Supporting Information

N-Heterocyclic Carbene Catalyzed Synthesis of Oxime Esters

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Contents

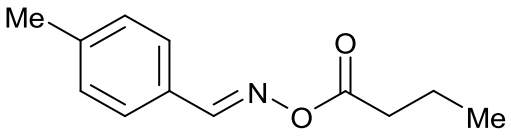
1. General Methods

- **Preparative column chromatography**: Merck silica gel 60, particle size 0.040-0.063 mm (230-240 mesh, flash).
- **Analytical TLC:** SIL G-25 UV254 from MACHEREY&NAGEL. Visualization of the developed TLC plates was performed with ultraviolet irradiation (254 nm) or by staining with basic potassium permanganate solution.
- **Microanalyses** were performed with a Vario EL element analyzer.
- **Mass spectra** were acquired on a Finnigan SSQ7000 (EI/CI) spectrometer and high resolution mass spectra on a Finnigan MAT 95 (EI/CI) or on a ThermoFisher Scientific LTQOrbitrap XL (ESI). All signals over 10% relative intensity are listed.
- **IR spectra** were taken on a Perkin-Elmer FT-IR Spectrum 100 using a Diamant/KRS5 ATR. The type of signal (w = weak, m = medium, s = strong, br = broad) is indicated by appended letters.
- **^{1}H-, ^{13}C- and ^{19}F-NMR** spectra were recorded at ambient temperature on aVNMRS 600 instrument with tetramethylsilane as an internal standard.
- **Melting Points** were measured on Büchi 510 apparatus.

2. Materials

- Oximes **10b**, **10n-10p** and **10s** were purchased from Sigma Aldrich and were used as received. All other oximes were prepared according to the literature procedure.[1] All oximes were used as a single *E*-isomer except for **10o**, which was present as a 2:1 *E*/*Z*-mixture and **10l** as a 6:1 *E*/*Z*-mixture.
- Carbene Precursors **12** were prepared according to the literature procedure[2] while azolium salts **14** and **15** were purchased from Sigma Aldrich.
- Aldehydes **11e**[3] and **11f**[4] were synthesized according to the literature procedures. All other aldehydes were purchased from Sigma Aldrich, distilled and stored in the fridge prior to use.
- $CHCl_3$ (spectroscopy grade) was purchased from a commercial source and used as received. All other solvents were of technical grade and dried using common purification techniques.

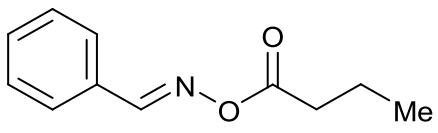
3. Analytical data



13a

(*E*)-4-Methylbenzaldehyde O-butyryl oxime (13a) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13a** as a colorless semi-solid.

R_f = 0.25 (**13a**), (*n*-hexane/ethylacetate 10:1); IR (ATR): 3514br, 2966s, 2877m, 1766s, 1609m, 1568w, 1514w, 1458m, 1418w, 1356m, 1302w, 1239w, 1145s, 1085s, 952m, 918s, 816m, 515m cm^{-1}; ^1H NMR (600 MHz, CDCl3): δ = 1.01 (t, *J* = 7.4 Hz, 3H), 1.72-179 (m, 2H), 2.37 (s, 3H), 2.44 (t, *J* = 7.4 Hz, 2H), 7.21 (d, *J* = 7.9 Hz, 2H), 7.61 (d, *J* = 8.4 Hz, 2H), 8.31 (s, 1H) ppm; ^{13}C NMR (151 MHz, CDCl3): δ = 13.6, 18.3, 21.5, 34.6, 127.3, 128.3, 129.5, 142.1, 155.8, 171.1 ppm; MS (EI, 75 eV): *m/z* (%) = 205 (M^+, 56), 135 (47), 118 (27), 91 (28), 71 (100), 65 (15); elemental analysis calcd for $C_{12}H_{15}NO_2$: C 70.22, H 7.37, N 6.82; found: C 70.15, H 7.46, N 7.14.



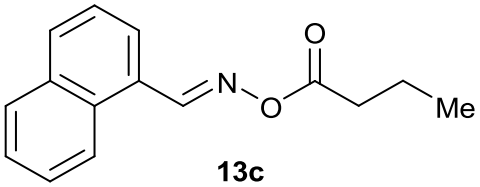
13b

(*E*)-Benzaldehyde O-butyryl oxime (13b) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13b** as a colorless oil.

R_f = 0.23 (**13b**), (*n*-hexane/ethylacetate 10:1); IR (ATR): 3512br, 2967m, 2877w, 1766s, 1614w, 1575w, 1452w, 1355w, 1297w, 1242w, 1212w, 1144s, 1083s, 953m, 919s, 885m, 757m, 693m, 510w cm^{-1}; ^1H NMR

(1) B. C. Sanders, F. Friscourt, P. A. Ledin, N. Eric Mbua, S. Arumugam, J. Guo, T. J. Boltje, V. V. Popik, G.-J. Boons, *J. Am. Chem. Soc.*, 2011, **133**, 949.
(2) M. S. Kerr, J. R. de Alaniz, T. Rovis, *J. Org. Chem.*, 2005, **70**, 5725.
(3) Boone, M. A.; McDonald, F. E.; Lichter, J.; Lutz, S.; Cao, R.; Hardcastle, K. I. *Org. Lett.*, 2009, **11**, 851.
(4) Bulger, P. G.; Moloney, M. G.; Trippier, P. C. *Org. Biomol. Chem.,* 2003, **1**, 3726.

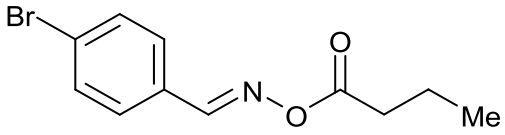
(600 MHz, $CDCl_3$): δ = 1.02 (t, *J* = 7.7 Hz, 3H), 1.73-1.81 (m, 2H), 2.45 (t, *J* = 7.4 Hz, 2H), 7.38-7.44 (m, 2H), 7.45-7.51 (m, 1H), 7.73 (d, *J* = 6.9 Hz, 2H), 8.53 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.6, 128.2, 128.8, 130.1, 131.5, 155.8, 171.0 ppm; MS (EI, 75 eV): *m/z* (%) = 191 (M^+, 28), 104 (11), 89 (13), 77 (41), 71 (100), 65 (11), 51 (25); elemental analysis calcd for $C_{11}H_{13}NO_2$: C 69.09, H 6.85, N 7.32; found: C 69.09, H 6.92, N 7.63.



13c

(*E*)-1-Naphthaldehyde O-butyryl oxime (13c) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13c** as a colorless oil.

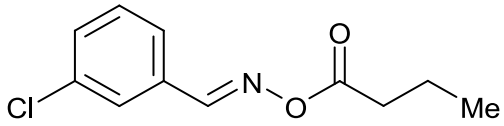
R_f = 0.33 (**13c**), (*n*-hexane/ethylacetate 10:1); IR (ATR): 3503br, 3054w, 2964m, 2878w, 1763s, 1587w, 1512w, 1458w, 1365m, 1237w, 1145s, 1083s, 918s, 779s, 642w cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 1.04 (t, *J* = 7.4 Hz, 3H), 1.75-1.86 (m, 2H), 2.50 (t, *J* = 7.6 Hz, 2H), 7.48 (dd, *J* = 8.2 Hz, 7.2 Hz, 1H), 7.53 (dt, *J* = 6.9 Hz, 1.3 Hz, 1H), 7.59-7.63 (m, 1H), 7.87 (d, *J* = 8.6 Hz, 2.6 Hz, 2H), 7.94 (d, *J* = 8.2 Hz, 1H), 8.60 (d, *J* = 8.6 Hz, 1H), 8.94 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.7, 18.3, 34.6, 124.5, 125.0, 126.1, 126.4, 127.8, 128.8, 129.5, 130.7, 132.2, 133.7, 155.7, 171.1 ppm; MS (CI, 100 eV): *m/z* (%) = 483 ($2M+H^+$, 100), 395 (14); HRMS (ESI): *m/z* calcd for $C_{15}H_{15}NO_2Na^+$: 264.0995 [$M+Na^+$]; found: 264.0994.



13d

(*E*)-4-Bromobenzaldehyde O-butyryl oxime (13d) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13d** as a colorless solid.

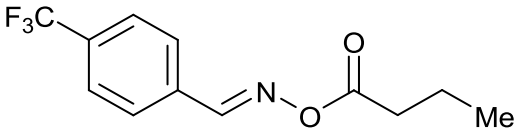
R_f = 0.27 (**13d**), (*n*-hexane/ethylacetate 10:1); Mp.: 46 °C (*n*-hexane/ethylacetate 20:1) ; IR (ATR): 2966m, 2933w, 2876w, 2324w, 2091w, 1920w, 1761s, 1612w, 1586m, 1483m, 1463m, 1396m, 1364m, 1295m, 1210w, 1133s, 1091s, 1007m, 922s, 880m, 826s, 748m, 720m cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 1.02 (t, *J* = 7.3 Hz, 3H), 1.70-1.84 (m, 2H), 2.45 (t, *J* = 7.6 Hz, 2H), 7.56 (d, *J* = 8.6 Hz, 2H), 7.62 (d, *J* = 8.6 Hz, 2H), 8.31 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.6, 126.1, 129.1, 129.6, 132.1, 154.7, 170.9 ppm; MS (CI, 100 eV): *m/z* (%) = 541 ($2M+H^+$, 36), 272 (92), 270 (100), 184 (64), 182 (52), 71 (11); elemental analysis calcd for $C_{11}H_{12}BrNO_2$: C 48.91, H 4.48, N 5.19; found: C 48.89, H 4.65, N 5.14.



13e

(*E*)-3-Chlorobenzaldehyde O-butyryl oxime (13e) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13e** as a colorless oil.

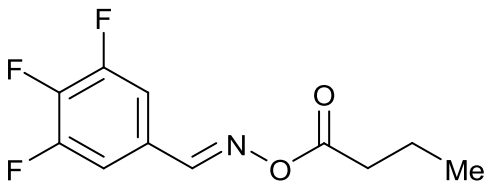
R_f = 0.29 (**13e**), (*n*-hexane/ethylacetate 10:1); IR (ATR): 3520br, 3067w, 2966s, 2877m, 1768s, 1615w, 1565m, 1465m, 1423m, 1350m, 1293w, 1208m, 1142s, 1083s, 960m, 923s, 885m, 789m, 686m cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.02 (t, *J* = 7.4 Hz, 3H), 1.72-1.82 (m, 2H), 2.46 (t, *J* = 7.4 Hz, 2H), 7.36 (t, *J* = 7.9 Hz, 1H), 7.44 (d, *J* = 7.9 Hz, 1H), 7.60 (d, *J* = 7.9 Hz, 1H), 7.77 (t, *J* = 2.0 Hz, 1H), 8.31 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.5, 126.6, 127.9, 130.1, 131.6, 131.9, 135.0, 154.5, 170.9 ppm; MS (EI, 75 eV): *m/z* (%) = 225 (M^+, 7), 111 (11), 75 (11), 71 (100); elemental analysis calcd for $C_{11}H_{12}ClNO_2$: C 58.54, H 5.36, N 6.21; found: C 58.52, H 5.29, N 6.54.



13f

(*E*)-4-(Trifluoromethyl)benzaldehyde O-butyryl oxime (13f) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13f** as a colorless solid.

R_f = 0.25 (**13f**), (*n*-hexane/ethylacetate 10:1); Mp.: 85 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 2968w, 2881w, 2326w, 2068w, 1757s, 1619w, 1462w, 1414m, 1371w, 1316s, 1218w, 1115s, 1065s, 1014m, 982w, 961w, 919s, 881m, 844s, 751w, 719w, 665w cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.03 (t, *J* = 7.6 Hz, 3H), 1.72-1.82 (m, 2H), 2.47 (t, *J* = 7.2 Hz, 2H), 7.69 (d, *J* = 8.2 Hz, 2H), 7.87 (d, *J* = 8.2 Hz, 2H), 8.40 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.5, 123.6, (q, *J* = 272.0 Hz, CF_3), 125.8, 128.6, 133.1 (q, *J* = 32.0 Hz), 133.7, 154.4, 170.8 ppm; ^{19}F NMR (564 MHz, $CDCl_3$): δ = –63.1 ppm; MS (CI, 100 eV): *m/z* (%) = 260 ($M+H^+$, 100), 172 (11), 69 (14); elemental analysis calcd for $C_{12}H_{12}F_3NO_2$: C 55.60, H 4.67, N 5.40; found: C 56.02, H 4.80, N 5.18.

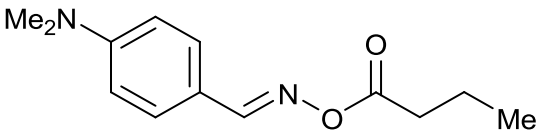


13g

(*E*)-3,4,5-Trifluorobenzaldehyde O-butyryl oxime (13g) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13g** as a colorless solid.

R_f = 0.26 (**13g**), (*n*-hexane/ethylacetate 10:1); Mp.: 71 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3076w, 2971m, 2881w, 1761s, 1592s, 1527s, 1441s, 1371s, 1305s, 1236m, 1135s, 1087s, 1043s, 973m, 931s, 883s, 794m, 752m, 692s cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.04 (t, *J* = 7.6 Hz, 3H), 1.73-1.81 (m, 2H), 2.46 (t,

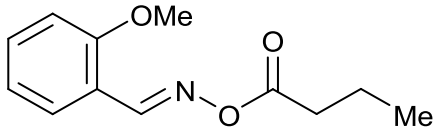
J = 7.2 Hz, 2H), 7.41 (t, *J* = 6.8 Hz, 2H), 8.25 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.5, 112.5 (dd, *J* = 22.2 Hz, 4.9 Hz), 126.4 (d, *J* = 4.9 Hz), 141.8 (dt, *J* = 258.4 Hz, 16 Hz), 151.5 (dd, *J* = 254.7 Hz, 13.5 Hz), 152.8, 170.6 ppm; ^{19}F NMR (564 MHz, $CDCl_3$): δ = –154.4 (dt, *J* = 19.2 Hz, 6.4 Hz, 1F), –132.5 (dd, *J* = 20.4 Hz, 6.8 Hz, 2F) ppm; MS (CI, 100 eV): *m/z* (%) = 491 ($2M+H^+$, 100), 272 (24); elemental analysis calcd for $C_{11}H_{10}F_3NO_2$: C 53.88, H 4.11, N 5.71; found: C 53.53, H 3.78, N 5.56.



13h

(*E*)-4-(Dimethylamino)benzaldehyde O-butyryl oxime (13h) was purified by flash chromatography (*n*-hexane/ethylacetate 5:1) yielding a single *E*-isomer of **13h** as a colorless solid.

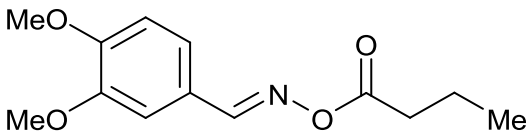
R_f = 0.19 (**13h**), (*n*-hexane/ethylacetate 5:1); Mp.: 82 °C (*n*-hexane/ethylacetate 5:1); IR (ATR): 2924m, 2818w, 2328w, 2090w, 1901w, 1746s, 1595s, 1533s, 1419w, 1365s, 1308m, 1232m, 1139s, 1068s, 992m, 940w, 910m, 808s, 728m cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 1.01 (t, *J* = 7.4 Hz, 3H), 1.72-1.80 (m, 2H), 2.43 (t, *J* = 7.9 Hz, 2H), 3.02 (s, 6H), 6.67 (*J* = 8.9 Hz, 2H), 7.59 (*J* = 8.9 Hz, 2H), 8.23 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.7, 18.4, 34.8, 40.0, 111.5, 117.1, 129.9, 152.5, 156.1, 171.5 ppm; MS (EI, 75 eV): *m/z* (%) = 234 (M^+, 69), 164 (100), 147 (33), 146 (36), 145 (24); elemental analysis calcd for $C_{13}H_{18}N_2O_2$: C 66.64, H 7.74, N 11.96; found: C 66.87, H 7.46, N 11.90.



13i

(*E*)-2-Methoxybenzaldehyde O-butyryl oxime (13i) was purified by flash chromatography (*n*-hexane/ethylacetate 15:1) yielding a single *E*-isomer of **13i** as a colorless semi-solid.

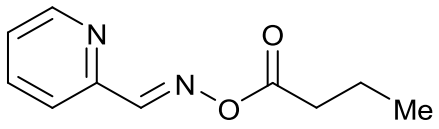
R_f = 0.40 (**13i**), (*n*-hexane/ethylacetate 5:1); IR (ATR): 3014w, 2953m, 2877m, 2334w, 2051w, 1760s, 1601s, 1464s, 1371m, 1296s, 1249s, 1130s, 1028s, 961m, 917s, 879s, 760s cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 1.02 (t, *J* = 7.2 Hz, 3H), 1.70-1.82 (m, 2H), 2.44 (t, *J* = 7.2 Hz, 2H), 3.86 (s, 3H), 6.91 (d, *J* = 8.6 Hz, 1H), 6.98 (t, *J* = 7.6 Hz, 1H), 7.42 (dt, *J* = 7.2 Hz, 1.3 Hz, 1H), 7.97 (dd, *J* = 7.6 Hz, 1.6 Hz, 1H), 8.77 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.7, 55.5, 111.0, 118.6, 120.8, 127.5, 133.0, 152.0, 158.5, 171.2 ppm; MS (CI, 100 eV): *m/z* (%) = 443 ($2M+H^+$, 100), 427 (21), 358 (10), 357 (51), 223 (10), 222 (70); elemental analysis calcd for $C_{12}H_{15}NO_3$: C 65.14, H 6.83, N 6.33; found: C 64.89, H 6.89, N 6.24.



13j

(*E*)-3,4-Dimethoxybenzaldehyde O-butyryl oxime (13j) was purified by flash chromatography (*n*-hexane/ethylacetate 5:1-3:1) yielding a single *E*-isomer of **13j** as a colorless solid.

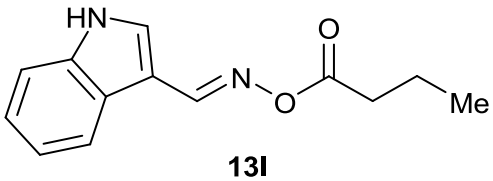
R_f = 0.34 (**13j**), (*n*-hexane/ethylacetate 2:1); Mp.: 63 °C (*n*-hexane/ethylacetate 5:1- 3:1); IR (ATR): 2925s, 2325w, 2079w, 1910w, 1758s, 1652w, 1599m, 1577m, 1509s, 1466m, 1416m, 1361s, 1299m, 1257s, 1133s, 1094s, 1037m, 1006s, 933s, 912m, 857s, 800s, 752s, 710m cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.02 (t, *J* = 7.2 Hz, 3H), 1.70-1.82 (m, 2H), 2.44 (t, *J* = 7.2 Hz, 2H), 3.92 (s, 3H), 3.93 (s, 3H), 6.88 (d, *J* = 8.6 Hz, 1H), 7.13 (dd, *J* = 8.2 Hz, 1.6 Hz, 1H), 7.41 (d, *J* = 1.6 Hz, 1H), 8.28 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.4, 34.7, 55.9, 56.0, 108.7, 110.6, 122.8, 123.9, 149.4, 152.2, 155.9, 171.1 ppm; MS (EI, 75 eV): *m/z* (%) = 251 (M^+, 42), 182 (11), 181 (100), 164 (11), 163 (12), 138 (12), 79 (12), 77 (10), 71 (49); elemental analysis calcd for $C_{13}H_{17}NO_4$: C 62.14, H 6.82, N 5.57; found: C 62.23, H 7.00, N 5.59.



13k

(*E*)-Picolinaldehyde O-butyryl oxime (13k) was purified by flash chromatography (*n*-hexane/ethylacetate 5:1) yielding a single *E*-isomer of **13k** as a yellowish oil.

R_f = 0.28 (**13k**), (*n*-hexane/ethylacetate 2:1); IR (ATR): 3444br, 3058w, 2967m, 2877m, 1771s, 1617w, 1582m, 1466m, 1437w, 1361m, 1301w, 1241w, 1140s, 1082s, 924s, 779m, 745w, 660w, 618w, 518w cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.03 (t, *J* = 7.4 Hz, 3H), 1.74-1.82 (m, 2H), 2.49 (t, *J* = 7.4 Hz, 2H), 7.35-7.38 (m, 1H), 7.77 (dt, *J* = 7.6 Hz, 1.0 Hz, 1H), 8.11 (dt, *J* = 8.2 Hz, 1.3 Hz, 1H), 8.45 (s, 1H), 8.66-8.69 (m, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.6, 122.0, 125.4, 136.7, 149.9, 150.0, 156.6, 170.8 ppm; MS (CI, 100 eV): *m/z* (%) = 385 ($2M+H^+$, 100), 193 (15); HRMS (ESI): *m/z* calcd for $C_{10}H_{13}N_2O_2^+$: 193.0972 [$M+H^+$]; found: 193.0970.

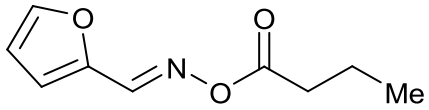


13l

(*E*)-1H-Indole-3-carbaldehyde O-butyryl oxime (13l) was purified by flash chromatography (*n*-hexane/ethylacetate 2:1) yielding a single *E*-isomer of **13l** as a off-white solid.

R_f = 0.56 (**13l**), (*n*-hexane/ethylacetate 1:1); Mp.: 106 °C (*n*-hexane/ethylacetate 2:1); IR (ATR): 3284s, 2966w, 2934w, 2223w, 1737s, 1603s, 1575m, 1522m, 1431s, 1370m, 1298m, 1248m, 1161s, 1106s, 1006w, 965m, 919m, 871m, 783s, 745s cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.03 (t, *J* = 7.4 Hz, 3H), 1.73-1.83 (m,

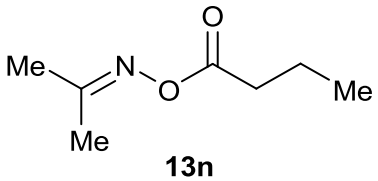
2H), 2.50 (t, *J* = 7.4 Hz, 2H), 7.10 (t, *J* = 7.6 Hz, 1H), 7.18 (t, *J* = 7.5 Hz, 1H), 7.34 (d, *J* = 8.4 Hz, 1H), 7.39 (d, *J* = 2.5 Hz, 1H), 8.09 (d, *J* = 7.9 Hz, 1H), 8.46 (s, 1H), 9.40 (br s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.7, 18.4, 34.8, 107.8, 111.8, 121.7, 121.9, 123.6, 124.3, 130.5, 136.8, 151.7, 172.5 ppm; MS (CI, 100 eV): *m/z* (%) = 461 ($2M+H^+$, 2), 285 (35), 284 (10), 231 ($M+H^+$, 34), 230 (14), 161 (30), 160 (31), 157 (10), 145 (20), 144 (13), 143 (100), 142 (75), 89 (12), 76 (13), 75 (18), 74 (15), 63 (24), 62 (19), 61 (19); elemental analysis calcd for $C_{13}H_{14}N_2O_2$: C 67.81, H 6.13, N 12.17; found: C 68.01, H 5.82, N 12.46.



13m

(*E*)-Furan-2-carbaldehyde O-butyryl oxime (13m) was purified by flash chromatography (*n*-hexane/ethylacetate 10:1-5:1) yielding a single *E*-isomer of **13m** as a colorless oil.

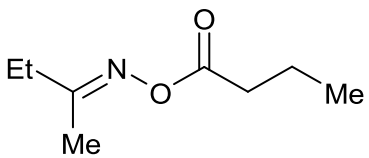
R_f = 0.30 (**13m**), (*n*-hexane/ethylacetate 5:1); IR (ATR): 3467br, 3129w, 2965s, 2878m, 1765s, 1621m, 1475m, 1382m, 1271w, 1245w, 1148s, 1082s, 1022m, 922s, 759s, 594w cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 1.01 (t, *J* = 7.6 Hz, 3H), 1.71-1.80 (m, 2H), 2.44 (t, *J* = 7.6 Hz, 2H), 6.52 (dd, *J* = 3.6 Hz, 2.0 Hz, 1H), 6.93 (d, *J* = 3.6 Hz, 1H), 7.58 (d, *J* = 1.0 Hz, 1H), 8.23 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.3, 34.5, 112.1, 116.1, 145.3, 145.8 (2C), 170.7 ppm; MS (CI, 100 eV): *m/z* (%) = 182 ($M+H^+$, 13), 112 (13), 96 (17), 94 (100), 89 (29), 71 (11); elemental analysis calcd for $C_9H_{11}NO_3$: C 59.66, H 6.12, N 7.73; found: C 59.56, H 6.21, N 8.03.



13n

Propan-2-one O-butyryl oxime (13n) was purified by flash chromatography (*n*-hexane/ethylacetate 3:1) yielding **13n** as a colorless oil.

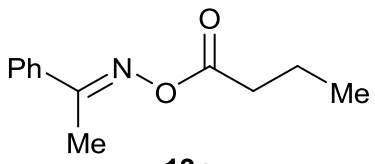
R_f = 0.18 (**13n**), (*n*-hexane/ethylacetate 5:1); IR (ATR): 3504w, 2965s, 2879m, 1760s, 1648m, 1439m, 1374s, 1275m, 1240w, 1152s, 1065s, 905m, 566w cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 1.00 (t, *J* = 7.5 Hz, 3H), 1.70-1.78 (m, 2H), 2.00 (s, 3H), 2.05 (s, 3H), 2.40 (t, *J* = 7.5 Hz, 2H), ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 16.8, 18.4, 21.9, 34.8, 163.5, 170.9 ppm; elemental analysis calcd for $C_7H_{13}NO_2$: C 58.72, H 9.15, N 9.78; found: C 58.28, H 9.20, N 9.89.



13o

(*E*)-Butan-2-one O-butyryl oxime (13o) was purified by flash chromatography (*n*-hexane/ethylacetate 5:1) yielding a single *E*-isomer of **13o** as a colorless oil.

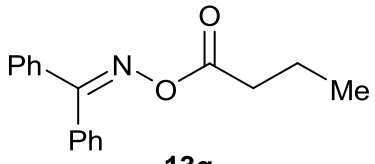
R_f = 0.31 (**13o**), (*n*-hexane/ethylacetate 5:1); IR (ATR): 3512w, 2970s, 2879s, 1762s, 1645m, 1460m, 1370m, 1300w, 1269w, 1241m, 1151s, 1078m, 1030w, 937m, 906m, 862m, 777w, 749w, 572w cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.00 (t, *J*= 7.4 Hz, 3H), 1.16 (t, *J*= 7.4 Hz, 3H), 1.70-1.77 (m, 2H), 1.98 (s, 3H), 2.35-2.43 (m, 4H), ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 10.7, 13.6, 14.8, 18.4, 29.1, 34.8, 167.3, 171.1 ppm; HRMS (ESI): *m/z* calcd for $C_8H_{16}NO_2^+$: 158.1176 [M+H^+]; found: 158.1172.



