Electronic Supplementary Information for

Efficient Palladium-Catalyzed Synthesis of Substituted Indoles Employing a New (Silanyloxyphenyl)phosphine Ligand

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General Considerations:

Unless otherwise noted, all reactions were set up inside a dinitrogen-filled inert atmosphere glovebox and worked up in air using benchtop procedures. Toluene used in the synthesis of L1 and the catalytic transformations was deoxygenated by sparging with dinitrogen followed by passage through an mBraun double column solvent purification system packed with alumina and copper-Q5 reactant. [Pd(cinnamyl)Cl]$_2$, di(1-adamantyl)phosphine, and (4-bromophenoxy)triisopropylsilane were prepared according to literature protocols. The 2-alkynylbromoarene substrates were prepared by using literature synthetic protocols involving Sonogashira reactions of aryl iodides or bromides with appropriate terminal alkyne precursors. Reactions employing methylamine were conducted using commercially available 2.0 M solutions of methylamine in tetrahydrofuran. C$_6$D$_6$ was degassed by using at least three repeated freeze-pump-thaw cycles and stored over 4 Å molecular sieves for 24 h prior to use. All other chemicals were obtained from commercial sources in high purity and used as received. Column chromatography was carried out using Silicycle SiliaFlash 60 with particle size 40-63 μm (230-400 mesh). Gas chromatography (GC) data were obtained on a Shimadzu GC-2014 equipped with a SGE BP-5 30 m, 0.25 mm I.D. column. In the case where conversions and yields are given on the basis of gas chromatography experiments, the data were corrected by calibration using dodecane as an internal standard and product identity was confirmed by comparison with authentic samples. All $^1$H, $^{13}$C, and $^{31}$P NMR characterization data were collected at 300 K on a Bruker AV-500 spectrometer operating at 500.1, 125.8, and 202.5 MHz (respectively) with chemical shifts reported in parts per million downfield of SiMe$_4$ (for $^1$H and $^{13}$C) or 85% H$_3$PO$_4$ in D$_2$O (for $^{31}$P). NMR data were acquired with the technical assistance of Dr. Michael Lumsden (NMR-3, Dalhousie University), while mass spectrometric data were acquired by Mr. Xiao Feng (Mass Spectrometry Laboratory, Dalhousie University).

Synthesis and characterization of L1:

\[
\text{Br} \quad \text{Si} \quad \text{O} \quad \text{C} \quad \text{C} \quad \text{C} \quad \text{C} \quad \text{C} \\
\]

**Step 1.** To an oven dried screw-capped vial was added a magnetic stir bar, imidazole (629 mg, 9.2 mmol), 2-bromophenol (536 μL, 4.6 mmol) and 9.0 mL of methylene chloride. Triisopropylchlorosilane (1.1 mL, 5.1 mmol) was then added dropwise with constant magnetic stirring. The vial was sealed under dinitrogen with a cap containing a PTFE septum and was removed from the glovebox and stirred vigorously at ambient temperature. Full consumption of starting material and quantitative formation of one new product was observed after 16 h by removing a 50 μL aliquot of the reaction mixture by syringe and filtering through a Celite plug, followed by dilution of the eluent with methylene chloride for GC and thin layer chromatography (TLC) analysis. At this point, the reaction mixture was diluted with ethyl acetate (100 mL) and water (50 mL). The layers were separated and the organic layer was washed with water (3 x 50
The organic layer was dried over sodium sulfate, filtered and concentrated to afford a light yellow oil. The crude oil was purified by column chromatography with hexanes to afford the target product as a colorless oil (1.3 g, 93%). $^1$H NMR (CDCl$_3$): $\delta$ 7.52 (dd, $J = 7.9$ Hz, 1.7 Hz, 1H), 7.15 (m, 1H), 6.90 (dd, $J = 8.1$ Hz, 1.4 Hz, 1H), 6.80 (m, 1H), 1.34 (sept, $J = 7.4$ Hz, 3H), 1.14 (d, $J = 7.4$ Hz, 18H); $^{13}$C NMR (CDCl$_3$) $\delta$ 153.3, 133.8, 128.5, 122.3, 120.0, 115.4, 18.3, 13.3. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^7$

**Step 2.** To an oven dried screw-capped vial was added a stir bar, (2-bromophenoxy)-triisopropylsilane (703 mg, 2.1 mmol), Pd(OAc)$_2$ (14.4 mg, 0.0640 mmol, 3 mol%), 1,1'-bis(diisopropylphosphino)ferrocene (31.3 mg, 0.0747 mmol, 3.5 mol%), NaOt-Bu (246 mg, 2.5 mmol) and 5 mL of toluene. The resulting suspension was stirred until apparently homogeneous and then di(1-adamantyl)phosphine (645 mg, 2.1 mmol) was added. The vial was sealed under dinitrogen with a cap containing a PTFE septum, removed from the glovebox, placed in a temperature-controlled aluminum heating block set at 110 °C and vigorous magnetic stirring was initiated. After 12 h, $^{31}$P NMR analysis of the reaction mixture confirmed the consumption of di(1-adamantyl)phosphine and the quantitative formation of one new phosphorus-containing product. The vial containing the reaction mixture was then cooled and opened to air, and on the benchtop the reaction mixture was then filtered through a plug of silica, which in turn was washed with methylene chloride. Removal of the solvent from the combined eluent afforded the target product, which was further purified by recrystallization from cold hexanes as a beige powder (950 mg, 83%). $^1$H NMR (CDCl$_3$): $\delta$ 7.65 (dt, $J_{HH} = 7.65$ Hz, 1.7 Hz, 1H), 7.18 (m, 1H), 6.88 (m, 1H), 6.80 (m, 1H), 1.96 (m, 6H), 1.90 (m, 12H), 1.67 (s, 12H), 1.34 (sept, $J = 7.6$ Hz, 3H), 1.15 (d, $J_{HH} = 7.5$ Hz, 18H); $^{13}$C NMR (CDCl$_3$) $\delta$ 161.4 (d, $J_{P,C} = 20.1$ Hz), 137.7, 129.7, 125.6 (d, $J_{P,C} = 26.4$ Hz) 119.2, 118.7, 42.1 (d, $J_{P,C} = 13.8$ Hz), 37.5, 37.0 (d, $J_{P,C} = 27.7$ Hz), 29.3 (d, $J_{P,C} = 7.5$ Hz), 18.6, 13.6; $^{31}$P{$^1$H} NMR (CDCl$_3$): $\delta$ 12.2. HRMS (ESI/[M+H]$^+$) calcd. for C$_{35}$H$_{56}$O$_1$P$_1$Si$_1$: 551.3833. Found: 551.3835. **Note:** Two control experiments were performed using L1 to investigate if O-Si bond cleavage occurred readily under catalytic conditions. In the first control experiment, a toluene solution of L1 was heated at 120 °C in the presence of 60 equivalents of KOt-Bu for 14 h and using trimesitylphosphine as an internal standard; no ligand degradation was observed by use of $^{31}$P NMR analysis. In the second control experiment a catalytic reaction was run using similar conditions to those reported herein but at a 50 mol% catalyst loading which would allow for loss of the silane moiety from L1 (e.g. as triisopropylsilyl chloride) to be observed by GC analysis; no such ligand degradation was observed.
Synthesis and characterization of L1’:

