

Supplementary Information

Catalyst-free Arylation of Sulfonamides via Visible Light-mediated Deamination

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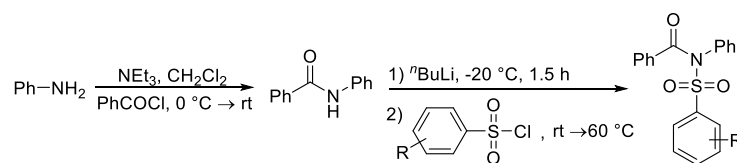
General Methods

All experiments were performed using standard Schlenk techniques under argon atmosphere. All anhydrous solvents, commercial aryl boronic acids, and aryl sulfonyl chlorides were purchased from Adamas-Beta Co. or Bidepharm Co. and used as received. All starting materials reported in the manuscript have been prepared according to the method reported previously¹. All products were identified using NMR analysis and comparison with authentic samples. ¹H NMR and ¹³C NMR spectra were recorded in CDCl₃ on Bruker spectrometers at 400 or 500 MHz. All shifts are reported in parts per million (ppm) relative to residual CHCl₃ peak (7.26 and 77.0 ppm, ¹H NMR and ¹³C NMR, respectively). Abbreviations are: s, singlet; d, doublet; t, triplet; q, quartet; brs, broad singlet. High Resolution Mass Spectra were obtained on a Waters Synapt G2-Si (ESI) or Thermofisher Q Exactive GC (EI). All flash chromatography was performed using silica gel, 300-400 mesh. TLC analysis was carried out on glassplates coated with silica gel 60 F254, 0.2 mm thickness. The plates were visualized using a 254 nm ultraviolet lamp or iodine cylinder.

Experimental Procedures

General Procedure I. Synthesis of *N*-acylsulfonamide

N-Acylsulfonamide **1a** was prepared by procedures reported in the literature,¹ proceeding sulfonylation of aniline, and followed by acylation.

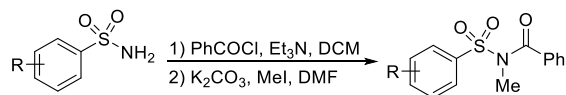


Starting materials bearing different sulfonyl groups were synthesized by following the procedures below. An oven-dried round-bottomed flask (100 mL) equipped with a stir bar was charged with aniline (20.0 mmol, 1.0 equiv), triethylamine (2.0 equiv), and dichloromethane (50 mL). Acyl chloride (1.1 equiv) was added dropwise to the reaction mixture with vigorous stirring at 0°C , and the reaction mixture was stirred 3.5 h at room temperature. Then, the reaction mixture was diluted with CH_2Cl_2 and filtered. The organic layer was washed with HCl (1.0 *N*, 30 mL), brine (30 mL), dried, and concentrated. Unless stated otherwise, the crude amide product was used without column chromatography for the next step.

An oven-dried round-bottomed flask (100 mL) equipped with a stir bar was charged with amide (10 mmol, 1.0 equiv), sealed with a cap, and subjected to three evacuation/backfilling cycles under high vacuum. Tetrahydrofuran (50 mL) was added to dissolve the amide. *n*-BuLi (1.6 M in hexane, typically 1.5 equiv) was added dropwise to the reaction mixture with vigorous stirring at -20°C , and the reaction mixture was stirred 1.5 h at the same temperature. After that, the reaction mixture was stirred at room temperature for a while. Sulfonyl chloride (3.0 equiv) in THF was added

dropwise, and the reaction mixture was stirred at 60 °C for overnight. Then, the reaction mixture was quenched carefully with NH₄Cl solution, diluted with ethyl acetate, and filtered. The organic layer was washed with HCl (1.0 N, 30 mL), brine (30 mL), dried, and concentrated. Purification by column chromatography on silica gel afforded the pure product.

General Procedure II. Preparation of substrates derived from *Celecoxib* and *Valdecoxib*



An oven-dried round-bottomed flask (150 mL) equipped with a stir bar was charged with sulfonamide (10 mmol, 1.0 equiv), triethylamine (2.0 equiv), and dichloromethane (50 mL). Benzoyl chloride (1.1 equiv) was added dropwise to the reaction mixture with vigorous stirring at 0 °C. After stirred overnight at room temperature, the reaction mixture was washed with HCl (1.0 N, 30 mL), brine (30 mL), dried, concentrated, and purified by column chromatography.

To a flask charged with *N*-acylsulfonamide (1.0 equiv), K₂CO₃ (5.0 equiv), and DMF (0.2 M) was added MeI (5.0 equiv). The mixture was stirred overnight at room temperature, filtered through a short silica gel column, concentrated, and purified by column chromatography (petroleum:EtOAc = 10:1).

General Procedure III. Preparation of substrates derived from amine group-containing drugs

A round-bottomed flask (250 mL) equipped with a stir bar was charged with sulfonamide (10 mmol, 1.0 equiv), MeOH (100 mL), and KOH (11 mmol, 1.1 equiv). The mixture was stirred for 30 min to form a clean solution. Then, the solvent was evaporated under vacuum to get crude potassium sulfonamide. To this flask were added acetone (150 mL), pyridine (20 mL), and benzoic anhydride (30 mmol 3.0 equiv). This mixture was heated for 20 hours in reflux. After that, the flask was cooled to 0 °C in ice bath. To this flask was added PhCOCl (20 mmol, 2.0equiv) dropwise. After stirring at room temperature for 10 h, the mixture was diluted with ethyl acetate (100 mL), washed with HCl (1.0 N, 50 mL), brine (50 mL), dried, concentrated, and purified by column chromatography.

To a flask charged with *N*-acylsulfonamide (1.0 equiv), K₂CO₃ (5.0 equiv), and DMF (0.2 M) was added MeI (5.0 equiv). The mixture was stirred overnight at room temperature, filtered through a short silica gel column, concentrated, and purified by column chromatography (petroleum:EtOAc = 3:1).

General Procedure IV. Catalyst-free arylation of *N*-acylsulfonamides

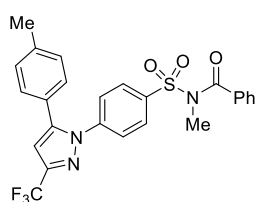
An oven-dried Schlenk tube equipped with a stir bar was charged with *N*-acylsulfonamide (0.4 mmol, 2.0 equiv), boronic acid (0.2 mmol, 1.0 equiv), and CsF or K₃PO₄ (0.5 mmol, 2.5 equiv). Then, the tube was sealed with a cap, and evacuated and back-filled with Ar for 3 times. Subsequently, anhydrous 1,4-dioxane (2 mL unless otherwise noted) was added. The tube was placed in a water bath with irradiation by

50W blue LEDs (460 nm, distance: 1 cm, the reaction temperature reached 40 °C) for 12 hours. The organic layer was washed with water (1 x 5 mL), brine (1 x 5 mL), dried, and concentrated. The crude product was purified by flash chromatography (typically EtOAc/petroleum ether = 1:10) to give analytically pure product **3**.

