Supporting Information

Chemoselective nucleophilic arylation and single-step oxidative esterification of aldehydes using siloxanes and a palladium-phosphinous acid as a reaction switch

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All commercially available reagents and solvents were used without further purification. Flash chromatography was carried out on SiO₂ (Merck Kieselgel 60, particle size 0.032-0.063 μ m). Microwave reactions were conducted in sealed glass vessels (capacity 10 mL). NMR spectra were obtained on a 300 MHz (¹H NMR) and 75 MHz (¹³C NMR) Varian FT-NMR spectrometer using CDCl₃ as the solvent. Chemical shifts are reported in ppm relative to TMS.

1. General procedure for esterification of aldehydes. A mixture of POPd (25.0 mg, 2.5 mol%) aldehyde (2.0 mmol), tetramethyl orthosilicate (334.0 mg, 2.19 mmol), and TBAF (679.0 mg, 2.6 mmol) was stirred in 5 mL of anhydrous acetonitrile under inert atmosphere at 50 °C for 24 hours. The reaction mixture was allowed to cool to room temperature, poured onto 4 mL of water, and extracted with methylene chloride. The combined organic layers were washed with water, dried over MgSO₄, and the solvents were removed under vacuum. Crude products were purified by flash chromatography on silica gel.

2. General procedure for esterification of aldehydes (1 gram scale). A mixture of POPd (125.0 mg, 2.5 mol%) aldehyde (0.01 mol), tetramethyl orthosilicate (1.67 g, 0.0109 mol), and TBAF (3.39 g, 0.013 mol) was stirred in 10 mL of anhydrous ACN at 50 °C for 24 hours. The reaction mixture was allowed to cool to room temperature, poured onto 10 mL of water, and extracted with methylene chloride. The combined organic layers were washed with water, dried over MgSO₄, and the solvents were removed under vacuum. Crude products were purified by flash chromatography on silica gel as indicated below.

3. General procedure for 1,2-addition of phenylsiloxanes to aldehydes. A mixture of aldehyde (2.0 mmol), phenyltrimethoxysilane (450.0, 2.2 mmol), and TBAF (679.0 mg, 2.6 mmol) was placed in a 10 mL glass tube with 5 mL of anhydrous ACN. Reaction mixtures were

heated with microwave irradiation to 120°C (300 W) for 30 minutes and the temperature was monitored using a calibrated infrared temperature control mounted under the reaction vessel. The reaction mixture was then allowed to cool to room temperature, poured onto 4 mL of water, and extracted with methylene chloride. The combined organic layers were washed with brine, dried over MgSO_4 , and the solvents were removed under vacuum. The residue was purified by flash chromatography or by recrystallization as indicated below.

4. NMR studies of the one-step esterification

The reaction course of the POPd-catalyzed oxidative esterification of benzaldehyde with tetramethyl orthosilicate in the presence of TBAF was monitored by ^1H - and ^2H -NMR spectroscopy using acetonitrile as solvent. Since we expected that a siloxane species can function as the hydride acceptor, the NMR spectra of trimethoxysilane, $\text{HSi}(\text{OMe})_3$, in the absence and presence of TBAF were recorded. The NMR spectrum of trimethoxysilane showed singlets at 3.58 (9H) and 4.15ppm (1H). These signals shift to 3.28 (s, 9H) and 4.58ppm (s, 1H), respectively, in the presence of TBAF which can be attributed to formation of $\text{HSiF}(\text{OMe})_3$ (Figure 1).

Figure 1. NMR spectrum of trimethoxysilane in the absence (top) and in the presence (bottom) of tetrabutylammonium fluoride in ACN-d_3 .

We then monitored the reaction between benzaldehyde and tetramethyl orthosilicate by ^1H -NMR spectroscopy over 24 h. Although the reaction was found to proceed more slowly (the mixture was kept in the NMR tube without spinning) than in a stirred solution, we could clearly see the formyl proton of the aldehyde group disappearing while new signals appeared at 3.3, 3.9, and 4.6ppm (Figure 2). The singlet at 3.9ppm corresponds to the methoxy group of methyl benzoate

which is formed from benzaldehyde by oxidative esterification. The shifts of the new singlets at 3.3 and 4.6 ppm are in excellent agreement with those obtained for HSiF(OMe)_3 (compare Figures 1 and 2). We therefore concluded that intermediately formed SiF(OMe)_3 functions as the hydride acceptor.

