**One-pot direct synthesis of Weinreb amides from aryl and hetero aryl
halides using $\text{Co}_2(\text{CO})_8$ as an effective CO source under conventional
thermal heating**

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CONTENTS

The ^1H NMR and ^{13}C NMR data and spectra of all the isolated compounds along with
elemental analysis data for the new compounds

3a. N-Methoxy-3,N-dimethyl-benzamide.¹ Following the general procedure, **3a** was obtained as a colourless liquid; Yield: (164 mg, 91%); ¹H-NMR (300 MHz, CDCl₃): δ = 7.46-7.44 (m, 2H), 7.27-7.25 (m, 2H), 3.57 (s, 3H), 3.35 (s, 3H), 2.38 (s, 3H); ¹³C NMR (CDCl₃, 75 MHz): δ = 170.2, 137.7, 134.1, 131.2, 128.6, 127.8, 124.9, 60.9, 21.26; MS ESI calcd. For C₉H₁₁NO₂ [M + H]⁺ = 180.4

3b. N-Methoxy-N-methyl-benzamide.² Following the general procedure, **3b** was obtained as a colourless liquid; Yield: (139 mg, 84%); ¹H-NMR (300 MHz, CDCl₃): δ = 7.65 (d, J = 7.59 Hz, 2H), 7.56-7.35 (m, 3H), 3.57 (s, 3H), 3.43 (s, 3H); ¹³C NMR (CDCl₃, 75 MHz): δ = 170.1, 134.1, 133.7, 128.1, 127.2, 61.1; MS ESI calcd. For C₉H₁₁NO₂ [M + H]⁺ = 166.3

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3h. 4-Formyl-*N*-methoxy-*N*-methyl-benzamide. Following the general procedure, **3h** was obtained as a white solid; Yield: 155 mg, 80% for bromo analogue and 139 mg, 72% for iodo analogue; ^1H -NMR (300 MHz, CDCl_3): δ = 10.06 (s, 1H), 7.92 (d, J = 8.40 Hz, 2H), 7.80 (d, J = 8.22 Hz, 2H), 3.68 (s, 3H), 3.37 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): δ = 191.6, 168.7, 139.6, 137.3, 129.8, 128.6, 61.2, 33.3; MS ESI calcd. For $\text{C}_{10}\text{H}_{11}\text{NO}_3$ $[\text{M} + \text{H}]^+ = 194.5$. Anal. Calcd for $\text{C}_{10}\text{H}_{11}\text{NO}_3$: C, 62.17; H, 5.74; N, 7.25; O, 24.84. Found: C, 62.20; H, 5.72; N, 7.26, O, 24.81.

3i. 4-Methanesulfonyl-*N*-methoxy-*N*-methyl-benzamide. Following the general procedure, **3i** was obtained as a white solid; Yield: (180 mg, 74%); ^1H -NMR (400 MHz, CDCl_3): δ =

8.00 (d, $J = 8.36$ Hz, 2H), 7.86 (d, $J = 8.32$ Hz, 2H), 3.54 (s, 3H), 3.40 (s, 3H), 3.09 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): $\delta = 168.0, 142.0, 139.4, 129.1, 127.2, 61.4, 44.4$; MS ESI calcd. For $\text{C}_{10}\text{H}_{13}\text{NO}_4\text{S}[\text{M} + \text{H}]^+ = 244.5$. Anal. Calcd for $\text{C}_{10}\text{H}_{13}\text{NO}_4\text{S}$: C, 49.37; H, 5.39; N, 5.76; O, 26.31; S, 13.18. Found: C, 49.38; H, 5.33; N, 5.72; O, 26.34; S, 13.19.

