Supporting Information

Copper-Mediated Coupling of 1,1-Dibromo-1-alkenes with Dialkylphosphonates: A Convenient Synthesis of 1-Alkenylphosphonates

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Supplementary Material (ESI) for Chemical Communications: *Copper-Mediated Cyclization of 1,1-Dibromoalkenes with Dialkylphosphonates*
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General Information.

All reactions were carried out in oven or flame-dried glassware under an argon atmosphere employing standard techniques in handling air-sensitive materials. Copper-catalyzed cyclization reactions were carried out in resealable pressure tubes.

All solvents were reagent grade. Toluene was freshly distilled from sodium/benzophenone under argon and degassed immediately prior to use.

Copper(I) iodide (99,999% purity) was purchased from Aldrich and used as supplied. Finely powdered potassium phosphate tribasic was purchased from Riedel-de Haën through Sigma Aldrich. All other reagents were used as supplied.

Unless otherwise noted, reactions were magnetically stirred and monitored by thin layer chromatography using Merck-Kiesegel $60F_{254}$ plates. Flash chromatography was performed with silica gel 60 (particle size 35-70 μm) supplied by SDS. Yields refer to chromatographically and spectroscopically pure compounds, unless otherwise noted.

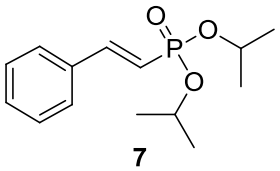
Proton NMR spectra were recorded using an internal deuterium lock at ambient temperature on a Bruker 300 MHz spectrometer. Internal reference of δ_H 7.26 was used for $CDCl_3$. Data are presented as follows: chemical shift (in ppm on the δ scale relative to δ_{TMS} = 0), multiplicity (s = singlet, d = doublet, t = triplet, quint. = quintuplet, m = multiplet, br. = broad, app. = apparent), coupling constant (*J*/Hz) and integration. Resonances that are either partially or fully obscured are denoted obscured (obs.). Carbon-13 NMR spectra were recorded at 75 MHz and an internal reference of δ_C 77.16 was used for $CDCl_3$. Phosphorus-31 NMR spectra were recorded at 121.5 MHz and are referenced to H_3PO_4 (85% solution in D_2O, 0 ppm). ^{19}F NMR spectra were recorded at 188 MHz.

Melting points were recorded on a Buchi B-545. Infrared spectra were recorded on a Nicolet iS 10 (SMART iTR diamond ATR) spectrophotometer. Mass spectra were obtained on a Waters XevoQTof spectrometer.

Experimental Procedures and Characterization Data

General procedure for the synthesis of vinylphosphonates from 1,1-dibromo-1-alkenes:

A 15 mL pressure tube was charged with dialkylphosphonate (2.5 mmol), 1,1-dibromo-1-alkene (1.0 mmol), K_3PO_4 (1.3 g, 6.0 mmol), and copper(I) iodide (76 mg, 0.40 mmol). The tube was fitted with a rubber septum, evacuated under high vacuum and backfilled with argon. Dry and degassed toluene (3 mL) and *N*,*N*'-dimethylethylenediamine (85 μL, 0.8 mmol) were next added, the rubber septa was replaced by a Teflon-coated screw cap and the light blue-green suspension was heated at 120 °C for 20-24 h. The brownish suspension was cooled to rt, filtered over a plug of silica gel (washed with EtOAc), and concentrated. The crude residue was purified by flash chromatography over silica gel.



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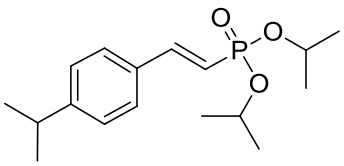
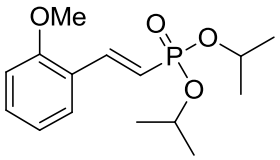
(*E*)-Diisopropyl styrylphosphonate 7.[S1] Scale: 150 mg of compound obtained (*E*/*Z*: 90/10); yield: 60%. Pale yellow liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.17-7.65 (m, 6 H), 6.18 (t app., J = 16.8 Hz, 1 H), 4.47-4.68 (m, 2 H), 1.35 and 1.29 (d, J = 6.1 Hz, d, J = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 147.5 (d, J = 7.1 Hz), 135.0 (d, J = 23.6 Hz), 129.8, 128.6, 127.4, 115.5 (d, J = 191.2 Hz), 70.1 (d, J = 5.5 Hz), 24.0 (d, J = 4.1 Hz), 23.8 (d, J = 4.1 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 17.2; IR (ATR) ν_{max}: 2970, 1620, 1445 1385, 1240, 1100, 980, 890, 825 cm^{-1}; ESIMS (positive mode): 559.2, 291.1, 269.1, 185.0; ESI-HRMS (positive mode): calcd for $C_{14}H_{21}PO_3Na$ $[M+Na]^+$ 291.1126, found 291.1135.



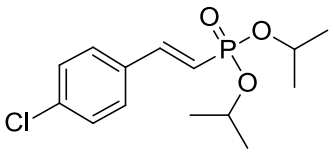
(*E*)-Diisopropyl 4-isopropylstyrylphosphonate. Scale: 180 mg of compound obtained (*E*/*Z*: 92/8); yield: 58%. Brown liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.39 (dd, J = 22.5 and 17.6

[S1] Inoue, H.; Tsubouchi, H.; Nagaoka, Y.; Tomioka, K. *Tetrahedron* **2002**, *58*, 83.

Hz, 1H), 7.36 (d, *J* = 8.2 Hz, 2H), 7.16 (d, *J* = 8.2 Hz, 2H), 6.14 (t app., *J* = 17.6 Hz, 1H), 4.47-4.70 (m, 2H), 2.84 (sept., *J* = 6.9 Hz, 1H), 1.29, 1.23 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H), 1.17 (d, *J* = 6.9 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 151.2, 148.0 (d, *J* = 6.6 Hz), 132.5 (d, *J* = 23.1 Hz), 127.7, 126.8, 114.0 (d, *J* = 192.1 Hz), 70.3 (d, *J* = 5.5 Hz), 34.0, 24.0 (d, *J* = 3.8 Hz), 23.8 (d, *J* = 4.91 Hz), 23.7, 23.6; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 17.7; IR (ATR) ν_{max}: 2975, 2930, 2865, 2160, 2030, 1965, 1710, 1610, 1470, 1380, 1250, 1175, 1100, 975 cm^{-1}; ESIMS (positive mode): 643.3, 621.3, 334.2, 333.2, 311.2, 269.1, 227.1; ESI-HRMS: calcd for $C_{17}H_{27}PO_3Na$ $[M+Na]^+$ 333.1596, found 333.1600.



(*E*)-Diisopropyl 2-methoxystyrylphosphonate. Scale: 200 mg of compound obtained (*E*/*Z*: 89/11); yield: 67%. Pale yellow liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.74 (dd, *J* = 23.6 and 17.7 Hz, 1H), 7.39 (d, *J* = 7.7 Hz, 1H), 7.24 (t, *J* = 8.4 Hz, 1H), 6.73-6.88 (m, 2H), 6.27 (dd, *J* = 19.3 and 17.7 Hz, 1H), 4.55-4.69 (m, 2H), 3.76 (s, 3H), 1.28 and 1.23 (d, *J* = 6.1 Hz, d, *J* = 6.6 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 157.7, 143.0 (d, *J* = 7.6 Hz), 131.0, 128.0, 124.0 (d, *J* = 23.0 Hz), 120.3, 116.8 (d, *J* = 190.4 Hz), 111.1, 70.5 (d, *J* = 5.5 Hz), 55.2, 24.1 (d, *J* = 4.4 Hz), 24.0 (d, *J* = 5.0 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 18.4; IR (ATR) ν_{max}: 2975, 2930, 2200, 2160, 2035, 1980, 1710, 1660, 1490, 1460, 1380, 1290, 1245, 1105, 970 cm^{-1}; ESIMS (positive mode): 620.3, 619.2, 322.1, 299.1, 257.1, 215.0; ESI-HRMS: calcd for $C_{15}H_{23}PO_4Na$ $[M+Na]^+$ 321.1232, found 321.1231.



(*E*)-Diisopropyl 4-chlorostyrylphosphonate. Scale: 160 mg of compound obtained (*E*/*Z*: 89/11); yield: 56%. Yellow liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.19-7.38 (m, 5H), 6.17 (t app., *J* = 17.0 Hz, 1H), 4.54-4.68 (m, 2H), 1.27 and 1.23 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 145.2 (d, *J* = 6.8 Hz), 134.9, 132.5 (d, *J* = 23.6 Hz), 128.0, 127.8, 115.4 (d, *J* = 191.0 Hz), 69.5 (d, *J* = 5.6 Hz), 23.1 (d, *J* = 4.5 Hz), 23.0 (d, *J* = 4.7 Hz);

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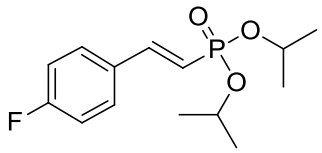
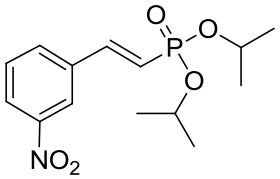
^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.9; IR (ATR) ν_{max}: 2790, 1620, 1590, 1490, 1400, 1220, 1090, 995, 860, 800 cm^{-1}; ESIMS (positive mode): 629.2, 627.2, 327.1, 325.1, 303.1, 219.0; ESI-HRMS: calcd for $C_{14}H_{20}ClPO_3Na$ $[M+Na]^+$ 325.0736, found 325.0733.



(*E*)-Diisopropyl 4-fluorostyrylphosphonate. Scale: 150 mg of compound obtained (*E*/*Z*: 95/5); yield: 52%. Light yellow liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.40 (dd, *J* = 6.5 Hz, 2H), 7.32 (d, *J* = 17.3 Hz, 1H), 6.98 (t, *J* = 8.8 Hz, 2H), 6.10 (t app., *J* = 17.3 Hz, 1H), 4.52-4.70 (m, 2H), 1.28 and 1.23 (d, *J* = 6.2 Hz, d, *J* = 6.2 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 163.8 (d, *J* = 251.0 Hz), 146.3 (d, *J* = 7.1 Hz), 131.0 (dd, *J* = 3.3, 23.0 Hz), 129.3 (d, *J* = 8.8 Hz), 115.7 (d, *J* = 22.0 Hz), 115.0 (d, *J* = 192.0 Hz), 70.3 (d, *J* = 5.5 Hz), 23.9 (d, *J* = 3.8 Hz), 23.8 (d, *J* = 4.9 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 17.2; ^{19}F NMR (188.0 MHz, $CDCl_3$): δ -110.30 - -110.10 (m); IR (ATR) ν_{max}: 2980, 2930, 2160, 2025, 1970, 1715, 1620, 1600, 1510, 1380, 1230, 1100, 975 cm^{-1}; ESIMS (positive mode): 596.2, 595.2, 310.1, 309.1, 203.0; ESI-HRMS: calcd for $C_{14}H_{20}FPO_3Na$ $[M+Na]^+$ 309.1032, found 309.0984.



(*E*)-Diisopropyl 3-nitrostyrylphosphonate. Scale: 250 mg of compound obtained (*E*/*Z*: 87/13); yield: 84%. Yellow solid; Mp: 58-62 ^{o}C; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 8.26 (s, 1H), 8.11 (d, *J* = 8.1 Hz, 1H), 7.74 (d, *J* = 7.7 Hz, 1H), 7.31-7.56 (m, 2H), 6.38 (t app., *J* = 15.8 Hz, 1H), 4.55-4.73 (m, 2H), 1.29 and 1.25 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 148.2, 144.3 (d, *J* = 7.1 Hz), 136.6 (d, *J* = 24.4 Hz), 133.0, 129.6, 124.0, 121.0, 119.3 (d, *J* = 191.6 Hz), 70.5 (d, *J* = 5.5 Hz), 24.0 (d, *J* = 4.4 Hz), 24.0 (d, *J* = 3.8 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 15.3; IR (ATR) ν_{max}: 2980, 1530, 1350, 1250, 1105, 985, 895, 810, 730 cm^{-1}; ESIMS (positive mode): 650.2, 649.2, 337.1, 336.1, 314.1, 272.1, 230.0; ESI-HRMS: calcd for $C_{14}H_{20}NPO_5Na$ $[M+Na]^+$ 336.0977, found 336.0945.

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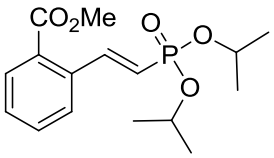
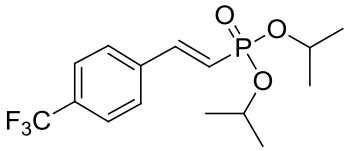
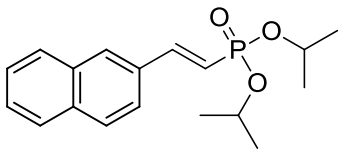


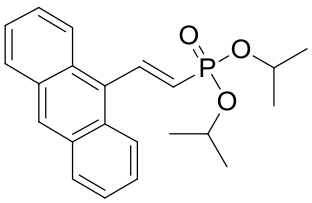
(*E*)-Diisopropyl 2-(carbomethoxy)styrylphosphonate. Scale: 170 mg of compound obtained (*E*/*Z*: 83/17); yield: 52%. Brown liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 8.09 (dd, J = 22.4 and 17.4 Hz, 1H), 7.86 (dd, J = 7.6 and 1.0 Hz, 1H), 7.42-7.52 (m, 1H), 7.31-7.38 (m, 2H), 6.10 (t app., J = 17.4 Hz, 1H), 4.62-4.75 (m, 2H), 3.84 (s, 3H), 1.31 and 1.28 (d, J = 6.5 Hz, d, J = 6.5 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 167.0, 146.3 (d, J = 8.2 Hz), 137.1 (d, J = 24.1 Hz), 132.2, 130.6, 129.5, 129.1, 127.6, 119.2 (d, J = 191.0 Hz), 70.5 (d, J = 5.5 Hz), 52.3, 24.0 (d, J = 4.4 Hz), 23.9 (d, J = 4.4 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.3; IR (ATR) ν_{max}: 2975, 2850, 1715, 1620, 1480, 1435, 1295, 1265, 1195, 1130, 850 cm^{-1}; ESIMS (positive mode): 675.2, 350.1, 349.1, 327.1, 307.1, 243.0, 211.0; ESI-HRMS: calcd for $C_{16}H_{23}PO_5Na$ $[M+Na]^+$ 349.1181, found 349.1165.



(*E*)-Diisopropyl 4-(trifluoromethyl)styrylphosphonate. Scale: 220 mg of compound obtained (*E*/*Z*: 80/20); yield: 67%. Yellow oily solid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.48-7.56 (m, 4H), 7.41 (dd, J = 22.3 and 17.3 Hz, 1H), 6.30 (t app., J = 17.2 Hz, 1H), 4.58-4.72 (m, 2H), 1.29 and 1.24 (d, J = 6.1 Hz, d, J = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 145.6 (d, J = 6.6 Hz), 138.0 (d, J = 23.6 Hz), 131.3 (d, J = 32.4 Hz), 127.6, 125.6 (q, J = 3.8 Hz), 123.9 (q, J = 281.4 Hz), 118.8 (d, J = 191.0 Hz), 70.5 (d, J = 6.0 Hz), 24.0 (d, J = 4.1 Hz), 23.8 (d, J = 4.1 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.0; ^{19}F NMR (188 MHz, $CDCl_3$): δ -65.0; IR (ATR) ν_{max}: 2970, 2360, 1750, 1605, 1320, 1165, 1175, 1015, 885 cm^{-1}; ESIMS (positive mode): 695.2, 359.1, 337.1, 295.1, 253.0; ESI-HRMS: calcd for $C_{15}H_{20}F_3PO_3Na$ $[M+Na]^+$ 359.1000, found 359.0993.

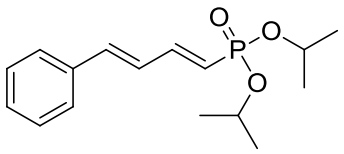


(*E*)-Diisopropyl 2-(naphthalen-2-yl)vinylphosphonate. Scale: 190 mg of compound obtained (*E*/*Z*: 92/8); yield: 60%. Dark brown liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 8.21 (dd, *J* = 22.4 and 17.2 Hz, 1H), 8.08 (d, *J* = 8.2 Hz, 1H), 7.32-7.81 (m, 6H), 6.28 (t app., *J* = 17.3 Hz, 1H), 4.60-4.77 (m, 2H), 1.29 and 1.23 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 144.8 (d, *J* = 7.1 Hz), 133.6, 132.7 (d, *J* = 23.0 Hz), 131.1, 130.3, 128.7, 126.8, 126.2, 125.4, 124.6, 123.3, 118.8 (d, *J* = 190.0 Hz), 70.6 (d, *J* = 5.5 Hz), 24.0 (d, *J* = 4.1 Hz), 23.8 (d, *J* = 4.1 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.8; IR (ATR) ν_{max}: 2980, 2365, 1610, 1380, 1240, 1110, 980, 890, 790 cm^{-1}; ESIMS (positive mode): 659.3, 637.3, 615.2, 342.1, 341.1, 297.1, 275.1, 247.1; ESI-HRMS: calcd for $C_{18}H_{23}PO_3Na$ $[M+Na]^+$ 341.1283, found 341.1287.

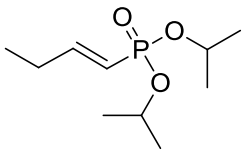


(*E*)-Diisopropyl 2-(anthracen-9-yl)vinylphosphonate. Scale: 180 mg of compound obtained (*E*/*Z* > 95/5); yield: 48%. Brown liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 8.24 (dd, *J* = 22.8 and 17.8 Hz, 1H), 8.23 (s, 1H), 8.07 (d, *J* = 8.4 Hz, 2H), 7.82 (d, *J* = 7.7 Hz, 2H), 7.29-7.38 (m, 4H), 6.20 (dd, *J* = 20.8 and 18.1 Hz, 1H), 4.68-4.83 (m, 2H), 1.33 and 1.31 (d, *J* = 4.2 Hz, d, *J* = 4.2 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 145.0 (d, *J* = 6.0 Hz), 131.2, 130.5 (d, *J* = 22.5 Hz), 129.0, 128.8, 128.0, 127.0 (d, *J* = 185.5 Hz), 126.3, 125.4, 125.1, 70.5 (d, *J* = 5.5 Hz), 24.3 (d, *J* = 3.3 Hz), 24.2 (d, *J* = 3.3 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 15.2; IR (ATR) ν_{max}: 2975, 2930, 2160, 2030, 1970, 1710, 1660, 1600, 1450, 1390, 1240, 1105, 980, 895, 730 cm^{-1}; ESIMS (positive mode): 791.3, 760.3, 759.3, 737.3, 423.1, 392.1, 391.1, 369.2, 327.1, 285.1; ESI-HRMS: calcd for $C_{22}H_{25}PO_3Na$ $[M+Na]^+$ 391.1439, found 391.1440.

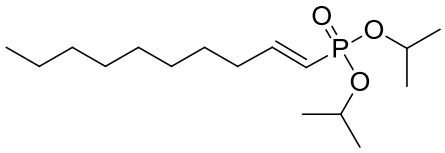
Copper-Mediated Cross-Coupling of 1,3-Dienyl Iodides with Dialkylphosphonates



(1*E*,3*E*)-Diisopropyl 4-phenylbuta-1,3-dienylphosphonate. Scale: 210 mg of compound obtained (*E*/*Z* > 95/5); yield: 71%. Yellow solid; Mp: 68-70 ^{o}C; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.33-7.36 (m, 2H), 7.06-7.27 (m, 4H), 6.73 (d, *J* = 5.4 Hz, 2H), 5.72 (t app., *J* = 17.7 Hz, 1H), 4.48-4.70 (m, 2H), 1.26 and 1.22 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 147.5 (d, *J* = 6.0 Hz), 139.1, 135.7 (d, *J* = 2.2 Hz), 128.7, 128.5, 127.2, 126.9, 118.6 (d, *J* = 192.1 Hz), 70.5 (d, *J* = 5.5 Hz), 24.0 (d, *J* = 4.1 Hz), 23.8 (d, *J* = 4.1 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.9; IR (ATR) ν_{max}: 2980, 1530, 1350, 1250, 1105, 985, 895, 810, 730 cm^{-1}; ESIMS (positive mode): 612.3, 611.3, 318.1, 317.1, 295.1, 253.1, 211.1; ESI-HRMS: calcd for $C_{16}H_{23}PO_3Na$ $[M+Na]^+$ 317.1283, found 317.1291.



(*E*)-Diisopropyl but-1-en-1-ylphosphonate. Scale: 100 mg of compound obtained (*E*/*Z* > 95/5); yield: 45%. Light brown liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 6.74 (ddt, *J* = 22.4, 17.6 and 5.6 Hz, 1H), 5.57 (br. t app., *J* = 17.6 Hz, 1H), 4.53-4.61 (m, 2H), 2.10-2.22 (m, 2H), 1.26, 1.23 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H), 0.99 (t, *J* = 8.1 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 154.0 (d, *J* = 4.9 Hz), 117.0 (d, *J* = 189.4 Hz), 70.0 (d, *J* = 6.0 Hz), 26.8 (d, *J* = 22.5 Hz), 24.0 (d, *J* = 4.9 Hz), 24.0 (d, *J* = 4.4 Hz), 11.8; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 17.3; IR (ATR) ν_{max}: 2970, 2350, 1245, 1100, 1000, 960, 970, 890 cm^{-1}; ESIMS (positive mode): 463.2, 244.1, 243.1, 201.1; ESI-HRMS: calcd for $C_{10}H_{21}PO_3Na$ $[M+Na]^+$ 243.1126, found 243.1116.



(*E*)-Diisopropyl dec-1-en-1-ylphosphonate. Scale: 120 mg of compound obtained (*E*/*Z* > 95/5); yield: 59%. Colorless liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 6.68 (ddt, *J* = 21.9, 17.0

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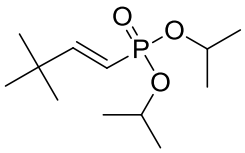
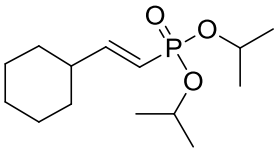
and 6.8 Hz, 1H), 5.57 (ddt, *J* = 21.0, 17.0 and 1.6 Hz, 1H), 4.52-4.63 (m, 2H), 2.13 (q app., *J* = 6.9 Hz, 2H), 1.25 and 1.22 (d, *J* = 6.1 Hz, d, *J* = 6.5 Hz, 12H), 1.14-1.39 (obs. m, 12H), 0.81 (t, *J* = 7.0 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 153.0 (d, *J* = 4.4 Hz), 118.0 (d, *J* = 118.3 Hz), 70.0 (d, *J* = 5.5 Hz), 34.0 (d, *J* = 2.2 Hz), 31.7, 29.2, 29.1, 29.0, 27.6, 23.9 (d, *J* = 4.4 Hz), 23.8 (d, *J* = 4.4 Hz), 22.5, 14.0; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 17.0; IR (ATR) ν_{max}: 3000, 2850, 2360, 1460, 1260, 1004, 865, 820, 780 cm^{-1}; ESIMS (positive mode): 935.6, 632.4, 631.4, 609.4, 327.2; ESI-HRMS: calcd for $C_{16}H_{33}PO_3Na$ $[M+Na]^+$ 327.2065, found 327.2075.



