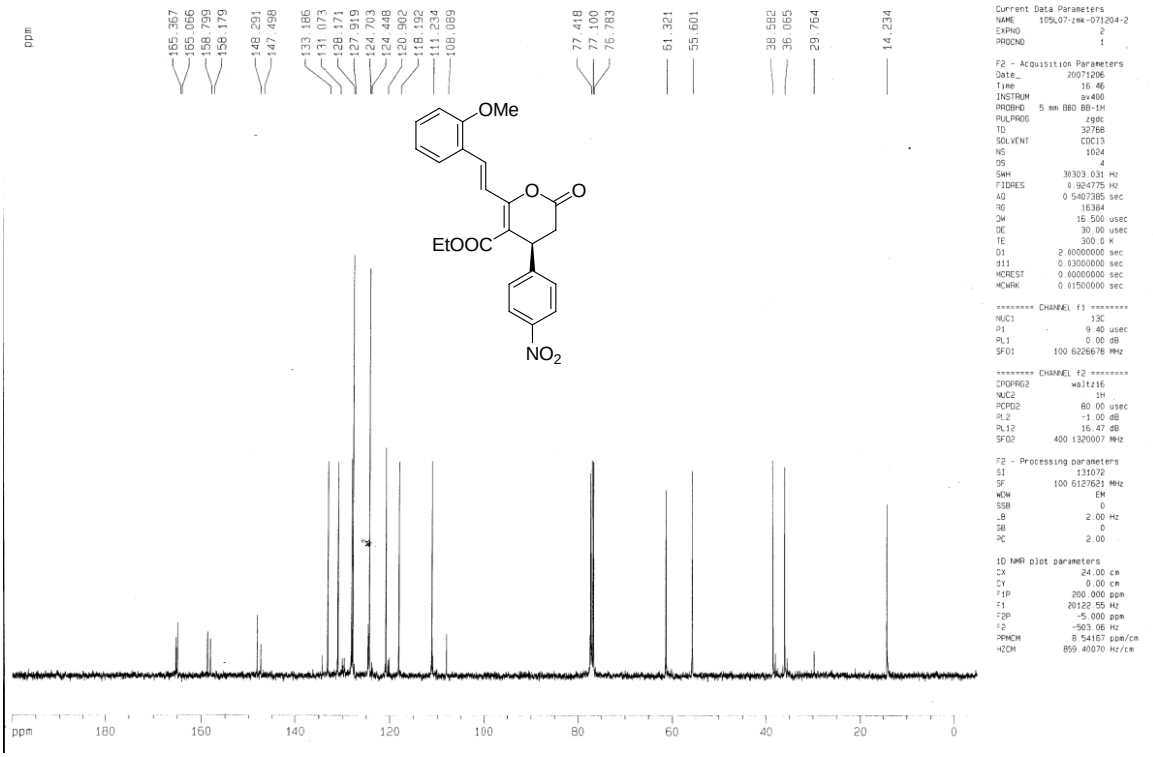
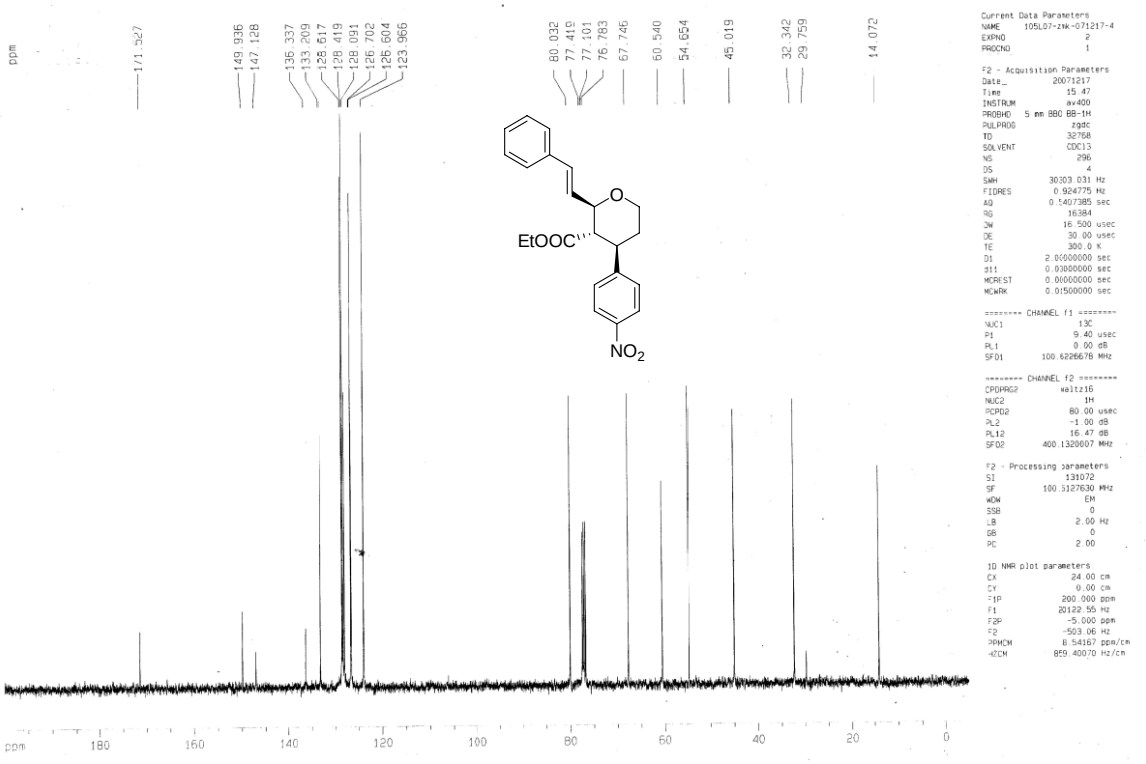
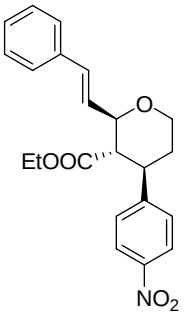
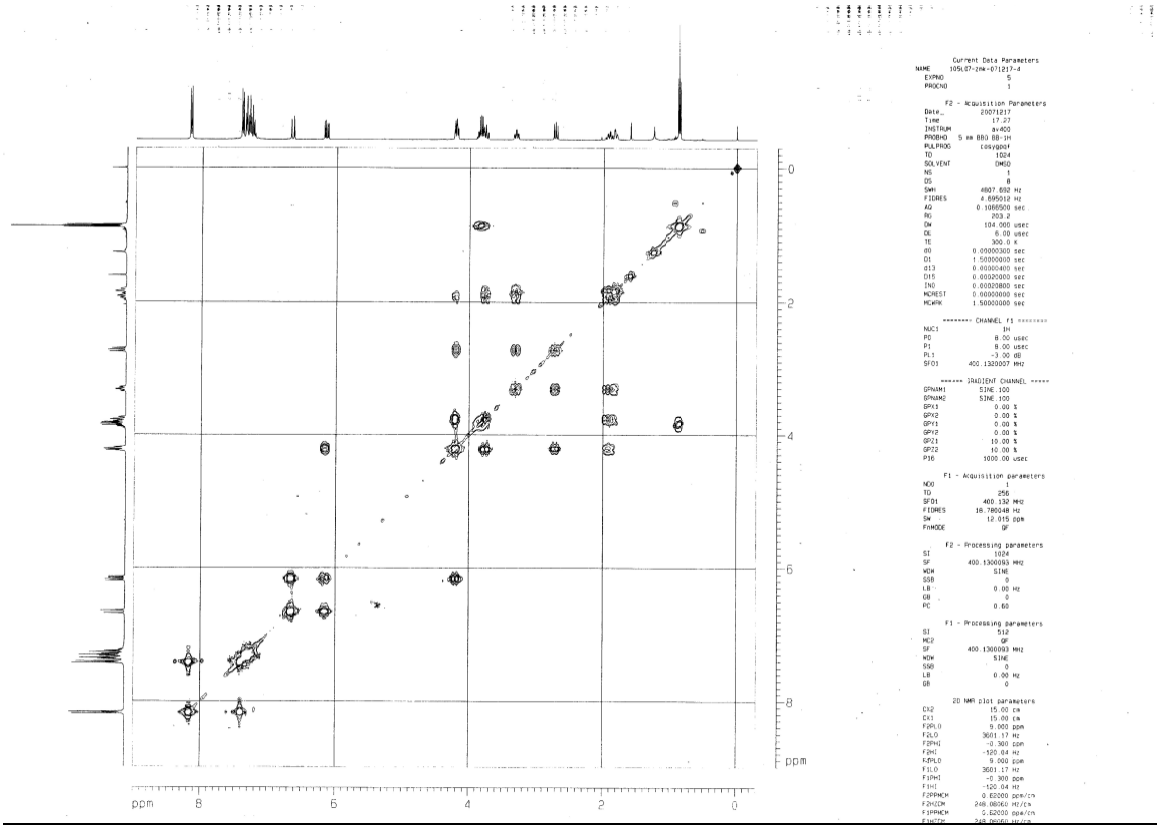
2.1355
2.9720
1.0133
1.0190
4.1623


OMe
O
O
EtOOC
NO2
ppm
165.367
165.066
158.799
158.179
148.291
147.498
133.186
131.073
128.171
127.919
124.703
124.448
120.902
118.192
111.234
108.089
77.418
77.100
76.783
61.321
55.601
38.582
36.065
29.764
14.234


