Supporting Information

Intramolecular Cyclization of in situ Generated Adducts Formed between Thioamide Dianions and Thioformamides Leading to Generation of 5-Amino-2-thiazolines and 5-Aminothiazoles, and Their Fluorescence Properties

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**General procedure.** The IR spectra were obtained on a JASCO FT-IR 410 spectrophotometer. $^1$H NMR (399.7 MHz), $^{13}$C (100.4 MHz), $^{19}$F (376 MHz) NMR spectra were measured on a JNM-α-400 spectrometer. $^1$H and $^{13}$C chemical shifts are reported in $\delta$ values referred to tetramethylsilane or CDCl$_3$ as an internal standard, respectively. For $^{19}$F chemical shifts CF$_3$COOH was used as an external standard. All spectra were acquired in the proton-decoupled mode. The mass spectra (MS) and high resolution mass spectra (HRMS) were taken on JMS-700 mass spectrometers. Melting points were determined by using a Yanaco seisakusyo MP-S2 micro melting point apparatus and are uncorrected. UV/Vis spectra were measured on a JAI Ubest-55 spectrometer. Fluorescence spectra were measured on a FluoroMax-4.

2,4-Diphenyl-5-dimethylaminothiazoline (4a)

To a solution of $N$-benzylthiobenzamide (0.228 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.28 M solution of $n$-butyllithium in $n$-hexane (1.56 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added $N,N$-dimethylthioformamide (88 $\mu$L, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.124 g, 0.5 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of NH$_4$Cl, and extracted with CH$_2$Cl$_2$. The organic layer was dried over MgSO$_4$ and concentrated in vacuo. The residue was purified by column chromatography (SiO$_2$, hexane : EtOAc : Et$_3$N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4a (0.240 g, 85%) as a faint yellow solid. (mp 89-91 °C); IR (KBr) 2947, 1597, 1450, 1265, 1229, 1051, 1027, 834, 754, 687, 651, 566, 521 cm$^{-1}$; $^1$H NMR (CDCl$_3$) $\delta$ 2.11 (s, 6H, NMe$_2$), 5.11 (d, $J$ = 2.0 Hz, 1H, SCH), 5.57 (d, $J$ = 2.0 Hz, 1H, C=NCH), 7.08-7.19 (m, 5H, Ar), 7.27-7.35 (m, 3H, Ar), 7.90-7.92 (m, 2H, Ar); $^{13}$C NMR (CDCl$_3$) $\delta$ 40.0 (NMe$_2$), 84.2 (SCH), 90.5 (C=NCH), 126.0, 127.6, 128.3, 128.4, 128.5, 131.1, 133.5, 139.7, 168.7 (SC=N); MS (EI) m/z 282 (M$^+$); HRMS (EI) Calcd for C$_{17}$H$_{18}$N$_2$S(M$^+$) 282.1191, found: 282.1177.
2-Phenyl-4-(4-methoxyphenyl)-5-dimethylaminothiazoline (4b)

To a solution of N-(4-methoxybenzyl)-thio benzamide (0.257 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.33 M solution of n-butyllithium in n-hexane (1.50 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-dimethylthioformamide (88 µL, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.127 g, 0.5 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4b (0.243 g, 77%) as a yellow oil; IR (neat) 2950, 2833, 2788, 1602, 1510, 1448, 1294, 1175, 1032, 947, 823, 768, 691 cm⁻¹; ¹H NMR (CDCl₃) δ 2.26 (s, 6H, NMe₂), 3.73 (s, 3H, OMe), 5.23 (d, J = 1.5 Hz, 1H, SCH), 5.67 (d, J = 1.4 Hz, 1H, C=NCH), 6.87 (d, J = 8.8 Hz, 2H, Ar), 7.25 (d, J = 8.8 Hz, 2H, Ar), 7.43-7.52 (m, 3H, Ar), 8.04 (dd, J = 8.3 Hz, 1.5 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 40.0 (NMe₂), 55.1 (OMe), 83.8 (SCH), 90.6 (C=NCH), 113.9, 127.2, 128.4, 128.4, 131.2, 131.8, 133.6, 159.1, 168.4 (SC=N); MS (EI) m/z 312 (M⁺); HRMS (EI) calcd for C₁₈H₂₀N₂OS (M⁺) 312.1296, found: 312.1290.

2-Phenyl-4-(4-fluorophenyl)-5-dimethylaminothiazoline (4c)

To a solution of N-(4-fluorobenzyl)-thio benzamide (0.245 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.33 M solution of n-butyllithium in n-hexane (1.50 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-dimethylthioformamide (88 µL, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.127 g, 0.5 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4c (0.193 g, 64%) as a yellow oil; IR (neat) 1604,
1506, 1449, 1228, 1028, 948, 825, 767, 690 cm⁻¹; ¹H NMR (CDCl₃) δ 2.14 (s, 6H, NMe₂), 5.23 (d, J = 1.7 Hz, 1H, SCH), 5.67 (d, J = 1.7 Hz, 1H, C=CH), 6.90 (t, J = 8.8 Hz, 2H, Ar), 7.17 (dd, J = 8.8 Hz, 5.4 Hz, 2H, Ar), 7.31-7.39 (m, 3H, Ar), 7.92 (dd, J = 8.3 Hz, 1.5 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 40.1 (NMe₂), 83.5 (SCH), 90.5 (C=CH), 115.3, 115.5, 127.7, 127.8, 128.5, 131.3, 133.4, 135.5, 135.6, 161.0, 163.5, 169.0 (SC=N); ¹⁹F NMR (CDCl₃) δ -115.1; MS (EI) m/z 300 (M⁺); HRMS (EI) Calcd for C₁₇H₁₇FN₂S (M⁺) 300.1096, found: 300.1068.