(*E*)-Diisopropyl 3,3-dimethylbut-1-en-1-ylphosphonate.[S1] Scale: 120 mg of compound obtained (*E*/*Z* > 95/5); yield: 48%. Colorless liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 6.51 (dd, *J* = 22.9 and 17.3 Hz, 1H), 5.31 (t app., *J* = 19.8 Hz, 1H), 4.37-4.46 (m, 2H), 1.10 and 1.06 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H), 1.0 (s, 9H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 162.0 (d, *J* = 3.8 Hz), 113.0 (d, *J* = 188.8 Hz), 70.0 (d, *J* = 5.5 Hz), 34.5 (d, *J* = 18.6 Hz), 28.2, 23.8 (d, *J* = 4.4 Hz), 23.7 (d, *J* = 4.4 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 18.4; IR (ATR) ν_{max}: 2950, 2860, 2365, 1620, 1480, 1370, 1250, 1175, 1010 cm^{-1}; ESIMS (positive mode): 615.1, 520.3, 519.3, 271.1, 249.2, 207.1, 165.1; ESI-HRMS: calcd for $C_{12}H_{25}PO_3Na$ $[M+Na]^+$ 271.1439, found 271.1442.



(*E*)-Diisopropyl 2-cyclohexylvinylphosphonate.[S1] Scale: 140 mg of compound obtained (*E*/*Z* > 95/5); yield: 54%. Colorless liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 6.51 (ddd, *J* = 22.5, 17.0 and 6.3 Hz, 1H), 5.31 (t app., *J* = 19.0 Hz, 1H), 4.51-4.62 (m, 2H), 1.93-2.09 (m, 1H), 1.53-1.75 (m, 4H), 1.25 and 1.21 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H), 0.98-1.20 (m, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 157.4 (d, *J* = 3.8 Hz), 115.2 (d, *J* = 188.8 Hz), 69.8 (d, *J* = 5.5 Hz), 41.6 (d, *J* = 20.8 Hz), 31.2, 25.9, 25.6, 24.0 (d, *J* = 4.4 Hz), 23.8 (d, *J* = 3.8 Hz); ^{31}P NMR

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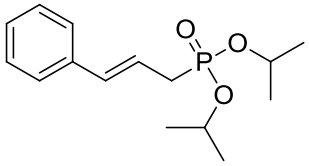
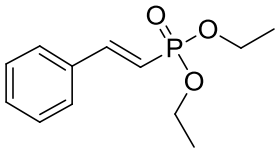
(121.5 MHz, $CDCl_3$): δ 17.5; IR (ATR) ν_{max}: 2980, 2925, 2850, 2365, 2195, 2160, 1720, 1630, 1450, 1385, 1255, 980 cm^{-1}; ESIMS (positive mode): 845.5, 571.3, 297.2; ESI-HRMS: calcd for $C_{14}H_{27}PO_3Na$ $[M+Na]^+$ 297.1596, found 297.1608.



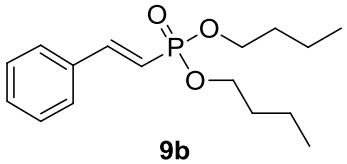
(*E*)-Diisopropyl cinnamylphosphonate.[S2] Scale: 100 mg of compound obtained (*E*/*Z* > 95/5); yield: 62%. Colorless liquid; ^1H NMR ($CDCl_3$, 300 MHz): δ 7.09-7.29 (m, 5H), 6.40 (dd, *J* = 15.8 and 5.1 Hz, 1H), 6.05 (ddd, *J* = 15.8, 7.6 and 7.3 Hz, 1H), 4.43-4.68 (m, 2H), 2.63 (dd, *J* = 22.3 and 7.3 Hz, 2H), 1.22 and 1.19 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 135.1 (d, *J* = 3.3 Hz), 132.6 (d, *J* = 14.8 Hz), 126.7, 125.6, 124.3, 117.5 (d, *J* = 12.1 Hz), 69.0 (d, *J* = 5.5 Hz), 30.2 (d, *J* = 140.5 Hz), 23.8 (d, *J* = 3.3 Hz), 23.8 (d, *J* = 2.2 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 25.0; IR (ATR) ν_{max}: 2980, 2155, 2025, 1975, 1735, 1550, 1390, 1230, 985 cm^{-1}; ESIMS (positive mode): 459.1, 305.1, 263.1, 221.0, 199.0, 117.1; ESI-HRMS: calcd for $C_{15}H_{23}PO_3Na$ $[M+Na]^+$ 305.1283, found 305.1283.



9a

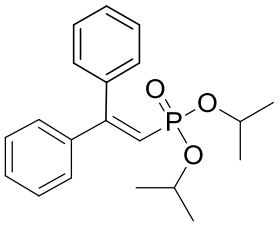
(*E*)-Diethyl styrylphosphonate 9a.[S3] Scale: 180 mg of compound obtained (*E*/*Z*: 94/6); yield: 77%. Pale yellow liquid; ^1H NMR ($CDCl_3$, 300 MHz): δ 7.22-7.51 (m, 6H), 6.17 (t app., *J* = 17.3 Hz, 1H), 3.98-4.09 (m, 4H), 1.26 (t, *J* = 7.7 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 148.4 (d, *J* = 7.1 Hz), 134.4 (d, *J* = 23.6 Hz), 130.0, 128.5, 127.4, 113.4 (d, *J* = 191.0 Hz), 61.5 (d, *J* = 5.5 Hz), 16.0 (d, *J* = 6.6 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 19.6; IR (ATR) ν_{max}: 2980, 2370, 1620, 1450, 1390, 1245, 1165, 1045, 1025 cm^{-1}; ESIMS (positive mode): 539.2, 503.2, 264.1, 263.1, 241.1; ESI-HRMS: calcd for $C_{12}H_{17}PO_3Na$ $[M+Na]^+$ 263.0813, found 263.0825.

[S2] Wender, P. A.; Smith, T. E. *Tetrahedron* **1998**, *54*, 1255.
[S3] Thielges, S.; Bisseret, P.; Eustache, J. *Org. Lett.* **2005**, *7*, 681.



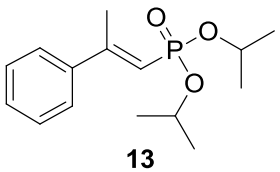
9b

(*E*)-Dibutyl styrylphosphonate 9b. Scale: 170 mg of compound obtained (*E*/*Z*: 84/16); yield: 55%. Pale yellow liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.23-7.61 (m, 6H), 6.17 (t app., J = 17.7 Hz, 1H), 3.97 (q app., J = 6.9 Hz, 4H), 1.14-1.63 (m, 8H), 0.84 (t, J = 7.3 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 148.3 (d, J = 7.1 Hz), 134.5 (d, J = 23.0 Hz), 129.8, 128.5, 127.3, 113.6 (d, J = 191.0 Hz), 65.2 (d, J = 5.5 Hz), 32.2 (d, J = 6.6 Hz), 18.7, 13.2; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 20.3; IR (ATR) ν_{max}: 2980, 1625, 1370, 1240, 1180, 1110, 970 cm^{-1}; ESIMS (positive mode): 911.5, 615.3, 593.3, 319.1, 297.2; ESI-HRMS: calcd for $C_{16}H_{25}PO_3Na$ $[M+Na]^+$ 319.1439, found 319.1454.



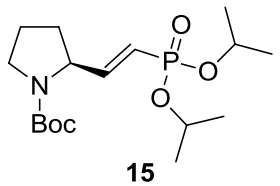
11

Diisopropyl 2,2-diphenylvinylphosphonate 11. Scale: 100 mg of compound obtained; yield: 58%. Colorless liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.12-7.37 (m, 10H), 6.10 (d, J = 15.8 Hz, 1H), 4.39-4.49 (m, 2H), 1.13 (d, J = 6.1 Hz, 6H), 1.02 (d, J = 6.1 Hz, 6H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 159.3 (d, J = 5.5 Hz), 142.0 (d, J = 22.5 Hz), 139.0, 138.9, 130.0, 129.0, 128.4, 128.1, 127.6, 116.4 (d, J = 194.3 Hz), 70.2 (d, J = 6.6 Hz), 23.9 (d, J = 4.9 Hz), 23.6 (d, J = 3.8 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 14.5; IR (ATR) ν_{max}: 2970, 1600, 1450, 1385, 1245, 1110, 970, 840 cm^{-1}; ESIMS (positive mode): 711.3, 689.3, 367.1, 345.2; ESI-HRMS: calcd for $C_{20}H_{25}PO_3$ Na $[M+Na]^+$ 367.1439, found 367.1421.



13

(*E*)-Dibutyl 2-phenylprop-1-enylphosphonate 13. Scale: 110 mg of compound obtained (*E*/*Z* > 95/5); yield: 78%. Colorless liquid; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.22-7.41 (m, 5H), 5.85 (d, *J* = 16.6 Hz, 1H), 4.56-4.72 (m, 2H), 2.42 (dd, *J* = 1.2, 3.5 Hz, 3H), 1.29 and 1.26 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 157.0 (d, *J* = 8.2 Hz), 141.8 (d, *J* = 24.1 Hz), 128.9, 128.4, 128.4, 125.8, 115.2 (d, *J* = 190.4 Hz), 70.0 (d, *J* = 5.5 Hz), 24.1 (d, *J* = 4.9 Hz), 24.0 (d, *J* = 3.8 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.2; IR (ATR) ν_{max}: 3055, 2365, 1605, 1570, 1495, 1445, 1320, 1255, 1100, 995, 960, 880 cm^{-1}; ESIMS (positive mode): 587.3, 538.2, 305.1, 283.1, 241.1, 199.0; ESI-HRMS: calcd for $C_{15}H_{23}PO_3Na$ $[M+Na]^+$ 305.1283, found 305.1296.



15

(*S*,*E*)-1-*tert*-Butoxycarbonyl-2-(2-(diisopropoxyphosphoryl)vinyl)pyrrolidine 15. Scale: 200 mg of compound obtained (*E*/*Z* > 95/5); yield: 55%. Colorless liquid; $[\alpha]_D^{20}$ -17 (c 1.0, $CHCl_3$); ^{1}H NMR ($CDCl_3$, 300 MHz): δ 6.18-6.42 (m, 1H), 5.41 (t app., *J* = 15.1 Hz, 1H), 5.03 (q app., *J* = 7.4 Hz, 1H), 4.51-4.63 (m, 2H), 3.39-3.52 (br. m, 1H), 3.26-3.33 (m, 1H), 2.22-2.32 (m, 1H), 1.69-1.80 (m, 2H), 1.55-1.66 (m, 1H), 1.36 (s, 9H), 1.27 and 1.24 (d, *J* = 6.5 Hz, d, *J* = 6.2 Hz, 12H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 155.5, 154.6, 115.5 (d, *J* = 187.7 Hz), 79.6, 70.0 (d, *J* = 5.5 Hz), 56.6, 46.8, 34.0, 28.4, 24.0 (d, *J* = 4.1 Hz), 23.8 (d, *J* = 4.1 Hz) *(1C not observed)*; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 14.3; IR (ATR) ν_{max}: 2950, 2360, 1695, 1390, 1365, 1155, 1115, 920 cm^{-1}; ESIMS (positive mode): 745.4, 384.2, 362.2, 262.2, 220.1, 178.1; ESI-HRMS: calcd for $C_{18}H_{34}NPO_5$ Na $[M+Na]^+$ 384.1916, found 384.1880.

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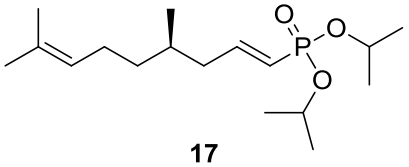
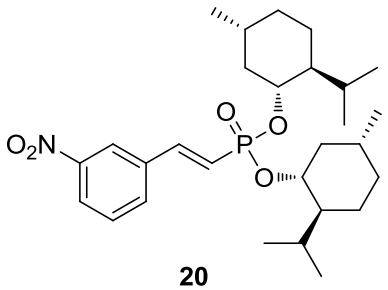


17

(*R*,*E*)-Diisopropyl (4,8-dimethylnona-1,7-dien-1-yl)phosphonate 17. Scale: 140 mg of compound obtained (*E*/*Z*: 87/13); yield: 44%. Brown liquid; $[\alpha]_D^{20}$ +17 (*c* 1.0, $CHCl_3$); ^1H NMR ($CDCl_3$, 300 MHz): δ 6.64 (ddt, J = 21.8, 17.0 and 7.2 Hz, 1H), 5.60 (dd, *J* = 21.2 and 17.0 Hz, 1H), 5.00 (t, *J* = 6.2 Hz, 1H), 4.45-4.70 (m, 2H), 2.30-2.55 (m, 1H), 2.08-2.24 (m, 1H), 1.80-2.01 (m, 3H), 1.60 (s, 3H), 1.52 (s, 3H), 1.25 and 1.22 (d, *J* = 6.2 Hz, d, *J* = 6.2 Hz, 12H), 1.10-1.26 (obs. m, 2H), 0.82 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 150.4 (d, *J* = 4.4 Hz), 131.2, 124.3, 119.5 (d, *J* = 187.2 Hz), 70.0 (d, *J* = 5.5 Hz), 40.5 (d, *J* = 22.0 Hz), 36.5, 31.7 (d, *J* = 1.6 Hz), 25.6, 25.3, 23.9 (d, *J* = 3.8 Hz), 23.8 (d, *J* = 4.9 Hz), 19.3, 17.5; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 16.5; IR (ATR) ν_{max}: 2970, 1755, 1625, 1455, 1385, 1240, 1100, 985 cm^{-1}; ESIMS (positive mode): 687.4, 655.4, 371.2, 339.2, 317.2, 275.2, 233.1; ESI-HRMS: calcd for $C_{17}H_{33}PO_3Na$ $[M+Na]^+$ 339.2065, found 339.2074.



20

Bis[(1*R*,2*S*,5*R*)-2-isopropyl-5-methylcyclohexyl] (*E*)-3-nitrostyrylphosphonate 20. Scale: 330 mg of compound obtained (*E*/*Z* > 95/5); yield: 65%. Pale yellow solid Mp: 155-160 ^oC; $[\alpha]_D^{20}$ -93 (*c* 1.0, $CHCl_3$); ^1H NMR ($CDCl_3$, 300 MHz): δ 8.35 (s, 1H), 8.21 (d, *J* = 8.1 Hz, 1H), 7.77 (d, *J* = 7.7 Hz, 1H), 7.47-7.60 (m, 2H), 6.40 (dd, *J* = 17.4 and 15.2 Hz, 1H), 4.23-4.35 (m, 1H), 4.10-4.18 (m, 1H), 2.01-2.37 (m, 4H), 1.63-1.70 (m, 4H), 0.68-1.47 (m, 28H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 148.7, 144.5 (d, *J* = 7.5 Hz), 137.0 (d, *J* = 24.0 Hz), 133.4, 129.9, 124.2, 121.8, 120.1 (d, *J* = 191.0 Hz), 77.8 (d, *J* = 6.8 Hz), 77.4 (d, *J* = 5.4 Hz), 48.6 (d, *J* = 6.5 Hz), 48.5 (d, *J* = 6.8 Hz), 43.5, 43.2, 34.0, 31.6, 31.5, 25.5, 22.8, 22.7, 21.9, 21.0, 15.9, 15.5; ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 15.0-16.0 (m); IR (ATR) ν_{max}: 2970, 1376, 1245, 1102, 972 cm^{-1}; ESIMS (positive mode): 528.3, 277.1, 229.1; ESI-HRMS: calcd for $C_{28}H_{44}NPO_5Na$ $[M+Na]^+$ 528.2855, found 528.2873.

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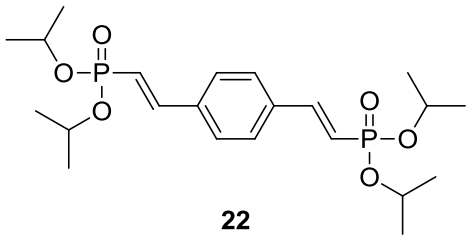
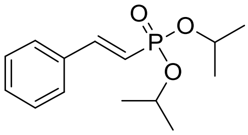


22

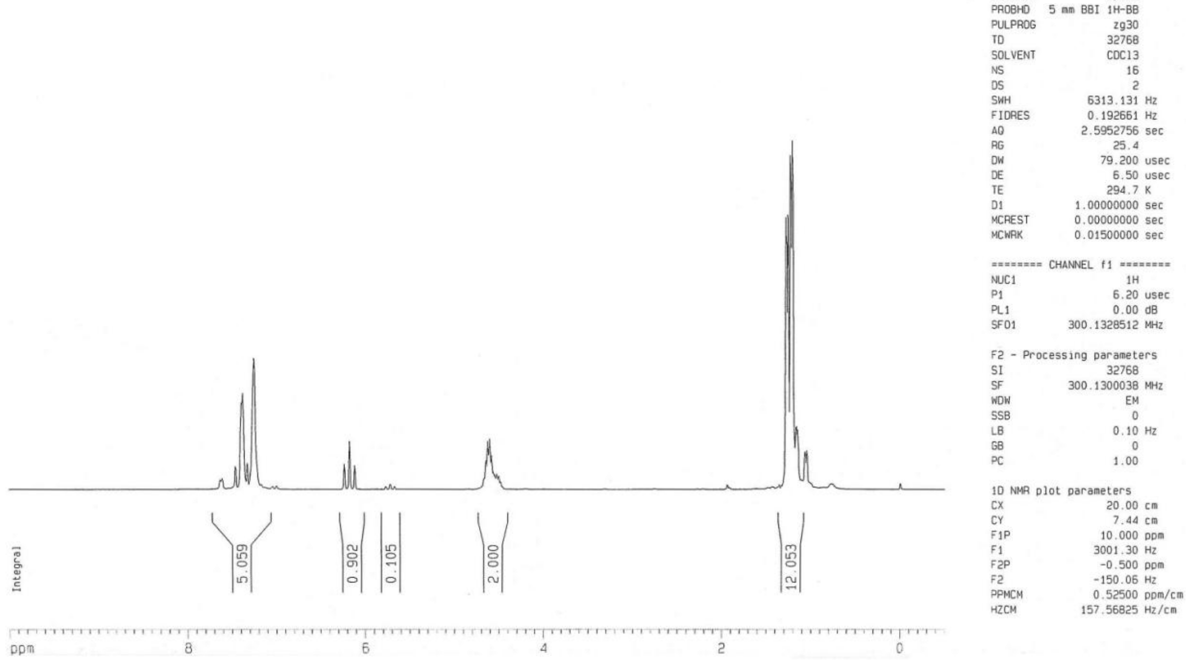
Tetraisopropyl ((1*E*,1'*E*)-1,4-phenylenebis(ethene-2,1-diyl))bis(phosphonate) 22. Scale: 380 mg of compound obtained (*E*/*Z*: 88/12); yield: 83%. Yellow crystals; Mp: 135-140 ^{o}C; ^{1}H NMR ($CDCl_3$, 300 MHz): δ 7.44 (s, 4H), 7.39 (dd, *J* = 22.3 and 17.3 Hz, 2H), 6.23 (t app., *J* = 17.3 Hz, 2H), 4.56-4.72 (m, 4H), 1.30 and 1.25 (d, *J* = 6.1 Hz, d, *J* = 6.1 Hz, 24H); ^{13}C NMR (75 MHz, $CDCl_3$): δ 146.5 (d, *J* = 7.1 Hz), 136.6 (d, *J* = 23.6 Hz), 128.0, 116.8 (d, *J* = 191.5 Hz), 70.6 (d, *J* = 5.5 Hz), 24.1 (d, *J* = 1.6 Hz), 24.0 (d, *J* = 1.6 Hz); ^{31}P NMR (121.5 MHz, $CDCl_3$): δ 17.1; IR (ATR) ν_{max}: 2970, 1620, 1460, 1380, 1230, 1110, 970, 895 cm^{-1}; ESIMS (positive mode): 481.2, 439.2, 417.2, 375.1, 359.1, 253.2; ESI-HRMS: calcd for $C_{22}H_{36}P_2O_6Na$ $[M+Na]^+$ 481.1885, found 481.1800.

