Supporting Information

Palladium-Catalyzed Cross-Coupling Reactions of Allylic Halides and Acetates with Indium Organometallics

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(E)-1,3-Diphenylpropene (2, R = Ph).¹ ¹H NMR (CDCl₃, 200 MHz) 3.56 (d, *J* = 5.9 Hz, 2 H), 6.39 (dt, *J* = 15.6, 5.9 Hz, 1 H), 6.49 (d, *J* = 16.1 Hz, 1 H), 7.18–7.44 (m, 10 H); ¹³C NMR (CDCl₃, 50 MHz) 39.3 (CH₂), 126.1 (CH), 126.2 (CH), 127.1 (CH), 128.5 (4 CH), 128.7 (4 CH), 131.1 (CH), 137.5 (C), 140.5 (C); MS (EI, 70 eV) *m/z* 194 (*M*⁺, 100), 178 (*M*⁺ – CH₃, 60).

(E)-1-Phenyl-3-(4'-methoxyphenyl)-1-propene (2, R = *p*-MeOC₆H₄).² ¹H NMR (CDCl₃, 200 MHz) 3.51 (d, *J* = 5.9 Hz, 2 H), 3.81 (s, 3 H), 6.33 (dd, *J* = 15.6, 5.9 Hz, 1 H), 6.46 (d, *J* = 15.6 Hz, 1 H), 6.87 (d, *J* = 8.5 Hz, 2 H), 7.17 (d, *J* = 8.5 Hz, 2 H), 7.23–7.39 (m, 5 H); ¹³C NMR (CDCl₃, 50 MHz) 38.4 (CH₂), 55.3 (CH₃), 113.9 (2 CH), 126.1 (2 CH), 127.0 (CH), 128.5 (2 CH), 129.6 (CH), 129.7 (2 CH), 130.7 (CH), 132.2 (C), 137.5 (C), 158.1 (C); MS (EI, 70 eV) *m/z* 224 (*M*⁺, 100), 193 (*M*⁺ – CH₃O, 42), 115 (50).

(E)-1-Phenyl-1,4-pentadiene (2, R = CH=CH₂).³ ¹H NMR (CDCl₃, 200 MHz) 2.99 (t, 2 H), 5.06 (q, 1 H), 5.10 (m, 1 H), 5.18 (dd, *J* = 15.6, 3.4 Hz, 1 H), 6.32 (dt, *J* = 15.6, 6.4 Hz, 1 H), 6.92 (ddt, *J* = 20.1, 10.2, 6.4 Hz, 1 H), 7.20–7.40 (m, 5 H); ¹³C NMR (CDCl₃, 50 MHz) 37.0 (CH₂), 115.6 (CH₂), 127.0 (2 CH), 128.5 (2 CH), 130.8 (CH), 136.5 (C); MS (EI, 70 eV) *m/z* 144 (*M*⁺, 35), 129 (*M*⁺ – CH₃, 100).

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(E)-1-Phenyl-1-butene (2, R = Me).⁴ ¹H NMR (CDCl₃, 200 MHz) 1.11 (t, 3 H), 2.25 (m, 2 H), 6.31 (dt, *J* = 15.6, 5.4 Hz, 1 H), 6.40 (d, *J* = 15.6 Hz, 1 H), 7.16–7.39 (m, 5 H); ¹³C NMR (CDCl₃, 50 MHz) 13.6 (CH₃), 26.0 (CH₂), 125.9 (2 CH), 126.7 (CH), 128.4 (2 CH), 128.8 (CH), 132.6 (CH), 137.9 (C); MS (EI, 70 eV) *m/z* 132 (M⁺, 38), 117 (M⁺ – CH₃, 100).

(E)-3,7-Dimethyl-1-phenyl-2,6-octadiene (4, R = Ph).⁵ ¹H NMR (CDCl₃, 200 MHz) 1.61 (s, 3 H), 1.70 (s, 3 H), 1.72 (s, 3 H), 2.09–2.17 (m, 4 H), 3.37 (d, 2 H), 5.12–5.16 (m, 1 H), 5.36 (t, 1 H), 7.17–7.50 (m, 5 H); ¹³C NMR (CDCl₃, 50 MHz) 14.1 (CH₃), 16.1 (CH₃), 17.7 (CH₃), 22.6 (CH₂), 25.7 (CH₂), 39.7 (CH₂), 123.0 (CH), 124.2 (CH), 127.1 (2 CH), 128.3 (CH), 128.7 (2 CH), 131.4 (C), 136.2 (C), 141.2 (C); MS (EI, 70 eV) *m/z* 214 (M⁺, 7), 154 (100).