3j. 4-Benzoyl-*N*-methoxy-*N*-methyl-benzamide.² Following the general procedure, **3j** was obtained as a colourless liquid; Yield: (232 mg, 86%); ^1H -NMR (300 MHz, CDCl_3): $\delta = 7.75$ -7.73 (m, 6H), 7.58-7.56 (m, 1H), 7.46-7.45 (m, 2H), 3.53 (s, 3H), 3.36 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 197.6, 169.0, 136.9, 134.6, 132.8, 130.2, 128.5, 61.3, 26.8$; MS ESI calcd. For $\text{C}_{16}\text{H}_{15}\text{NO}_3[\text{M} + \text{H}]^+ = 270.2$

3k. Biphenyl-4-carboxylic acid methoxy-methyl-amide.¹ Following the general procedure, **3k** was obtained as a white solid; Yield: 193 mg, 80% for bromo analogue and 181 mg, 75% for iodo analogue; ^1H -NMR (300 MHz, CDCl_3): $\delta = 7.78$ -7.64 (m, 3H), 7.60-7.47 (m, 3H), 7.45-7.44 (m, 2H), 7.36-7.35 (m, 1H), 3.59 (s, 3H), 3.39 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 169.8, 143.5, 140.3, 133.9, 128.9, 127.9, 127.2, 126.8, 61.2, 38.1$; MS ESI calcd. For $\text{C}_{15}\text{H}_{15}\text{NO}_2[\text{M} + \text{H}]^+ = 242.1$.

3l. *N*-Methoxy-*N*-methyl-3-nitro-benzamide.¹ Following the general procedure, **3l** was obtained as a colourless liquid; Yield: 137 mg, 65% for bromo analogue and 122 mg, 58% for iodo analogue. ^1H -NMR (300 MHz, CDCl_3): $\delta = 8.59$ (s, 1H), 8.33 (d, $J = 6.00$ Hz, 1H), 8.05 (d, $J = 6.00$ Hz, 1H), 7.62 (t, $J = 6.00$ Hz, 1H), 3.57 (s, 3H), 3.42 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 167.2, 147.8, 135.5, 134.4, 129.2, 125.3, 123.6, 61.4, 33.3$; MS ESI calcd. For $\text{C}_9\text{H}_{10}\text{N}_2\text{O}_4[\text{M} + \text{H}]^+ = 211.2$.

3m. *N*-Methoxy-*N*-methyl-terephthalamic acid ethyl ester. Following the general procedure, **3m** was obtained as a colourless liquid; Yield: 211 mg, 89% for bromo analogue and 190 mg, 80% for iodo analogue. ^1H -NMR (300 MHz, CDCl_3): $\delta = 8.05$ -8.04 (m, 2H),

7.69-7.68 (m, 2H), 4.37 (q, J = 6.00 Hz, 2H), 3.49 (s, 3H), 3.33 (s, 3H), 1.37 (t, J = 6.00 Hz, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): δ = 169.1, 166.0, 138.2, 132.2, 129.3, 128.1, 61.3, 14.4; MS ESI calcd. For $\text{C}_{12}\text{H}_{15}\text{NO}_4$ $[\text{M} + \text{H}]^+ = 238.6$. Anal. Calcd for $\text{C}_{12}\text{H}_{15}\text{NO}_4$: C, 60.75; H, 6.37; N, 5.90; O, 26.97. Found: C, 60.76; H, 6.38; N, 5.89; O, 26.99.

3n. 3-Cyano-*N*-methoxy-*N*-methyl-benzamide.³ Following the general procedure, **3n** was obtained as a colourless liquid; Yield: (131 mg, 69%); ^1H -NMR (300 MHz, CDCl_3): δ = 8.02 (s, 1H), 7.95 (d, J = 6.00 Hz, 1H), 7.76 (d, J = 6.00 Hz, 1H), 7.55-7.54 (m, 1H), 3.54 (s, 3H), 3.39 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): δ = 167.3, 135.1, 134.0, 132.7, 132.0, 129.1, 118.2, 112.4, 61.3, 33.3; MS ESI calcd. For $\text{C}_{10}\text{H}_{10}\text{N}_2\text{O}_2$ $[\text{M} + \text{H}]^+ = 191.5$