Supporting Information

^{1}H and ^{13}C NMR spectra



7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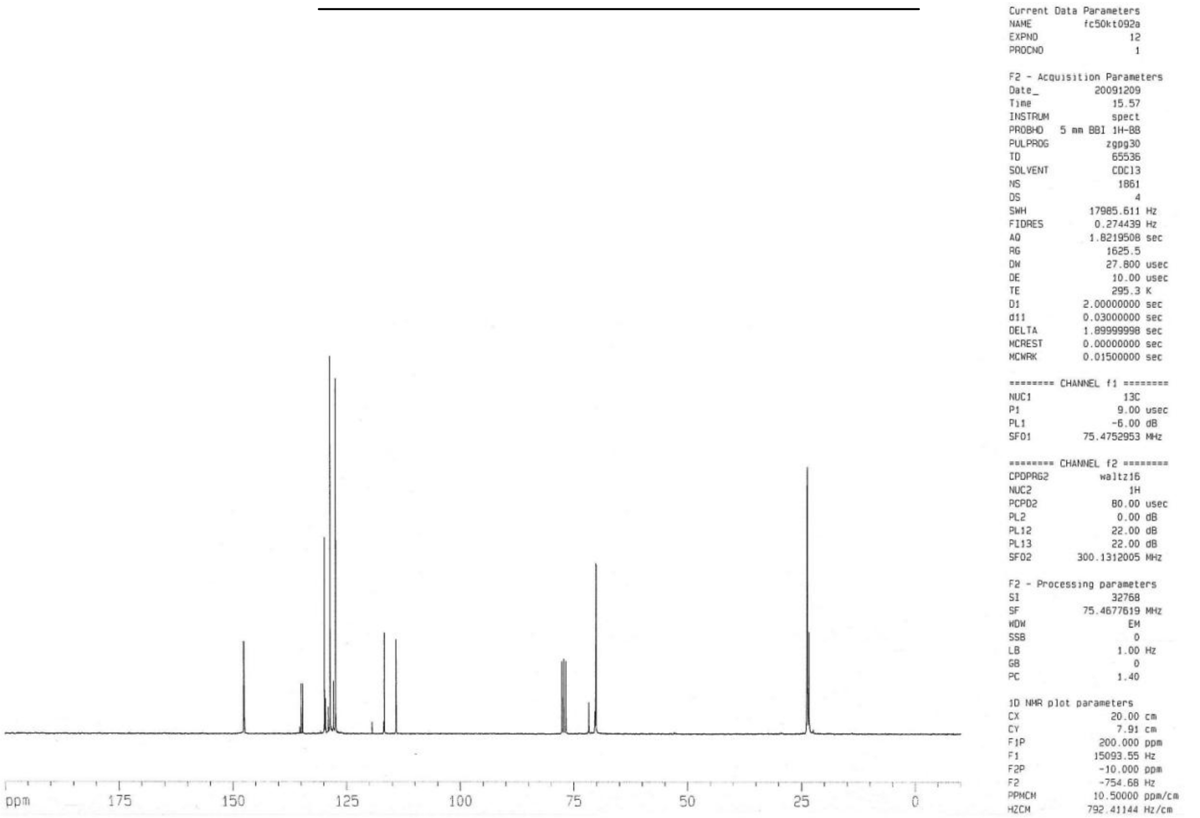
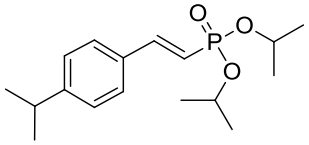
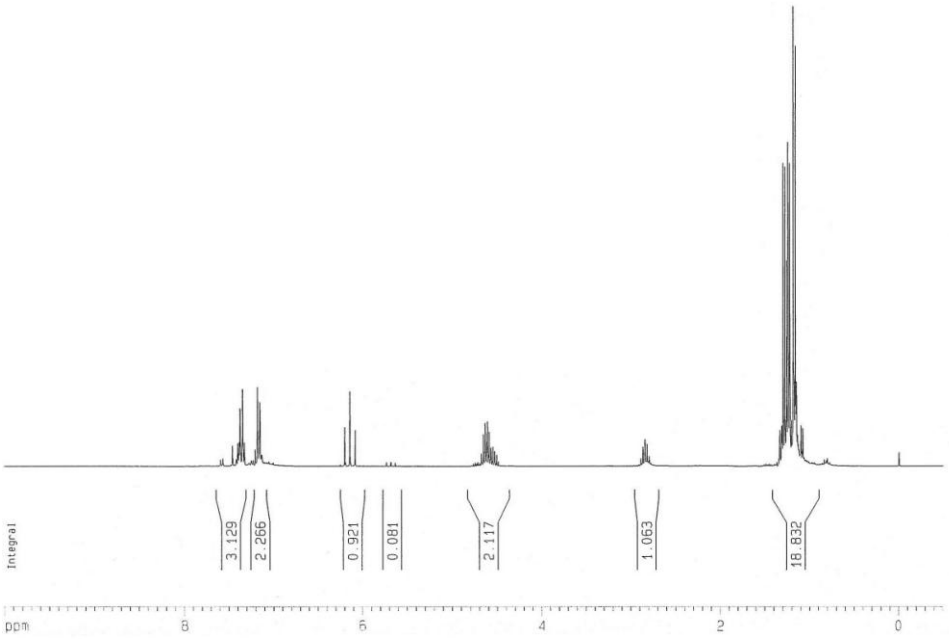
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300038 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 7.44 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm
Integral
5.059
0.902
0.105
2.000
12.053
ppm
8
6
4
2
0


Current Data Parameters
NAME fc50kt092a
EXPNO 12
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091209
Time 15.57
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1861
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1625.5
DW 27.800 usec
DE 10.00 usec
TE 295.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677619 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 7.91 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41144 Hz/cm
ppm
175
150
125
100
75
50
25
0

Supplementary Material (ESI) for Chemical Communications





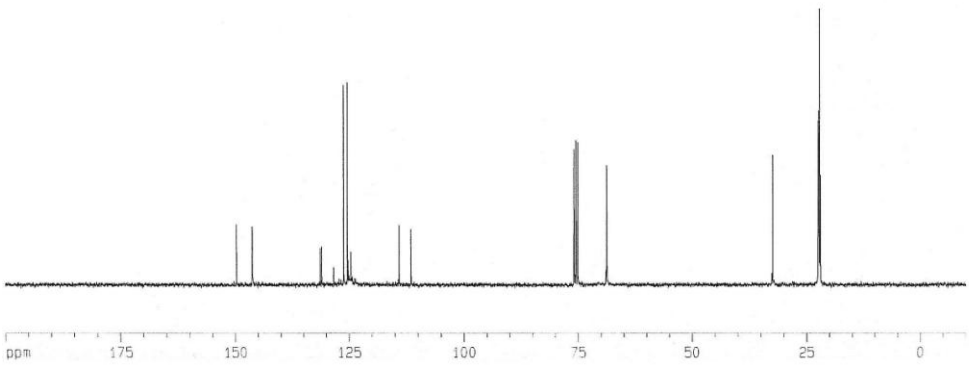

```
Current Data Parameters
NAME            fc50kt117
EXPNO                  10
PROCNO                  1

F2 - Acquisition Parameters
Date_            20091212
Time                3.05
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG             zg30
TD                 32768
SOLVENT             C6D6
NS                    16
DS                     2
SWH             6313.131 Hz
FIDRES          0.192661 Hz
AQ              2.5952756 sec
RG                    64
DW                79.200 usec
DE                 6.50 usec
TE                294.7 K
D1             1.00000000 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

======== CHANNEL f1 ========
NUC1                  1H
P1                 6.20 usec
PL1                0.00 dB
SF01          300.1328512 MHz

F2 - Processing parameters
SI                 32768
SF            300.1300351 MHz
WDW                   EM
SSB                    0
LB                  0.10 Hz
GB                     0
PC                  1.00

1D NMR plot parameters
CX                 20.00 cm
CY                  9.76 cm
F1P               10.000 ppm
F1              3001.30 Hz
F2P               -0.500 ppm
F2              -150.07 Hz
PPMCM           0.52500 ppm/cm
HZCM           157.56827 Hz/cm
```




```
Current Data Parameters
NAME            fc50kt117
EXPNO                  12
PROCNO                  1

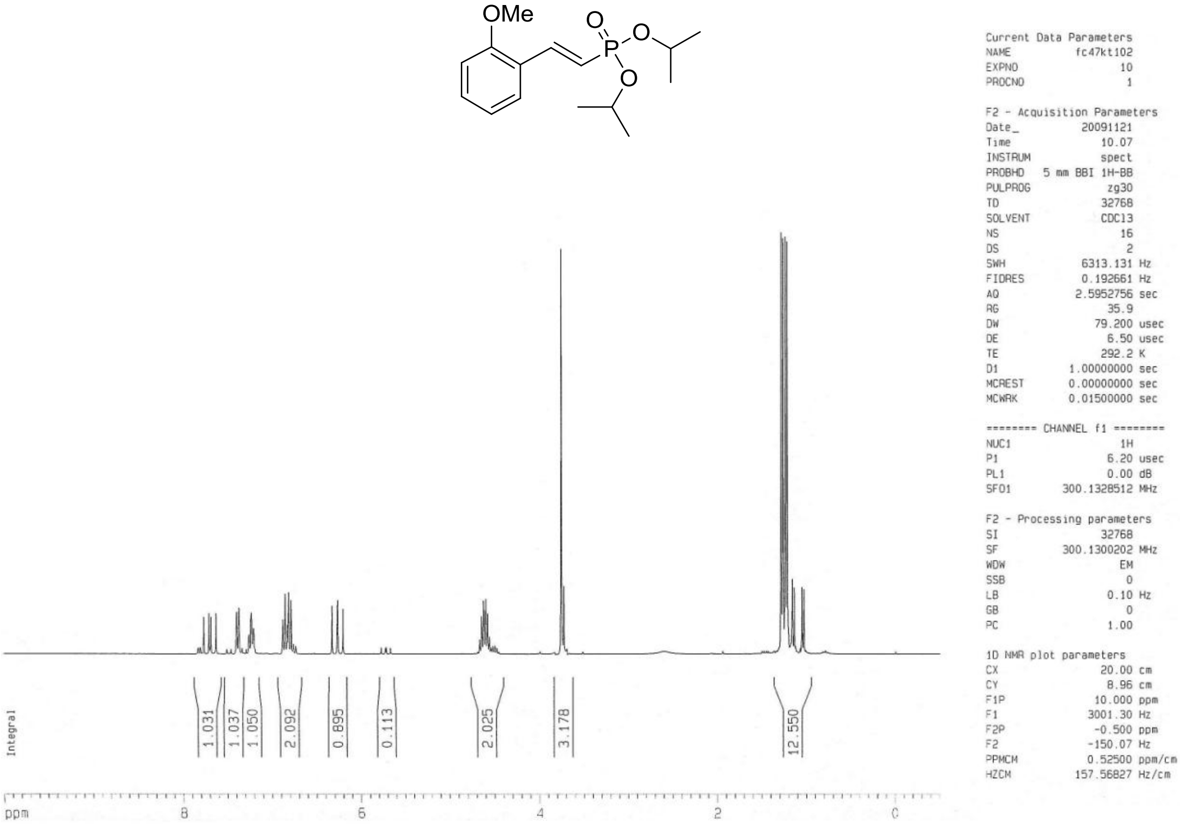
F2 - Acquisition Parameters
Date_            20091212
Time                5.21
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG          zgpg30
TD                 65536
SOLVENT             CDCl3
NS                  2000
DS                     4
SWH            17985.611 Hz
FIDRES          0.274439 Hz
AQ              1.8219508 sec
RG                1625.5
DW                27.800 usec
DE                10.00 usec
TE                294.7 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

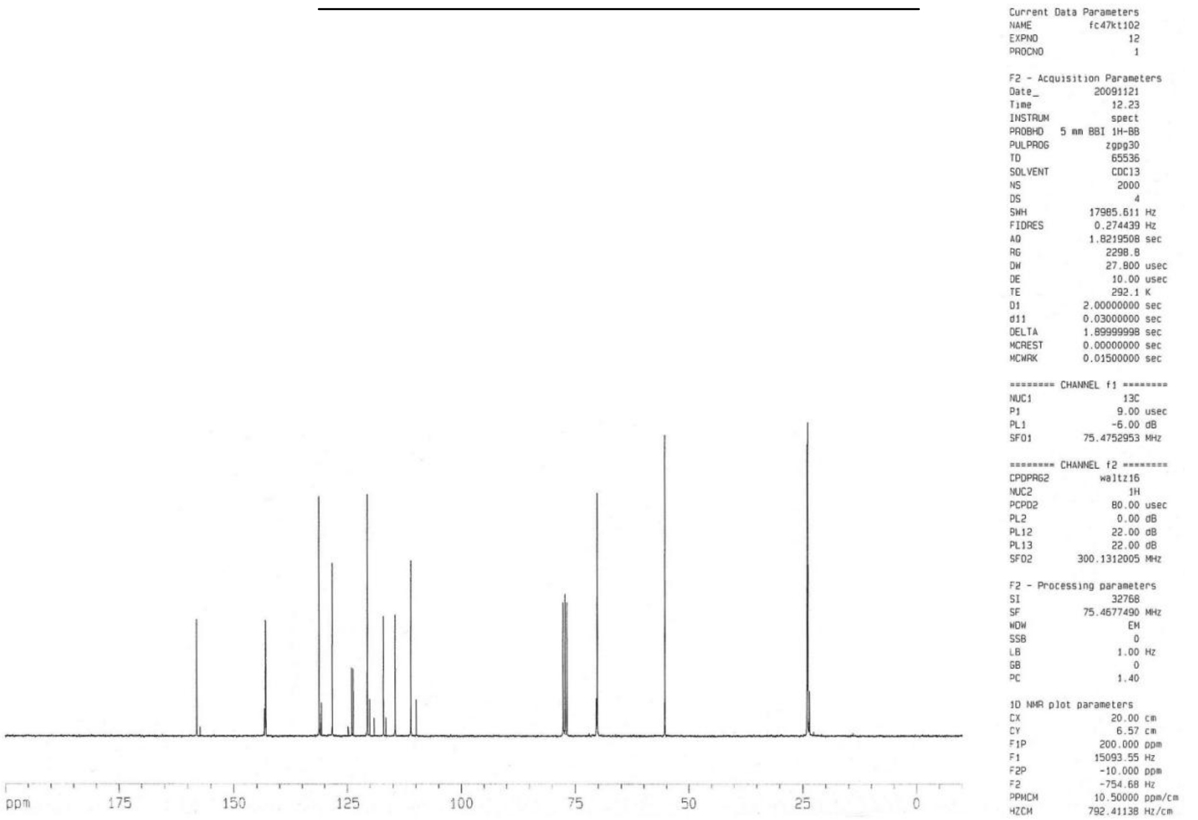
======== CHANNEL f1 ========
NUC1                  13C
P1                 9.00 usec
PL1               -6.00 dB
SF01          75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                  1H
PCPD2             80.00 usec
PL2                0.00 dB
PL12              22.00 dB
PL13              22.00 dB
SF02          300.1312005 MHz

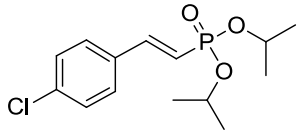
F2 - Processing parameters
SI                 32768
SF            75.4678716 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40

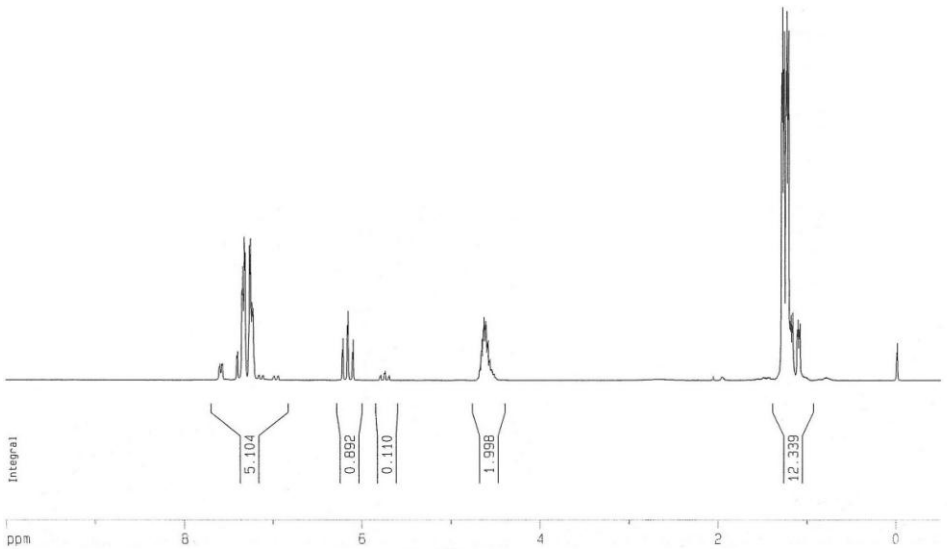
1D NMR plot parameters
CX                 20.00 cm
CY                  5.79 cm
F1P               200.000 ppm
F1              15093.57 Hz
F2P               -10.000 ppm
F2              -754.68 Hz
PPMCM           10.50000 ppm/cm
HZCM           792.41266 Hz/cm
```


OMe
O
P
O
O
Current Data Parameters
NAME fc47kt102
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091121
Time 10.07
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 35.9
DW 79.200 usec
DE 6.50 usec
TE 292.2 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300202 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 8.96 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.07 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56827 Hz/cm
Integral
1.031
1.037
1.050
2.092
0.895
0.113
2.025
3.178
12.550
ppm
8
6
4
2
0


Current Data Parameters
NAME fc47kt102
EXPNO 12
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091121
Time 12.23
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 2298.8
DW 27.800 usec
DE 10.00 usec
TE 292.1 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677490 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 6.57 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41138 Hz/cm
ppm
175
150
125
100
75
50
25
0

Copper-Mediated Coupling of 1,1-Dibromoalkenes with Dialkylphosphonates





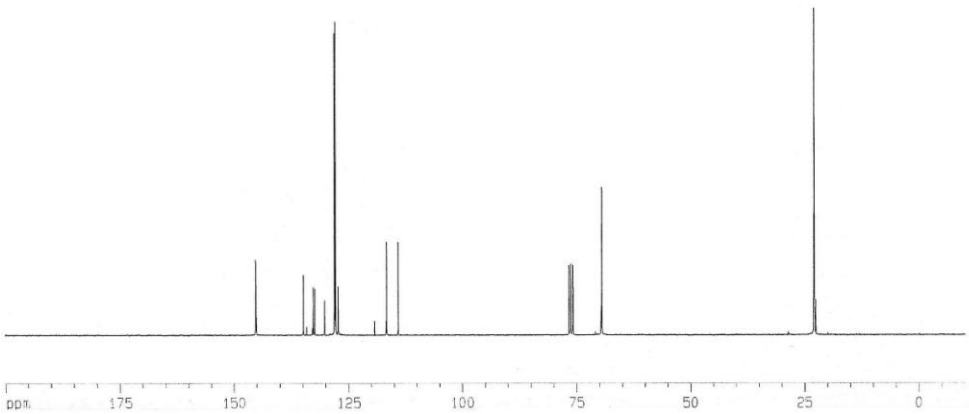

```
Current Data Parameters
NAME            fc47kt09B
EXPNO                  11
PROCNO                  1

F2 - Acquisition Parameters
Date_            20091118
Time                7.55
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             6313.131 Hz
FIDRES          0.192661 Hz
AQ              2.5952756 sec
RG                  35.9
DW                79.200 usec
DE                 6.50 usec
TE                294.8 K
D1              1.00000000 sec
MCREST          0.00000000 sec
MCWRK           0.01500000 sec

======== CHANNEL f1 ========
NUC1                   1H
P1                   6.20 usec
PL1                  0.00 dB
SFO1          300.1328512 MHz

F2 - Processing parameters
SI                 32768
SF            300.1300137 MHz
WDW                   EM
SSB                    0
LB                  0.10 Hz
GB                     0
PC                  1.00

1D NMR plot parameters
CX                 20.00 cm
CY                  7.96 cm
F1P               10.000 ppm
F1              3001.30 Hz
F2P               -0.500 ppm
F2              -150.06 Hz
PPMCM            0.52500 ppm/cm
HZCM           157.56825 Hz/cm
```




```
Current Data Parameters
NAME            fc47kt09B
EXPNO                  10
PROCNO                  1

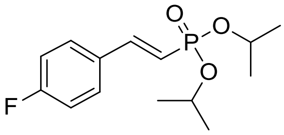
F2 - Acquisition Parameters
Date_            20091118
Time                7.53
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  3000
DS                     4
SWH            17985.611 Hz
FIDRES          0.274439 Hz
AQ              1.8219508 sec
RG                1625.5
DW                27.800 usec
DE                10.00 usec
TE                294.9 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
MCREST          0.00000000 sec
MCWRK           0.01500000 sec

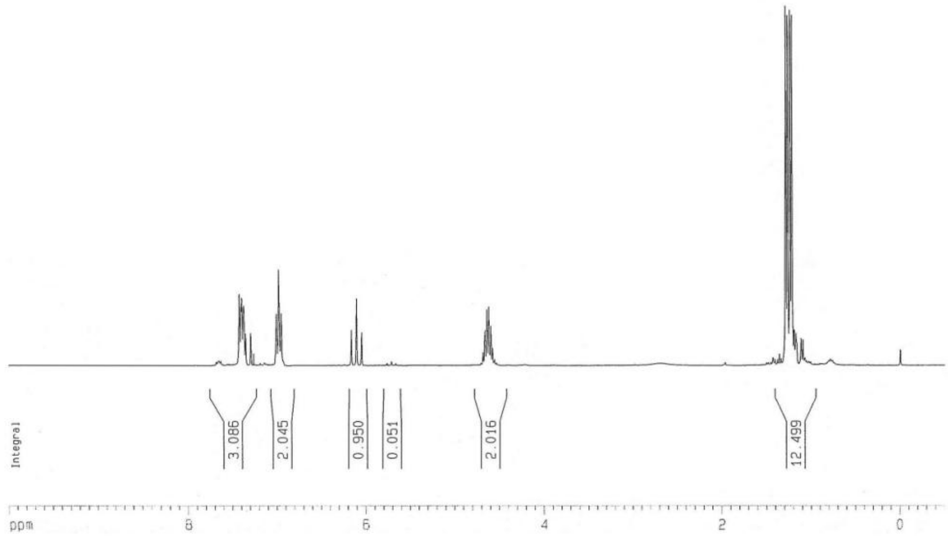
======== CHANNEL f1 ========
NUC1                   13C
P1                   9.00 usec
PL1                 -6.00 dB
SFO1          75.4752953 MHz

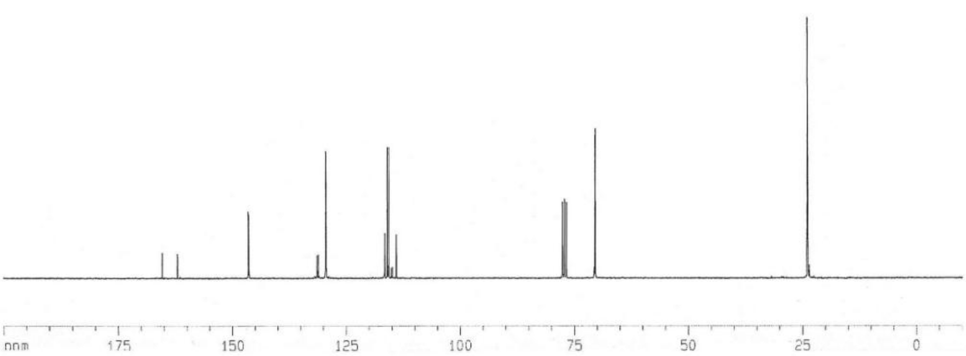
======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2               80.00 usec
PL2                  0.00 dB
PL12                22.00 dB
PL13                22.00 dB
SFO2          300.1312005 MHz

F2 - Processing parameters
SI                 32768
SF             75.4678235 MHz
WDW                   EM
SSB                    0
LB                  1.00 Hz
GB                     0
PC                  1.40

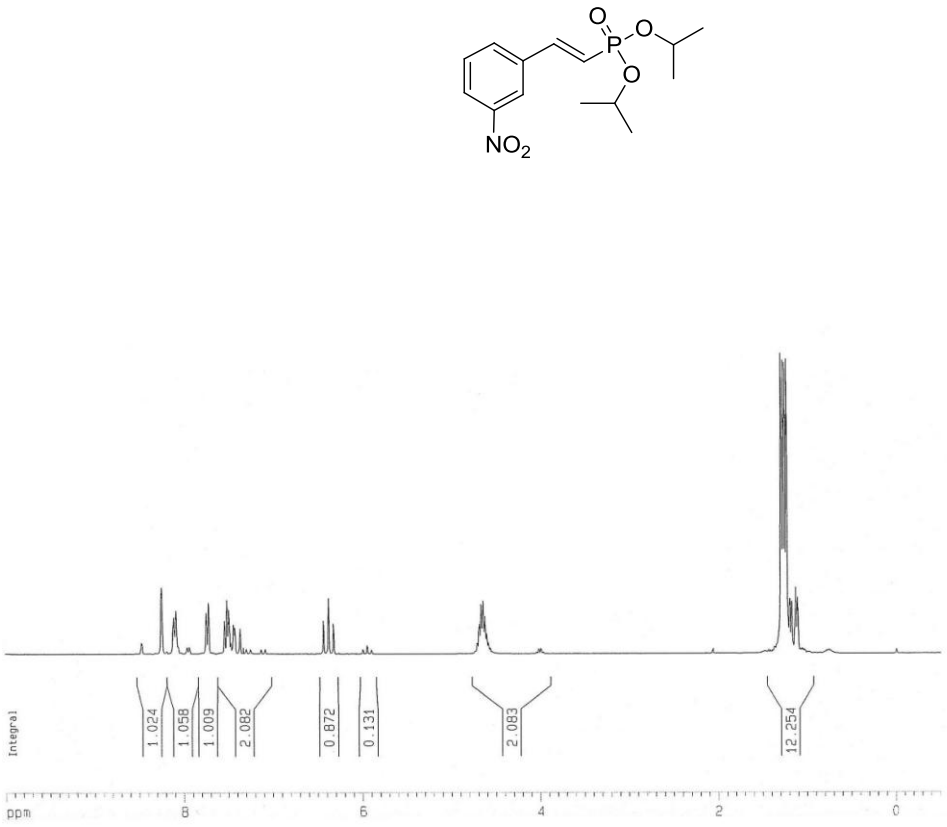
1D NMR plot parameters
CX                 20.00 cm
CY                  6.93 cm
F1P               200.000 ppm
F1              15093.57 Hz
F2P               -10.000 ppm
F2              -754.68 Hz
PPMCM           10.50000 ppm/cm
```