2-(4-Methoxyphenyl)-4-phenyl-5-dimethylaminothiazoline (4d)

To a solution of N-benzyl-4-methoxythiobenzamide (0.258 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.20 M solution of n-butyllithium in n-hexane (1.66 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-dimethylthioformamide (88 µL, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.125 g, 0.5 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4d (0.215 g, 69%) as a yellow oil; IR (neat) 2951, 2833, 2786, 1605, 1508, 1254, 1170, 1031, 948, 837, 698, 657, 566 cm⁻¹; ¹H NMR (CDCl₃) δ 2.19 (s, 6H, NMe₂), 3.77 (s, 3H, OMe), 5.16 (d, J = 2.0 Hz, 1H, SCH), 5.61 (d, J = 2.0 Hz, 1H, C=CH), 6.88-6.90 (d, J = 8.8 Hz, 2H, Ar), 7.19-7.26 (m, 5H, Ar), 7.92-7.94 (m, 2H, Ar); ¹³C NMR (CDCl₃) δ 40.0 (NMe₂), 55.2 (OMe), 84.2 (SCH), 90.4 (C=CH), 113.6, 126.1, 126.2, 127.5, 128.5, 130.1, 140.0, 162.0, 168.0 (SC=N); MS (EI) m/z 312 (M⁺); HRMS (EI) Calcd for C₁₈H₁₇FN₂OS (M⁺) 312.1296, found: 312.1292.

2-(4-Fluorophenyl)-4-phenyl-5-dimethylaminothiazoline (4e)

To a solution of N-benzyl-4-fluorothiobenzamide (0.245 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.15 M solution of n-butyllithium in n-hexane (1.74 mL, 2.0 mmol) at 0 °C, and
the mixture was stirred for 5 min at this temperature. To this was added
\(N,N\)-dimethylthioformamide (88 \(\mu\)L, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.127 g, 0.5 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of \(\text{NH}_4\text{Cl}\), and extracted with \(\text{CH}_2\text{Cl}_2\). The organic layer was dried over \(\text{MgSO}_4\) and concentrated in vacuo. The residue was purified by column chromatography (SiO\(_2\), hexane : EtOAc : Et\(_3\)N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4e (0.190 g, 63%) as a orange oil; IR (neat) 3062, 2949, 1603, 1506, 1451, 1234, 1154, 1028, 949, 842, 753, 698, 657, 562 \(\text{cm}^{-1}\); \(^1\)H NMR (CDCl\(_3\)) \(\delta\) 2.20 (s, 6H, NMe\(_2\)), 5.22 (d, \(J = 2.0\) Hz, 1H, SCH), 5.63 (d, \(J = 2.0\) Hz, 1H, C=NCH), 7.05-7.10 (t, \(J = 8.5\) Hz, 2H, Ar), 7.23-7.31 (m, 5H, Ar), 7.95-8.00 (m, 2H, Ar); \(^{13}\)C NMR (CDCl\(_3\)) \(\delta\) 40.1 (NMe\(_2\)), 84.3 (SCH), 91.1 (C=NCH), 115.5, 126.0, 127.8, 128.7, 129.9, 130.6, 139.7, 165.9, 168.7 (SC=N); \(^{19}\)F NMR (CDCl\(_3\)) \(\delta\) -108.8; MS (EI) m/z 300 (M\(^+\)); HRMS (EI) Calcd for C\(_{17}\)H\(_{17}\)FN\(_2\)S (M\(^+\)) 300.1096, found: 300.1120.

2,4-Diphenyl-5-diphenylaminothiazoline (4f)

To a solution of \(N\)-benzylthiobenzamide (0.229 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.49 M solution of \(n\)-butyllithium in \(n\)-hexane (1.34 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added \(N,N\)-diphenylthioformamide (0.213 g, 1.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 0.5 h. To this was added iodine (0.512 g, 2.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of Na\(_2\)S\(_2\)O\(_3\), and extracted with \(\text{CH}_2\text{Cl}_2\). The organic layer was dried over MgSO\(_4\) and concentrated in vacuo. The residue was purified by column chromatography (SiO\(_2\), hexane : EtOAc : Et\(_3\)N = 10 : 1 : 0.01) to give the 5-aminothiazoline 4f (0.221 g, 54%) as a yellow solid. (mp 161-162 °C); IR (KBr) 3037, 2927, 1490, 1232, 1036, 946, 765, 750, 688 cm\(^{-1}\); \(^1\)H NMR (CDCl\(_3\)) \(\delta\) 5.91 (d, \(J = 3.6\) Hz, 1H, SCH), 6.20 (d, \(J = 3.6\) Hz, 1H, C=NCH), 6.93-6.97 (m, 6H, Ar), 7.15 (t, \(J = 8.1\) Hz, 5H, Ar), 7.21-7.24 (m, 4H, Ar), 7.25-7.30 (m, 2H,
2-(4-Methoxyphenyl)-4-phenyl-5-diphenylaminothiazoline (4g)