13p

(*E*)-Acetophenone O-butyryl oxime (13p) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13p** as a colorless solid.

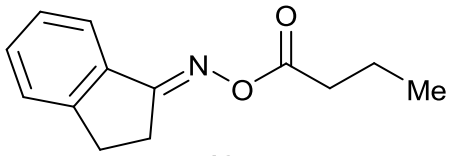
R_f = 0.24 (**13p**), (*n*-hexane/ethylacetate 10:1); Mp.: 104 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 2963m, 2929w, 2875w, 2269w, 2178m, 2108m, 2065m, 1995w, 1936w, 1758s, 1613w, 1567w, 1493w, 1443m, 1401m, 1370s, 1301s, 1131s, 1089s, 975s, 918s, 871s, 769s, 692s cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.03 (t, *J*= 7.4 Hz, 3H), 1.74-1.82 (m, 2H), 2.38 (s, 3H), 2.51 (t, *J* = 7.4 Hz, 2H), 7.38-7.47 (m, 3H), 7.75 (d, *J* = 7.9 Hz, 2H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.7, 14.4, 18.4, 34.9, 127.0, 128.5, 130.5, 134.9, 162.5, 171.2 ppm; MS (EI, 75 eV): *m/z* (%) = 205 (M^+, 19), 118 (20), 103 (14), 78 (12), 77 (44), 71 (100), 51 (20); elemental analysis calcd for $C_{12}H_{15}NO_2$: C 70.22, H 7.37, N 6.82; found: C 70.57, H 7.51, N 7.05.



13q

Benzophenone O-butyryl oxime (13q) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding **13q** as a colorless solid.

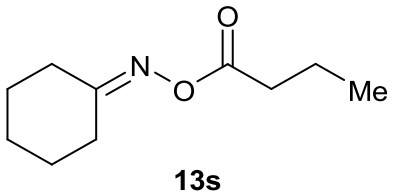
R_f = 0.30 (**13q**), (*n*-hexane/ethylacetate 10:1); Mp.: 63 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3064w, 2958m, 2322w, 2086w, 1764s, 1607w, 1454m, 1367m, 1302s, 1130s, 1087s, 928s, 867s, 771s, 693s cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 0.90 (t, *J*= 7.4 Hz, 3H), 1.57-1.66 (m, 2H), 2.30 (t, *J* = 7.4 Hz, 2H), 7.29-7.33 (m, 2H), 7.35 (t, *J* = 7.6 Hz, 2H), 7.41-7.48 (m, 4H), 7.59 (d, *J* = 7.2 Hz, 2H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.5, 18.1, 34.8, 128.1, 128.3, 128.6, 128.9, 129.4, 130.8, 132.6, 134.7, 164.8, 170.9 ppm; MS (CI, 100 eV): *m/z* (%) = 535 (2M+H^+, 65), 449 (12), 447 (18), 432 (10), 361 (13), 268 (M+H^+, 13), 181 (16), 180 (100) ; elemental analysis calcd for $C_{17}H_{17}NO_2$: C 76.38, H 6.41, N 5.24; found: C 76.27, H 6.58, N 5.21.



13r

(*E*)-2,3-Dihydro-1H-inden-1-one O-butyryl oxime (13r) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13r** as a colorless solid.

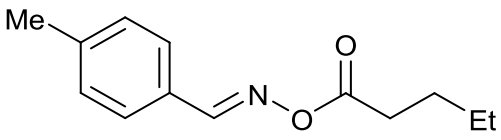
R_f = 0.16 (**13r**), (*n*-hexane/ethylacetate 10:1); Mp.: 66 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 2955m, 2930m, 2872w, 2320w, 2067w, 1761s, 1638m, 1600w, 1461m, 1415m, 1370m, 1336m, 1297m, 1182m, 1135s, 1095s, 1049s, 954s, 917m, 868s, 757s, 709m cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.02 (t, *J*= 7.4 Hz, 3H), 1.72-1.82 (m, 2H), 2.47 (t, *J* = 7.4 Hz, 2H), 2.97-3.04 (m, 2H), 3.05-3.11 (m, 2H), 7.29 (t, *J* = 7.4 Hz, 1H), 7.33 (d, *J* = 7.4 Hz, 1H), 7.41 (t, *J* = 7.4 Hz, 1H), 7.91 (d, *J* = 7.9 Hz, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.4, 27.5, 28.3, 34.8, 123.0, 125.5, 127.0, 131.8, 134.2, 149.6, 170.2, 171.2 ppm; MS (CI, 100 eV): *m/z* (%) = 218 ($M+H^+$, 100), 148 (12), 115 (16), 71 (12), 63 (10); elemental analysis calcd for $C_{13}H_{15}NO_2$: C 71.87, H 6.96, N 6.45; found: C 71.81, H 7.03, N 6.17.



13s

Cyclohexanone O-butyryl oxime (13s) was purified by flash chromatography (*n*-hexane/ethylacetate 5:1) yielding **13s** as a yellowish oil.

R_f = 0.36 (**13s**), (*n*-hexane/ethylacetate 5:1); IR (ATR): 3476br, 2938s, 2867s, 1759s, 1639m, 1448m, 1374m, 1252w, 1151s, 1083m, 989w, 917m, 854m cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 0.96-1.03 (m, 3H), 1.60-1.81 (m, 8H), 2.35-2.42 (m, 4H), 2.51-2.58 (m, 2H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 18.4, 25.4, 25.7, 26.7, 26.8, 32.1, 34.9, 168.5, 171.2 ppm; MS (CI, 100 eV): *m/z* (%) = 367 ($2M+H^+$, 48), 280 (19), 279 (100), 209 (27), 192 (16), 184 ($M+H^+$, 19), 96 (19), 71 (60); HRMS (ESI): *m/z* calcd for $C_{10}H_{17}NO_2Na^+$: 206.1151 [$M+Na^+$]; found: 206.1152.

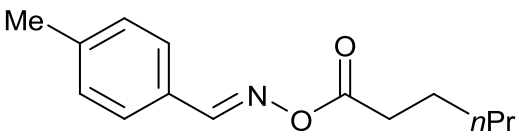


13t

(*E*)-4-Methylbenzaldehyde O-pentanoyl oxime (13t) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13t** as colorless solid.

R_f = 0.31 (**13t**), (*n*-hexane/ethylacetate 10:1); Mp.: 45 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3500w, 3020w, 2956m, 2870m, 2319w, 2094w, 1994w, 1924w, 1757s, 1609m, 1566w, 1513w, 1463m, 1414w, 1345m, 1266m, 1216w, 1137s, 1092s, 1017m, 994m, 890s, 849m, 816s, 768w, 717m cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 0.95 (t, *J* = 7.4 Hz, 3H), 1.37-1.47 (m, 2H), 1.67-1.75 (m, 2H), 2.38 (s, 3H), 2.47 (t, *J*

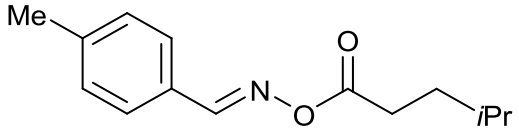
= 7.4 Hz, 2H), 7.22 (d, *J* = 7.9 Hz, 2H), 7.62 (d, *J* = 7.9 Hz, 2H), 8.31 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.6, 21.5, 22.2, 26.9, 32.5, 127.3, 128.3, 129.5, 142.1, 155.8, 171.3 ppm; MS (CI, 100 eV): *m/z* (%) = 220 ($M+H^+$, 88), 219 (12), 164 (12), 120 (12), 119 (18), 118 (100), 85 (21); elemental analysis calcd for $C_{13}H_{17}NO_2$: C 71.21, H 7.81, N 6.39; found: C 70.96, H 7.94, N 6.31.



13u

(*E*)-4-Methylbenzaldehyde O-hexanoyl oxime (13u) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13u** as a colorless solid.

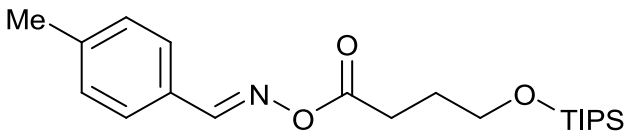
R_f = 0.38 (**13u**), (*n*-hexane/ethylacetate 10:1); Mp.: 39 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3503w, 2952m, 2867m, 2326w, 2097w, 1924w, 1759s, 1608m, 1564w, 1513w, 1458m, 1417w, 1359m, 1313m, 1241m, 1214m, 1136s, 1095s, 986m, 885s, 848m, 817s, 765w, 721m cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 0.91 (t, *J* = 6.9 Hz, 3H), 1.30-1.41 (m, 4H), 1.69-1.77 (m, 2H), 2.38 (s, 3H), 2.45 (t, *J* = 7.4 Hz, 2H), 7.22 (d, *J* = 7.9 Hz, 2H), 7.62 (d, *J* = 7.9 Hz, 2H), 8.31 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 13.8, 21.5, 22.2, 24.5, 31.2, 32.7, 127.3, 128.2, 129.5, 142.1, 155.8, 171.3 ppm; MS (CI, 100 eV): *m/z* (%) = 234 ($M+H^+$, 61), 119 (16), 118 (100), 117 (10), 99 (23); elemental analysis calcd for $C_{14}H_{19}NO_2$: C 72.07, H 8.21, N 6.00; found: C 72.11, H 8.34, N 5.96.



13v

(*E*)-4-Methylbenzaldehyde O-(4-methylpentanoyl) oxime (13v) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13v** as a colorless solid.

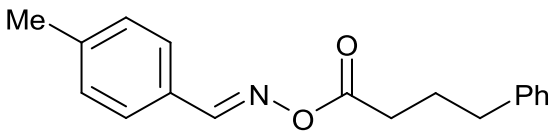
R_f = 0.40 (**13v**), (*n*-hexane/ethylacetate 10:1); Mp.: 32 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3504w, 3040w, 3015w, 2954m, 2867w, 2725w, 2321w, 2067w, 1923w, 1757s, 1664w, 1611m, 1565w, 1513w, 1463m, 1417w, 1370w, 1346m, 1329m, 1270m, 1211m, 1181w, 1139s, 1102s, 1047w, 985m, 958w, 893s, 857m, 818s, 770m, 709m cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 0.93 (d, *J* = 6.3 Hz, 6H), 1.60-1.68 (m, 3H), 2.36 (s, 3H), 2.45 (t, *J* = 7.6 Hz, 2H), 7.21 (d, *J* = 7.9 Hz, 2H), 7.61 (d, *J* = 7.9 Hz, 2H), 8.31 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 21.4, 22.0, 27.5, 30.7, 33.5, 127.2, 128.2, 129.4, 142.0, 155.7, 171.3 ppm; MS (CI, 100 eV): *m/z* (%) = 468 ($2M+H^+$, 100), 234 ($M+H^+$, 2); HRMS (ESI): *m/z* calcd for $C_{14}H_{19}NO_2Na^+$: 256.1308 [$M+Na^+$]; found: 256.1307.



13w

(*E*)-4-Methylbenzaldehyde O-(4-((triisopropylsilyl)oxy)butanoyl) oxime (13w) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13w** as a colorless oil.

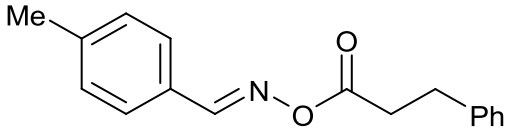
R_f = 0.31 (**13w**), (*n*-hexane/ethylacetate 10:1); IR (ATR): 3850w, 3743w, 3518w, 2943s, 2866s, 2727w, 2427w, 2230w, 1913w, 1768s, 1610m, 1569w, 1513w, 1462s, 1382m, 1314w, 1248m, 1215m, 1110s, 968m, 915m, 883m, 813m, 726w, 680s, 564w, 514m cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 1.03-1.14 (m, 21H), 1.93-1.99 (m, 2H), 2.39 (s, 3H), 2.61 (t, *J* = 7.3 Hz, 2H), 3.78 (t, *J* = 5.9 Hz, 2H), 7.23 (d, *J* = 7.9 Hz, 2H), 7.62 (d, *J* = 7.9 Hz, 2H), 8.32 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 11.9, 18.0, 21.6, 28.0, 29.3, 62.1, 127.4, 128.3, 129.6, 142.2, 155.8, 171.4 ppm; MS (EI, 75 eV): *m/z* (%) = 378 (M^+, 4), 243 (21), 218 (16), 217 (100), 118 (11), 91 (17); HRMS (ESI): *m/z* calcd for $C_{21}H_{36}NO_3Si^+$: 378.2459 [M+H^+]; found: 378.2460.



13x

(*E*)-4-Methylbenzaldehyde O-(4-phenylbutanoyl) oxime (13x) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13x** as a colorless solid.

R_f = 0.27 (**13x**), (*n*-hexane/ethylacetate 10:1); Mp.: 56 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3417w, 3021w, 2917w, 2856w, 1756s, 1606m, 1567w, 1498w, 1452w, 1416w, 1373m, 1309m, 1212m, 1110s, 1029w, 991m, 960w, 903s, 852m, 814s, 743s, 700s cm^{-1}; ^1H NMR (600 MHz, $CDCl_3$): δ = 2.02-2.11 (m, 2H), 2.39 (s, 3H), 2.48 (t, *J* = 7.4 Hz, 2H), 2.72 (t, *J* = 7.6 Hz, 2H), 7.18-7.26 (m, 5H), 7.29 (t, *J* = 7.6 Hz, 2H), 7.62 (d, *J* = 7.9 Hz, 2H), 8.30 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 21.6, 26.4, 32.1, 35.0, 126.0, 127.3, 128.3, 128.4, 128.5, 129.6, 141.2, 142.2, 155.9, 171.0 ppm; MS (CI, 100 eV): *m/z* (%) = 282 (M+H^+, 4), 147 (46), 120 (21), 119 (13), 118 (100); elemental analysis calcd for $C_{18}H_{19}NO_2$: C 76.84, H 6.81, N 4.98; found: C 76.58, H 6.96, N 4.89.



13y

(E)-4-Methylbenzaldehyde O-(3-phenylpropanoyl) oxime (13y) was purified by flash chromatography (*n*-hexane/ethylacetate 20:1) yielding a single *E*-isomer of **13y** as a colorless solid.

R_f = 0.29 (**13y**), (*n*-hexane/ethylacetate 10:1); Mp.: 81 °C (*n*-hexane/ethylacetate 20:1); IR (ATR): 3857w, 3506w, 3031w, 2912w, 2853w, 2728w, 2315w, 2098w, 1990w, 1938w, 1869w, 1759s, 1609m, 1568w,

1496w, 1439w, 1378m, 1324w, 1294w, 1263w, 1216w, 1183w, 1128s, 1039w, 974m, 907s, 858w, 823m, 780s, 706s cm^{-1}; ^{1}H NMR (600 MHz, $CDCl_3$): δ = 2.39 (s, 3H), 2.79 (t, *J* = 7.9 Hz, 2H), 3.06 (t, *J* = 7.9 Hz, 2H), 7.19-7.27 (m, 5H), 7.30 (t, *J* = 7.4 Hz, 2H), 7.61 (d, *J* = 8.4 Hz, 2H), 8.28 (s, 1H) ppm; ^{13}C NMR (151 MHz, $CDCl_3$): δ = 21.6, 30.8, 34.6, 126.4, 127.3, 128.4, 128.5, 128.6, 129.6, 140.3, 142.3, 156.1, 170.6 ppm; MS (CI, 100 eV): *m/z* (%) = 268 ($M+H^+$, 17), 133 (21), 120 (12), 119 (13), 118 (100), 105 (11); elemental analysis calcd for $C_{17}H_{17}NO_2$: C 76.38, H 6.41, N 5.24; found: C 76.33, H 6.38, N 5.16.

4. NMR Spectra

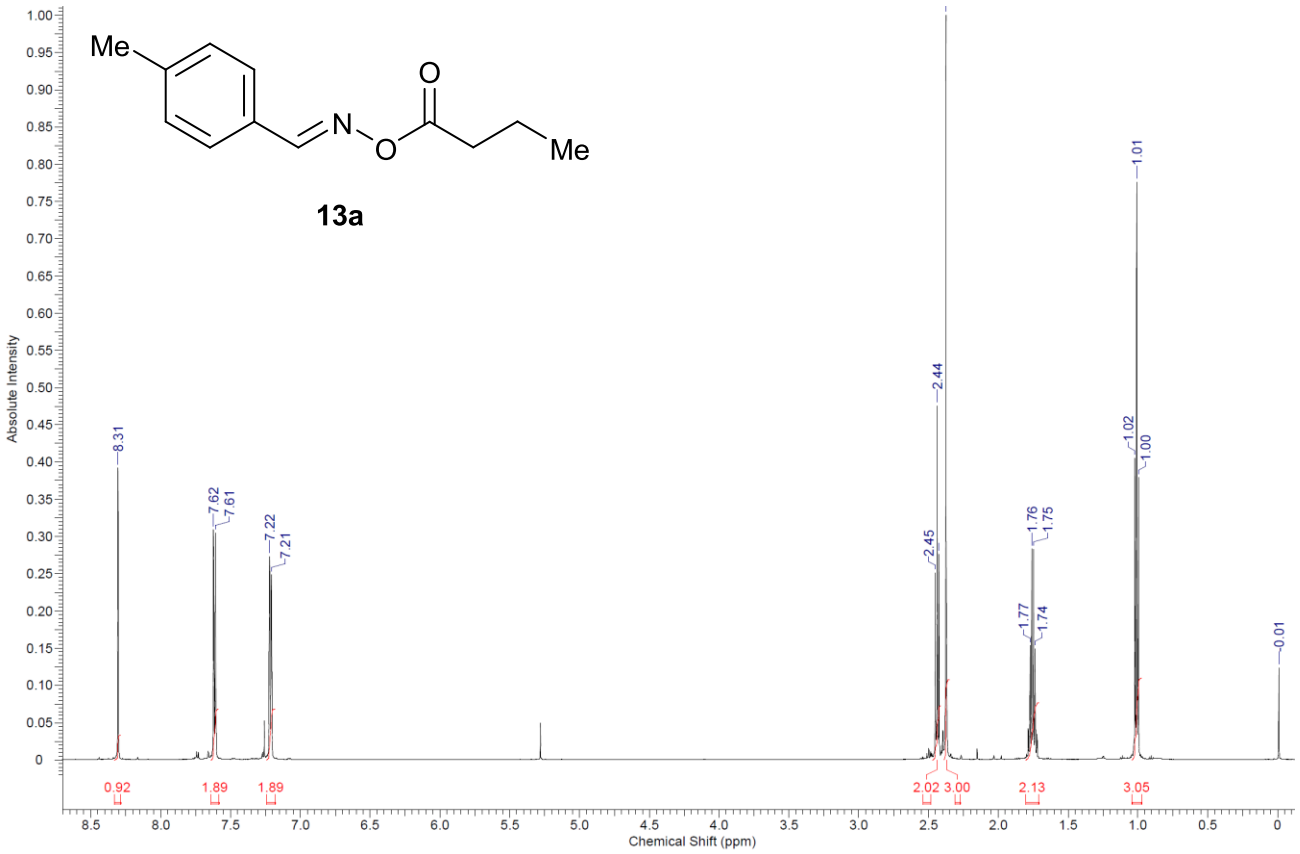


Figure S1. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13a**.

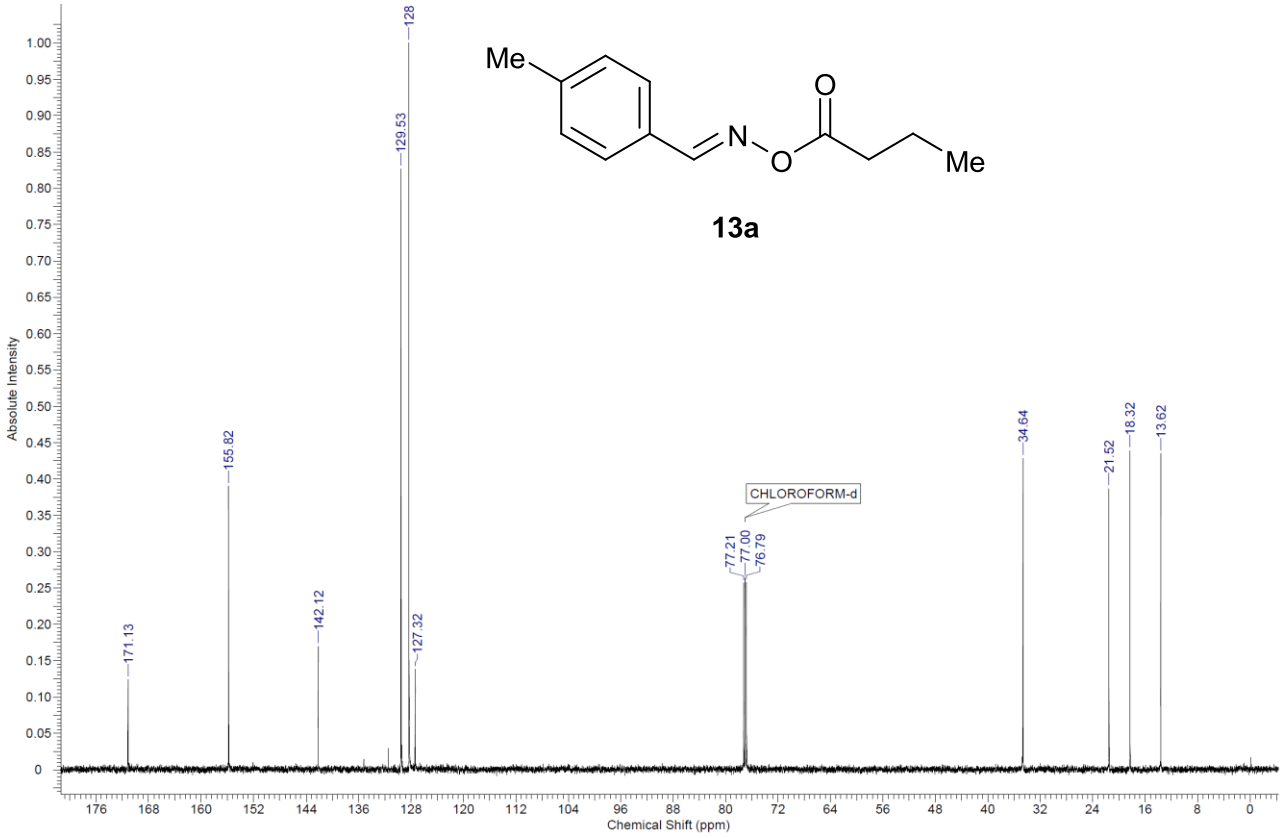


Figure S2. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13a**.

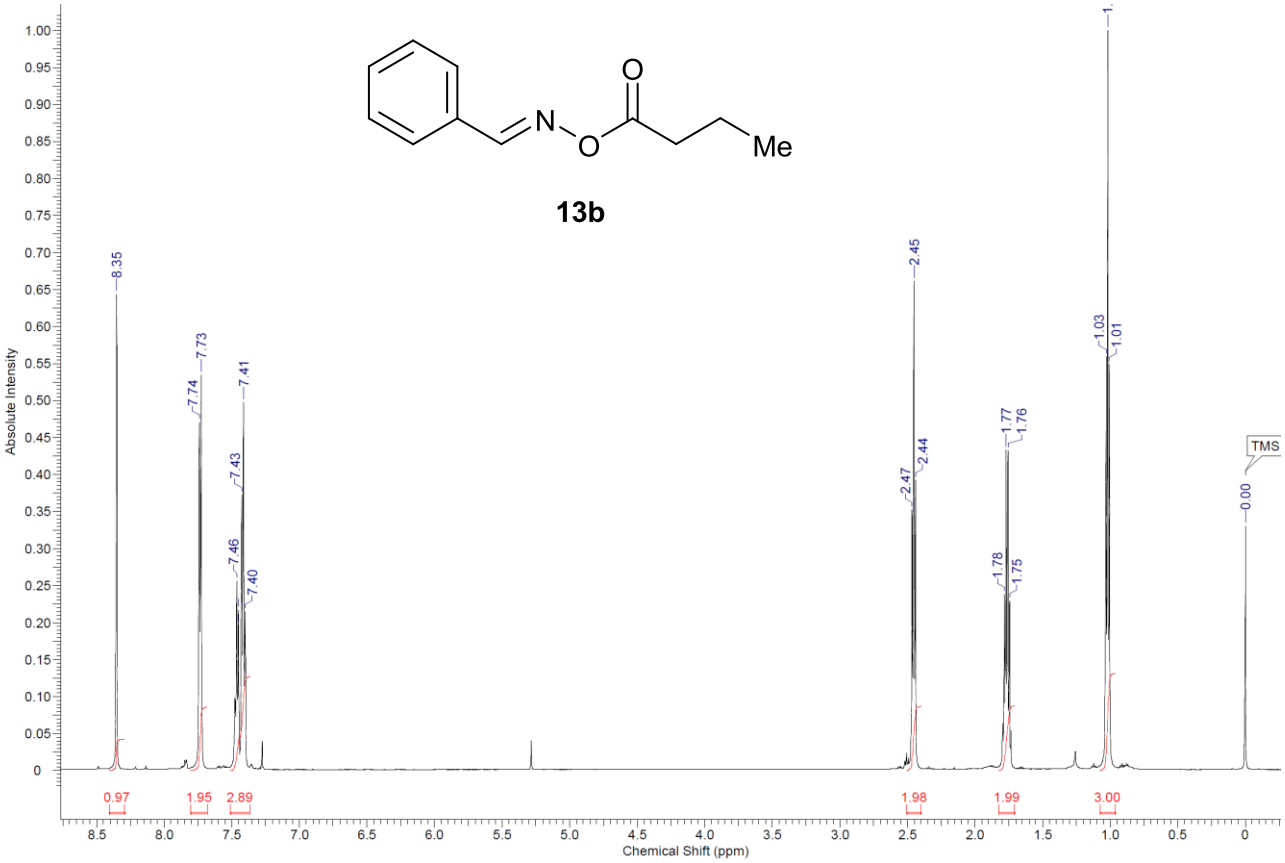


Figure S3. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13b**.

