Supporting Information for:

Combining Transition Metal Catalysis with Radical Chemistry: Dramatic Acceleration of Palladium-Catalyzed C–H Arylation with Diaryliodonium Salts

Sharon R. Neufeldt and Melanie S. Sanford*

University of Michigan, Department of Chemistry
930 N. University Ave., Ann Arbor, MI 48109
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I. General Procedures

NMR spectra were obtained on a Varian vnmrs 700 (699.76 MHz for $^1$H; 175.95 MHz for $^{13}$C; 658.43 for $^{19}$F), Varian vnmrs 500 (500.10 MHz for $^1$H; 125.75 MHz for $^{13}$C, 470.56 MHz for $^{19}$F), Varian Inova 500 (499.90 MHz for $^1$H; 125.70 MHz for $^{13}$C), or a Varian MR400 (400.52 MHz for $^1$H; 100.71 for $^{13}$C, 376.87 MHz for $^{19}$F) spectrometer. $^1$H NMR chemical shifts are reported in parts per million (ppm) relative to TMS, with the residual solvent peak used as an internal reference. Multiplicities are reported as follows: singlet (s), doublet (d), doublet of doublets (dd), doublet of doublets of doublets (ddd), doublet of triplets (dt), triplet (t), triplet of doublets (td), triplet of triplets (tt), quartet (q), quintet (quin), multiplet (m), and broad resonance (br). IR spectra were obtained on a Perkin-Elmer Spectrum BX FT-IR spectrometer. Melting points were determined with a Mel-Temp 3.0, a Laboratory Devices Inc, USA instrument, and are uncorrected. HRMS data were obtained on a Micromass AutoSpec Ultima Magnetic Sector mass spectrometer. Gas chromatography was carried out on a Shimadzu 17A using a Restek Rtx®-5 (Crossbond 5% diphenyl – 95% dimethyl polysiloxane; 15 m, 0.25 mm ID, 0.25 μm df) column. GC calibrated yields are reported relative to hexadecane as an internal standard.

Materials and Methods: Substrates 2$^1$ and 8$^2$ were prepared according to literature procedures. Substrate 9 was prepared by a palladium-catalyzed Suzuki coupling between 2-methoxyboronic acid and 2-bromopyridine. Oxime ethers 10 and 11 were prepared by the reaction of the corresponding ketones with MeONH$_2$•HCl in pyridine.$^3$ The remaining substrates were obtained from Aldrich (1, 5, and 7), Alfa Aesar (3 and 4), or Acros (6) and were used as received. [Ph$_2$I]BF$_4$ and [Mes–I–Ph]BF$_4$ were prepared by the reaction of PhI(OAc)$_2$ or MesI(OAc)$_2$ with PhB(OH)$_2$ in the presence of BF$_3$•Et$_2$O.$^4$ [Ph$_2$I]OTf and [Mes$_2$I]OTf were prepared by the reaction of iodobenzene or iodomesitylene with mCPBA and benzene or mesitylene in the presence of TfOH.$^5$ Unsymmetrical [Ar–I–Ph]BF$_4$ salts were prepared by the reaction of an aryl iodide with m-CPBA and PhB(OH)$_2$ in the presence of BF$_3$•Et$_2$O.$^6$ Symmetrical [Ar$_2$I]BF$_4$ salts were prepared by the reaction of an aryl iodide with m-CPBA and the corresponding arylboronic acid in the presence of BF$_3$•Et$_2$O.$^6$ Pd(OAc)$_2$, obtained from Pressure Chemical, and Pd(NO$_3$)$_2$ and Ru(bpy)$_3$Cl$_2$•6H$_2$O, obtained from Strem, were used as received. Ir(ppy)$_3$$^7$ and Ir(ppy)$_2$(dtbbpy)PF$_6$ were prepared according to literature procedures. Solvents were obtained from Fisher Chemical and used without further purification. Flash chromatography was performed on EM Science silica gel 60 (0.040–0.063 mm particle size, 230–400 mesh) and thin layer chromatography was performed on Merck TLC plates pre-coated with silica gel 60 F$_{254}$. 
II. Synthesis and Characterization of Products in Table 2

**General Procedure:** Substrate (1 equiv), [Ph₂I]BF₄ or [Ph₂I]OTf (2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (0.05 equiv), and Pd(NO₃)₂•2H₂O (0.10 equiv) were combined in MeOH in a 4 mL scintillation vial. For substrates containing N-acetyl moieties (noted below), MgO (1 equiv) was also included and appeared to help prevent substrate and/or product degradation. The reaction mixture was cooled in an ice bath (to prevent evaporation) and sparged with N₂ using a submerged needle for 10 min, and the vial was then immediately sealed with a Teflon-lined cap. The vial was placed on a stir plate with two 26 W compact fluorescent light bulbs (one on either side of the vial about 5–8 cm away), and the reaction mixture was allowed to stir at room temperature for 15 h. The reaction mixture was diluted with EtOAc (50 mL) and washed with 10% aqueous Na₂SO₃ (2 x 25 mL) and brine (1 x 25 mL). The combined aqueous layers were extracted with EtOAc (3 x 10 mL), and the organic layers were then combined, dried over MgSO₄, filtered, concentrated, and purified by column chromatography on silica gel.