To an oven dried screw-capped vial was added a stir bar, (4-bromophenoxy)triisopropylsilane (844 mg, 2.5 mmol), Pd(OAc)$_2$ (17.4 mg, 0.0768 mmol, 3 mol%), 1,1’-bis(diisopropylphosphino)ferrocene (37.5 mg, 0.0896 mmol, 3.5 mol%), NaO$_{t}$-Bu (295 mg, 3.0 mmol) and 6 mL of toluene. The resulting suspension was stirred until apparently homogeneous and then di(1-adamantyl)phosphine (774 mg, 2.5 mmol) was added. The vial was sealed under dinitrogen with a cap containing a PTFE septum, removed from the glovebox, placed in a temperature-controlled aluminum heating block set at 110 °C and vigorous magnetic stirring was initiated. After 8 h, $^{31}$P NMR analysis of the reaction mixture confirmed the consumption of di(1-adamantyl)phosphine and the quantitative formation of one new phosphorus-containing product. The vial containing the reaction mixture was allowed to cool to room temperature and was brought back inside the glovebox for workup under inert atmosphere; attempts to isolate and purify L1’ under the benchtop conditions that proved effective for L1 resulted in degradation of L1’. The reaction mixture was filtered through a plug of Celite and alumina, which in turn was washed with methylene chloride. Removal of the solvent from the combined eluent afforded the target product, which was further purified by washing with cold pentane (3 x 3 mL) to give a beige powder (986 mg, 72 %). $^{1}$H NMR (C$_6$D$_6$): δ 7.73-7.70 (m, 2H), 6.95 (br m, 2H), 2.11-2.03 (m, 12H), 1.87 (br s, 6H), 1.64 (s, 12H), 1.19-1.12 (m, 21H); $^{13}$C NMR (C$_6$D$_6$) δ 158.0, 142.6 (br), 137.1 (br), 127.6 (d, $J_{P,C}$ = 30.2 Hz), 120.2, 120.1, 42.8 (d, $J_{P,C}$ = 12.6 Hz), 37.9, 37.4 (d, $J_{P,C}$ = 23.9 Hz), 29.9 (d, $J_{P,C}$ = 7.5 Hz), 18.7, 13.6; $^{31}$P{$_1^H$} NMR (C$_6$D$_6$): δ 38.5. HRMS (ESI/[M+H]$^+$) calcd. for C$_{35}$H$_{56}$O$_1$P$_1$Si$_1$: 551.3833. Found: 551.3822.

Representative catalytic protocol (synthesis of 2):

To an oven dried screw-capped vial was added a stir bar, [Pd(cinnamyl)Cl]$_2$ (3.2 mg, 0.0063 mmol, 1.25 mol%), L1 (6.8 mg, 0.013 mmol, 2.5 mol%), and 2.0 mL of toluene. The mixture was then stirred magnetically for 2 minutes at which point KO$_{t}$-Bu (168 mg, 1.5 mmol) was added. The mixture was then stirred briefly followed by the addition of 1-bromo-2-(phenylethynyl)benzene (128.6 mg, 0.5 mmol) in 3 x 1.0 mL portions of toluene, as well as 1-adamantylamine (83.1 mg, 0.55 mmol). The vial was sealed under dinitrogen with a cap containing a PTFE septum, removed from the glovebox, placed in a temperature-controlled aluminum heating block set at 90 °C and vigorous magnetic stirring was initiated. Reaction progress was monitored by use of TLC or GC methods and after complete consumption of the aryl bromide (12 h), the reaction mixture was cooled, diluted with ethyl acetate (50 mL) and
washed with water (50 mL). The layers were separated and the organic layer was washed with water (3 x 50 mL). The organic layer was dried over sodium sulfate, filtered and concentrated to afford a brown solid. The crude solid was purified by column chromatography with a hexanes:ethyl acetate (100:1) eluent system to afford 1-Adamantan-1-yl-2-phenyl-1H-indole (2) as a white crystalline solid (146 mg, 89 %).