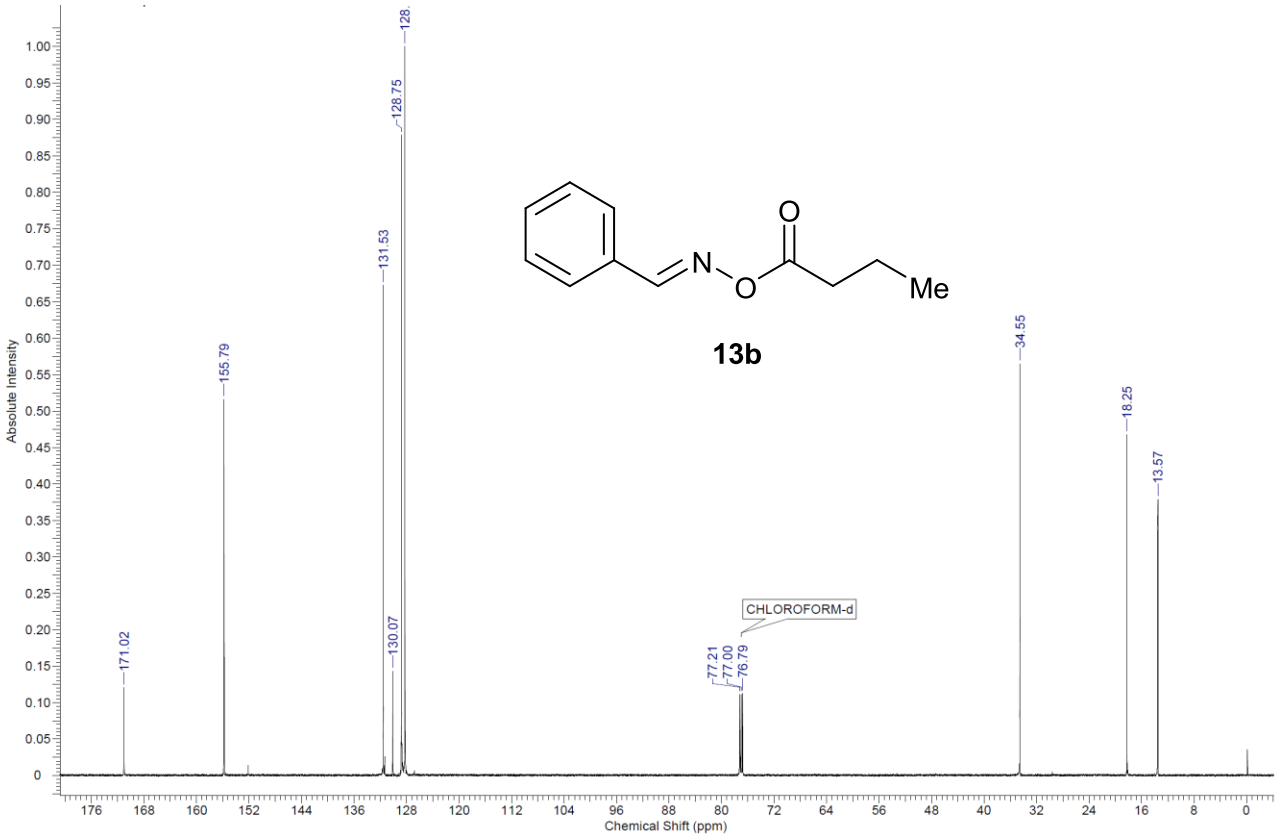


Figure S4. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13b**.

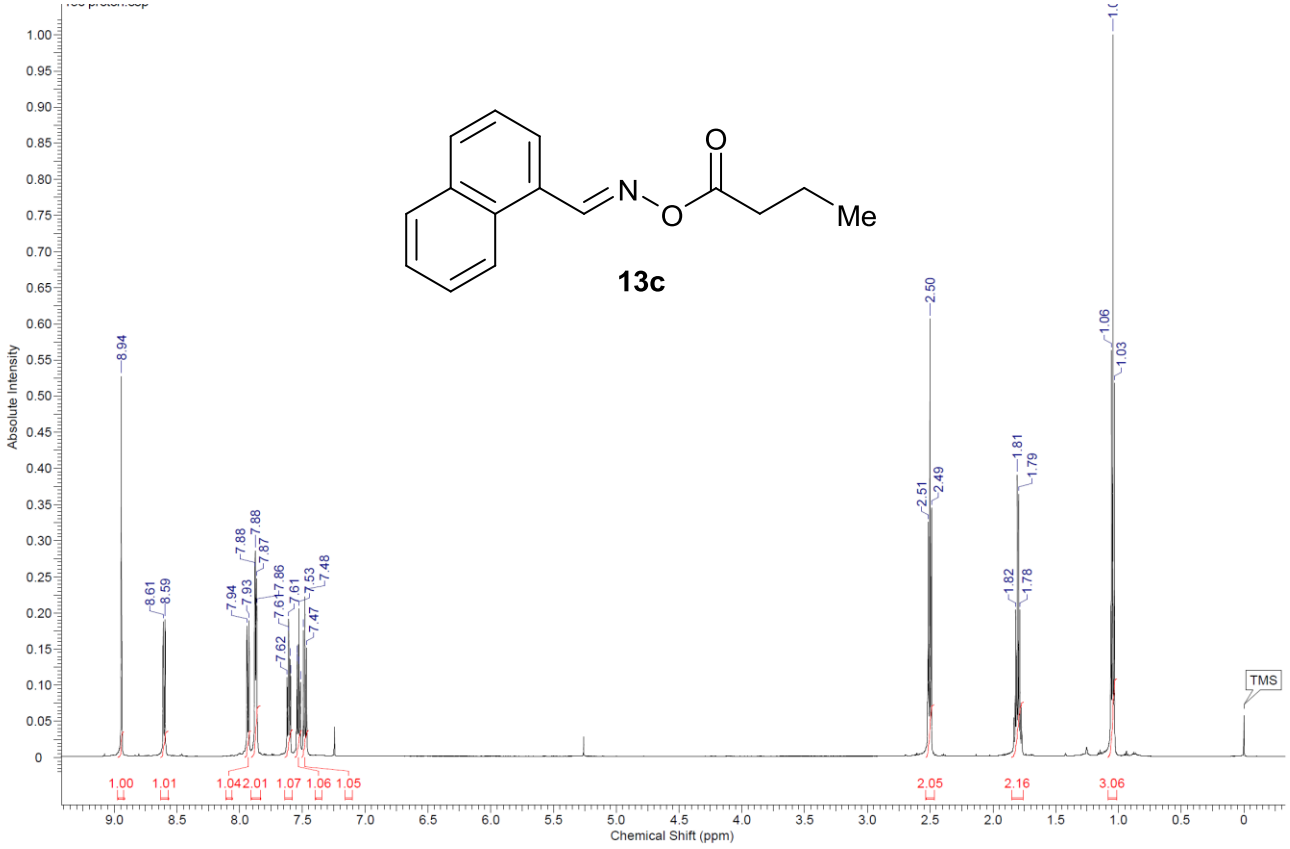


Figure S5. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13c**.

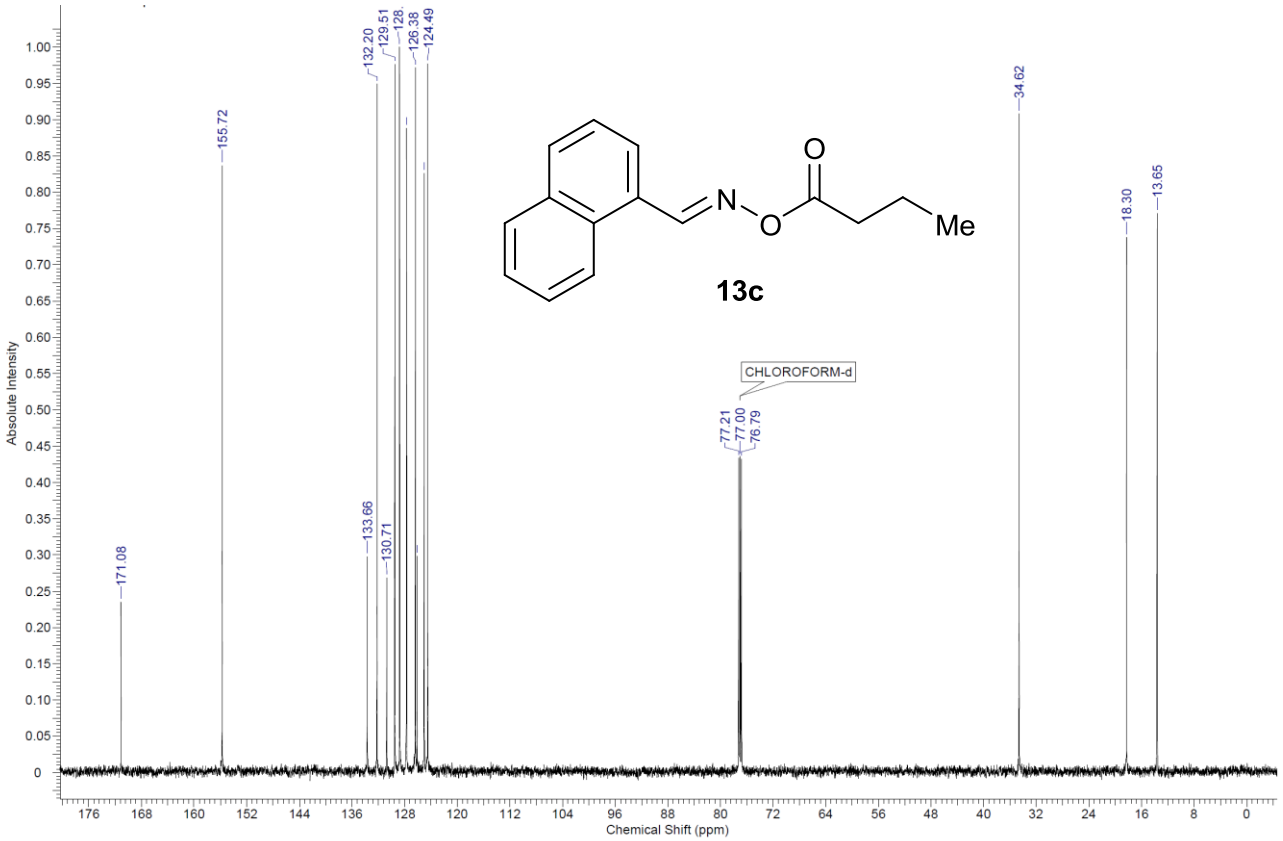


Figure S6. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13c**.

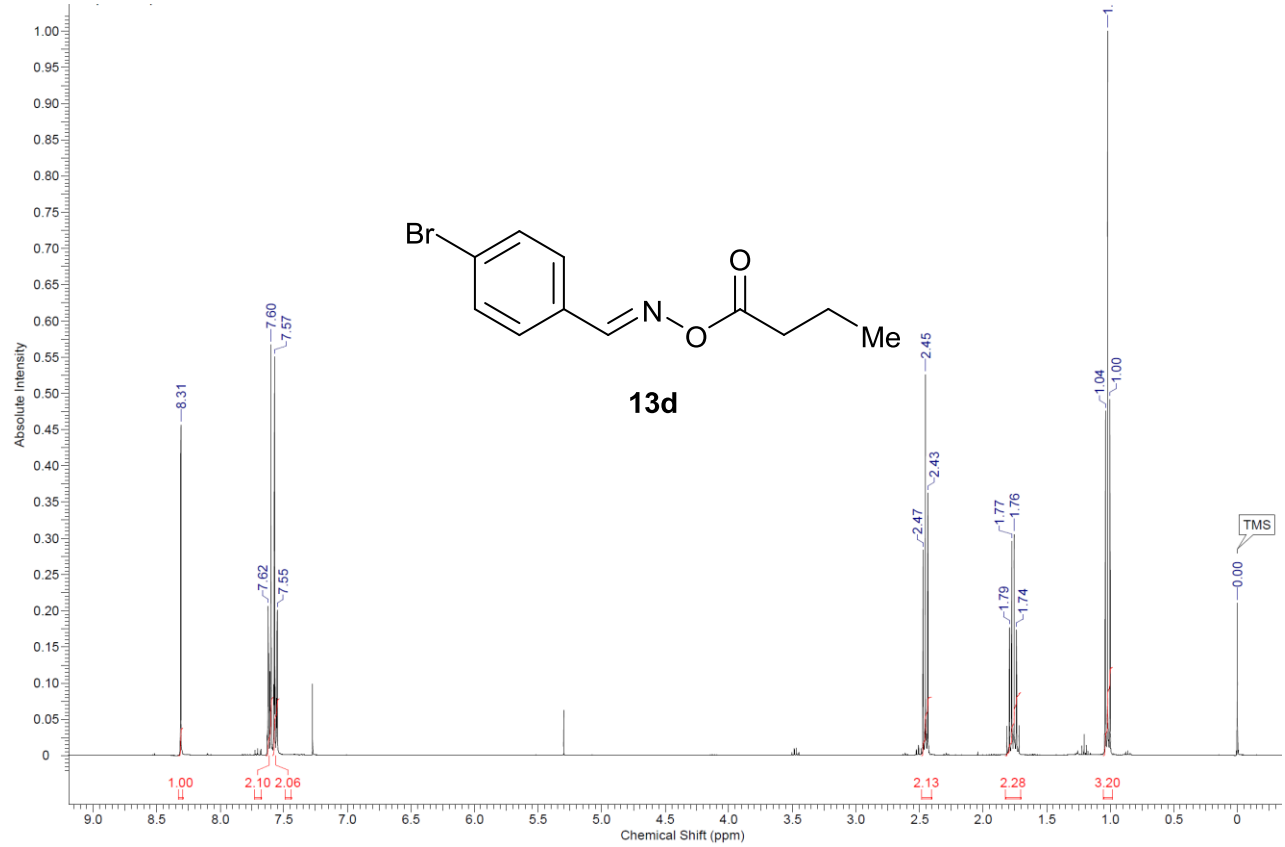


Figure S7. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13d**.

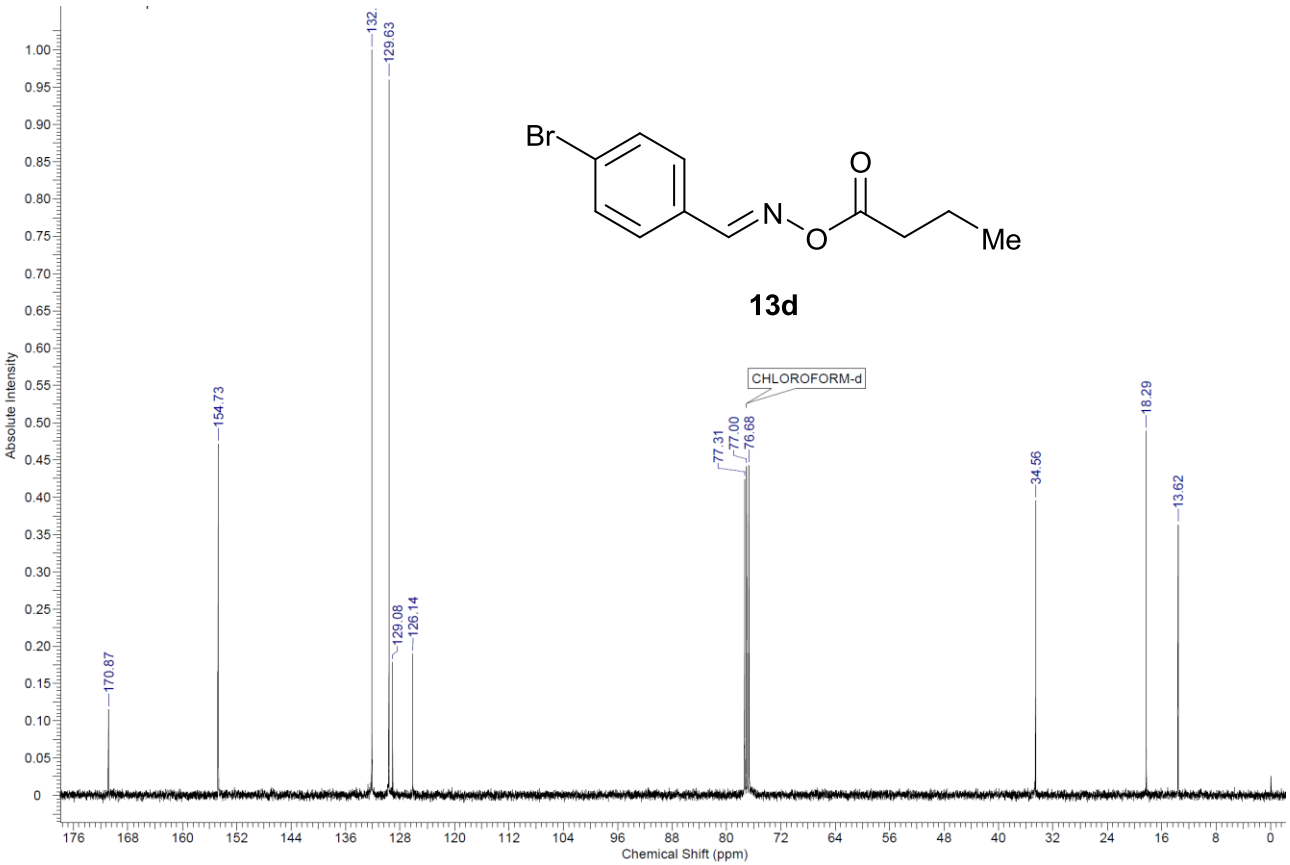


Figure S8. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13d**.

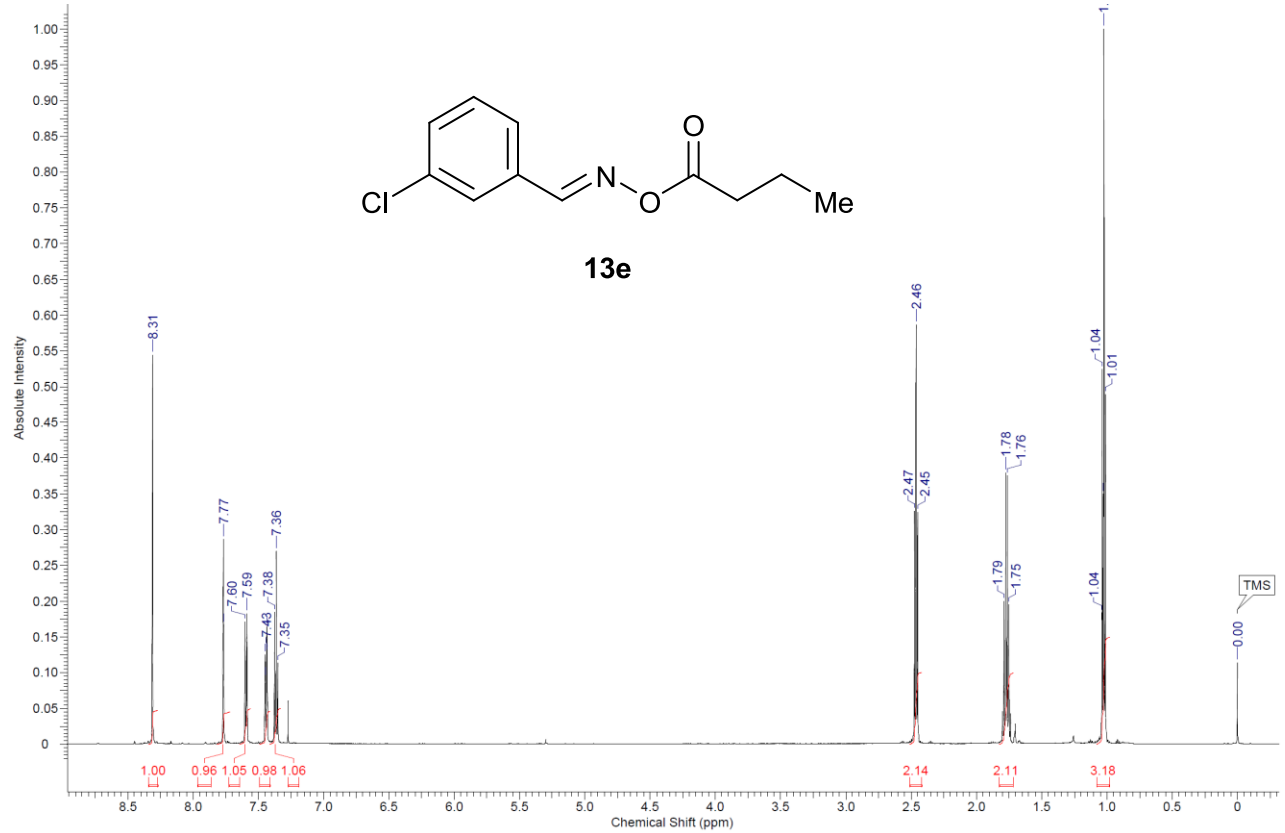


Figure S9. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13e**.

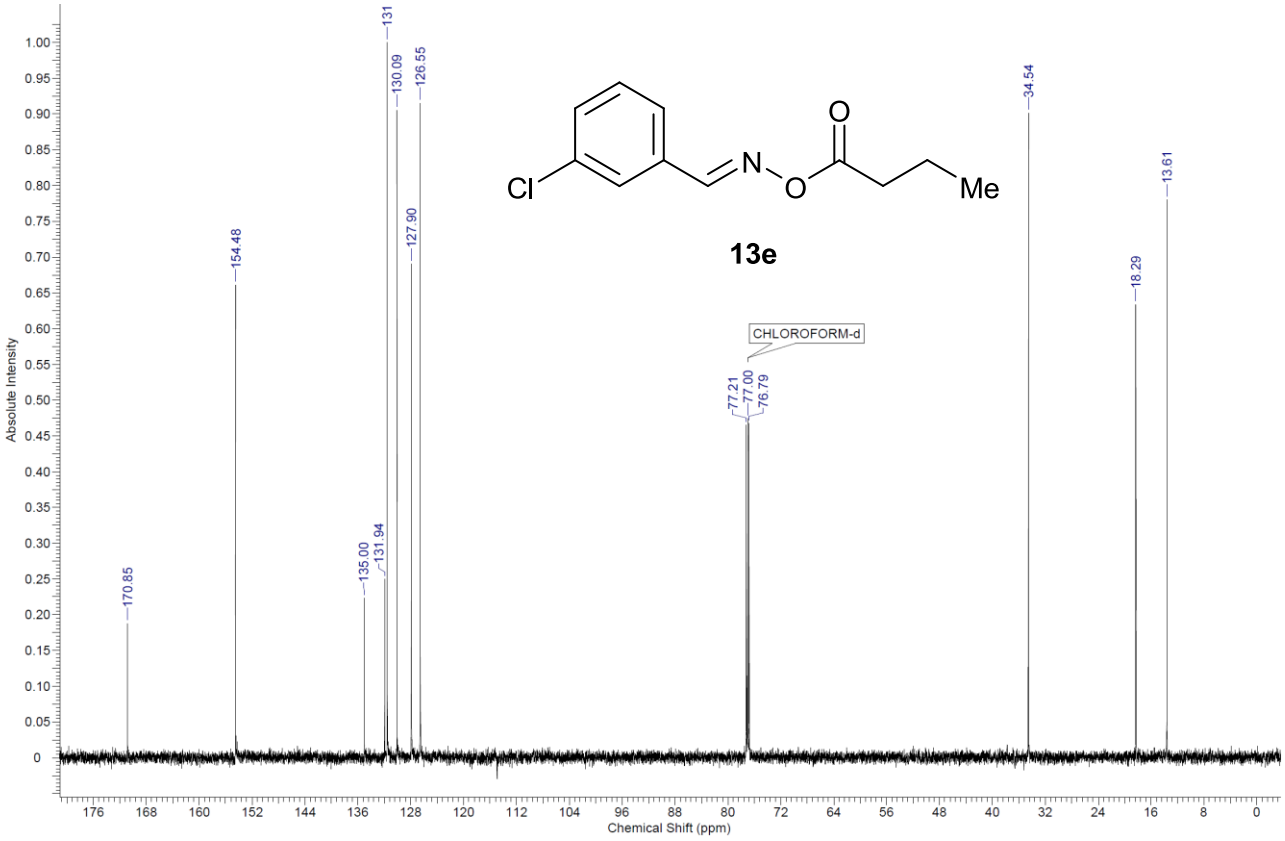


Figure S10. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13e**.

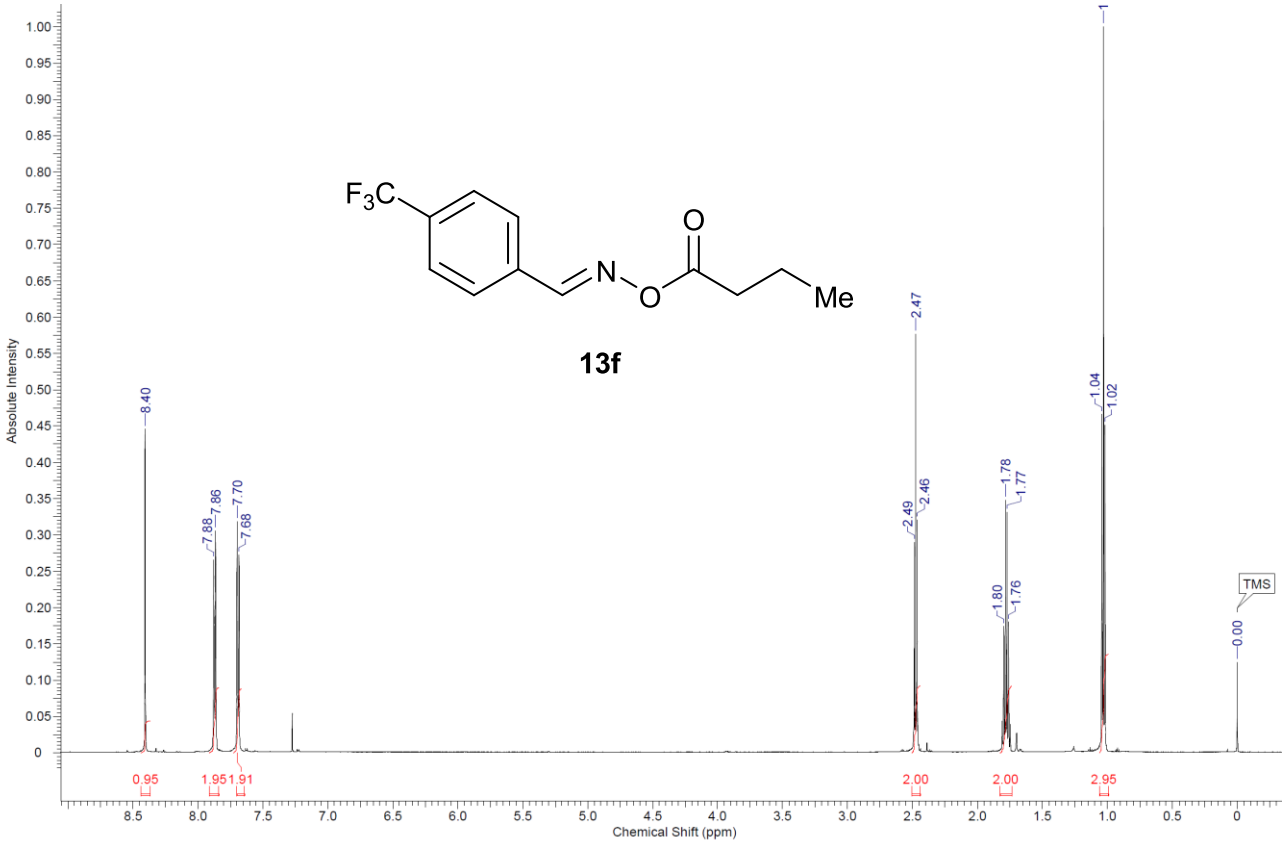


Figure S11. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13f**.