**Pyrrolidinone 1a.** The general procedure was followed utilizing substrate 1 (80.6 mg, 0.50 mmol, 1.0 equiv), [Ph₂I]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (13.3 mg, 0.05 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1a was obtained as a pale yellow oil (96.3 mg, 81% yield, Rₓ = 0.17 in 20% hexanes/80% Et₂O). ¹H and ¹³C NMR data matched those reported in the literature.⁹

**Pyrrolidinone 2a.** The general procedure was followed utilizing substrate 2 (47.8 mg, 0.25 mmol, 1.0 equiv), [Ph₂I]OTf (215 mg, 0.50 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (11.4 mg, 0.0125 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (6.7 mg, 0.025 mmol, 0.10 equiv), and MeOH (1.8 mL). Product 2a was obtained as a pale yellow solid [62.5 mg, 94% yield, Rₓ = 0.10 in 20% hexanes/80% Et₂O, mp = 72.9-74.7 ºC (lit. 11 61–64 ºC)]. ¹H and ¹³C NMR data matched those reported in the literature.⁹

**Acetanilide 3a.** The general procedure was followed utilizing substrate 3 (37.3 mg, 0.25 mmol, 1.0 equiv), [Ph₂I]BF₄ (184 mg, 0.50 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (11.4 mg, 0.0125 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (6.7 mg, 0.025 mmol, 0.10 equiv), and MeOH (1.25 mL), with the addition of MgO (10.1 mg, 0.25 mmol, 1.0 equiv). Product 3a was obtained as a pale yellow solid [40.6 mg, 72% yield, Rₓ = 0.17 in 30% hexanes/70% Et₂O, mp = 134.5-136.0 ºC (lit. 139-140 ºC)].¹⁰ ¹H NMR (700 MHz, CD₃CN): δ
7.64 (br s, 1H); 7.42–7.39 (multiple peaks, 2H); 7.35 (t, J = 7.4 Hz, 1H); 7.32–7.31 (multiple peaks, 2H); 7.27 (d, J = 4.9 Hz, 2H); 7.17 (t, J = 4.9 Hz, 1H); 2.23 (s, 3H); 1.85 (s, 3H). 

13C{1H} NMR (176 MHz, CD3CN): δ 170.04; 141.30; 140.97; 138.16; 130.52; 129.67; 129.03; 128.72; 128.14; 128.05; 22.76; 18.54. IR (thin film, CH2Cl2) 3246, 3026, 2922, 1652, 1522 cm⁻¹. HRMS [M+H]+ Calcd for C15H16NO: 226.1226; Found: 226.1234.

Acetylindoline 4a. The general procedure was followed utilizing substrate 4 (80.5 mg, 0.50 mmol, 1.0 equiv), [Ph2I]BF4 (368 mg, 1.00 mmol, 2 equiv), Ir(ppy)2(dtbbpy)PF6 (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO3)2•2H2O (26.6 mg, 0.100 mmol, 0.20 equiv), and MeOH (2.5 mL), with the addition of MgO (20.2 mg, 0.50 mmol, 1.0 equiv). Product 4a was obtained as a pale yellow solid [51.7 mg, 44% yield, Rf = 0.30 in 20% hexanes/80% Et2O, mp = 116.3-117.8 ºC (lit. 117-119 ºC)]. 1H and 13C NMR data matched those reported in the literature.11

Benzamide 5a. The general procedure was followed utilizing substrate 5 (33.8 mg, 0.50 mmol, 1.0 equiv), [Ph2I]BF4 (368 mg, 1.00 mmol, 2 equiv), Ir(ppy)2(dtbbpy)PF6 (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO3)2•2H2O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 5a was obtained as a white solid (39 mg, 40% yield, Rf = 0.26 in 1:1:1 benzene:CH2Cl2:Et2O, mp = 169.0-173.0 ºC). 1H NMR (700 MHz, CDCl3): δ 7.79 (d, J = 7.7 Hz, 1H), 7.50 (td, J = 7.7, 0.7 Hz, 1H), 7.46-7.42 (multiple peaks, 5H), 7.39 (m, 1H), 7.37 (dd, J = 7.7, 0.7 Hz, 1H), 5.62 (br s, 1H), 5.25 (br s, 1H). 13C{1H} NMR (176 MHz, CDCl3): δ 171.21, 140.15, 139.80, 134.30, 130.54, 130.38, 129.08, 128.77, 128.69, 127.93, 127.62. IR (thin film, CDCl3) 3383, 3178, 1653, 1643 cm⁻¹. HRMS [M+H]+ Calcd for C13H12NO: 198.0913; Found: 198.0920.

Benzamide 6a. The general procedure was followed utilizing substrate 6 (67.6 mg, 0.50 mmol, 1.0 equiv), [Ph2I]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)2(dtbbpy)PF6 (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO3)2•2H2O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 6a was obtained as a pale yellow solid (56.7 mg, 54% yield, Rf = 0.27 in 20% hexanes/80% Et2O, mp = 164.5-166.8 ºC). 1H NMR (400 MHz, CDCl3): δ 7.69 (dd, J = 7.6, 1.6 Hz, 1H), 7.47 (td, J = 7.6, 1.2 Hz, 1H), 7.42-7.35 (multiple peaks, 7H), 5.19 (br s, 1H), 2.67 (d, J = 4.8 Hz, 3H). 13C{1H} NMR (100 MHz, CDCl3): δ 170.24, 140.12, 139.29, 135.68, 130.11, 130.10, 128.82, 128.60, 128.58, 127.75, 127.59, 26.64. IR (thin film, CDCl3)
3286, 3060, 2936, 1636, 1540, 1313 cm$^{-1}$. HRMS [M+H]$^+$ Calcd for C$_{14}$H$_{14}$NO: 212.1070; Found: 212.1074.

**Benzamide 7a.** The general procedure was followed utilizing substrate 7 (74.6 mg, 0.50 mmol, 1.0 equiv), [Ph$_2$I]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)$_2$(dtbbpy)PF$_6$ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO$_3$)$_2$•2H$_2$O (13.3 mg, 0.05 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 7a was obtained as a yellow oil (9.8 mg, 9% yield, $R_f$ = 0.27 in 20% hexanes/80% Et$_2$O). $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 7.48-7.44 (multiple peaks, 3H), 7.42-7.32 (multiple peaks, 6H), 2.85 (s, 3H), 2.39 (s, 3H). $^{13}$C{$_1^H$} NMR (100 MHz, CDCl$_3$): $\delta$ 171.33, 139.93, 138.67, 135.74, 129.30, 128.47, 128.36, 127.70, 127.58, 127.41, 37.94, 24.53. Two aromatic $^{13}$C resonances are coincidentally overlapping. IR (thin film, CDCl$_3$) 3057, 2924, 1624, 1394 cm$^{-1}$. HRMS [M+H]$^+$ Calcd for C$_{15}$H$_{16}$NO: 226.1226; Found: 226.1232.