**Synthesis and characterization of reaction products:**

(1) **1-methyl-2-phenyl-1H-indole.**

Representative catalytic protocol A was followed, however, addition via syringe of methylamine as a 2.0 M solution in tetrahydrofuran (0.300 mL, 0.55 mmol) was performed outside of the glovebox. $^1$H NMR (CDCl$_3$): $\delta$ 7.68 (d, $J$ = 7.8 Hz, 1H), 7.57-7.55 (m, 2H), 7.53-7.49 (m, 2H), 7.44 (m, 1H), 7.41 (d, $J$ = 8.5 Hz, 1H), 7.30 (m, 1H), 7.20 (m, 1H), 6.62 (s, 1H), 3.79 (s, 3H); $^{13}$C{$^1$H}NMR (CDCl$_3$): $\delta$ 141.9, 138.7, 133.2, 129.7, 128.8, 128.3, 128.2, 122.0, 120.8, 120.2, 109.9, 102.0, 31.5. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^8$

(2) **1-Adamantan-1-yl-2-phenyl-1H-indole.**

$^1$H NMR (CDCl$_3$): $\delta$ 7.85 (d, $J$ = 8.4 Hz, 1H), 7.59 (dd, $J$ = 7.7 Hz, 0.6 Hz, 1H), 7.44-7.40 (m, 2H), 7.37-7.33 (m, 3H), 7.19-7.15 (m, 1H), 7.12-7.09 (m, 1H), 6.30 (s, 1H), 2.30 (d, $J$ = 5.0 Hz, 6H), 2.11 (s, 3H), 1.72-1.65 (m, 6H); $^{13}$C{$^1$H}NMR (CDCl$_3$): $\delta$ 141.8, 139.9, 136.8, 130.5, 129.5, 127.7, 127.6, 120.9, 120.6, 119.6, 116.1, 107.0, 61.2, 43.7, 36.5, 30.6. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^9$

(3) **1,2-Diphenyl-1H-indole.**

$^1$H NMR (CDCl$_3$): $\delta$ 7.77(m, 1H), 7.46 (m, 1H), 7.41 (m, 1H), 7.37 (m, 1H), 7.35-7.28 (m, 7H), 7.27-7.23 (m, 2H), 6.88 (d, $J$ = 0.7 Hz, 1H); $^{13}$C{$^1$H}NMR (CDCl$_3$): $\delta$ 141.0, 139.3, 138.8, 132.8,
129.6, 129.2, 128.6, 128.5, 127.6, 127.5, 122.7, 121.0, 120.8, 111.0, 104.0. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{10}$

(4) 2-phenyl-1-(2,6-di-iso-propylphenyl)-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.81 (d, $J = 7.8$ Hz, 1H), 7.57 (t, $J = 7.7$ Hz, 1H), 7.41–7.39 (m, 3H), 7.37 (s, 1H), 7.31-7.21 (m, 5H), 7.08 (s, 1H), 6.97 (d, $J = 8.3$ Hz, 1H), 2.47 (sept., $J = 6.9$ Hz, 2H), 1.08 (d, $J = 6.8$ Hz, 6H), 0.96 (d, $J = 6.8$ Hz, 6H); $^{13}$C {$^1$H} NMR (CDCl$_3$): $\delta$ 148.2, 141.3, 140.1, 134.0, 132.8, 129.8, 128.5, 128.1, 128.0, 127.6, 124.6, 122.3, 120.7, 120.7, 111.5, 102.2, 28.5, 25.4, 23.4. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^9$

(5) 1-tert-Butyl-2-phenyl-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.74 (dd, $J = 8.5$ Hz, 0.7 Hz, 1H), 7.59 (d,d, $J = 7.6$ Hz, 0.4 Hz, 1H), 7.43-7.42 (m, 2H), 7.38-7.35 (m, 3H), 7.19 (m, 1H), 7.12 (m, 1H), 6.32 (d, $J = 0.7$ Hz, 1H), 1.61 (s, 9H); $^{13}$C {$^1$H} NMR (CDCl$_3$): $\delta$ 142.2, 138.5, 137.6, 130.5, 129.3, 127.9, 127.7, 121.0, 120.8, 119.7, 115.4, 106.5, 59.2, 32.4. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{11}$

(6) 1-Naphthalen-1-yl-2-phenyl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 8.01-7.98 (m, 2H), 7.83 (dt, $J = 7.9$ Hz, 1.0 Hz, 1H), 7.59-7.52 (m, 3H), 7.44 (m, 1H), 7.41 (m, 1H), 7.33-7.30 (m, 2H), 7.27(m, 1H), 7.19-7.14 (m, 4H), 7.03 (d, $J = 1$ Hz, 1H), 6.90 (dd, $J = 8.25$ Hz, 0.8 Hz, 1H); $^{13}$C {$^1$H} NMR (CDCl$_3$): $\delta$ 142.5, 140.6, 135.7, 134.7, 132.9, 131.7, 128.9, 128.6, 128.5, 128.4, 127.6, 127.5, 127.4, 126.9, 125.8, 124.0, 122.6, 121.0, 120.8, 111.6, 103.6.
In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{10}$

(7) 2-phenyl-1-(2,6-dimethyl)-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.74 (dd, $J = 6.7$ Hz, 1.4 Hz, 1H), 7.32-7.29 (m, 2H), 7.28-7.23 (m, 4H), 7.22-7.15 (m, 4H), 6.92 (s, 1H), 6.86 (d, $J = 7.8$ Hz, 1H), 1.91 (s, 6H); $^{13}$C{${^1}$H} NMR (CDCl$_3$): $\delta$ 140.8, 138.1, 137.7, 136.9, 133.1, 128.9, 128.8, 128.7, 127.8, 127.7, 122.5, 120.8, 120.7, 110.8, 102.5, 18.2. HRMS (ESI/[$\text{M}+\text{H}$]$^+$) calcd. for C$_{22}$H$_{20}$N$_1$: 298.1590. Found: 298.1279.

(8) 1-(4-Chloro-phenyl)-2-phenyl-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.72 (m, 1H), 7.42-7.40 (m, 2H), 7.31-7.27 (m, 6H), 7.24-7.20 (m, 4H), 6.83 (s, 1H); $^{13}$C{${^1}$H} NMR (CDCl$_3$): $\delta$ 140.9, 139.1, 137.4, 133.2, 132.5, 129.8, 129.5, 129.3, 128.7, 127.8, 122.9, 121.3, 121.0, 110.7, 104.5. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{12}$

(9) 2-Phenyl-1-(3-trifluoromethyl-phenyl)-1H-indole.