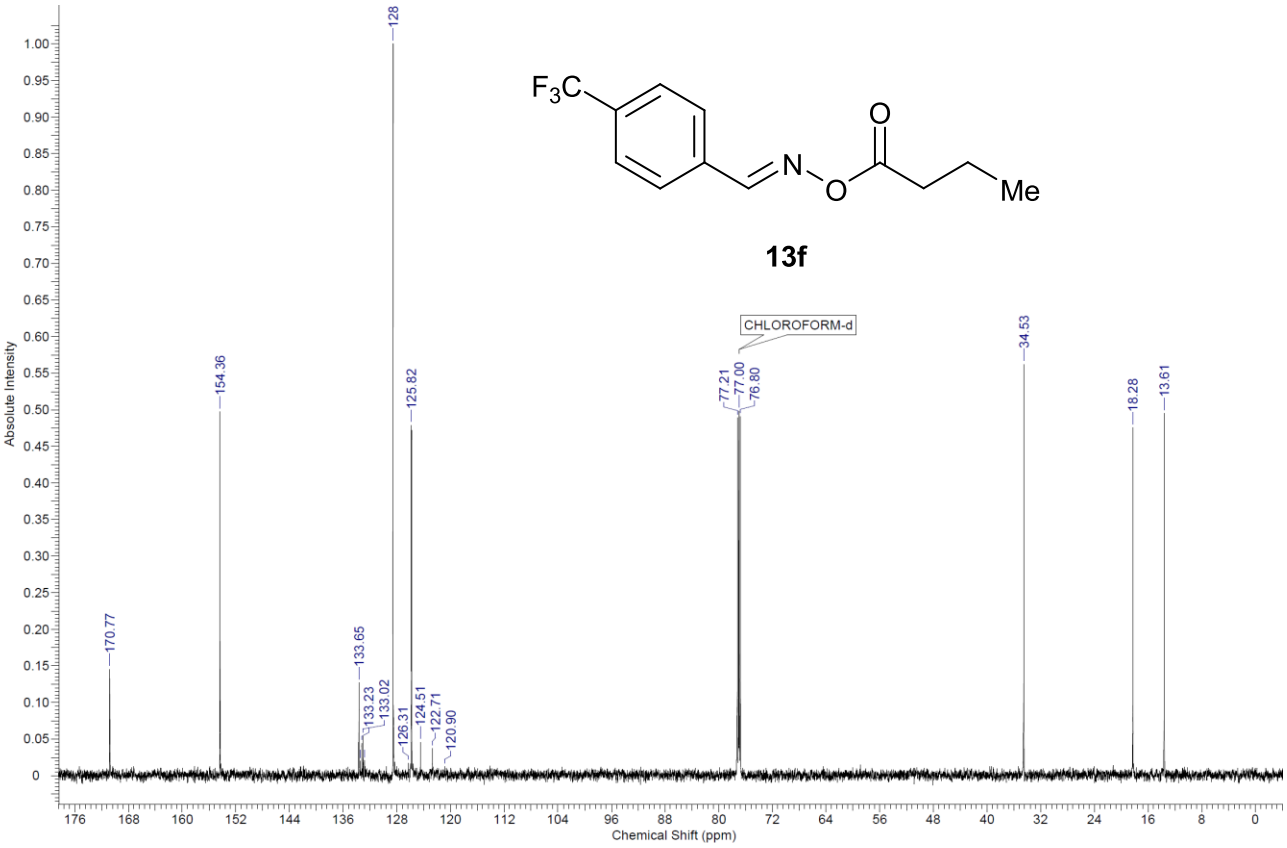


Figure S12. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13f**.

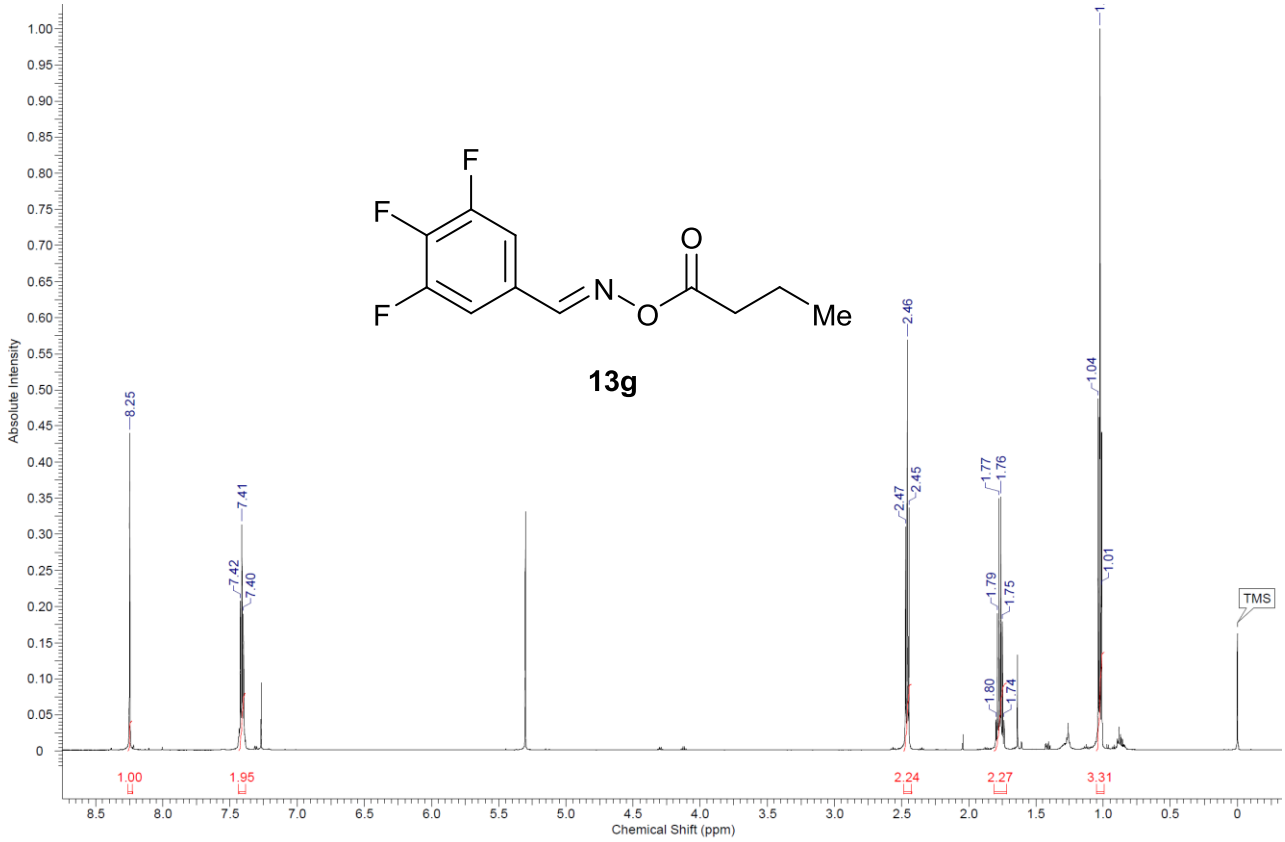


Figure S13. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13g**.

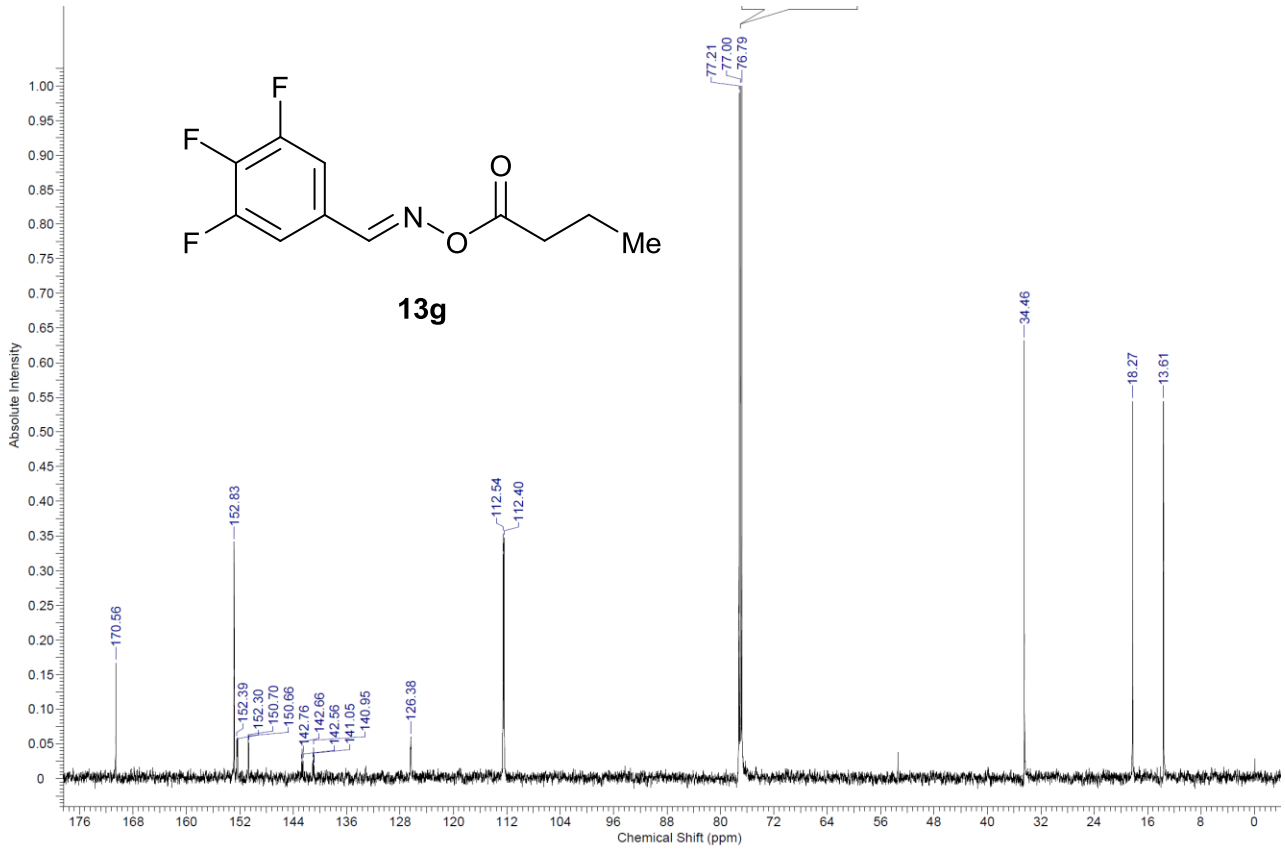


Figure S14. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13g**.

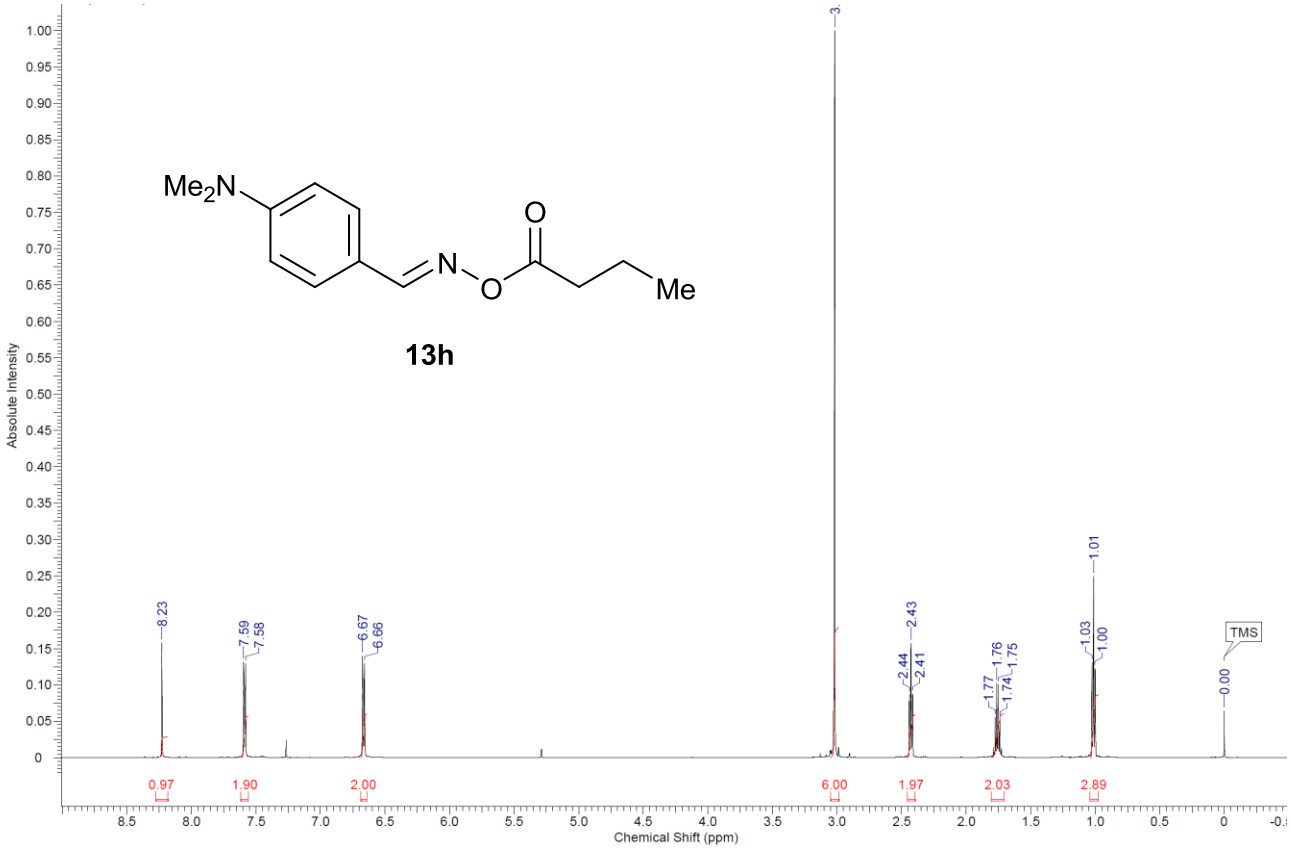


Figure S15. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13h**.

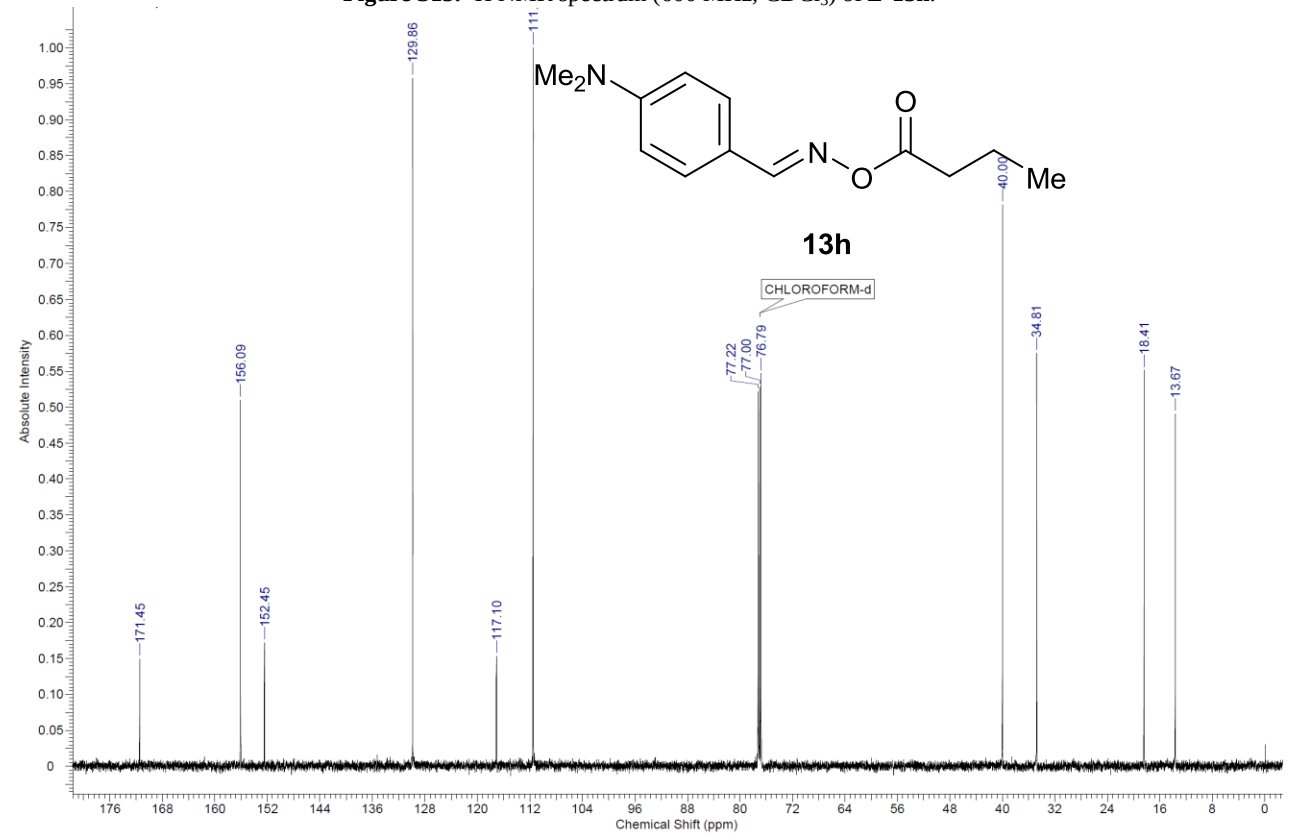


Figure S16. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13h**.

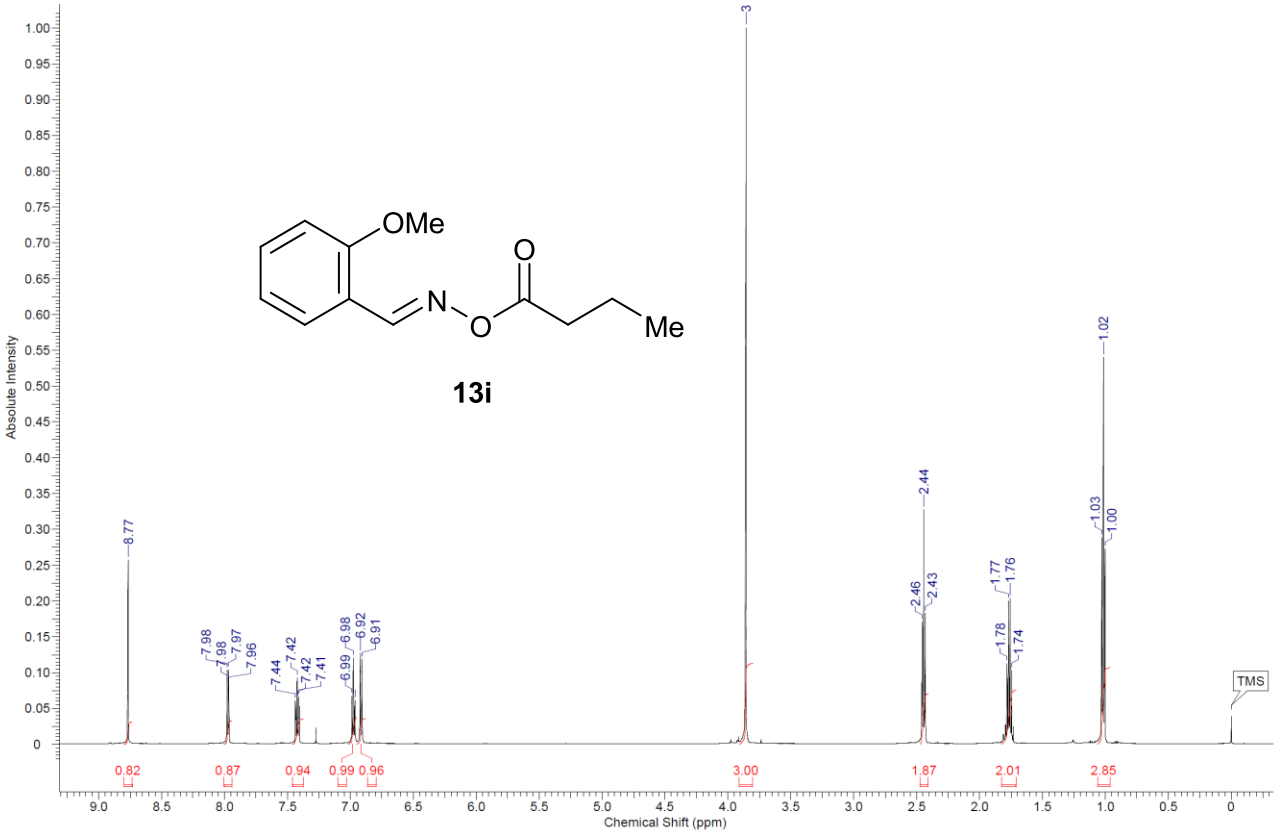


Figure S17. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13i**.

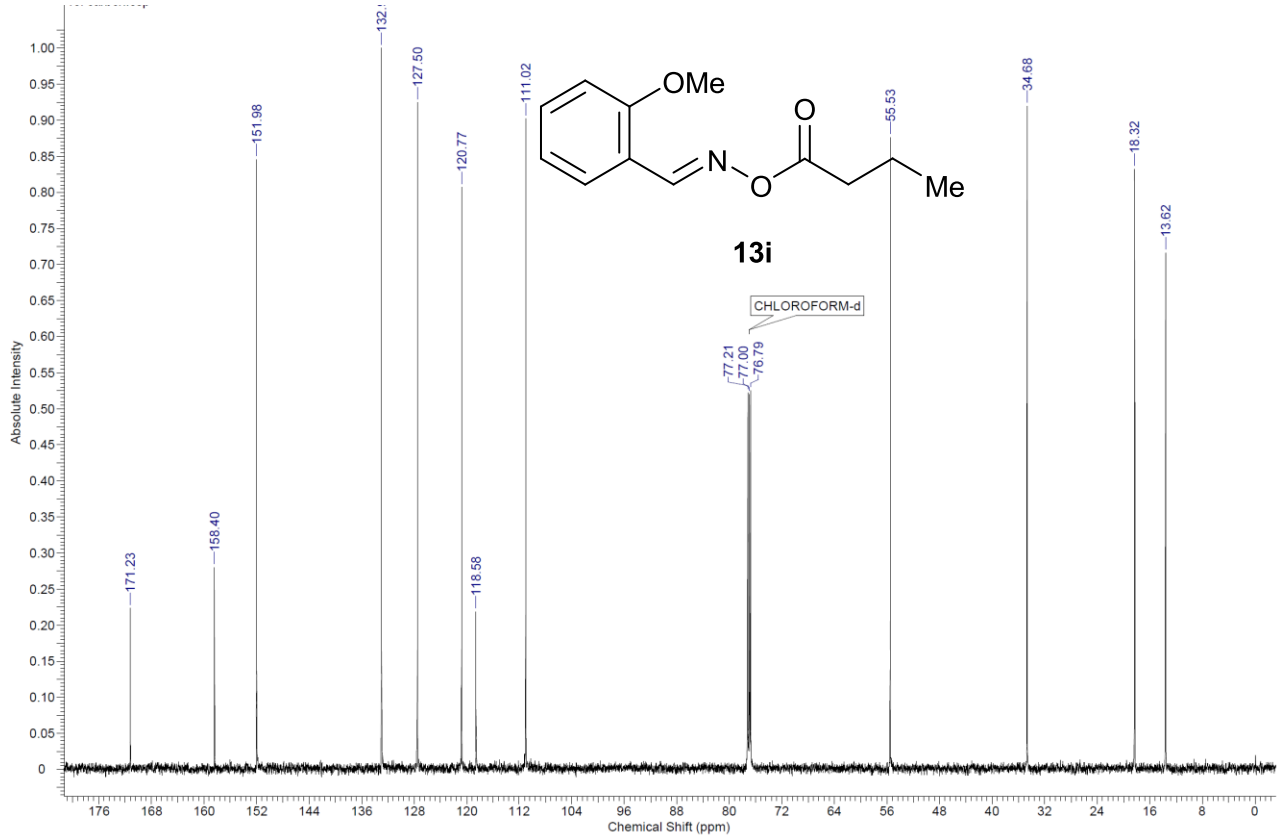


Figure S18. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13i**.

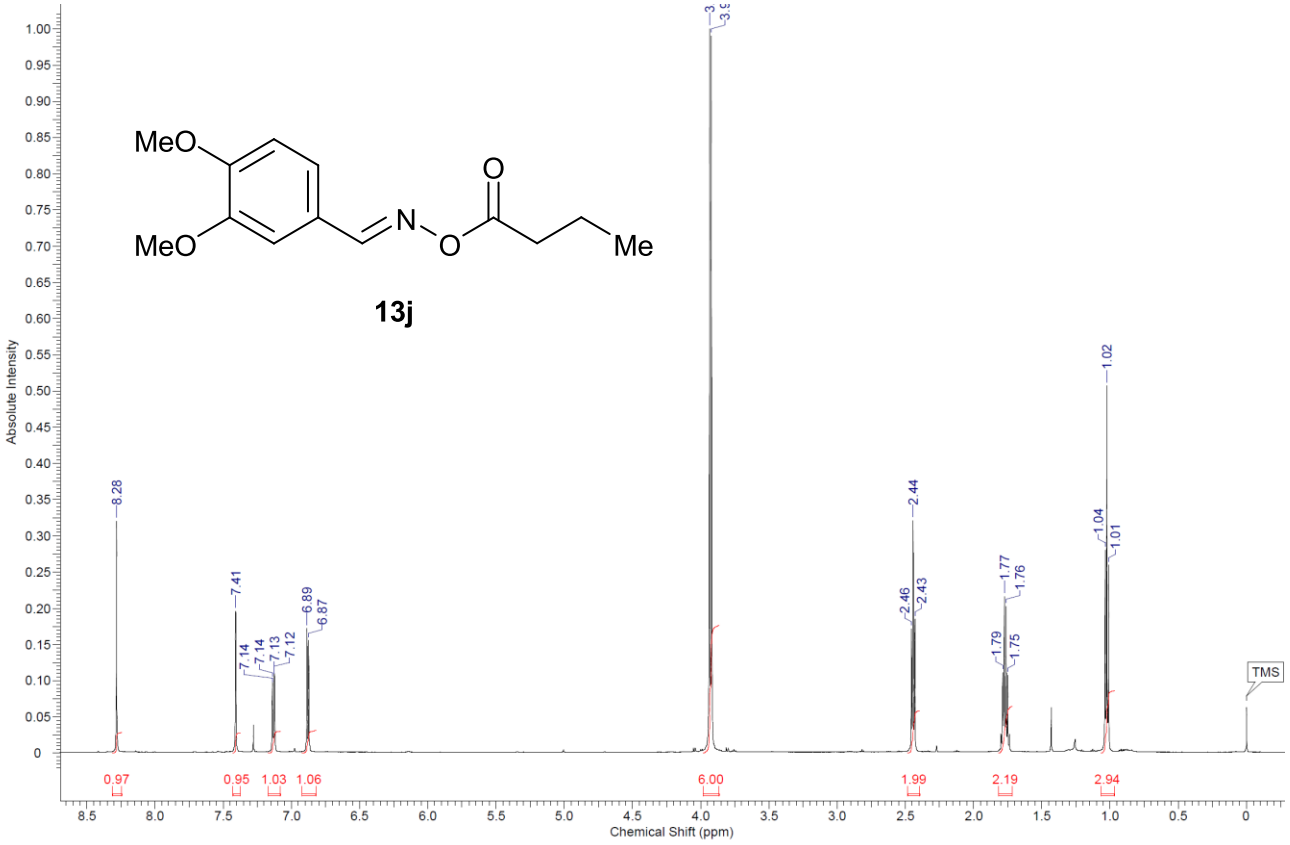


Figure S19. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13j**.