O
P
O
O
F


Integral
3.086
2.045
0.950
0.051
2.016
12.499
ppm
8
6
4
2
0
Current Data Parameters
NAME fc48kt105
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091123
Time 18.59
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 40.3
DW 79.200 usec
DE 6.50 usec
TE 294.7 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300152 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 7.66 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm


ppm
175
150
125
100
75
50
25
0
Current Data Parameters
NAME fc48kt105
EXPNO 11
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091123
Time 21.10
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1625.5
DW 27.800 usec
DE 10.00 usec
TE 294.9 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677498 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 5.50 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm

Copper-Mediated Coupling of 1,1-Dibromoalkenes with Dialkylphosphonates



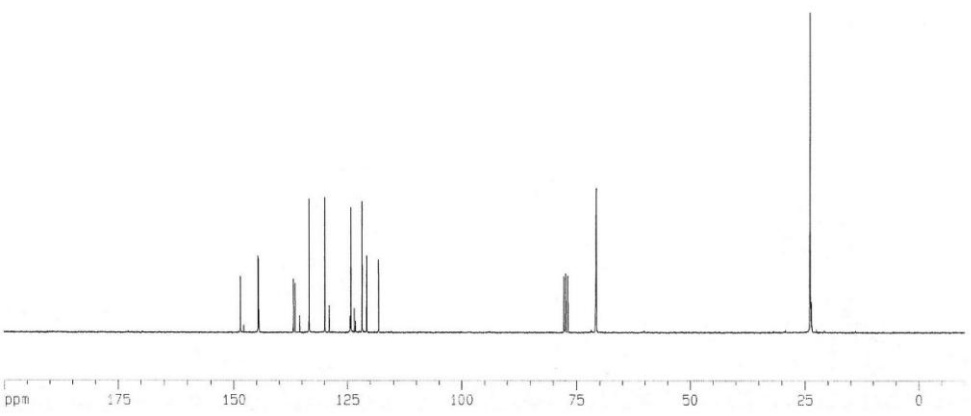

```
Current Data Parameters
NAME            fc47kt101
EXPNO                  20
PROCNO                  1

F2 - Acquisition Parameters
Date_            20091119
Time                7.14
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             6313.131 Hz
FIDRES          0.192661 Hz
AQ              2.5952756 sec
RG                  28.5
DW                79.200 usec
DE                 6.50 usec
TE                294.2 K
D1              1.00000000 sec
MCREST          0.00000000 sec
MCWRK           0.01500000 sec

======== CHANNEL f1 ========
NUC1                   1H
P1                  6.20 usec
PL1                 0.00 dB
SFO1          300.1328512 MHz

F2 - Processing parameters
SI                    32768
SF            300.1299932 MHz
WDW                      EM
SSB                       0
LB                     0.10 Hz
GB                        0
PC                     1.00

1D NMR plot parameters
CX                    20.00 cm
CY                     6.44 cm
F1P                10.000 ppm
F1                3001.30 Hz
F2P                -0.500 ppm
F2                -150.06 Hz
PPMCM              0.52500 ppm/cm
HZCM             157.56825 Hz/cm
```




```
Current Data Parameters
NAME            fc47kt101
EXPNO                  21
PROCNO                  1

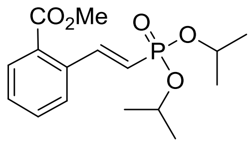
F2 - Acquisition Parameters
Date_            20091119
Time                8.06
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                   796
DS                     4
SWH            17985.611 Hz
FIDRES          0.274439 Hz
AQ              1.8219508 sec
RG                1625.5
DW                27.800 usec
DE                10.00 usec
TE                294.3 K
D1              2.00000000 sec
d11             0.03000000 sec
DELTA           1.89999998 sec
MCREST          0.00000000 sec
MCWRK           0.01500000 sec

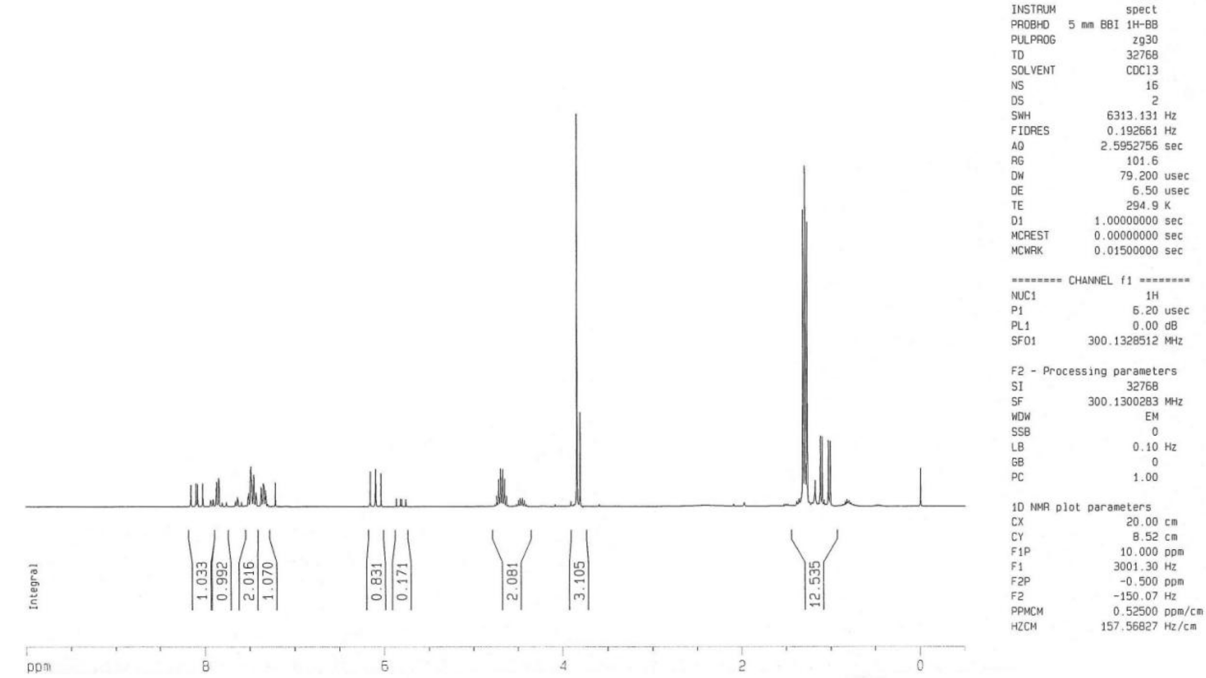
======== CHANNEL f1 ========
NUC1                   13C
P1                  9.00 usec
PL1                -6.00 dB
SFO1          75.4752953 MHz

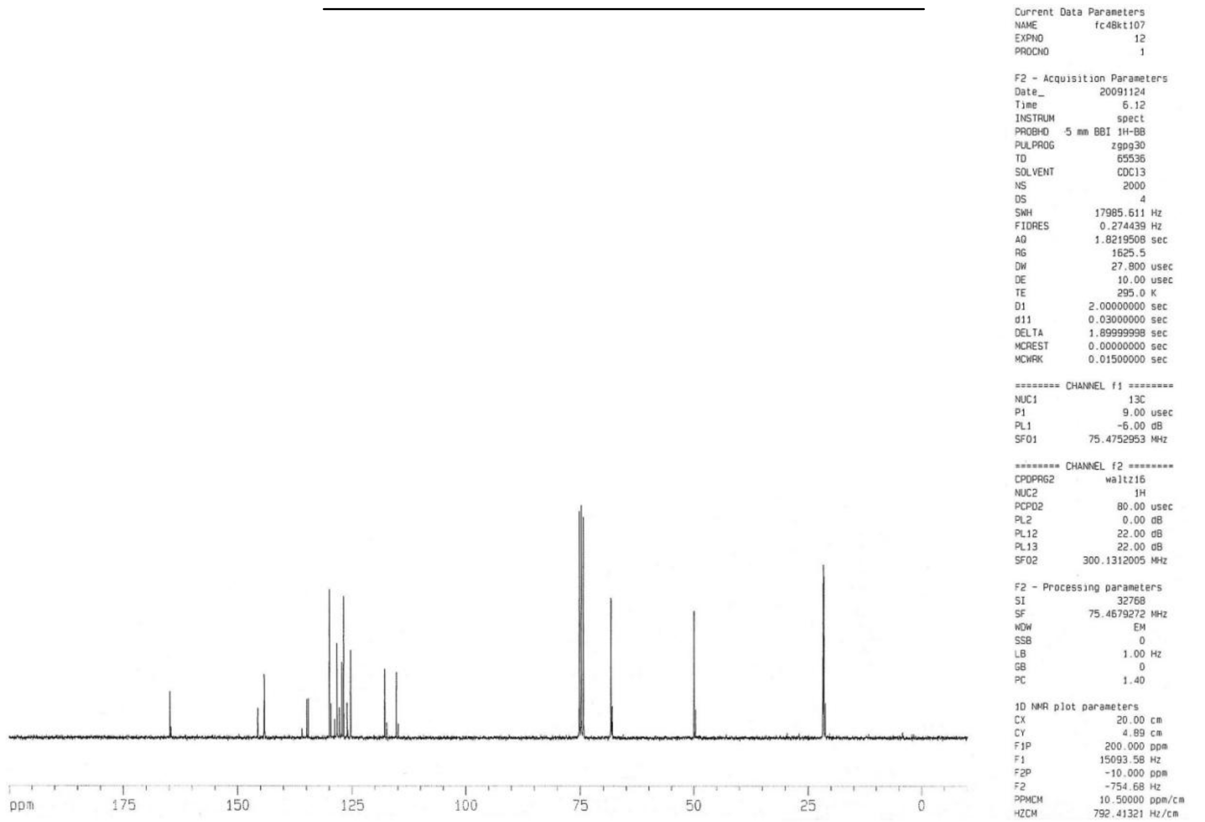
======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2                 0.00 dB
PL12               22.00 dB
PL13               22.00 dB
SFO2          300.1312005 MHz

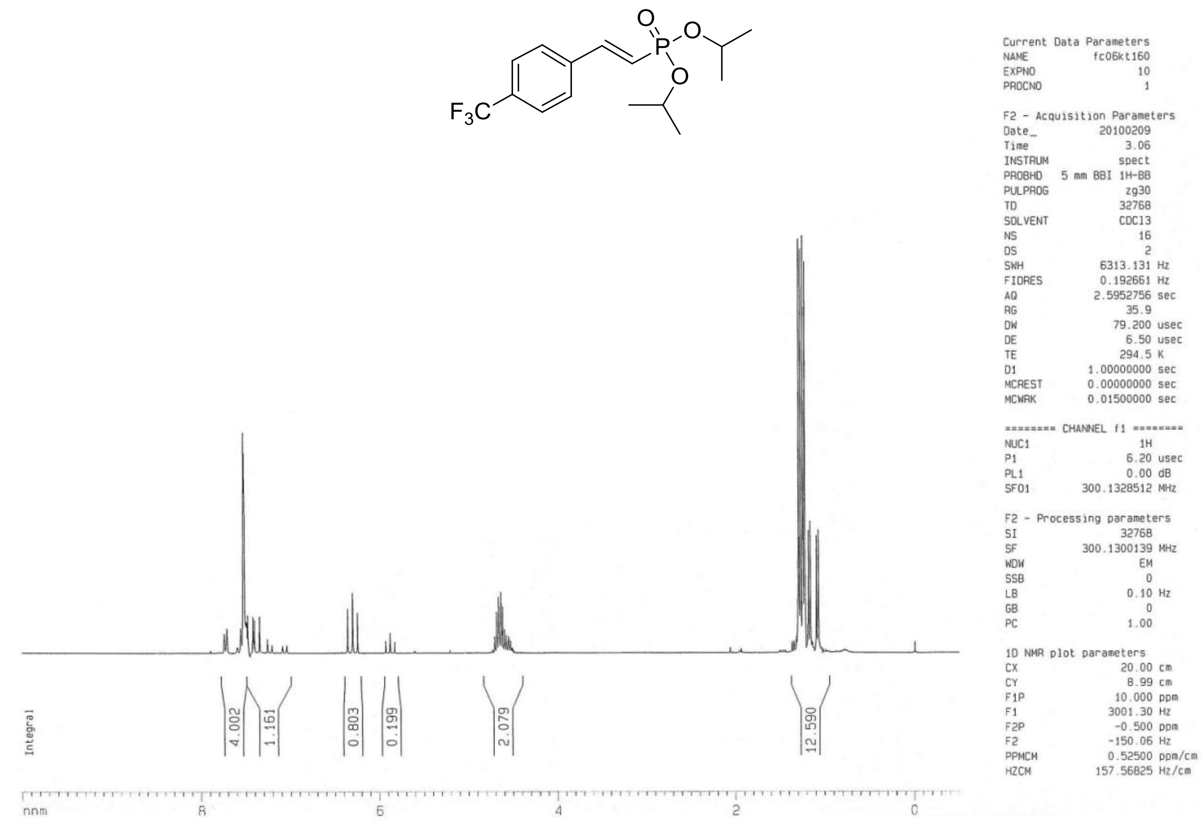
F2 - Processing parameters
SI                    32768
SF            75.4677490 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40

1D NMR plot parameters
CX                    20.00 cm
CY                     6.71 cm
F1P               200.000 ppm
F1              15093.55 Hz
F2P               -10.000 ppm
F2              -754.68 Hz
PPMCM             10.50000 ppm/cm
HZCM            792.41138 Hz/cm
```


CO2Me
O
P
O
O


Current Data Parameters
NAME fc48kt107
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091124
Time 3.56
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 101.6
DW 79.200 usec
DE 6.50 usec
TE 294.9 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300283 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 8.52 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.07 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56827 Hz/cm
Integral
1.033
0.992
2.016
1.070
0.831
0.171
2.081
3.105
12.535
ppm
8
6
4
2
0


Current Data Parameters
NAME fc48kt107
EXPNO 12
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091124
Time 6.12
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1625.5
DW 27.800 usec
DE 10.00 usec
TE 295.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4679272 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 4.89 cm
F1P 200.000 ppm
F1 15093.58 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41321 Hz/cm
ppm
175
150
125
100
75
50
25
0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P
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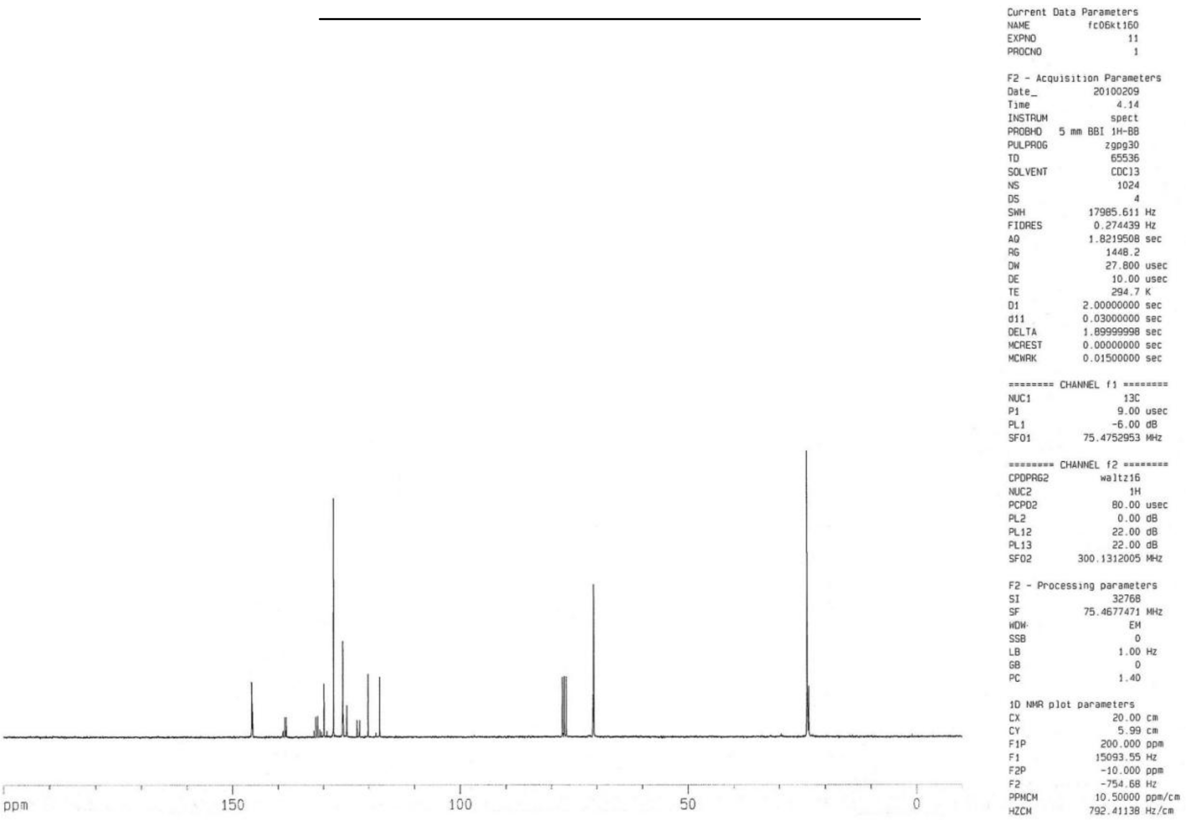
F3C
Current Data Parameters
NAME fc06kt160
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20100209
Time 3.06
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 35.9
DW 79.200 usec
DE 6.50 usec
TE 294.5 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300139 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 8.99 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm
Integral
4.002
1.161
0.803
0.199
2.079
12.590
ppm
8
6
4
2
0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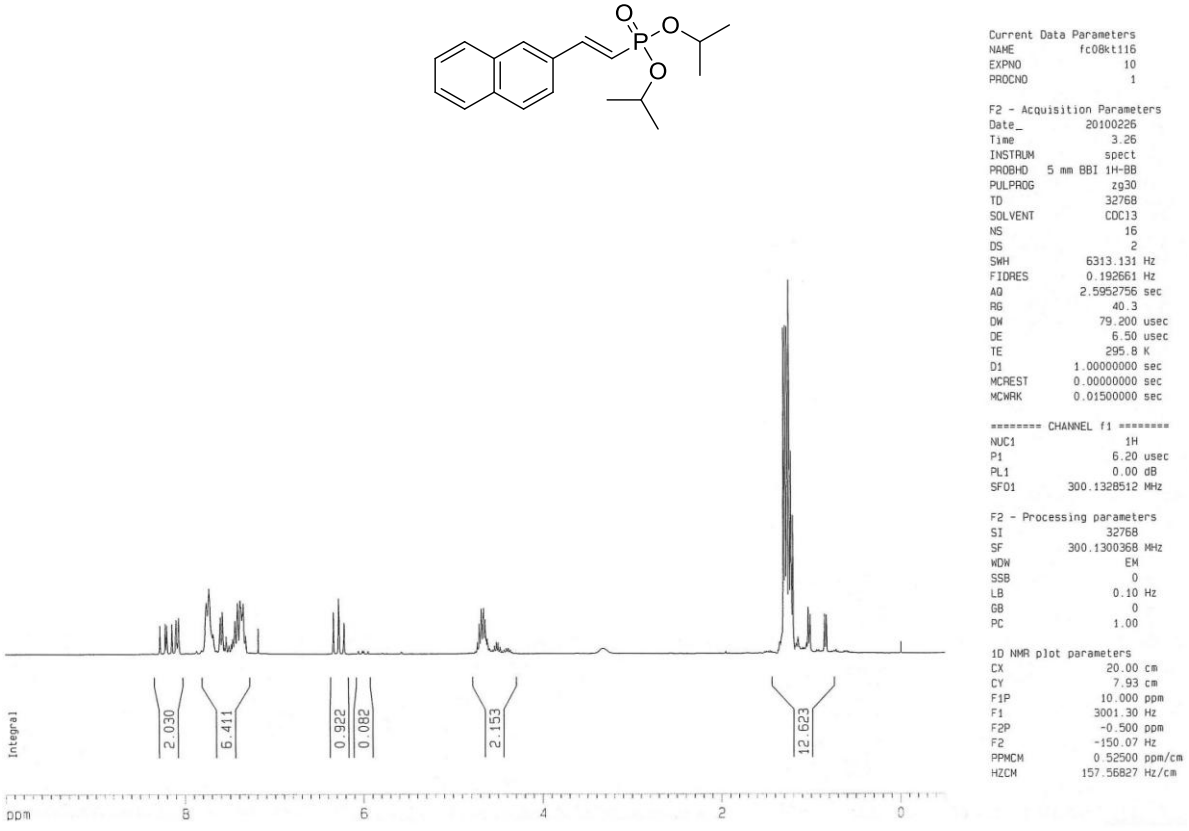
NAME fc06kt160
EXPNO 11
PROCNO 1
F2 - Acquisition Parameters
Date_ 20100209
Time 4.14
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1448.2
DW 27.800 usec
DE 10.00 usec
TE 294.7 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677471 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 5.99 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41138 Hz/cm
ppm
150
100
50
0

Copper-Mediated Cross-Coupling Reactions with Dialkylphosphonates

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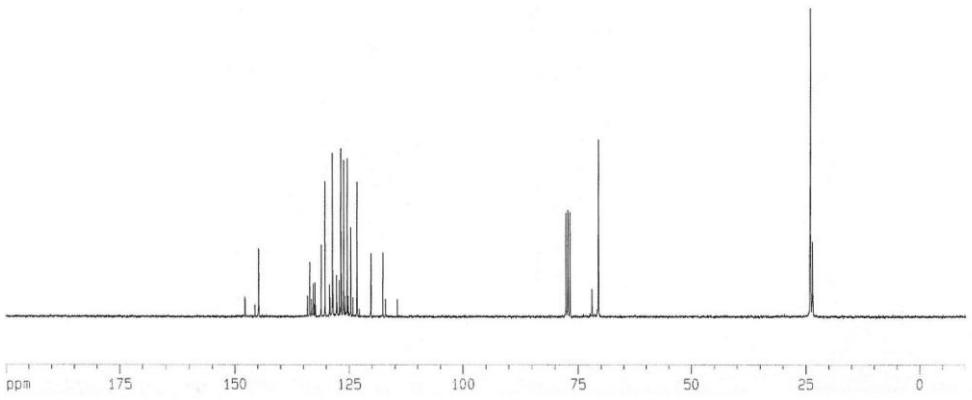
Current Data Parameters
NAME                 fc08kt116
EXPNO                       10
PROCNO                       1

F2 - Acquisition Parameters
Date_               20100226
Time                    3.26
INSTRUM                spect
PROBHD   5 mm BBI 1H-BB
PULPROG                 zg30
TD                     32768
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 6313.131 Hz
FIDRES              0.192661 Hz
AQ                  2.5952756 sec
RG                       40.3
DW                     79.200 usec
DE                      6.50 usec
TE                     295.8 K
D1                  1.00000000 sec
MCREST              0.00000000 sec
MCWRK               0.01500000 sec

