Supporting Information

For

Direct synthesis of hydrazones by visible light mediated aerobic oxidative cleavage of C=C bond

Ya Ding,* Hao Li,* Yunge Meng,* Te Zhang,* Jiawen Li,* Qiu-Yun Chen* and Chunyin Zhu*ab

*aSchool of Chemistry and Chemical Engineering, Jiangsu University, Zhenjiang 212013, PR China
bState Key Laboratory of Physical Chemistry of Solid Surfaces, Xiamen University, Xiamen 361005, P.R. China.
* E-mail: zhucycn@gmail.com

List of contents

1. General Information ..........................................................2
2. General procedure for synthesis of 3aa-3al and 3ba-3bl ...........3
3. Compound characterizations............................................3-13
4. Synthesis of intermediate 4al ...........................................13
5. Luminescence quenching by compound 1a..............................14
6. References............................................................................15
7. Spectroscopic Data for Products...........................................16-40
1. General Information

Column chromatography was generally performed on silica gel (200-300 mesh) and reactions were monitored by thin layer chromatography (TLC) using UV light to visualize the course of the reactions. The $^1$H (400MHz) and $^{13}$C NMR (100MHz) data were recorded on Bruker AVANCE II 400MHz spectrometer using CDCl$_3$ as solvent. The chemical shifts (δ) are reported in ppm and coupling constants (J) in Hz. $^1$H NMR spectra was recorded with tetramethylsilane (δ= 0.00 ppm) as internal reference; $^{13}$C NMR spectra was recorded with CDCl$_3$ (δ = 77.00 ppm) as internal reference.

Reaction Apparatus:

Photochemical reactions were carried out under visible light irradiation by a blue led bulb at room temperature.
2. General procedures for synthesis of 3aa-3al and 3ba-3bl

To a solution of aryl hydrazines (0.5 mmol) and alkene (1.5 mmol) in MeCN (1.5 mL) was added Methylene Blue (0.01 mmol) and 2, 6-lutidine (0.5 mmol). The reaction mixture was stirred at room temperature under air atmosphere (open vial) and irradiated by blue LED (7 W) for 8 h. The reaction was monitored by thin layer chromatography (TLC). When the reaction was completed, it was diluted with water and extracted with ethyl acetate 3 times. Removal of solvent followed by column chromatography afforded desired products.

3. Compound characterizations

(E)-1-benzylidene-2-phenylhydrazine (3aa).\[1\] Petroleum ether/ethyl acetate = 20:1, white solid, 75% yield (150 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.65-7.70 (m, 3H), 7.35-7.39 (m, 2H), 7.28-7.32 (m, 3H), 7.11-7.13 (m, 2H), 6.87 (t, $J$ = 7.2 Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.6, 137.3, 135.3, 129.3, 128.6, 128.4, 126.2, 120.1, 112.8.

(E)-1-(4-methylbenzylidene)-2-phenylhydrazine (3ab).\[1\] Petroleum ether/ethyl acetate = 20:1, white solid, 78% yield (156 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.64 (s, 1H), 7.57-7.59 (m, 2H), 7.29-7.33 (m, 2H), 7.20-7.22
(m, 2H), 7.12-7.15 (m, 2H), 6.90 (t, J = 7.2 Hz, 1H), 2.40 (s, 3H). 13C NMR (100 MHz, CDCl3) δ 144.8, 138.4, 137.6, 132.5, 129.3, 129.3, 126.1, 119.9, 112.7, 21.4.

(E)-1-(2-methylbenzylidene)-2-phenylhydrazine (3ac). Petroleum ether/ethyl acetate = 20:1, white solid, 62% yield (124 mg). 1H NMR (400 MHz, CDCl3) δ 7.94 (s, 1H), 7.84-7.86 (m, 1H), 7.31 (t, J = 8.0 Hz, 2H), 7.20-7.25 (m, 3H), 7.12-7.14 (m, 2H), 6.90 (t, J = 7.2 Hz, 1H), 2.51 (s, 3H). 13C NMR (100 MHz, CDCl3) δ 144.7, 136.3, 135.4, 133.1, 130.8, 129.3, 128.1, 126.4, 126.1, 120.0, 112.7, 20.2.