To a solution of N-benzyl-4-methoxythiobenzamide (0.257 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.43 M solution of n-butyllithium in n-hexane (1.40 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-diphenylthioformamide (0.213 g, 1.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 0.5 h. To this was added iodine (0.512 g, 2.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4g (0.234 g, 54%) as a yellow solid. (mp 148-151 °C); IR (KBr) 3053, 2926, 1604, 1519, 1508, 1491, 1258, 1170, 952, 840, 751, 691, 609, 552 cm⁻¹; ¹H NMR (CDCl₃) δ 3.80 (s, 3H, OMe), 5.97 (d, J = 3.4 Hz, 1H, SCH), 6.27 (d, J = 3.4 Hz, 1H, C=NCH), 6.88 (d, J = 8.8 Hz, 2H, Ar), 7.02-7.06 (m, 6H, Ar), 7.24 (t, J = 8.0 Hz, 5H, Ar), 7.30-7.32 (m, 4H, Ar), 7.77 (d, J = 8.8 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 55.3 (OMe), 81.3 (SCH), 82.4 (C=NCH), 113.7, 123.4, 123.6, 126.2, 126.3, 127.7, 128.7, 129.3, 129.9, 140.3, 145.6, 161.9, 167.5 (SC=N); MS (El) m/z 436 (M⁺); HRMS (EI) calcd for C₂₈H₂₂N₂S (M⁺) 406.1504, found: 406.1499.

2-(4-Fluorophenyl)-4-phenyl-5-diphenylaminothiazoline (4h)

To a solution of N-benzyl-4-fluorothiobenzamide (0.246 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.43 M solution of n-butyllithium in n-hexane (1.40 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-diphenyl
thioformamide (0.214 g, 1.0 mmol) at this temperature, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.512 g, 2.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₅, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 30 : 1 : 0.01) to give the 5-aminothiazoline 4h (0.191 g, 45%) as a faint yellow solid. (mp 170-171 °C); IR (KBr) 3055, 1611, 1597, 1506, 1449, 1235, 1152, 1093, 1069, 1037, 949, 846, 751, 705, 666, 606, 585, 543 cm⁻¹; ¹H NMR (CDCl₃) δ 5.96 (d, J = 3.4 Hz, 1H, SCH), 6.29 (d, J = 3.4 Hz, 1H, C=NCH), 6.99-7.07 (m, 8H, Ar), 7.21-7.31 (m, 9H, Ar), 7.77-7.81 (m, 2H, Ar); ¹³C NMR (CDCl₃) δ 81.9 (SCH), 82.5 (C=NCH), 115.4, 115.7, 123.5, 123.9, 126.3, 128.0, 128.8, 129.4, 130.4, 130.5, 139.9, 145.6, 163.3, 165.8 (SC=N); ¹⁹F NMR (CDCl₃) δ -28.3; MS (El) m/z 424 (M⁺); HRMS (El) calcd for C₂₇H₂₁FN₂S(M⁺) 424.1409, found: 424.1412.

2-(4-Chlorophenyl)-4-phenyl-5-diphenylaminothiazoline (4i)

To a solution of N-benzyl-4-chlorothiobenzamide (0.263 g, 1.0 mmol) in THF (4.0 mL) was added slowly 1.41 M solution of n-butyllithium in n-hexane (1.42 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-diphenylthioformamide (0.213 g, 1.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 0.5 h. To this was added iodine (0.769 g, 3.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₅, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 30 : 1 : 0.01) to give the 5-aminothiazoline 4i (0.231 g, 52%) as a yellow ocher solid. (mp 144-145 °C); IR (KBr) 2815, 1604, 1490, 1092, 1037, 949, 841, 749, 704, 607, 527 cm⁻¹; ¹H NMR (CDCl₃) δ 6.02 (d, J = 3.4 Hz, 1H, SCH), 6.33 (d, J = 3.4 Hz, 1H, C=NCH), 7.03-7.08 (m, 6H, Ar), 7.26 (t, J = 7.7 Hz, 4H, Ar), 7.30-7.36 (m, 7H, Ar), 7.77 (d, J = 8.5 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 81.8 (SCH), 82.5 (C=NCH), 123.4, 123.8, 126.3, 127.9,
128.6, 128.8, 129.3, 129.5, 132.0, 137.2, 139.8, 145.5, 167.1 (SC=N); MS (EI) m/z 440 (M⁺); HRMS (EI) calcd for C₂₇H₂₁ClN₂S(M⁺) 440.1114, found: 440.1084.