======== CHANNEL f1 ========
NUC1                       1H
P1                      6.20 usec
PL1                     0.00 dB
SFO1               300.1328512 MHz

F2 - Processing parameters
SI                         32768
SF                 300.1300368 MHz
WDW                           EM
SSB                            0
LB                          0.10 Hz
GB                             0
PC                          1.00

1D NMR plot parameters
CX                         20.00 cm
CY                          7.93 cm
F1P                       10.000 ppm
F1                      3001.30 Hz
F2P                       -0.500 ppm
F2                      -150.07 Hz
PPMCM                    0.52500 ppm/cm
HZCM                   157.56827 Hz/cm
```

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Current Data Parameters
NAME                 fc08kt116
EXPNO                       11
PROCNO                       1

F2 - Acquisition Parameters
Date_               20100226
Time                    5.04
INSTRUM                spect
PROBHD   5 mm BBI 1H-BB
PULPROG                zgpg30
TD                     65536
SOLVENT                CDCl3
NS                        1500
DS                           4
SWH                17985.611 Hz
FIDRES              0.274439 Hz
AQ                  1.8219508 sec
RG                       1448.2
DW                     27.800 usec
DE                     10.00 usec
TE                     296.0 K
D1                  2.00000000 sec
d11                 0.03000000 sec
DELTA               1.89999998 sec
MCREST              0.00000000 sec
MCWRK               0.01500000 sec

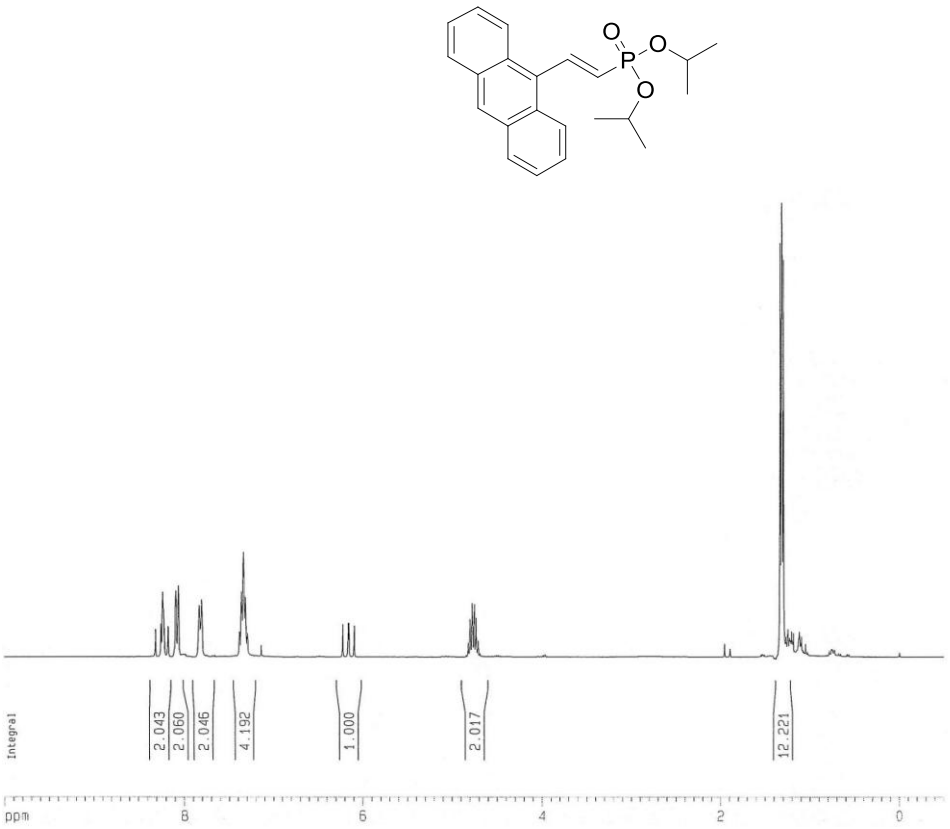
======== CHANNEL f1 ========
NUC1                       13C
P1                      9.00 usec
PL1                     -6.00 dB
SFO1               75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                       1H
PCPD2                  80.00 usec
PL2                     0.00 dB
PL12                   22.00 dB
PL13                   22.00 dB
SFO2               300.1312005 MHz

F2 - Processing parameters
SI                         32768
SF                 75.4677490 MHz
WDW                           EM
SSB                            0
LB                          1.00 Hz
GB                             0
PC                          1.40

1D NMR plot parameters
CX                         20.00 cm
CY                          6.63 cm
F1P                      200.000 ppm
F1                     15093.55 Hz
F2P                      -10.000 ppm
F2                     -754.68 Hz
PPMCM                   10.50000 ppm/cm
```

Supplementary Material (ESI) for Chemical Communications
Copper-Mediated Coupling of 1,1-Dibromoalkenes with Dialkylphosphonates



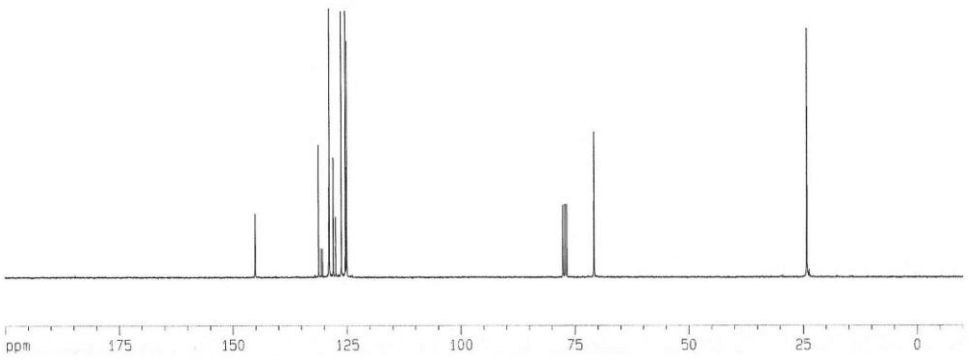

```
Current Data Parameters
NAME          fc47kt100b
EXPNO                 10
PROCNO                 1

F2 - Acquisition Parameters
Date_           20091119
Time               19.29
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG             zg30
TD                 32768
SOLVENT            CDCl3
NS                    16
DS                     2
SWH           6313.131 Hz
FIDRES        0.192661 Hz
AQ            2.5952756 sec
RG                 40.3
DW               79.200 usec
DE                6.50 usec
TE               294.7 K
D1            1.00000000 sec
MCREST        0.00000000 sec
MCWRK         0.01500000 sec

======== CHANNEL f1 ========
NUC1                  1H
P1                 6.20 usec
PL1                0.00 dB
SFO1        300.1328512 MHz

F2 - Processing parameters
SI                 32768
SF          300.1300516 MHz
WDW                   EM
SSB                    0
LB                 0.10 Hz
GB                     0
PC                 1.00

1D NMR plot parameters
CX                20.00 cm
CY                 9.66 cm
F1P              10.000 ppm
F1             3001.30 Hz
F2P              -0.500 ppm
F2             -150.07 Hz
PPMCM          0.52500 ppm/cm
HZCM          157.56828 Hz/cm
```

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Current Data Parameters
NAME          fc47kt100b
EXPNO                 11
PROCNO                 1

F2 - Acquisition Parameters
Date_           20091119
Time               21.39
INSTRUM            spect
PROBHD   5 mm BBI 1H-BB
PULPROG           zgpg30
TD                 65536
SOLVENT            CDCl3
NS                  2000
DS                     4
SWH          17985.611 Hz
FIDRES        0.274439 Hz
AQ            1.8219508 sec
RG                1625.5
DW               27.800 usec
DE               10.00 usec
TE               294.3 K
D1            2.00000000 sec
d11           0.03000000 sec
DELTA         1.89999998 sec
MCREST        0.00000000 sec
MCWRK         0.01500000 sec

======== CHANNEL f1 ========
NUC1                 13C
P1                 9.00 usec
PL1               -6.00 dB
SFO1        75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2         waltz16
NUC2                  1H
PCPD2             80.00 usec
PL2                0.00 dB
PL12              22.00 dB
PL13              22.00 dB
SFO2        300.1312005 MHz

F2 - Processing parameters
SI                 32768
SF          75.4677490 MHz
WDW                   EM
SSB                    0
LB                 1.00 Hz
GB                     0
PC                 1.40

1D NMR plot parameters
CX                20.00 cm
CY                 5.68 cm
F1P             200.000 ppm
F1            15093.55 Hz
F2P             -10.000 ppm
F2            -754.68 Hz
PPMCM         10.50000 ppm/cm
HZCM          792.41138 Hz/cm
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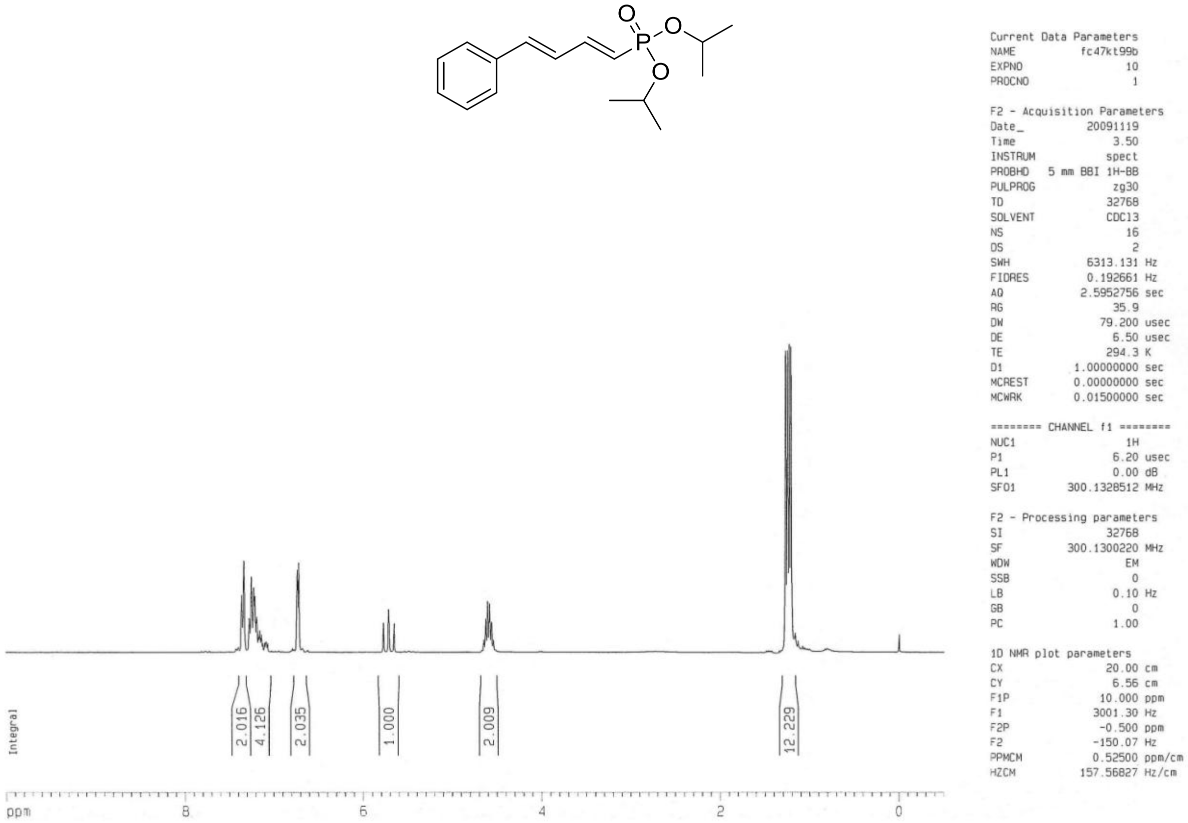
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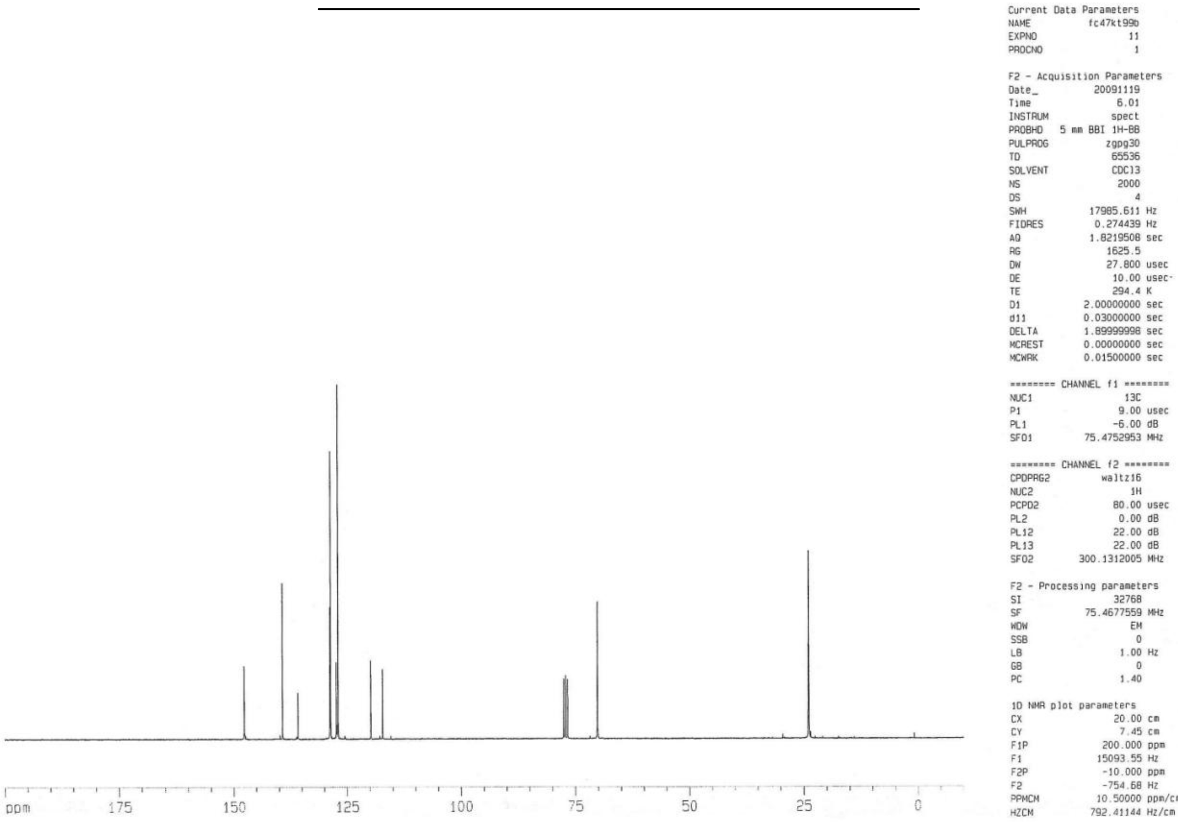
Current Data Parameters
NAME fc47kt99b
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091119
Time 3.50
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 35.9
DW 79.200 usec
DE 6.50 usec
TE 294.3 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300220 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 6.56 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.07 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56827 Hz/cm
Integral
2.016
4.126
2.035
1.000
2.009
12.229
ppm
8
6
4
2
0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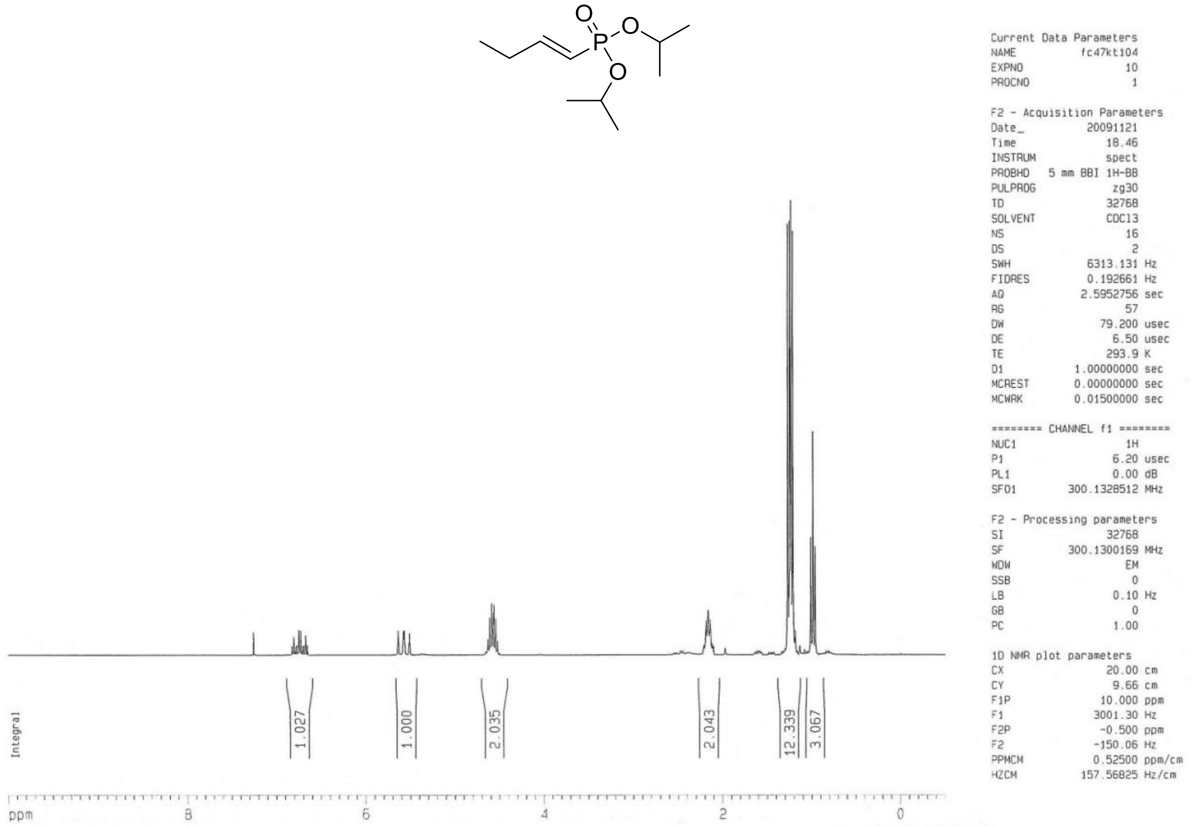
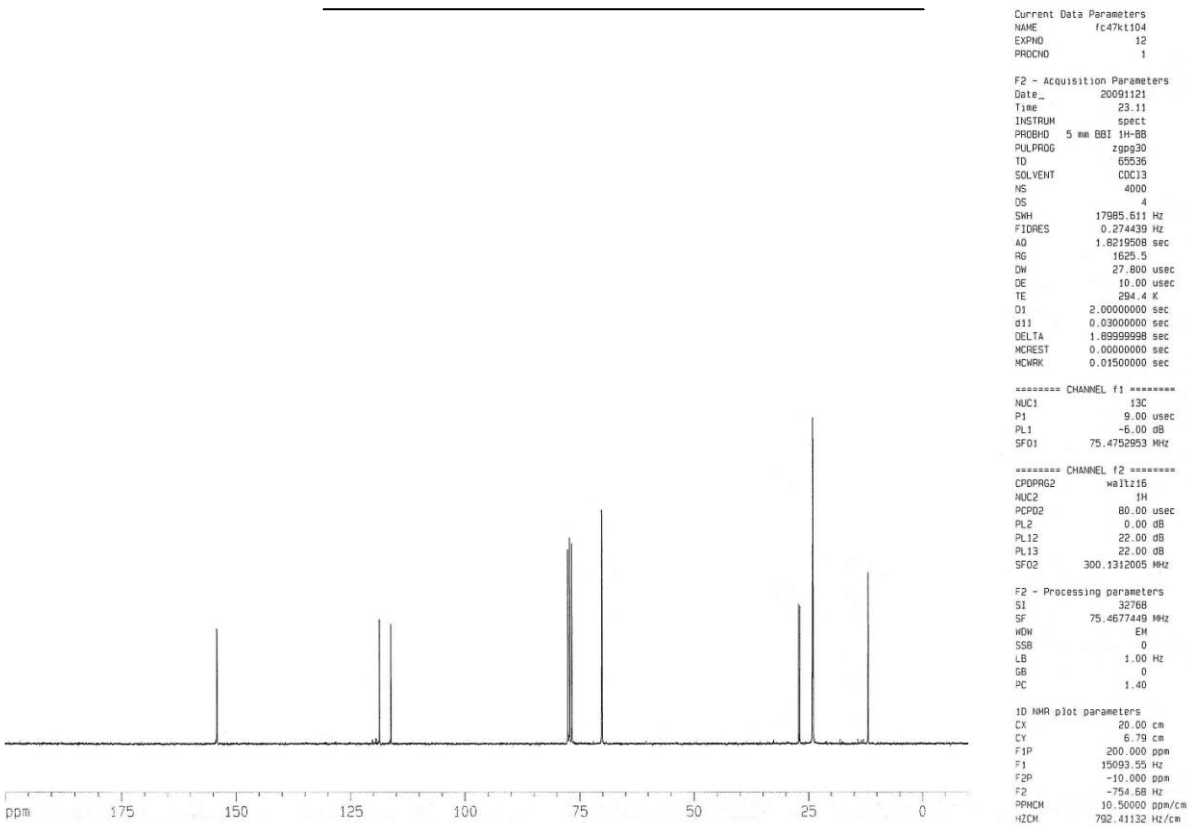
NAME fc47kt99b
EXPNO 11
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091119
Time 6.01
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1625.5
DW 27.800 usec
DE 10.00 usec
TE 294.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677559 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 7.45 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41144 Hz/cm
ppm
175
150
125
100
75
50
25
0