**Pyridine 8a.** The general procedure was followed utilizing substrate 8 (84.6 mg, 0.50 mmol, 1.0 equiv), [Ph$_2$I]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)$_2$(dtbbpy)PF$_6$ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO$_3$)$_2$•2H$_2$O (13.3 mg, 0.05 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 8a was obtained as a clear viscous oil (76.0 mg, 62% yield, $R_f$ = 0.09 in 90% hexanes/10% Et$_2$O). $^1$H and $^{13}$C NMR data matched those reported in the literature.9

**Pyridine 9a.** The general procedure was followed utilizing substrate 9 (92.6 mg, 0.50 mmol, 1.0 equiv), [Ph$_2$I]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)$_2$(dtbbpy)PF$_6$ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO$_3$)$_2$•2H$_2$O (13.3 mg, 0.05 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 9a was obtained as a pale yellow solid (88.0 mg, 67% yield, $R_f$ = 0.11 in 60% hexanes/40% Et$_2$O, mp = 83.5-86.4 °C (lit. 77.7-85.4 °C)). $^1$H and $^{13}$C NMR data matched those reported in the literature.9

**Oxime ether 10a.** The general procedure was followed utilizing substrate 10 (81.6 mg, 0.50 mmol, 1.0 equiv), [Ph$_2$I]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)$_2$(dtbbpy)PF$_6$ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO$_3$)$_2$•2H$_2$O (13.3 mg, 0.05 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 10a was obtained as a colorless oil (71.4 mg, 60% yield, $R_f$ = 0.14 in 98% hexanes/2% Et$_2$O). $^1$H NMR (700 MHz, CDCl$_3$): $\delta$ 7.39-7.36 (multiple peaks, 4H), 7.32 (m, 1H), 7.29 (d, $J$ = 7.7 Hz, 1H), 7.23 (dd, $J$ = 7.0, 0.7 Hz, 1H), 7.20 (dd, $J$ = 7.7, 0.7 Hz, 1H), 3.92 (s, 3H), 2.37 (s, 3H), 1.69 (s, 3H). $^{13}$C{$_1^H$} NMR (176 MHz, CDCl$_3$): $\delta$ 156.52, 154.02, 139.96, 138.67, 135.75, 129.30, 128.47, 128.36, 127.70, 127.58, 127.41, 37.94, 24.53. Two aromatic $^{13}$C resonances are coincidentally overlapping. IR (thin film, CDCl$_3$) 3057, 2924, 1624, 1394 cm$^{-1}$. HRMS [M+H]$^+$ Calcd for C$_{16}$H$_{16}$NO: 238.1380; Found: 238.1384.
Oxime ether 11a. The general procedure was followed utilizing substrate 11 (74.6 mg, 0.50 mmol, 1.0 equiv), [Ph3]OTf (430 mg, 1.00 mmol, 2 equiv), Ir(ppy)3(dtbbpy)PF6 (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO3)2•2H2O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 11a was obtained as a colorless oil consisting of a 1.5:1 mixture of oxime stereo isomers (64.7 mg, 57% yield, Rf = 0.28 (major) and 0.14 (minor) in 6:1:0.2 hexanes/benzene/methylene chloride). **Major Isomer:** 1H NMR (700 MHz, C6D6): δ 8.26 (s, 1H); 7.22 (m, 2H), 7.09 (tt, J = 7.4, 1.4 Hz, 2H); 7.06-7.05 (multiple peaks, 2H); 7.04-7.02 (multiple peaks, 2H); 3.76 (s, 3H), 2.62 (s, 3H). 13C{1H} NMR (100 MHz, CDCl3): δ 149.09, 143.18, 140.66, 137.83, 130.33, 129.83, 128.48, 128.12, 127.84, 127.21, 141.15, 126.99, 61.85, 22.46. Two aromatic 13C resonances are coincidentally overlapping.

**Minor Isomer:** 1H NMR (700 MHz, C6D6): δ 7.40 (d, J = 7.7 Hz, 2H); 7.24 (s, 1H); 7.19 (t, J = 7.7 Hz, 2H); 7.13-7.10 (multiple peaks, 2H); 7.08 (t, J = 7.7 Hz, 1H); 6.98 (d, J = 7.7 Hz, 1H); 3.66 (s, 3H), 2.22 (s, 3H). 13C{1H} NMR (100 MHz, CDCl3): δ 147.58, 140.70, 140.66, 136.43, 130.19, 128.87, 128.84, 128.74, 128.05, 127.36, 126.99, 61.79, 20.13. IR (thin film, CDCl3) 3059, 2935, 1460, 1048 cm⁻¹. HRMS [M+H]⁺ Calcd for C13H16NO: 226.1226; Found: 226.1227.
III. Synthesis and Characterization of Products in Table 3

**General Procedure:** Substrate (1 equiv), [Ar2I]BF4 (2 equiv), Ir(ppy)2(dtbbpy)PF6 (0.05 equiv), and Pd(NO3)2•2H2O (0.10 equiv) were combined in MeOH in a 4 mL scintillation vial. The reaction mixture was cooled in an ice bath (to prevent evaporation) and sparged with N2 using a submerged needle for 10 min, and the vial was then immediately sealed with a Teflon-lined cap. The vial was placed on a stir plate with two 26 W compact fluorescent light bulbs (one on either side of the vial about 5–8 cm away), and the reaction mixture was allowed to stir at room temperature for 15 h. The reaction mixture was diluted with EtOAc (50 mL) and washed with 10% aqueous Na2SO3 (2 x 25 mL) and brine (1 x 25 mL). The combined aqueous layers were extracted with EtOAc (3 x 10 mL), and the organic layers were then combined, dried over MgSO4, filtered, concentrated, and purified by column chromatography on silica gel.

