Supporting information for
Microwave-Assisted Amination from Aryl Triflates
Without Base and Catalyst

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Experimental

General Information: The materials were used as purchased and NMP was used without any additional purification. All reactions under microwave irradiation were monitored by thin-layer chromatography (TLC) on gel F₂₅₄ plates. The silica gel (300-400 meshes) for column chromatography was purchased from the Qingdao Marine Chemical Factory in China. ¹HNMR spectra were recorded in CDCl₃ solution on the Bruke Avance 500M instruments, and spectral data are reported in *ppm* relative to tetramethylsilane (TMS) as internal standard. GC-MS analysis was performed on a HP-5973 spectrometer. MS was carried out on a HP5989B mass spectrometer. The microwave heating amination reactions were performed on a Sanle WHL70S-01 Microwave Synthesizer.

General Procedure for Aryl aminations: Aryl triflate (2mmol), amine (5mmol) and NMP (10mL) were added to a 50 mL flask with a condenser. The vessel was placed inside the center of the microwave oven and then it was exposed to microwave irradiation (250W) to reflux for 45~120 min at a temperature of 198-206°C. After the irradiation, the reaction mixture was cooled to room temperature, poured into 50mL of water and extracted with Et₂O (50mL × 2). The combined organic extracts were washed with saturated brine, and dried over anhydrous Na₂SO₄. After removal of the solvent, the residue was purified by the column chromatography on silica gel to give the pure product.

Spectroscopic Data for the Products:

a colorless oil.

¹H NMR (500MHz, CDCl₃): δ 7.24 (t, J=7.5Hz, 2H), δ 6.94 (d, J=8.1Hz, 2H), δ 6.81 (t, J=7.2Hz, 1H), δ 3.14 (t, J=5.4Hz, 4H), δ 1.68-1.73 (m, 4H), δ 1.52-1.57 (m, 4H)

m/z (relative intensity)= 161 (M⁺, 90), 160 (M⁺-1, 100), 132 (22), 120 (25), 105 (40), 77 (35).

a colorless oil.

¹H NMR (500MHz, CDCl₃): δ 7.25-7.30 (m, 2H), δ 6.89-6.94 (m, 3H), δ 3.87 (t, J=4.6Hz, 4H), δ 3.16 (t, J=4.6Hz, 4H).

m/z (relative intensity)= 163 (M⁺, 48), 105 (100), 77(37), 51 (27).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.25-7.28 (m, 2H), δ 6.93 (d, $J=8.0\text{Hz}$, 2H), δ 6.84-6.86 (t, $J=7.3\text{Hz}$, 1H), δ 3.22 (t, $J=5.0\text{Hz}$, 4H), δ 2.58-2.60 (t, $J=5.0\text{Hz}$, 4H), δ 2.36 (s, 3H).

m/z (relative intensity)= 176 (M^+ , 100), 177 (M^++1 , 52), 77(15), 70(30), 42(52).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.26 (t, $J=7.5\text{Hz}$, 2H), δ 6.94 (d, $J=8.0\text{Hz}$, 2H), δ 6.85 (t, $J=7.3\text{Hz}$, 1H), δ 3.22-3.24 (t, $J=5.0\text{Hz}$, 4H), δ 2.61 (t, $J=5.0\text{Hz}$, 4H), δ 2.46-2.50 (m, 2H), δ 1.13 (t, $J=7.2\text{Hz}$, 3H).

m/z (relative intensity)= 190 (M^+), 191 (M^++1 , 68), 84 (30), 56 (35), 42 (66).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.21-7.25 (m, 2H), δ 6.66 (s, 1H), δ 6.58 (s, 2H), δ 3.29 (s, 4H), δ 2.00 (m, 4H).

m/z (relative intensity)= 147 (M^+ , 73), 146 (M^+-1 , 100), 104 (20), 91 (51), 77 (30).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.15-7.18 (m, 2H), δ 6.66-6.70 (m, 1H), δ 6.60-6.61 (m, 2H), δ 3.09 (t, $J=7.2\text{Hz}$, 2H), δ 1.57-1.61 (m, 2H), δ 1.40-1.45 (m, 2H), δ 0.96 (t, $J=7.3\text{Hz}$, 3H).