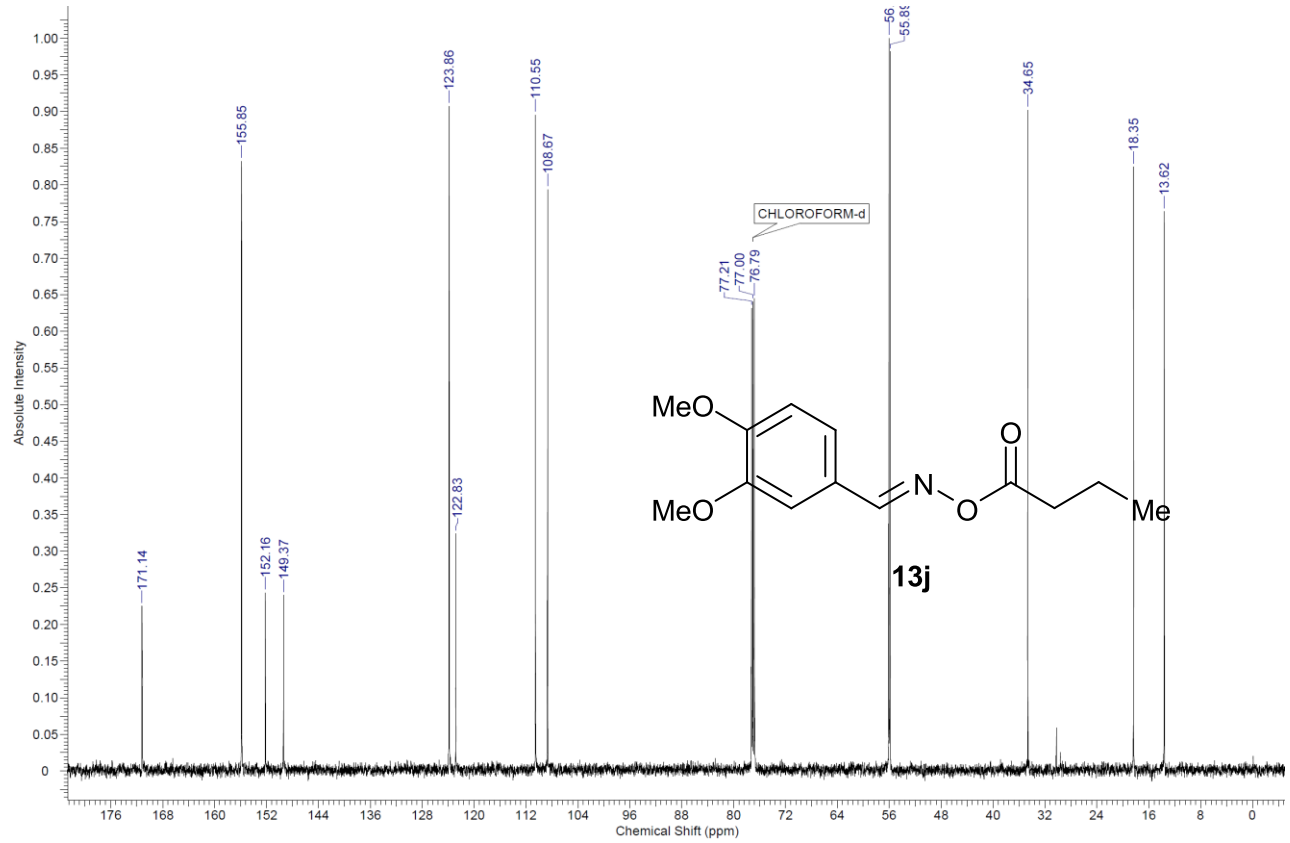


Figure S20. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13j**.

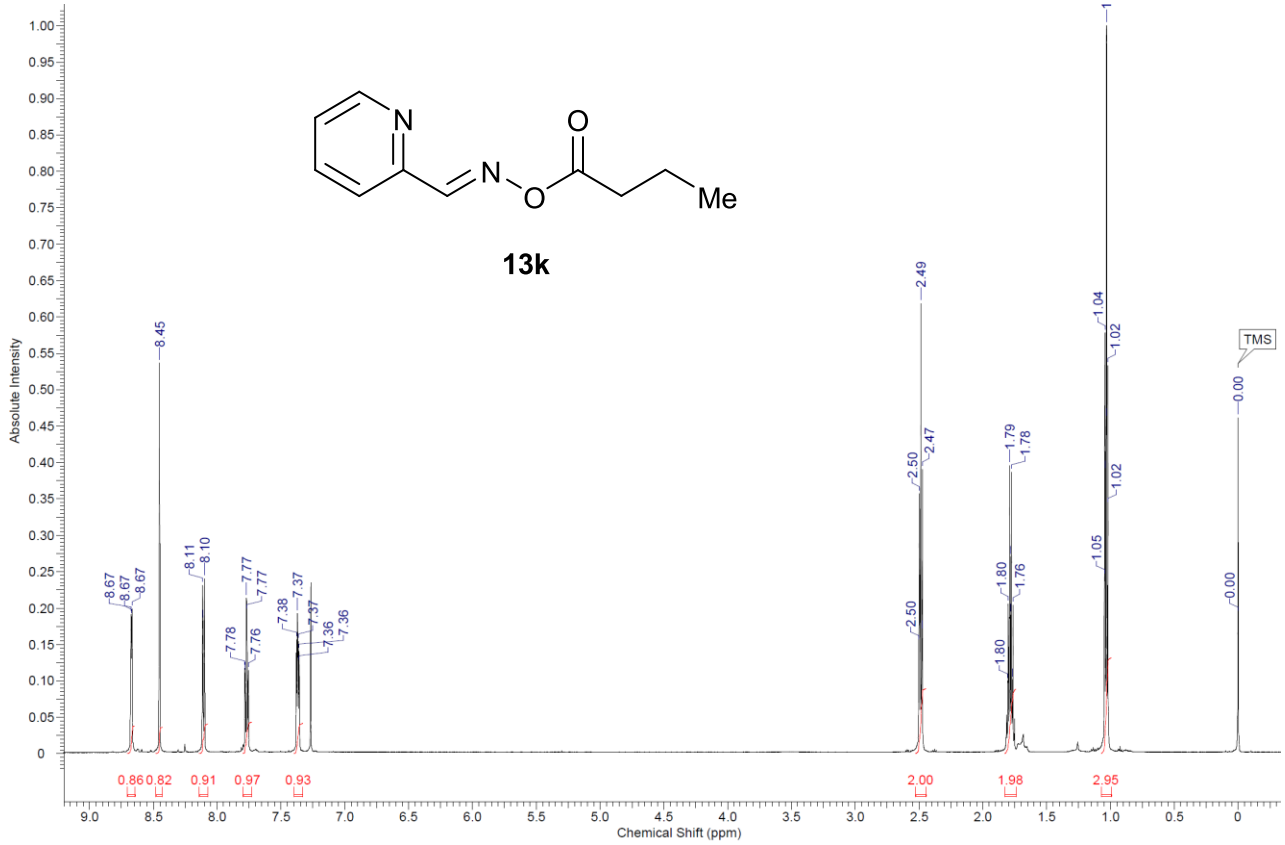


Figure S21. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13k**.

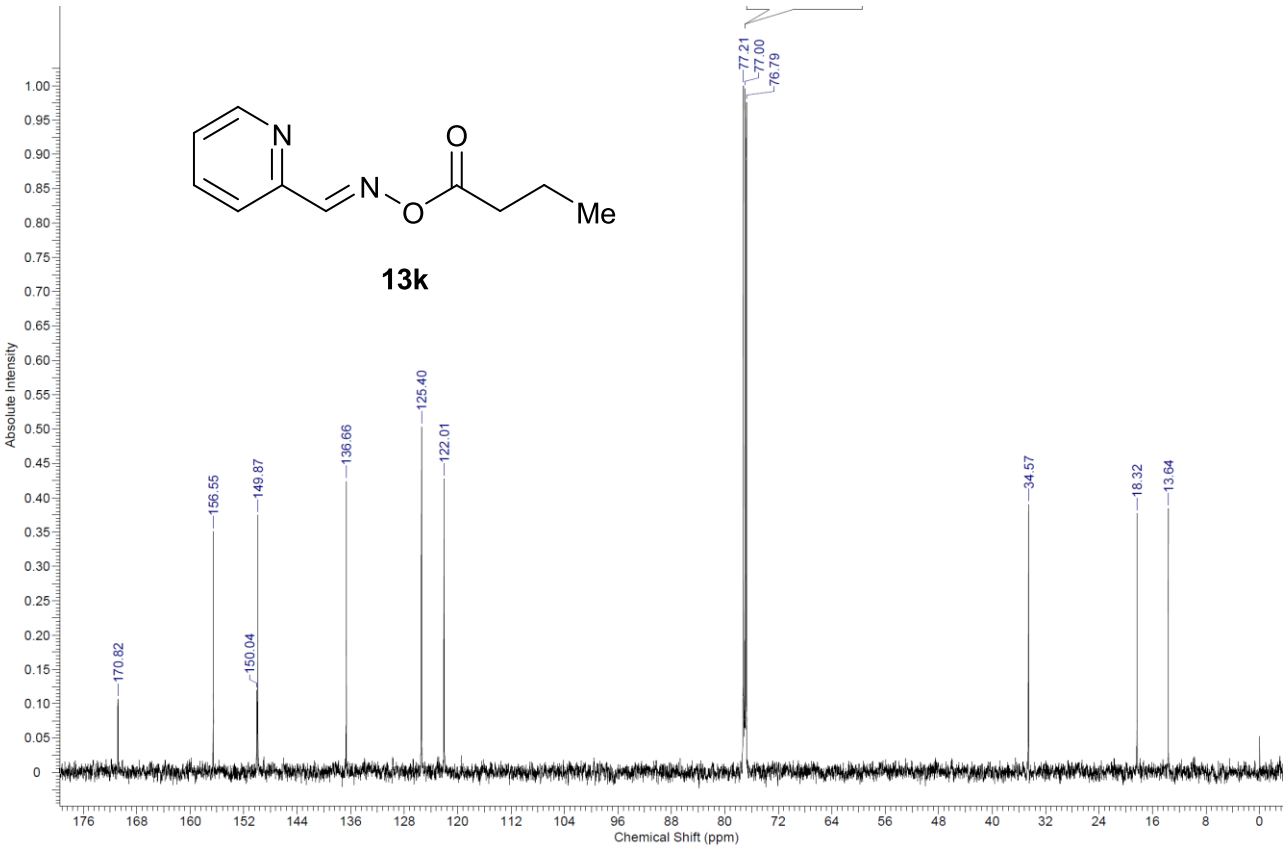


Figure S22. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13k**.

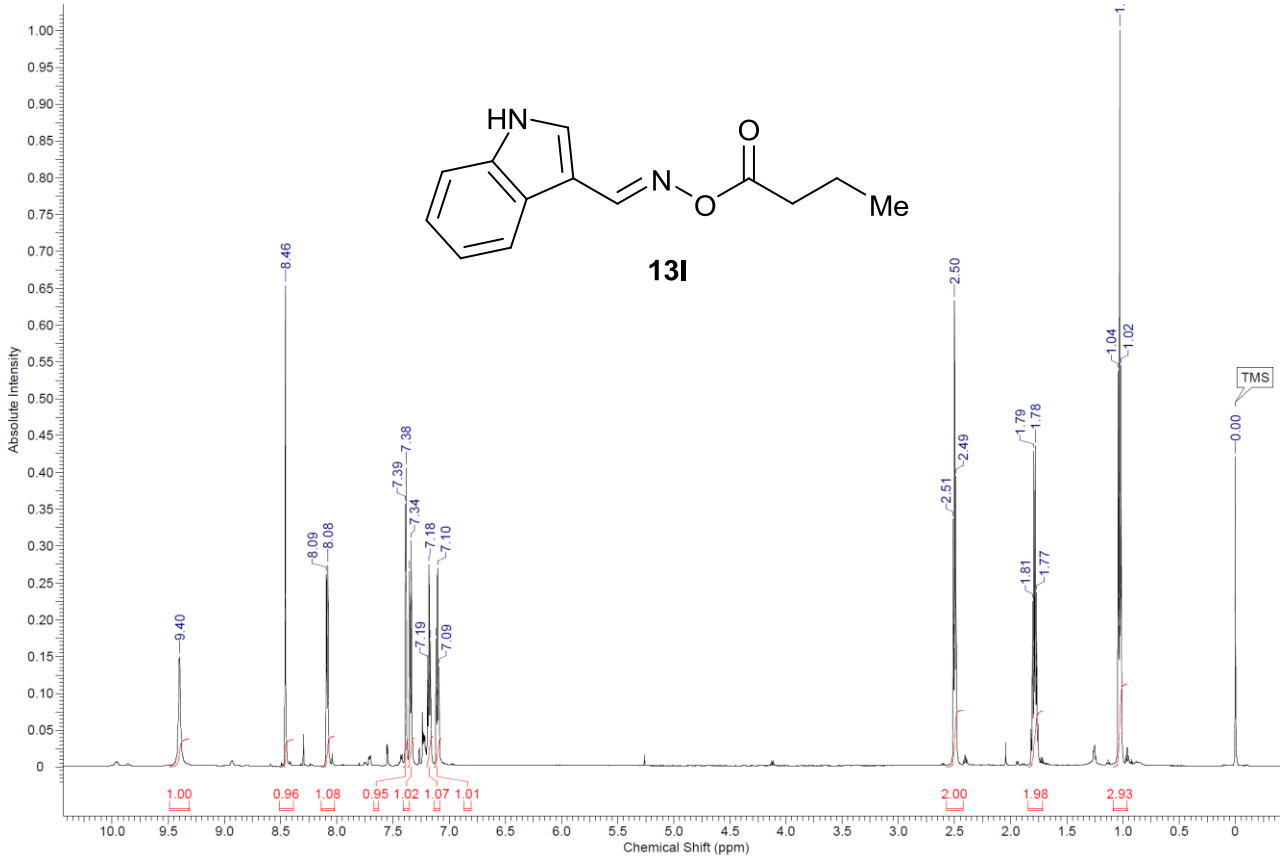


Figure S23. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13l**.

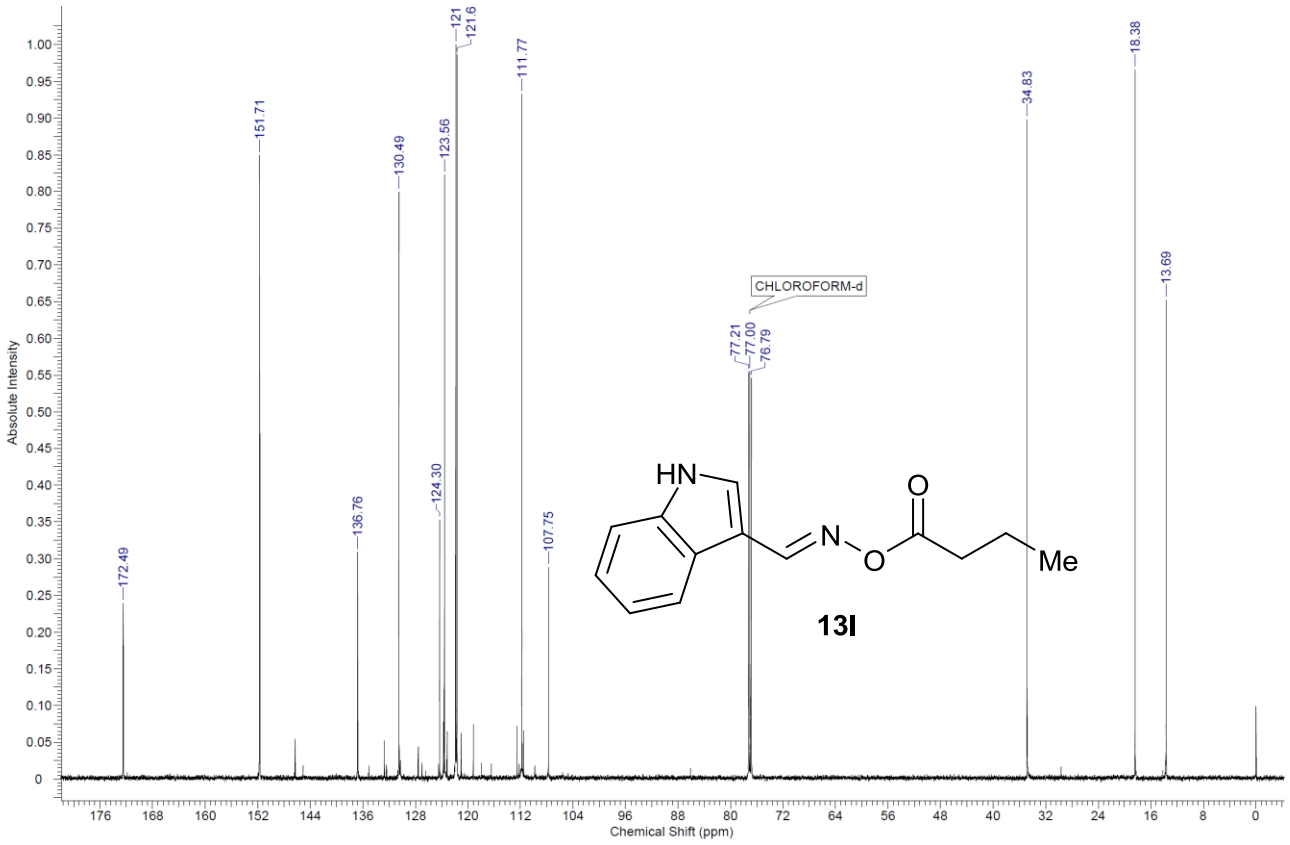


Figure S24. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13l**.

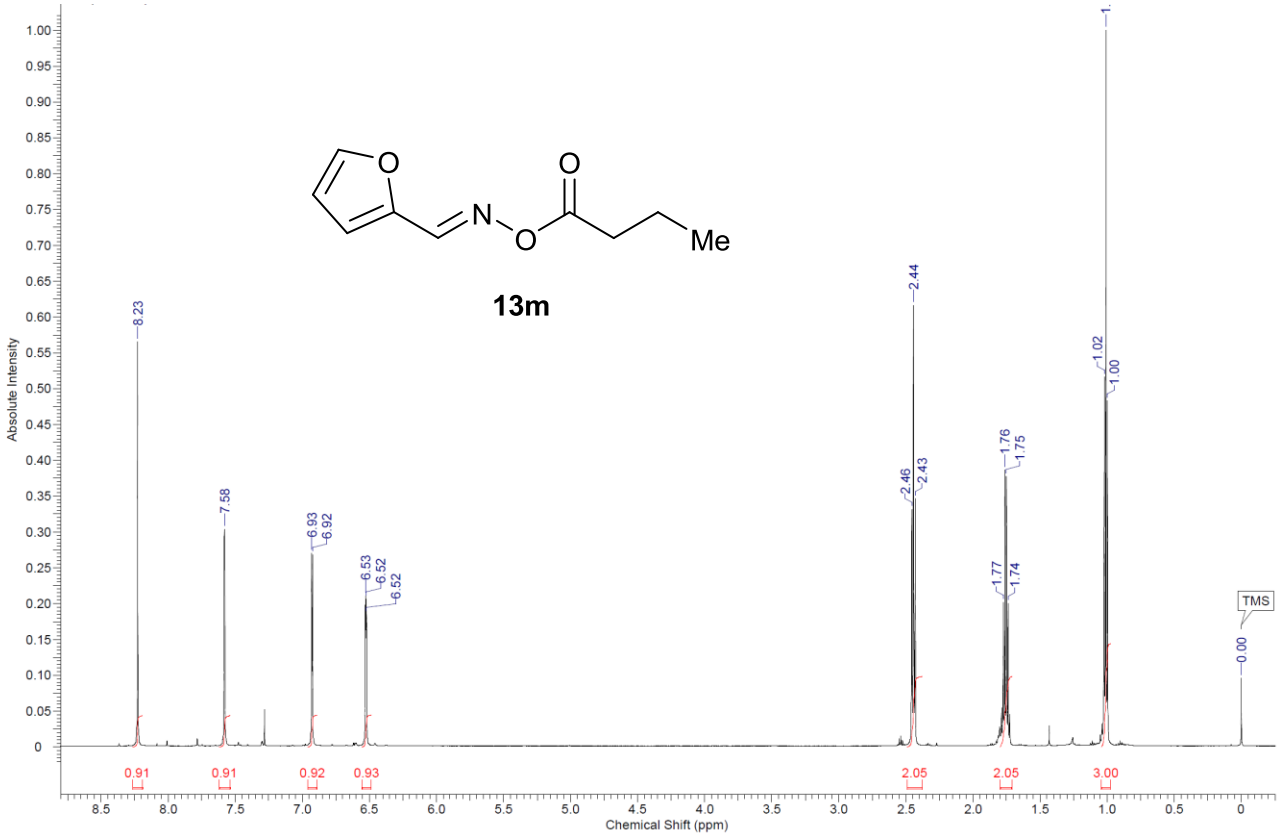


Figure S25. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13m**.

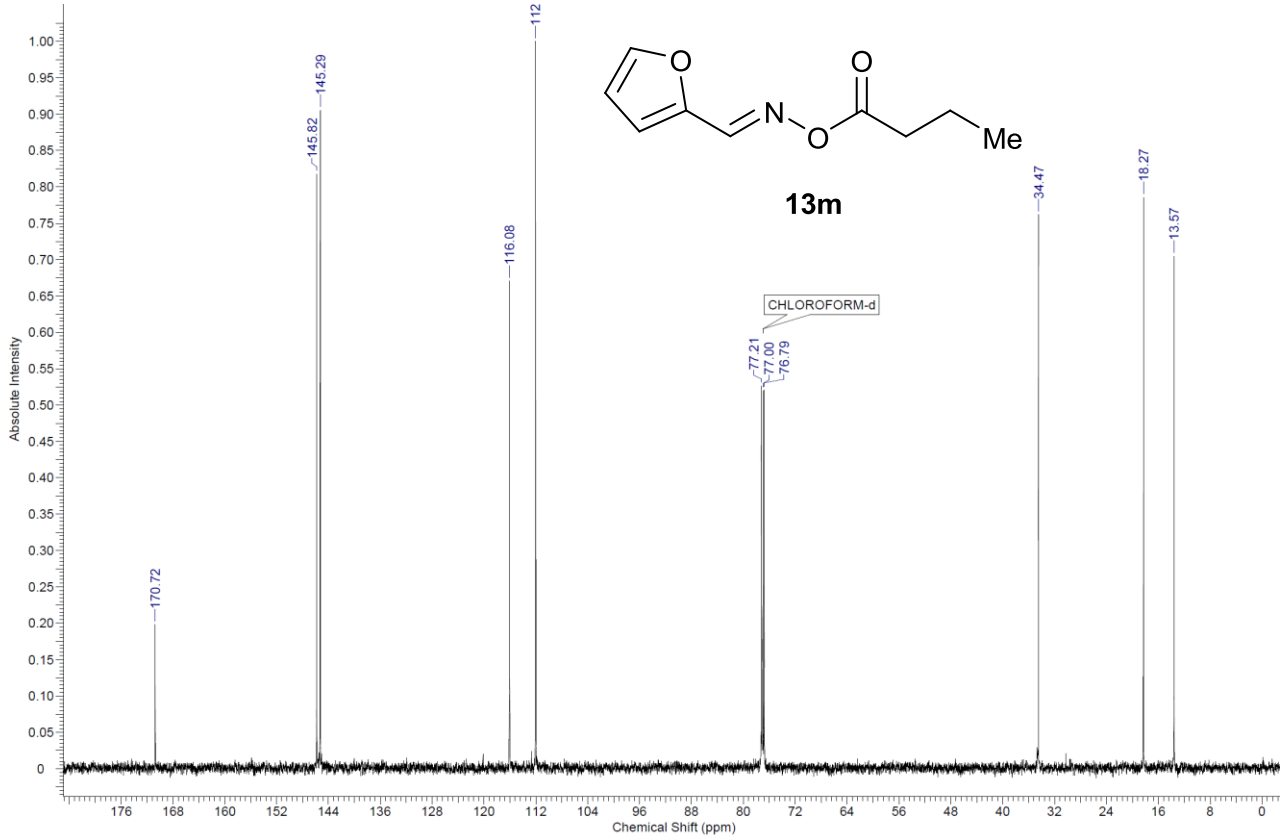


Figure S26. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13m**.