(E)-1-(4-chlorobenzylidene)-2-phenylhydrazine (3ad). Petroleum ether/ethyl acetate = 20:1, white solid, 70% yield (140 mg). 1H NMR (400 MHz, CDCl3) δ 7.58-7.63 (m, 4H), 7.29-7.36 (m, 4H), 7.11-7.13 (m, 2H), 6.92 (t, J = 7.2 Hz, 1H). 13C NMR (100 MHz, CDCl3) δ 144.3, 135.8, 133.9, 133.8, 129.3, 128.8, 127.2, 120.3, 112.8.

(E)-1-(4-bromobenzylidene)-2-phenylhydrazine (3ae). Petroleum ether/ethyl acetate = 20:1, white solid, 70% yield (140 mg). 1H NMR (400 MHz, CDCl3) δ 7.58-7.63 (m, 4H), 7.29-7.36 (m, 4H), 7.11-7.13 (m, 2H), 6.92 (t, J = 7.2 Hz, 1H). 13C NMR (100 MHz, CDCl3) δ 144.3, 135.8, 133.9, 133.8, 129.3, 128.8, 127.2, 120.3, 112.8.
ether/ethyl acetate = 20:1, white solid, 76% yield (152 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.64 (s, 1H), 7.58 (s, 1H), 7.49-7.54 (m, 4H), 7.29-7.33 (m, 2H), 7.11-7.13 (m, 2H), 6.92 (t, $J = 7.2$ Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.3, 135.8, 134.2, 131.7, 129.3, 127.5, 122.1, 120.3, 112.8.

(E)-1-(2-bromobenzylidene)-2-phenylhydrazine (3af). Petroleum ether/ethyl acetate = 20:1, white solid, 61% yield (120 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 8.05-8.07 (m, 2H), 7.84 (s, 1H), 7.51-7.54 (m, 1H), 7.27-7.33 (m, 3H), 7.11-7.15 (m, 3H), 6.89 (t, $J = 7.2$ Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.1, 135.6, 134.0, 132.8, 129.2, 129.2, 127.3, 126.8, 122.5, 120.3, 112.7.

(E)-1-(3-bromobenzylidene)-2-phenylhydrazine (3ag). Petroleum ether/ethyl acetate = 20:1, white solid, 54% yield (110 mg), mp: 135-136 °C. $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.82 (s, 1H), 7.69 (s, 1H), 7.51-7.57 (m, 2H), 7.39-7.41 (m, 1H), 7.20-7.31 (m, 3H), 7.10-7.12 (m, 2H), 6.90 (t, $J = 7.2$ Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.2, 137.4, 135.2, 131.1, 130.1, 129.3, 128.7, 124.8, 122.8, 120.5, 112.8. IR (film) $\nu$/cm$^{-1}$ 3220 (s), 3047 (s), 2865 (w), 890 (w), 760 (m), 695 (m). MS (ESI, m/z) 275.0 (M + H$^+$), 297.0 (M + Na$^+$).
Anal. calcd for C_{13}H_{11}BrN_{2}: C, 56.75; H, 4.03; N, 10.18. Found: C, 56.48; H, 4.23; N, 10.08.

(E)-1-(4-methoxybenzylidene)-2-phenylhydrazine (3ah).\[^2\] Petroleum ether/ethyl acetate = 15:1, yellow solid, 65% yield (130 mg). \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 7.59-7.62 (m, 3H), 7.46 (s, 1H), 7.30 (t, \(J = 7.6\) Hz, 2H), 7.11-7.13 (m, 2H), 6.87-6.94 (m, 3H), 3.85 (s, 3H). \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) 159.9, 144.9, 137.4, 129.2, 128.1, 127.5, 119.7, 114.0, 112.6, 55.3.