Column chromatography using a hexanes:ethyl acetate (20:1) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 7.71 (m, 1H), 7.61 (d, $J = 7.9$ Hz, 1H), 7.58 (s, 1H), 7.53 (d, $J = 7.9$ Hz, 1H), 7.39 (d, $J = 7.9$ Hz, 1H), 7.31-7.22 (m, 7H), 6.84 (d, $J = 0.4$ Hz, 1H). $^{13}$C{${^1}$H} NMR (CDCl$_3$): $\delta$ 140.9, 139.5, 138.9, 132.3, 132.1 ($J_{C,F} = 66$ Hz), 131.5, 130.2, 129.3, 128.8, 128.7, 128.0, 125.0 ($J_{C,F} = 4$ Hz), 124.1 ($J_{C,F} = 4$ Hz), 123.1, 121.8 ($J_{C,F} = 272$ Hz), 121.5, 121.2, 110.5, 104.9. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{10}$
(10) 1-(4-tert-Butyl-phenyl)-2-phenyl-1\textit{H}-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.73 (m, 1H), 7.47-7.44 (m, 2H), 7.36-7.26 (m, 6H), 7.23-7.20 (m, 4H), 6.84 (s, 1H), 1.40 (s, 9H); $^{13}$C\{\textit{H}\} NMR (CDCl$_3$): $\delta$ 150.5, 141.1, 139.4, 136.1, 133.0, 129.1, 128.5, 128.4, 127.8, 127.5, 126.4, 122.5, 120.8, 120.8, 111.1, 103.8, 35.0, 31.8. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.\textsuperscript{13}

(11) 1-(4-Methyl-piperazin-1-yl)-2-phenyl-1\textit{H}-indole.

Column chromatography using a dichloromethane:ethyl acetate (6:4) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 7.75 (d, $J$ = 8.2 Hz, 1H), 7.68-7.67 (m, 2H), 7.63 (d, $J$ = 7.7 Hz, 1H), 7.46-7.43 (m, 2H), 7.37 (m, 1H), 7.19 (m, 1H), 7.14 (m, 1H), 6.54 (s, 1H), 4.01 (dt, $J$ = 2.2 Hz, 10.9 Hz, 2H), 3.12 (d, $J$ = 11.1 Hz, 2H), 2.83 (d, $J$ = 11.8 Hz, 2H), 2.37 (s, 3H), 2.31 (dt, $J$ = 2.6 Hz, 11.2 Hz, 2H); $^{13}$C\{\textit{H}\} NMR (CDCl$_3$): $\delta$ 140.7, 135.7, 132.7, 129.5, 128.1, 127.8, 127.3, 121.7, 121.4, 120.3, 112.1, 100.2, 55.6, 52.1, 46.3. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.\textsuperscript{14}

(12) 1,5-Dimethyl-2-phenyl-1\textit{H}-indole.

Representative catalytic protocol A was followed, however, addition via syringe of methylamine as a 2.0 M solution in tetrahydrofuran (0.300 mL, 0.55 mmol) was performed outside of the glovebox. $^1$H NMR (CDCl$_3$): $\delta$ 7.56-7.53 (m, 2H), 7.51-7.48 (m, 2H), 7.46 (m, 1H), 7.42 (m, 1H), 7.29 (d, $J$ = 8.3 Hz, 1H), 7.11 (dd, $J$ = 8.4 Hz, 1.3 Hz, 1H), 6.52 (d, $J$ = 0.7 Hz, 1H), 3.76 (s, 3H), 2.51 (s, 3H); $^{13}$C\{\textit{H}\} NMR (CDCl$_3$): $\delta$ 141.9, 137.2, 133.3 129.6, 129.4, 128.5, 128.1, 123.6, 120.5, 109.6, 101.5, 31.5, 21.8. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.\textsuperscript{15}
(13) 1-Adamantan-1-yl-5-methyl-2-phenyl-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.72 (d, $J = 8.6$ Hz, 1H), 7.42-7.40 (m, 2H), 7.37 (s, 1H), 7.34-7.33 (m, 3H), 6.99 (d, $J = 8.6$ Hz, 1H), 6.21 (s, 1H), 2.44 (s, 3H), 2.28 (d, $J = 2.3$ Hz, 6H), 2.09 (s, 3H), 1.71-1.64 (m, 6H); $^{13}$C{$_1^H$} NMR (CDCl$_3$): $\delta$ 142.0, 139.1, 135.2, 130.5, 129.8, 128.8, 127.6, 127.5, 122.2, 120.6, 115.7, 106.5, 61.0, 43.7, 36.6, 30.5, 21.4. HRMS (ESI/[M+H]$^+$) calcd. for C$_{25}$H$_{28}$N$_1$: 342.2216. Found: 342.2219.

(14) 1-(2,6-Dimethyl-phenyl)-5-methyl-2-phenyl-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.57 (s, 1H), 7.34-7.26 (m, 6H), 2.55 (s, 3H), 1.95 (s, 6H); $^{13}$C{$_1^H$} NMR (CDCl$_3$): $\delta$ 140.8, 137.8, 137.0, 136.5, 133.2, 129.9, 128.8, 128.7, 128.6, 127.7, 127.6, 124.1, 120.5, 110.5, 102.0, 21.8, 18.1. HRMS (ESI/[M+H]$^+$) calcd. for C$_{23}$H$_{22}$N$_1$: 312.1747. Found: 312.1753.