m/z (relative intensity)= 149 (M^+ , 30), 106 (100), 77 (16).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.19 (t, $J=7.8\text{Hz}$, 2H), δ 6.61-6.65 (m, 3H), δ 3.25 (t, $J=7.6\text{Hz}$, 4H), δ 1.55-1.59 (m, 4H), δ 1.32-1.37 (m, 4H), δ 0.95 (t, $J=7.4\text{Hz}$, 6H).

m/z (relative intensity)= 205 (M^+ , 56), 206 (M^++1 , 47), 162 (100), 120 (85), 106 (17), 41 (26).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.27 (d, $J=8.7\text{Hz}$, 2H), δ 6.89 (d, $J=8.7\text{Hz}$, 2H), δ 3.11 (t, $J=5.4\text{Hz}$, 4H), δ 1.68-1.73 (m, 4H), δ 1.54-1.57 (m, 2H), δ 1.30 (s, 9H).

m/z (relative intensity)= 217 (M^+ , 52), 202 (100), 57 (19).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.05 (d, $J=8.5\text{Hz}$, 2H), δ 6.86 (d, $J=8.5\text{Hz}$, 2H), δ 3.08 (t, $J=5.4\text{Hz}$, 4H), δ 2.26 (s, 3H), δ 1.68-1.73 (m, 4H), δ 1.54-1.58 (m, 2H).

m/z (relative intensity)= 175 (M^+ , 100), 174 (M^+-1 , 61), 176 (31), 118 (28), 91 (41), 41 (41).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.14 (t, $J=7.8\text{Hz}$, 1H), δ 6.75-6.77 (m, 2H), δ 6.65 (d, $J=7.3\text{Hz}$, 1H), δ 3.14 (t, $J=5.4\text{Hz}$, 4H), δ 2.31 (s, 3H), δ 1.68-1.73 (m, 4H), δ 1.55-1.59 (m, 2H).

m/z (relative intensity)= 175 (M^+ , 100), 174 (M^+-1 , 94), 119 (45), 91 (50), 65 (28), 41 (21).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.68-7.64 (m, 3H), δ 7.36-7.38 (m, 1H), δ 7.27-7.30 (m, 2H), δ 7.15 (s, 1H), δ 3.26 (t, $J=5.4\text{Hz}$, 4H), δ 1.76-1.77 (m, 4H), δ 1.59-1.62 (m, 2H).

m/z (relative intensity)= 211 (M^+ , 95), 210(M^+-1 , 100), 170 (18), 155 (30), 127 (45).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 6.91 (d, $J=9.0\text{Hz}$, 2H), δ 6.82 (d, $J=9.0\text{Hz}$, 2H), δ 3.76 (s, 3H), δ 3.01 (t, $J=5.4\text{Hz}$, 4H), δ 1.69-1.74 (m, 4H), δ 1.52-1.55 (m, 2H).

m/z (relative intensity)= 191 (M^+ , 100), 190(M^+-1 , 23), 176 (32), 41 (13).

a colorless oil.

^1H NMR (500MHz, CDCl_3): δ 7.15 (t, $J=8.3\text{Hz}$, 1H), δ 6.54-6.56 (m, 1H), δ 6.46-6.48 (m, 1H), δ 6.37-6.39 (m, 1H), δ 3.78 (s, 3H), δ 3.15 (t, $J=5.5\text{Hz}$, 4H), δ 1.67-1.71 (m, 4H), δ 1.55-1.58 (m, 2H).

m/z (relative intensity)= 191 (M^+ , 100), 190(M^+-1 , 54), 42 (17).

a solid, Mp = 100~102 $^{\circ}\text{C}$

^1H NMR (500MHz, CDCl_3): δ 8.10 (d, $J=7.7\text{Hz}$, 2H), δ 6.78 (d, $J=7.7\text{Hz}$, 2H), δ 3.44 (s, 4H), δ 1.69 (s, 6H).

m/z (relative intensity)= 206 (M^+ , 100), 205 (M^+-1 , 83), 159 (22), 120 (24), 77 (26), 41 (30).

a solid, Mp= 40~44 °C.

¹H NMR (500MHz, CDCl₃): δ 7.18 (d, J=8.8Hz, 2H), δ 6.84 (d, J=8.8Hz, 2H), δ 3.10-3.12 (t, J=5.4Hz, 4H), δ 1.68-1.72 (m, 4H), δ 1.55-1.58 (m, 2H).

m/z (relative intensity)= 195 (M⁺, 70), 194 (M⁺-1, 100), 154 (20), 139 (30), 111 (20).

a solid, Mp= 54~58 °C.