Supplementary Material (ESI) for Chemical Communications
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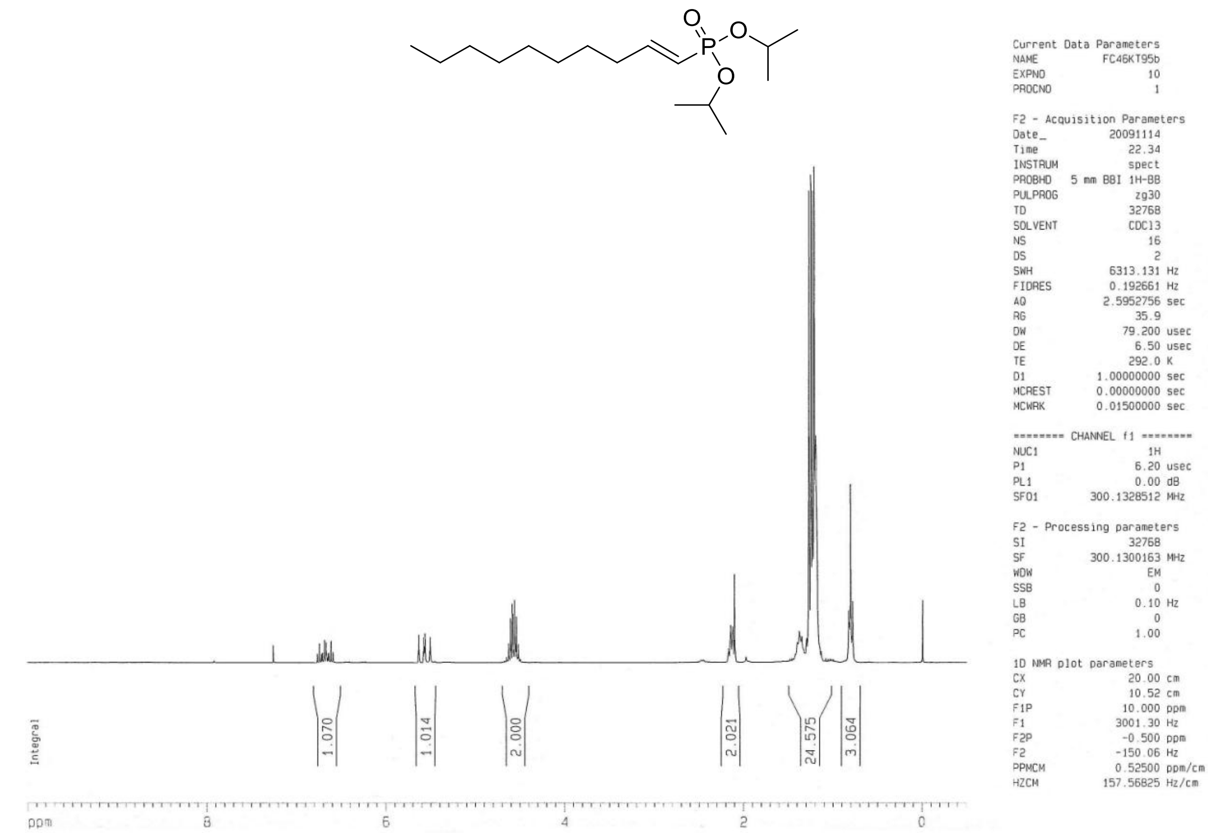
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Current Data Parameters
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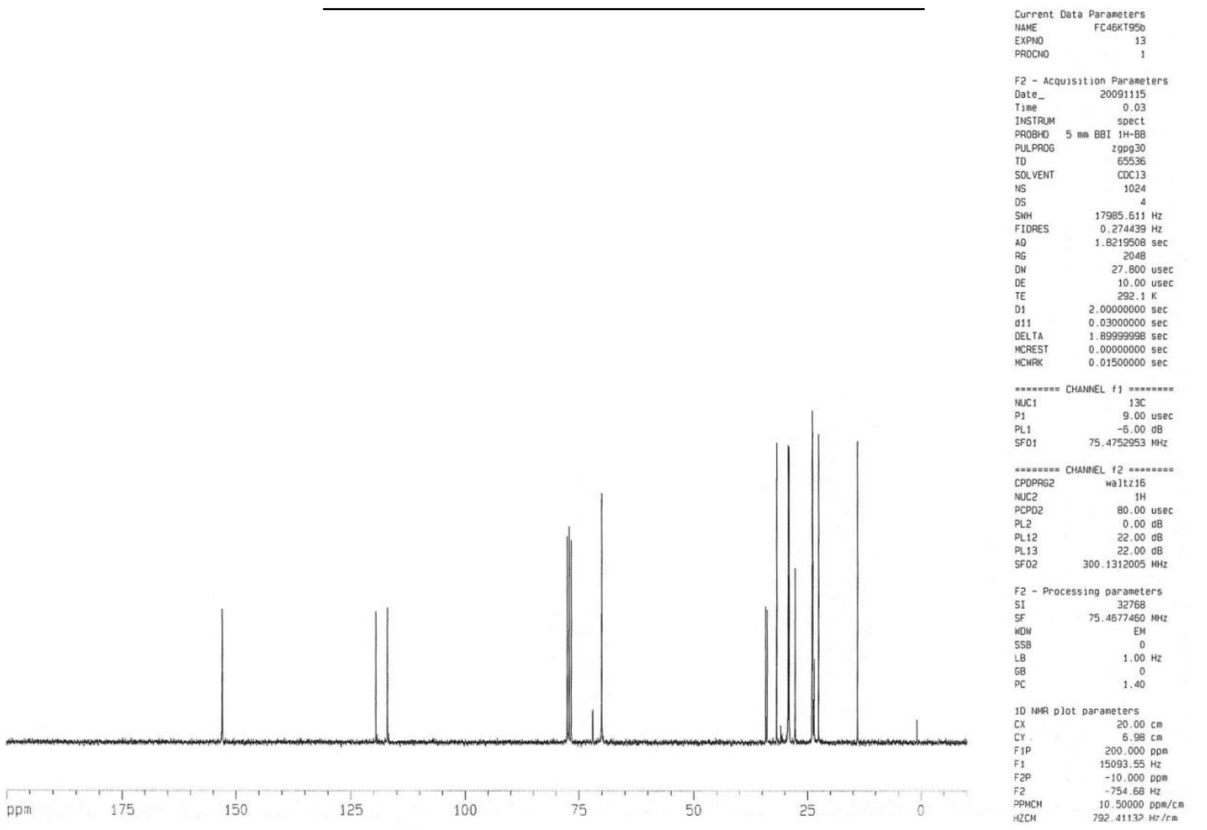
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091114
Time 22.34
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 35.9
DW 79.200 usec
DE 6.50 usec
TE 292.0 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300163 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 10.52 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm
Integral
1.070
1.014
2.000
2.021
24.575
3.064
ppm
8
6
4
2
0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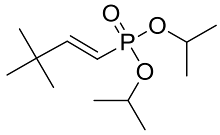
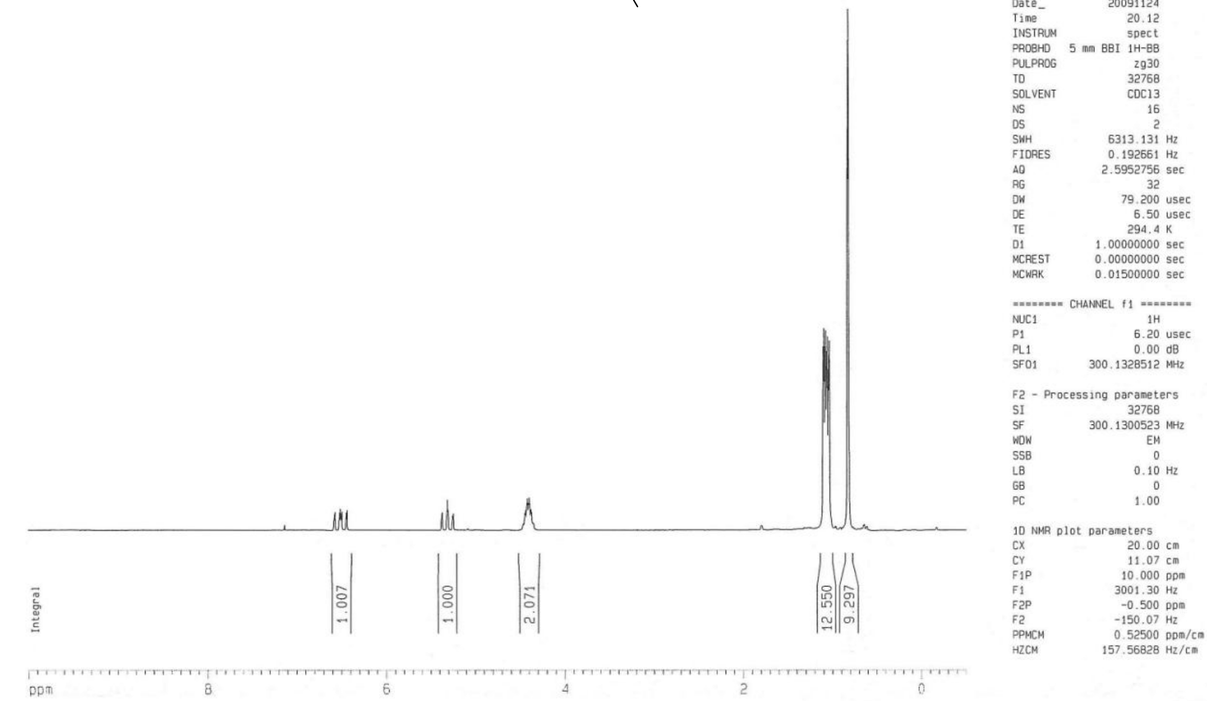
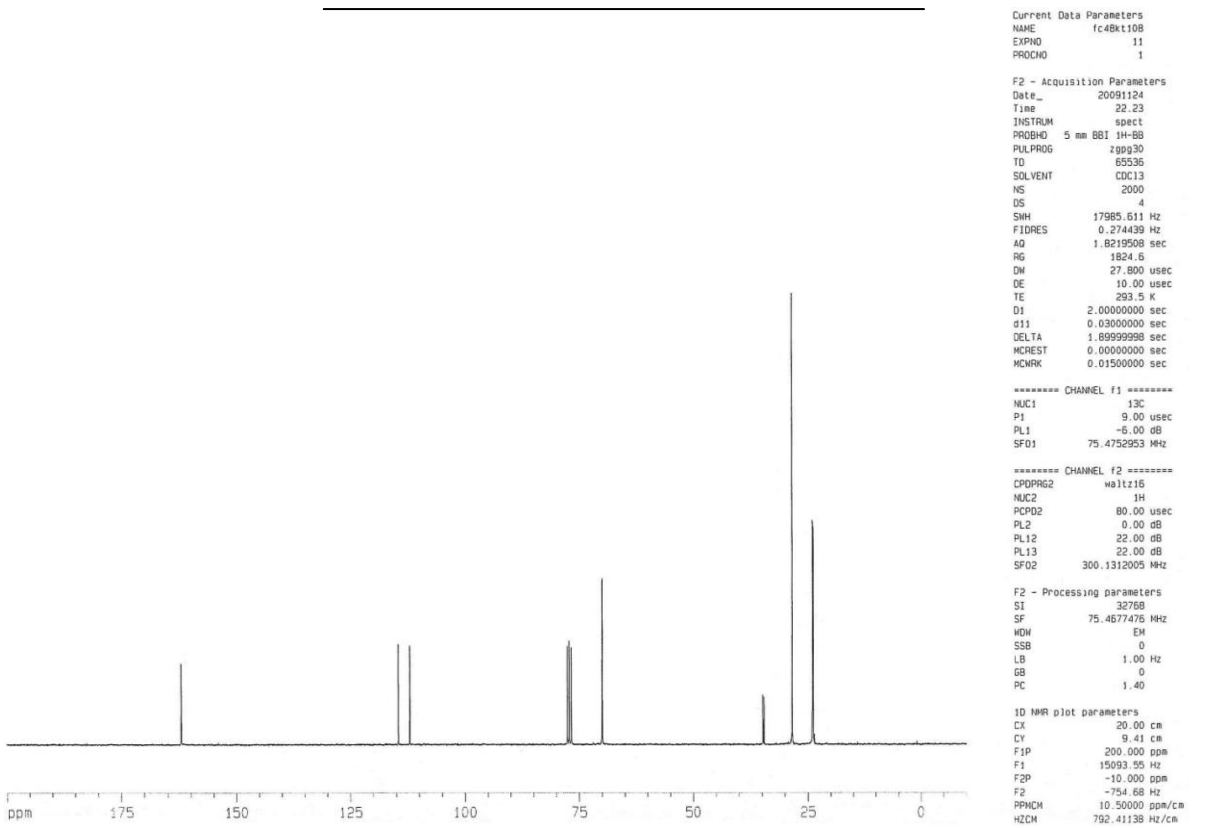
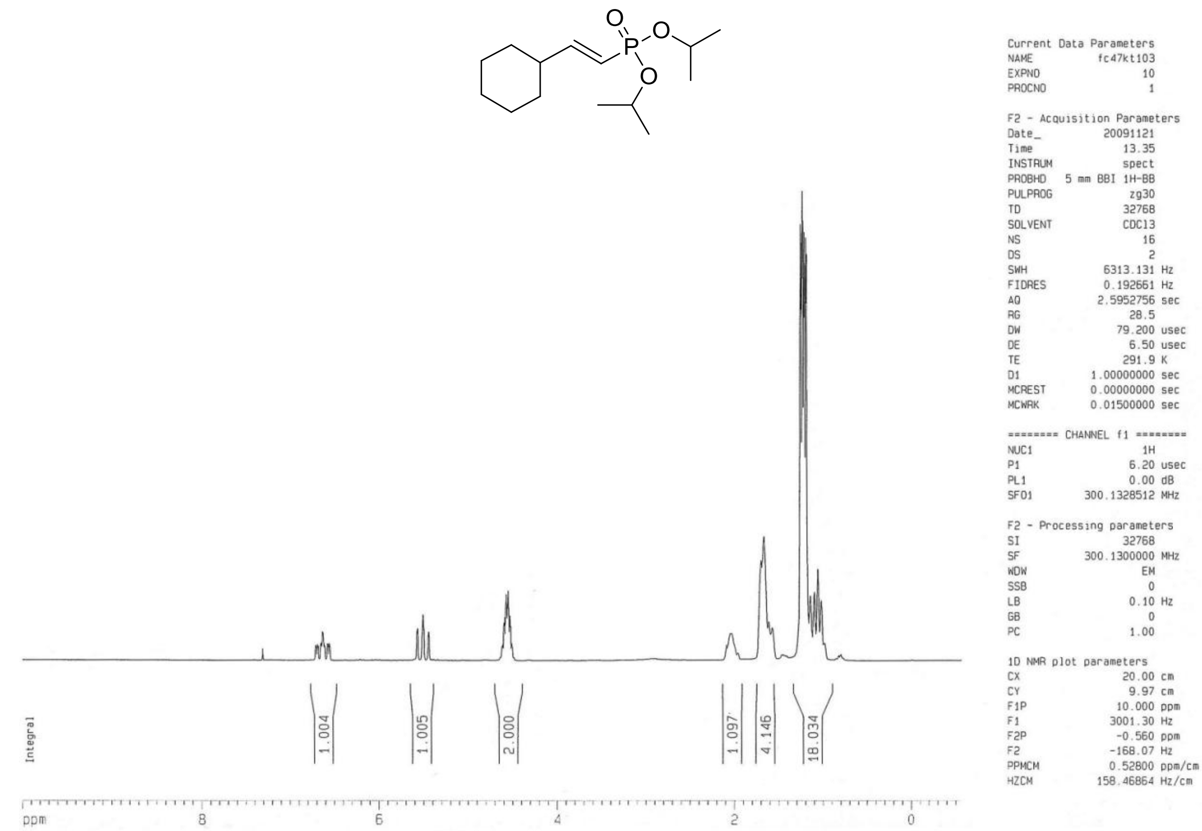
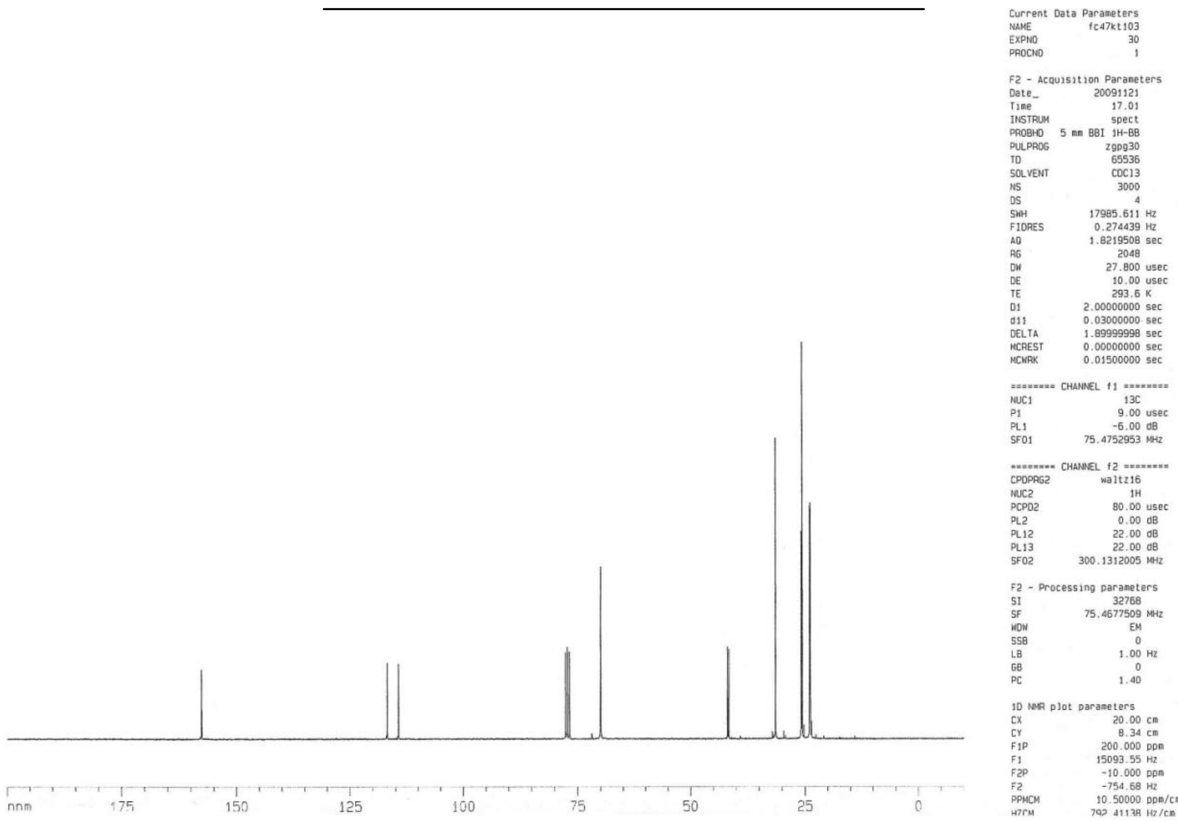
NAME FC46KT95b
EXPNO 13
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091115
Time 0.03
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 2048
DW 27.800 usec
DE 10.00 usec
TE 292.1 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677460 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 6.98 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41132 Hz/cm
ppm
175
150
125
100
75
50
25
0

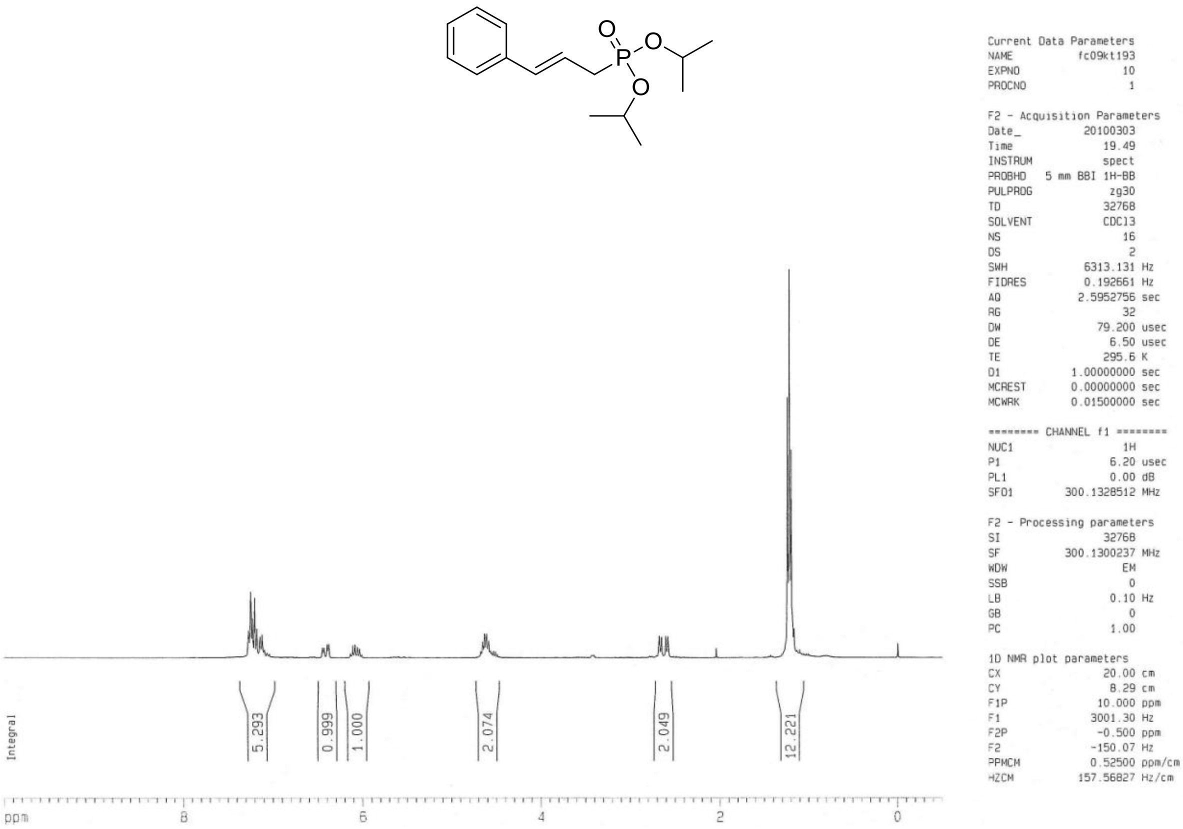


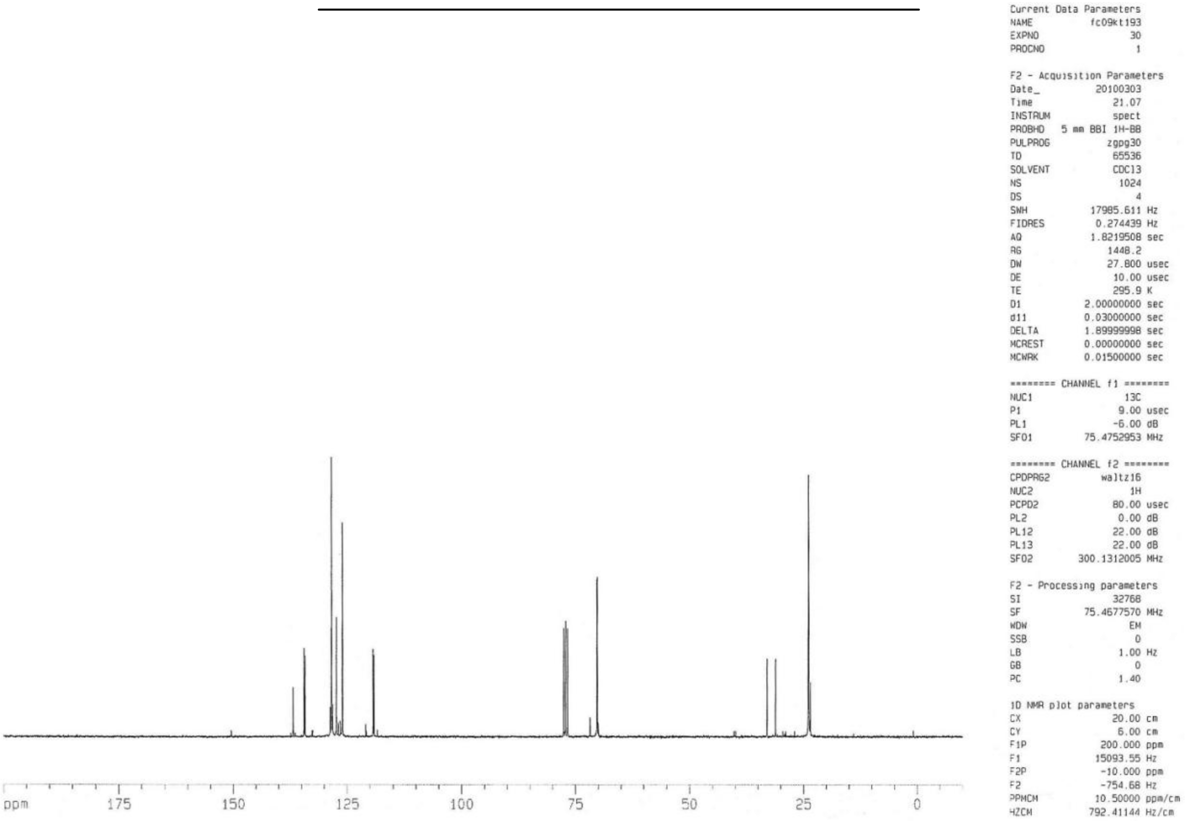

Current Data Parameters
NAME fc48kt108
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091124
Time 20.12
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 32
DW 79.200 usec
DE 6.50 usec
TE 294.4 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300523 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 11.07 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.07 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56828 Hz/cm
Integral
1.007
1.000
2.071
12.550
9.297
ppm
8
6
4
2
0