EtOOC
O
NO2


EtOOC
O
NO2





Current Data Parameters
NAME 105(87-2ea-071217-d
EXPNO 5
PROCNO 1

F2 - Acquisition Parameters
Date_ 20071217
Time 17.27
INSTRUM av400
PROBHD 5 mm BBO BB-1H
PULPROG cosygpqf
TD 1024
SOLVENT DMSO
NS 1
DS 8
SWH 4807.692 Hz
FIDRES 4.695012 Hz
AQ 0.1066500 sec
RG 203.2
DW 104.000 usec
DE 6.00 usec
TE 300.0 K
d0 0.00000300 sec
D1 1.50000000 sec
d13 0.00004400 sec
D15 0.00020000 sec
IN0 0.00020800 sec
MCREST 0.00000000 sec
MCWRK 1.50000000 sec

======== CHANNEL f1 ========
NUC1 1H
P0 8.00 usec
P1 8.00 usec
PL1 -3.00 dB
SFO1 400.1320007 MHz

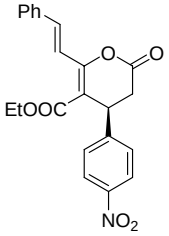
====== GRADIENT CHANNEL =====
GPNAM1 SINE.100
GPNAM2 SINE.100
GPX1 0.00 %
GPX2 0.00 %
GPY1 0.00 %
GPY2 0.00 %
GPZ1 10.00 %
GPZ2 10.00 %
P16 1000.00 usec

F1 - Acquisition parameters
NO0 1
TD 256
SFO1 400.132 MHz
FIDRES 18.780048 Hz
SW 12.015 ppm
FnMODE QF

F2 - Processing parameters
SI 1024
SF 400.1300093 MHz
WDW SINE
SSB 0
LB 0.00 Hz
GB 0
PC 0.60

F1 - Processing parameters
SI 512
MC2 QF
SF 400.1300093 MHz
WDW SINE
SSB 0
LB 0.00 Hz
GB 0

2D NMR plot parameters
CX2 15.00 cm
CX1 15.00 cm
F2PL0 9.000 ppm
F2LO 3601.17 Hz
F2PH1 -0.300 ppm
F2H1 -120.04 Hz
F1PL0 9.000 ppm
F1LO 3601.17 Hz
F1PH1 -0.300 ppm
F1H1 -120.04 Hz
F2PPMCM 0.62000 ppm/cm
F2HZCM 248.08060 Hz/cm
F1PPMCM 5.62000 ppm/cm
F1HZCM 248.08060 Hz/cm

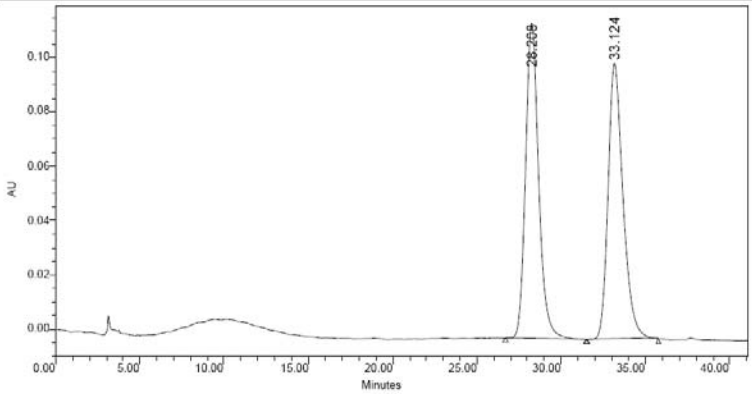


USTC
Project Name: zmk
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuanzhi-IA-6%-dl	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/8/2007 10:31:45 PM
Vial:	1	Acq. Method:	zmk 6%
Injection #:	1	Date Processed:	11/8/2007 11:17:09 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



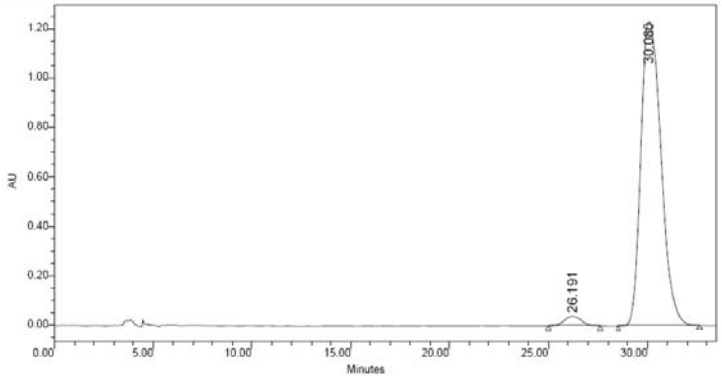
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	28.208	6309269	50.12	116348	53.32
2	33.124	6279275	49.88	101841	46.68

USTC
Project Name: zmk
Reported by User: System

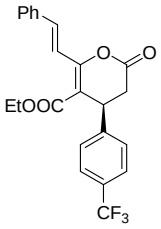
Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuancat-ph 0OC-IA--6%-	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/13/2007 8:01:04 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	11/13/2007 8:34:44 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	26.191	2293653	2.56	38732	3.05
2	30.080	87418747	97.44	1229258	96.95

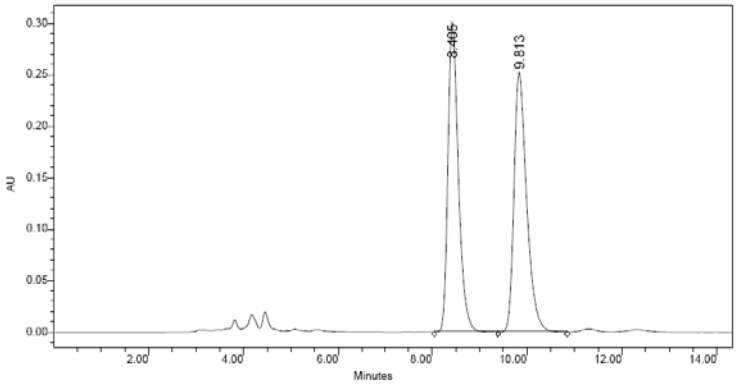


USTC
Project Name: zmk
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-CF3-IA-6%-DL	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/11/2007 4:37:35 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/11/2007 5:13:34 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



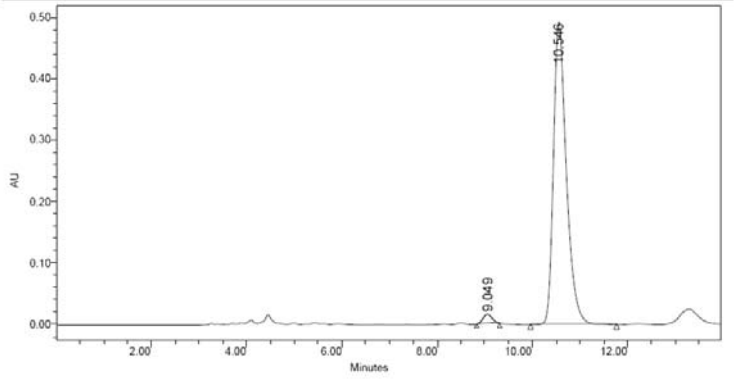
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.405	4615001	49.53	301412	54.41
2	9.813	4702933	50.47	252590	45.59

USTC
Project Name: zmk
Reported by User: System

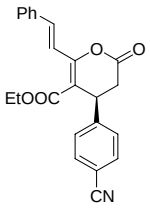
Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-CF3-IA-6%YAN	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/15/2007 1:42:45 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/15/2007 1:59:15 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



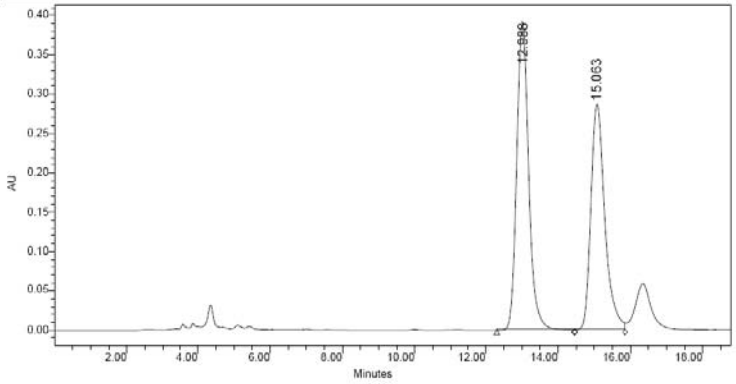
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	9.049	206417	2.17	15248	2.99
2	10.546	9321768	97.83	494252	97.01



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-CN-IA-15%-DL	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/26/2007 9:50:08 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/26/2007 10:59:58 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

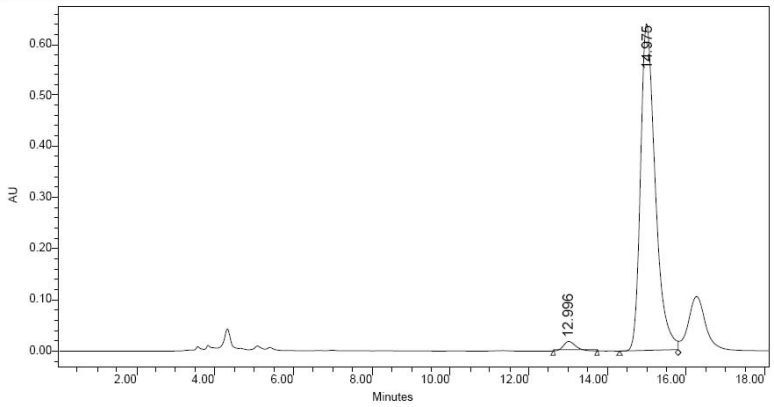


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.988	9140647	54.17	392310	57.77
2	15.063	7731939	45.83	286802	42.23