**Pyrrolidinone 1b.** The general procedure was followed utilizing substrate 1b (80.6 mg, 0.50 mmol, 1.0 equiv), [(p-CF3C6H4)2I]BF4 (504 mg, 1.00 mmol, 2 equiv), Ir(ppy)2(dtbbpy)PF6 (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO3)2•2H2O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1b was obtained as a tan solid [106 mg, 69% yield, Rf = 0.17 in 20% hexanes/80% Et2O, mp = 87.6-89.2 °C (lit. 86.1–88.0 °C)]. 1H and 13C NMR data matched those reported in the literature.9

\[
\begin{align*}
\text{(1b)} \\
\text{O} & \quad \text{N} & \quad \text{F}_3 \text{C} \\
\end{align*}
\]

**Pyrrolidinone 1c.** The general procedure was followed utilizing substrate 1c (80.6 mg, 0.50 mmol, 1.0 equiv), [(m-CF3C6H4)2I]BF4 (504 mg, 1.00 mmol, 2 equiv), Ir(ppy)2(dtbbpy)PF6 (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO3)2•2H2O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1c was obtained as a tan solid [86.1 mg, 56% yield, Rf = 0.23 in 20% hexanes/80% Et2O, mp = 79.2-83.5 °C].

\[
\begin{align*}
\text{(1c)} \\
\text{O} & \quad \text{N} & \quad \text{CF}_3 \\
\end{align*}
\]

1H NMR (700 MHz, CDCl3): δ 7.64 (br s, 1H), 7.62 (d, J = 8.4 Hz, 1H), 7.60 (d, J = 7.7 Hz, 1H), 7.53 (t, J = 7.7 Hz, 1H), 7.45 (m, 1H), 7.41–7.40 (multiple peaks, 2H), 7.33 (d, J = 7.7 Hz, 1H), 3.28 (t, J = 8.1 Hz, 2H), 2.40 (t, J = 8.1 Hz, 2H), 1.91 (tt, J = 8.1, 7.0 Hz, 2H). 13C{1H} NMR (176 MHz, CDCl3): δ 175.42, 139.84, 138.11, 136.29, 131.80, 130.71 (q, J_C–F = 32 Hz), 130.60, 129.25, 128.96, 128.30, 128.25, 124.99 (q, J_C–F = 3.6 Hz), 124.21 (q, J_C–F = 3.8 Hz), 123.97 (q, J_C–F = 272 Hz), 50.30, 30.93, 18.83. 19F NMR (376 MHz, CDCl3): δ –62.65 (s). IR (thin film, CDCl3) 2918, 1692, 1333, 1117 cm⁻¹. HRMS [M+H]+ Calcd for C17H15F3NO: 306.1100; Found: 306.1110.
**Pyrrolidinone 1d.** The general procedure was followed utilizing substrate 1 (40.3 mg, 0.25 mmol, 1.0 equiv), [(o-CF₃C₆H₄)₂]BF₄ (252 mg, 0.50 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (11.4 mg, 0.0125 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (6.7 mg, 0.025 mmol, 0.10 equiv), and MeOH (1.25 mL). Product 1d was obtained as a white solid (35.0 mg, 46% yield, Rₚ = 0.13 in 20% hexanes/80% Et₂O, mp = 61.8-63.9 ºC). ¹H NMR (700 MHz, CDCl₃): δ 7.76 (d, J = 7.7 Hz, 1H), 7.54 (t, J = 7.7 Hz, 1H), 7.49 (t, J = 7.7 Hz, 1H), 7.46 (td, J = 7.7, 1.4 Hz, 1H), 7.41 (d, J = 7.7 Hz, 1H), 7.36 (td, J = 7.4, 1.4 Hz, 1H), 7.33-7.32 (multiple peaks, 2H), 3.36 (ddd, J = 14.0, 7.7, 5.6 Hz, 1H), 3.03 (ddd, J = 14.0, 8.4, 5.6 Hz, 1H), 2.40 (ddd, J = 16.4, 9.1, 6.3 Hz, 1H), 2.22 (ddd, J = 16.4, 9.1, 6.3 Hz, 1H), 1.94 (m, 1H), 1.67 (m, 1H). ¹³C{¹H} NMR (176 MHz, CDCl₃): δ 175.57, 137.43, 136.99, 136.76, 132.08, 131.25, 131.05 (q, J_C–F = 2.1 Hz), 129.25, 128.28 (q, J_C–F = 30 Hz), 128.08, 127.96, 127.17, 126.21 (q, J_C–F = 5.3 Hz), 124.06 (q, J_C–F = 274 Hz), 49.90, 30.98, 19.05. ¹⁹F NMR (376 MHz, CDCl₃): δ –57.09 (s). IR (thin film, CDCl₃) 2920, 1697, 1313, 1111 cm⁻¹. HRMS [M+H]+ Calcd for C₁₇H₁₅F₃NO: 306.1100; Found: 306.1112.