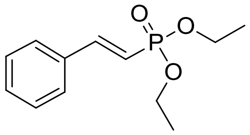

Current Data Parameters
NAME fc48kt108
EXPNO 11
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091124
Time 22.23
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1824.6
DW 27.800 usec
DE 10.00 usec
TE 293.5 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677476 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 9.41 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41138 Hz/cm
ppm
175
150
125
100
75
50
25
0


Current Data Parameters
NAME fc47kt103
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091121
Time 13.35
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 28.5
DW 79.200 usec
DE 6.50 usec
TE 291.9 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 9.97 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.560 ppm
F2 -168.07 Hz
PPMCM 0.52800 ppm/cm
HZCM 158.46864 Hz/cm
Integral
1.004
1.005
2.000
1.097
4.146
18.034
ppm
8
6
4
2
0

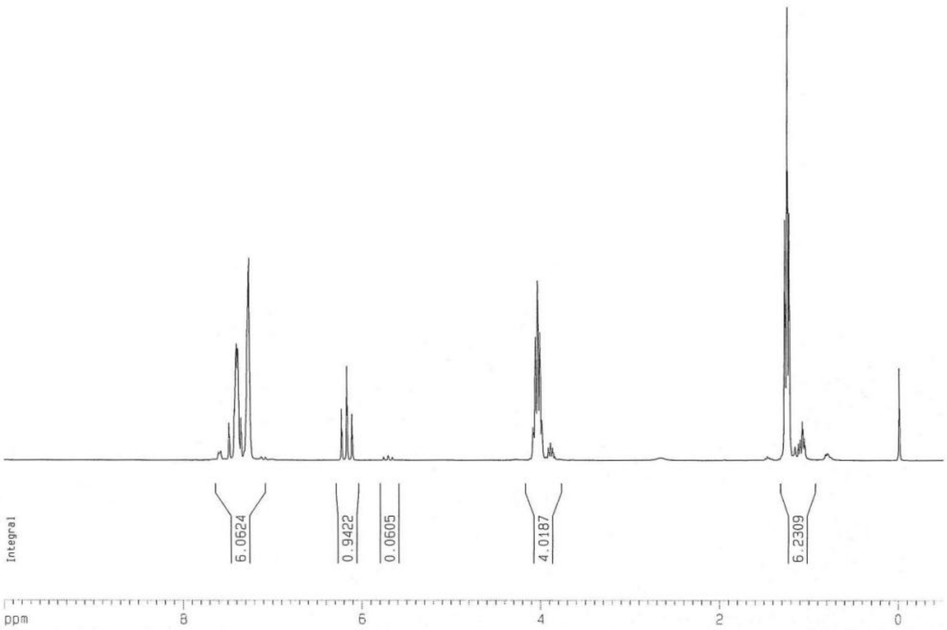

Current Data Parameters
NAME fc47kt103
EXPNO 30
PROCNO 1
F2 - Acquisition Parameters
Date_ 20091121
Time 17.01
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 3000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 2048
DW 27.800 usec
DE 10.00 usec
TE 293.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677509 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 8.34 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41138 Hz/cm
ppm
175
150
125
100
75
50
25
0


Current Data Parameters
NAME fc09kt193
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20100303
Time 19.49
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 32
DW 79.200 usec
DE 6.50 usec
TE 295.6 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300237 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 8.29 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.07 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56827 Hz/cm
Integral
5.293
0.999
1.000
2.074
2.049
12.221
ppm
8
6
4
2
0


Current Data Parameters
NAME fc09kt193
EXPNO 30
PROCNO 1
F2 - Acquisition Parameters
Date_ 20100303
Time 21.07
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1448.2
DW 27.800 usec
DE 10.00 usec
TE 295.9 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677570 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 6.00 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41144 Hz/cm
ppm
175
150
125
100
75
50
25
0



9a



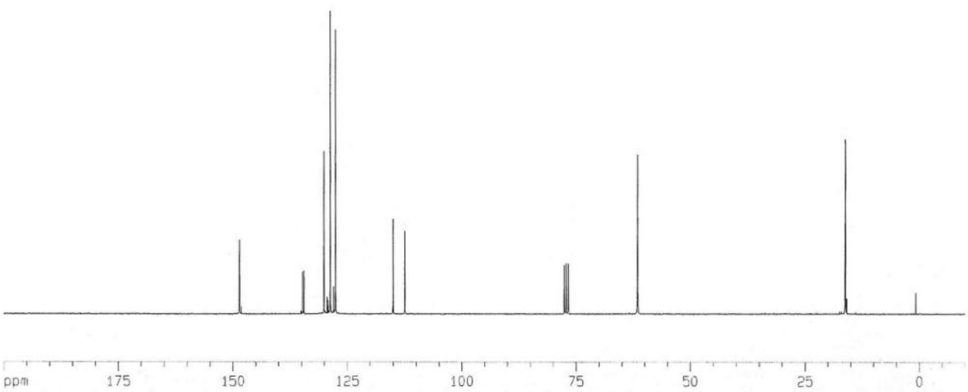
Current Data Parameters
NAME FC01KT141
EXPNO 10
PROCNO 1

F2 - Acquisition Parameters
Date_ 20100108
Time 18.19
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 35.9
DW 79.200 usec
DE 6.50 usec
TE 292.5 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz

F2 - Processing parameters
SI 32768
SF 300.1300133 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 20.00 cm
CY 9.64 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56824 Hz/cm



Current Data Parameters
NAME FC01KT141
EXPNO 11
PROCNO 1

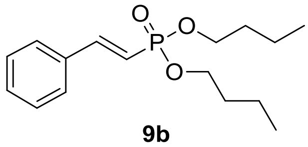
F2 - Acquisition Parameters
Date_ 20100108
Time 20.30
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 2048
DW 27.800 usec
DE 10.00 usec
TE 292.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz

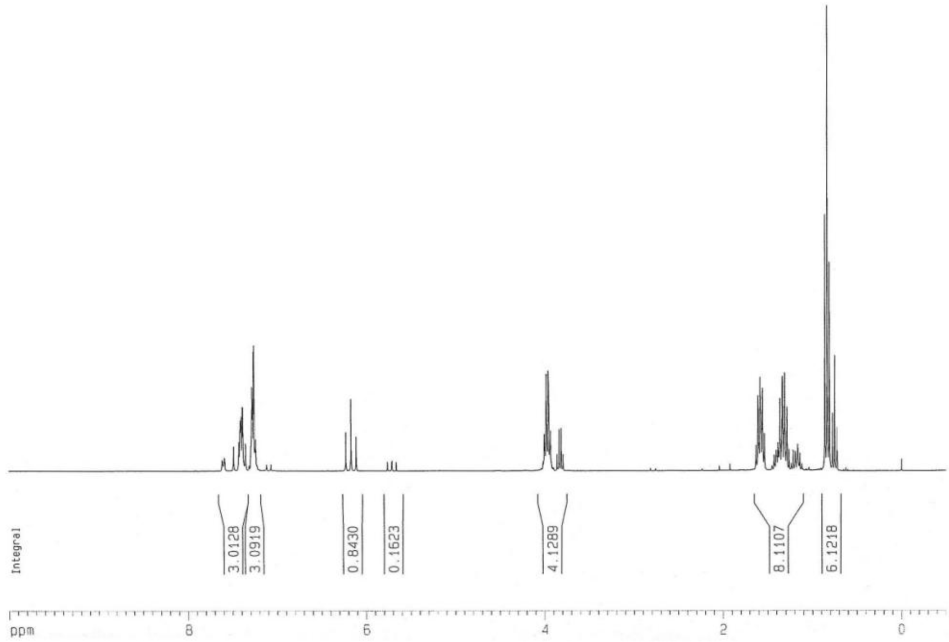
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz

F2 - Processing parameters
SI 32768
SF 75.4677586 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1D NMR plot parameters
CX 20.00 cm
CY 6.33 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41144 Hz/cm



9b



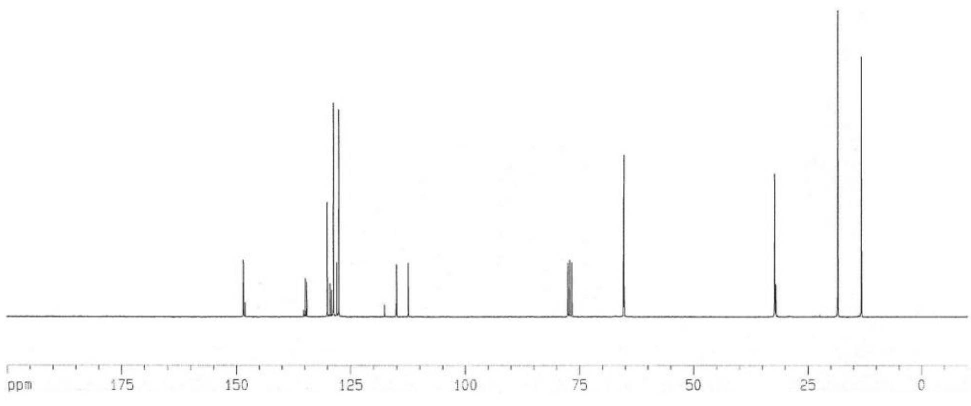
Current Data Parameters
NAME fc51kt134
EXPNO 10
PROCNO 1

F2 - Acquisition Parameters
Date_ 20091215
Time 21.53
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 28.5
DW 79.200 usec
DE 6.50 usec
TE 293.3 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz

F2 - Processing parameters
SI 32768
SF 300.1300126 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 20.00 cm
CY 10.06 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm



Current Data Parameters
NAME fc51kt134
EXPNO 12
PROCNO 1

F2 - Acquisition Parameters
Date_ 20091216
Time 0.09
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1448.2
DW 27.800 usec
DE 10.00 usec
TE 293.5 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz

F2 - Processing parameters
SI 32768
SF 75.4677586 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1D NMR plot parameters
CX 20.00 cm
CY 6.39 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41144 Hz/cm

Supplementary Material (ESI) for Chemical Communications
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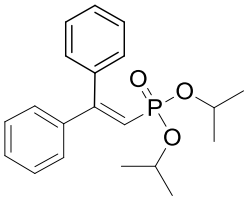
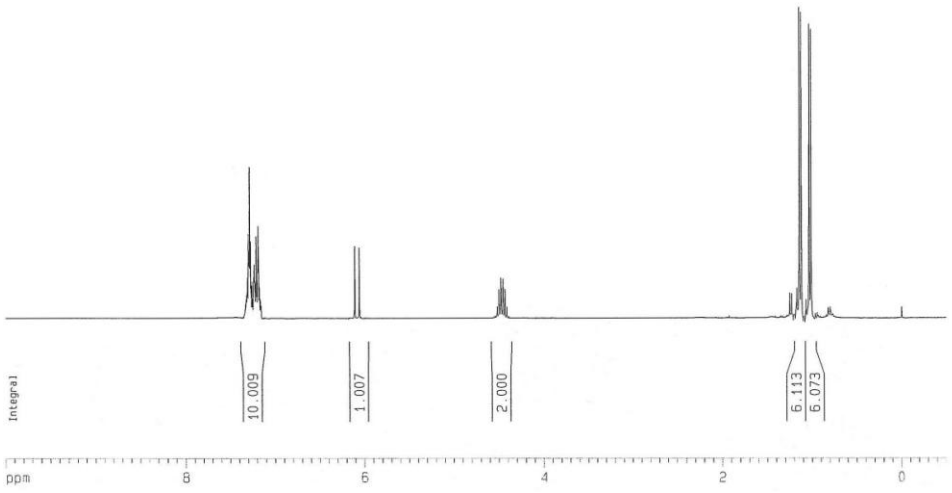
Copper-Mediated Coupling of 1,1-Dibromoalkenes with Dialkylphosphonates



11

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Current Data Parameters
NAME                 fc03kt144
EXPNO                       10
PROCNO                       1

F2 - Acquisition Parameters
Date_               20100123
Time                    11.24
INSTRUM                 spect
PROBHD   5 mm BBI 1H-BB
PULPROG                 zg30
TD                      32768
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                6313.131 Hz
FIDRES            0.192661 Hz
AQ                2.5952756 sec
RG                      50.8
DW                   79.200 usec
DE                    6.50 usec
TE                   294.8 K
D1                1.00000000 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

======== CHANNEL f1 ========
NUC1                        1H
P1                        6.20 usec
PL1                       0.00 dB
SFO1              300.1328512 MHz

F2 - Processing parameters
SI                      32768
SF                300.1300342 MHz
WDW                        EM
SSB                         0
LB                       0.10 Hz
GB                          0
PC                       1.00

1D NMR plot parameters
CX                      20.00 cm
CY                       6.62 cm
F1P                    10.000 ppm
F1                   3001.30 Hz
F2P                   -0.500 ppm
F2                   -150.07 Hz
PPMCM                 0.52500 ppm/cm
HZCM                157.56827 Hz/cm
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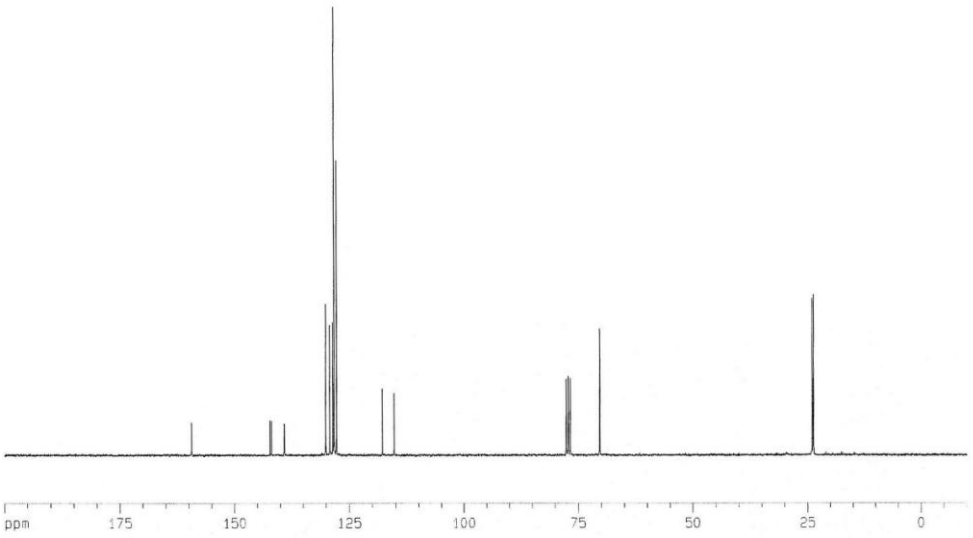



```
Current Data Parameters
NAME                 fc03kt144
EXPNO                       11
PROCNO                       1

F2 - Acquisition Parameters
Date_               20100123
Time                    12.32
INSTRUM                 spect
PROBHD   5 mm BBI 1H-BB
PULPROG                 zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                       1024
DS                          4
SWH               17985.611 Hz
FIDRES            0.274439 Hz
AQ                1.8219508 sec
RG                    1625.5
DW                   27.800 usec
DE                   10.00 usec
TE                   295.0 K
D1                2.00000000 sec
d11               0.03000000 sec
DELTA             1.89999998 sec
MCREST            0.00000000 sec
MCWRK             0.01500000 sec

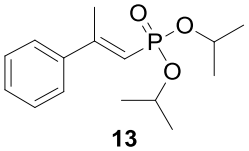
======== CHANNEL f1 ========
NUC1                       13C
P1                        9.00 usec
PL1                      -6.00 dB
SFO1             75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2                waltz16
NUC2                        1H
PCPD2                    80.00 usec
PL2                       0.00 dB
PL12                     22.00 dB
PL13                     22.00 dB
SFO2              300.1312005 MHz

F2 - Processing parameters
SI                      32768
SF                75.4677493 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40

1D NMR plot parameters
CX                      20.00 cm
CY                       9.43 cm
F1P                   200.000 ppm
F1                  15093.55 Hz
F2P                  -10.000 ppm
F2                   -754.68 Hz
PPMCM                10.50000 ppm/cm
HZCM               792.41138 Hz/cm
```

Copper-Mediated Coupling of 1,1-Dibromoalkenes with Dialkylphosphonates



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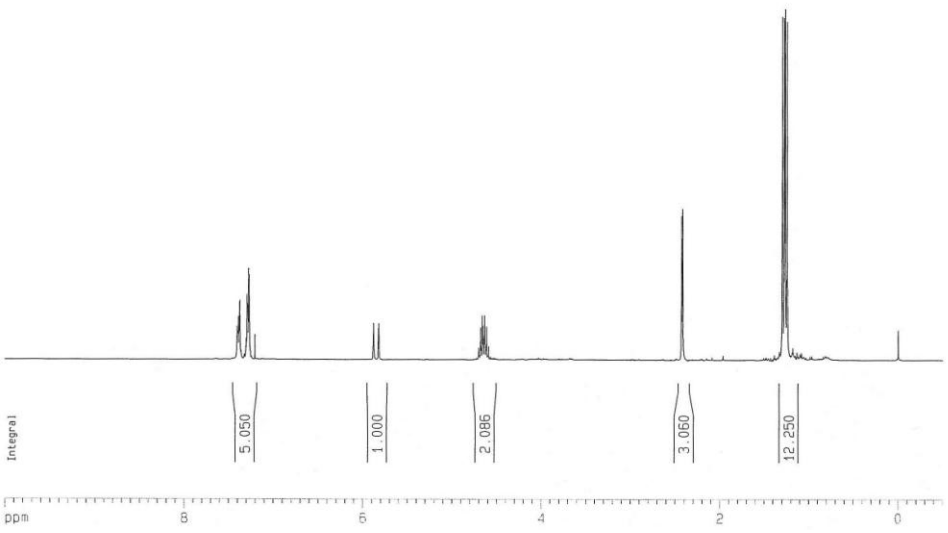


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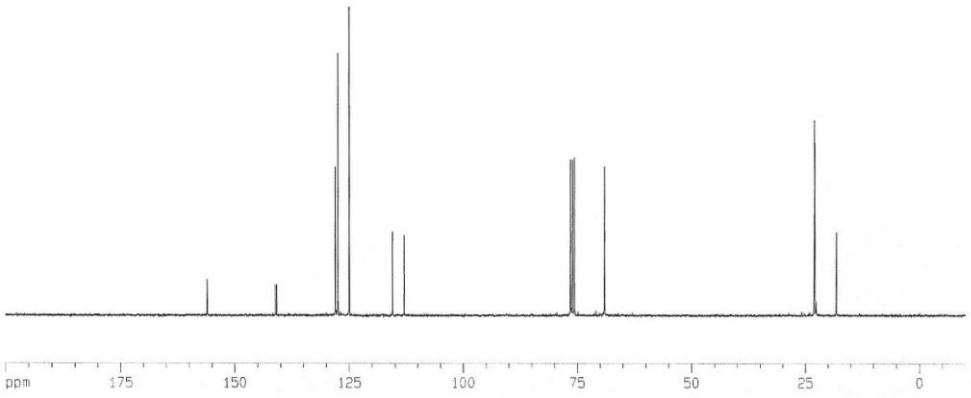
Current Data Parameters
NAME            fc51kt136a
EXPNO                   10
PROCNO                   1

F2 - Acquisition Parameters
Date_             20091219
Time                 14.27
INSTRUM              spect
PROBHD   5 mm BBI 1H-BB
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              6313.131 Hz
FIDRES           0.192661 Hz
AQ               2.5952756 sec
RG                     64
DW                79.200 usec
DE                 6.50 usec
TE                293.0 K
D1             1.00000000 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

======== CHANNEL f1 ========
NUC1                   1H
P1                  6.20 usec
PL1                 0.00 dB
SFO1          300.1328512 MHz

F2 - Processing parameters
SI                  32768
SF            300.1300314 MHz
WDW                    EM
SSB                     0
LB                   0.10 Hz
GB                      0
PC                   1.00

1D NMR plot parameters
CX                  20.00 cm
CY                   7.56 cm
F1P                10.000 ppm
F1                3001.30 Hz
F2P                -0.500 ppm
F2                -150.07 Hz
PPMCM              0.52500 ppm/cm
HZCM             157.56827 Hz/cm
```




```
Current Data Parameters
NAME            fc51kt136a
EXPNO                   11
PROCNO                   1

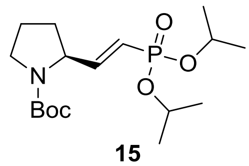
F2 - Acquisition Parameters
Date_             20091219
Time                 16.37
INSTRUM              spect
PROBHD   5 mm BBI 1H-BB
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                   2000
DS                      4
SWH             17985.611 Hz
FIDRES           0.274439 Hz
AQ               1.8219508 sec
RG                  1625.5
DW                27.800 usec
DE                10.00 usec
TE                293.0 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

======== CHANNEL f1 ========
NUC1                   13C
P1                  9.00 usec
PL1                -6.00 dB
SFO1          75.4752953 MHz

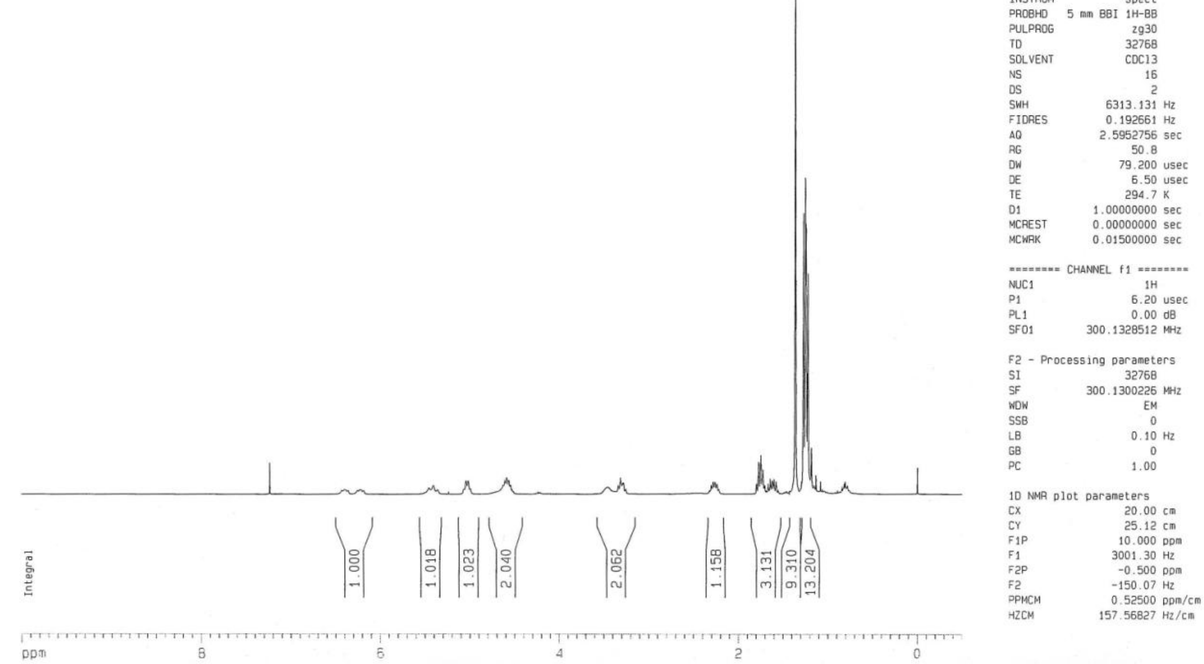
======== CHANNEL f2 ========
CPDPRG2            waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2                 0.00 dB
PL12               22.00 dB
PL13               22.00 dB
SFO2          300.1312005 MHz