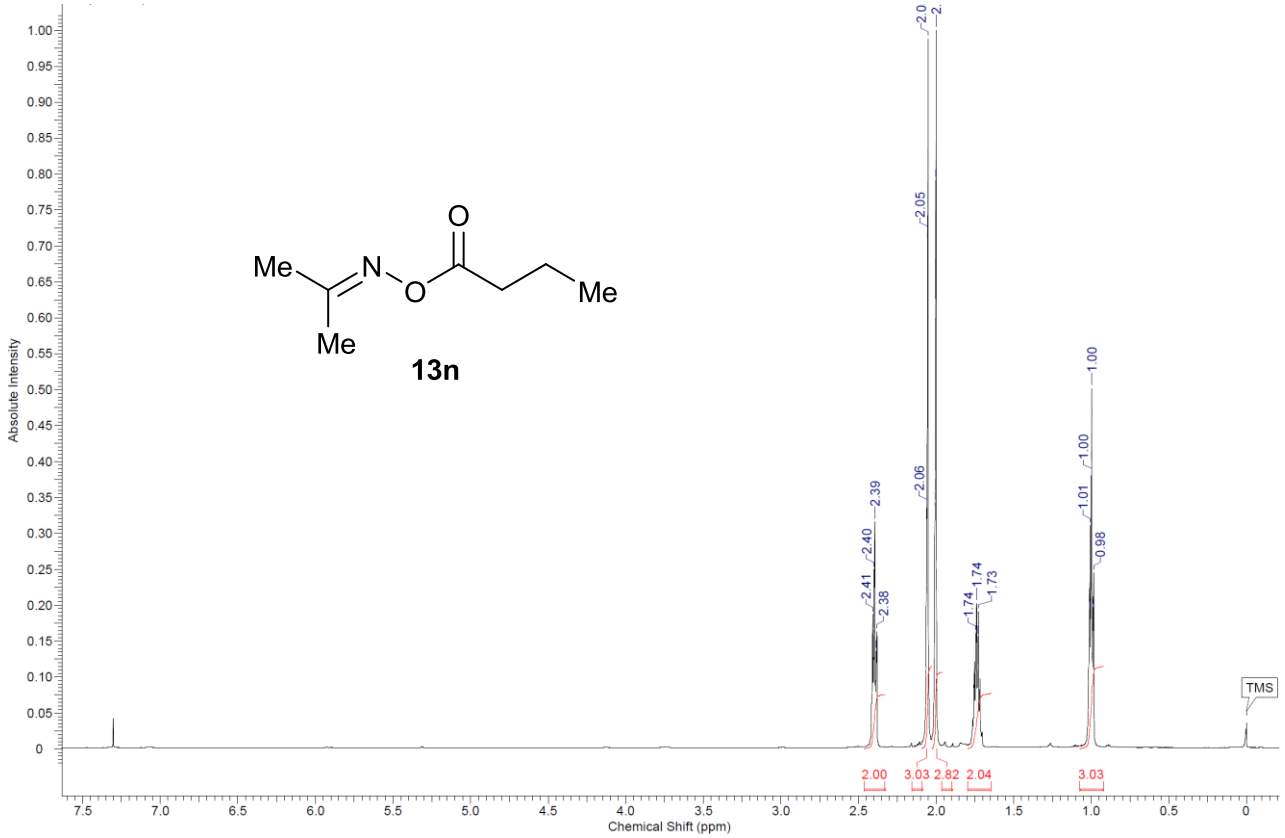


Figure S27. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of **13n**.

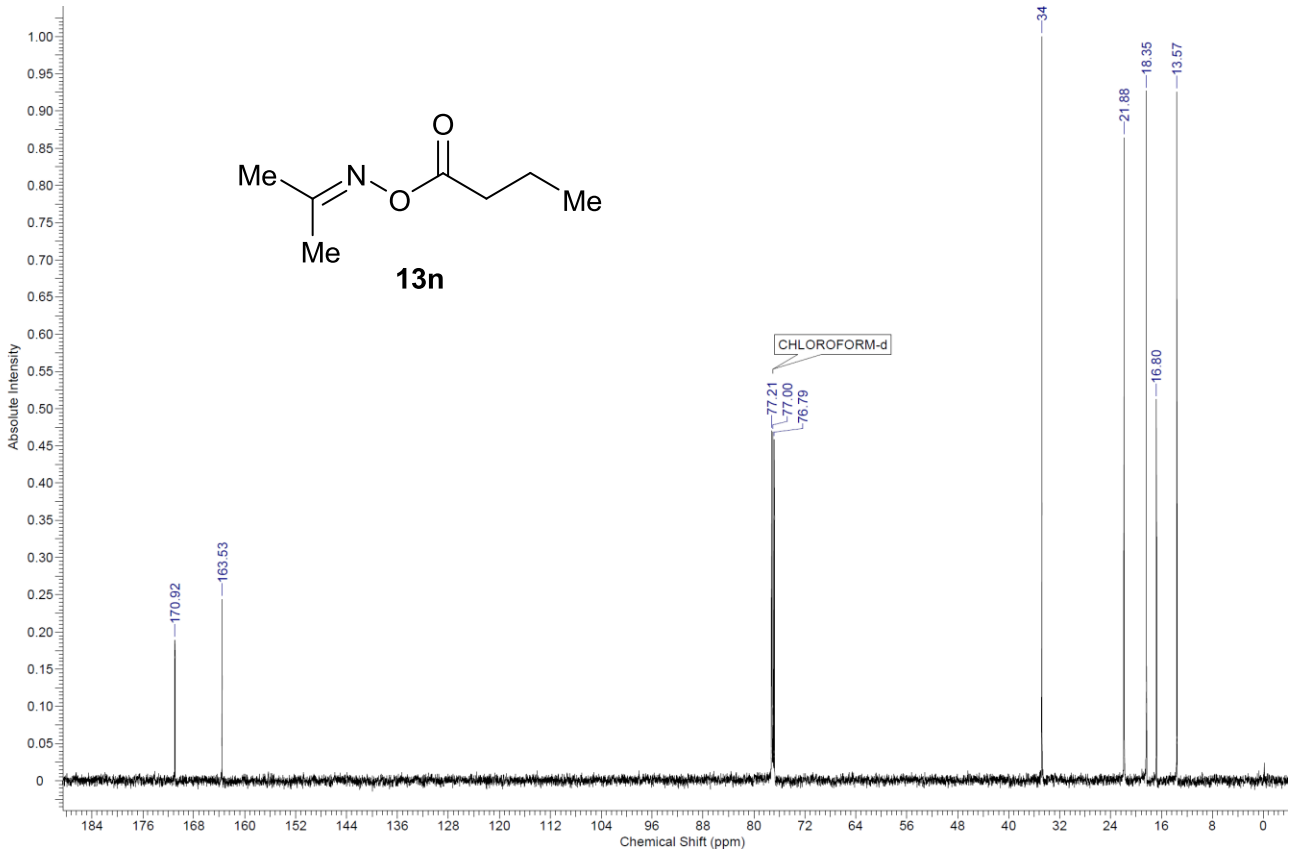


Figure S28. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of **13n**.

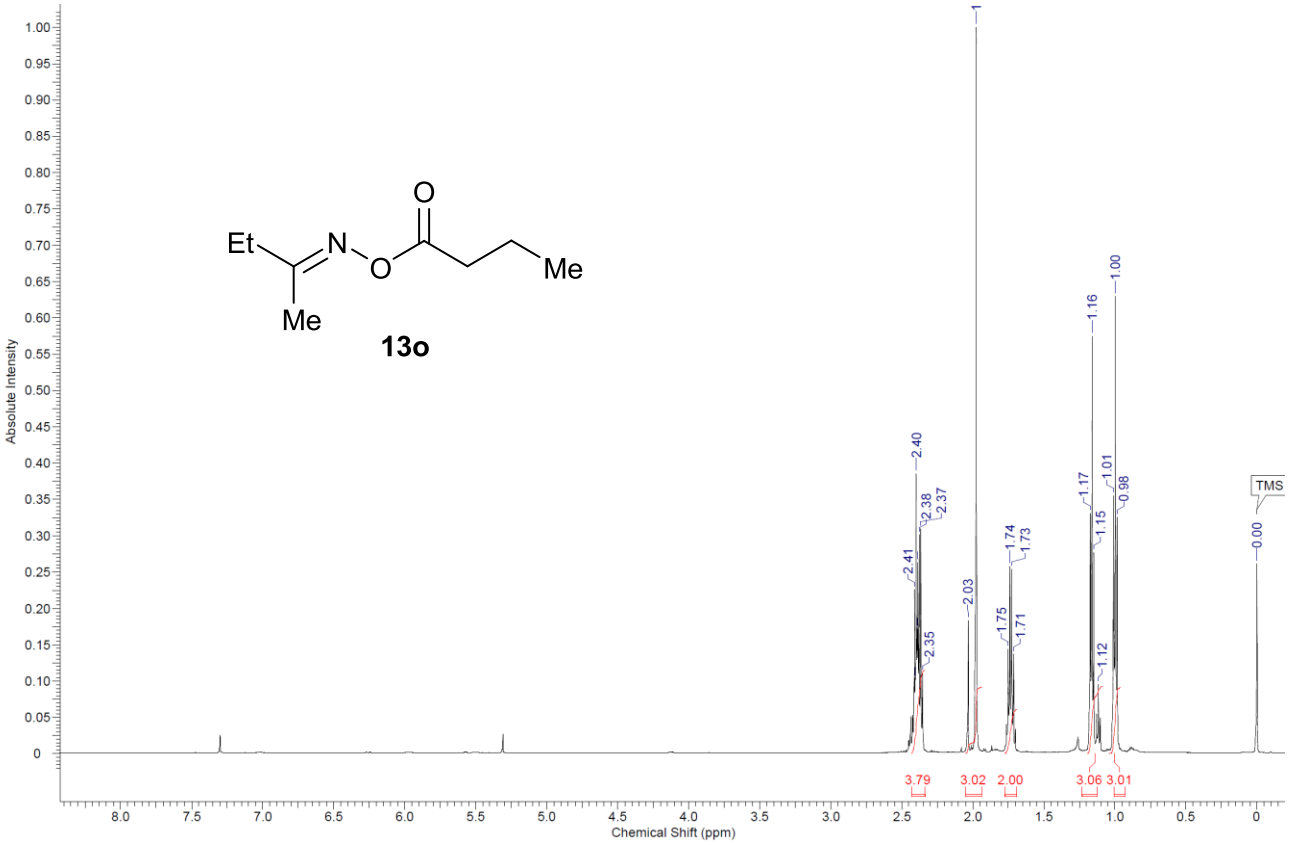


Figure S29. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13o**.

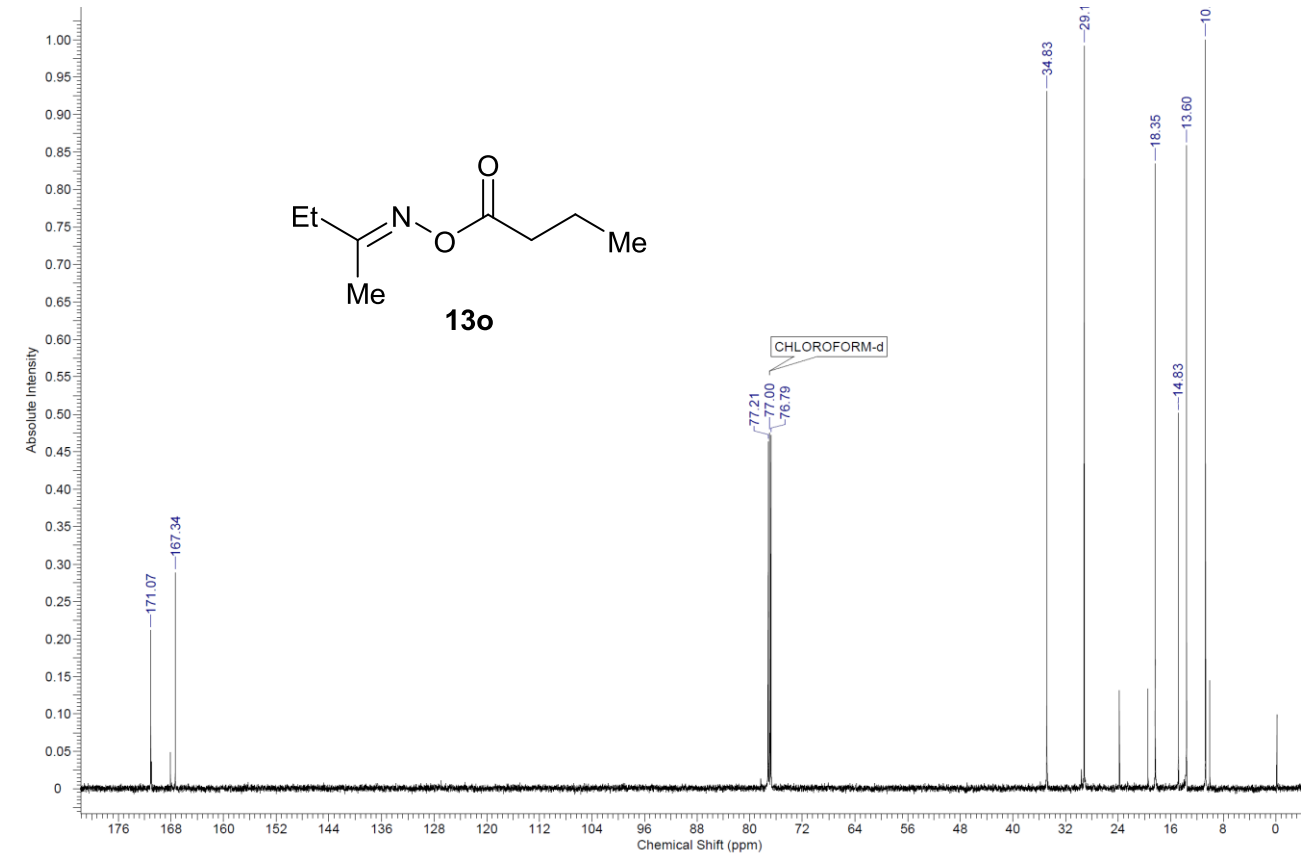


Figure S30. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13o**.

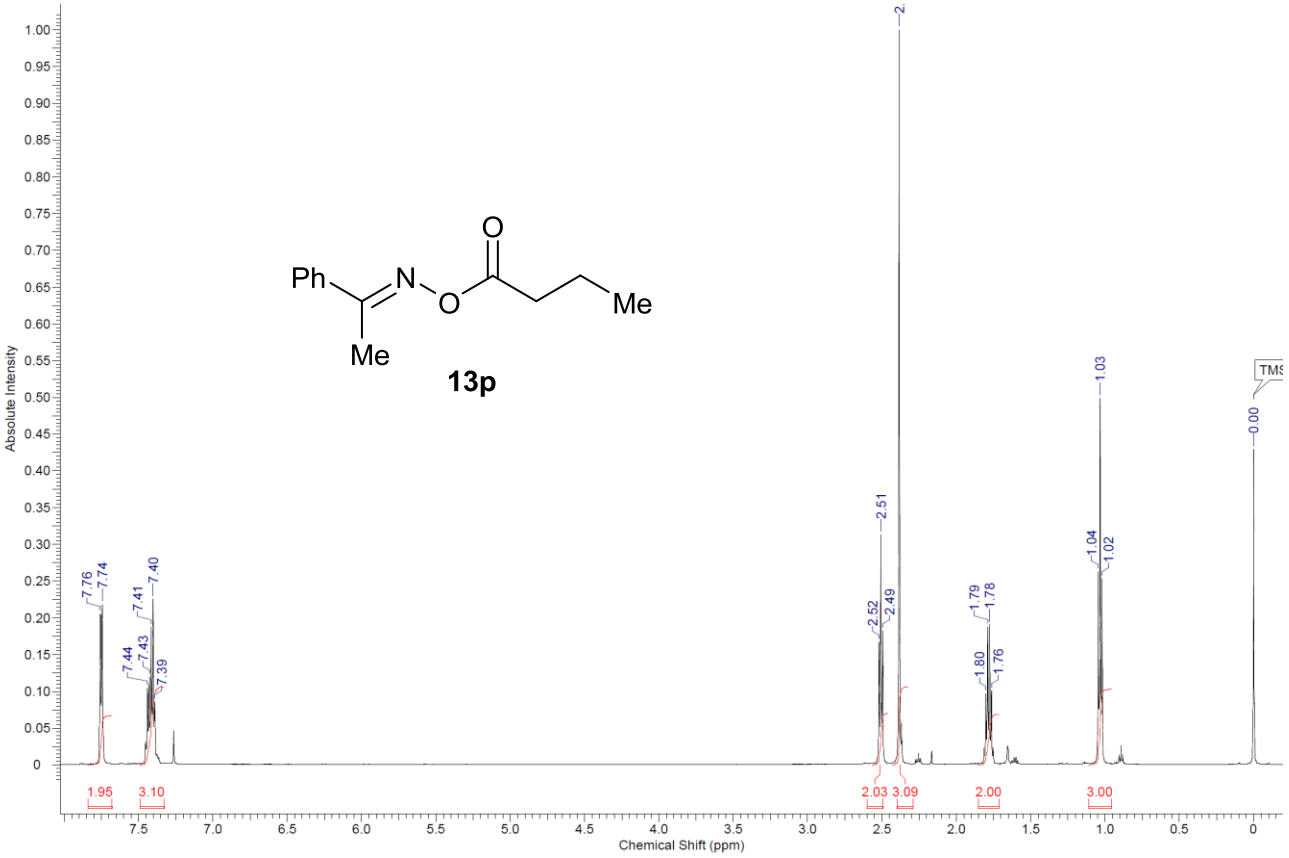


Figure S31. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13p**.

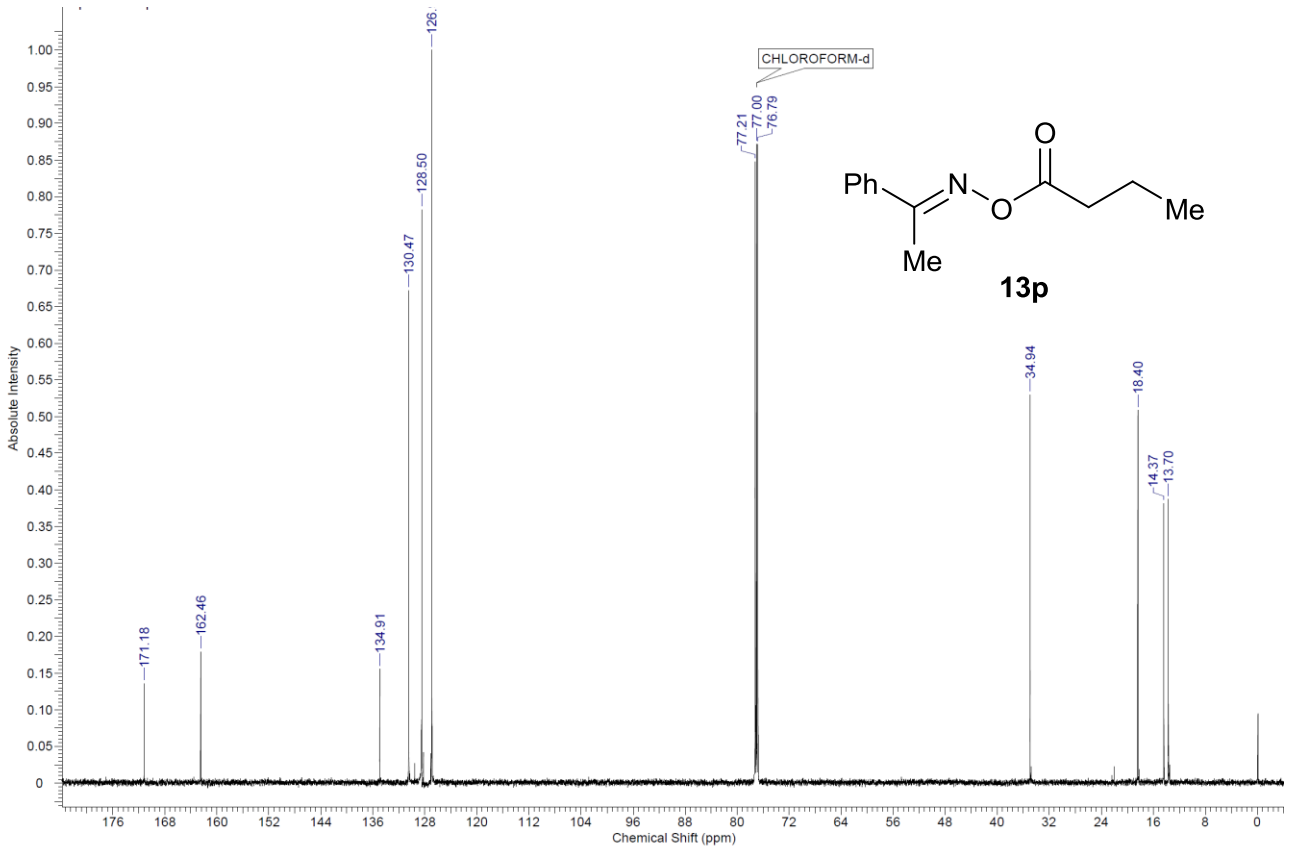


Figure S32. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13p**.

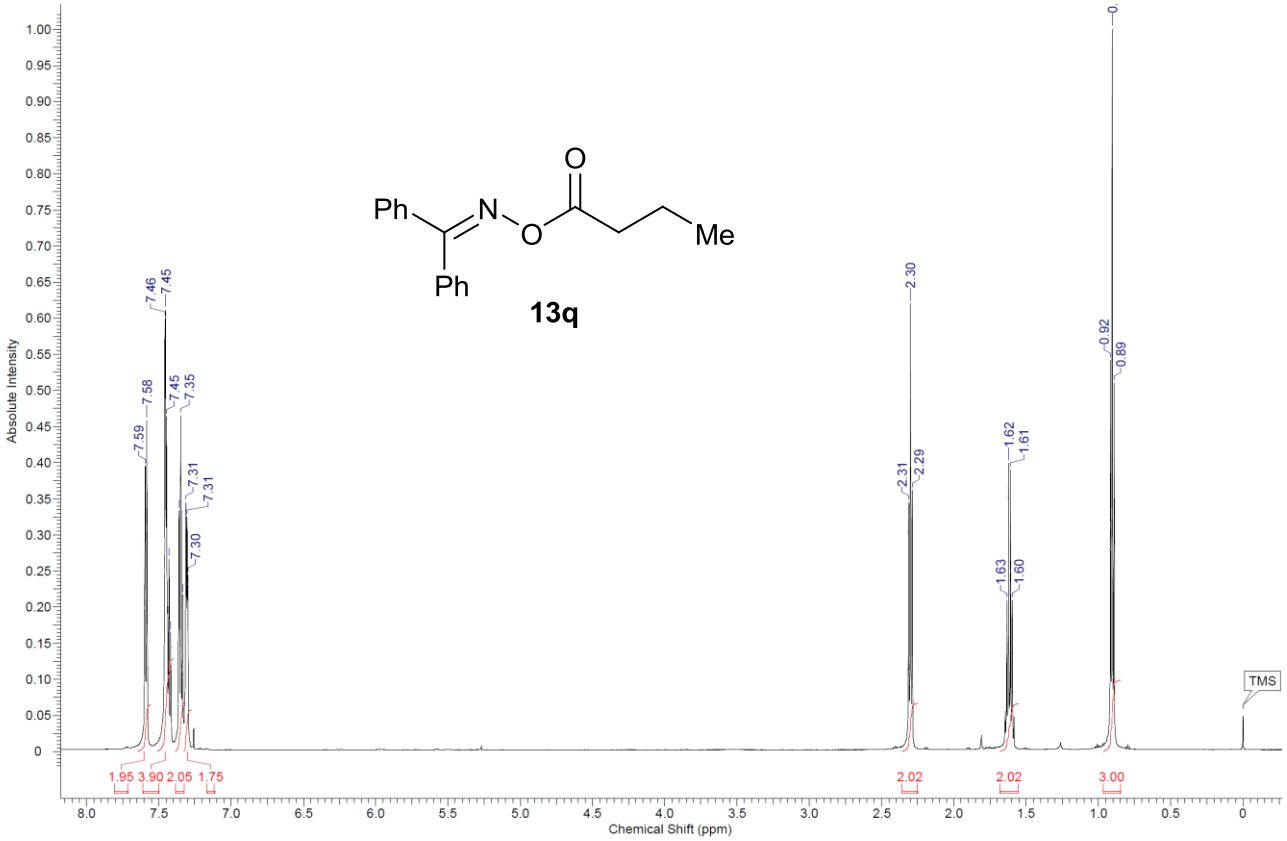


Figure S33. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of **13q**.

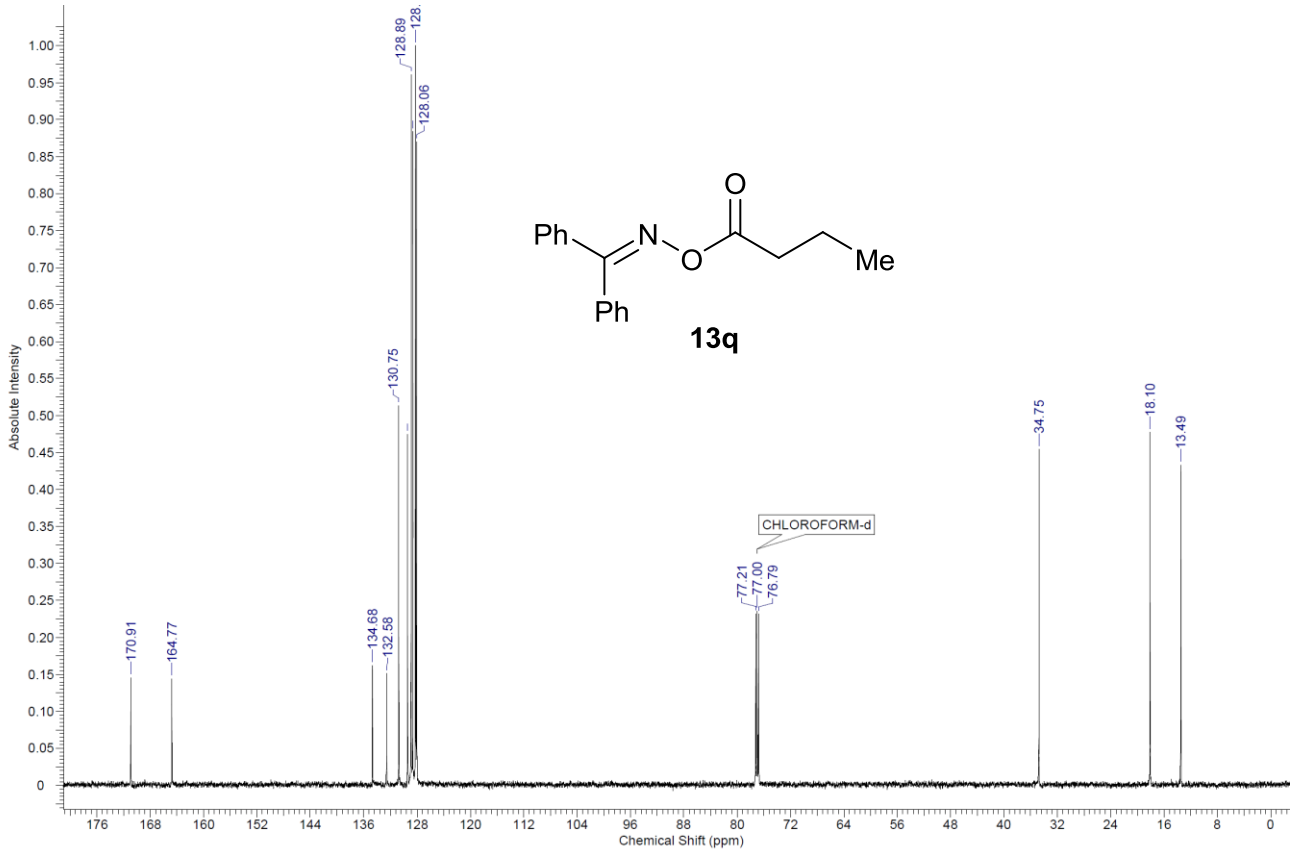


Figure S34. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of **13q**.