(E)-1-(4-fluorobenzylidene)-2-phenylhydrazine (3ai).\[^3\] Petroleum ether/ethyl acetate = 20:1, white solid, 72% yield (144 mg). \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 7.63-7.68 (m, 3H), 7.28-7.31 (m, 2H), 7.05-7.13 (m, 4H), 6.89 (t, \(J = 7.6\) Hz, 1H). \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) 162.8 (d, \(J = 246.6\) Hz), 144.6, 136.1, 131.5 (d, \(J = 3.3\) Hz), 129.3, 127.7 (d, \(J = 8.1\) Hz), 120.1, 115.6 (d, \(J = 22.0\) Hz), 112.7.

(E)-4-((2-phenylhydrazono)methyl)benzonitrile (3aj).\[^3\] Petroleum
ether/ethyl acetate = 10:1, yellow solid, 63% yield (120 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.96 (s, 1H), 7.71-7.74 (m, 2H), 7.62-7.64 (m, 3H), 7.30-7.34 (m, 2H), 7.14-7.16 (m, 2H), 6.95 (t, $J$ = 7.6 Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 143.7, 139.8, 134.3, 132.3, 129.4, 126.2, 121.0, 119.0, 113.0, 110.8.

![Chemical structure](image)

**(E)-1-(naphthalen-2-ylmethylene)-2-phenylhydrazine (3ak).** Petroleum ether/ethyl acetate = 15:1, white solid, 52% yield (100 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 8.81 (d, $J$ = 8.8 Hz, 1H), 8.34 (s, 1H), 7.82-7.91 (m, 3H), 7.49-7.64 (m, 3H), 7.32-7.36 (m, 2H), 7.19-7.21 (m, 2H), 6.92 (t, $J$ = 7.6 Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.6, 136.9, 134.0, 130.6, 130.3, 129.4, 129.0, 128.7, 126.7, 126.3, 125.9, 125.4, 124.4, 120.1, 112.8.

![Chemical structure](image)

**(E)-1-phenyl-2-(3-vinylbenzylidene)hydrazine (3al).** Petroleum ether/ethyl acetate = 15:1, white solid, 73% yield (140 mg). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.69-7.70 (m, 2H), 7.55 (d, $J$ = 6.8 Hz, 1H), 7.27-7.35 (m, 4H), 7.13 (d, $J$ = 8.0 Hz, 2H), 6.88 (t, $J$ = 7.2 Hz, 1H), 6.75 (dd, $J_1$ = 10.8 Hz, $J_2$ = 17.6 Hz, 1H), 5.81 (dd, $J_2$ = 0.8 Hz, $J_2$ = 18.0 Hz, 1H), 5.30 (dd, $J_2$ = 0.8 Hz, $J_2$ = 10.8 Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.6, 137.9, 137.1, 136.6, 135.5, 129.3, 128.8, 126.1, 125.6, 124.0, 120.2, 114.3, 112.8. IR (film) $\nu$/cm$^{-1}$ 3314 (w), 1595 (vs),
1506 (vs), 1247 (vs), 1131 (vs), 913 (m), 749 (m). MS(ESI, m/z) 223.1 (M + H⁺), 245.1 (M + Na⁺). Anal.calcd for C₁₅H₁₄N₂: C, 81.05; H, 6.35; N, 12.60. Found: C, 80.92; H, 6.23; N, 12.85.

(E)-1-benzylidene-2-(4-fluorophenyl)hydrazine (3ba).[¹] Petroleum ether/ethyl acetate = 15:1, white solid, 72% yield (144 mg). ¹H NMR (400 MHz, CDCl₃) δ 7.71 (s, 1H), 7.65-7.67 (m, 2H), 7.37-7.40 (m, 2H), 7.31 (t, J= 8.8 Hz, 1H), 7.06-7.09 (m, 2H), 7.00 (t, J= 8.4 Hz, 2H). ¹³C NMR (100 MHz, CDCl₃) δ 157.3 (d, J= 235.9 Hz), 141.0, 137.5, 135.1, 128.6, 128.5, 126.1, 115.8 (d, J= 22.5 Hz), 113.7 (d, J= 7.1 Hz).