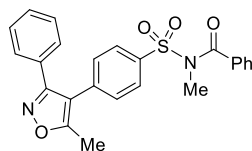
General Procedure V. Catalyst-free methylation of *N*-acylsulfonamides

N-Acylsulfonamide (0.2 mmol, 1.0 equiv), hantzsch ester (0.4 mmol, 2.0 eq), [Ir(ppy)₂(dtbbpy)]PF₆ (5 mol%), K₂CO₃ (1.0 mmol, 5.0 eq) were placed into an oven-dried Schleck tube. Then, the tube was sealed with a cap, and evacuated and back-filled with Ar for 3 times. Subsequently, MeI (1.0mmol, 5.0eq) and dry DMF (2 mL) were added. The tube was placed in a water bath with irradiation by 50W blue LEDs (460 nm, distance: 1 cm) for 15 hours. Then the reaction mixture was diluted with EtOAc, washed with H₂O and brine. The organic layer was dried over NaSO₄ and concentrated under reduced pressure. Finally, the crude product was purified by flash chromatography (typically petroleum/EtOAc 5:1 to 2:1) to give analytically pure product **4**.

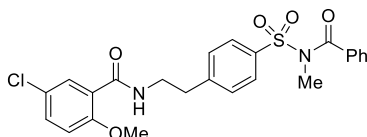
Characterization Data for Substrates



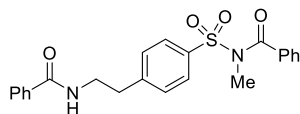
Following the general procedure II, the product was isolated as white solid (51% yield). **¹H NMR (500 MHz, CDCl₃)** δ 7.97 (d, *J* = 8.4 Hz, 2H), 7.57–7.47 (m, 5H), 7.42 (t, *J* = 7.7 Hz, 2H), 7.19 (d, *J* = 7.8 Hz, 2H), 7.12 (d, *J* = 7.9 Hz, 2H), 6.75 (s, 1H), 3.28 (s, 3H), 2.39 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 171.2, 145.4, 144.3 (q, *J* = 39.1 Hz), 143.4, 139.9, 137.4, 134.0, 132.3, 129.8, 129.6, 128.8, 128.49, 128.47, 125.7, 125.2, 120.9 (q, *J* = 269.6 Hz), 106.5, 35.9, 21.4. **HRMS (ESI/[M+H]⁺)** calculated for C₂₅H₂₁N₃O₃F₃S⁺: 500.1256, found: 500.1253.



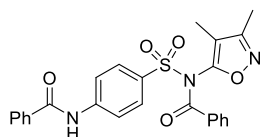
Following the general procedure II, the product was isolated as white solid (48% yield). **¹H NMR (500 MHz, CDCl₃)** δ 7.94 (d, *J* = 8.0 Hz, 2H), 7.58–7.50 (m, 3H), 7.44–7.31 (m, 9H), 3.33 (s, 3H), 2.51 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 171.4, 167.4, 161.2, 137.3, 136.5, 134.2, 132.2, 130.1, 129.8, 128.9, 128.8, 128.5, 128.4, 128.4, 114.4, 35.8, 11.9. **HRMS (ESI/[M+H]⁺)** calculated for C₂₄H₂₁N₂O₄S⁺: 433.1222, found: 433.1221.



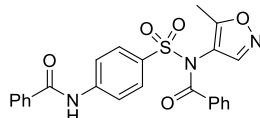
Following the general procedure II, the product was isolated as white solid (64% yield). **¹H NMR (400 MHz, CDCl₃)** δ 8.17 (d, *J* = 2.8 Hz, 1H), 7.93 (d, *J* = 8.4 Hz, 2H), 7.81 (br, 1H), 7.54-7.50 (m, 3H), 7.43-7.36 (m, 5H), 6.87 (d, *J* = 8.8 Hz, 1H), 3.78-3.73 (m, 5H), 3.30 (s, 3H), 3.03 (t, *J* = 6.8 Hz, 2H). **¹³C NMR (126 MHz, CDCl₃)** δ 171.4, 164.1, 155.9, 146.1, 136.4, 134.2, 132.5, 132.1, 131.8, 129.5, 128.7, 128.4, 126.7, 122.6, 112.9, 56.3, 40.6, 35.8, 35.6. **HRMS** (ESI/[M]⁺) calculated for C₂₄H₂₂N₂O₅SCl⁺: 485.0938, found: 485.0937.



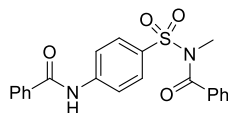
Following the general procedure III, the product was isolated as white solid (61% yield). **¹H NMR (400 MHz, CDCl₃)** δ 7.90 (d, *J* = 8.4 Hz, 2H), 7.91-7.69 (m, 2H), 7.54-7.49 (m, 4H), 7.43-7.38 (m, 6H), 6.30 (br, 1H), 3.75-3.70 (m, 2H), 3.29 (s, 3H), 3.04 (t, *J* = 7.0 Hz, 2H). **¹³C NMR (126 MHz, CDCl₃)** δ 171.5, 167.7, 145.9, 136.4, 134.3, 132.1, 131.7, 129.5, 128.8, 128.7, 128.5, 128.4, 126.8, 40.8, 35.8, 35.7. **HRMS** (ESI/[M]⁺) calculated for C₂₃H₂₂N₂O₄S⁺: 421.1222, found: 421.1227.



Following the first step in general procedure III, the product was isolated as white solid (67% yield). **¹H NMR (500 MHz, CDCl₃)** δ 8.52 (br, 1H), 8.09 (d, *J* = 8.5 Hz, 2H), 7.92 (d, *J* = 8.5 Hz, 2H), 7.87 (d, *J* = 7.6 Hz, 2H), 7.58-7.55 (m, 1H), 7.48-7.45 (m, 2H), 7.42-7.37 (m, 3H), 7.26 (d, *J* = 7.6 Hz, 2H), 2.11 (s, 3H), 1.72 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 167.9, 166.2, 162.0, 154.8, 144.1, 144.1, 134.1, 132.7, 132.5, 132.3, 132.2, 131.0, 128.9, 128.4, 127.9, 127.3, 119.5, 112.9, 10.9, 6.8. **HRMS** (ESI/[M]⁺) calculated for C₂₃H₂₂N₂O₄S⁺: 421.1222, found: 421.1227.

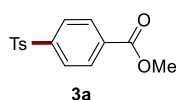


Following the first step in general procedure III, the product was isolated as white solid (63% yield). **¹H NMR (400 MHz, CDCl₃)** δ 8.22 (br, 1H), 8.05 (d, *J* = 8.8 Hz, 2H), 7.90-7.86 (m, 4H), 7.59-7.57 (m, 1H), 7.54-7.48 (m, 4H), 7.45-7.42 (m, 1H), 7.32-7.28 (m, 2H), 6.45 (s, 1H), 2.44 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 172.0, 168.4, 165.9, 158.6, 143.5, 134.2, 132.7, 132.6, 132.4, 132.2, 130.9, 129.0, 128.4, 127.2, 119.3, 102.7, 12.9. **HRMS** (ESI/[M]⁺) calculated for C₂₅H₂₀N₃O₅S⁺: 474.1124, found: 474.1130.

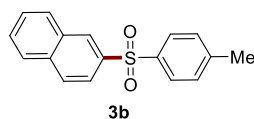


Following the general procedure III, the product was isolated as white solid (45% yield). **¹H NMR (400 MHz, CDCl₃)** δ 8.41 (br, 1H), 7.96 (d, *J* = 8.8 Hz, 2H), 7.87–7.85 (m, 4H), 7.57–7.38 (m, 8H), 3.30 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 171.6, 166.1, 143.2, 134.2, 134.1, 132.7, 132.4, 132.1, 130.0, 128.9, 128.5, 128.4, 127.2, 119.6, 35.9. **HRMS** (ESI/[M]⁺) calculated for C₂₁H₁₇N₂O₄S⁺: 393.0909, found: 393.0906.