3o. 3,4,*N*-Trimethoxy-*N*-methyl-benzamide.³ Following the general procedure, **3o** was obtained as a colourless liquid; Yield: (202.5 mg, 90%); ^1H -NMR (400 MHz, CDCl_3): δ 7.40 (d, J = 8.00 Hz, 1H), 7.33 (s, 1H), 6.87 (d, J = 8.40 Hz, 1H), 3.93 (s, 6H), 3.58 (s, 3H), 3.37 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): δ = 169.2, 151.1, 148.3, 126.1, 122.1, 111.9, 110.1, 60.9, 55.95, 55.91, 34.0; MS ESI calcd. For $\text{C}_{11}\text{H}_{15}\text{NO}_4$ $[\text{M} + \text{H}]^+ = 226.4$.

3p. *N*-Methoxy-*N*-methyl-nicotinamide.⁴ Following the general procedure, **3p** was obtained as a colourless liquid; Yield: 133 mg, 80% for bromo analogue and 90 mg, 54% for bromo analogue; ^1H -NMR (400 MHz, CDCl_3): δ 8.98 (s, 1H), 8.71-8.65 (m, 1H), 8.04 (d, J = 8.00 Hz, 1H), 7.38-7.37 (m, 1H), 3.57 (s, 3H), 3.40 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): δ = 167.3, 151.2, 149.2, 136.3, 130.0, 123.1, 61.3, 33.2; MS ESI calcd. For $\text{C}_8\text{H}_{10}\text{N}_2\text{O}_2$ $[\text{M} + \text{H}]^+ = 167.3$.

3q. 6-Chloro-*N*-methoxy-*N*-methyl-nicotinamide. Following the general procedure, **3q** was obtained as a colourless liquid; Yield: (138 mg, 69%); ^1H -NMR (400 MHz, CDCl_3): δ 8.78 (s, 1H), 8.03 (d, J = 8.40 Hz, 1H), 7.40 (d, J = 8.40 Hz, 1H), 3.57 (s, 3H), 3.40 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): δ = 166.2, 153.4, 149.7, 139.1, 128.5, 123.8, 61.3, 33.1; MS

ESI calcd. For $C_8H_9ClN_2O_2$ $[M + H]^+ = 201.5$. Anal.Calcd for $C_8H_9ClN_2O_2$: C, 47.89; H, 4.52; Cl, 17.67; N, 13.96; O, 15.95. Found: C, 47.87; H, 4.53; Cl, 17.67; N, 13.93; O, 15.91.

3r. 2-Methoxy-1-(6-trifluoromethyl-pyridin-3-yl)-propan-1-one. Following the general procedure, **3r** was obtained as a colourless liquid; Yield: (185.5 mg, 79%); 1H -NMR (400 MHz, $CDCl_3$): δ 9.04 (s, 1H), 8.23-8.19 (m, 1H), 7.77-7.74 (m, 1H), 3.57 (s, 3H), 3.42 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ =166.0, 149.5, 149.2, 137.7, 132.5, 122.5, 119.8, 61.5, 33.0; MS ESI calcd. For $C_8H_9F_3N_2O_2$ $[M + H]^+ = 235.4$. Anal.Calcd for $C_8H_9F_3N_2O_2$: C, 46.16; H, 3.87; F, 24.34; N, 11.96; O, 13.66. Found: C, 46.13; H, 3.88; F, 24.35; N, 11.94; O, 13.63.

3s. 6-Oxo-1,6-dihydro-pyridine-3-carboxylic acid methoxy-methyl-amide. Following the general procedure, **3s** was obtained as white solid; Yield: (124 mg, 74%); 1H -NMR (400 MHz, $CDCl_3$): δ = 8.22 (s, 1H), 8.05-8.02 (m, 1H), 6.60-6.58 (m, 1H), 3.64 (s, 3H), 3.36 (s, 3H); ^{13}C NMR ($CDCl_3$, 75 MHz): δ =164.9, 142.3, 138.6, 119.4, 113.5, 61.1, 33.3; MS ESI calcd. For $C_7H_9N_3O_2$ $[M + H]^+ = 183.5$. Anal.Calcd for $C_8H_{10}N_2O_3$: C, 52.74; H, 5.53; N, 15.38; O, 26.35. Found: C, 52.72; H, 5.51; N, 15.39; O, 26.35.