(E)-1-benzylidene-2-(4-chlorophenyl)hydrazine (3bb).[²] Petroleum ether/ethyl acetate = 20:1, white solid, 74% yield (140 mg). ¹H NMR (400 MHz, CDCl₃) δ 7.63-7.66 (m, 3H), 7.35-7.39 (m, 2H), 7.31 (t, J= 7.2 Hz, 1H), 7.20-7.24 (m, 2H), 7.03-7.05 (m, 2H). ¹³C NMR (100 MHz, CDCl₃) δ 143.2, 137.9, 135.0, 129.2, 128.7, 128.6, 126.2, 124.6, 113.8.
(E)-1-benzylidene-2-(2,4-dichlorophenyl)hydrazine (3bc). Petroleum ether/ethyl acetate = 20:1, white solid, 63% yield (130 mg), mp: 127-128 °C.

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.66-7.68 (m, 3H), 7.59 (s, 1H), 7.32-7.44 (m, 3H), 7.28-7.30 (m, 2H), 6.89 (dd, $J_1$ = 8.8 Hz, $J_2$ = 2.4 Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 144.1, 138.9, 134.6, 133.1, 130.7, 129.0, 128.7, 126.4, 122.5, 114.2, 112.1. IR (film)$\nu$/cm$^{-1}$ 3230 (s), 3084 (s), 2960 (m), 758 (w), 690 (w). MS(ESI, $m/z$) 265.0 (M + H$^+$), 287.0 (M + Na$^+$). Anal. calcd for C$_{13}$H$_{10}$Cl$_2$N$_2$: C, 58.89; H, 3.80; N, 10.57. Found: C, 58.63; H, 4.03; N, 10.48.

(E)-1-benzylidene-2-(2-chlorophenyl)hydrazine (3bd). Petroleum ether/ethyl acetate = 20:1, white solid, 52% yield (104 mg), mp: 122-123 °C.

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 8.09 (s, 1H), 7.85 (s, 1H), 7.64-7.71 (m, 3H), 7.39-7.43 (m, 2H), 7.32-7.36 (m, 1H), 7.24-7.30 (m, 2H), 6.81 (t, $J$ = 8.0 Hz, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ 140.5, 139.5, 134.9, 129.0, 128.8, 128.6, 127.9, 126.4, 120.0, 116.8, 114.2. IR (film)$\nu$/cm$^{-1}$ 3215 (m), 3051 (s), 2884 (s), 745 (w), 690 (m). MS(ESI, $m/z$) 231.1 (M + H$^+$), 253.1 (M + Na$^+$). Anal. calcd for C$_{13}$H$_{11}$ClN$_2$: C, 67.68; H, 4.81; N, 12.14. Found: C, 67.63; H, 4.63; N, 12.02.

(E)-N'-benzylideneacetohydrazide (3be). Petroleum ether/ethyl acetate =
benzyl (E)-2-benzylidenehydrazine-1-carboxylate (3bf).\textsuperscript{[5]} Petroleum ether/ethyl acetate = 2:1, yellow oil, 63% yield (120 mg). \textsuperscript{1}H NMR (400 MHz, CDCl$_3$) $\delta$ 8.15 (s, 1H), 7.86 (s, 1H), 7.67-7.69 (m, 2H), 7.34-7.43 (m, 8H), 5.27 (s, 2H). \textsuperscript{13}C NMR (100 MHz, CDCl$_3$) $\delta$ 145.2, 135.8, 133.6, 130.0, 128.5, 128.5, 128.3, 128.3, 127.2, 67.4.

\[
\text{Ph} \equiv \text{N}^-\text{N}_2\text{O}^-\text{O} \equiv \text{Ph}
\]

(E)-tert-butyl 2-benzylidenehydrazinecarboxylate (3bg). Petroleum ether/ethyl acetate = 3:1, yellow oil, 68% yield (130 mg). \textsuperscript{1}H NMR (400 MHz, CDCl$_3$) $\delta$ 7.85 (s, 1H), 7.67-7.90 (m, 2H), 7.36-7.37 (m, 3H), 1.55 (s, 9H). \textsuperscript{13}C NMR (100 MHz, (CD$_3$)$_2$SO) $\delta$ 152.9, 143.6, 135.1, 129.8, 129.2, 126.9, 79.9, 28.6. IR (film) $\nu$/cm$^{-1}$ 3250 (s), 2978 (w), 1703 (vs), 1529 (s), 1258 (s), 1053 (m), 761 (w), 694 (w). MS(ESI, $m/z$) 221.1 (M + H$^+$), 243.1 (M + Na$^+$).
Anal. calcd for C\textsubscript{12}H\textsubscript{16}N\textsubscript{2}O\textsubscript{2}: C, 65.43; H, 7.32; N, 12.72. Found: C, 65.27; H, 7.59; N, 12.93.