(15) 6-Fluoro-1-methyl-2-phenyl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. Representative catalytic protocol A was followed, however, addition via syringe of methylamine as a 2.0 M solution in tetrahydrofuran (0.300 mL, 0.55 mmol) was performed outside of the glovebox. $^1$H NMR (CDCl$_3$): $\delta$ 7.54-7.49 (m, 4H), 7.44 (m, 1H), 3.76 (s, 3H), $^{13}$C{$_1^H$} NMR (CDCl$_3$): $\delta$ 158.3 (d, $J_{C,F} = 234.3$ Hz), 143.5, 135.3, 132.8, 129.7, 128.9, 128.5, 128.4, 110.5 (d, $J_{C,F} = 12.6$ Hz), 110.2 (d, $J_{C,F} = 26.3$ Hz), 105.5 (d, $J_{C,F} = 23.4$ Hz), 101.9 (d, $J_{C,F} = 23.4$ Hz), 31.7. HRMS (ESI/[M+H]$^+$) calcd. for C$_{15}$H$_{13}$F$_1$N$_1$: 226.1027. Found: 226.1026.
(16) 1-Adamantan-1-yl-6-fluoro-2-phenyl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 7.75 (dd, $J = 9.2$ Hz, 4.3 Hz, 1H), 7.42-7.40 (m, 2H), 7.37-7.35 (m, 3H), 7.21 (dd, $J = 9.2$ Hz, 2.7 Hz, 1H), 6.91 (dt, $J = 2.8$ Hz, 9.1 Hz, 1H), 6.25 (d, $J = 0.6$ Hz, 1H), 2.27 (d, $J = 2.9$ Hz, 6H), 2.11 (s, 3H). 1.69-1.66 (m, 6H); 13C{1H} NMR (CDCl$_3$): $\delta$ 157.6 (d, $J_{C,F} = 235.4$ Hz), 143.5, 138.6, 133.4, 129.9 (d, $J_{C,F} = 9.8$ Hz), 127.9, 127.6, 116.6 (d, $J_{C,F} = 9.1$ Hz), 108.8 (d, $J_{C,F} = 25.4$ Hz), 106.8 (d, $J_{C,F} = 3.8$ Hz), 105.3 (d, $J_{C,F} = 22.4$ Hz), 61.4, 43.8, 36.5, 30.5. HRMS (ESI/[M+H]$^+$) calcd. for C$_{24}$H$_{25}$F$_1$N$_1$: 346.1966. Found: 346.1954.

(17) 1-(2,6-Diisopropyl-phenyl)-6-fluoro-2-phenyl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 7.54 (t, $J = 7.7$ Hz, 1H), 7.41 (dd, $J = 9.4$ Hz, 2.4 Hz, 1H), 7.36-7.33 (m, 4H), 7.29-7.24 (m, 3H), 6.99 (d, $J = 0.7$ Hz, 1H), 6.93 (dt, $J = 2.5$ Hz, 9.1 Hz, 1H), 6.83 (dd, $J = 8.9$ Hz, 4.5 Hz, 1H), 2.40 (sept, $J = 6.9$ Hz, 2H), 1.04 (d, $J = 6.9$ Hz, 6H), 0.93 (d, $J = 6.9$ Hz, 6H); 13C{1H} NMR (CDCl$_3$): $\delta$ 158.6 (d, $J_{C,F} = 235.0$ Hz), 148.1, 142.9, 136.7, 133.8, 132.5, 130.0, 128.5, 128.3, 128.1, 127.9, 124.7, 112.1 (d, $J_{C,F} = 26.3$ Hz), 110.6 (d, $J_{C,F} = 25.1$ Hz), 105.4 (d, $J_{C,F} = 23.6$ Hz), 102.1 (d, $J_{C,F} = 4.4$ Hz), 28.5, 25.4, 23.4. HRMS (ESI/[M+Na]$^+$) calcd. for C$_{26}$H$_{26}$F$_1$N$_1$Na$_1$: 394.1941. Found: 394.1946.

(18) 1-Adamantan-1-yl-1H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.74 (m, 1H), 7.64 (d, $J = 7.8$ Hz, 1H), 7.32 (d, $J = 3.4$ Hz, 1H), 7.14 (m, 1H), 7.07 (m, 1H), 6.46 (dd, $J = 8.3$ Hz, 0.6 Hz, 1H), 2.38 (d, $J = 2.9$ Hz, 6H), 2.29 (s, 3H), 1.86-1.81 (m, 6H); 13C{1H} NMR (CDCl$_3$): $\delta$ 134.8, 130.6, 124.6, 121.6, 120.6, 119.1, 114.1, 100.4,
57.0, 42.5, 36.8, 30.2. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{16}$

(19) 1-Methyl-2-propyl-$^1$H-indole.

Representative catalytic protocol A was followed, however, addition via syringe of methylamine as a 2.0 M solution in tetrahydrofuran (0.300 mL, 0.55 mmol) was performed outside of the glovebox. $^1$H NMR (CDCl$_3$): $\delta$ 7.54 (d, $J = 9.2$ Hz, 1H), 7.28 (s, 1H), 7.15 (m, 1H), 7.07 (m, 1H), 6.26 (d, $J = 0.7$ Hz, 1H), 3.67 (s, 3H), 2.72 (t, $J = 7.6$ Hz, 2H), 1.76 (m, 2H), 1.06 (t, $J = 7.3$ Hz, 3H); $^{13}$C{$^1$H} NMR (CDCl$_3$): $\delta$ 141.6, 137.8, 128.4, 120.9, 120.2, 119.6, 109.1, 99.2, 29.7, 29.3, 22.4, 14.3. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.$^{17}$

(20) 1-Adamantan-1-yl-2-propyl-$^1$H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.77 (d, $J = 8.4$ Hz, 1H), 7.49 (m, 1H), 7.04 (m, 2H), 6.68 (s, 1H), 2.98 (t, $J = 7.7$ Hz, 2H), 2.56 (d, $J = 2.5$ Hz, 6H), 2.27 (s, 3H), 1.87-1.73 (m, 8H), 1.04 (t, $J = 7.3$ Hz, 3H). $^{13}$C{$^1$H} NMR (CDCl$_3$): $\delta$ 143.1, 136.8, 129.6, 120.3, 119.8, 118.8, 115.6, 103.4, 61.3, 42.6, 36.7, 34.7, 30.6, 24.4, 14.7. HRMS (ESI/[M+H]$^+$) calcd. for C$_{21}$H$_{28}$N$_1$: 294.2216. Found: 294.2218.

(21) 1-(2,6-Dimethyl-phenyl)-2-propyl-$^1$H-indole.