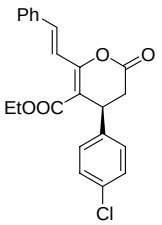
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-CN-IA-15%-yan(	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/26/2007 10:30:47 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/26/2007 10:59:58 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



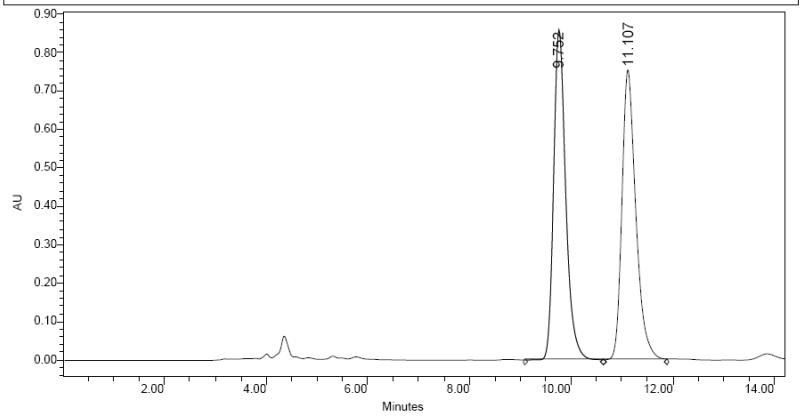
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.996	410625	2.39	18627	2.82
2	14.975	16787216	97.61	640909	97.18



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-Cl--IA-6%-dl	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	1/6/2008 8:41:25 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	1/6/2008 9:01:51 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

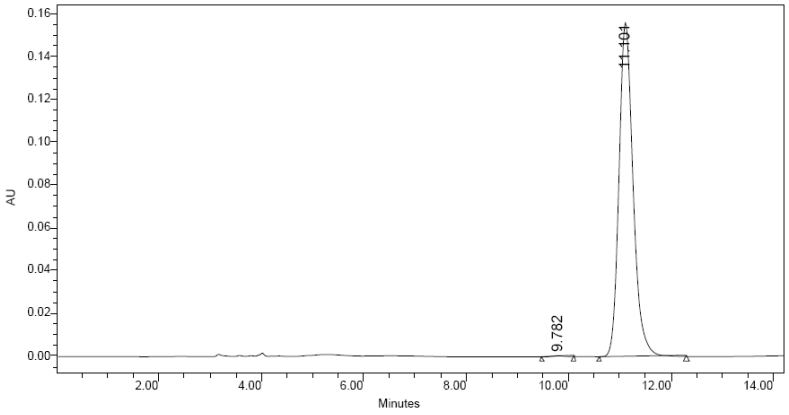


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	9.752	14328275	49.82	860679	53.19
2	11.107	14433661	50.18	757482	46.81

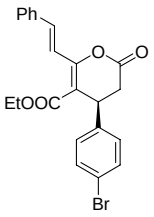
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-Cl--IA-6%-yCHC	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	1/6/2008 9:59:34 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	2	Date Processed:	1/6/2008 10:14:03 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	9.782	6706	0.22	457	0.29
2	11.101	2984534	99.78	156003	99.71

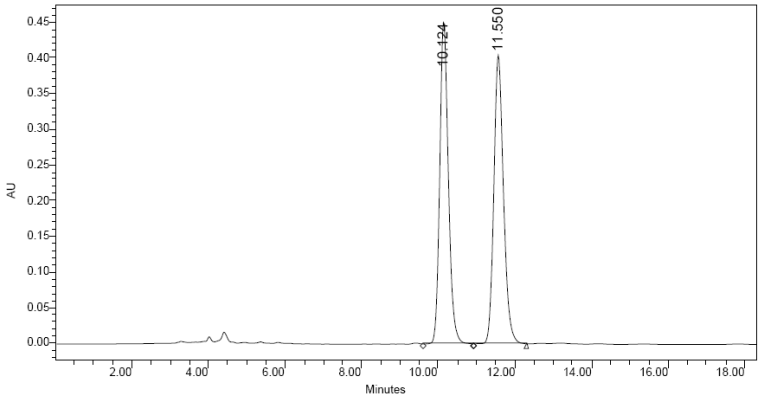


USTC
Project Name: zmk
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br--IA--6%-dl	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/17/2007 8:34:15 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	11/17/2007 8:54:50 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



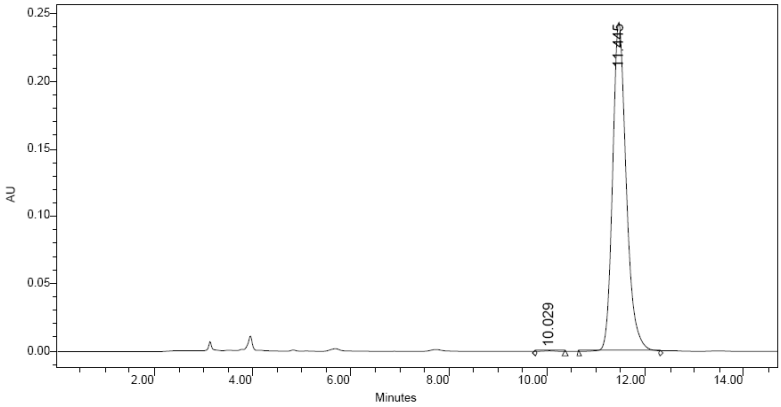
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.124	7066659	49.92	451300	52.77
2	11.550	7090638	50.08	403993	47.23

USTC
Project Name: zmk
Reported by User: System

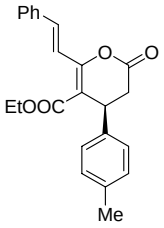
Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+4-Br--IA-6%-chong	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	1/7/2008 1:50:10 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	1/7/2008 2:06:11 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



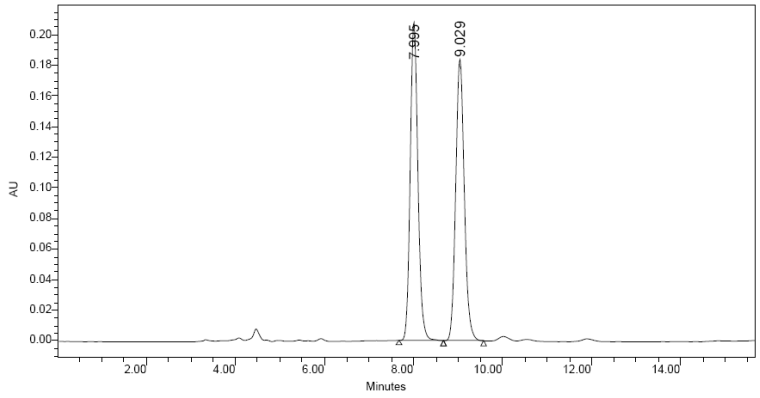
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.029	7424	0.16	445	0.18
2	11.445	4715453	99.84	244134	99.82



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-CH3--IA--6%-DL	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/17/2007 3:03:21 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	4	Date Processed:	12/2/2007 7:20:08 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

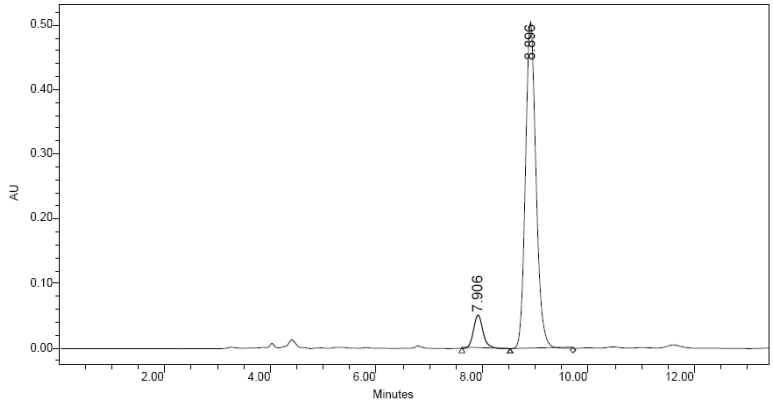


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.995	2503150	50.25	208398	53.09
2	9.029	2477759	49.75	184122	46.91

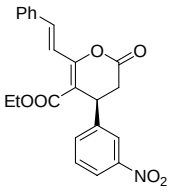
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-CH3--IA--6%-yang	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/17/2007 9:13:08 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	3	Date Processed:	12/2/2007 7:20:24 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.906	653404	8.51	51717	9.28
2	8.896	7022132	91.49	505568	90.72