2-Phenyl-4-(4-chlorophenyl)-5-diphenylaminothiazoline (4j)
To a solution of N-(4-chlorobenzyl)thiobenzamide (0.263 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.33 M solution of n-butyllithium in n-hexane (1.50 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-diphenylthioformamide (0.213 g, 1.0 mmol) at 0 °C, and this mixture was stirred at room temperature for 0.5 h. To this was added iodine (0.514 g, 2.0 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₃, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 30 : 1 : 0.01) to give the 5-aminothiazoline 4j (0.210 g, 47%) as a faint yellow solid (mp 121-122 °C); IR (KBr) 3064, 1600, 1496, 1445, 1397, 1374, 1270, 1218, 1094, 950, 878, 855, 811, 766, 708, 599, 561 cm⁻¹; ¹H NMR (CDCl₃) δ 5.95 (d, J = 3.7 Hz, 1H, SCH), 6.22 (d, J = 3.7 Hz, 1H, C=NCH), 6.88 (d, J = 8.8 Hz, 2H, Ar), 6.99-7.06 (m, 6H, Ar), 7.21-7.30 (m, 8H, Ar), 7.35 (t, J = 7.3 Hz, 2H, Ar), 7.41-7.45 (m, 1H, Ar), 7.78 (d, J = 6.8 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 81.3 (SCH), 81.8 (NCH), 123.4, 123.9, 127.7, 128.3, 128.5, 128.9, 129.4, 131.4, 133.4, 133.6, 138.6, 145.6, 168.8 (SC=N); MS (EI) m/z 440 (M⁺); HRMS (EI) calcd for C₂₇H₂₁ClN₂S(M⁺) 440.1114, found: 440.1089.

2-(4-Methoxyphenyl)-4-phenyl-5-(methylphenylamino)thiazoline (4k)
To a solution of N-benzyl-4-methoxythiobenzamide (0.257 g, 1.0 mmol) in THF (2.0 mL) was added slowly 1.45 M solution of n-butyllithium in n-hexane (1.38 mL, 2.0 mmol) at 0 °C, and mixture was stirred for 5 minutes at this temperature. To this was added N-methyl-N-phenylthioformamide (107 µl, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.512 g, 2.0 mmol) at 0 °C, and this mixture was
stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₂N = 7 : 1 : 0.01) to give the 5-aminothiazoline 4k (0.112 g, 30%) as a yellow solid (mp 147-149 °C); IR (KBr) 2972, 1596, 1506, 1453, 1304, 1254, 1168, 1097, 1029, 955, 835, 748 cm⁻¹; ¹H NMR (CDCl₃) δ 2.74 (s, 3H, NMe), 3.77 (s, 3H, OMe), 5.79 (d, J = 1.9 Hz, 1H, SCH), 5.92 (d, J = 2.0 Hz, 1H, C=NCH), 6.80-6.89 (m, 5H, Ar), 7.16-7.28 (m, 7H, Ar), 7.24 (d, J = 9.4 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 32.6 (NMe), 55.4 (OMe), 83.9 (SCH), 84.5 (C=NCH), 113.8, 116.9, 120.5, 126.1, 127.8, 128.8, 129.2, 130.3, 140.0, 149.0, 162.2, 168.2 (SC=N); MS (EI) m/z 374 (M⁺); HRMS (EI) Calcd for C₂₃H₂₂N₂O₃S (M⁺) 374.1453, found: 374.1471.

2-(4-Chlorophenyl)-4-phenyl-5-di(4-methoxyphenyl)aminothiazoline (4l)

To a solution of N-benzyl-4-chlorothiobenzamide (0.262 g, 1.0 mmol) in THF (4.0 mL) was added slowly 1.28 M solution of n-butyllithium in n-hexane (1.56 mL, 2.0 mmol) at 0 °C, and the mixture was stirred for 5 min at this temperature. To this was added N,N-bis-(4-methoxyphenyl)thioformamide (0.275 g, 1.0 mmol) at 0 °C, and this mixture was stirred at 0 °C for 0.5 h. To this was added iodine (0.641 g, 2.5 mmol) at 0 °C, and this mixture was stirred at this temperature for 2 h. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₃, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₂N = 30 : 1 : 0.01) to give the 5-aminothiazoline 4l (0.317 g, 63%) as a brownish yellow sticky oil; IR (KBr) 2954, 2832, 1698, 1602, 1507, 1458, 1397, 1246, 1180, 1091, 1037, 949, 835, 699, 576 cm⁻¹; ¹H NMR (CDCl₃) δ 3.64 (s, 6H, OMe), 5.88 (d, J = 3.9 Hz, 1H, SCH), 6.15 (d, J = 3.9 Hz, 1H, C=NCH), 6.70 (d, J = 8.8 Hz, 4H, Ar), 6.88 (d, J = 8.8 Hz, 4H, Ar), 7.19-7.23 (m, 4H, Ar), 7.26 (d, J = 8.8 Hz, 3H, Ar), 7.67 (d, J = 8.8 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 55.4 (OMe), 55.5 (OMe), 82.6 (SCH), 83.1 (C=NCH), 114.5, 114.6, 119.4,
124.5, 126.3, 127.8, 128.6, 128.7, 129.6, 132.2, 137.2, 139.4, 140.0, 156.0, 167.2 (SC=N); MS (EI) m/z 500 (M⁺); HRMS (EI) calcd for C_{29}H_{25}ClN_{2}O_{2}S (M⁺) 500.1325, found: 500.1304.

2,4-Diphenyl-5-dimethylaminothiazole (5a)

To a solution of 2,4-diphenyl-5-dimethylaminothiazoline (0.156 g, 0.55 mmol) in THF (2.5 mL) was added iodine (0.281 g, 1.1 mmol) at room temperature, and the mixture was stirred for 2 h at this temperature. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 5 : 1 : 0.01) to give the 5-aminothiazole 5a (0.132 g, 86%) as a brownish yellow oil. IR (neat) 3059, 2947, 2786, 1599, 1530, 1489, 1345, 1148, 1070, 914, 762, 690 cm⁻¹; ¹H NMR (CDCl₃) δ 2.64 (s, 6H, NMe₂), 7.18 (d, J = 7.3 Hz, 1H, Ar), 7.23-7.34 (m, 5H, Ar), 7.84 (d, J = 7.3 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 46.5 (NMe₂); MS (EI) m/z 280 (M⁺); HRMS (EI) Calcd for C_{17}H_{16}N₂S (M⁺) 280.1034, found: 280.1025.