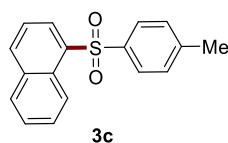
Characterization Data for Products



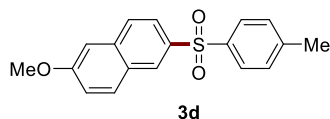
Following the general procedure IV, the title product was isolated as white solid (55.1 mg, 95%). **¹H NMR (400 MHz, CDCl₃)** δ 8.11 (d, *J* = 8.5 Hz, 2H), 7.97 (d, *J* = 8.5 Hz, 2H), 7.82 (d, *J* = 8.3 Hz, 2H), 7.29 (d, *J* = 8.1 Hz, 2H), 3.90 (s, 3H), 2.36 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 165.5, 145.9, 144.8, 137.8, 134.0, 130.4, 130.1, 127.9, 127.5, 52.7, 21.6; **HRMS** (ESI/[M+H]⁺) calculated for C₁₅H₁₅O₄S⁺: 291.0686, found: 291.0682.



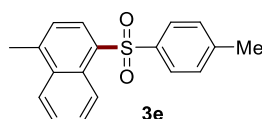
Following the general procedure IV, the title product was isolated as white solid (54.7 mg, 97%). **¹H NMR (400 MHz, CDCl₃)** δ 8.55 (s, 1H), 7.95 (d, *J* = 7.4 Hz, 1H), 7.91–7.79 (m, 5H), 7.60 (qd, *J* = 6.8, 3.5 Hz, 2H), 7.31–7.24 (m, 2H), 2.36 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 144.2, 138.8, 138.7, 134.9, 132.2, 130.0, 129.6, 129.4, 129.0, 128.8, 128.6, 127.9, 127.8, 127.6, 122.7; **HRMS** (ESI/[M+H]⁺) calculated for C₁₇H₁₅O₂S⁺: 283.0787, found: 283.0786.



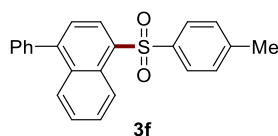
Following the general procedure IV, the title product was isolated as white solid (49.0 mg, 87%). **¹H NMR (400 MHz, CDCl₃)** δ 8.67 (d, *J* = 8.5 Hz, 1H), 8.50 (d, *J* = 7.2 Hz, 1H), 8.09 (d, *J* = 8.2 Hz, 1H), 7.87 (m, 3H), 7.60 (dd, *J* = 16.0 Hz, 8.0 Hz, 2H), 7.54 (t, *J* = 7.4 Hz, 1H), 7.27 (d, *J* = 8.3 Hz, 2H), 2.36 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 144.0, 138.8, 136.2, 135.0, 134.2, 129.8, 129.0, 128.4, 128.3, 127.5, 126.9, 124.4, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₁₇H₁₅O₂S⁺: 283.0787, found: 283.0784.



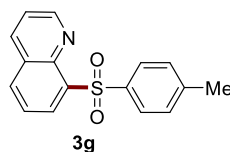
Following the general procedure IV, the title product was isolated as white solid (38.1 mg, 61%). **¹H NMR (400 MHz, CDCl₃)** δ 8.45 (s, 1H), 7.95–7.63 (m, 5H), 7.33–7.20 (m, 3H), 7.13 (d, *J* = 1.9 Hz, 1H), 3.92 (s, 3H), 2.37 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 160.1, 144.0, 136.8, 130.9, 130.0, 128.7, 128.2, 127.6, 123.4, 120.6, 105.8, 55.5, 21.6; **HRMS** (ESI/[M+H]⁺) calculated for C₁₈H₁₇O₃S⁺: 313.0893, found: 313.0894.



Following the general procedure IV, the title product was isolated as white solid (50.3 mg, 85%). **¹H NMR (400 MHz, CDCl₃)** δ 8.71–8.60 (m, 1H), 8.40 (d, *J* = 7.5 Hz, 1H), 8.07–7.96 (m, 1H), 7.83 (d, *J* = 8.2 Hz, 2H), 7.65–7.50 (m, 2H), 7.45 (d, *J* = 7.5 Hz, 1H), 7.24 (d, *J* = 8.0 Hz, 2H), 2.74 (s, 3H), 2.33 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 143.8, 142.4, 139.2, 134.2, 133.3, 129.7, 128.5, 127.8, 127.4, 126.7, 125.3, 125.0, 124.9, 21.5, 20.2; **HRMS** (ESI/[M+H]⁺) calculated for C₁₈H₁₇O₂S⁺: 297.0944, found: 297.0943.

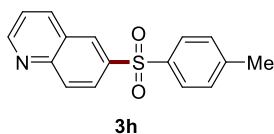


Following the general procedure IV, the title product was isolated as white solid (48.7 mg, 68%). **¹H NMR (400 MHz, CDCl₃)** δ 8.75 (s, 1H), 8.57 (d, *J* = 7.6 Hz, 1H), 7.93 (d, *J* = 8.2 Hz, 3H), 7.65 – 7.49 (m, 5H), 7.49 – 7.42 (m, 3H), 7.31 (d, *J* = 8.1 Hz, 2H), 2.40 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 147.3, 144.0, 139.4, 138.9, 135.3, 132.6, 129.8, 129.3, 128.9, 128.5, 128.2, 128.0, 127.6, 127.4, 126.8, 125.5, 124.6, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₂₃H₁₉O₂S⁺: 359.1098, found: 359.1100.

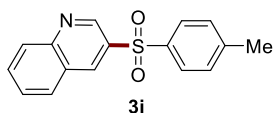


Following the general procedure IV, the title product was isolated as white solid (36 mg, 64%). **¹H NMR (400 MHz, CDCl₃)** δ 8.98 (dd, *J* = 4.1, 1.6 Hz, 1H), 8.71 (dd, *J* = 7.4, 1.1 Hz, 1H), 8.16 (dd, *J* = 13.7, 5.0 Hz, 3H), 8.05 (dd, *J* = 16.0, 8.8 Hz, 1H), 7.71 (t, *J* = 7.8 Hz, 1H), 7.43 (dt, *J* = 20.0, 10.0 Hz, 1H), 7.27 (d, *J* = 8.0 Hz, 2H), 2.37 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 151.1, 143.8, 138.9, 138.2, 136.3, 134.5, 131.6, 129.3,

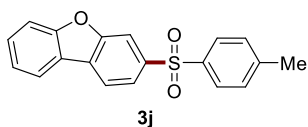
129.0, 128.9, 125.5, 122.0, 21.6; **HRMS** (ESI/[M+H]⁺) calculated for C₁₆H₁₄NO₂S⁺: 284.0745, found: 284.0747.



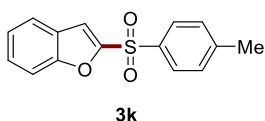
Following the general procedure IV, the title product was isolated as white solid (51.5 mg, 91%). **¹H NMR (400 MHz, CDCl₃)** δ 9.04 (dd, *J* = 4.2, 1.7 Hz, 1H), 8.57 (d, *J* = 1.9 Hz, 1H), 8.30 (d, *J* = 7.6 Hz, 1H), 8.19 (d, *J* = 8.9 Hz, 1H), 8.08 (dd, *J* = 8.9, 2.0 Hz, 1H), 7.90 (d, *J* = 8.3 Hz, 2H), 7.53 (dd, *J* = 8.3, 4.2 Hz, 1H), 7.32 (d, *J* = 8.1 Hz, 2H), 2.38 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 153.3, 149.4, 144.6, 139.7, 138.1, 137.4, 131.3, 130.1, 128.9, 127.9, 127.4, 126.4, 122.6, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₁₆H₁₄NO₂S⁺: 284.0745, found: 284.0749.