(E)-N’-benzylidene-4-methylbenzenesulfonohydrazide (3bh). Petroleum ether/ethyl acetate = 3:1, white solid, 69% yield (140 mg), mp: 143-145 °C. \textsuperscript{1}H NMR (400 MHz, CDCl\textsubscript{3}) \( \delta \) 8.68 (s, 1H), 7.88-7.90 (m, 2H), 7.80 (s, 1H), 7.54-7.56 (m, 2H), 7.27-7.34 (m, 5H), 2.37 (s, 3H). \textsuperscript{13}C NMR (100 MHz, CDCl\textsubscript{3}) \( \delta \) 148.0, 144.2, 135.2, 133.2, 130.3, 129.7, 128.5, 127.9, 127.3, 21.5. IR (film) \( \nu/cm^{-1} \) 3226 (s), 2923 (w), 2856 (w), 1371 (m), 1157 (vs), 814 (w), 699 (w). MS (ESI, \( m/z \)) 275.1 (M + H\textsuperscript{+}), 297.1 (M + Na\textsuperscript{+}). Anal. calcd for C\textsubscript{14}H\textsubscript{14}N\textsubscript{2}O\textsubscript{2}S: C, 61.29; H, 5.14; N, 10.21. Found: C, 61.07; H, 5.32; N, 10.03.

(E)-N’-benzylideneisonicotinohydrazide (3bi). Petroleum ether/ethyl acetate = 1:2, yellow oil, 71% yield (140 mg). \textsuperscript{1}H NMR (400 MHz, (CD\textsubscript{3})\textsubscript{2}SO) \( \delta \) 12.08 (s, 1H), 8.78 (d, \( J = 6.0 \) Hz, 2H), 8.46 (s, 1H), 7.81-7.82 (m, 2H), 7.73-7.76 (m, 2H), 7.46-7.47 (m, 3H). \textsuperscript{13}C NMR (100 MHz, (CD\textsubscript{3})\textsubscript{2}SO) \( \delta \) 162.2, 150.8, 149.6, 140.9, 134.5, 130.9, 129.4, 127.7, 122.0. IR (film) \( \nu/cm^{-1} \) 3427 (w), 3200 (m), 2917 (m), 1680 (vs), 1566 (vs), 769 (w), 690 (m). MS (ESI, \( m/z \)) 226.1 (M + H\textsuperscript{+}), 248.1 (M + Na\textsuperscript{+}). Anal. calcd for C\textsubscript{13}H\textsubscript{11}N\textsubscript{3}O: C, 69.32; H,
4.92; N, 18.66. Found: C, 69.07; H, 5.13; N, 18.53.

\[
\text{Ph} - \text{N}^+ - \text{N} - \text{O}
\]

**{(E)-N’-benzylidenenicotinohydrazide (3bj).}** Petroleum ether/ethyl acetate = 1:2, yellow oil, 66% yield (130 mg). \( ^1\text{H NMR (400 MHz, CDCl}_3 \) \( \delta \) 10.94-11.95 (m, 1H), 9.18-9.25 (m, 1H), 8.63-8.76 (m, 1H), 8.08-8.47 (m, 2H), 7.19-7.58 (m, 6H). \( ^{13}\text{C NMR (100 MHz, CDCl}_3 \) \( \delta \) 163.3, 152.1, 150.6, 148.6, 135.8, 133.3, 130.4, 128.9, 128.4, 127.5, 123.3.

\[
\text{Ph} - \text{N}^+ - \text{N} - \text{O}
\]