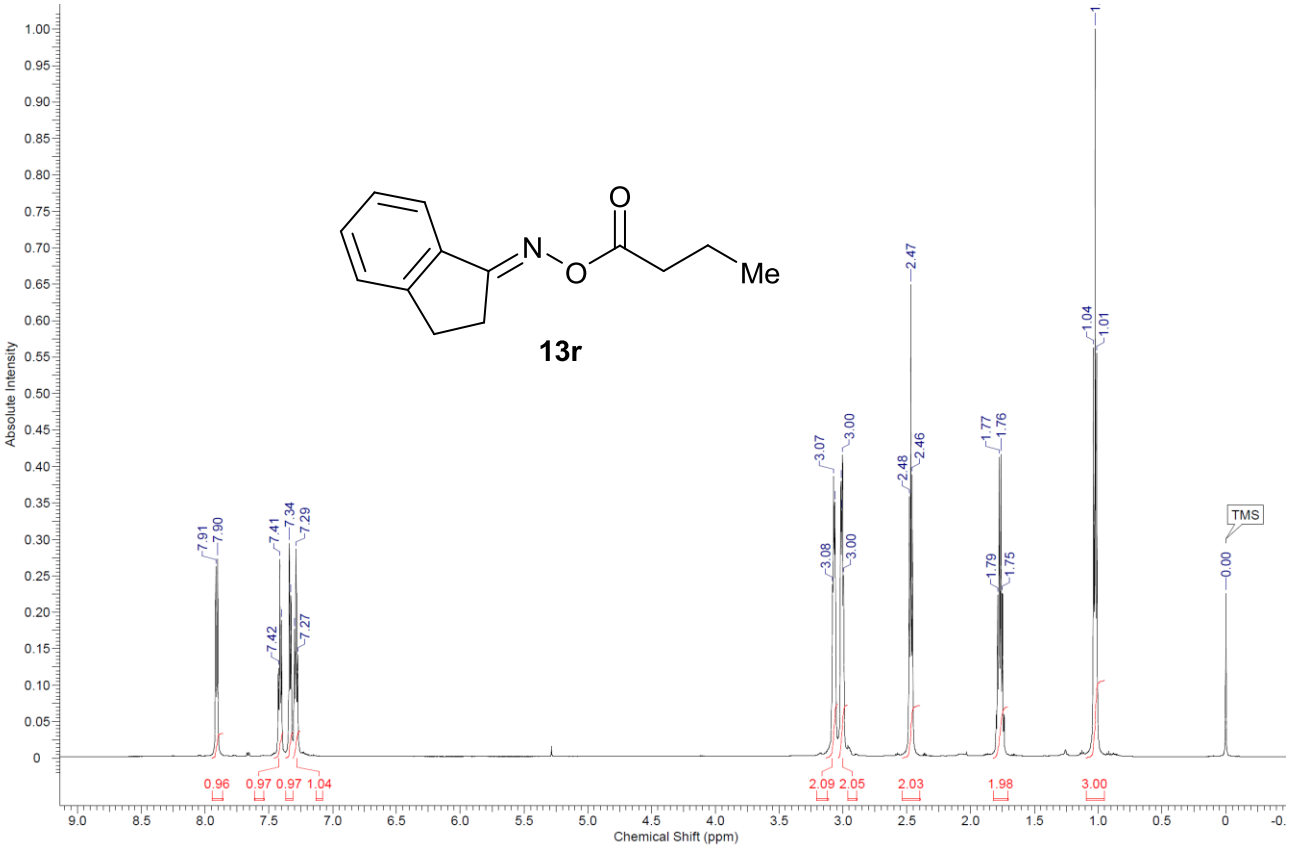


Figure S35. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13r**.

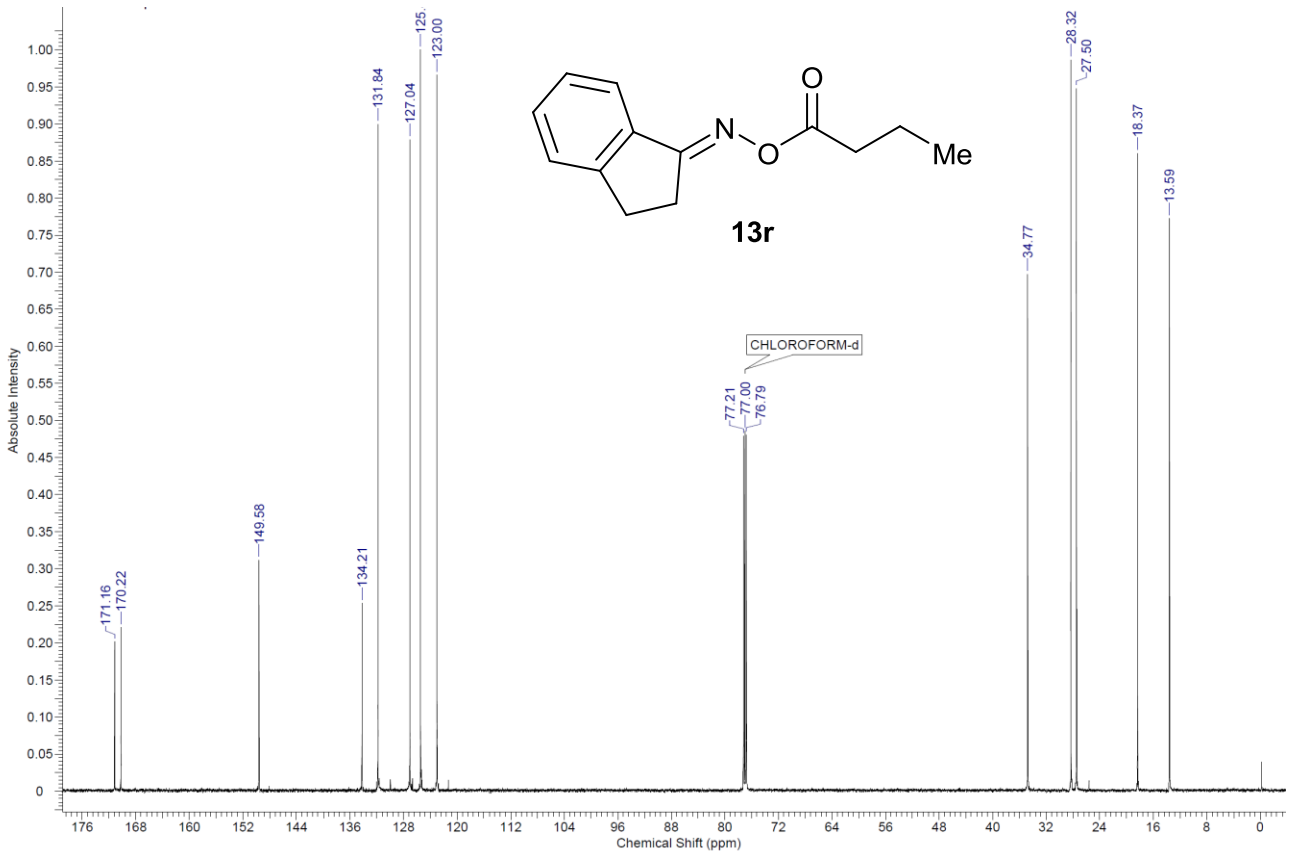


Figure S36. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13r**.

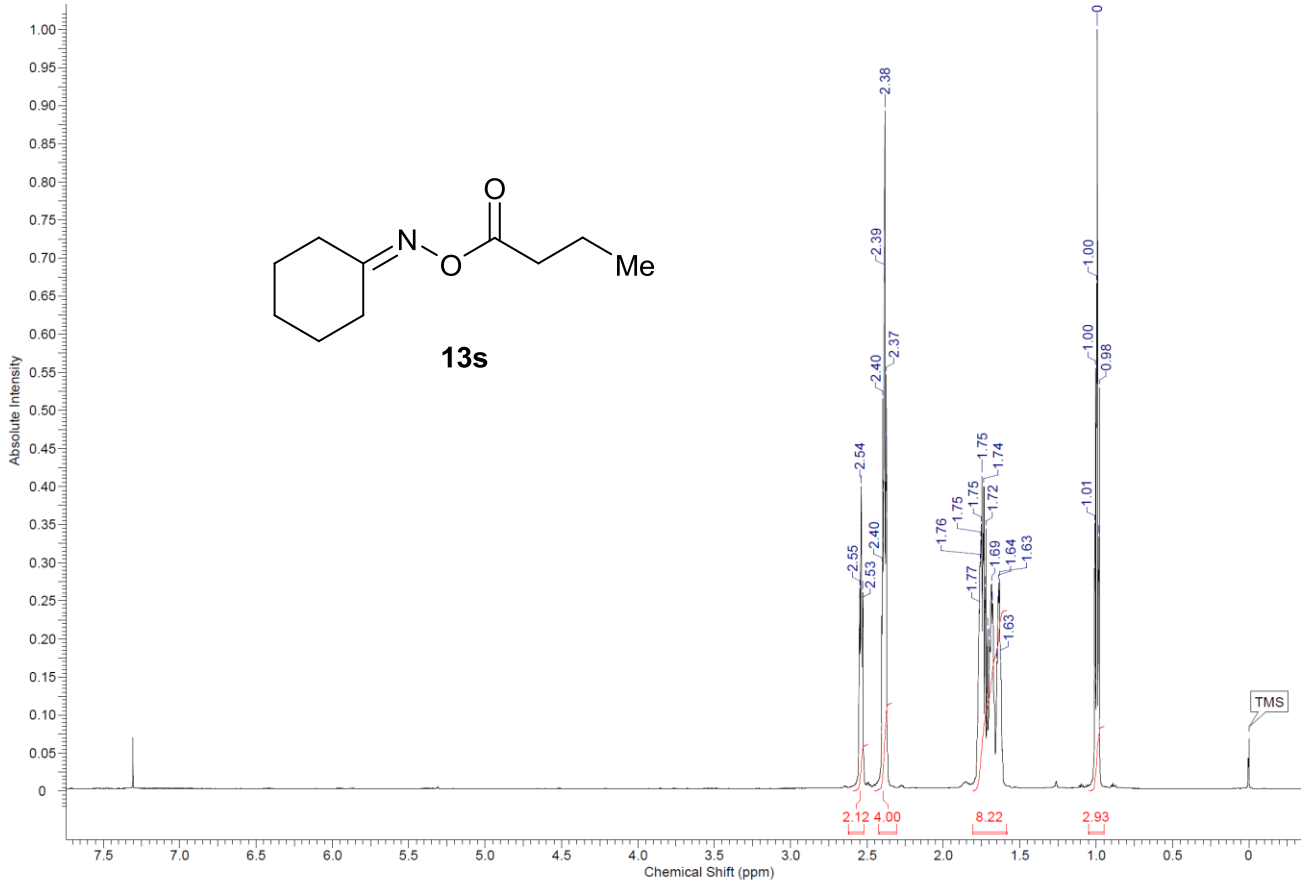


Figure S37. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of **13s**.

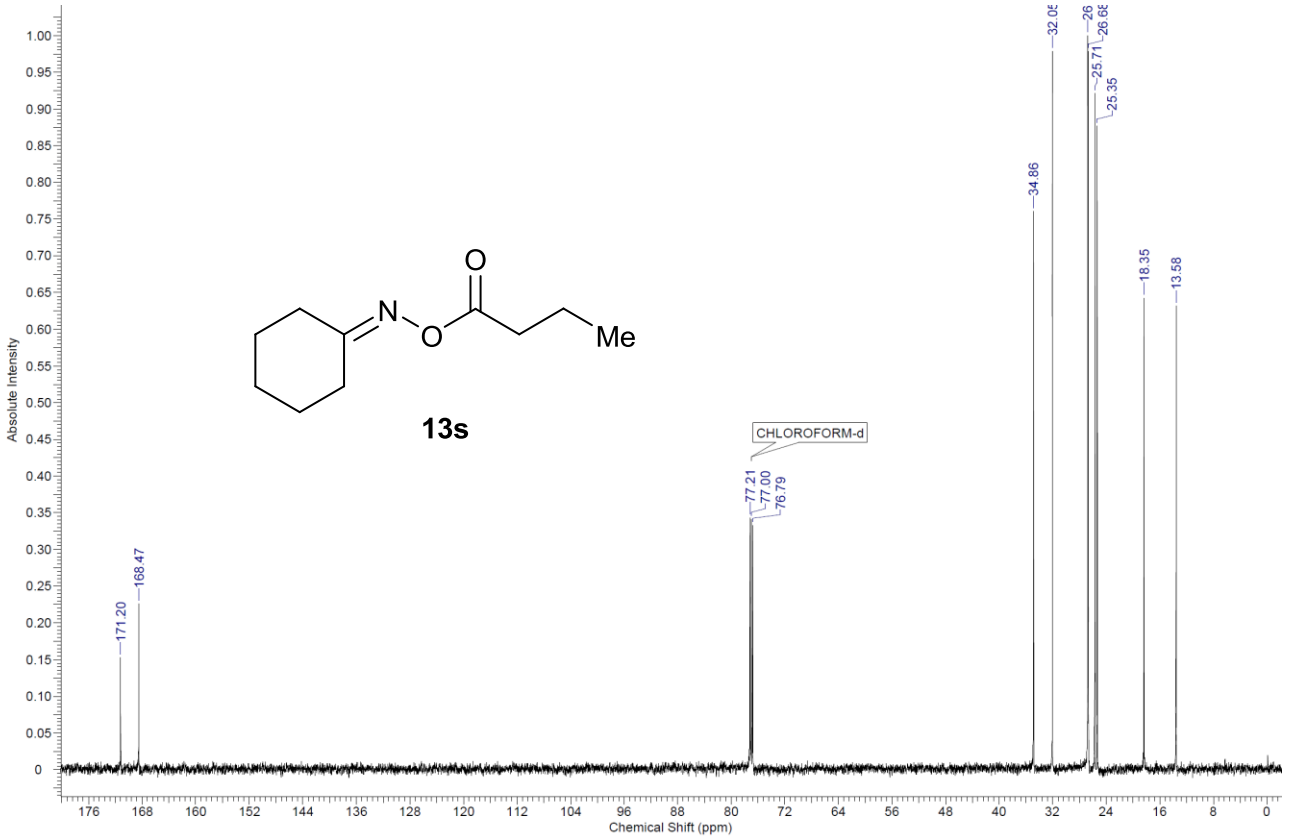


Figure S38. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of **13s**.

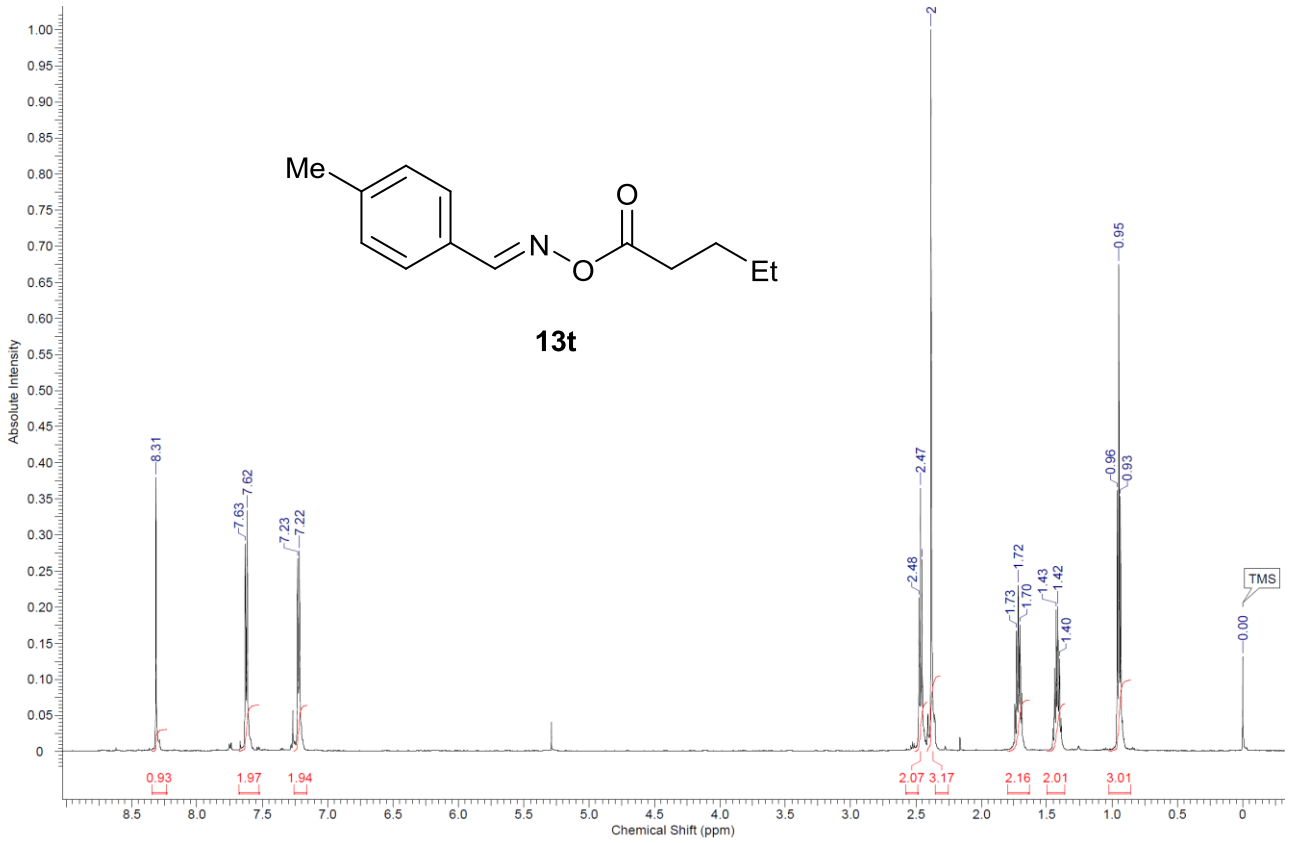


Figure S39. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13t**.

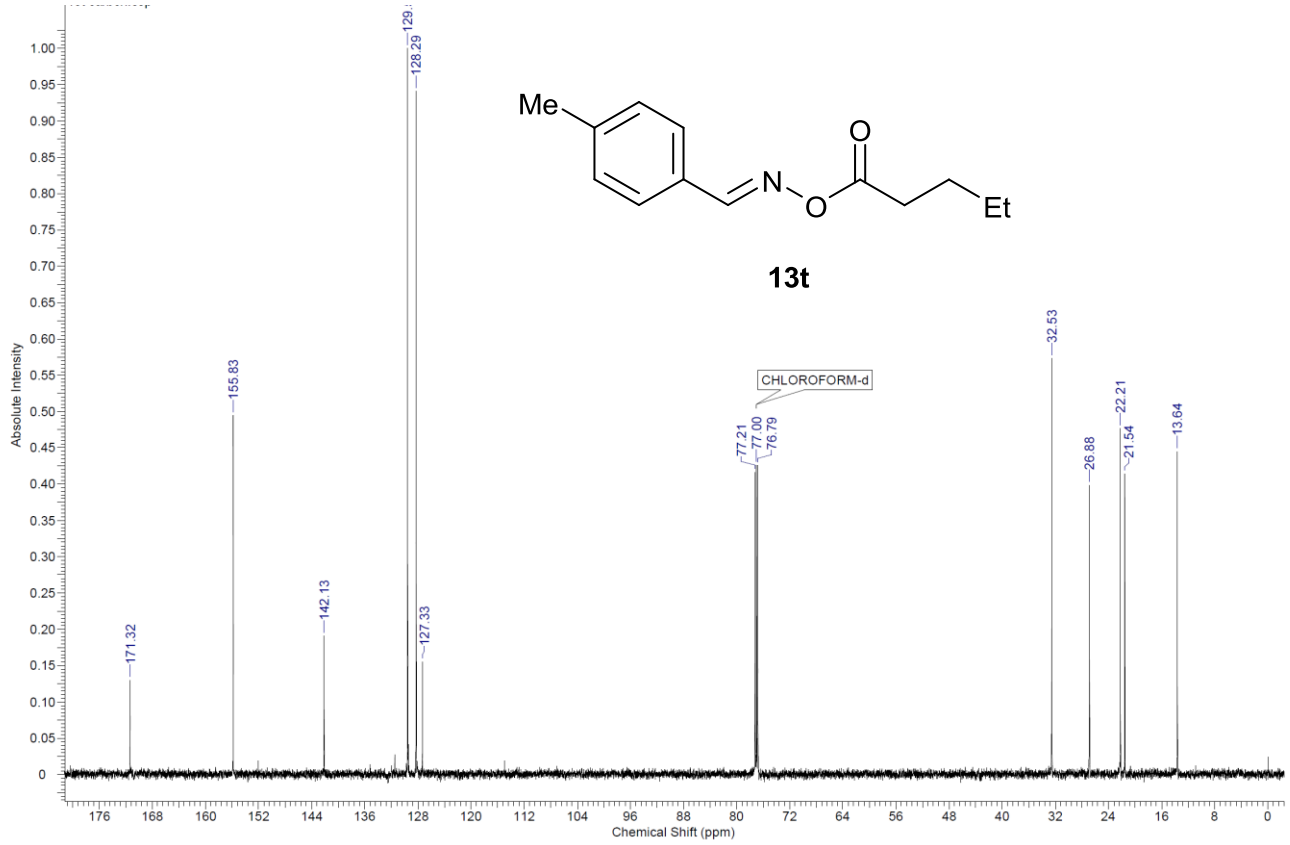


Figure S40. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13t**.

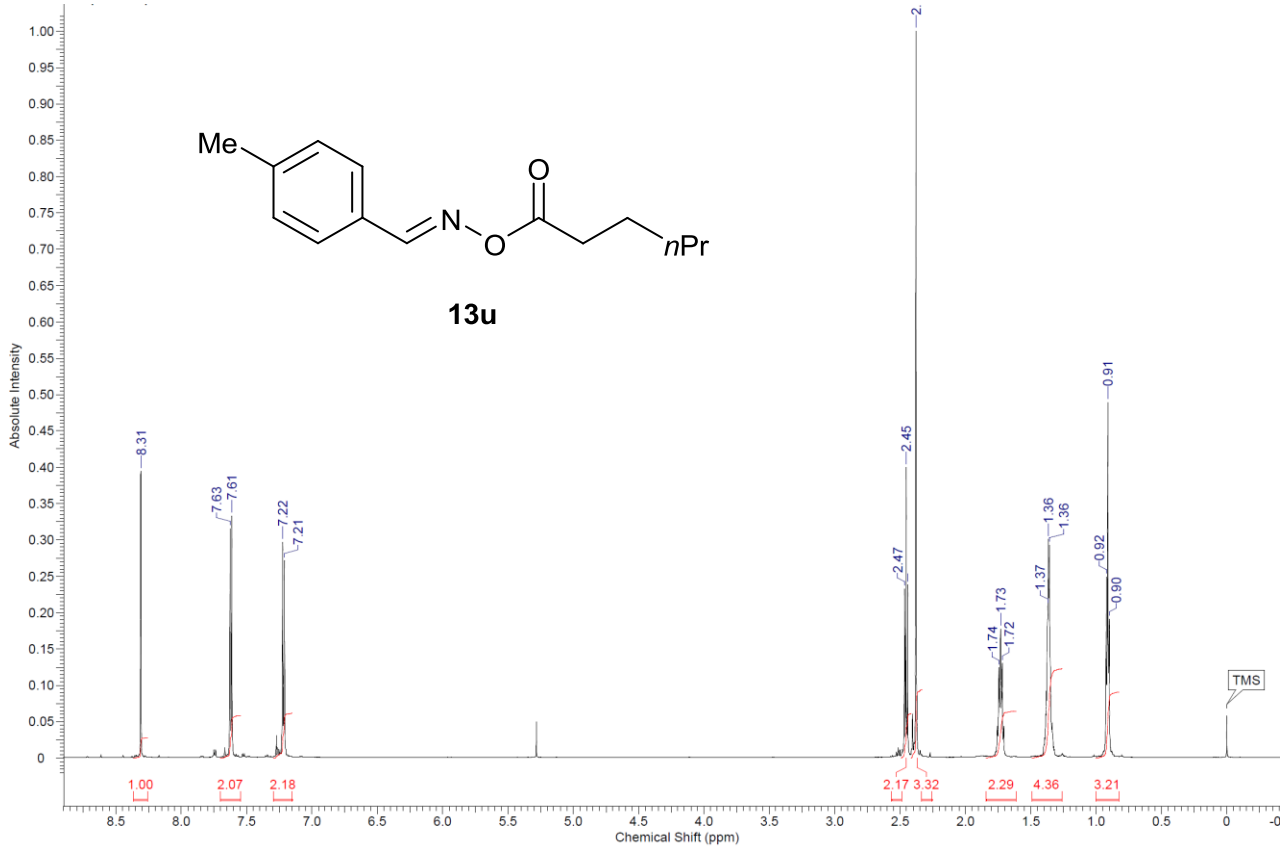


Figure S41. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13u**.