(E)-2,6-Dimethyl-2,6-nonadiene (4, R = Me).⁶ ¹H NMR (CDCl₃, 200 MHz) 0.95 (t, 3 H), 1.61 (s, 6 H), 1.69 (s, 3 H), 1.95–2.05 (m, 4 H), 2.84 (m, 2 H), 5.11–5.14 (m, 2 H); ¹³C NMR (CDCl₃, 50 MHz) 14.3 (CH₃), 15.8 (CH₃), 17.6 (CH₂), 21.1 (CH₂), 26.7 (2 CH₃), 39.6 (CH₂), 124.4 (CH), 126.4 (CH), 127.2 (C), 131.2 (C); MS (EI, 70 eV) *m/z* 152 (M⁺, 9), 137 (M⁺ – CH₃, 12), 84 (100).

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(R)-(E)-4-Phenyl-3-buten-2-ol.⁷ ¹H NMR (CDCl₃, 200 MHz) 1.39 (d, *J* = 6.4 Hz, 3 H), 2.24 (br s, 1 H), 4.50 (m, 1 H), 6.28 (dd, *J* = 16.1, 6.4 Hz, 1 H), 6.58 (d, *J* = 16.1 Hz, 1 H), 7.25–7.43 (m, 5 H); ¹³C NMR (CDCl₃, 50 MHz) 23.4 (CH₃), 68.9 (CH), 126.4 (2 CH), 127.6 (CH), 128.6 (2 CH), 129.4 (CH), 133.6 (CH), 136.7 (C); MS (EI, 70 eV) *m/z* 148 (M⁺, 71), 133 (M⁺ – CH₃, 40), 105 (100); [²¹D = +25.4 (*c* = 5.07, CHCl₃); Lit.⁷ [²⁰D = +31.4 (*c* = 1.38, CHCl₃).

(R)-(E)-4-Phenyl-3-buten-2-ol, Acetate [(R)-(E)-5].⁸ ¹H NMR (CDCl₃, 200 MHz) 1.41 (d, *J* = 6.4 Hz, 3 H), 2.08 (s, 3 H), 5.54 (m, 1 H), 6.20 (dd, *J* = 16.1, 6.4 Hz, 1 H), 6.61 (d, *J* = 16.1 Hz, 1 H), 7.27–7.41 (m, 5 H); ¹³C NMR (CDCl₃, 50 MHz) 20.3 (CH₃), 21.4 (CH₃), 71.0 (CH), 126.5 (2 CH), 127.9 (CH), 128.5 (2 CH), 128.8 (CH), 131.5 (CH), 136.3 (C), 170.3 (C); MS (EI, 70 eV) *m/z* 190 (M⁺, 22), 129 (100); [²¹D +146.7 (*c* 1.3, CHCl₃); Lit.⁸ [²⁰D +142.2 (*c* 1, CHCl₃).

(S)-(E)-1, 3-Diphenyl-1-butene [(S)-(E)-6].⁹ ¹H NMR (CDCl₃, 200 MHz) 1.48 (d, *J* = 6.9 Hz, 3 H), 3.66 (m, 1 H), 6.40 (m, 2 H), 7.20–7.50 (m, 10 H); ¹³C NMR (CDCl₃, 50 MHz) 21.2 (CH₃), 42.5 (CH), 126.1 (2 CH), 127.0 (2 CH), 127.3 (2 CH), 128.5 (4 CH), 135.2 (2 CH), 137.0 (C), 145.6 (C); MS (EI, 70 eV) *m/z* 208 (M⁺, 59), 193 (M⁺ – CH₃, 51), 115 (100); [²²D –37.7 (*c* 2.25, CHCl₃); Lit.⁹ [²⁰D –39.3 (*c* 2.51, CHCl₃).

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2 (R = Ph)

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2 (R = *p*-MeOC₆H₄)

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2 (R = CH=CH₂)

2 (R = CH=CH₂)

2 (R = Me)

4 (R = Ph)

4 (R = Ph)

4 (R = Me)

4 (R = Me)

(R)-(E)-4-Phenyl-3-buten-2-ol

(R)-(E)-4-Phenyl-3-buten-2-ol

(R)-(*E*)-5