**SEQUENTIAL ELIMINATION-CYCLOPROPANATION REACTIONS
PROMOTED BY SAMARIUM: HIGHLY DIASTEREOSELECTIVE
SYNTHESIS OF CYCLOPROPYLAMIDES**

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***trans*-*N,N*-Diisopropyl-2-heptylcyclopropanecarboxamide (3a):** R_f = 0.3 (hexane/ethyl acetate 3/1); ^1H NMR (CDCl_3 , 300 MHz) δ 4.17-3.05 (2 H, m), 1.61-0.45 (31 H, m); ^{13}C NMR (CDCl_3 , 75 MHz) δ 172.0 (C), 33.4 (CH_2), 31.7 (CH_2), 29.6 (CH_2), 29.2 (CH_2), 29.1 (CH_2), 22.5 (CH_2), 21.5 (CH_3), 21.3 (CH), 21.0 (CH), 20.6 (CH_3), 14.0 (CH_2); MS (70 eV): m/z (%): 267 [M^+] (15), 100 (21), 86 (100), 55 (35), 43 (52); IR (neat) 2968, 2926, 2855, 1632, 1457, 1368 cm^{-1} .

3a

***trans*-*N,N*-Diethyl-2-(1-phenylethyl)cyclopropanecarboxamide (3b):** R_f = 0.3 (hexane/ethyl acetate 3/1); ^1H NMR (CDCl_3 , 300 MHz) δ 7.30-7.15 (10 H, m), 3.48-3.00 (8 H, m), 2.35-1.99 (4 H, m), 1.65-0.63 (24 H, m); ^{13}C NMR (CDCl_3 , 75 MHz) δ 171.9 (C), 171.6 (C), 146.3 (C), 145.6 (C), 128.2 (CH), 126.9 (CH), 126.8 (CH), 126.0 (CH), 44.1 (CH), 43.2 (CH), 41.9 (CH_2), 41.5 (CH_2), 40.7 (CH_2), 40.5 (CH_2), 28.7 (CH), 28.5 (CH), 21.9 (CH_3), 18.6 (CH), 18.2 (CH), 14.8 (CH_2), 14.6 (CH_2), 14.2 (CH_3), 13.1 (CH_3), 13.0 (CH_3); MS (70 eV): m/z (%): 245 [M^+] (19), 230 (8), 173 (18), 105 (51), 72 (59), 55 (100); HRMS calcd for $\text{C}_{16}\text{H}_{23}\text{NO}$ 245.1780, found 245.1776; IR (neat) 3038, 2969, 2929, 1632, 1453, 1377 cm^{-1} .

***trans*-*N,N*-Diethyl-2-cyclohexylcyclopropanecarboxamide (3c):** R_f = 0.3 (hexane/ethyl acetate 3/1); ^1H NMR (CDCl_3 , 200 MHz) δ 3.51-3.21 (4 H, m), 1.68-0.52 (21 H, m); ^{13}C NMR (CDCl_3 , 50 MHz) δ 172.3 (C), 41.8 (CH_2), 40.6 (CH_2), 32.8 (CH_2), 32.4 (CH_2), 28.4 (CH), 26.2 (CH_2), 26.0 (CH_2), 17.2 (CH), 14.7 (CH), 13.5 (CH_3), 13.1 (CH_3); MS (70 eV): m/z (%): 223 [M^+] (32), 100 (75), 72 (71), 55 (100); IR (neat) 2968, 2924, 2851, 1634, 1450, 1379 cm^{-1} .

***trans*-*N,N*-Diethyl-2-phenylcyclopropanecarboxamide (3d):** $R_f = 0.3$ (hexane/ethyl acetate 3/1); ^1H NMR (CDCl_3 , 300 MHz) δ 7.31-7.10 (5 H, m), 3.44 (2 H, q, $J = 7.18$), 3.43 (2 H, q, $J = 7.18$), 2.49 (1 H, ddd, $J = 9.11, 5.98, 4.27$), 1.93 (1 H, ddd, $J = 8.25, 5.41, 4.27$), 1.65 (1 H, ddd, $J = 9.11, 5.41, 3.99$), 1.25 (1 H, ddd, $J = 8.25, 5.98, 3.99$), 1.19 (3 H, t, $J = 7.18$), 1.14 (3 H, t, $J = 7.18$); ^{13}C NMR (CDCl_3 , 75 MHz) δ 170.9 (C), 141.0 (C), 128.3 (CH), 126.0 (CH), 42.0 (CH_2), 40.8 (CH_2), 25.3 (CH), 23.1 (CH), 16.1 (CH_2), 14.8 (CH_3), 13.2 (CH_3); MS (70 eV): m/z (%): 217 [M^+] (37), 145 (25), 117 (39), 72 (91), 42 (100); HRMS calcd for $\text{C}_{14}\text{H}_{19}\text{NO}$ 217.1467, found 217.1495; IR (neat) 3019, 2971, 1627, 1452, 1377 cm^{-1} .