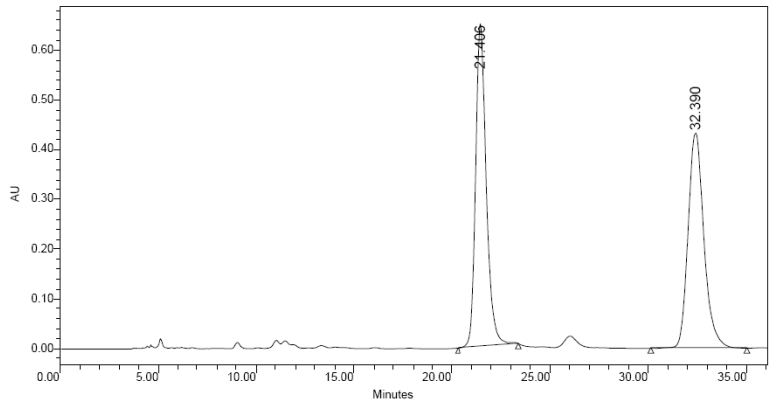


USTC
Project Name: zmk
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph+3-NO2-IA-6%-YAN	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/12/2007 7:35:19 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/12/2007 8:17:05 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



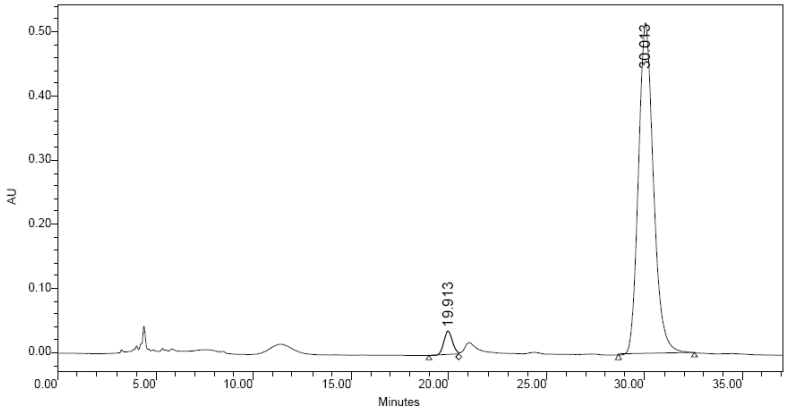
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	21.406	24513521	50.09	649207	60.00
2	32.390	24428103	49.91	432792	40.00

USTC
Project Name: zmk
Reported by User: System

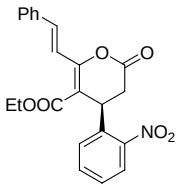
Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-3-NO2--IA--6%-YANG	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/18/2007 9:41:45 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	2	Date Processed:	11/18/2007 10:45:59 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	19.913	1209291	4.19	37809	6.82
2	30.013	27656844	95.81	516864	93.18

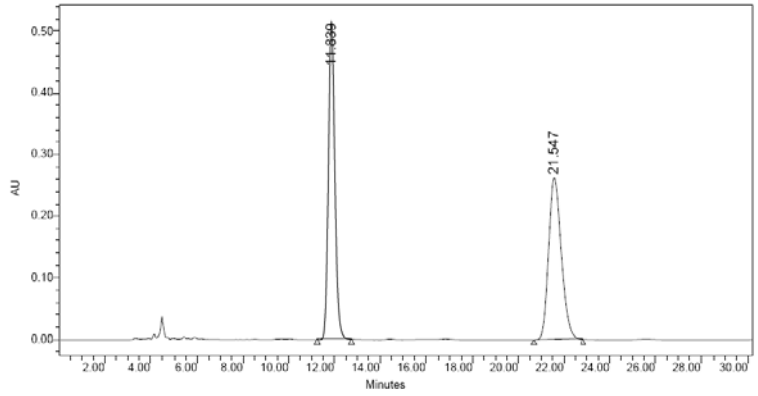


USTC
Project Name: zmk
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-2-NO2--IA--6%-DL	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/17/2007 2:32:14 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	3	Date Processed:	11/17/2007 3:03:59 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



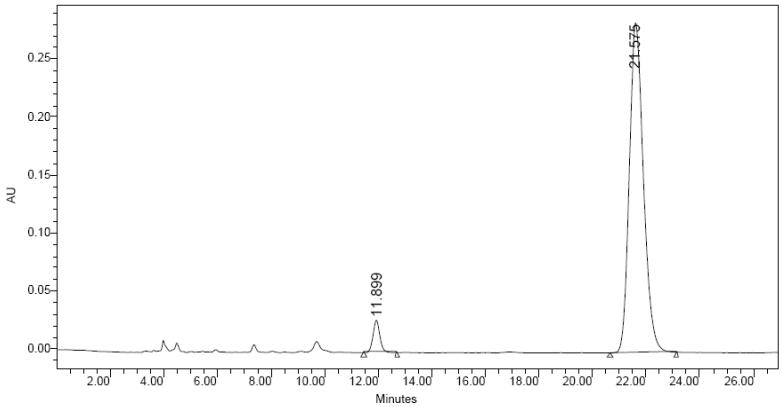
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.839	10071367	49.90	516082	66.24
2	21.547	10112645	50.10	263079	33.76

USTC
Project Name: zmk
Reported by User: System

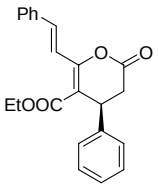
Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-2-NO2--IA--6%-YANG	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/17/2007 3:21:06 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	5	Date Processed:	11/17/2007 3:48:12 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



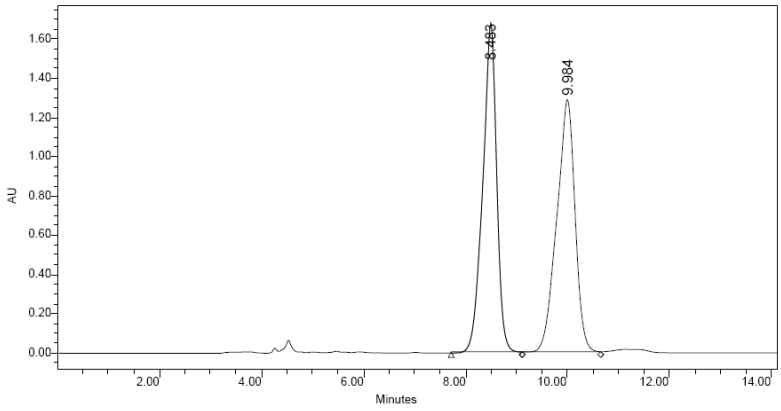
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.899	496213	4.55	27901	8.94
2	21.575	10398556	95.45	284336	91.06



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-ph--IA--6%-dl	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/17/2007 1:45:43 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	11/17/2007 3:03:43 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

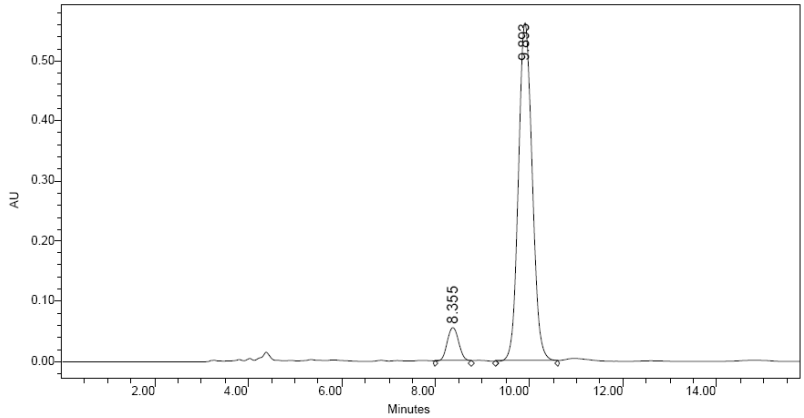


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.483	32065119	49.64	1680584	56.53
2	9.984	32528801	50.36	1292580	43.47

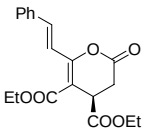
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-Ph-IA--10octiao-6%-	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/23/2007 1:07:01 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	11/23/2007 1:23:10 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



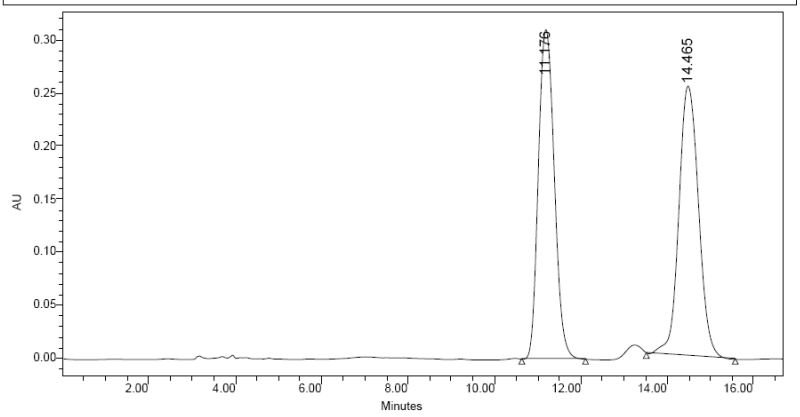
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.355	991144	7.90	56469	9.11
2	9.893	11562381	92.10	563544	90.89



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-COOEt-IA--6%-DL	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/26/2007 11:29:35 AM
Vial:	1	Acq. Method:	znk06%
Injection #:	5	Date Processed:	11/29/2007 1:40:27 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