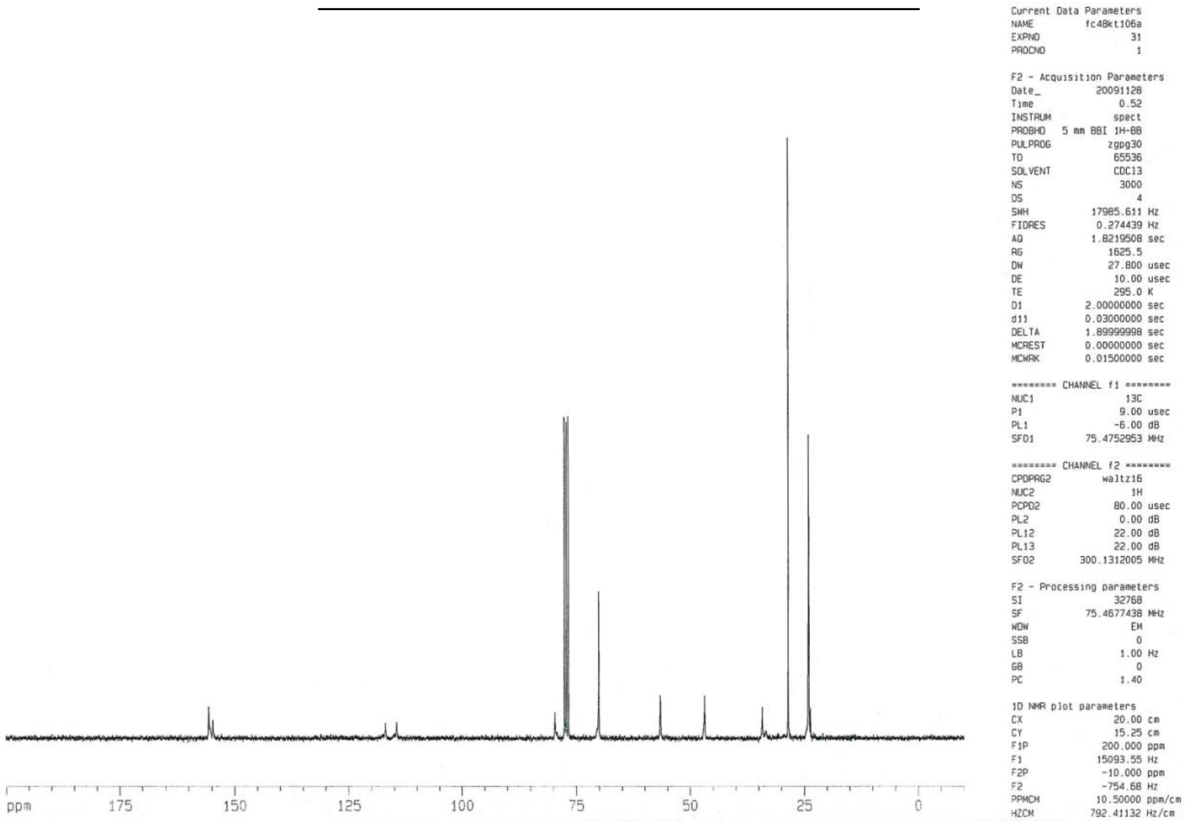
F2 - Processing parameters
SI                  32768
SF            75.4678288 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40

1D NMR plot parameters
CX                  20.00 cm
CY                   6.58 cm
F1P               200.000 ppm
F1              15093.57 Hz
F2P               -10.000 ppm
F2                -754.68 Hz
PPMCM             10.50000 ppm/cm
HZCM             792.41217 Hz/cm
```



15





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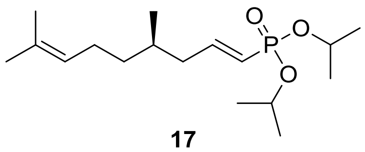
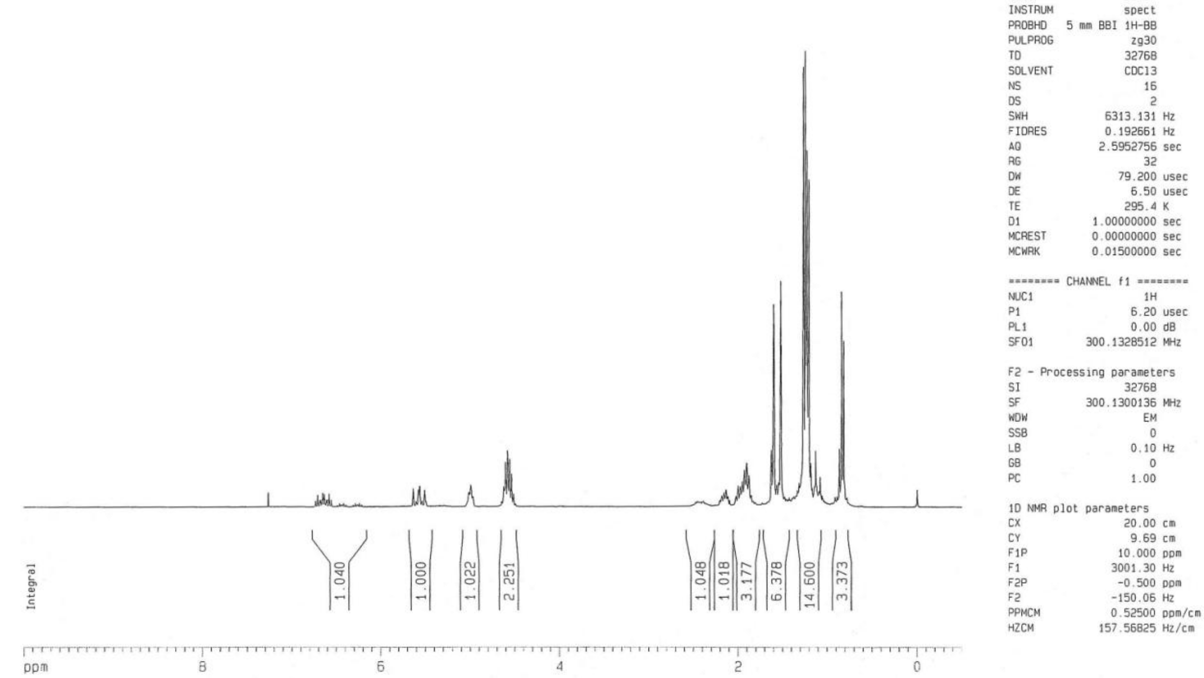
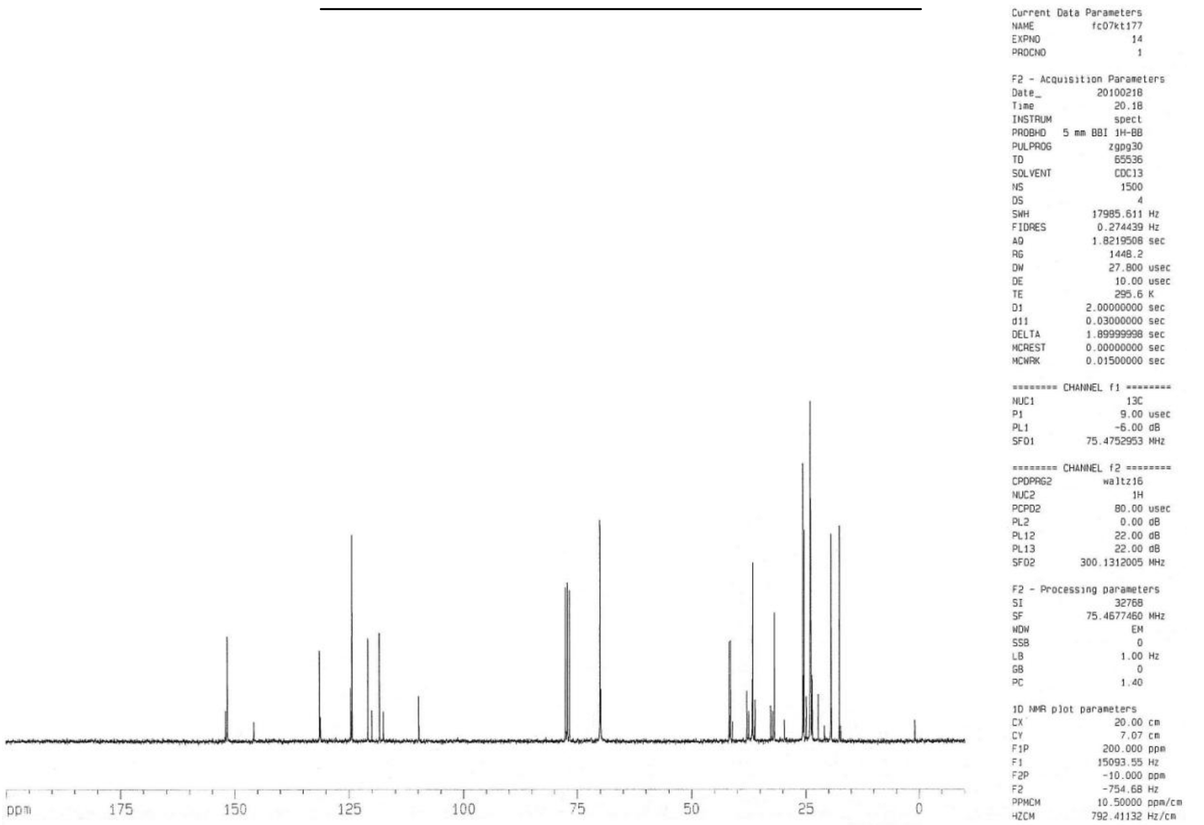
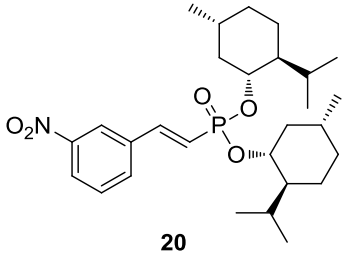

O
P
O
O

17


Current Data Parameters
NAME fc07kt177
EXPNO 10
PROCNO 1
F2 - Acquisition Parameters
Date_ 20100218
Time 18.17
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 32
DW 79.200 usec
DE 6.50 usec
TE 295.4 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz
F2 - Processing parameters
SI 32768
SF 300.1300136 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 9.69 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm
Integral
1.040
1.000
1.022
2.251
1.048
1.018
3.177
6.378
14.600
3.373
ppm
8
6
4
2
0


Current Data Parameters
NAME fc07kt177
EXPNO 14
PROCNO 1
F2 - Acquisition Parameters
Date_ 20100218
Time 20.18
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1500
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1448.2
DW 27.800 usec
DE 10.00 usec
TE 295.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz
F2 - Processing parameters
SI 32768
SF 75.4677460 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
1D NMR plot parameters
CX 20.00 cm
CY 7.07 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41132 Hz/cm
ppm
175
150
125
100
75
50
25
0

Copper-Mediated Coupling of 1,1-Dibromoalkenes with Dialkylphosphonates



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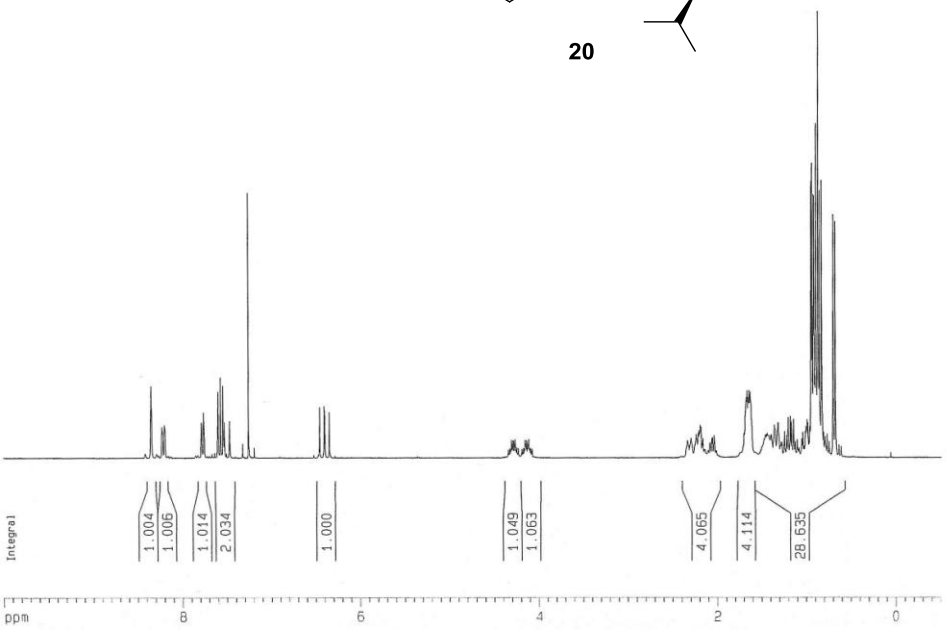


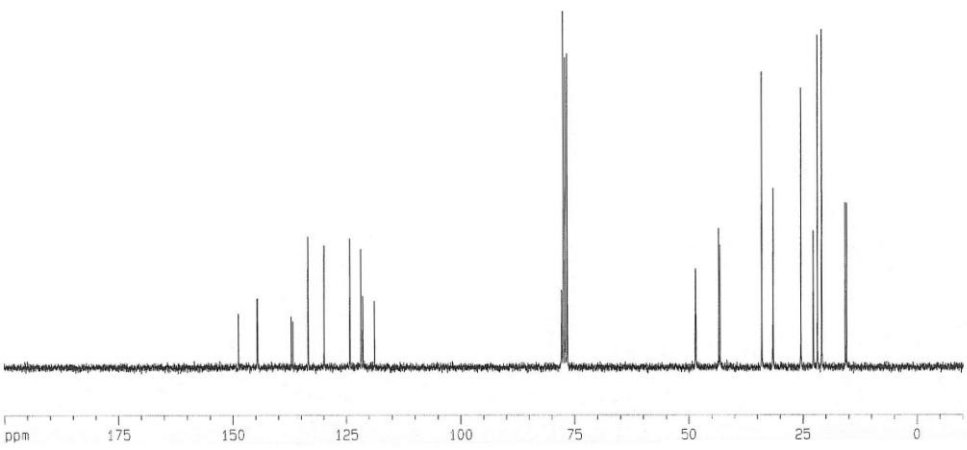

```
Current Data Parameters
NAME            fc15kt220a
EXPNO                  300
PROCNO                   1

F2 - Acquisition Parameters
Date_            20100414
Time                11.34
INSTRUM             spect
PROBHD   5 mm BBI 1H-BB
PULPROG              zg30
TD                  32768
SOLVENT              DMSO
NS                      16
DS                       0
SWH             6313.131 Hz
FIDRES          0.192661 Hz
AQ              2.5952756 sec
RG                   287.4
DW                79.200 usec
DE                 6.50 usec
TE                297.4 K
D1             1.00000000 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

======== CHANNEL f1 ========
NUC1                   1H
P1                   6.20 usec
PL1                  0.00 dB
SFO1          300.1328512 MHz

F2 - Processing parameters
SI                  32768
SF            300.1300063 MHz
WDW                    EM
SSB                     0
LB                   0.10 Hz
GB                      0
PC                   1.00

1D NMR plot parameters
CX                  20.00 cm
CY                   9.50 cm
F1P                10.000 ppm
F1               3001.30 Hz
F2P                -0.500 ppm
F2               -150.06 Hz
PPMCM              0.52500 ppm/cm
HZCM             157.56825 Hz/cm
```

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Current Data Parameters
NAME            fc15kt220a
EXPNO                  21
PROCNO                  1

F2 - Acquisition Parameters
Date_            20100416
Time                20.04
INSTRUM             spect
PROBHD   5 mm BBI 1H-BB
PULPROG           zgpg30
TD                  65536
SOLVENT             CDCl3
NS                   1500
DS                      4
SWH            17985.611 Hz
FIDRES          0.274439 Hz
AQ              1.8219508 sec
RG                 1448.2
DW                27.800 usec
DE                10.00 usec
TE                298.5 K
D1             2.00000000 sec
d11            0.03000000 sec
DELTA          1.89999998 sec
MCREST         0.00000000 sec
MCWRK          0.01500000 sec

======== CHANNEL f1 ========
NUC1                  13C
P1                   9.00 usec
PL1                 -6.00 dB
SFO1          75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2          waltz16
NUC2                   1H
PCPD2              80.00 usec
PL2                 0.00 dB
PL12               22.00 dB
PL13               22.00 dB
SFO2          300.1312005 MHz

F2 - Processing parameters
SI                  32768
SF            75.4677490 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40

1D NMR plot parameters
CX                  20.00 cm
CY                   7.44 cm
F1P               200.000 ppm
F1              15093.55 Hz
F2P               -10.000 ppm
F2               -754.68 Hz
PPMCM             10.50000 ppm/cm
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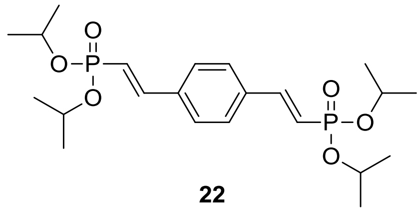

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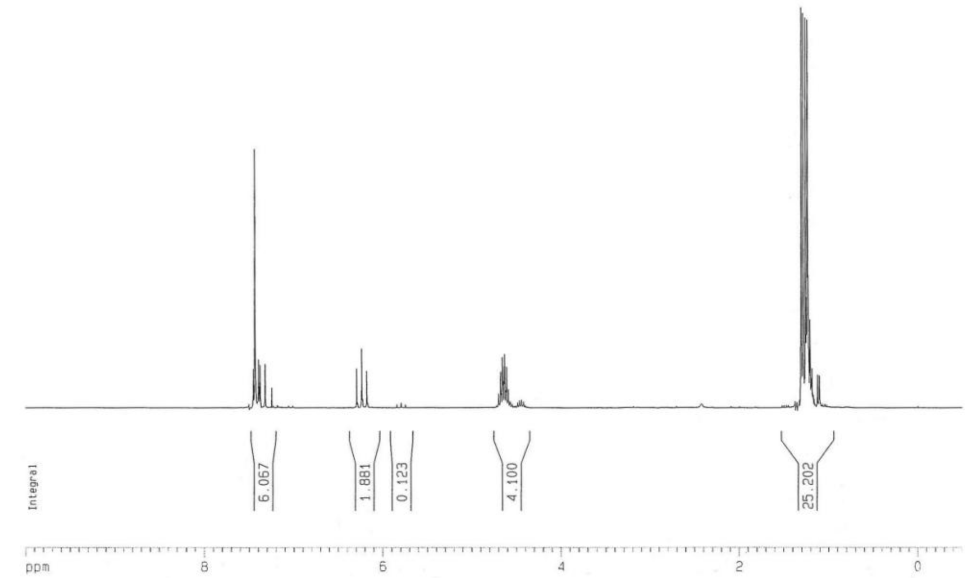


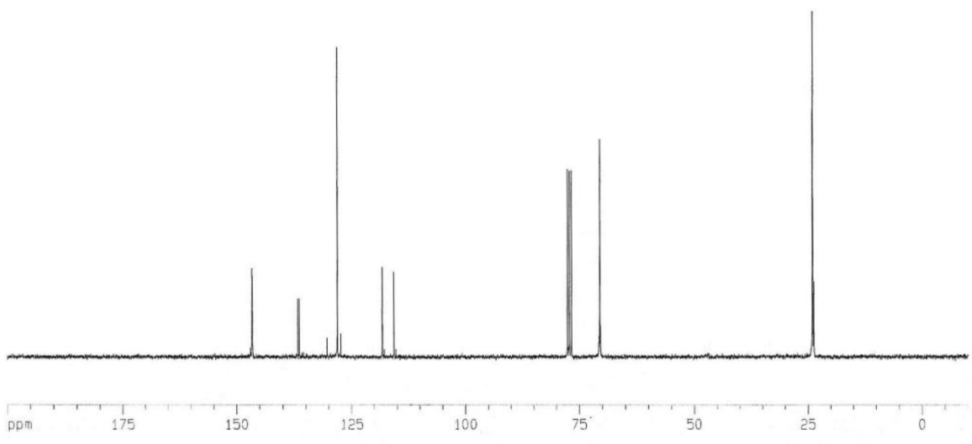
Current Data Parameters
NAME fc07kt164
EXPNO 10
PROCNO 1

F2 - Acquisition Parameters
Date_ 20100218
Time 21.38
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 6313.131 Hz
FIDRES 0.192661 Hz
AQ 2.5952756 sec
RG 50.8
DW 79.200 usec
DE 6.50 usec
TE 295.4 K
D1 1.00000000 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 1H
P1 6.20 usec
PL1 0.00 dB
SFO1 300.1328512 MHz

F2 - Processing parameters
SI 32768
SF 300.1300182 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00

1D NMR plot parameters
CX 20.00 cm
CY 8.55 cm
F1P 10.000 ppm
F1 3001.30 Hz
F2P -0.500 ppm
F2 -150.06 Hz
PPMCM 0.52500 ppm/cm
HZCM 157.56825 Hz/cm



Current Data Parameters
NAME fc07kt164
EXPNO 12
PROCNO 1

F2 - Acquisition Parameters
Date_ 20100218
Time 22.51
INSTRUM spect
PROBHD 5 mm BBI 1H-BB
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 17985.611 Hz
FIDRES 0.274439 Hz
AQ 1.8219508 sec
RG 1625.5
DW 27.800 usec
DE 10.00 usec
TE 295.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
MCREST 0.00000000 sec
MCWRK 0.01500000 sec

======== CHANNEL f1 ========
NUC1 13C
P1 9.00 usec
PL1 -6.00 dB
SFO1 75.4752953 MHz

======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 0.00 dB
PL12 22.00 dB
PL13 22.00 dB
SFO2 300.1312005 MHz

F2 - Processing parameters
SI 32768
SF 75.4677471 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

1D NMR plot parameters
CX 20.00 cm
CY 7.44 cm
F1P 200.000 ppm
F1 15093.55 Hz
F2P -10.000 ppm
F2 -754.68 Hz
PPMCM 10.50000 ppm/cm
HZCM 792.41138 Hz/cm