Figure 2. ^1H -NMR spectra of the oxidative esterification of benzaldehyde using tetramethyl orthosilicate.

Conditions: POPd (1.2 mg, 2.5 mol%) benzaldehyde (10.1 mg, 0.07 mmol), tetramethyl orthosilicate (11.9 mg, 1.1eq) TBAF (20.3 g, 1.3 eq) in ACN-d_3 . The first spectrum was taken at 25°C , and then the temperature of the instrument was raised to 50°C . The spectra were recorded at 0.1, 0.5, 1, 5, 15 and 24 h.

The same conclusion can be drawn from the corresponding ^2H -NMR spectroscopy experiment using benzaldehyde- d_6 and tetramethyl orthosilicate (Figure 3). Again, we observed the disappearance of the formyl deuterium signal and concomitant formation of DSiF(OMe)_3 (Figure 3).

Figure 3. ^2H -NMR spectra of the oxidative esterification of benzaldehyde- d_6 using tetramethyl orthosilicate.

Conditions: POPd (1.2 mg, 2.5 mol%) benzaldehyde- d_6 (10.1 mg, 0.07 mmol), tetramethyl orthosilicate (13.5 mg, 1.1eq) TBAF (23.1 g, 1.3 eq) in ACN using a small amount of ACN-d_3 as the reference. The first spectrum was taken at 25°C , and then the temperature of the instrument was raised to 50°C . The spectra were recorded at 0.5, 2, 5, 7 and 12 h.

5. Characterization of oxidative esterification and 1,2-addition products

Methyl 4-chlorobenzoate (1).^[1] Flash chromatography (hexane/ethyl acetate 5:1) gave 306.1 mg of white crystals (1.80 mmol, 90%). ¹H NMR: δ 3.93 (s, 3H), 7.42 (d, $J=8.6$ Hz, 2H), 7.98 (d, $J=8.6$ Hz, 2H). ¹³C NMR: δ 52.5, 128.9, 131.2, 139.6, 166.5. EI-MS (70eV): m/z (%) = 170 (30, M⁺), 139 (100, M⁺-OMe), 111 (35, M⁺-C(O)OMe).

Methyl 1-naphthoate (2).^[2] Flash chromatography (hexane/ethyl acetate 10:1) gave 302.9 mg of white crystals (1.74 mmol, 87 %). ¹H NMR: δ 3.99 (s, 3H), 7.50-7.65 (m, 3H), 7.93 (d, $J=8.1$ Hz, 1H), 8.04 (d, $J=8.1$ Hz, 1H), 8.22 ($J=7.1$ Hz, 1H), 8.95 (d, $J=7.1$ Hz, 1H). ¹³C NMR: δ 52.4, 124.8, 126.1, 127.5, 128.4, 128.8, 130.5, 131.6, 133.7, 134.1, 168.5. EI-MS (70eV): m/z (%) = 186 (60, M⁺), 155 (100, M⁺-OMe), 127 (90, M⁺-C(O)OMe).

Methyl 2-naphthoate (3).^[3] Purification by flash chromatography (hexane/ethyl acetate 10:1) gave 343.8 mg of white crystals (1.84 mmol, 92 %). ¹H NMR: δ 4.01 (s, 3H), 7.56-7.62 (m, 2H), 7.85 (d, $J=9.1$, 2H), 7.99 (d, $J=7.8$, 1H), 8.11 (d, $J=7.8$, 1H), 8.64 (s, 1H). ¹³C NMR: δ 52.3, 125.5, 126.9, 127.6, 128.0, 128.4, 128.5, 129.6, 131.3, 132.8, 135.8, 167.6. EI-MS (70eV): m/z (%) = 186 (20, M⁺), 155 (100, M⁺-OMe), 127 (80, M⁺-C(O)OMe).

Methyl cyclohexanecarboxylate (4).^[4] Flash chromatography (hexane/ethyl acetate 20:1) gave 213.3 mg of a yellow oil (1.5 mmol, 75 %). ¹H NMR: δ 1.18-1.23 (m, 2H), 1.25-1.27 (m, 2H), 1.31-1.45 (m, 2H), 1.71-1.82 (m, 2H), 2.35 (m, 1H), 3.73 (s, 3H). ¹³C NMR: δ 22.5, 23.1, 29.8, 43.3, 51.9, 175.7. EI-MS (70eV): m/z (%) = 142 (10, M⁺), 111 (10, M⁺-OMe), 83 (100, M⁺-C(O)OMe).