$^1$H NMR (CDCl$_3$): $\delta$ 7.65 (m, 1H), 7.32 (m, 1H), 7.26-7.23 (m, 2H), 7.13 (dt, $J = 1.0$ Hz, 7.1 Hz, 1H), 7.08 (m, 1H), 6.77 (m, 1H), 6.48 (d, $J = 0.9$ Hz, 1H), 2.39 (t, $J = 8.0$ Hz, 2H), 1.90 (s, 6H), 1.70 (m, 2H), 0.98 (t, $J = 7.35$ Hz, 3H); $^{13}$C{$^1$H} NMR (CDCl$_3$): $\delta$ 141.3, 138.1, 136.9, 136.0, 128.7, 128.6, 121.2, 119.9, 119.9, 100.8, 99.7, 29.1, 21.5, 17.6, 14.2. HRMS (ESI/[M+H]$^+$) calcd. for C$_{19}$H$_{22}$N$_1$: 264.1747. Found: 264.1747.
(22) 1-Methyl-2-thiophen-3-yl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. Representative catalytic protocol A was followed, however, addition via syringe of methylamine as a 2.0 M solution in tetrahydrofuran (0.300 mL, 0.55 mmol) was performed outside of the glovebox. $^1$H NMR (CDCl$_3$): $\delta$ 7.62 (dt, $J$ = 7.8 Hz, 0.9 Hz, 1H), 7.44 (m, 1H), 7.40 (m, 1H), 7.36 (m, 1H), 7.30 (m, 1H), 7.24 (m, 1H), 7.14 (m, 1H), 6.60 (d, $J$ = 0.7 Hz, 1H), 3.80 (s, 3H); $^{13}$C{$^1$H} NMR (CDCl$_3$): $\delta$ 138.4, 136.7, 133.7, 128.7, 128.0, 126.1, 123.5, 122.0, 120.7, 120.2, 109.8, 101.7, 31.4. In good agreement with previously reported $^1$H and $^{13}$C characterization data for the title compound.  

(23) 1-Adamantan-1-yl-2-thiophen-3-yl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 7.87 (d, $J$ = 8.5 Hz, 1H), 7.60 (dd, $J$ = 7.7 Hz, 0.6 Hz, 1H), 7.31 (m, 1H), 7.30 (m, 1H), 7.20 (m, 1H), 7.15 (dd, $J$ = 4.6 Hz, 1.5 Hz, 1H), 7.12 (m, 1H), 6.39 (s, 1H), 2.38 (d, $J$ = 2.7 Hz, 6H), 2.17 (s, 3H), 1.78-1.72 (m, 6H); $^{13}$C{$^1$H} NMR (CDCl$_3$): $\delta$ 138.5, 136.9, 136.0, 113.0, 129.3, 124.2, 124.1, 120.9, 120.8, 119.5, 116.0, 107.2, 61.1, 43.1, 36.6, 30.6. HRMS (ESI/[M+H]$^+$) calcd. for C$_{22}$H$_{24}$N$_1$S$_1$: 334.1624. Found: 334.1609.

(24) 1-(2,6-Dimethyl-phenyl)-2-thiophen-3-yl-1H-indole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. $^1$H NMR (CDCl$_3$): $\delta$ 7.69 (m, 1H), 7.34 (t, $J$ = 7.6 Hz, 1H), 7.23-7.22 (m, 4H), 6.93 (d, $J$ = 0.7 Hz, 1H), 6.81 (m, 1H), 6.59 (t, $J$ = 2.1 Hz, 1H), 1.87 (s, 6H); $^{13}$C{$^1$H} NMR (CDCl$_3$): $\delta$ 138.3, 137.7, 137.0, 135.6, 133.4, 129.2, 129.0, 128.4, 125.5, 122.6, 120.7, 120.2, 110.4, 101.7, 17.9. HRMS (ESI/[M+H]$^+$) calcd. for C$_{20}$H$_{18}$N$_1$S$_1$: 304.1154. Found: 304.1140.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 7.47-7.45 (m, 2H), 7.37-7.36 (m, 3H), 7.29 (m, 1H), 7.08 (d, \(J = 5.4\) Hz, 1H), 6.23 (d, \(J = 0.4\) Hz, 1H), 2.22 (d, \(J = 2.9\) Hz, 6H), 2.11 (s, 3H), 1.70-1.64 (m, 6H); \(^{13}\)C\{\(^1\)H\} NMR (CDCl\(_3\)): \(\delta\) 139.8, 139.0, 138.3, 131.5, 127.8, 127.5, 124.0, 121.2, 115.9, 104.4, 61.7, 44.2, 36.4, 30.4. HRMS (ESI/[M+H]+) calcd. for C\(_{22}\)H\(_{24}\)N\(_1\)S\(_1\): 334.1624. Found: 334.1632.

(26) 4-(2,6-Dimethyl-phenyl)-5-phenyl-4\(^H\)-thieno[3,2-b]pyrrole.

Column chromatography using a hexanes:ethyl acetate (50:1) eluent system. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 7.27 (m, 1H), 7.24-7.19 (m, 4H), 7.16-7.15 (m, 2H), 7.09 (d, \(J = 5.2\) Hz, 1H), 6.83 (s, 1H), 6.59 (d,d, \(J = 5.2\) Hz, 0.3 Hz, 1H), 1.98 (s, 6H); \(^{13}\)C\{\(^1\)H\} NMR (CDCl\(_3\)): \(\delta\) 141.8, 139.4, 138.0, 137.0, 133.5, 128.7, 128.6, 127.0, 126.9, 124.0, 123.8, 111.4, 101.3, 18.2. HRMS (ESI/[M+H]+) calcd. for C\(_{20}\)H\(_{18}\)N\(_1\)S\(_1\): 304.1154. Found: 304.1152.

(27) 1-Adamantan-1-yl-2-phenyl-1\(^H\)-pyrrolo[2,3-b]pyridine.