2-Phenyl-4-(4-methoxyphenyl)-5-dimethylaminothiazole (5b)

To a solution of 2-phenyl-4-(4-methoxyphenyl)-5-dimethylaminothiazoline (0.220 g, 0.70 mmol) in THF (2.5 mL) was added iodine (0.355 g, 1.4 mmol) at room temperature, and the mixture was stirred for 2 h at this temperature. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 7 : 1 : 0.01) to give the 5-aminothiazole 5b (0.188 g, 87%) as a brown oil. IR (neat) 2947, 2832, 2785, 1609, 1497, 1467, 1251, 1174, 1035, 915, 836, 761, 689, 568, 469 cm⁻¹; ¹H NMR (CDCl₃) δ 2.63 (s, 6H, NMe₂), 3.72 (s, 3H, OMe), 6.86 (d, J = 8.8 Hz, 2H, Ar), 7.22-7.31 (m, 3H, Ar), 7.83 (d, J = 7.8 Hz, 2H, Ar), 8.04 (d, J = 8.8 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 46.5 (NMe₂), 55.1 (OMe), 113.5, 125.8, 127.6, 128.6, 128.9, 129.1, 134.3,
2-Phenyl-4-(4-fluorophenyl)-5-dimethylaminothiazole (5c)

To a solution of 2-phenyl-4-(4-fluorophenyl)-5-dimethylaminothiazoline (0.174 g, 0.58 mmol) in THF (2.5 mL) was added iodine (0.294 g, 1.16 mmol) at room temperature, and the mixture was stirred for 2 h at this temperature. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 5 : 1 : 0.01) to give the 5-aminothiazole 5c (0.170 g, 98%) as a brown oil. IR (neat) 2947, 2787, 1535, 1497, 1339, 1221, 1155, 839, 761, 689 cm⁻¹; ¹H NMR (CDCl₃) δ 2.66 (s, 6H, NMe₂), 7.02 (t, J = 8.8 Hz, 2H, Ar), 7.28-7.34 (m, 3H, Ar), 7.84 (dd, J = 8.1 Hz, J = 1.2 Hz, 2H, Ar), 8.10 (dd, J = 8.8 Hz, J = 5.9 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 46.6 (NMe₂), 114.9, 115.2, 125.9, 128.7, 129.3, 129.4, 129.5, 131.1, 131.1, 134.3, 140.9, 150.9, 158.0, 160.6, 163.0 (SCN); ¹⁹F NMR (CDCl₃) δ -115.1; MS (EI) m/z 298 (M⁺); HRMS (EI) calcd for C₁₇H₁₅FN₂S (M⁺) 298.0940, found: 298.0941.

2-(4-Methoxyphenyl)-4-phenyl-5-dimethylaminothiazole (5d)

To a solution of 2-(4-methoxyphenyl)-4-phenyl-5-dimethylaminothiazoline (0.179 g, 0.57 mmol) in THF (2.5 mL) was added iodine (0.291 g, 1.14 mmol) at room temperature, and the mixture was stirred for 2 h at this temperature. The resulting mixture was poured into a saturated aqueous solution of NH₄Cl, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 7 : 1 : 0.01) to give the 5-aminothiazole 5d (0.131 g, 74%) as a brown oil. IR (neat) 2948, 2836, 2784, 1607, 1519, 1490, 1443, 1249, 1173, 1033, 916, 832, 770, 696, 561, 437 cm⁻¹; ¹H NMR (CDCl₃) δ 2.65 (s, 6H, NMe₂), 3.73 (s, 3H, OMe), 6.83 (d, J = 8.8 Hz, 2H, Ar), 7.19 (t, J = 7.3 Hz, 1H, Ar), 7.33 (t, J = 7.6 Hz, 2H, Ar), 7.78 (d, J = 9.3 Hz,
2H, Ar), 8.10 (d, J = 6.8 Hz, 2H, Ar); $^{13}$C NMR (CDCl$_3$) δ 46.7 (NMe$_2$), 55.3 (OMe), 114.0, 127.0, 127.3, 127.5, 127.6, 128.2, 135.0, 141.6, 150.5, 158.0, 160.6 (SC=N); MS (EI) m/z 310 (M$^+$); HRMS (EI) Calcd for C$_{18}$H$_{18}$N$_2$OS (M$^+$) 310.1140, found: 310.1125.