Methyl 4-methylbenzoate (5).^[1] Purification by flash chromatography (hexane/ethyl acetate 1:1) gave 267.4 mg of white crystals (1.78 mmol, 89 %). ¹H NMR: δ 2.44 (s, 3H), 3.93 (s, 3H), 7.25 (d, $J=8.8$, 2H), 7.95 (d, $J=8.8$, 2H). ¹³C NMR: δ 21.6, 52.1, 127.9, 129.4, 129.9, 143.8, 167.4. EI-MS (70eV): m/z (%) = 150 (45, M⁺), 119 (100, M⁺-OMe), 91 (80, M⁺-C(O)OMe).

Methyl 2-cyanobenzoate (6).^[5] Purification by flash chromatography (hexane/ethyl acetate 2:1) gave 251.8 mg of yellow crystals (1.56 mmol, 78 %). ¹H NMR: δ 4.01 (s, 3H), 7.67-7.71 (m, 2H), 7.81 (m, 1H), 8.14 (m, 1H). ¹³C NMR: δ 53.1, 113.2, 117.8, 131.4, 132.6, 132.7, 132.9, 135.1, 164.7. EI-MS (70eV): m/z (%) = 161 (23, M⁺), 130 (100, M⁺-OMe), 102 (70, M⁺-C(O)OMe).

Methyl 4-nitrobenzoate (7).^[1] Purification by flash chromatography (hexane/ethyl acetate 3:1) gave 351.4 mg of an orange oil (1.94 mmol, 97 %). ¹H NMR: δ 4.00 (s, 3H), 8.23 (d, $J=8.9$, 2H), 8.31 (d, $J=8.9$, 2H). ¹³C NMR: δ 53.1, 123.8, 130.9, 135.7, 150.8, 165.4. EI-MS (70eV): m/z (%) = 181 (24, M⁺), 150 (100, M⁺-OMe), 135 (10, M⁺-NO₂), 104 (38, M⁺-NO₂, -OMe).

Methyl 4-methoxybenzoate (8).^[1] Purification by flash chromatography (hexane/ethyl acetate 2:1) gave 200.1 mg of a colorless oil (1.22 mmol, 61 %). ¹H NMR: δ 3.87 (s, 3H), 3.90 (s, 3H), 6.93 (d, $J=8.9$ Hz, 2H), 8.02 (d, $J=8.9$ Hz, 2H). ¹³C NMR: δ 52.1, 55.7, 113.9, 122.9, 131.9, 163.6, 167.1. EI-MS (70eV): m/z (%) = 166 (26, M⁺), 135 (100, M⁺-OMe), 107 (10, M⁺-C(O)OMe).

Methyl 4-cyanobenzoate (9).^[6] Purification by flash chromatography (hexane/ethyl acetate 10:1) gave 254.4 mg of white crystals (1.58 mmol, 79 %). ¹H NMR: δ 3.96 (s, 3H), 7.74 (d, $J=8.9$, 2H), 7.86 (d, $J=8.9$, 2H). ¹³C NMR: δ 52.9, 116.6, 118.2, 130.3, 132.5, 134.2, 165.7. EI-MS (70eV): m/z (%) = 161 (25, M⁺), 130 (100, M⁺-OMe), 102 (60, M⁺-C(O)OMe).

Methyl benzoate (10).^[1] Flash chromatography (hexane/ethyl acetate 20:1) gave 263.7 mg of a colorless oil (1.94 mmol, 97 %). ¹H NMR: δ 3.95 (s, 3H), 7.47 (dd, $J=7.5$ Hz, 7.8 Hz, 2H), 7.59 (d, $J=7.8$ Hz, 1H), 8.07 (d, $J=7.5$ Hz, 2H). ¹³C NMR: δ 52.8, 128.5, 130.3, 135.8, 167.4. EI-MS (70eV): m/z (%) = 136 (26, M⁺), 105 (100, M⁺-OMe), 77 (80, Ph).