¹H NMR (500MHz, CDCl₃): δ 7.31 (d, J=8.8Hz, 2H), δ 6.80 (d, J=8.8Hz, 2H), δ 3.12 (t, J=5.3Hz, 4H), δ 1.68-1.70 (m, 4H), δ 1.57-1.59 (m, 2H).

m/z (relative intensity)= 240 (M⁺, 100), 239 (M⁺-1, 80), 241 (M⁺+1, 79), 76 (39), 55 (35), 41 (48).

a solid, Mp= 69~71 °C.

¹H NMR (500MHz, CDCl₃): δ 7.22 d, J=8.9Hz, 2H), δ 6.83 (d, J=8.9Hz, 2H), δ 3.85 (t, J=4.8Hz, 4H), δ 3.12 (t, J=4.8Hz, 4H).

m/z (relative intensity)= 197 (M⁺, 100), 139 (93), 111 (20), 75 (21).

a solid, Mp= 79~81 °C.

¹H NMR (500MHz, CDCl₃): δ 7.20 (d, J=9.0Hz, 2H), δ 6.84 (d, J=9.0Hz, 2H), δ 3.18 (t, J=5.0Hz, 4H), δ 2.58 (t, J=5.0Hz, 4H), δ 2.36 (s, 3H).

m/z (relative intensity)= 210 (M⁺, 100), 211 (M⁺+1, 41), 71 (42), 42 (69).

a solid, Mp= 84~86 °C.

¹H NMR (500MHz, CDCl₃): δ 7.14(d, J=8.9Hz, 2H), δ 6.45 (d, J=8.9Hz, 2H), δ 3.23 (t, J=6.5Hz, 4H), δ 1.98-2.01 (m, 4H).

m/z (relative intensity)= 181 (M⁺, 98), 180 (M⁺-1, 100), 138 (25), 125 (57), 111 (28), 75 (21).

a solid, Mp= 106~108 °C.

¹H NMR (500MHz, CDCl₃): δ 7.36 (d, J=8.9Hz, 2H), δ 6.79 (d, J=8.7Hz, 2H), δ 3.86 (t, J=4.7Hz, 4H), δ 3.12 (t, J=4.7Hz, 4H).

m/z (relative intensity)= 242 (M⁺, 33), 241(M⁺-1, 100), 243 (M⁺+1, 97).

a solid, Mp= 84~86 °C.

^1H NMR (500MHz, CDCl_3): δ 7.33 (d, J = 9.0Hz, 2H), δ 6.79 (d, J =9.0Hz, 2H), δ 3.19 (t, J =4.9Hz, 4H), δ 2.61 (t, J =4.9Hz, 4H), δ 2.46-2.50 (m, 2H), δ 1.14 (t, J =7.3Hz, 3H).

m/z (relative intensity)= 269(M^+ , 45), 268 (M^+-1 , 82), 270(M^++1 , 82), 84(63), 70 (47), 56 (60), 42 (100).

a solid, Mp= 98~100 °C.

^1H NMR (500MHz, CDCl_3): δ 7.27 (d, J =8.7Hz, 2H), δ 6.42 (d, J =8.7Hz, 2H), δ 3.24 (t, J =6.6Hz, 4H), δ 1.99-2.02 (m, 4H).

m/z (relative intensity)= 226(M^+ , 72), 225 (M^+-1 , 100), 227 (M^++1 , 96), 224 (55), 41 (43).

a solid, Mp= 68~70 °C.

^1H NMR (500MHz, CDCl_3): δ 7.49 (d, J =8.9Hz, 2H), δ 6.70 (d, J =8.9Hz, 2H), δ 3.13 (t, J =5.4Hz, 4H), δ 1.68-1.69 (m, 4H), δ 1.56-1.60 (m, 2H).

m/z (relative intensity)= 287(M^+ , 100), 286 (M^+-1 , 86), 246 (17), 231 (20), 77 (10).

a solid, Mp= 161~163 °C.

^1H NMR (500MHz, CDCl_3): δ 7.53 (d, J =8.9Hz, 2H), δ 6.68 (d, J =8.8Hz, 2H), δ 3.85 (t, J =4.8Hz, 4H), δ 3.12 (t, J =4.8Hz, 4H).

m/z (relative intensity)= 289 (M^+ , 100), 231 (86), 77(15).