2-(4-Fluorophenyl)-4-phenyl-5-dimethylaminothiazole (5e)

To a solution of 2-(4-fluorophenyl)-4-phenyl-5-dimethylaminothiazoline (0.090 g, 0.30 mmol) in THF (2.5 mL) was added iodine (0.153 g, 0.60 mmol) at room temperature, and the mixture was stirred for 2 h at this temperature. The resulting mixture was poured into a saturated aqueous solution of NH$_4$Cl, and extracted with CH$_2$Cl$_2$. The organic layer was dried over MgSO$_4$ and concentrated in vacuo. The residue was purified by column chromatography (SiO$_2$, hexane : EtOAc : Et$_3$N = 7 : 1 : 0.01) to give the 5-dimethylaminothiazole 5e (0.082 g, 92%) as a yellow oil. IR (neat) 2948, 2830, 2788, 1601, 1517, 1490, 1230, 1153, 1097, 770, 698 cm$^{-1}$; $^1$H NMR (CDCl$_3$) δ 2.67 (s, 6H, NMe$_2$), 7.01 (t, J = 8.8 Hz, 2H, Ar), 7.20 (t, J = 7.6 Hz, 1H, Ar), 7.34 (t, J = 7.6 Hz, 2H, Ar), 7.88 (dd, J = 8.8 Hz, J = 5.4 Hz, 2H, Ar), 8.08 (d, J = 7.3 Hz, 2H, Ar); $^{13}$C NMR (CDCl$_3$) δ 46.6 (NMe$_2$), 115.6, 115.8, 127.1, 127.6, 127.7, 127.7, 128.3, 130.8, 130.8, 134.8, 141.6, 151.4, 156.5, 162.2, 164.7 (SC=N); $^{19}$F NMR (CDCl$_3$) δ -112.2; MS (EI) m/z 298 (M$^+$); HRMS (EI) calcd for C$_{17}$H$_{15}$FN$_2$S (M$^+$) 298.0940, found: 298.0924.

2,4-Diphenyl-5-diphenylaminothiazole (5f)

To a solution of 2,4-diphenyl-5-diphenylaminothiazoline (0.323 g, 0.8 mmol) in THF (5 mL) was added iodine (0.404 g, 1.6 mmol) at room temperature, and the mixture was stirred for 2 h under reflux. The resulting mixture was poured into a saturated aqueous solution of Na$_2$S$_2$O$_3$, and extracted with CH$_2$Cl$_2$. The organic layer was dried over MgSO$_4$ and concentrated in vacuo. The residue was purified by column chromatography (SiO$_2$, hexane : EtOAc : Et$_3$N = 30 : 1 : 0.01) to give the 5-aminothiazole 5f (0.319 g, 99%) as a white solid. (mp 164-165 °C); IR (KBr) 3054, 1585, 1489, 1268, 1227, 759, 692 cm$^{-1}$; $^1$H NMR (CDCl$_3$) δ 6.90 (t, J = 7.3 Hz, 2H, Ar), 7.04-7.07 (m, 4H, Ar), 7.11-7.20 (m, 7H, Ar), 7.31-7.35 (m, 3H, Ar), 7.85-7.90 (m, 4H, Ar); $^{13}$C
NMR (CDCl₃) δ 121.4, 123.1, 126.2, 127.4, 128.0, 128.2, 128.8, 129.2, 130.0, 133.4, 133.9, 139.8, 146.5, 148.8, 163.5 (SC=N); MS (EI) m/z 404 (M⁺); HRMS (EI) calcd for C₂₇H₂₀N₂S(M⁺) 404.1347, found: 404.1367.

2-(4-Methoxyphenyl)-5-phenyl-5-diphenylaminothiazole (5g)

To a solution of 2-(4-methoxyphenyl)-4-phenyl-5-diphenylaminothiazole (0.281 g, 0.64 mmol) in THF (4.0 mL) was added iodine (0.330 g, 1.3 mmol) at room temperature, and the mixture was stirred for 4 h under reflux. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₃, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 30 : 1 : 0.01) to give the 5-aminothiazole 5g (0.251 g, 90%) as a white solid. (mp 152-155 °C); IR (KBr) 3064, 2926, 2839, 1602, 1515, 1490, 1415, 1341, 1290, 1245, 1173, 1029, 975, 838, 748, 514 cm⁻¹; ¹H NMR (CDCl₃) δ 3.75 (s, 3H, OMe), 6.86 (d, J = 8.8 Hz, 2H, Ar), 6.90 (t, J = 7.3 Hz, 2H, Ar), 7.05-7.07 (m, 4H, Ar), 7.10-7.20 (m, 7H, Ar), 7.82 (d, J = 8.8 Hz, 2H, Ar), 7.85-7.88 (m, 2H, Ar); ¹³C NMR (CDCl₃) δ 55.4 (OMe), 114.1, 121.3, 122.9, 127.0, 127.4, 127.7, 127.9, 128.2, 129.2, 133.4, 138.9, 146.5, 148.6, 161.2, 163.6 (SC=N); MS (EI) m/z 434 (M⁺); HRMS (EI) Calcd for C₂₈H₂₂N₂OS(M⁺) 434.1453, found: 434.1437.