Column chromatography using a hexanes:ethyl acetate (20:1) eluent system. Representative catalytic protocol A was followed, however, 2.5 mol% [Pd(cinnamyl)Cl]\(_2\) (6.4 mg, 0.013 mmol) and 5 mol% \(\text{L1}\) (13.6 mg, 0.026 mmol) was used; reaction was also performed at 110 ºC. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 8.32 (dd, \(J = 4.6\) Hz, 1.7 Hz, 1H), 7.80 (dd, \(J = 7.8\) Hz, 1.7 Hz, 1H), 7.44-7.42 (m, 2H), 7.37-7.35 (m, 3H), 7.03 (dd, \(J = 7.8\) Hz, 4.6 Hz, 1H), 6.21 (s, 1H), 2.48 (d, \(J = 2.6\) Hz, 6H), 2.07 (s, 3H), 1.75-1.62 (m, 6H); \(^{13}\)C\{\(^1\)H\} NMR (CDCl\(_3\)): \(\delta\) 150.5, 142.3, 141.3, 138.4, 130.6, 128.1 127.7, 121.3, 115.9, 104.2, 62.5, 43., 36.6, 30.6. HRMS (ESI/[M+H]+) calcd. for C\(_{23}\)H\(_{25}\)N\(_2\): 329.2012. Found: 329.2010.
(28) 1-(2,6-Diisopropyl-phenyl)-2-phenyl-1H-pyrrolo[2,3-b]pyridine.

Column chromatography using a hexanes:ethyl acetate (20:1) eluent system. Representative catalytic protocol A was followed, however, 2.5 mol% [Pd(cinnamyl)Cl]₂ (6.4 mg, 0.013 mmol) and 5 mol% L1 (13.6 mg, 0.026 mmol) was used; reaction was also performed at 110 °C. ¹H NMR (CDCl₃): δ 8.40 (dd, J = 4.7 Hz, 1.5 Hz, 1H), 7.99 (dd, J = 7.8 Hz, 1.6 Hz, 1H), 7.49 (t, J = 7.8 Hz, 1H), 7.33-7.32 (m, 2H), 7.30-7.28 (m, 2H), 7.24-7.23 (m, 3H), 7.11 (dd, J = 7.8 Hz, 4.7 Hz, 1H), 6.91 (s, 1H), 2.36 (sept, J = 6.8 Hz, 2H), 1.03 (d, J = 6.9 Hz, 6H), 0.90 (d, J = 6.9 Hz, 6H); ¹³C{¹H} NMR (CDCl₃): δ 150.8, 147.7, 143.9, 141.7, 133.0, 132.3, 130.1, 128.4, 128.1, 124.5, 120.5, 116.9, 100.1, 28.9, 25.0, 23.2. HRMS (ESI/[M+H]+) calcd. for C₂₅H₂₇N₂: 355.2169. Found: 355.2174.

Crystallographic Solution and Refinement Details for L1:

Crystallographic data were obtained at 173(±2) K on a Bruker D8/APEX II CCD diffractometer using a graphite-monochromated Mo Kα (λ = 0.71073 Å) radiation, employing a sample that was mounted in inert oil and transferred to a cold gas stream on the diffractometer. Gaussian integration (face-indexed) was employed as the absorption correction method and the structure was solved by use of direct methods. The structure was refined by use of full-matrix least-squares procedures (on F²) with R₁ based on F₀² ≥ 2σ(F₀²) and wR₂ based on F₀² ≥ −3σ(F₀²). Anisotropic displacement parameters were employed for all the non-hydrogen atoms. All hydrogen atoms were added at calculated positions and refined by use of a riding model employing isotropic displacement parameters based on the isotropic displacement parameter of the attached atom. Additional crystallographic information is provided in Table S1 and in the accompanying CIF (CCDC 871158).
Table S1. Crystallographic Experimental Details for L1

A. Crystal Data

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<td>$b$ (Å)</td>
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<td>$c$ (Å)</td>
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B. Data Collection and Refinement Conditions

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$^a$Obtained from least-squares refinement of 9967 reflections with 5.84° < 2$\theta$ < 139.04°.
$^b$Programs for diffractometer operation, data collection, data reduction and absorption correction were those supplied by Bruker.
$^e$ $S = [\Sigma w(F_o^2 - F_c^2)^2/(n - p)]^{1/2}$ (n = number of data; p = number of parameters varied; $w = [\sigma^2(F_o^2) + (0.0592P)^2 + 2.7697P]^{-1}$ where $P = [\text{Max}(F_o^2, 0) + 2F_c^2]/3$).
$^f$ $R_1 = \Sigma |F_o| - |F_c|/\Sigma |F_o|$; $wR_2 = [\Sigma w(F_o^2 - F_c^2)^2/\Sigma w(F_o^4)]^{1/2}$. 
ESI References