3t. Thiophene-3-carboxylic acid methoxy-methyl-amide.¹ Following the general procedure, **3t** was obtained as a colourless liquid; Yield: 149 mg, 87% for bromo analogue and 122 mg, 71% for iodo analogue; 1H -NMR (400 MHz, $CDCl_3$): δ =8.07 (dd, J = 4.2, 1.2 Hz, 1H), 7.58 (dd, J = 6.3, 1.2 Hz, 1H), 7.30-7.29 (m, 1H), 3.67 (s, 3H), 3.38 (s, 3H); ^{13}C NMR ($CDCl_3$, 75 MHz): δ =163.8, 134.5, 130.8, 129.0, 124.7, 61.2, 33.3; MS ESI calcd. For $C_7H_9NO_2S$ $[M + H]^+ = 172.7$.

3u. Thiophene-2-carboxylic acid methoxy-methyl-amide.⁵ Following the general procedure, **3u** was obtained as a colourless liquid; Yield: (122 mg, 75%); ¹H-NMR (400 MHz, CDCl₃): δ =7.98-7.97 (m, 1H), 7.56-7.55 (m, 1H), 7.12-7.11 (m, 1H), 3.80 (s, 3H), 3.38 (s, 3H); ¹³C NMR (CDCl₃, 75 MHz): δ =162.3, 134.4, 133.3, 132.2, 126.8, 61.5, 33.0; MS ESI calcd. For C₇H₉NO₂S [M + H]⁺ = 172.3.

3v. Dibenzothiophene-2-carboxylic acid methoxy-methyl-amide. Following the general procedure, **3v** was obtained as a white solid; Yield: (195 mg, 72%); ¹H-NMR (400 MHz, CDCl₃): δ =8.55 (s, 1H), 8.21-8.20 (m, 1H), 7.89-7.88 (m, 2H), 7.83-7.82 (m, 1H), 7.50-7.49 (m, 2H), 3.59 (s, 3H), 3.45 (s, 3H); ¹³C NMR (CDCl₃, 75 MHz): δ =161.3, 141.9, 139.6, 135.3, 135.2, 130.2, 127.1, 126.5, 124.7, 122.8, 122.2, 122.02, 121.8, 61.1, 33.1; MS ESI calcd. For C₁₅H₁₃NO₂S [M + H]⁺ = 272.6. Anal.Calcd for C₁₅H₁₃NO₂S; C, 66.40; H, 4.83; N, 5.16; O, 11.79; S, 11.82. Found: C, 66.41; H, 4.81; N, 5.19; O, 11.80; S, 11.82.

3w. Dibenzofuran-2-carboxylic acid methoxy-methyl-amide. Following the general procedure, **3w** was obtained as a white solid; Yield: (155 mg, 61%); ¹H-NMR (400 MHz, CDCl₃): δ =8.39 (s, 1H), 8.00 (d, J = 7.72 Hz, 1H), 7.88 (d, J = 6.80 Hz, 1H), 7.54-7.53 (m, 2H), 7.51 (t, J = 7.08 Hz, 1H), 7.41 (t, J = 6.72 Hz, 1H); ¹³C NMR (CDCl₃, 75 MHz): δ =169.7, 157.3, 156.7, 128.6, 127.8, 126.7, 124.0, 123.8, 123.1, 121.6, 120.9, 111.8, 111.2, 61.0, 33.2; MS ESI calcd. For C₁₅H₁₃NO₃ [M + H]⁺ = 256.8. Anal.Calcd for C₁₅H₁₃NO₃; C, 70.58; H, 5.13; N, 5.49; O, 18.80. Found: C, 70.55; H, 5.11; N, 5.52; O, 18.83.