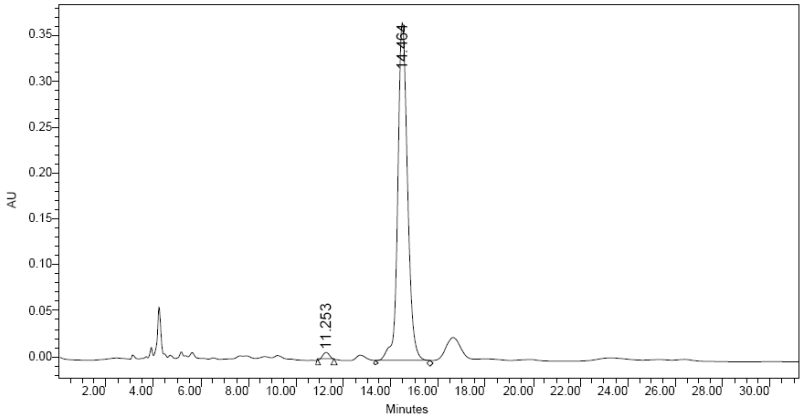


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.176	7967862	49.65	310402	54.97
2	14.465	8080339	50.35	254296	45.03

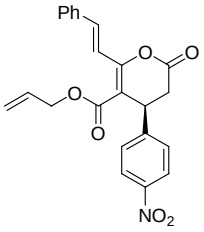
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-COOEt--oC-IA--6%-y2	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	11/28/2007 5:46:23 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	2	Date Processed:	11/28/2007 6:42:57 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.253	159028	1.49	7857	2.09
2	14.464	10547595	98.51	368135	97.91

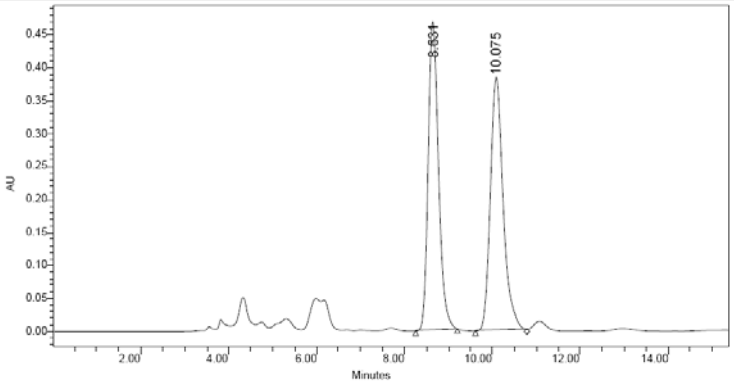


USTC
Project Name: zmk
Reported by User: System

Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-OtBu+4-NO2-IA-15%-I	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/13/2007 6:58:02 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/13/2007 7:26:15 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



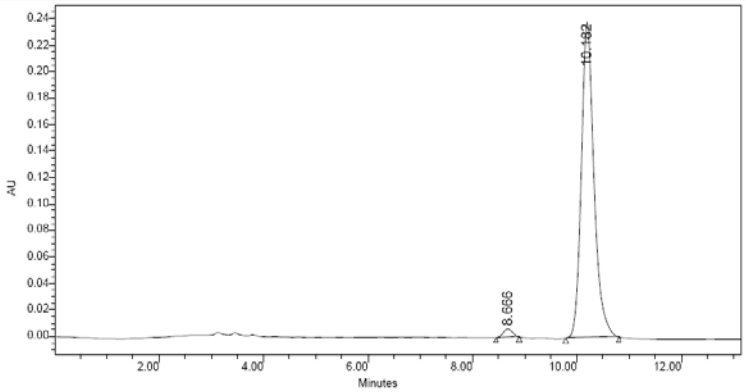
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.631	7677831	49.66	468633	54.88
2	10.075	7782015	50.34	385302	45.12

USTC
Project Name: zmk
Reported by User: System

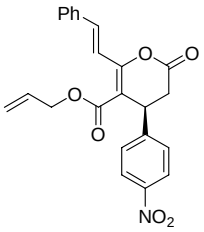
Breeze

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-NO2+Ot-Bu-IA-15%`	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/17/2007 1:15:22 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/17/2007 1:28:48 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



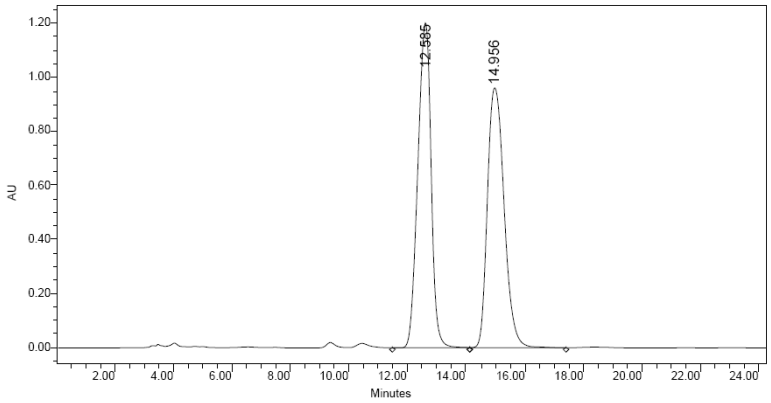
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.666	81661	1.99	6474	2.65
2	10.182	4018406	98.01	238052	97.35



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-allyl+4-NO2-IA-15%-d	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/9/2007 9:39:00 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/9/2007 10:05:12 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

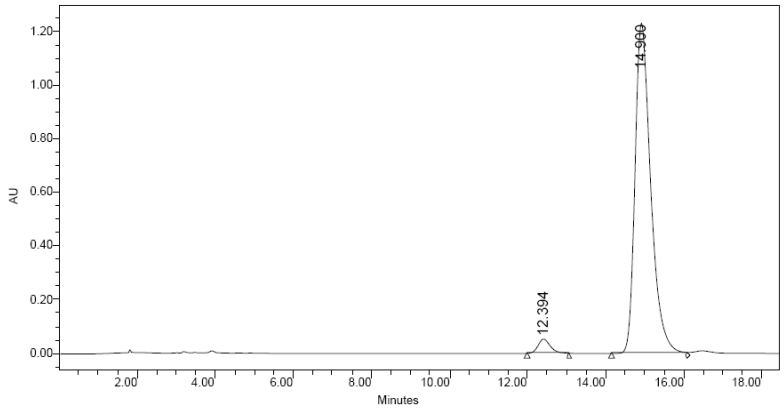


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.585	37998799	49.78	1203692	55.54
2	14.956	38327505	50.22	963416	44.46

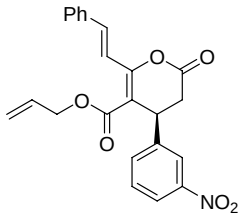
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-allyl+4-NO2-IA-15%-y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/10/2007 12:49:25 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/10/2007 1:09:50 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



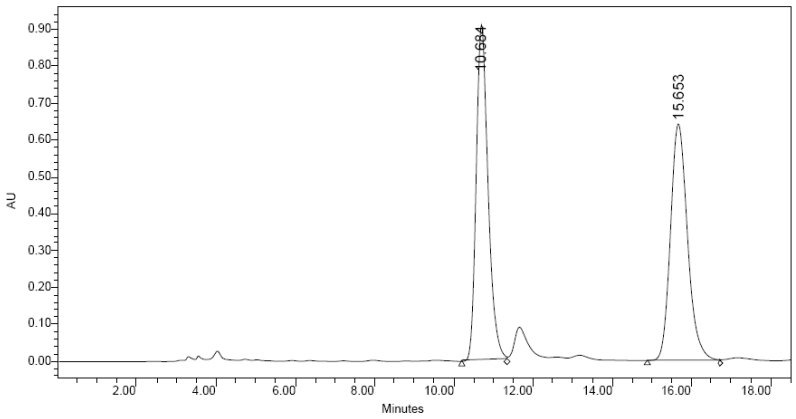
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.394	1153367	3.24	53070	4.13
2	14.900	34451242	96.76	1230940	95.87



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-allyl+3-NO2-IA-15%-d	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/9/2007 9:09:54 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/9/2007 9:29:11 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

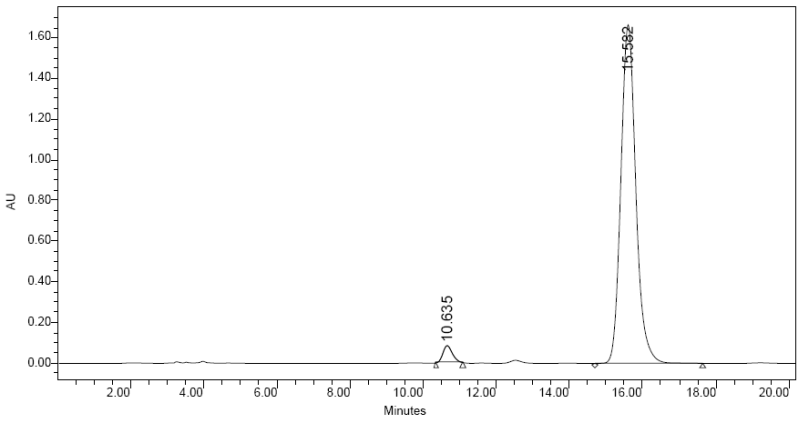


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.684	18972504	49.64	910056	58.64
2	15.653	19245011	50.36	641977	41.36

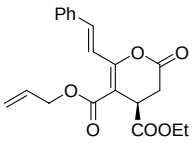
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-allyl+3-NO2-IA-15%-y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/10/2007 1:08:38 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/10/2007 1:31:32 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