Following the general procedure IV, the title product was isolated as white solid (45.8 mg, 81%). **¹H NMR (400 MHz, CDCl₃)** δ 9.26 (d, *J* = 2.4 Hz, 1H), 8.80 (d, *J* = 1.9 Hz, 1H), 8.15 (d, *J* = 8.4 Hz, 1H), 7.96-7.84 (m, 4H), 7.68-7.65 (m, 1H), 7.31 (d, *J* = 8.0, 2H), 2.40 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 149.3, 147.1, 144.9, 138.0, 136.7, 135.1, 132.7, 130.2, 129.6, 129.2, 128.3, 127.9, 126.4, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₁₆H₁₄NO₂S⁺: 284.0745, found: 284.0747.

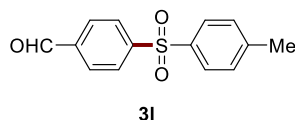


Following the general procedure IV, the title product was isolated as white solid (58 mg, 91%). **¹H NMR (400 MHz, CDCl₃)** δ 8.81 (d, *J* = 8.0 Hz, 1H), 8.07 (d, *J* = 7.8 Hz, 1H), 7.88 (d, *J* = 8.2 Hz, 2H), 7.80 (d, *J* = 8.0 Hz, 1H), 7.60 (dd, *J* = 16.0 Hz, 7.6 Hz, 2H), 7.55 (t, *J* = 7.6 Hz, 1H), 7.43 (t, *J* = 7.5 Hz, 1H), 7.25 (d, *J* = 8.0 Hz, 2H), 2.35 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 156.8, 144.5, 138.1, 134.7, 129.9, 128.9, 127.3, 126.6, 125.9, 124.5, 123.5, 121.6, 121.1, 117.0, 111.6, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₁₉H₁₅O₃S⁺: 323.0736, found: 323.0732.

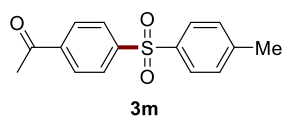


Following the general procedure IV, the title product was isolated as white solid (30.5 mg, 56%). **¹H NMR (400 MHz, CDCl₃)** δ 7.96 (d, *J* = 8.4 Hz, 2H), 7.67 (d, *J* = 7.9 Hz,

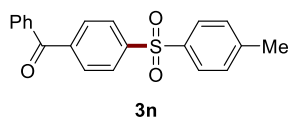
1H), 7.54 (d, $J = 3.9$ Hz, 1H), 7.49 (d, $J = 8.4$ Hz, 1H), 7.42 (td, $J = 8.8, 1.6$ Hz, 1H), 7.35 (d, $J = 8.4$ Hz, 2H) 7.32–7.27 (m, 3H), 2.42 (s, 3H). **^{13}C NMR (100 MHz, CDCl_3)** δ 156.3, 151.9, 145.3, 136.4, 130.1, 128.3, 127.9, 126.0, 124.3, 123.1, 112.9, 112.5, 21.7. **HRMS** ($\text{ESI}/[\text{M}+\text{H}]^+$) calculated for $\text{C}_{15}\text{H}_{13}\text{O}_3\text{S}^+$: 273.0580, found: 273.0577.



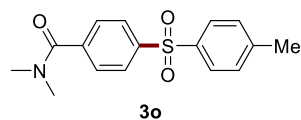
Following the general procedure IV, the title product was isolated as white solid (26 mg, 53%). **^1H NMR (400 MHz, CDCl_3)** δ 10.09 (s, 1H), 8.11 (d, $J = 8.4$ Hz, 2H), 8.01 (d, $J = 8.8$ Hz, 2H), 7.86 (d, $J = 8.0$ Hz, 2H), 7.36 (d, $J = 8.0$, 2H), 2.41 (s, 3H). **^{13}C NMR (100 MHz, CDCl_3)** δ 190.8, 147.1, 145.0, 139.0, 137.6, 130.3, 130.2, 128.2, 128.0, 21.7.



Following the general procedure IV, the title product was isolated as white solid 67% (36.7 mg, 67%). **^1H NMR (400 MHz, CDCl_3)** δ 8.03 (dt, $J = 12.4, 8.4$ Hz, 4H), 7.84 (d, $J = 8.3$ Hz, 2H), 7.32 (d, $J = 8.2$ Hz, 2H), 2.62 (s, 3H), 2.41 (s, 3H). **^{13}C NMR (100 MHz, CDCl_3)** δ 196.8, 145.8, 144.8, 140.2, 137.8, 130.1, 129.1, 127.9, 127.8, 26.9, 21.6. **HRMS** ($\text{ESI}/[\text{M}+\text{H}]^+$) calculated for $\text{C}_{15}\text{H}_{15}\text{O}_3\text{S}^+$: 275.0736, found: 275.0735.

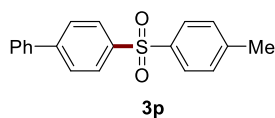


Following the general procedure IV, the title product was isolated as white solid (51.7 mg, 77%). **^1H NMR (500 MHz, CDCl_3)** δ 8.04 (d, $J = 7.6$ Hz, 2H), 7.86 (d, $J = 8.0$ Hz, 4H), 7.76 (d, $J = 7.7$ Hz, 2H), 7.62 (t, $J = 7.4$ Hz, 1H), 7.49 (t, $J = 7.4$ Hz, 2H), 7.34 (d, $J = 7.8$ Hz, 2H), 2.42 (s, 3H). **^{13}C NMR (125 MHz, CDCl_3)** δ 195.2, 145.3, 144.8, 141.6, 137.9, 136.4, 133.3, 130.5, 130.1, 130.1, 128.6, 128.0, 127.5, 21.7. **HRMS** ($\text{ESI}/[\text{M}+\text{H}]^+$) calculated for $\text{C}_{20}\text{H}_{17}\text{O}_3\text{S}^+$: 337.0893, found: 337.0889.

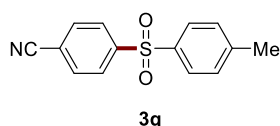


Following the general procedure IV, the title product was isolated as white solid (47.3 mg, 78%). **^1H NMR (400 MHz, CDCl_3)** δ 7.99 (d, $J = 8.4$ Hz, 2H), 7.83 (d, $J = 8.4$ Hz, 2H), 7.53 (d, $J = 8.4$ Hz, 2H), 7.29 (d, $J = 8.0$ Hz, 2H), 3.09 (s, 3H), 2.92 (s, 3H), 2.40 (s, 3H). **^{13}C NMR (125 MHz, CDCl_3)** δ 169.8, 144.6, 142.9, 140.9, 138.0, 130.0, 129.2,

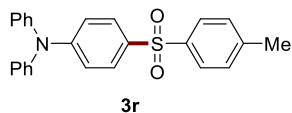
127.80, 127.77, 115.2, 39.4, 35.3, 21.6; **HRMS** (ESI/[M+H]⁺) calculated for C₁₆H₁₈O₃S⁺: 304.1002, found: 304.1004.