2-(4-Fluorophenyl)-4-phenyl-5-diphenylaminothiazole (5h)

To a solution of 2-(4-fluorophenyl)-4-phenyl-5-diphenylaminothiazole (0.151 g, 0.36 mmol) in THF (2.5 mL) was added iodine (0.183 g, 0.72 mmol) at room temperature, and the mixture was stirred for 2.5 h under reflux. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₃, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 10 : 1 : 0.01) to give the 5-aminothiazole 5h (0.149 g, 99%) as a faint yellow solid. (mp 158-160 °C); IR (KBr) 2963, 1586, 1519, 1490, 1262, 1227, 1156, 1103, 1025, 807,
759, 693 cm⁻¹; ¹H NMR (CDCl₃) δ 6.92 (t, J = 7.3 Hz, 2H, Ar), 7.02-7.07 (m, 6H, Ar), 7.13-7.21 (m, 7H, Ar), 7.84-7.90 (m, 4H, Ar); ¹³C NMR (CDCl₃) δ 115.8, 116.0, 121.4, 123.1, 127.4, 128.1 (d, J = 9.1 Hz, Ar), 128.1, 129.3, 130.3 (d, J = 2.4 Hz, Ar), 133.2, 139.9, 146.4, 148.8, 162.5 (d, J = 35.6 Hz, Ar) 165.2 (SC=N); MS (EI) m/z 422 (M⁺); HRMS (EI) calcd for C₂₇H₁₉FN₂S (M⁺) 422.1253, found: 422.1262.

2-(4-Chlorophenyl)-4-phenyl-5-diphenylaminothiazole (5i)

To a solution of 2-(4-chlorophenyl)-4-phenyl-5-diphenylaminothiazoline (0.223 g, 0.5 mmol) in THF (4 mL) was added iodine (0.255 g, 1.0 mmol) at room temperature, and the mixture was stirred for 4 h under reflux. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₃, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 30 : 1 : 0.01) to give the 5-aminothiazole 5i (0.211 g, 96%) as a faint yellow solid. (mp 166-168 °C); IR (KBr) 1586, 1524, 1487, 1341, 1275, 1090, 976, 832, 755, 692 cm⁻¹; ¹H NMR (CDCl₃) δ 6.86 (t, J = 7.3 Hz, 2H, Ar), 7.02-7.04 (m, 4H, Ar), 7.10-7.18 (m, 7H, Ar), 7.27 (d, J = 8.8 Hz, 2H, Ar), 7.78 (d, J = 8.3 Hz, 2H, Ar), 7.84 (d, J = 6.8 Hz, 2H, Ar); ¹³C NMR (CDCl₃) δ 121.4, 123.2, 127.3, 127.4, 128.1, 128.2, 129.0, 129.2, 132.4, 133.2, 135.9, 140.2, 146.4, 148.8, 162.0 (SC=N); MS (EI) m/z 438 (M⁺); HRMS (EI) calcd for C₂₇H₁₉ClN₂S (M⁺) 438.0957, found: 438.0943.

2-Phenyl-4-(4-chlorophenyl)-5-diphenylaminothiazole (5j)

To a solution of 2-phenyl-4-(4-chlorophenyl)-5-diphenylaminothiazoline (0.221 g, 0.5 mmol) in THF (4.0 mL) was added iodine (0.255 g, 1.0 mmol) at room temperature, and the mixture was stirred for 4 h under reflux. The resulting mixture was poured into a saturated aqueous solution of Na₂S₂O₃, and extracted with CH₂Cl₂. The organic layer was dried over MgSO₄ and concentrated in vacuo. The residue was purified by column chromatography (SiO₂, hexane : EtOAc : Et₃N = 30 : 1 : 0.01) to give the 5-aminothiazole 5j (0.189 g, 86%) as a faint yellow solid. (mp 164-165 °C); IR (KBr) 1585, 1530, 1486, 1458, 1347, 1277, 1231, 1087, 1013, 977,
To a solution of 2-(4-methoxyphenyl)-4-phenyl-5-(methylphenylamino)thiazoline (0.187 g, 0.5 mmol) in THF (2.5 mL) was added iodine (0.255 g, 1.0 mmol) at room temperature, and the mixture was stirred for 2 h at this temperature. The resulting mixture was poured into a saturated aqueous solution of NH$_4$Cl, and extracted with CH$_2$Cl$_2$. The organic layer was dried over MgSO$_4$ and concentrated in vacuo. The residue was purified by column chromatography (SiO$_2$, hexane : EtOAc : Et$_3$N = 7 : 1 : 0.01) to give the 5-aminothiazole 5k (0.116 g, 62%) as a yellow ochre solid. (mp 100-101 °C); IR (KBr) 2939, 1904, 1596, 1491, 1298, 1258, 1211, 1168, 1136, 1111, 1028, 977, 833, 751, 701 cm$^{-1}$; $^1$H NMR (CDCl$_3$) $\delta$ 3.10 (s, 3H, NMe), 3.74 (s, 3H, OMe), 6.76-6.87 (m, 5H, Ar), 7.12-7.21 (m, 3H, Ar), 7.26 (t, $J = 7.3$ Hz, 2H, Ar), 7.83 (d, $J = 9.4$ Hz, 2H, Ar), 7.90 (d, $J = 7.3$ Hz, 2H, Ar); $^{13}$C NMR (CDCl$_3$) $\delta$ 40.3 (NMe), 55.3 (OMe), 114.1, 114.2, 119.3, 127.1, 127.3, 127.7, 127.9, 128.5, 129.1, 133.8, 141.0, 148.3, 148.4, 161.1, 163.2 (SC=N); MS (EI) m/z 372 (M$^+$); HRMS (EI) Calcd for C$_{23}$H$_{20}$N$_2$OS (M$^+$) 372.1296, found: 372.1294.