(1*S,2*S**)-2-Butyl-*N,N*-diethyl-1-ethylcyclopropanecarboxamide (3e):** $R_f = 0.3$ (hexane/ethyl acetate 3/1); ^1H NMR (CDCl_3 , 200 MHz) δ 3.47-3.27 (4 H, m), 1.69-0.84 (16 H, m), 0.96 (3 H, t, $J = 7.40$), 0.88 (3 H, t, $J = 7.12$), 0.13 (1 H, dd, $J = 5.69, 4.56$); ^{13}C NMR (CDCl_3 , 75 MHz) δ 173.1 (C), 40.9 (CH_2), 38.7 (CH_2), 31.6 (CH_2), 30.4 (C), 27.8 (CH_2), 24.1 (CH_2), 22.8 (CH), 22.4 (CH_2), 16.9 (CH_2), 13.9 (CH_3), 13.6 (CH_3), 12.5 (CH_3), 11.7 (CH_3); MS (70 eV): m/z (%): 225 [M^+] (8), 182 (9), 154 (62), 139 (41), 69 (100); HRMS calcd for $\text{C}_{14}\text{H}_{27}\text{NO}$ 225.2093, found 225.2091; IR (neat) 2960, 2911, 1631, 1460, 1376 cm^{-1} .

(1*S,2*R**)-2-Cyclohexyl-*N,N*-diethyl-1-methylcyclopropanecarboxamide (3f):** *R*_f = 0.4 (hexane/ethyl acetate 3/1); ¹H NMR ([D₆]DMSO, 373 K, 400 MHz) δ 3.48 (4 H, q, *J* = 7.0), 1.95-1.69 (5 H, m), 1.45-0.98 (6 H, m), 1.33 (3 H, s), 1.17 (6 H, t, *J* = 7.05), 1.06 (1 H, dd, *J* = 8.97, 4.20), 0.90 (1 H, dd, *J* = 8.97, 4.77), 0.27 (1 H, dd, *J* = 4.77, 4.20); ¹³C NMR ([D₆]DMSO, 373 K, 100 MHz) δ 172.7 (C), 39.1 (CH₂), 36.9 (CH), 32.2 (CH₂), 27.8 (CH), 25.5 (CH₂), 25.3 (CH₂), 25.1 (CH₂), 24.5 (C), 16.9 (CH₂), 15.7 (CH₃), 12.6 (CH₃); MS (70 eV): *m/z* (%): 237 [*M*⁺] (10), 222 (5), 100 (25), 55 (52), 41 (100); HRMS calcd for C₁₅H₂₇NO 237.2093, found 237.2101; IR (neat) 2981, 2924, 1627, 1429, 1379 cm⁻¹.

(1*S,2*R**)-*N,N*-Diisopropyl-1-methyl-2-(4-methoxyphenyl)cyclopropanecarboxamide (3g):** *R*_f = 0.3 (hexane/ethyl acetate 3/1); ¹H NMR (CDCl₃, 300 MHz) δ 7.10 (2 H, d, *J* = 8.39 Hz), 6.85 (2 H, d, *J* = 8.39 Hz), 4.51-4.35 (1 H, m), 3.79 (3 H, s), 3.42-3.25 (1 H, m), 2.33 (1 H, dd, *J* = 8.97, 6.87), 1.46 (1 H, dd, *J* = 8.97, 5.34), 1.45-1.01 (13 H, m), 0.99 (3 H, s); ¹³C NMR (CDCl₃, 75 MHz) δ 173.2 (C), 157.8 (C), 129.1 (CH), 113.4 (CH), 55.0 (CH₃), 48.1 (CH), 45.3 (CH), 28.9 (C), 26.4 (CH), 20.6 (CH₃), 20.5 (CH₃), 20.3 (CH₃), 16.3 (CH₂), 16.0 (CH₃); MS (70 eV): *m/z* (%): 289 [*M*⁺] (10), 246 (5), 189 (15), 43 (100); HRMS calcd for C₁₈H₂₇NO₂ 289.2042, found 289.2038; IR (neat) 2999, 2970, 2920, 1631, 1445, 1378 cm⁻¹.