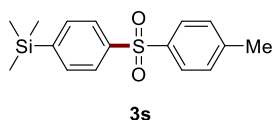
Following the general procedure IV, the title product was isolated as white solid (49.8 mg, 81%). **¹H NMR (400 MHz, CDCl₃)** δ 7.98 (d, *J* = 8.4 Hz, 2H), 7.86 (d, *J* = 8.3 Hz, 2H), 7.68 (d, *J* = 8.4 Hz, 2H), 7.55 (d, *J* = 6.8 Hz, 2H), 7.48 – 7.36 (m, 3H), 7.31 (d, *J* = 8.1 Hz, 2H), 2.40 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 146.0, 144.2, 140.5, 139.2, 138.8, 130.0, 129.0, 128.6, 128.0, 127.9, 127.7, 127.4, 21.6; **HRMS** (ESI/[M+H]⁺) calculated for C₁₉H₁₇O₂S⁺: 309.0944, found: 309.0939.



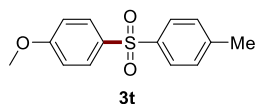
Following the general procedure IV, the title product was isolated as white solid (20.0 mg, 39%). **¹H NMR (500 MHz, CDCl₃)** δ 8.03 (d, *J* = 7.8 Hz, 2H), 7.83 (d, *J* = 7.7 Hz, 2H), 7.78 (d, *J* = 7.9 Hz, 2H), 7.34 (d, *J* = 7.8 Hz, 2H), 2.42 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 146.3, 145.3, 137.1, 133.0, 130.3, 128.2, 128.1, 117.2, 116.7, 21.7; **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₂O₂S⁺: 258.0583, found: 258.0582.



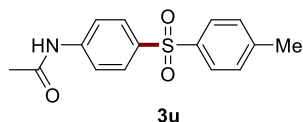
Following the general procedure IV, the title product was isolated as white solid (59.8 mg, 75%). **¹H NMR (400 MHz, CDCl₃)** δ 7.81 (d, *J* = 8.2 Hz, 2H), 7.68 (d, *J* = 8.9 Hz, 2H), 7.29 (dt, *J* = 11.5, 7.7 Hz, 6H), 7.12 (dd, *J* = 14.4, 7.4 Hz, 6H), 6.96 (d, *J* = 8.9 Hz, 2H), 2.39 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 152.1, 146.1, 143.6, 139.7, 132.2, 129.8, 129.7, 128.9, 127.4, 126.2, 125.1, 119.6, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₂₅H₂₂NO₂S⁺: 400.1366, found: 400.1358.



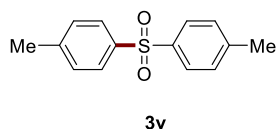
Following the general procedure IV, the title product was isolated as white oil (36.6 mg, 60%). **¹H NMR (400 MHz, CDCl₃)** δ 7.87 (m, 4H), 7.64 (d, *J* = 8.3 Hz, 2H), 7.31 (d, *J* = 7.8 Hz, 2H), 2.40 (s, 3H), 0.28 (s, 9H). **¹³C NMR (100 MHz, CDCl₃)** δ 148.9, 145.5, 143.5, 140.1, 135.5, 131.3, 129.2, 127.7, 23.0, 0.0. **HRMS** (ESI/[M+H]⁺) calculated for C₁₆H₂₁O₂SSi⁺: 305.1026, found: 305.1023.



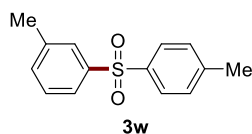
Following the general procedure IV, the title product was isolated as white solid (31.4 mg, 60%). **¹H NMR (400 MHz, CDCl₃)** δ 7.85 (d, *J* = 8.8 Hz, 2H), 7.79 (d, *J* = 8.0 Hz, 2H), 7.24 (d, *J* = 8.0 Hz, 2H), 6.95 (d, *J* = 8.8 Hz, 2H), 3.83 (s, 3H), 2.37 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 163.2, 143.8, 139.4, 133.5, 129.9, 129.7, 127.4, 114.5, 55.6, 21.5; **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₅O₃S⁺: 263.0736, found: 263.0736.



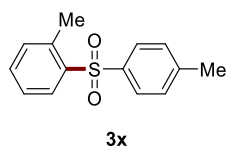
Following the general procedure IV, the title product was isolated as white solid (36.7 mg, 60%). **¹H NMR (400 MHz, CDCl₃)** δ 7.86 (dt, *J* = 8.8, 3.2 Hz, 2H), 7.79 (dt, *J* = 8.4, 1.6 Hz, 2H), 7.27 (d, *J* = 8.0 Hz, 2H), 6.95 (dt, *J* = 8.8, 3.2 Hz, 2H), 3.83 (s, 3H), 2.37 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 163.2, 143.8, 139.4, 133.5, 129.9, 129.7, 127.4, 114.5, 21.5.



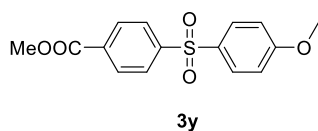
Following the general procedure IV, the title product was isolated as white solid (49.8 mg, 81%). **¹H NMR (400 MHz, CDCl₃)** δ 7.81 (d, *J* = 8.2 Hz, 4H), 7.29 (d, *J* = 8.0 Hz, 4H), 2.38 (s, 6H). **¹³C NMR (100 MHz, CDCl₃)** δ 144.0, 139.0, 129.9, 127.6, 21.6. **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₅O₂S⁺: 247.0787, found: 247.0785.



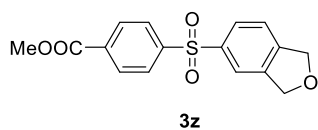
Following the general procedure IV, the title product was isolated as white solid (37.9 mg, 77%). **¹H NMR (400 MHz, CDCl₃)** δ 7.82 (d, *J* = 8.2 Hz, 2H), 7.72 (d, *J* = 6.4 Hz, 2H), 7.40 – 7.31 (m, 2H), 7.28 (t, *J* = 7.1 Hz, 2H), 2.39 (s, 6H). **¹³C NMR (100 MHz, CDCl₃)** δ 144.1, 141.8, 139.5, 138.8, 133.8, 129.9, 129.1, 127.8, 127.7, 124.7, 21.6, 21.3. **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₅O₂S⁺: 247.0787, found: 247.0788.



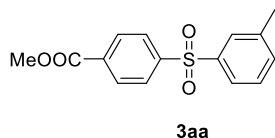
Following the general procedure IV, the title product was isolated as white oil (33.5 mg, 68%). **¹H NMR (400 MHz, CDCl₃)** δ 8.19 (d, *J* = 7.9 Hz, 1H), 7.75 (d, *J* = 8.0 Hz, 2H), 7.46 (t, *J* = 7.4 Hz, 1H), 7.38 (t, *J* = 7.6 Hz, 1H), 7.28 (dd, *J* = 8.4, 4.5 Hz, 2H), 7.22 (d, *J* = 7.5 Hz, 1H), 2.43 (d, *J* = 8.2 Hz, 3H), 2.40 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 144.0, 139.2, 138.3, 137.9, 133.5, 132.6, 129.7, 129.3, 127.8, 126.4, 21.6, 20.2. **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₅O₂S⁺: 247.0787, found: 247.0787.