**Pyrrolidinone 1e.** The general procedure was followed utilizing substrate 1 (80.6 mg, 0.50 mmol, 1.0 equiv), [(p-ClC₆H₄)₂]BF₄ (437 mg, 1.00 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1e was obtained as a tan solid [104 mg, 77% yield, Rₚ = 0.13 in 20% hexanes/80% Et₂O, mp = 95.6-97.4 ºC (lit. 93.9-96.0 ºC)]. ¹H and ¹³C NMR data matched those reported in the literature.³

**Pyrrolidinone 1f.** The general procedure was followed utilizing substrate 1 (80.6 mg, 0.50 mmol, 1.0 equiv), [(p-BrC₆H₄)₂]BF₄ (526 mg, 1.00 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1f was obtained as a pale yellow oil (125 mg, 79% yield, Rₚ = 0.13 in 20% hexanes/80% Et₂O). ¹H NMR (500 MHz, CDCl₃): δ 7.54 (d, J = 8.5 Hz, 2H), 7.44–7.35 (multiple peaks, 3H) 7.33 (d, J = 7.5 Hz, 1H), 7.27 (d, J = 8.5 Hz, 2H), 3.27 (t, J = 7.0 Hz, 2H), 2.44 (t, J = 8.0 Hz, 2H), 1.93 (tt, J = 8.0, 7.0 Hz, 2H). ¹³C{¹H} NMR (126 MHz, CDCl₃): δ 175.61, 138.48, 138.01, 136.18, 131.56, 130.61, 130.00, 128.95, 128.40, 128.18, 121.87, 50.26, 31.09, 18.94. IR (thin film, neat) 2879, 1680, 1402 cm⁻¹. HRMS [M+H]+ Calcd for C₁₆H₁₅BrNO: 316.0332; Found: 316.0340.
**Pyrrolidinone 1g.** The general procedure was followed utilizing substrate 1 (80.6 mg, 0.50 mmol, 1.0 equiv), [(p-MeC₆H₄)₂I]BF₄ (396 mg, 1.00 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1g was obtained as a tan solid (109.8 mg, 87% yield, Rₜ = 0.17 in 20% hexanes/80% Et₂O, mp = 78.6-80.4 °C). ¹H NMR (700 MHz, CDCl₃): δ 7.40-7.35 (multiple peaks, 3H), 7.31 (d, J = 7.3 Hz, 1H), 7.27 (d, J = 8.0 Hz, 2H), 7.20 (d, J = 8.0 Hz, 2H), 3.22 (t, J = 6.9 Hz, 2H), 2.43 (t, J = 8.0 Hz, 2H), 2.39 (s, 3H), 1.88 (tt, J = 8.0, 6.9 Hz, 2H). ¹³C{¹H} NMR (176 MHz, CDCl₃): δ 175.61, 139.52, 137.28, 136.27, 136.26, 130.86, 129.12, 128.34, 128.30, 128.18, 127.98, 50.06, 31.20, 21.18, 18.97. IR (thin film, CDCl₃) 3026, 2920, 1694, 1487, 1407, 1301 cm⁻¹. HRMS [M+H]⁺ Calcd for C₁₇H₁₈NO: 252.1383; Found: 252.1391.

**Pyrrolidinone 1h.** The general procedure was followed utilizing substrate 1 (80.6 mg, 0.50 mmol, 1.0 equiv), [(o-MeC₆H₄)₂I]BF₄ (396 mg, 1.00 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1h was obtained as a pale yellow oil (107 mg, 85% yield, Rₜ = 0.20 in 20% hexanes/80% Et₂O). NMR (500 MHz, CDCl₃): δ 7.40 (ddd, J = 7.7, 7.0, 1.4 Hz, 1H), 7.36 (dd, J = 8.4, 1.4 Hz, 1H), 7.34 (td, J = 7.7, 1.4 Hz, 1H), 7.27–7.24 (multiple peaks, 3H), 7.19 (m, 1H), 7.16 (d, J = 7.0 Hz, 1H), 3.23 (ddd, J = 9.1, 8.4, 5.6 Hz, 1H), 3.09 (ddd, J = 9.1, 7.7, 5.6 Hz, 1H) 2.32 (m, 2H), 2.15 (s, 3H), 1.82 (m, 1H), 1.75 (m, 1H). ¹³C{¹H} NMR (126 MHz, CDCl₃): δ 175.10, 138.89, 138.60, 136.96, 135.88, 131.11, 130.13, 129.39, 128.3, 128.1, 127.72, 127.29, 125.47, 49.94, 31.15, 19.93, 19.02. IR (thin film, neat) 2952, 1696, 1398 cm⁻¹. HRMS [M+H]⁺ Calcd for C₁₇H₁₈NO: 252.1383; Found: 252.1392.

**Pyrrolidinone 1i.** The general procedure was followed utilizing substrate 1 (40.3 mg, 0.25 mmol, 1.0 equiv), [Mes₂I]OTf (257 mg, 0.50 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (11.3 mg, 0.0125 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (6.7 mg, 0.025 mmol, 0.10 equiv), and MeOH (1.25 mL). Product 1i was obtained as a white solid (8 mg, 11% yield, Rₜ = 0.17 in 96% CH₂Cl₂/4% Et₂O, mp = 121.2-123.8 °C). ¹H NMR (700 MHz, CDCl₃): δ 7.44–7.39 (multiple peaks, 2H), 7.34 (td, J = 7.5, 1.5 Hz, 1H), 7.13 (dd, J = 7.5, 1.2 Hz, 1H), 6.92 (s, 2H), 3.12 (t, J = 6.9 Hz, 2H), 2.36 (t, J = 8.0 Hz, 2H), 2.34 (s, 3H), 1.98 (s, 6H), 1.80 (tt, J = 8.0, 6.9 Hz, 2H). ¹³C{¹H} NMR (176 MHz, CDCl₃): δ 174.82, 137.32, 137.16, 137.01, 136.23, 135.62, 131.27, 128.25, 128.06, 127.97, 127.33, 49.16, 31.35.
21.06, 20.41, 19.07. IR (thin film, CH₂Cl₂) 2918, 1699, 1398, 1301 cm⁻¹. HRMS [M+H]⁺ Calcd for C₁₉H₂₂NO: 280.1699; Found: 280.1705.