***N,N*-Diethyl-1-methylspiro[2.5]octanecarboxamide (3h):** $R_f = 0.3$ (hexane/ethyl acetate 3/1); ^1H NMR (CDCl_3 , 300 MHz) δ 3.61-3.43 (2 H, m), 3.26-3.05 (2 H, m), 1.75-0.75 (11 H, m), 1.21 (3 H, s), 1.17 (3 H, t, $J = 7.12\text{H}$), 1.02 (3 H, t, $J = 7.12$, 3 H), 0.21 (1 H, d, $J = 4.55$); ^{13}C NMR (CDCl_3 , 75 MHz) δ 173.4 (C), 40.9 (CH_2), 38.3 (CH_2), 30.3 (C), 30.1 (CH_2), 28.9 (C), 26.2 (CH_2), 25.3 (CH_2), 25.2 (CH_2), 17.4 (CH_3), 14.1 (CH_3), 12.2 (CH_3); MS (70 eV): m/z (%): 223 [M^+] (50), 208 (27), 194 (12), 151 (18), 100 (81), 72 (92), 41 (100); HRMS calcd for $\text{C}_{14}\text{H}_{25}\text{NO}$ 223.1936, found 223.1947; IR (neat) 2928, 1632, 1445, 1381 cm^{-1} .

(1*S*^{*},2*S*^{*})-2-Benzyl-*N,N*-Diethyl-1,2-dimethylcyclopropanecarboxamide (3i): *R*_f = 0.3 (hexane/ethyl acetate 3/1); ¹H NMR (CDCl₃, 300 MHz) δ 7.31-7.18 (5 H, m), 3.72-3.52 (2 H, m), 3.38-3.18 (2 H, m), 2.64 (1 H, d, *J* = 13.46), 2.13 (1 H, d, *J* = 13.46), 1.51 (1 H, d, *J* = 5.13), 1.35 (3 H, s), 1.29 (3 H, t, *J* = 7.18), 1.12 (3 H, t, *J* = 7.18), 1.05 (3 H, s), 0.37 (1 H, d, *J* = 7.18); ¹³C NMR (CDCl₃, 75 MHz) δ 173.3 (C), 140.0 (C), 129.2 (CH), 128.0 (CH), 126.0 (CH), 42.0 (CH₂), 41.1 (CH₂), 38.6 (CH₂), 29.6 (C), 26.7 (C), 24.9 (CH₂), 18.5 (CH₃), 16.9 (CH₃), 14.2 (CH₃), 12.3 (CH₃); MS (70 eV): *m/z* (%): 259 [*M*⁺] (11), 244 (6), 140 (21), 117 (50), 91 (100); HRMS calcd for C₁₇H₂₅NO 259.1936, found 259.1943; IR (neat) 3011, 2980, 2930, 1631, 1459, 1381 cm⁻¹.

(1*S,2*R**)-*N,N*-Diethyl-2-ethyl-1-methyl-2-phenylcyclopropanecarboxamide (3j):** *R*_f = 0.3 (hexane/ethyl acetate 3/1); ¹H NMR (CDCl₃, 300 MHz) δ 7.45-7.01 (5 H, m), 3.54-3.27 (4 H, m), 2.75-2.49 (2 H, m), 2.21 (1 H, d, *J* = 5.41), 1.46 (3 H, s), 1.03 (3 H, t, *J* = 7.12), 0.82 (3 H, t, *J* = 7.12), 0.53 (1 H, d, *J* = 5.41), 0.32 (3 H, t, *J* = 7.12); ¹³C NMR (CDCl₃, 50 MHz) δ 171.4 (C), 138.8 (C), 127.6 (CH), 127.5 (CH), 125.7 (CH), 40.8 (CH₂), 37.9 (CH₂), 35.6 (C), 34.3 (C), 25.7 (CH₂), 22.9 (CH₂), 18.8 (CH₃), 13.5 (CH₃), 11.0 (CH₃), 10.8 (CH₃); MS (70 eV): *m/z* (%): 259 [*M*⁺] (25), 244 (12), 91 (91), 42 (100); HRMS calcd for C₁₇H₂₅NO 259.1936, found 259.1933; IR (neat) 3058, 2968, 1628, 1450, 1381 cm⁻¹.