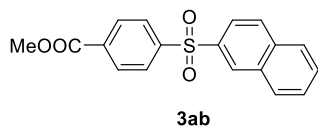
Following the general procedure IV, the title product was isolated as white solid (44.1 mg, 72%). **¹H NMR (400 MHz, CDCl₃)** δ 8.05 (d, *J* = 8.4 Hz, 2H), 7.90 (d, *J* = 8.4 Hz, 2H), 7.80 (d, *J* = 8.9 Hz, 2H), 6.90 (d, *J* = 8.9 Hz, 2H), 3.85 (s, 3H), 3.78 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 165.6, 163.7, 146.3, 134.0, 132.2, 130.4, 130.1, 127.3, 114.7, 55.7, 52.7. **HRMS** (ESI/[M+H]⁺) calculated for C₁₅H₁₅O₅S⁺: 307.0640, found: 307.0643.



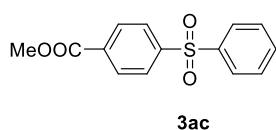
Following the general procedure IV, the title product was isolated as white solid (52.2 mg, 82%). **¹H NMR (400 MHz, CDCl₃)** δ 8.14 (d, *J* = 8.4 Hz, 2H), 7.98 (d, *J* = 8.5 Hz, 2H), 7.76 (d, *J* = 7.1 Hz, 2H), 6.84 (d, *J* = 8.8 Hz, 1H), 4.66 (t, *J* = 8.8 Hz, 2H), 3.94 (s, 3H), 3.25 (t, *J* = 8.8 Hz, 2H). **¹³C NMR (100 MHz, CDCl₃)** δ 195.3, 145.1, 144.8, 141.5, 137.9, 136.4, 133.3, 130.5, 130.2, 128.6, 128.0, 127.5, 21.7; **HRMS** (ESI/[M+H]⁺) calculated for C₁₆H₁₅O₅S⁺: 319.0635, found: 319.0632.



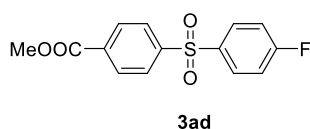
Following the general procedure IV, the title product was isolated as white solid (41.2 mg, 71%). **¹H NMR (400 MHz, CDCl₃)** δ 8.15 (d, *J* = 8.8 Hz, 2H), 8.01 (d, *J* = 8.8 Hz, 2H), 7.77 (s, 2H), 7.42-7.38 (m, 2H), 3.93 (s, 3H), 2.41 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 165.5, 145.6, 140.6, 139.8, 134.5, 134.2, 130.4, 129.3, 128.1, 127.7, 125.0, 52.7, 21.4. **HRMS** (ESI/[M+H]⁺) calculated for C₁₅H₁₅O₄S⁺: 291.0686, found: 291.0682.



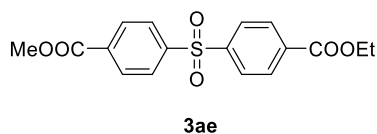
Following the general procedure IV, the title product was isolated as white solid (51.5 mg, 79%). **¹H NMR (400 MHz, CDCl₃)** δ 8.62 (d, *J* = 9.7 Hz, 1H), 8.16 (d, *J* = 8.6 Hz, 2H), 8.08 (d, *J* = 8.6 Hz, 2H), 8.01 (d, *J* = 7.7 Hz, 1H), 7.96 (d, *J* = 8.7 Hz, 1H), 7.92–7.84 (m, 2H), 7.70–7.61 (m, 2H), 3.94 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 165.5, 145.5, 137.6, 135.2, 134.3, 132.2, 130.5, 129.9, 129.5, 129.4, 128.0, 127.8, 127.7, 122.6, 52.7. **HRMS** (ESI/[M+H]⁺) calculated for C₁₈H₁₅O₄S⁺: 327.0691, found: 327.0689.



Following the general procedure IV, the title product was isolated as white solid (43.6 mg, 79%). **¹H NMR (400 MHz, CDCl₃)** δ 8.17 (d, *J* = 8.5 Hz, 2H), 8.03 (d, *J* = 8.5 Hz, 2H), 7.97 (d, *J* = 7.2 Hz, 2H), 7.61 (t, *J* = 6.8 Hz, 1H), 7.53 (t, *J* = 7.4 Hz, 2H), 3.95 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 165.5, 145.5, 140.8, 134.3, 133.7, 130.5, 129.5, 127.9, 127.7, 52.7. **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₃O₄S⁺: 277.0529, found: 277.0525. **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₃O₄S⁺: 277.0529, found: 277.0525.

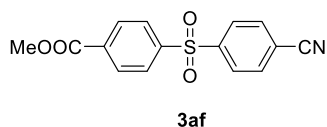


Following the general procedure IV, the title product was isolated as white solid (54.2 mg, 92%). **¹H NMR (400 MHz, CDCl₃)** δ 8.17 (d, *J* = 8.4 Hz, 2H), 8.05–7.96 (m, 4H), 7.20 (t, *J* = 8.6 Hz, 2H), 3.94 (s, 3H). **¹³C NMR (100 MHz, CDCl₃)** δ 165.7 (d, *J* = 256 Hz), 165.4, 145.3, 136.9, 134.4, 130.7 (d, *J* = 9.0 Hz), 130.6, 127.6, 116.8 (d, *J* = 22 Hz), 52.7. **HRMS** (ESI/[M+H]⁺) calculated for C₁₄H₁₂O₄FS⁺: 295.0440, found: 295.0442.

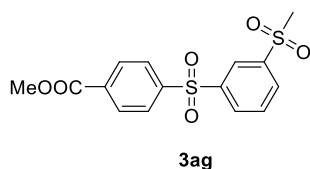


Following the general procedure IV, the title product was isolated as white solid (44.5 mg, 64%). **¹H NMR (400 MHz, CDCl₃)** δ 8.18 (dd, *J* = 8.5, 2.6 Hz, 4H), 8.03 (d, *J* =

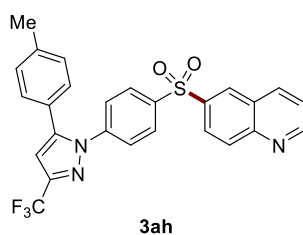
8.5 Hz, 4H), 4.41 (q, $J = 7.1$ Hz, 2H), 3.95 (s, 3H), 1.40 (t, $J = 7.1$ Hz, 3H). **^{13}C NMR (100 MHz, CDCl_3)** δ 165.4, 164.9, 144.7, 144.5, 135.1, 134.7, 130.6, 130.5, 127.9, 61.8, 52.8, 14.2. **HRMS** ($\text{ESI}/[\text{M}+\text{H}]^+$) calculated for $\text{C}_{17}\text{H}_{17}\text{O}_6\text{S}^+$: 349.0740, found: 349.0742.



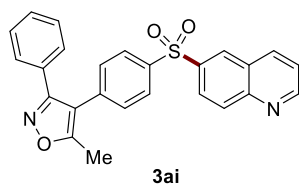
Following the general procedure IV, the title product was isolated as white solid (50.6 mg, 84%). **^1H NMR (400 MHz, CDCl_3)** δ 8.20 (d, $J = 8.5$ Hz, 2H), 8.08 (d, $J = 8.5$ Hz, 2H), 8.03 (d, $J = 8.5$ Hz, 2H), 7.84 (d, $J = 8.5$ Hz, 2H), 3.96 (s, 3H) **^{13}C NMR (100 MHz, CDCl_3)** δ 165.2, 145.1, 144.0, 135.1, 133.3, 130.8, 128.5, 128.1, 117.4, 117.0, 52.8. **HRMS** ($\text{EI}/[\text{M}]^+$) calculated for $\text{C}_{15}\text{H}_{11}\text{O}_4\text{NS}^+$: 304.0403, found: 301.0399.