**Pyrrolidinone 1j.** The general procedure was followed utilizing substrate 1 (80.6 mg, 0.50 mmol, 1.0 equiv), [(p-OMeC₆H₄)₂I]BF₄ (428 mg, 1.00 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (22.8 mg, 0.025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (13.3 mg, 0.050 mmol, 0.10 equiv), and MeOH (2.5 mL). Product 1j was obtained as a tan viscous oil (54.3 mg, 41% yield, R_f = 0.07 in 20% hexanes/80% Et₂O). ⁹H and ¹³C NMR data matched those reported in the literature.
IV. Experimental Details for Table 4

Radical/Photocatalytic Procedure for Reactions in Table 4 (entries 1–5): Substrate 8 (8.5 mg, 0.050 mmol, 1 equiv), [Ph₂I]BF₄ (36.8 mg, 0.100 mmol, 2 equiv), Ir(ppy)₂(dtbppy)PF₆ (2.3 mg, 0.0025 mmol, 0.05 equiv), Pd(NO₃)₂•2H₂O (1.3 mg, 0.005 mmol, 0.10 equiv), and galvinoxyl (0, 2.1, or 5.3 mg; 0, 0.005, or 0.0125 mmol; 0, 0.10, or 0.25 equiv) or TEMPO (0, 3.9, or 7.8 mg; 0, 0.025, or 0.050 mmol; 0, 0.50, or 1.0 equiv) were combined in MeOH (0.25 mL) in a 4 mL scintillation vial. The reaction mixture was cooled in an ice bath (to prevent evaporation) and sparged with N₂ using a submerged needle for 1 min, and the vial was then immediately sealed with a Teflon-lined cap. The vial was placed on a stir plate with two 26 W compact fluorescent light bulbs (one on either side of the vial about 5–8 cm away), and the reaction mixture was allowed to stir at room temperature for 15 h. Reactions were then quenched with 10% aqueous Na₂SO₃ (0.25 mL), diluted with EtOAc (3.5 mL), and analyzed by GC-FID. GC calibrated yields are reported relative to hexadecane as an internal standard. The yields reported in Table 4 are the averages of three separate trials.

Ionic/Thermal Procedure for Reactions in Table 4 (entries 6–9). Substrate 8 (8.5 mg, 0.050 mmol, 1 equiv), [Ph₂I]BF₄ (20.2 mg, 0.055 mmol, 1.1 equiv), Pd(OAc)₂ (1.1 mg, 0.005 mmol, 0.10 equiv), and galvinoxyl (0 or 5.3 mg; 0 or 0.0125 mmol; 0 or 0.25 equiv) or TEMPO (0 or 7.8 mg; 0 or 0.050 mmol; 0 or 1.0 equiv) were combined in AcOH (0.42 mL) in a 4 mL scintillation vial. The reaction was heated to 100 ºC for 15 h, then quenched with 10% aqueous Na₂SO₃ (0.25 mL), diluted with EtOAc (3.5 mL), and analyzed by GC-FID. GC calibrated yields are reported relative to hexadecane as an internal standard. The yields reported in Table 4 are the averages of three separate trials. These conditions are similar to those reported previously for 2-arylpyridine substrates;¹¹ however, the catalyst loading was increased to 10% (instead of 5%) to more closely resemble the conditions of the photocatalytic/radical trials.
V. Experimental Details for Equation 1

**Radical/Photocatalytic Procedure for Reaction in Equation 1.** Substrate 1 (8.1 mg, 0.050 mmol, 1 equiv), ([o-CF₃C₆H₄]–I–Ph)BF₄ (43.6 mg, 0.100 mmol, 2 equiv), Ir(ppy)₂(dtbbpy)PF₆ (2.3 mg, 0.0025 mmol, 0.05 equiv), and Pd(NO₃)₂•2H₂O (1.3 mg, 0.005 mmol, 0.10 equiv) were combined in MeOH (0.25 mL) in a 4 mL scintillation vial. The reaction mixture was cooled in an ice bath (to prevent evaporation) and sparged with N₂ using a submerged needle for 1 min, and the vial was then immediately sealed with a Teflon-lined cap. The vial was placed on a stir plate with two 26 W compact fluorescent light bulbs (one on either side of the vial about 5–8 cm away), and the reaction mixture was allowed to stir at room temperature for 15 h. Reactions were then quenched with 10% aq. Na₂SO₃ (0.25 mL), diluted with EtOAc (3.5 mL), and analyzed by GC-FID. GC calibrated yields are reported relative to hexadecane as an internal standard.

**Ionic/Thermal Procedure for Reaction in Equation 1.** Substrate 1 (8.1 mg, 0.050 mmol, 1 equiv), ([o-CF₃C₆H₄]–I–Ph)BF₄ (43.6 mg, 0.100 mmol, 2 equiv), Pd(OAc)₂ (1.1 mg, 0.005 mmol, 0.10 equiv), and NaHCO₃ (6.3 mg, 0.075 mmol, 1.5 equiv) were combined in toluene (0.42 mL). The reaction was heated to 100 °C for 15 h, then quenched with 10% aq. Na₂SO₃ (0.25 mL), diluted with EtOAc (3.5 mL), and analyzed by GC-FID. GC calibrated yields are reported relative to hexadecane as an internal standard. These conditions are similar to the conditions reported previously for substrate 1;¹¹ however, the equivalents of oxidant were increased to 2 (instead of 1.5) and the catalyst loading was increased to 10% (instead of 5%) to more closely resemble the conditions of the photocatalytic/radical trials.
VI. Experimental Details for Table 5

**PhN₂⁺ procedure.** Substrate (0.050 mmol, 1 equiv), Pd(OAc)₂ (1.1 mg, 0.005 mmol, 0.10 equiv), Ru(bpy)₃Cl₂•6H₂O (0.94 mg, 0.00125 mmol, 0.025 equiv), and [PhN₂]BF₄ (38.4 mg, 0.200 mmol, 4 equiv) were combined in MeOH (500 µL) in a 4 mL scintillation vial. The reaction mixture was cooled in an ice bath (to prevent evaporation) and sparged with N₂ using a submerged needle for 1 min, and the vial was then immediately sealed with a Teflon-lined cap. The vial was placed on a stir plate with two 26 W compact fluorescent light bulbs (one on either side of the vial about 5–8 cm away), and the reaction mixture was allowed to stir at room temperature for 15 h. Reactions were then quenched with 10% aq. Na₂SO₃ (0.25 mL), diluted with EtOAc (3.5 mL), and analyzed by GC-FID. GC calibrated yields are reported relative to hexadecane as an internal standard.