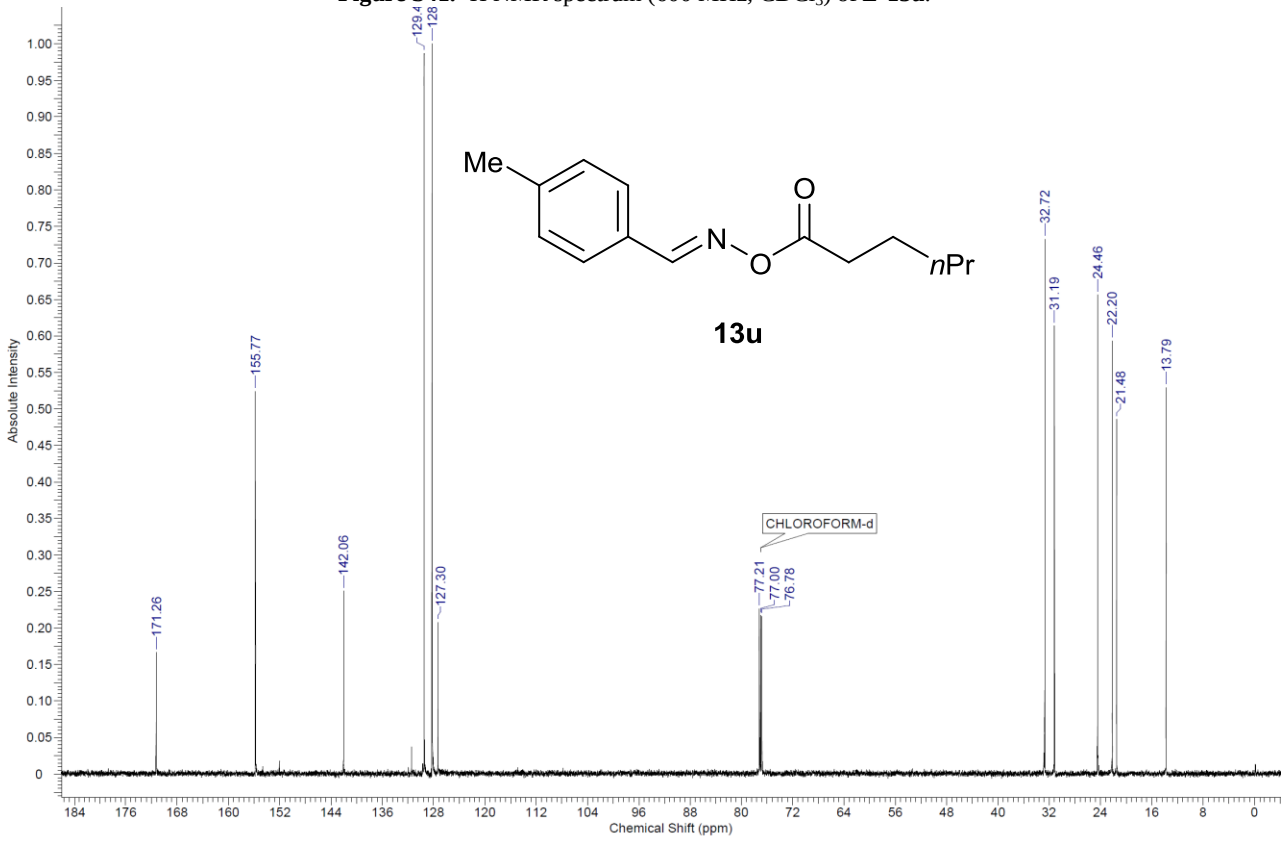


Figure S42. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13u**.

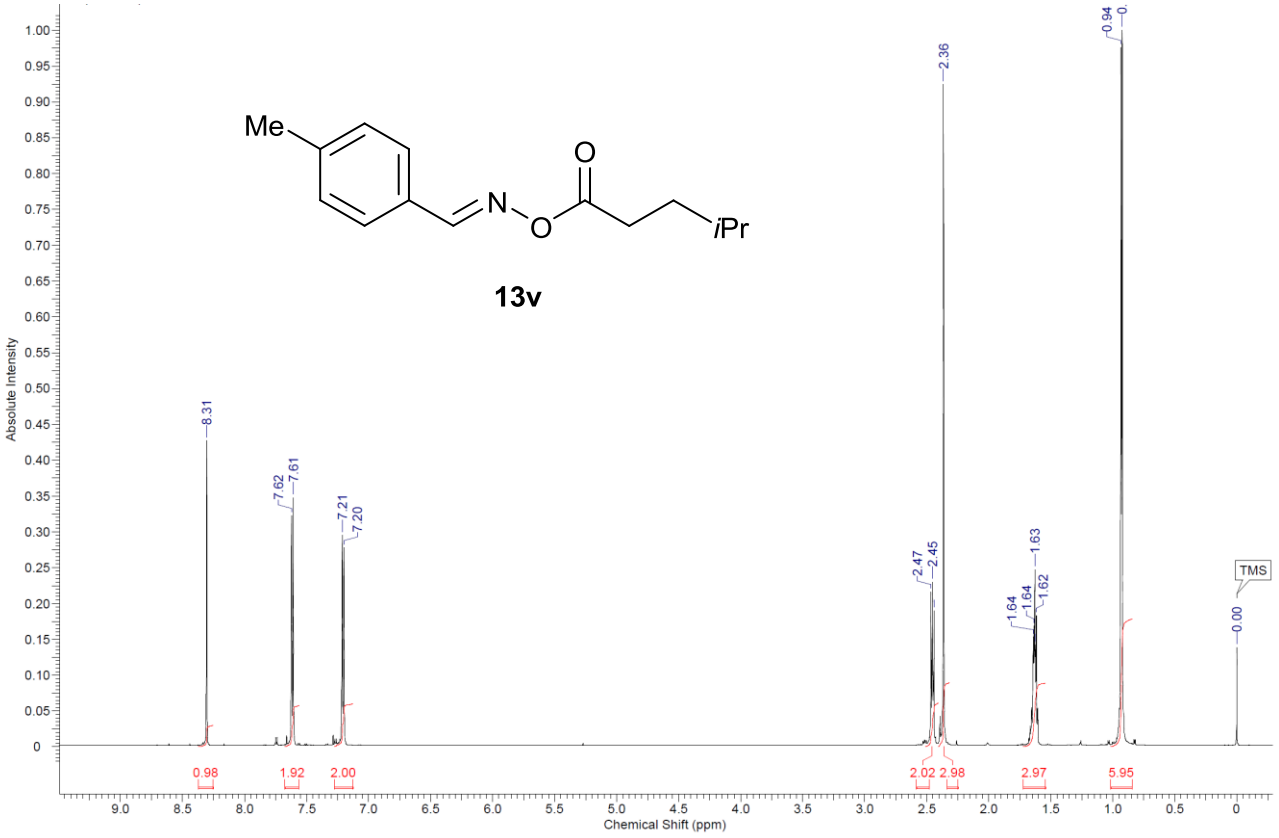


Figure S43. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13v**.

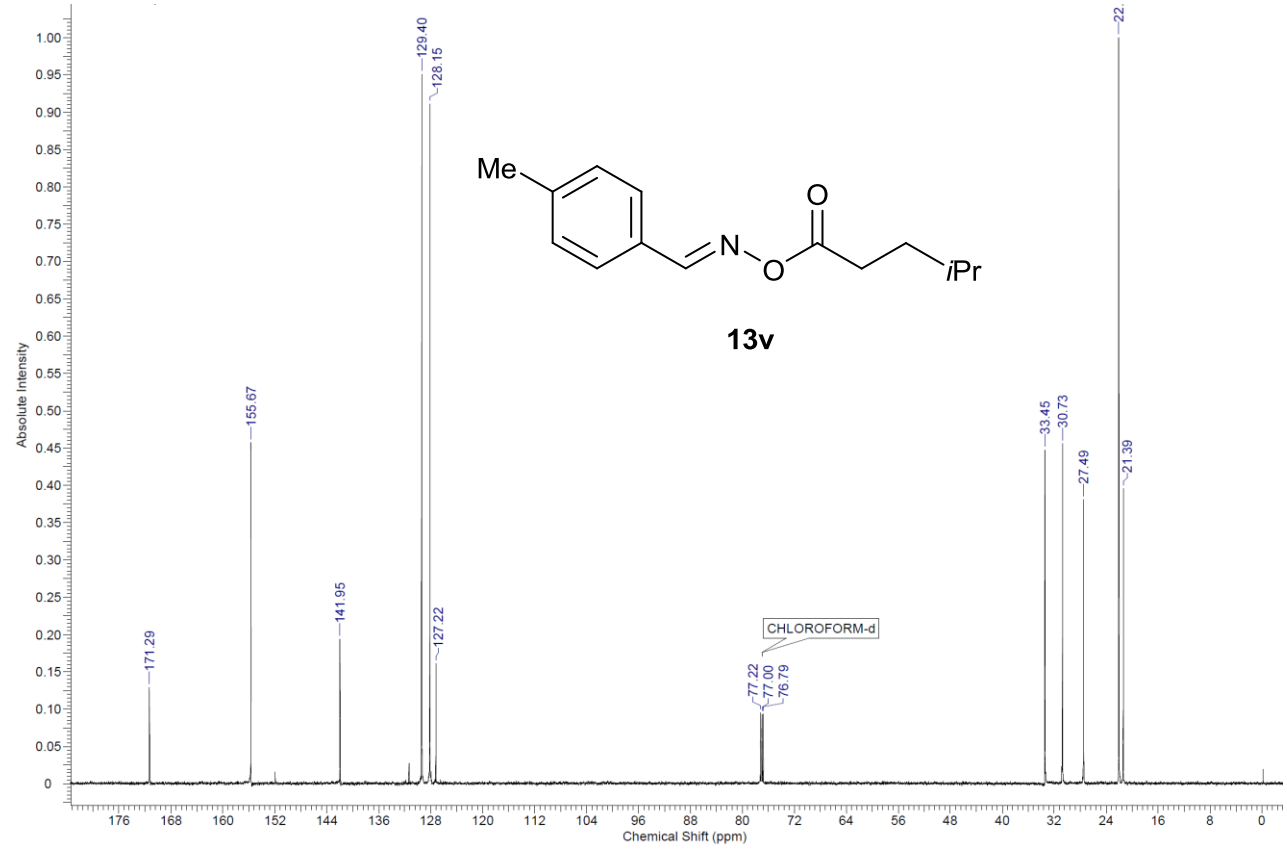


Figure S44. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13v**.

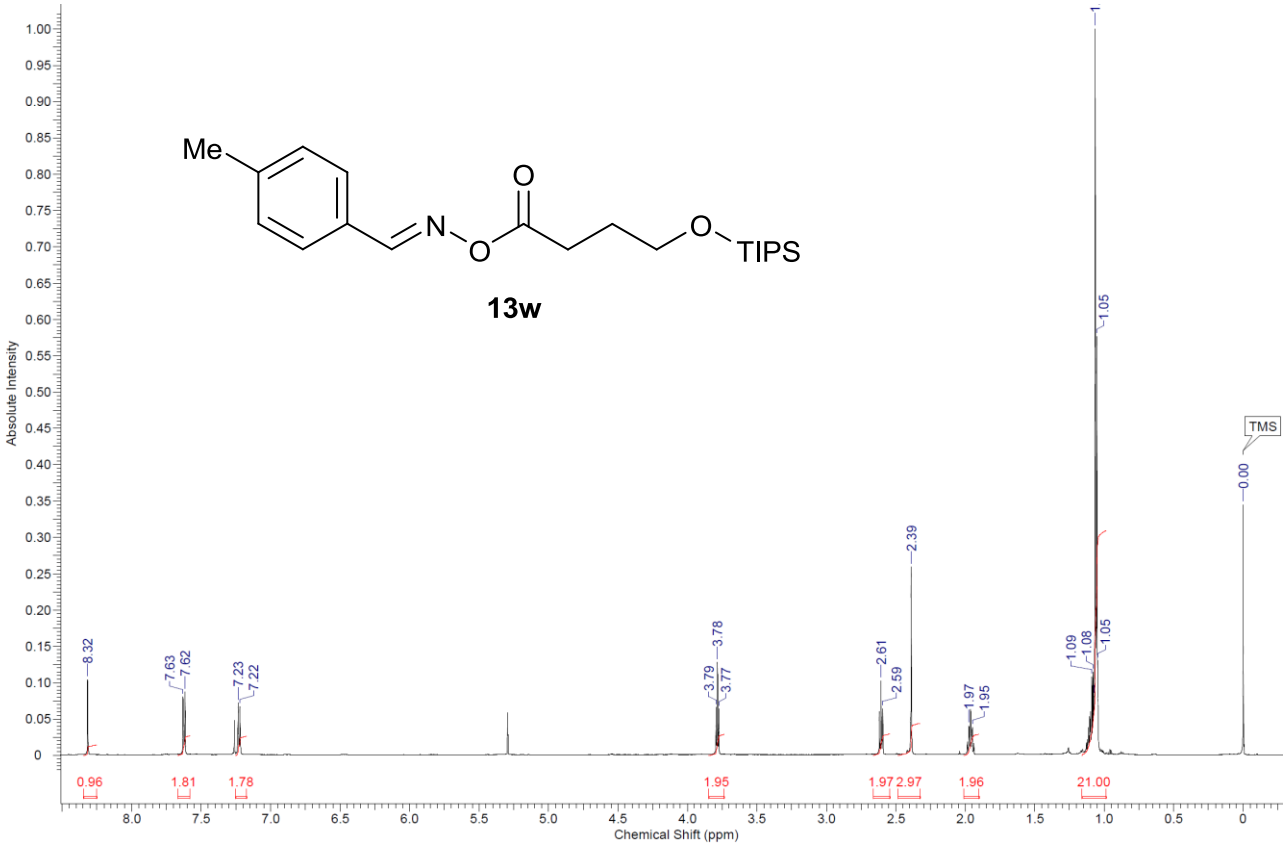


Figure S45. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13w**.

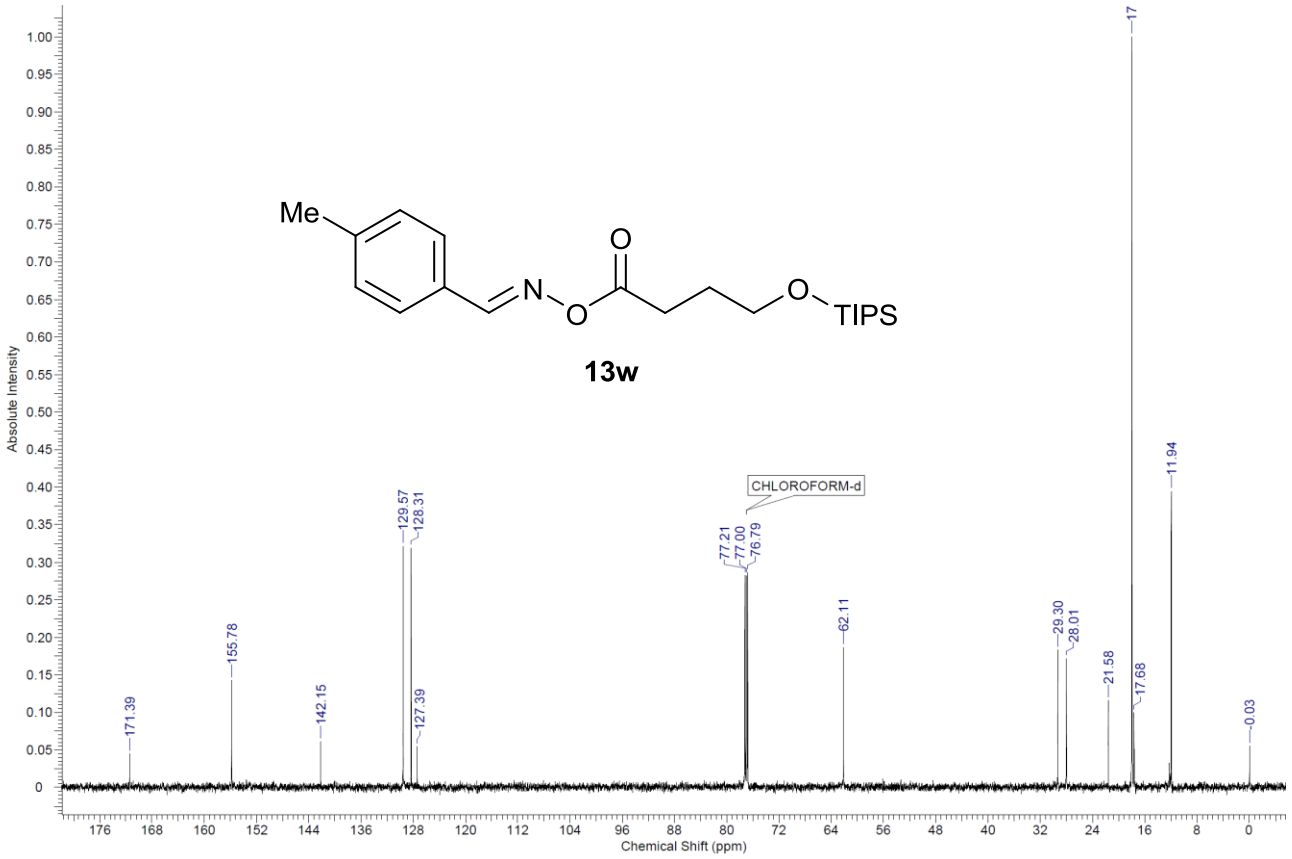


Figure S46. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13w**.

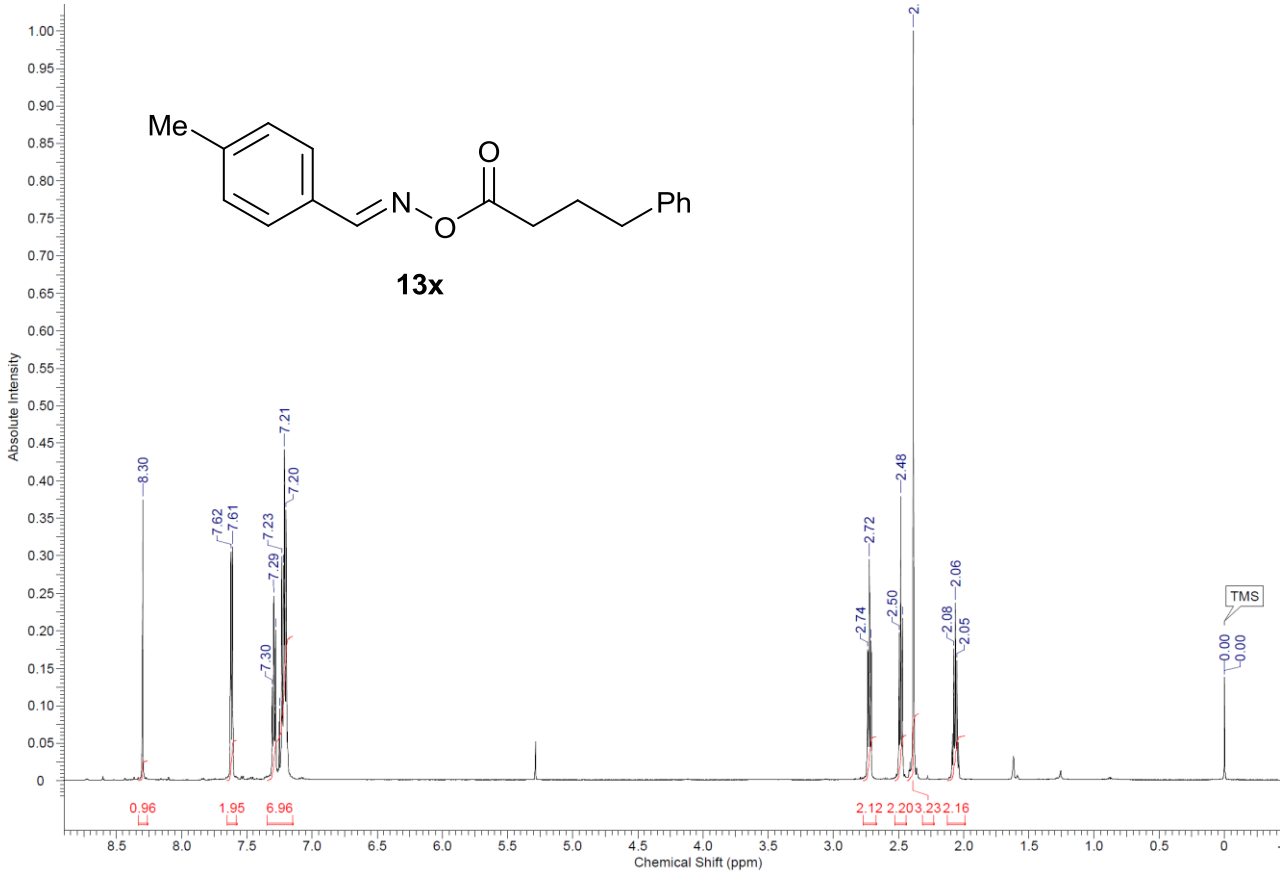


Figure S47. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13x**.

Figure S48. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13x**.

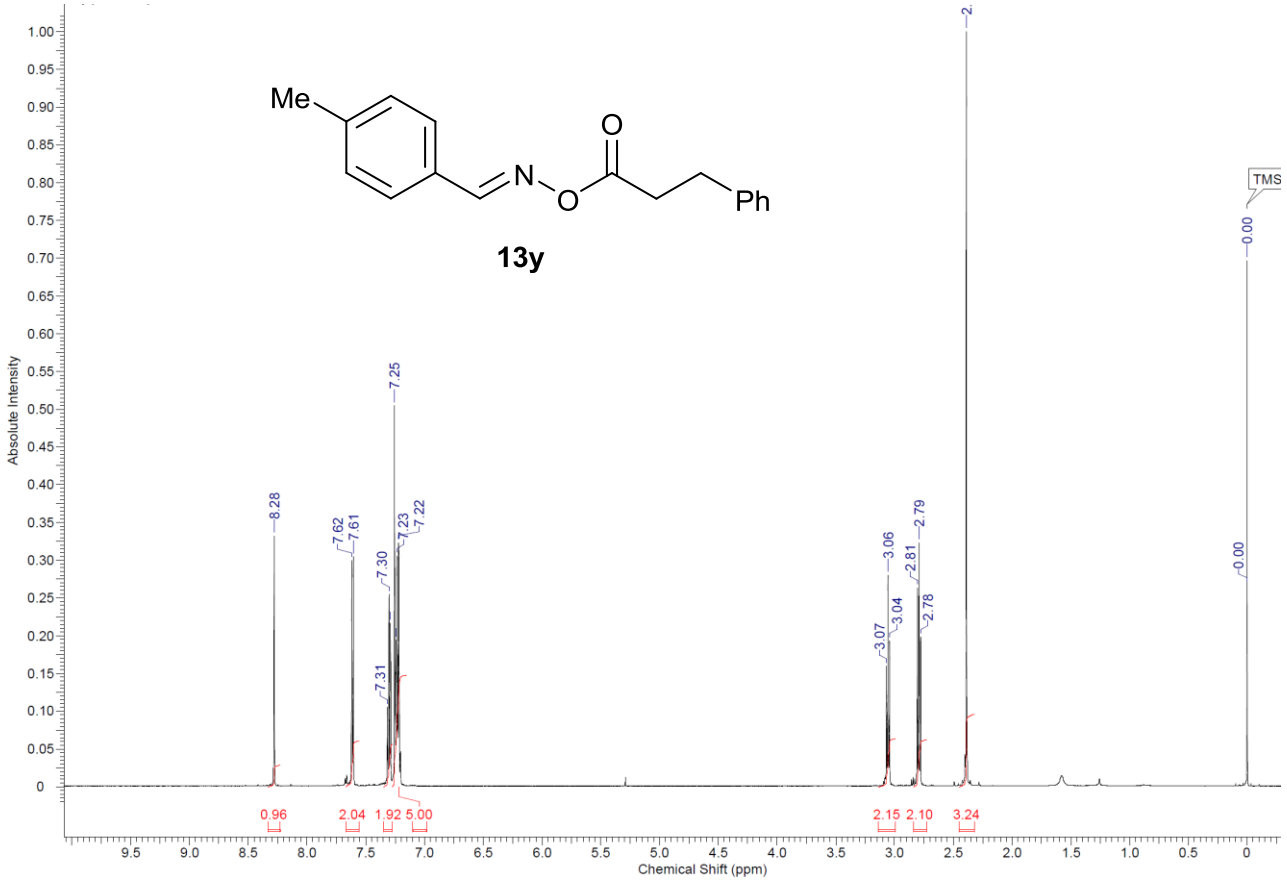


Figure S49. ^{1}H NMR spectrum (600 MHz, $CDCl_3$) of ***E*-13y**.

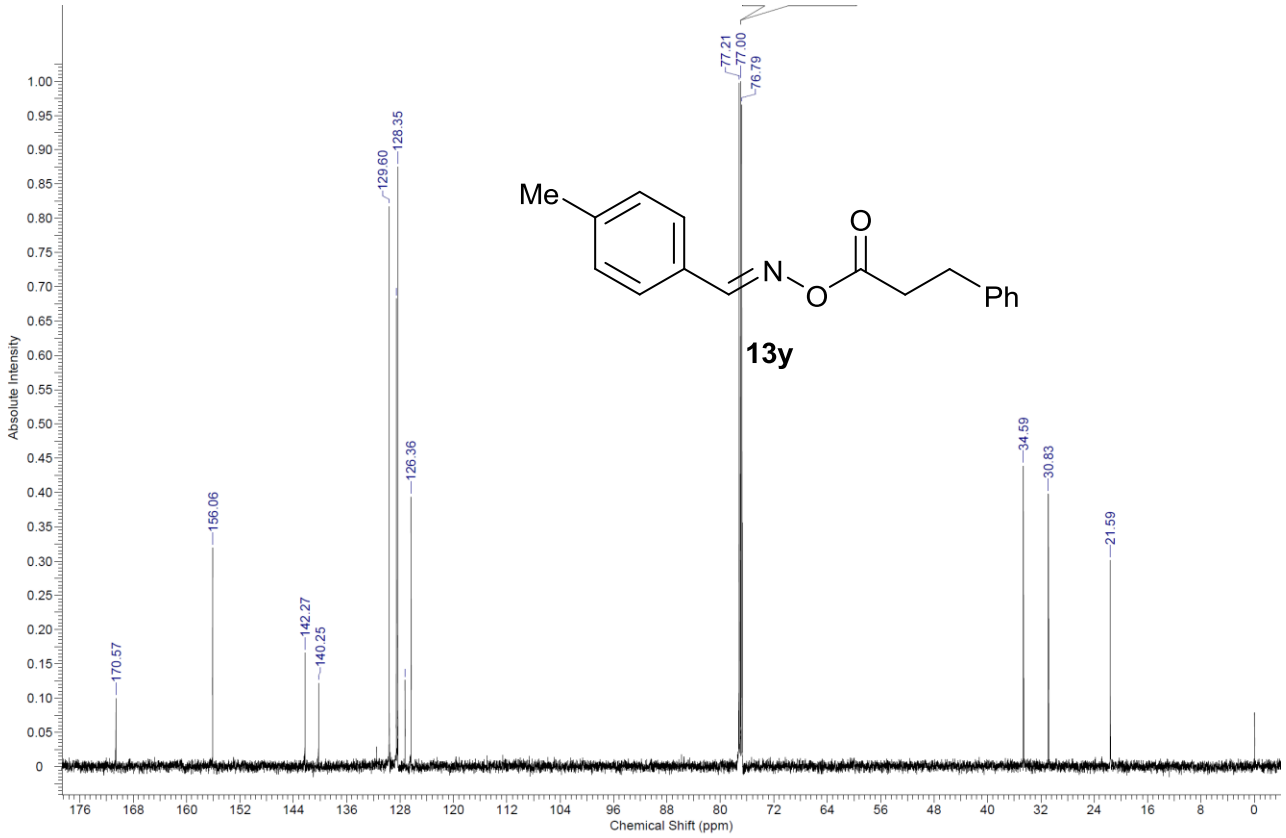


Figure S50. ^{13}C NMR spectrum (151 MHz, $CDCl_3$) of ***E*-13y**.