Methyl 4-bromobenzoate (11).^[1] Flash chromatography (hexane/ethyl acetate 5:1) gave 398.1 mg of white crystals (1.86 mmol, 93 %). ¹H NMR: δ 3.93 (s, 3H), 7.59 (d, $J=8.6$, 2H), 7.92 (d, $J=8.6$ Hz, 2H). ¹³C NMR: δ 52.7, 128.3, 129.3, 131.3, 132.0, 166.5. EI-MS (70eV): m/z (%) = 214 (40, M⁺), 183 (100, M⁺-OMe), 155 (45, (M⁺-C(O)OMe).

Methyl *trans*-cinnamate (12).^[7] Flash chromatography (hexane/ethyl acetate 10:1) gave 1.18 g of a yellow oil (7.2 mmol, 72 %). ¹H NMR: δ 3.84 (s, 3H), 6.43 (d, $J=6.0$ Hz 1H), 7.37-7.41 (m, 3H), 7.51-7.57 (m, 2H), 7.69 (d, $J=6.0$ Hz, 1H). ¹³C NMR: δ 51.9, 118.0, 128.3, 129.1, 130.5, 135.2, 145.1, 168.3. EI-MS (70 eV): m/z (%) 162 (50, M⁺), 131 (100, M⁺-OMe), 103 (70, M⁺-CO₂Me), 77 (60, Ph).

Methyl phenylacetate (13).^[8] Purification by flash chromatography (hexane/ethyl acetate 10:1) gave 1.27 g of a yellow oil (8.4 mmol, 84 %). ¹H NMR: δ 3.68 (s, 2H), 3.74 (s, 3H), 7.34-7.40 (m, 5H). ¹³C NMR: δ 41.8, 52.3, 127.5, 128.8, 129.5, 135.8, 172.6. EI-MS (70 eV): m/z (%) 150 (20, M⁺), 119 (10, M⁺-OMe), 91 (100, M⁺-CO₂Me), 77 (20, Ph).

Methyl phenylglyoxylate (14).^[9] Purification by flash chromatography (hexane/ethyl acetate 10:1) gave 1.32 g of a yellow oil (8.0 mmol, 80 %). ¹H NMR: δ 3.50 (s, 3H), 7.43 (dd, $J=7.5$ Hz, 7.8 Hz, 2), 7.60 (dd, $J=7.8$ Hz, 7.8 Hz, 1H), 8.01 (d, $J=7.5$ Hz, 2H) ¹³C NMR: δ 32.8, 128.4, 128.9, 133.4, 137.2, 198.3. EI-MS (70 eV): m/z (%) 164 (10, M⁺), 133 (100, M⁺-OMe), 105 (100, M⁺-CO₂Me), 77(60, Ph)

Methyl 3-phenylpropanoate (15).^[10] Purification by flash chromatography (hexane/ethyl acetate 20:1) gave 1.45 g of a clear oil (8.9 mmol, 89 %). ¹H NMR: δ 2.66 (t, $J=7.5$ Hz, 2H), 3.01 (t, $J=7.5$ Hz, 2H), 3.70 (s, 3H), 7.21-7.35 (m, 5H). ¹³C NMR: δ 31.0, 35.7, 51.6, 126.3, 128.3, 128.5, 140.5, 173.3. EI-MS (70 eV): m/z (%) 164 (20, M⁺), 133 (10, M⁺-OMe), 105 (100, M⁺-CO₂Me), 91 (70, C₇H₇), 77(30, Ph).

(4-Chlorophenyl)phenylmethanol (16).^[11] Recrystallization from hexane gave 240.0 mg of white crystals (1.72 mmol, 86 %). ¹H NMR: δ 2.26 (s, 1H), 5.81 (s, 1H), 7.25-7.35 (m, 9H). ¹³C NMR: 75.6, 126.5, 127.9, 128.6, 128.7, 128.8, 133.3, 142.2, 143.5. EI-MS (70eV): m/z (%) = 218 (15, M⁺), 183 (10, M⁺-Cl), 106 (100, M⁺-Cl, -Ph).