Reference for the compounds (**3a-3w**)

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3f. *N*-Methoxy-*N*-methyl-4-nitro-benzamide. Following the general procedure, **3f** was obtained as a colourless liquid; Yield: (149 mg, 71%); ^1H -NMR (300 MHz, CDCl_3): δ = 7.79 (d, J = 6.00 Hz, 2H), 7.68 (d, J = 6.00 Hz, 2H), 3.54 (s, 3H), 3.39 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): δ = 168.5, 137.5, 128.5, 125.0, 61.3, 33.3; MS ESI calcd. For $\text{C}_9\text{H}_{10}\text{N}_2\text{O}_4$ $[\text{M} + \text{H}]^+ = 211.3$. Anal. Calcd for $\text{C}_9\text{H}_{10}\text{N}_2\text{O}_4$: C, 51.43; H, 4.80; N, 13.33; O, 30.45. Found: C, 51.41; H, 4.74; N, 13.32, O, 30.32

3g. 4-Chloro-*N*-methoxy-*N*-methylbenzamide.¹ Following the general procedure, **3g** was obtained as a colourless liquid; Yield: 163 mg, 82% for bromo analogue and 169 mg, 85% for iodo analogue; ^1H -NMR (300 MHz, CDCl_3): δ = 7.66 (d, J = 6.00 Hz, 2H), 7.38 (d, J = 6.00 Hz, 2H), 3.54 (s, 3H), 3.36 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): δ = 168.7, 136.8, 132.3, 129.9, 128.3, 61.1, 33.5; MS ESI calcd. For $\text{C}_9\text{H}_{10}\text{ClNO}_2$ $[\text{M} + \text{H}]^+ = 200.2$

3h. 4-Formyl-*N*-methoxy-*N*-methyl-benzamide. Following the general procedure, **3h** was obtained as a white solid; Yield: 155 mg, 80% for bromo analogue and 139 mg, 72% for iodo analogue; ^1H -NMR (300 MHz, CDCl_3): δ = 10.06 (s, 1H), 7.92 (d, J = 8.40 Hz, 2H), 7.80 (d, J = 8.22 Hz, 2H), 3.68 (s, 3H), 3.37 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): δ = 191.6, 168.7, 139.6, 137.3, 129.8, 128.6, 61.2, 33.3; MS ESI calcd. For $\text{C}_{10}\text{H}_{11}\text{NO}_3$ $[\text{M} + \text{H}]^+ = 194.5$. Anal. Calcd for $\text{C}_{10}\text{H}_{11}\text{NO}_3$: C, 62.17; H, 5.74; N, 7.25; O, 24.84. Found: C, 62.20; H, 5.72; N, 7.26, O, 24.81.

3i. 4-Methanesulfonyl-*N*-methoxy-*N*-methyl-benzamide. Following the general procedure, **3i** was obtained as a white solid; Yield: (180 mg, 74%); ^1H -NMR (400 MHz, CDCl_3): δ =

8.00 (d, $J = 8.36$ Hz, 2H), 7.86 (d, $J = 8.32$ Hz, 2H), 3.54 (s, 3H), 3.40 (s, 3H), 3.09 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): $\delta = 168.0, 142.0, 139.4, 129.1, 127.2, 61.4, 44.4$; MS ESI calcd. For $\text{C}_{10}\text{H}_{13}\text{NO}_4\text{S}[\text{M} + \text{H}]^+ = 244.5$. Anal. Calcd for $\text{C}_{10}\text{H}_{13}\text{NO}_4\text{S}$: C, 49.37; H, 5.39; N, 5.76; O, 26.31; S, 13.18. Found: C, 49.38; H, 5.33; N, 5.72; O, 26.34; S, 13.19.