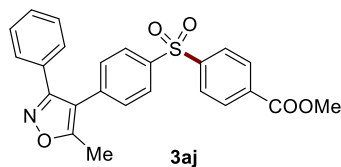
Following the general procedure IV, the title product was isolated as white solid (34.6 mg, 49%). **^1H NMR (400 MHz, CDCl_3)** δ 8.55 (s, 1H), 8.24 (d, $J = 7.9$ Hz, 1H), 8.19 (t, $J = 9.1$ Hz, 3H), 8.05 (d, $J = 8.8$ Hz, 2H), 7.78 (t, $J = 7.9$ Hz, 1H), 3.96 (s, 3H), 3.10 (s, 3H) **^{13}C NMR (100 MHz, CDCl_3)** δ 165.3, 144.0, 143.0, 135.0, 132.7, 132.2, 131.0, 130.8, 128.1, 127.0, 52.8, 44.4. **HRMS** ($\text{ESI}/[\text{M}+\text{Na}]^+$) calculated for $\text{C}_{15}\text{H}_{14}\text{NaO}_6\text{S}_2^+$: 377.0124, found: 377.0120.



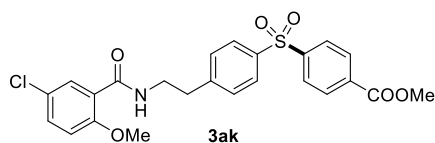
Following the general procedure IV, the title product was isolated as white solid (66.1 mg, 67%). **^1H NMR (500 MHz, CDCl_3)** δ 9.06 (d, 1H), 8.55 (s, 1H), 8.30 (d, $J = 8.2$ Hz, 1H), 8.20 (d, $J = 8.9$ Hz, 1H), 8.05 (d, $J = 8.9$ Hz, 1H), 7.99 (d, $J = 8.1$ Hz, 2H), 7.55 (dd, $J = 8.0, 3.9$ Hz, 1H), 7.48 (d, $J = 8.2$ Hz, 2H), 7.16 (d, $J = 7.6$ Hz, 2H), 7.09 (d, $J = 7.5$ Hz, 2H), 6.72 (s, 1H), 2.37 (s, 3H). **^{13}C NMR (126 MHz, CDCl_3)** δ 153.6, 149.6, 145.3, 144.2 (d, $J = 37.8$ Hz), 143.2, 140.4, 139.9, 138.7, 137.3, 131.6, 129.8, 129.3, 128.9, 128.7, 127.4, 126.3, 125.65, 125.59, 122.8, 121.0 (d, $J = 269.6$ Hz), 106.5, 21.3. **HRMS** ($\text{ESI}/[\text{M}+\text{H}]^+$) calculated for $\text{C}_{26}\text{H}_{19}\text{N}_3\text{O}_2\text{F}_3\text{S}^+$: 494.1150, found: 494.1147.



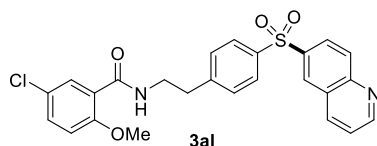
Following the general procedure IV, the title product was isolated as white solid (52.0 mg, 61%). **¹H NMR (500 MHz, CDCl₃)** δ 9.09 – 9.02 (m, 1H), 8.61 (s, 1H), 8.33 (d, *J* = 8.3 Hz, 1H), 8.23 (d, *J* = 8.9 Hz, 1H), 8.12 (d, *J* = 8.9 Hz, 1H), 7.99 (d, *J* = 7.7 Hz, 2H), 7.56 (dd, *J* = 8.2, 4.1 Hz, 1H), 7.39 (t, *J* = 6.8 Hz, 1H), 7.35-7.30 (m, 6H), 2.44 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 167.4, 161.1, 153.5, 149.6, 140.3, 139.0, 137.4, 136.2, 131.5, 130.5, 129.8, 129.3, 128.8, 128.5, 128.3, 128.2, 126.5, 122.8, 114.3, 11.8. **HRMS** (ESI/[M+H]⁺) calculated for C₂₅H₁₉N₂O₃S⁺: 427.1116, found: 427.1109.



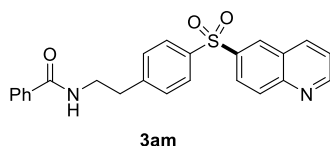
Following the general procedure IV, the title product was isolated as white solid (78.8 mg, 91%). **¹H NMR (500 MHz, CDCl₃)** δ 8.18 (d, *J* = 7.6 Hz, 2H), 8.04 (d, *J* = 7.6 Hz, 2H), 7.93 (d, *J* = 7.5 Hz, 2H), 7.39 (d, *J* = 6.6 Hz, 1H), 7.33 (d, *J* = 5.9 Hz, 6H), 3.95 (s, 3H), 2.46 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 167.4, 165.5, 161.1, 130.6, 129.8, 128.8, 128.5, 128.3, 128.2, 127.9, 114.3, 100.0, 52.8, 11.8. **HRMS** (ESI/[M+H]⁺) calculated for C₂₄H₂₀NO₅S⁺: 434.1062, found: 434.1059.



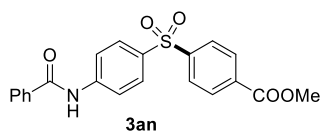
Following the general procedure IV with using sulfonamide (0.2 mmol) and aryl boronic acid (0.4 mmol) instead, the title product was isolated as white solid (90%). **¹H NMR (500 MHz, CDCl₃)** δ 8.16-8.13 (m, 3H), 8.00 (d, *J* = 8.0 Hz, 2H), 7.91 (d, *J* = 8.0 Hz, 2H), 7.77 (br, 1H), 7.41-7.36 (m, 3H), 6.86 (d, *J* = 8.3 Hz, 1H), 3.93 (s, 3H), 3.73-3.70 (m, 5H), 2.99 (t, *J* = 6.9 Hz, 2H). **¹³C NMR (126 MHz, CDCl₃)** δ 165.5, 164.1, 155.9, 146.0, 145.5, 139.0, 134.3, 132.5, 131.9, 130.5, 130.0, 128.1, 127.6, 126.8, 122.6, 112.9, 56.1, 52.7, 40.6, 35.6. **HRMS** (ESI/[M]⁺) calculated for C₂₄H₂₁NO₆SCl⁺: 486.0778, found: 486.0781.