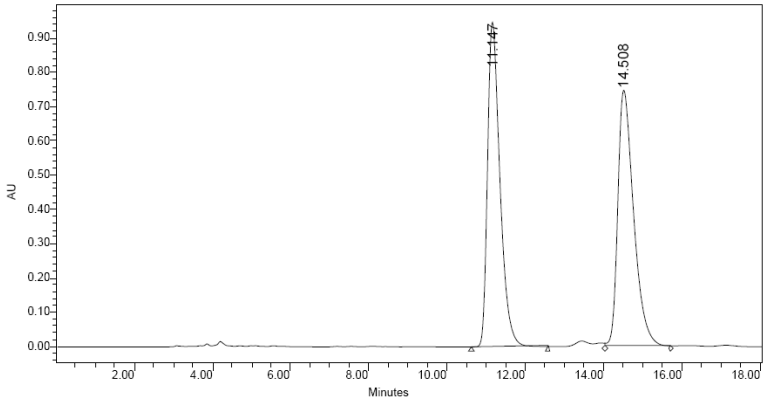
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	10.635	1525075	3.12	84193	4.81
2	15.582	47320870	96.88	1665130	95.19



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-allyl+COOEt-IA-6%-dl	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/9/2007 7:54:34 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/9/2007 8:12:58 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

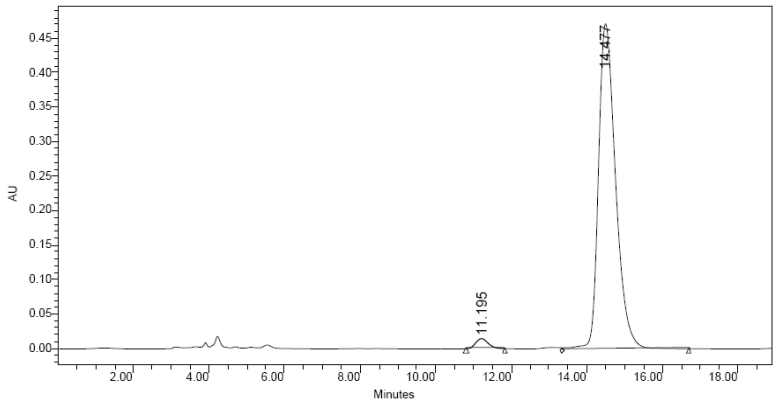


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.147	20923102	49.69	947572	55.85
2	14.508	21180731	50.31	749023	44.15

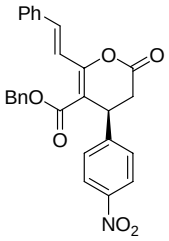
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-allyl+COOEt-IA-6%-ya	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/9/2007 8:18:13 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	2	Date Processed:	12/9/2007 8:37:44 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



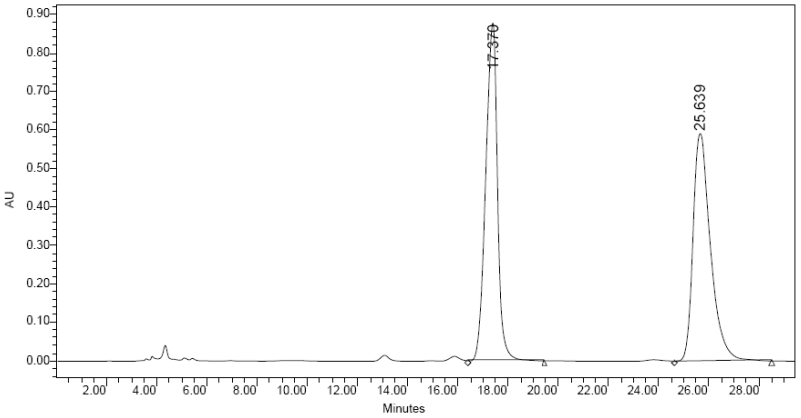
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.195	339045	2.24	14620	3.01
2	14.477	14822317	97.76	471874	96.99



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-OBn+4-NO2-IA-15%-Y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/23/2007 4:21:26 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/23/2007 5:03:39 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

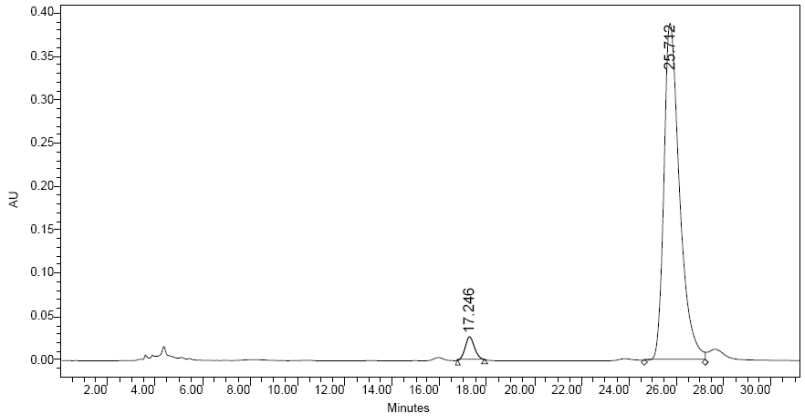


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.370	28693616	50.10	878426	59.76
2	25.639	28584442	49.90	591494	40.24

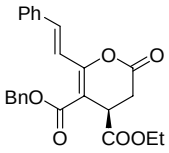
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-OBn+4-NO2-IA-15%-Y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/23/2007 4:55:17 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/23/2007 5:30:21 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



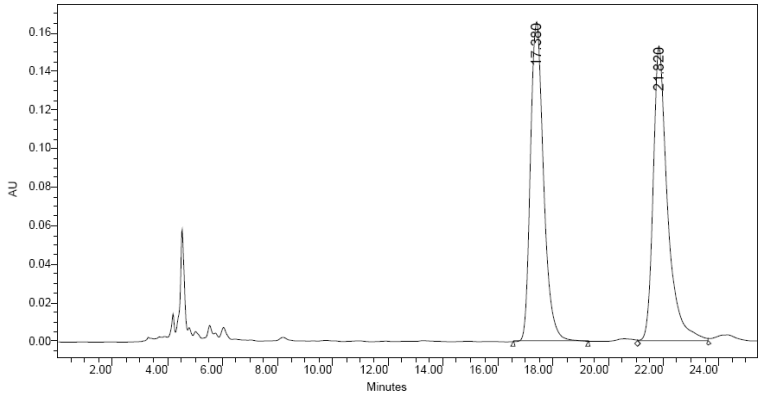
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.246	724768	3.89	26694	6.43
2	25.712	17905303	96.11	388559	93.57



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-OBn+COOEt-IA-6%-D	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/23/2007 3:17:36 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/23/2007 3:43:58 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

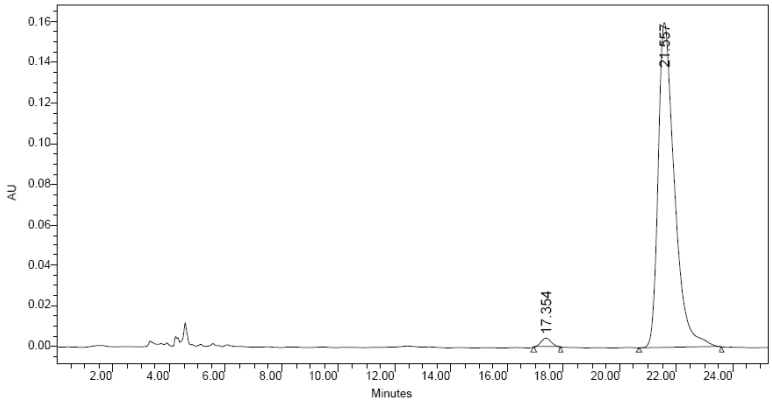


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.380	5513113	49.76	165866	52.00
2	21.820	5565483	50.24	153105	48.00

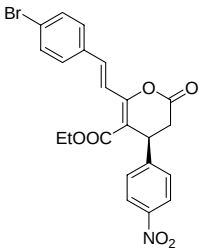
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-OBn+COOEt-IA-6%-Y.	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/23/2007 3:43:41 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	2	Date Processed:	12/23/2007 4:09:48 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



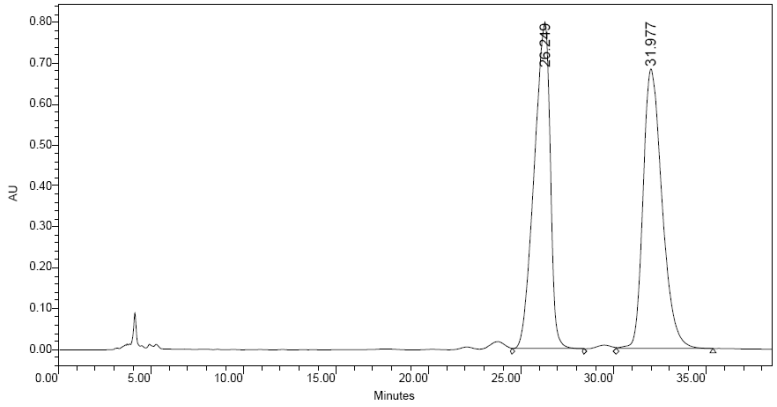
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.354	114289	1.74	4409	2.68
2	21.557	6443958	98.26	160226	97.32



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br+4-NO2--IA--9%-D	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/1/2007 10:07:19 PM
Vial:	1	Acq. Method:	zmk9%
Injection #:	1	Date Processed:	12/1/2007 10:46:05 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