$^1$H NMR of (2-Bromo-phenoxy)triisopropylsilane (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C($^1$H) NMR of (2-Bromo-phenoxy)triisopropylsilane (CDCl$_3$, 125.8 MHz, 300 K)
$^{31}$P{${}^1$H} NMR of L1 (CDCl$_3$, 202.5 MHz, 300 K)
$^1$H NMR of L1 (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C{\textsuperscript{\textit{1}H}} NMR of L1 (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
\(^{31}\text{P}^{(1}\text{H})\) NMR of \(\text{L1}'\) (\(\text{C}_6\text{D}_6\), 202.5 MHz, 300 K)
$^1$H NMR of L1' (C$_6$D$_6$, 500 MHz, 300 K)
$^{13}$C$\{^1$H$\}$ NMR of L1$'$ (C$_6$D$_6$, 125.8 MHz, 300 K)
$^1$H NMR of 1, 1-Methyl-2-phenyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C{$^{1}$H} NMR of 1, 1-Methyl-2-phenyl-$1^H$-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 2, 1-Adamantan-1-yl-2-phenyl-$1H$-indole (CDCl$_3$, 500 MHz, 300 K)
\(^{13}\text{C}\{^1\text{H}\}\text{ NMR of 2, 1-Adamantan-1-yl-2-phenyl-1H-indole (CDCl}_3, 125.8 \text{ MHz, 300 K}}\)
$^{1}$H NMR of 3, 1,2-Diphenyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\textsuperscript{1H} NMR of 3, 1,2-Diphenyl-1\textit{H}-indole (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
$^1$H NMR of 4, 1-(2,6-Diisopropyl-phenyl)-2-phenyl-$1H$-indole (CDCl$_3$, 500 MHz, 300 K)
\[^{13}C\{^1H\}\] NMR of 4, 1-(2,6-Diisopropyl-phenyl)-2-phenyl-1\textit{H}-indole (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
1H NMR of 5, 1-tert-Butyl-2-phenyl-1H-indole (CDCl₃, 500 MHz, 300 K)
$^{13}\text{C}^{1}\text{H}$ NMR of 5, 1-tert-Butyl-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 6, 1-Naphthalen-1-yl-2-phenyl-$1H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C$^{1}$$^1$H NMR of 6, 1-Naphthalen-1-yl-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 7, 1-(2,6-Dimethyl-phenyl)-2-phenyl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C/$^1$H NMR of 7, 1-(2,6-Dimethyl-phenyl)-2-phenyl-1H-indole (CDCl₃, 125.8 MHz, 300 K)
$^1$H NMR of 8, 1-(4-Chloro-phenyl)-2-phenyl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C$^\{^1^H\}$ NMR of 8, 1-(4-Chloro-phenyl)-2-phenyl-1$^H$-indole (CDCl$_3$, 125.8 MHz, 300 K)
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$^{13}$C$^{1}$H NMR of 9, 2-Phenyl-1-(3-trifluoromethyl-phenyl)-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 10, 1-(4-tert-Butyl-phenyl)-2-phenyl-$1H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}C\{^1H\}$ NMR of 10, 1-(4-tert-Butyl-phenyl)-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 11, 1-(4-Methyl-piperazin-1-yl)-2-phenyl-$1H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\textsuperscript{(1H)} NMR of 11, 1-(4-Methyl-piperazin-1-yl)-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 12, 1,5-Dimethyl-2-phenyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C-$^1$H NMR of 12, 1,5-Dimethyl-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 13, 1-Adamantan-1-yl-5-methyl-2-phenyl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C$\{^1\text{H}\}$ NMR of 13, 1-Adamantan-1-yl-5-methyl-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 14, 1-(2,6-Dimethyl-phenyl)-5-methyl-2-phenyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\textsuperscript{1H} NMR of 14, 1-(2,6-Dimethyl-phenyl)-5-methyl-2-phenyl-1\textit{H}-indole (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
$^1$H NMR of 15, 6-Fluoro-1-methyl-2-phenyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\{$^1$H\} NMR of 15, 6-Fluoro-1-methyl-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
\(^1\)H NMR of \textbf{16}, 1-Adamantan-1-yl-6-fluoro-2-phenyl-1\(H\)-indole (CDCl\(_3\), 500 MHz, 300 K)
$^{13}\text{C}^{(1\text{H})}$ NMR of 16, 1-Adamantan-1-yl-6-fluoro-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 17, 1-(2,6-Diisopropyl-phenyl)-6-fluoro-2-phenyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C-{$^1$H} NMR of 17, 1-(2,6-Diisopropyl-phenyl)-6-fluoro-2-phenyl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 18, 1-Adamantan-1-yl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C($^1$H) NMR of 18, 1-Adamantan-1-yl-1$H$-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 19, 1-Methyl-2-propyl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\textsuperscript{1H} NMR of 19, 1-Methyl-2-propyl-1\textit{H}-indole (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
$^1$H NMR of 20, 1-Adamantan-1-yl-2-propyl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\{$^1$H\} NMR of 20, 1-Adamantan-1-yl-2-propyl-1$H$-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 21, 1-(2,6-Dimethyl-phenyl)-2-propyl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C<sup>1H</sup> NMR of 21, 1-(2,6-Dimethyl-phenyl)-2-propyl-1H-indole (CDCl<sub>3</sub>, 125.8 MHz, 300 K)
$^1$H NMR of 22, 1-Methyl-2-thiophen-3-yl-1H-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C{\textsuperscript{(1)H}} NMR of 22, 1-Methyl-2-thiophen-3-yl-1H-indole (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
$^1$H NMR of 23, 1-Adamantan-1-yl-2-thiophen-3-yl-1$H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C{$^1$H} NMR of 23, 1-Adamantan-1-yl-2-thiophen-3-yl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 24, 1-(2,6-Dimethyl-phenyl)-2-thiophen-3-yl-$1H$-indole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\textsuperscript{(1H)} NMR of 24, 1-(2,6-Dimethyl-phenyl)-2-thiophen-3-yl-1H-indole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 25, 4-Adamantan-1-yl-5-phenyl-4H-thieno[3,2-b]pyrrole (CDCl$_3$, 500 MHz, 300 K)
$^{13}\text{C}^{\text{1H}}$ NMR of 25, 4-Adamantan-1-yl-5-phenyl-4$H$-thieno[3,2-$b$]pyrrole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 26, 4-(2,6-Dimethyl-phenyl)-5-phenyl-4$H$-thieno[3,2-$b$]pyrrole (CDCl$_3$, 500 MHz, 300 K)
$^{13}$C\textsuperscript{1H} NMR of 26, 4-(2,6-Dimethyl-phenyl)-5-phenyl-4$H$-thieno[3,2-$b$]pyrrole (CDCl$_3$, 125.8 MHz, 300 K)
$^1$H NMR of 27, 1-Adamantan-1-yl-2-phenyl-1$H$-pyrrolo[2,3-$b$]pyridine (CDCl$_3$, 500 MHz, 300 K)
\[^{13}\text{C}^{1\text{H}}\] NMR of 27, 1-Adamantan-1-yl-2-phenyl-1H-pyrrolo[2,3-b]pyridine (CDCl\textsubscript{3}, 125.8 MHz, 300 K)
$^1$H NMR of 28, 1-(2,6-Diisopropyl-phenyl)-2-phenyl-1H-pyrrolo[2,3-$b$]pyridine (CDCl$_3$, 500 MHz, 300 K)
$^{13}\text{C}^{(1\text{H})}$ NMR of 28, 1-(2,6-Diisopropyl-phenyl)-2-phenyl-1H-pyrrolo[2,3-b]pyridine (CDCl$_3$, 125.8 MHz, 300 K)