3j. 4-Benzoyl-*N*-methoxy-*N*-methyl-benzamide.² Following the general procedure, **3j** was obtained as a colourless liquid; Yield: (232 mg, 86%); ^1H -NMR (300 MHz, CDCl_3): $\delta = 7.75$ -7.73 (m, 6H), 7.58-7.56 (m, 1H), 7.46-7.45 (m, 2H), 3.53 (s, 3H), 3.36 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 197.6, 169.0, 136.9, 134.6, 132.8, 130.2, 128.5, 61.3, 26.8$; MS ESI calcd. For $\text{C}_{16}\text{H}_{15}\text{NO}_3[\text{M} + \text{H}]^+ = 270.2$

3k. Biphenyl-4-carboxylic acid methoxy-methyl-amide.¹ Following the general procedure, **3k** was obtained as a white solid; Yield: 193 mg, 80% for bromo analogue and 181 mg, 75% for iodo analogue; ^1H -NMR (300 MHz, CDCl_3): $\delta = 7.78$ -7.64 (m, 3H), 7.60-7.47 (m, 3H), 7.45-7.44 (m, 2H), 7.36-7.35 (m, 1H), 3.59 (s, 3H), 3.39 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 169.8, 143.5, 140.3, 133.9, 128.9, 127.9, 127.2, 126.8, 61.2, 38.1$; MS ESI calcd. For $\text{C}_{15}\text{H}_{15}\text{NO}_2[\text{M} + \text{H}]^+ = 242.1$.

3l. *N*-Methoxy-*N*-methyl-3-nitro-benzamide.¹ Following the general procedure, **3l** was obtained as a colourless liquid; Yield: 137 mg, 65% for bromo analogue and 122 mg, 58% for iodo analogue. ^1H -NMR (300 MHz, CDCl_3): $\delta = 8.59$ (s, 1H), 8.33 (d, $J = 6.00$ Hz, 1H), 8.05 (d, $J = 6.00$ Hz, 1H), 7.62 (t, $J = 6.00$ Hz, 1H), 3.57 (s, 3H), 3.42 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 167.2, 147.8, 135.5, 134.4, 129.2, 125.3, 123.6, 61.4, 33.3$; MS ESI calcd. For $\text{C}_9\text{H}_{10}\text{N}_2\text{O}_4[\text{M} + \text{H}]^+ = 211.2$.

3m. *N*-Methoxy-*N*-methyl-terephthalamic acid ethyl ester. Following the general procedure, **3m** was obtained as a colourless liquid; Yield: 211 mg, 89% for bromo analogue and 190 mg, 80% for iodo analogue. ^1H -NMR (300 MHz, CDCl_3): $\delta = 8.05$ -8.04 (m, 2H),

7.69-7.68 (m, 2H), 4.37 (q, $J = 6.00$ Hz, 2H), 3.49 (s, 3H), 3.33 (s, 3H), 1.37 (t, $J = 6.00$ Hz, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 169.1, 166.0, 138.2, 132.2, 129.3, 128.1, 61.3, 14.4$; MS ESI calcd. For $\text{C}_{12}\text{H}_{15}\text{NO}_4$ $[\text{M} + \text{H}]^+ = 238.6$. Anal. Calcd for $\text{C}_{12}\text{H}_{15}\text{NO}_4$: C, 60.75; H, 6.37; N, 5.90; O, 26.97. Found: C, 60.76; H, 6.38; N, 5.89; O, 26.99.

3n. 3-Cyano-*N*-methoxy-*N*-methyl-benzamide.³ Following the general procedure, **3n** was obtained as a colourless liquid; Yield: (131 mg, 69%); ^1H -NMR (300 MHz, CDCl_3): $\delta = 8.02$ (s, 1H), 7.95 (d, $J = 6.00$ Hz, 1H), 7.76 (d, $J = 6.00$ Hz, 1H), 7.55-7.54 (m, 1H), 3.54 (s, 3H), 3.39 (s, 3H); ^{13}C NMR (CDCl_3 , 75 MHz): $\delta = 167.3, 135.1, 134.0, 132.7, 132.0, 129.1, 118.2, 112.4, 61.3, 33.3$; MS ESI calcd. For $\text{C}_{10}\text{H}_{10}\text{N}_2\text{O}_2$ $[\text{M} + \text{H}]^+ = 191.5$