**{(E)-N’-benzylidenebenzohydrazide (3bk).}** Petroleum ether/ethyl acetate = 3:1, yellow oil, 77% yield (150 mg). \( ^1\text{H NMR (400 MHz, CD}_2\text{SO} \) \( \delta \) 11.86 (s, 1H), 8.45 (s, 1H), 7.90-7.92 (m, 2H), 7.72-7.73 (m, 2H), 7.44-7.59 (m, 6H). \( ^{13}\text{C NMR (100 MHz, CD}_2\text{SO} \) \( \delta \) 163.6, 148.3, 134.8, 133.9, 132.2, 130.6, 129.3, 129.0, 128.1, 127.6.

\[
\text{Ph} - \text{N}^+ - \text{N} - \text{CN}
\]

**{(E)-N’-benzylidene-2-cyanoacetohydrazide (3bl).}** Petroleum ether/ethyl acetate = 1:1, yellow oil, 53% yield (100 mg). \( ^1\text{H NMR (400 MHz, CD}_2\text{SO} \) \( \delta \) 11.80 (s, 1H), 8.00 (s, 1H), 7.68-7.70 (m, 2H), 7.41-7.43 (m, 3H), 4.21 (s, 2H). \( ^{13}\text{C NMR (100 MHz, CD}_2\text{SO} \) \( \delta \) 165.3, 144.9, 134.3, 130.6, 129.2, 127.5,
116.5, 24.8. IR (film) ν/cm⁻¹ 3215 (s), 2922 (m), 2260 (w), 1672 (vs), 758 (w), 690 (w). MS(ESI, m/z) 188.1 (M + H⁺), 210.1 (M + Na⁺). Anal. calcd for C₁₀H₉N₃O: C, 64.16; H, 4.85; N, 22.45. Found: C, 64.09; H, 5.03; N, 22.23.

4. Synthesis of intermediate 6

To a solution of aryl hydrazines (0.5 mmol) and alkene (1.5 mmol) in MeCN (1.5 mL) was added Methylene Blue (0.01mmol) and 2, 6-Dimethylpyridine (0.5 mmol). The reaction mixture was stirred at room temperature under air atmosphere (open vial) and irradiated by blue LED (7 W) for 3 h. Then it was diluted with water and extracted with ethyl acetate 3 times. Removal of solvent followed by column chromatography afforded intermediate 6 (31 mg, 26%).

\[
\text{HN} - \text{Ph}
\]

Petroleum ether/ethyl acetate = 25:1, white oil. \(^1\)H NMR (400 MHz, CDCl₃) δ 7.83 (s, 1H), 7.29-7.40 (m, 4H), 7.20-7.25 (m, 3H), 7.13-7.15 (m, 2H), 6.73 (dd, \(J₁= 17.6\) Hz, \(J₂= 10.8\) Hz, 1H), 5.76 (dd, \(J₁= 17.6\) Hz, \(J₂= 0.4\) Hz, 1H), 5.28 (dd, \(J₁= 10.8\) Hz, \(J₂= 0.8\) Hz, 1H), 5.14-5.17 (m, 1H), 3.19 (dd, \(J₁= 14.0\) Hz, \(J₂= 7.6\) Hz, 1H), 2.97 (dd, \(J₁= 13.6\) Hz, \(J₂= 6.0\) Hz, 1H). MS (ESI, m/z) 237.1 (M + H⁺), 259.1 (M + Na⁺).

5. Luminescence quenching by compound 1a

A Varian Cary Eclipse fluorescence spectrometer was used to record the emission intensities. All the solutions were excited at 664 nm and the emission intensity at 685
nm was observed. CH₃CN was degassed with a stream of N₂ for 30 min. In a typical experiment, the emission spectrum of a 5×10⁻⁵ M solution of Methylene Blue in CH₃CN was collected. Then, appropriate amount of quencher was added to the measured solution in a quartz cuvette and the emission spectrum of the sample was collected. I₀ and I represent the intensities of the emission in the absence and presence of the quencher at 685 nm.

6. References
7. Spectroscopic Data for Products
Ph\(\equiv\)N\(\equiv\)N\(\equiv\)F

3ba

Ph\(\equiv\)N\(\equiv\)N\(\equiv\)F

3ba