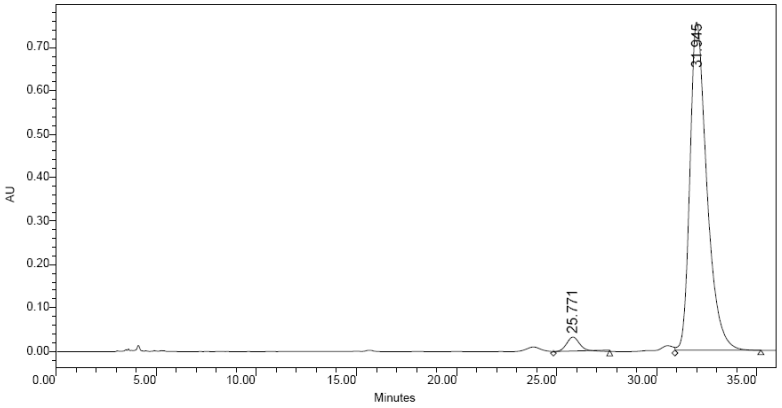


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	26.249	48496071	49.69	800390	53.90
2	31.977	49102127	50.31	684568	46.10

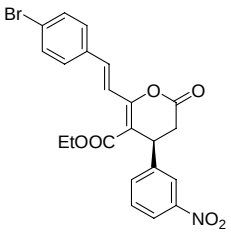
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br+4-NO2-IA-9%-y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/2/2007 3:32:53 PM
Vial:	1	Acq. Method:	zmk9%
Injection #:	1	Date Processed:	12/2/2007 4:09:03 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



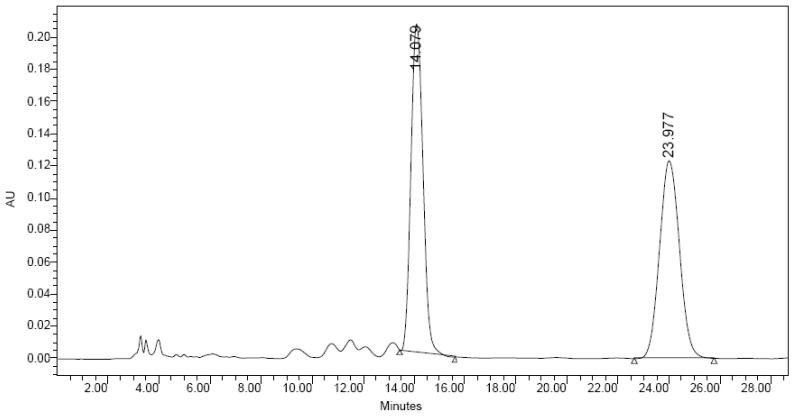
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	25.771	1583288	3.42	33207	4.20
2	31.945	44697203	96.58	757101	95.80



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br+3-NO2-IA-15%-d	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/2/2007 8:01:42 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	3	Date Processed:	12/2/2007 8:30:46 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

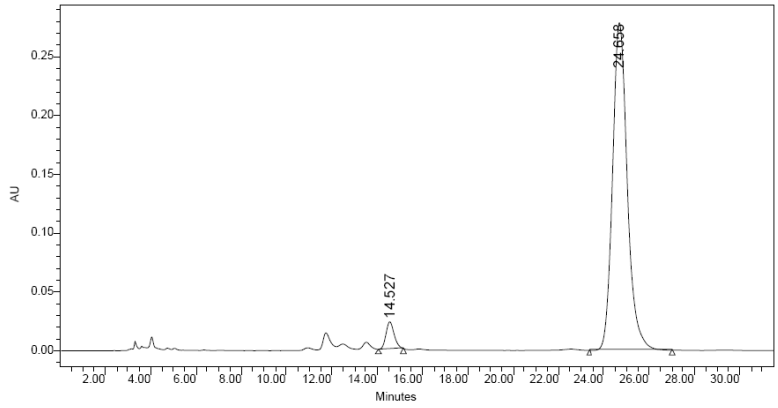


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	14.079	6735502	50.13	204530	62.40
2	23.977	6701547	49.87	123221	37.60

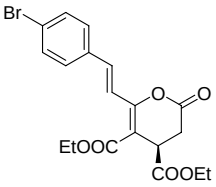
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br+3-NO2-IA-15%-y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/11/2007 2:14:23 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/11/2007 2:48:56 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



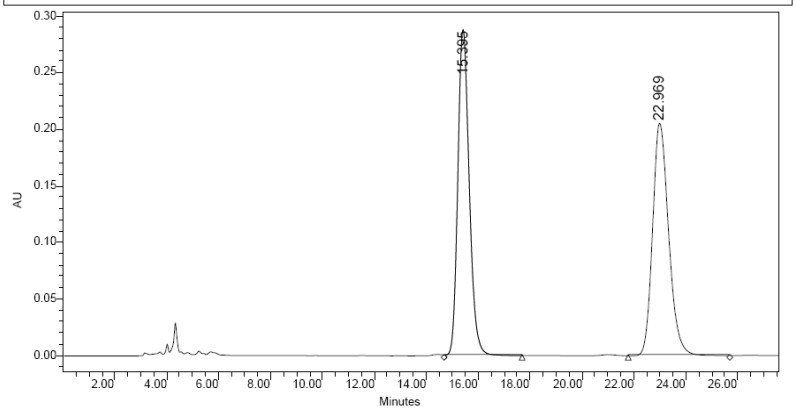
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	14.527	588453	4.46	23227	7.70
2	24.658	12604320	95.54	278566	92.30



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br+COOEt-IA-6%-DI	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/3/2007 10:00:01 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/3/2007 10:28:19 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

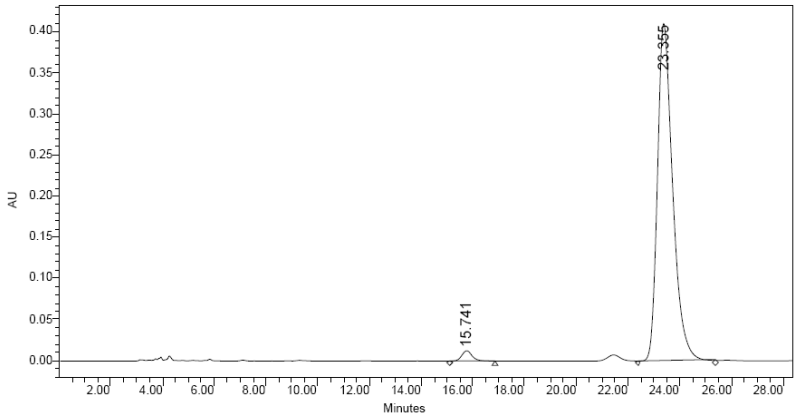


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	15.395	8822905	49.97	288266	58.38
2	22.969	8833738	50.03	205469	41.62

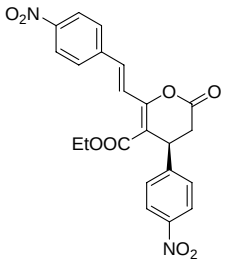
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-Br+COOEt-IA-6%-ya	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/4/2007 7:56:21 PM
Vial:	1	Acq. Method:	znk06%
Injection #:	1	Date Processed:	12/4/2007 8:26:11 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



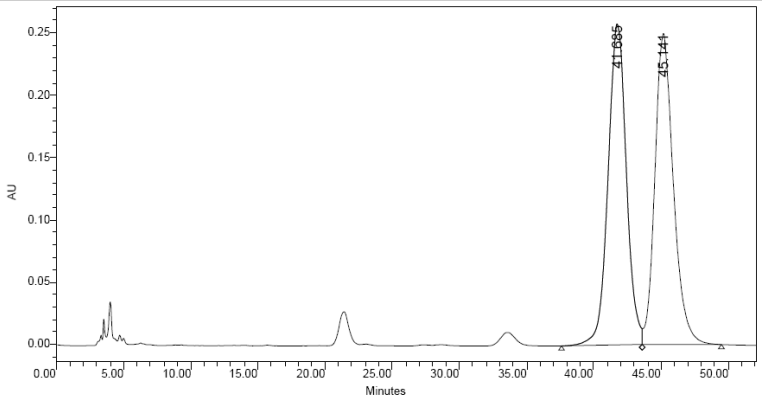
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	15.741	348420	2.03	12544	2.97
2	23.355	16835100	97.97	410406	97.03



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-NO2+4-NO2-IA-15%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/2/2007 7:04:52 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/2/2007 8:02:09 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

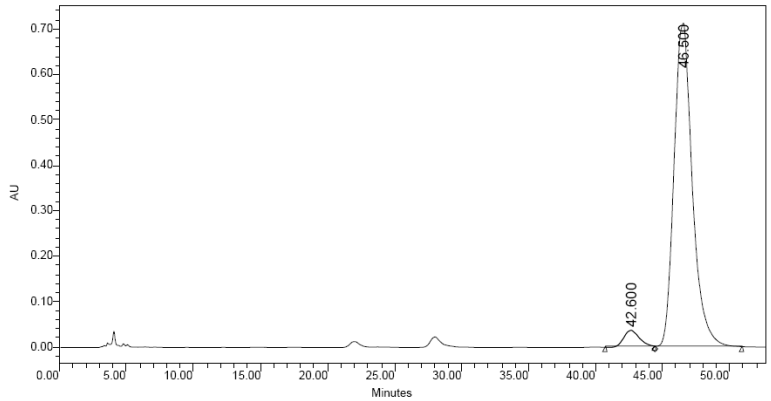


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	41.685	24548490	50.56	258128	50.77
2	45.141	24008293	49.44	250290	49.23