3o. 3,4,*N*-Trimethoxy-*N*-methyl-benzamide.³ Following the general procedure, **3o** was obtained as a colourless liquid; Yield: (202.5 mg, 90%); ^1H -NMR (400 MHz, CDCl_3): $\delta = 7.40$ (d, $J = 8.00$ Hz, 1H), 7.33 (s, 1H), 6.87 (d, $J = 8.40$ Hz, 1H), 3.93 (s, 6H), 3.58 (s, 3H), 3.37 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): $\delta = 169.2, 151.1, 148.3, 126.1, 122.1, 111.9, 110.1, 60.9, 55.95, 55.91, 34.0$; MS ESI calcd. For $\text{C}_{11}\text{H}_{15}\text{NO}_4$ $[\text{M} + \text{H}]^+ = 226.4$.

3p. *N*-Methoxy-*N*-methyl-nicotinamide.⁴ Following the general procedure, **3p** was obtained as a colourless liquid; Yield: 133 mg, 80% for bromo analogue and 90 mg, 54% for bromo analogue; ^1H -NMR (400 MHz, CDCl_3): $\delta = 8.98$ (s, 1H), 8.71-8.65 (m, 1H), 8.04 (d, $J = 8.00$ Hz, 1H), 7.38-7.37 (m, 1H), 3.57 (s, 3H), 3.40 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): $\delta = 167.3, 151.2, 149.2, 136.3, 130.0, 123.1, 61.3, 33.2$; MS ESI calcd. For $\text{C}_8\text{H}_{10}\text{N}_2\text{O}_2$ $[\text{M} + \text{H}]^+ = 167.3$.

3q. 6-Chloro-*N*-methoxy-*N*-methyl-nicotinamide. Following the general procedure, **3q** was obtained as a colourless liquid; Yield: (138 mg, 69%); ^1H -NMR (400 MHz, CDCl_3): $\delta = 8.78$ (s, 1H), 8.03 (d, $J = 8.40$ Hz, 1H), 7.40 (d, $J = 8.40$ Hz, 1H), 3.57 (s, 3H), 3.40 (s, 3H); ^{13}C NMR (CDCl_3 , 100 MHz): $\delta = 166.2, 153.4, 149.7, 139.1, 128.5, 123.8, 61.3, 33.1$; MS

ESI calcd. For $C_8H_9ClN_2O_2$ $[M + H]^+ = 201.5$. Anal.Calcd for $C_8H_9ClN_2O_2$: C, 47.89; H, 4.52; Cl, 17.67; N, 13.96; O, 15.95. Found: C, 47.87; H, 4.53; Cl, 17.67; N, 13.93; O, 15.91.

3r. 2-Methoxy-1-(6-trifluoromethyl-pyridin-3-yl)-propan-1-one. Following the general procedure, **3r** was obtained as a colourless liquid; Yield: (185.5 mg, 79%); 1H -NMR (400 MHz, $CDCl_3$): δ 9.04 (s, 1H), 8.23-8.19 (m, 1H), 7.77-7.74 (m, 1H), 3.57 (s, 3H), 3.42 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ =166.0, 149.5, 149.2, 137.7, 132.5, 122.5, 119.8, 61.5, 33.0; MS ESI calcd. For $C_8H_9F_3N_2O_2$ $[M + H]^+ = 235.4$. Anal.Calcd for $C_8H_9F_3N_2O_2$: C, 46.16; H, 3.87; F, 24.34; N, 11.96; O, 13.66. Found: C, 46.13; H, 3.88; F, 24.35; N, 11.94; O, 13.63.

3s. 6-Oxo-1,6-dihydro-pyridine-3-carboxylic acid methoxy-methyl-amide. Following the general procedure, **3s** was obtained as white solid; Yield: (124 mg, 74%); 1H -NMR (400 MHz, $CDCl_3$): δ = 8.22 (s, 1H), 8.05-8.02 (m, 1H), 6.60-6.58 (m, 1H), 3.64 (s, 3H), 3.36 (s, 3H); ^{13}C NMR ($CDCl_3$, 75 MHz): δ =164.9, 142.3, 138.6, 119.4, 113.5, 61.1, 33.3; MS ESI calcd. For $C_7H_9N_3O_2$ $[M + H]^+ = 183.5$. Anal.Calcd for $C_8H_{10}N_2O_3$: C, 52.74; H, 5.53; N, 15.38; O, 26.35. Found: C, 52.72; H, 5.51; N, 15.39; O, 26.35.