2-(4-Chlorophenyl)-4-phenyl-5-di(4-methoxyphenyl)aminothiazole (5I)

To a solution of 2-(4-chlorophenyl)-4-phenyl-5-di(4-methoxyphenyl)aminothiazoline (0.251 g, 0.5 mmol) in THF (3.5 mL) was added iodine (0.255 g, 1.0 mmol) at room temperature, and the mixture was stirred for 4 h under reflux. The resulting mixture was poured into a saturated aqueous solution of Na$_2$S$_2$O$_3$, and extracted with CH$_2$Cl$_2$. The organic layer was dried over MgSO$_4$ and concentrated *in vacuo*. The residue was purified by column chromatography (SiO$_2$, hexane : EtOAc : Et$_3$N = 7 : 1 : 0.01) to give the 5-aminothiazole 5I (0.162 g, 65%) as yellow ochre solid. (mp 129-130 °C); IR (KBr) 2936, 1904, 1594, 1491, 1298, 1258, 1211, 1168, 1136, 1111, 1028, 977, 833, 751, 701 cm$^{-1}$; $^1$H NMR (CDCl$_3$) $\delta$ 3.08 (s, 3H, NMe), 3.71 (s, 3H, OMe), 6.76-6.88 (m, 5H, Ar), 7.12-7.21 (m, 3H, Ar), 7.26 (t, $J = 7.3$ Hz, 2H, Ar), 7.83 (d, $J = 9.4$ Hz, 2H, Ar), 7.90 (d, $J = 7.3$ Hz, 2H, Ar); $^{13}$C NMR (CDCl$_3$) $\delta$ 39.9 (NMe), 55.1 (OMe), 114.1, 114.2, 119.3, 127.1, 127.3, 127.7, 127.9, 128.5, 129.1, 133.8, 141.0, 148.3, 148.4, 161.1, 164.8 (SC=N); MS (EI) m/z 372 (M$^+$); HRMS (EI) Calcd for C$_{23}$H$_{20}$N$_2$OS (M$^+$) 372.1294, found: 372.1294.
hexane : EtOAc : Et$_3$N = 30 : 1 : 0.01) to give the 5-aminothiazole 5I (0.259 g) with a small amount of unidentified compounds. The product was purified again by recrystallization (CH$_2$Cl$_2$/hexane) to give the thiazole 5I (0.236 g, 95%) as a yellow solid. (mp 54-55 °C); IR (KBr) 1506, 1241, 1036, 695, 608 cm$^{-1}$; $^1$H NMR (CDCl$_3$) $\delta$ 3.63 (s, 6H, OMe), 6.67 (d, $J$ = 9.0 Hz, 4H, Ar), 6.92 (d, $J$ = 9.0 Hz, 4H, Ar) 7.11 (t, $J$ = 7.3 Hz, 1H, Ar) , 7.18 (t, $J$ = 7.3 Hz, 2H, Ar), 7.28 (d, $J$ = 8.3 Hz, 2H, Ar), 7.78 (d, $J$ = 8.6 Hz, 2H, Ar), 7.87 (d, $J$ = 9.0 Hz, 2H, Ar); $^{13}$C NMR (CDCl$_3$) $\delta$ 55.4 (OMe), 114.5, 122.7, 127.3, 127.4, 127.9, 128.2, 129.0, 132.6, 133.3, 135.7, 140.6, 141.7, 147.6, 155.6, 161.1 (SC=N); MS (EI) m/z 498 (M$^+$); HRMS (EI) calcd for C$_{29}$H$_{23}$ClN$_2$O$_2$S (M$^+$) 498.1169, found: 498.1151.

X-Ray Analyses. The measurement of 4f was carried out on a Rigaku/MSC Mercury CCD diffractometer with graphite-monochromates Mo-Kα radiation ($\lambda$ = 0.71069 Å). Reflection data were collected at 113-153 K using a Rigaku XR-TCS-2-050 temperature controller. X-Ray absorption was corrected by numerical methods based on the crystal shape. The measurement of 5f was carried out on a Rigaku SCX mini diffractometer with graphite-monochlomates Mo-Kα radiation ($\lambda$ = 0.71069 Å). X-Ray absorption was corrected by numerical methods based on the crystal shape. The structures were solved and refined using the Yadokari-XG crystallographic software package of Molecular Structure Corporation. The X-ray quality crystal was obtained by slow diffusion of hexane into CH$_2$Cl$_2$ solution of 4f and 5f. The crystal was cut from the grown crystals and was mounted on a glass fiber. The structures were solved by direct method using SHELXL-97.$^2$ Crystal data and measurement description are summarized in Table S1.
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$^a$ $R1 = \Sigma ||F_o| - |F_c||/\Sigma |F_o|$.  
$^b$ wR2 = $[\Sigma \{w(F_o^2 - F_c^2)^2\}^1/\Sigma w(F_o^2)^2]^{1/2}$, w = 1/$[\sigma^2 F_o^2 + (aP)^2 + bP]$.  
(a and b are constants suggested by the refinement program; P = \[max(F_o^2,0) + 2F_c^2\]/3).  
$^c$ GOF = $[\Sigma w(F_o^2 - F_c^2)^2/(N_{\text{obs}} - N_{\text{params}})]^{1/2}$.  

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S17
References


(S2) Sheldrick, G. M. *SHELX-97, Program for the Refinement of Crystal Structures*; University of Gottingen: Gottingen, Germany, 1997.
Ph\[\text{S}\cdot\text{NPh}_2\]

[Chemical Shift Graph]

S24
S38