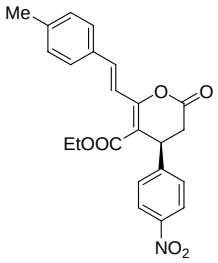
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-NO2+4-NO2-IA-15%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/11/2007 2:48:02 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/11/2007 3:42:21 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



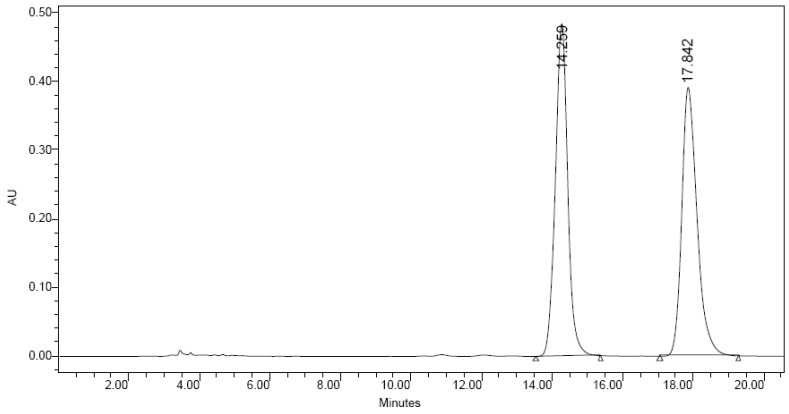
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	42.600	2879146	4.07	36244	4.84
2	46.500	67896581	95.93	712939	95.16



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-CH3+4-NO2-IA-15%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/20/2007 9:05:25 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/20/2007 9:28:39 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

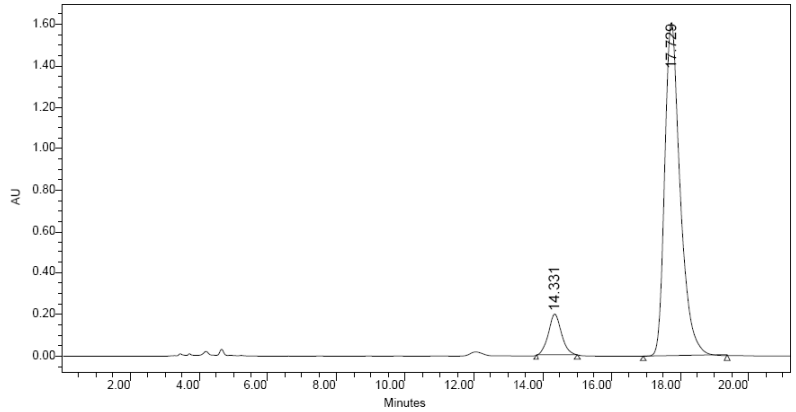


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	14.259	11825824	50.02	484609	55.30
2	17.842	11815857	49.98	391724	44.70

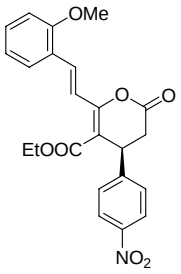
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-4-CH3+4-NO2-IA-15%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/20/2007 9:27:29 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/20/2007 9:49:14 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



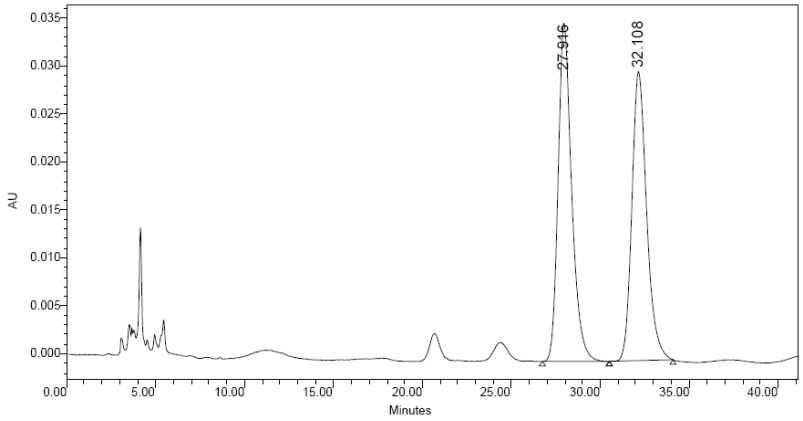
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	14.331	5274218	9.46	197820	10.94
2	17.729	50499552	90.54	1610764	89.06



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-2-OMe+4-NO2-IA--9%	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/1/2007 10:53:14 PM
Vial:	1	Acq. Method:	zmk9%
Injection #:	2	Date Processed:	12/1/2007 11:34:39 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

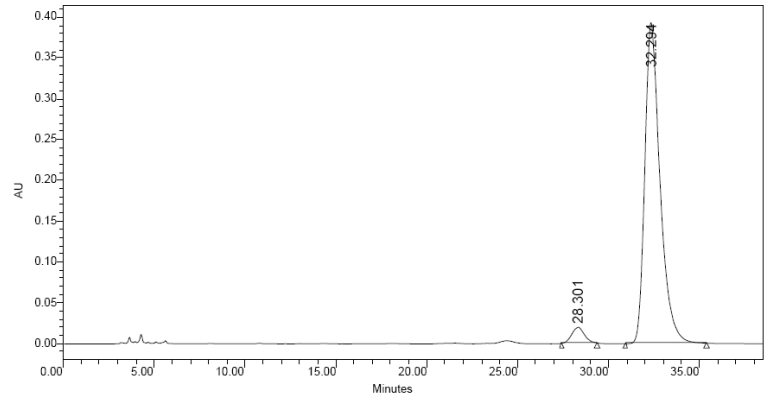


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	27.916	1869248	51.71	35270	53.89
2	32.108	1745654	48.29	30182	46.11

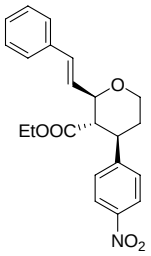
USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan-2-OMe+4-NO2-IA-9%-	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/2/2007 10:25:15 PM
Vial:	1	Acq. Method:	zmk9%
Injection #:	1	Date Processed:	12/2/2007 11:37:06 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



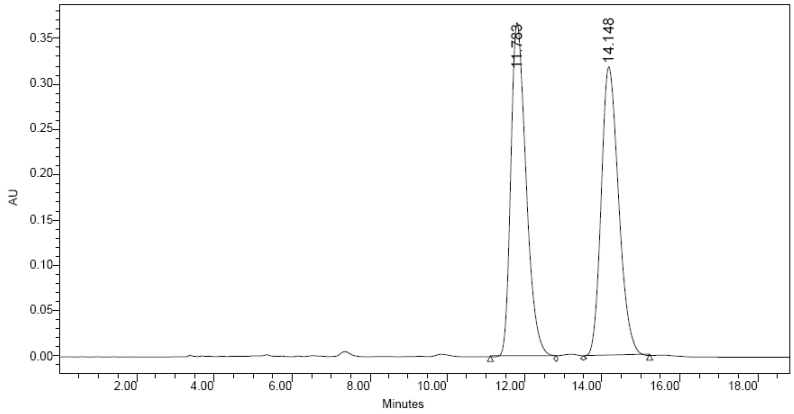
	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	28.301	944782	3.97	19598	4.75
2	32.294	22857397	96.03	393163	95.25



USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan+4-NO2-OD-15%-hy-dl	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/27/2007 5:02:07 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	1	Date Processed:	12/27/2007 5:38:42 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	

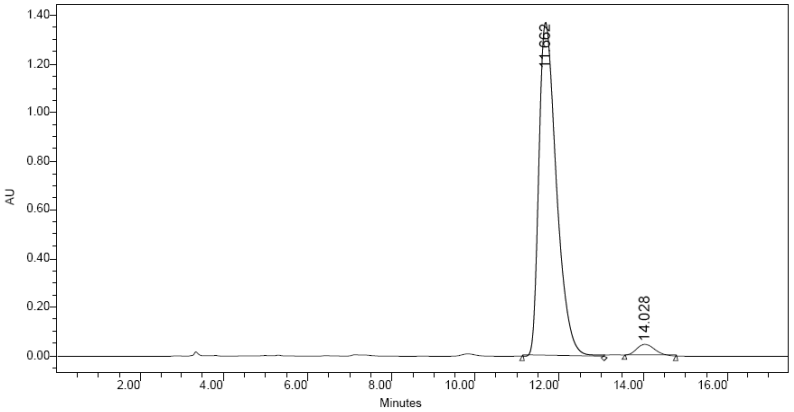


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.783	10064718	50.27	367719	53.61
2	14.148	9958561	49.73	318248	46.39

USTC
Project Name: zmk
Reported by User: System

SAMPLE INFORMATION

Sample Name:	zmk-liuhuan+4-NO2-OD-15%-hy-y	Acquired By:	System
Sample Type:	Unknown	Date Acquired:	12/27/2007 5:23:40 PM
Vial:	1	Acq. Method:	zmk15%
Injection #:	2	Date Processed:	12/27/2007 5:46:01 PM
Injection Volume:	20.00 ul	Channel Name:	2487Channel 1
Run Time:	200.00 Minutes	Sample Set Name:	



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.662	39970093	96.70	1372299	96.81
2	14.028	1362665	3.30	45206	3.19