**Ph₂I⁺ procedure.** GC calibrated yields were obtained from the reactions described in Section II and are reported relative to hexadecane as an internal standard.
VII. References

Sample Name: 1044N111_LJC
Data Collected on: May 27, 2012
Archive directory:
Sample directory: 1044N111_LJC
Pulse Sequence: CARBON (n,pol)
Solvent: 
Data collected on: May 27, 2012
Temp. 29.0 C / 299.1 K
Operator: 
Relax delay 0.100 sec
Pulse 90.0 degrees
Aver. 4 times 1.000 sec
Width 6442.9 Hz
226 repetitions
Observes C13; 178.993936 MHz
DECOUPLING E1; 689.762273 MHz
Power 35 W
continuously on
VAPOR-1H mediated
D echo PROCESSING
Time backwards 1.0 Hz
PT rate 133373
Total time 5 min 51 sec
Sample Name: S21
Archive directory:
Sample directory: S21
File Name: S21
Pulse Sequence: CARBD (x2pul)
Acqment: 1H
Data collected on: Jan 4 2012
Temp. 293.1 K
Operator: skoros
Receiver delay 0.103 sec
Pulse 45.0 degrees
Acq time 1.400 sec
Width 0.042 sec
2912 repetitions
0.0103748 MHz
DEGSQUE R2, 699.761156 MHz
Power 24 dB
continuously on

DATA PROCESSING
Linear broadening 1.0 Hz
F2 axis 131.8 Hz
Total time 1 hr, 16 min
S24
Sample Name: ISXNH4_LN

Data Collected on: 2013
Archive directory: ISXNH4_LN
Sample directory: ISXNH4_LN

Pulse Sequence: PROTON (x2qul)
Sweeps: 6513
Data collected on: May 22, 2012

Temp: 25.0 °C / 298.1 K
Operator: sharon

Pulse delay 0.000 sec
Pulse 90.0 degrees
Avg. time 3.000 sec
Width 6114.7 Hz
8 repetitions

Observations:
0.59, 7.88, 144.5 mHz

DATA PROCESSING
Line broadening 0.3 Hz
FT size 11512
Total time 2 min 40 sec

ppm
9 8 7 6 5 4 3 2 1

0.85 3.46 3.97 0.86 3.88

S30
Sample Name: 
Data Collected on: 
Archive directory: 
Sample directory: 
Fileprefix: S32

Pulse Sequence: PROTON (x2qul)
Spectrum: \_del3
Data collected on: May 22 2012

Temp: 29.0 C / 369.1 K
Operator: mahomes
Nucleus: delay 0.000 sec
Pulse 90.0 degrees
Avg. time 5.000 sec
Width 21146.7 Hz
N repetitions

RESOLUTION 60, 699.78474065 MHz
DATA PROCESSING
Line broadening 3.3 Hz
FT size 1024
Total time 5 min 49 sec

S32
Sample Name: 
Data Collected on: 5/20/2012
Archive directory: 
Sample directory: 
File: 1ISE9991.M
Pulse Sequence: PHOTON (x2pul)
Acq. Time: 20 sec
Data collected on: May 20 2012

Temp. 293 C / 298.1 K
Operator: aldo
Haize: delay 0.592 sec
Pulse: 90.0 degrees
Ann. time 3.000 sec
Sample: 31165.7 Hz
9 repetitions
Gains: RX: 699.786704 MHz
DATA PROCESSING
Line broadening 3.3 Hz
FT size 131072
Total time 5 min 43 sec

9 8 7 6 5 4 3 2 1 ppm

5.74 3.00 3.02
2.01

S34
Sample Name:

Data Collected on: 13-Apr-2013
Archive directory:

Sample directory:

Filepath: S353999R.13C

Pulse Sequence: CARBON (x2ppm)
Acoustic: ndc3

Data collected on: May 20 2012

Temp: 28.5 °C / 298.1 K
Operator: shake

Delay: delay 0.100 sec
Pulse 90.0 degrees
Acq. time 1.400 sec
Width 2.8442 3 Hz

120 repetitions

DECOUPLING: 01. 70.750067 MHz
DECOUPLING: 01. 69.750275 MHz

Power 25.0 W
continuously on

DATA PROCESSING
Line broadening 1.0 Hz
FT size 1024
Total time 16 min
Sample Name: IS590150_major_13C

Data Collected on: 29-Mar-15 11:01:24

Sample directory: IS590150_major_13C

Pulse Sequence: CARAQN (x2pul)

Data collected on: May 25 2012

Operator: sharon

Data Collected on: 29-Mar-15 11:01:24

Sample Name: IS590150_major_13C

Pulse Sequence: CARAQN (x2pul)

Data collected on: May 25 2012

Operator: sharon
minor isomer (with a small amount of major isomer)
The sample collected on May 25, 2012, contains a minor isomer (with a small amount of major isomer).