3t. Thiophene-3-carboxylic acid methoxy-methyl-amide.¹ Following the general procedure, **3t** was obtained as a colourless liquid; Yield: 149 mg, 87% for bromo analogue and 122 mg, 71% for iodo analogue; 1H -NMR (400 MHz, $CDCl_3$): δ =8.07 (dd, J = 4.2, 1.2 Hz, 1H), 7.58 (dd, J = 6.3, 1.2 Hz, 1H), 7.30-7.29 (m, 1H), 3.67 (s, 3H), 3.38 (s, 3H); ^{13}C NMR ($CDCl_3$, 75 MHz): δ =163.8, 134.5, 130.8, 129.0, 124.7, 61.2, 33.3; MS ESI calcd. For $C_7H_9NO_2S$ $[M + H]^+ = 172.7$.

3u. Thiophene-2-carboxylic acid methoxy-methyl-amide.⁵ Following the general procedure, **3u** was obtained as a colourless liquid; Yield: (122 mg, 75%); ¹H-NMR (400 MHz, CDCl₃): δ =7.98-7.97 (m, 1H), 7.56-7.55 (m, 1H), 7.12-7.11 (m, 1H), 3.80 (s, 3H), 3.38 (s, 3H); ¹³C NMR (CDCl₃, 75 MHz): δ =162.3, 134.4, 133.3, 132.2, 126.8, 61.5, 33.0; MS ESI calcd. For C₇H₉NO₂S [M + H]⁺ = 172.3.

3v. Dibenzothiophene-2-carboxylic acid methoxy-methyl-amide. Following the general procedure, **3v** was obtained as a white solid; Yield: (195 mg, 72%); ¹H-NMR (400 MHz, CDCl₃): δ =8.55 (s, 1H), 8.21-8.20 (m, 1H), 7.89-7.88 (m, 2H), 7.83-7.82 (m, 1H), 7.50-7.49 (m, 2H), 3.59 (s, 3H), 3.45 (s, 3H); ¹³C NMR (CDCl₃, 75 MHz): δ =161.3, 141.9, 139.6, 135.3, 135.2, 130.2, 127.1, 126.5, 124.7, 122.8, 122.2, 122.02, 121.8, 61.1, 33.1; MS ESI calcd. For C₁₅H₁₃NO₂S [M + H]⁺ = 272.6. Anal.Calcd for C₁₅H₁₃NO₂S; C, 66.40; H, 4.83; N, 5.16; O, 11.79; S, 11.82. Found: C, 66.41; H, 4.81; N, 5.19; O, 11.80; S, 11.82.

3w. Dibenzofuran-2-carboxylic acid methoxy-methyl-amide. Following the general procedure, **3w** was obtained as a white solid; Yield: (155 mg, 61%); ¹H-NMR (400 MHz, CDCl₃): δ =8.39 (s, 1H), 8.00 (d, J = 7.72 Hz, 1H), 7.88 (d, J = 6.80 Hz, 1H), 7.54-7.53 (m, 2H), 7.51 (t, J = 7.08 Hz, 1H), 7.41 (t, J = 6.72 Hz, 1H); ¹³C NMR (CDCl₃, 75 MHz): δ =169.7, 157.3, 156.7, 128.6, 127.8, 126.7, 124.0, 123.8, 123.1, 121.6, 120.9, 111.8, 111.2, 61.0, 33.2; MS ESI calcd. For C₁₅H₁₃NO₃ [M + H]⁺ = 256.8. Anal.Calcd for C₁₅H₁₃NO₃; C, 70.58; H, 5.13; N, 5.49; O, 18.80. Found: C, 70.55; H, 5.11; N, 5.52; O, 18.83.

Reference for the compounds (**3a-3w**)

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