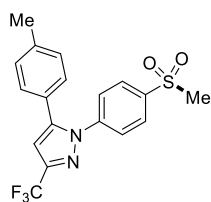
Following the general procedure IV with using sulfonamide (0.2 mmol) and aryl boronic acid (0.4 mmol) instead, the title product was isolated as white solid (65%). **¹H NMR (500 MHz, CDCl₃)** δ 9.05-9.04 (m, 1H), 8.58 (s, 1H), 8.31 (d, *J* = 8.3 Hz, 1H), 8.20 (d, *J* = 8.8 Hz, 1H), 8.13-8.08 (m, 2H), 7.96 (d, *J* = 8.0 Hz, 2H), 7.76 (br, 1H), 7.56-7.53 (m, 1H), 7.41 (d, *J* = 8.0 Hz, 2H), 7.37-7.35 (m, 1H), 6.83 (d, *J* = 8.8 Hz, 1H), 3.73-3.68 (m, 5H), 2.98 (t, *J* = 6.8 Hz, 2H). **¹³C NMR (126 MHz, CDCl₃)** δ 164.1, 155.8, 153.4, 149.5, 145.8, 139.4, 139.4, 137.4, 132.5, 131.9, 131.4, 130.0, 129.0, 128.1, 127.4, 126.8, 126.4, 122.7, 122.6, 112.8, 56.1, 40.6, 35.5. **HRMS (ESI/[M]⁺)** calculated for C₂₅H₂₀N₂O₄SCl⁺: 479.0832, found: 479.0831.



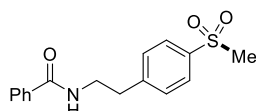
Following the general procedure IV with using sulfonamide (0.2 mmol) and aryl boronic acid (0.4 mmol) instead, the title product was isolated as white solid (64%). **¹H NMR (400 MHz, CDCl₃)** δ 9.02-9.00 (m, 1H), 8.55 (d, *J* = 2.1 Hz, 1H), 8.29 (d, *J* = 8.5 Hz, 1H), 8.17 (d, *J* = 8.0 Hz, 1H), 8.07-8.04 (m, 1H), 7.92 (d, *J* = 8.0 Hz, 2H), 7.68 (d, *J* = 7.2 Hz, 2H), 7.54-7.51 (m, 1H), 7.45-7.43 (m, 1H), 7.37-7.33 (m, 4H), 6.57 (br, 1H), 3.68-3.63 (m, 2H), 2.98 (t, *J* = 7.0 Hz, 2H). **¹³C NMR (126 MHz, CDCl₃)** δ 167.7, 153.4, 149.4, 145.7, 139.3, 139.2, 137.4, 134.2, 131.6, 131.3, 130.0, 129.0, 128.6, 128.1, 127.4, 126.8, 126.4, 122.7, 40.8, 35.6. **HRMS (ESI/[M]⁺)** calculated for C₂₄H₁₉N₂O₃S⁺: 415.1111, found: 415.1119.



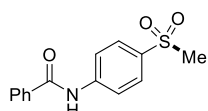
Following the general procedure IV with using sulfonamide (0.2 mmol) and aryl boronic acid (0.4 mmol) instead, the title product was isolated as white solid (57%). **¹H NMR (400 MHz, DMSO-*d*₆)** δ 10.68 (br, 1H), 8.16-7.94 (m, 10H), 7.62-7.53 (m, 3H), 3.88 (s, 3H). **¹³C NMR (126 MHz, DMSO-*d*₆)** δ 166.7, 165.5, 146.0, 144.8, 134.7, 134.5, 134.2, 132.6, 130.9, 129.4, 129.0, 128.3, 128.0, 120.8, 53.2, 40.1, 40.0, 39.8. **HRMS (ESI/[M]⁺)** calculated for C₂₁H₁₆NO₅S⁺: 394.0749, found: 394.0751.



Following the general procedure V. **¹H NMR (400 MHz, CDCl₃)** δ 7.94 (d, *J* = 8.6 Hz, 2H), 7.54 (d, *J* = 8.6 Hz, 2H), 7.19 (d, *J* = 7.9 Hz, 2H), 7.12 (d, *J* = 8.1 Hz, 2H), 6.75 (s, 1H), 3.06 (s, 3H), 2.39 (s, 3H). **¹³C NMR (126 MHz, CDCl₃)** δ 145.3, 144.3 (q, *J* = 38.6 Hz), 143.5, 139.9, 139.8, 129.8, 128.7, 128.5, 125.7, 125.6, 121.0 (q, *J* = 269.8 Hz), 106.5, 44.5, 26.9.



Following the general procedure V. **¹H NMR (400 MHz, CDCl₃)** δ 7.86 (d, *J* = 8.3 Hz, 2H), 7.73 (d, *J* = 8.0 Hz, 2H), 7.52-7.48 (m, 1H), 7.43-7.39 (m, 4H), 6.51 (br, 1H), 3.74-3.69 (m, 2H), 3.06-3.02 (m, 5H). **¹³C NMR (126 MHz, CDCl₃)** δ 167.7, 145.8, 138.7, 134.3, 131.6, 129.8, 128.6, 127.7, 126.9, 44.5, 40.8, 35.7. **HRMS (ESI/[M]⁺)** calculated for C₁₆H₁₆NO₃S⁺: 302.0845, found: 302.0854.



Following the general procedure V. **¹H NMR (400 MHz, DMSO-*d*₆)** δ 10.68 (br, 1H), 8.08 (d, *J* = 8.5 Hz, 2H), 8.00 (d, *J* = 7.6 Hz, 2H), 7.94 (d, *J* = 8.4 Hz, 2H), 7.63-7.54 (m, 3H), 3.20 (s, 3H). **¹³C NMR (126 MHz, DMSO-*d*₆)** δ 166.6, 144.3, 135.5, 134.9, 132.5, 129.0, 128.5, 128.3, 120.5, 44.3. **HRMS (ESI/[M]⁺)** calculated for C₁₄H₁₂NO₃S⁺: 274.0532, found: 274.0536.

Optimization Experiments

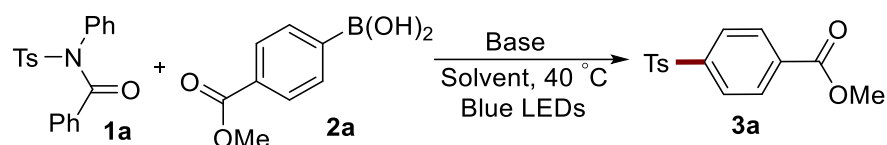
Table SI-1. Effect of base on the Arylation of Sulfonamides via Visible Light-mediated Deamination^a

Entry	Base	Yield (%)
1	LiO ^t Bu	Trace

2	NaOH	33%
3	NaOAc	NR
4	Na ₂ CO ₃	NR
5	Na ₃ PO ₄	trace
6	NaHCO ₃	NR

^a Reaction conditions: **1a** (0.2 mmol), **2a** (0.4 mmol), CsF (0.5 mmol), 1,4-dioxane (2 mL), 50 W blue LED, 12h, 40 °C, isolated yield.

Table SI-2. Effect of Light on the Arylation of Sulfonamides via Visible Light-mediated Deamination^a



Entry	Light	Yield
1	360nm	30%
2	26 W CFL	16%
4	Dark	NR

^a Reaction conditions: **1a** (0.4 mmol), **2a** (0.2 mmol), CsF (0.5 mmol), 1,4-dioxane (2 mL), 50 W blue LED, 12h, 40 °C, isolated yield.

Table SI-3. Effect of solvent on the Arylation of Sulfonamides via Visible Light-mediated Deamination^a

Entry	Solvent	Yield
1	MeOH	Trace
2	DMA	NR
3	DMSO	NR

^a Reaction conditions: **1a** (0.2 mmol), **2a** (0.4 mmol), CsF (0.5 mmol), 1,4-dioxane (2 mL), 50 W blue LED, 12h, 40 °C, isolated yield.

Reference

- 1 S. Shi, G. Meng and M. Szostak, *Angew. Chem. Int. Ed.* 2016, **55**, 6959-6963.

¹H and ¹³C Spectra