(1-Naphthyl)phenylmethanol (17).^[12] Recrystallization from hexane gave 309.9 mg of off-white crystals (1.98 mmol, 99%). ¹H NMR: 2.50 (bs, 1H), 6.35 (s, 1H), 7.17-7.42 (m, 8H), 7.53 (d, $J=7.2$ Hz, 1H), 7.75 (d, $J=9.6$ Hz, 1H), 7.80 (d, $J=7.2$ Hz, 1H), 7.95 (d, $J=9.6$ Hz, 1H). ¹³C NMR δ 73.8, 124.3, 124.9, 125.7, 125.9, 126.4, 127.4, 127.9, 128.8, 128.9, 129.1, 131.0, 134.2, 139.1, 143.4. EI-MS (70eV): m/z (%) = 234 (43, M⁺), 128 (80, naph), 107 (100, M⁺-naph), 77 (68, Ph).

(2-Naphthyl)phenylmethanol (18).^[11] Recrystallization from hexane gave 302.8 mg of off-white crystals (1.96 mmol, 98%). ¹H NMR: 2.54 (bs, 1H), 6.04 (s, 1H), 7.29-7.56 (m, 8H), 7.66 (m, 1H), 7.83-7.93 (m, 3H). ¹³C NMR δ 76.6, 125.1, 125.3, 126.2, 126.5, 127.0, 127.9, 128.3, 128.6, 128.8, 132.9, 133.2, 133.3, 141.1, 143.6. EI-MS (70eV): m/z (%) = 234 (30, M⁺), 128 (65, Naph), 107 (100, M⁺-naph), 77 (55, Ph).

(Cyclohexyl)phenylmethanol (19).^[13] Flash chromatography (hexane/ethyl acetate 20:1) gave 150.8 mg of a colorless oil (1.34 mmol, 67%). ¹H NMR δ 0.90-1.36 (m, 5H). 1.38-1.48 (m, 1H), 1.60-1.76 (m, 3H), 1.78-1.87 (m, 2H), 2.00 (m, 1H), 4.39 (d, $J=7.4$ Hz, 1H), 7.20-7.38 (m, 5H). ¹³C NMR δ 26.0, 26.1, 26.4, 28.8, 29.3, 44.9, 79.4, 126.6, 127.4, 128.2, 142.2. EI-MS (70eV): m/z (%) = 190 (10, M⁺), 107 (100, M⁺-Cy), 77 (21, Ph).

Phenyl(4-tolyl)methanol (20).^[13] Recrystallization from hexane gave 372.3 mg of off-white crystals (1.88 mmol, 94%). ¹H NMR δ 2.33 (s, 3H), 5.83 (d, $J=3.6$ Hz, 1H), 7.13 (d, $J=8.0$ Hz, 2H), 7.24 (d, $J=8.0$ Hz, 2H), 7.27-7.37 (m, 5H). ¹³C NMR δ 21.2, 76.4, 126.7, 126.8, 127.7, 128.7, 129.5, 137.5, 141.2, 144.2. EI-MS (70eV): m/z (%) = 198 (32, M⁺), 183 (35, M⁺-Me), 165 (30, M⁺-Me, -H₂O), 106 (100, M⁺-Me -Ph), 77 (92, Ph).

(2-Cyanophenyl)phenylmethanol (21).^[14] Flash chromatography (hexane/CH₂Cl₂ 5:1) gave 382.2 mg of a colorless oil (1.74 mmol, 87%). ¹H NMR δ 6.30 (s, 1H), 7.12-7.20 (m, 3H), 7.27-7.30 (m, 3H), 7.41-7.45 (m, 2H), 7.87 (d, $J=7.4$ Hz, 1H). ¹³C NMR δ 85.1, 122.8, 124.1, 127.2, 129.2, 129.3, 129.4, 130.1, 131.4, 132.6, 138.1, 147.4. EI-MS (70eV): m/z (%) = 209 (30, M⁺), 106 (87, M⁺-CN, -Ph), 77 (100, Ph).

(4-Nitrophenyl)phenylmethanol (22).^[13] Flash chromatography (hexane/ethyl acetate 5:1) gave 461.5 mg of white crystals (1.92 mmol, 96%). ¹H NMR δ 2.43 (bs, 1H), 5.92 (s, 1H), 7.30-7.36 (m, 5H), 7.58 (d, $J=8.8$ Hz, 2H), 8.19 ($J=8.8$ Hz, 2H). ¹³C NMR δ 75.4, 123.7, 126.6, 127.0, 128.4, 129.0, 142.7, 142.8, 150.8. EI-MS (70eV): m/z (%) = 229 (30, M⁺), 106 (100, M⁺-NO₂, -Ph), 77 (80, Ph).