Sample Name: HNOMe

Data Collected on: 20.06.2012, 14:28

Pulse Sequence: CARNOX x2qpu

Data Set: 061212_r1

Operator: sherena

Save: delay 0.138 sec

Pulse 45.0 degrees

Aver. Time 2.421 sec

Width 2032.0 Hz

2100 repetitions

OVERLINE C: 100.64245 Hz

OVERLINE H: 399.3391 Hz

Power 67 dB

Data Processing:

Line broadening 1.0 Hz

PT size 128\times128

Total time 12 min
Sample Name:  
Data Collected on:  
Sample directory:  
File path:  

Pulse Sequence: PHOTON (n2pul)  
Acquisition:  
Data collected on: May 4 2012  

Temp. 29.5 C / 298.1 K  
Operator:  

Relax. delay 0.600 sec  
Pulse 60.0 degrees  
Res. time 2000 sec  
Width 1116.7 Hz  
4 repetitions  

Chemical shift 6.09 7.89 8.69 9.89 10.69 MHz  
Data Processing  
Line broadening 3.2 Hz  
FT size 121872  
Total time 8 min 24 sec
Sample Name: 
Data Collected on: 
Archive directory: 
Sample directory: 
File Name: S41.png

Pulse Sequence: CARBON (z-spulse)
Acq. time: unknown
Data collected on: May 10 2012

Temp. 25.5 °C / 298.1 K
Operator: unknown
Delay: 0.100 sec
Pulse 90° degrees
Widh: 1.000 sec

4965 repetitions
GAIN UNITS 0.179, 0.256, 0.4062 MHz
DESCRIPT: 01, 0.69, 0.44, 0.22 MHz
Power of 0W
continuously on

DATA PROCESSING
Line broadening 1.0 Hz
FT size 1024
Total time 15 min

ppm
Sample Name:
Data Collected on: 2010-05-10
Archive directory: 
Sample directory: 
File Name: S43_NO_CF3
Pulse Sequence: CARBOC (x2pul)
Acquisition: 90-152
Data collected on: May 12 2012
Temp. -23.5 C / 244.5 K
Operator: sharoe
Relax: delay 0.150 sec
Pulse 90.0 degrees
Ampl. time 1.650 sec
Width 0.882 Hz
-766 experiments
DEGREASE C13: 178.4930610 MHz
DEGREASE Si: 69.7657754 MHz
Power off after
continuously on
WAALS-16 unlocked
DATA PROCESSING
Line broadening 1.0 Hz
FT noise 10153 2
Total time 15 min

220 200 180 160 140 120 100 80 60 40 20 0 ppm

S43
Sample Name:  
Data Collected on:  
Archive directory:  
Sample directory:  
Procedure:  

Pulse Sequence: FLUXDME (z2p1) 
Acquire:  
Data collected on:  

Temp.  
Operator:  
Relay:  
Pulse  
Ampl. time:  
Width:  
16 repetitions  
Sample:  
PF spin:  
Total time:  

Sample Name: 12250912_s1063_l3C
Data Collected on: 01-mar-2013
Archive directory:
Sample directory: 12250912_s1063_l3C
Pulse Sequence: CAR40 (Spip)
Acquisition: n3n2j
Data collected on: Jan 2 2013
Temp: 293.2 K / 29.3 °C
Operator: ashros
Delay: 0.153 sec
Pulse: 80.0 degrees
Amplitude: 1.000 sec
Width: 20480.0 Hz
4096 repetitions
RESOLVE C13 176.463560 MHz
DECOUPLE H1 699.752275 MHz
Power: 34 dB
continuously on
WAGS-16 modulated
DATA PROCESSING
Line broadening 1.0 Hz
FT scale 1024732
Total time 1 hr. 55 min
S47
Sample Name:

Data Collected on:

Archive directory:

Sample directory:

Pulse Sequence: PHOTON (x2spin)

Data collected on: May 4, 2012

Temp. 29.5 °C / 298.1 K

Operator: sharon

Mains: delay 0.939 sec

Pulse 45.0 degrees

Acq. time 3.000 sec

Width 11.110 Hz

8 repetitions

DATA PROCESSING

Line broadening 3.0 Hz

PT size 131872

Total time 6 min 45 sec
Sample Name: 
Data Collected on: 20-may-2012 
Archive directory: 
Sample directory: 
File Name: S499908_13C 
Pulse Sequence: CARBON (z2pul) 
Acquire: spec1 
Data collected on: May 4 2012 

Temp. 29.5 C / 298.1 K 
Operator: sharon 

Wait: delay 0.000 sec 
Pulse 10.0 degrees 
Anq time 1.400 sec 
Width 2.181 s sec 
1050 repetitions 

CARBON 13C 170.250677 MHz 
DECOUPL 81 699.742754 MHz 
Power 45 kw 
continuously on 

DATA PROCESSING 
Line broadening 1.0 Hz 
FT size 163872 
Total time 35 min
Sample Name:  

Data Collected on:  

Archive directory:  

Sample directory:  

File:  

Pulse Sequence:  

Acquisition:  

Data collected on:  

Temp:  

Operator:  

Relax:  

Pulse:  

Acq. time:  

Width:  

N repetitions:  

DATA PROCESSING:  

FT size:  

Total time:  

ppm:
Sample Name: 1H0001C
Data Collected on: 2012-March-12
Archive directory: 1H0001C
Sample directory: 1H0001C
File Name: 1H0001C
Pulse Sequence: CASHD (c2pu1)
Instrument: n2pu1
Data collected on: 2012-March-12

Temp. 30.0 °C / 298.1 K
Operator: sharon
Relaxation delay 0.100 sec
Pulse 90.0 degrees
Acq. time 1.400 sec
Width n4242 5 Hz
96 repetitions
DESWEEP 1.0, 179.913606 Hz
DESWEEP 0.1, 699.762772 Hz
Power of 8 kHz
continuously on
WALK-16 modulated
DATA PROCESSING
Line broadening 1.0 Hz
FT size 16384
Total time 2 min 30 sec
Sample Name: 1k89n98.18
Data Collected on: 20-05-2012
Archive directory: ...
Sample directory: ...
File Name: 1k89n98.18
Pulse Sequence: PHOTON (z2spin)
Acq. date: 2012
Data collected on: May 22 2012
Temp. 29.5 C / 298.1 K
Operator: abraham
Pulse delay 0.050 sec
Pulse 90.0 degrees
Avg. time 600 sec
N8 repetitions
Spectrum 81, 699.7867683 MHz
DATA PROCESSING
Line broadening 3.3 Hz
FT size 131072
Total time 8 min 43 sec