(4-Methoxyphenyl)phenylmethanol (23).^[13] Flash chromatography (hexane/ethyl acetate 5:1) gave 200.1 mg of white crystals (1.46 mmol, 73%). ¹H NMR δ 2.17 (d, $J=3.7$ Hz, 1H), 3.80 (s, 3H), 5.80 (d, $J=3.7$ Hz, 1H), 6.85 (d, $J=8.8$ Hz, 2H), 7.29-7.41 (m, 7H). ¹³C NMR δ 55.5, 75.9, 114.6, 126.5, 127.4, 128.0, 128.5, 136.3, 144.1, 159.0. EI-MS (70eV): m/z (%) = 214 (45, M⁺), 183 (15, M⁺-OMe), 109 (100, M⁺-OMe, -Ph), 77 (93, Ph).

(4-Cyanophenyl)phenylmethanol (24).^[13] Flash chromatography (hexane/ethyl acetate 5:1) gave 244.9 mg of white crystals (1.86 mmol, 93%). ¹H NMR δ 2.51 (d, $J=2.9$ Hz, 1H), 5.84 (d, $J=2.9$ Hz, 1H), 7.33-7.39 (m, 5H), 7.50 (d, $J=8.2$ Hz, 2H), 7.60 (d, $J=8.2$ Hz, 2H). ¹³C NMR δ 75.7, 111.2, 118.9, 126.7, 127.1, 128.2, 128.9, 132.3, 142.9, 149.1. EI-MS (70eV): m/z (%) = 209 (50, M⁺), 106 (80, M⁺-CN, -Ph), 77 (100, Ph).

Diphenylmethanol (25).^[15] Recrystallization from hexane gave 368.4 mg of white crystals (1.9 mmol, 95%). ¹H NMR δ 2.27 (d, $J=3.7$ Hz, 1H), 5.86 (d, $J=3.7$ Hz, 1H), 7.27-7.45 (m, 10H). ¹³C NMR δ 76.5, 126.8, 127.8, 128.6, 144.1. EI-MS (70eV): m/z (%) = 184 (29, M⁺), 107 (100, M⁺-Ph), 77 (70, Ph).

(4-Bromophenyl)phenylmethanol (26).^[13] Flash chromatography (hexane/ethyl acetate 5:1) gave 372.4 mg of white crystals (1.58 mmol, 79%). ¹H NMR 2.30 (d, *J*=2.9 Hz, 1H), 5.77 (d, *J*=2.9 Hz, 1H), 7.24 (d, *J*=8.4 Hz, 2H), 7.22-7.31 (m, 5H), 7.42 (d, *J*=8.4 Hz, 2H). ¹³C NMR δ 75.8, 121.7, 126.8, 128.1, 128.6, 128.9, 131.9, 143.0, 143.6. EI-MS (70eV): *m/z* (%) = 262 (10, M⁺), 183 (25, M⁺-Br), 106 (100, M⁺-Br, -Ph), 77 (60, Ph).

(3-Furyl)phenylmethanol (27).^[16] Flash chromatography (hexane/CH₂Cl₂ 5:1) gave 285.4 mg of a clear oil (1.64 mmol, 82%). ¹H NMR δ 2.81 (s, 1H), 5.64 (s, 1H), 6.27 (d, *J*=2.1 Hz, 1H), 7.21-7.33 (m, 7H). ¹³C NMR δ 69.2, 109.2, 126.3, 127.7, 128.4, 139.7, 142.9, 143.3. EI-MS (70 eV): *m/z* (%) 174 (30, M⁺), 97 (100, M⁺-Ph), 77 (70, Ph).

(2-Thiophene)phenylmethanol (28).^[17] Flash chromatography (hexane/methylene chloride 10:1) gave 292.7 mg of a clear oil (1.54 mmol, 77%). ¹H NMR δ 2.43 (d, *J*=2.9, 1H), 6.12 (d, *J*=2.9 Hz, 1H), 6.92-6.94, (m, 1H), 6.96-6.98 (m, 1H), 7.28-7.49, m, 6H). ¹³C NMR δ 72.7, 125.2, 125.7, 126.5, 126.9, 128.3, 128.8, 142.2. EI-MS (70eV): *m/z* (%) 190 (30, M⁺), 113 (100, M⁺-Ph), 77 (60, Ph).

6. References

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7. NMR Spectra of all synthesized esters and alcohols