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Dedicated to Professor José Elguero on occasion of his 80th birthday

Keywords: indium, detritylation, trityl ethers, protected alcohols, protected diols

Abstract: The reaction of primary, secondary, allylic and benzylic trityl ethers with indium powder in MeOH/NH₄Cl led to reductive cleavage of the trityl-oxygen bond, affording the corresponding alcohols in good to excellent yield under very mild reaction conditions. The detritylation process could successfully be extended to mono and detritylated diols. This methodology represents a new and efficient detritylation procedure under mild reaction conditions.

1. Introduction

The use of indium metal in reduction processes applied to synthetic organic chemistry is based on the fact that its electrode potential (5.8 eV) is rather similar to that of alkali metals, such as sodium (5.1 eV) or lithium (5.4 eV) and, therefore, indium metal behaves as an excellent single electron transfer reagent. This ability has been used successfully for the cleavage of carbon-heteroatom bonds and, consequently, for the deprotection of several functionalities such as protected alcohols, amines or thioethers. Among interesting protecting groups, the triphenylmethyl (trityl) unit has been extensively used in carbohydrate, peptide and nucleoside chemistry, mainly due to its steric demand. In addition, deprotection of the trityl group can be easily achieved by simple acid hydrolysis, this procedure being useful only for compounds having functionalities not-sensitive to acidic conditions; as an example when nucleosides are tritylated at the 5’-OH position, its treatment with protic acids leads, together with the expected detritylation, to the hydrolysis of the N-glycosidic bond.

In the last years, we have been interested in the deprotection of several oxygen, nitrogen and sulfur-containing compounds using lithium and a catalytic amount of naphthalene followed by hydrolysis. Among them, we investigated detritylation processes involving trityl ethers and trityl amines. In addition, more recently, we have explored the use of other metals, such as indium or zinc, in both cases in methanol, for the effective detritylation of 1-trityltetrazoles. In this paper,
we report the indium-promoted detritylation of trityl ethers as an efficient method for the deprotection of this type of compounds under very mild reaction conditions.

2. Results and discussion

As a model reaction we treated \( n \)-nonadecyl trityl ether (1a) with indium metal (1:1.7 molar ratio) under different reaction conditions finding that the optimal situation was the use of a mixture of methanol and aqueous ammonium chloride at reflux for 35 hours (Table 1, entry 8). Using other solvent combinations or diminishing the reaction temperature or time, no reaction occurred (Table 1, entries 1-7).

**Table 1**
Assayed conditions for the In-promoted cleavage of 1a for 24 h

<table>
<thead>
<tr>
<th>Entry</th>
<th>Solvent</th>
<th>T (ºC)</th>
<th>Yield (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In/MeOH/THF</td>
<td>rt</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>In/MeOH/THF</td>
<td>reflux</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>In/MeOH</td>
<td>rt</td>
<td>0</td>
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<td>4</td>
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<td>0</td>
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<tr>
<td>5</td>
<td>In/THF</td>
<td>rt</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>In/THF</td>
<td>reflux</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>In/MeOH/THF/NN(_4)\ Cl</td>
<td>rt</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>In/MeOH/NN(_4)\ Cl</td>
<td>reflux</td>
<td>80</td>
</tr>
</tbody>
</table>

\(^2\)Isolated yield. \(^3\)For 35 h.

Having the best reaction conditions in hand, we studied the scope of the process. Primary (1a-d, Table 2, entries 1-4) or secondary (1e-g, Table 2, entries 5-7) trityl ethers were easily deprotected to afford the expected alcohols 2a-g with yields ranging from 62 to 80%. Mono (1h, Table 2, entry 8) and ditritylated diols (1i,j, Table 2, entries 9 and 10) were fully deprotected using the same reaction conditions with the corresponding stoichiometry, affording the expected diols 2h-j. The low yield obtained for diols 2h-j could be explained by their partial solubility in water during the extractive work-up; actually no byproducts were observed in the reaction crude. Also allylic or benzylic derivatives (1k and 1l, respectively, Table 2, entries 11 and 12) were detritylated without any
problem: allylic or benzylic carbon-oxygen cleavage was not observed in any case. Finally, the
protected phenol 1m (Table 2, entry 13) was submitted to the same protocol giving the parent phenol
with reasonable yield.

Table 2
Indium-mediated detritylation of ethers 1

<table>
<thead>
<tr>
<th>Entry</th>
<th>Substrate</th>
<th>t (h)</th>
<th>Product</th>
<th>Yield (%)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>1a</td>
<td>35</td>
<td>2a</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
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<td>70</td>
</tr>
<tr>
<td>3</td>
<td>1c</td>
<td>28</td>
<td>2c</td>
<td>71</td>
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<tr>
<td>4</td>
<td>1d</td>
<td>30</td>
<td>2d</td>
<td>62</td>
</tr>
<tr>
<td>5</td>
<td>1e</td>
<td>32</td>
<td>2e</td>
<td>68</td>
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<td>9</td>
<td>1i</td>
<td>34</td>
<td>2i</td>
<td>60</td>
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</tbody>
</table>
3. Experimental part

3.1. General

FT-IR spectra were recorded on a Nicolet Impact 400D spectrophotometer and Fourier Shimadzu FTIR-8201 PC using KBr pellets. NMR spectra were recorded on a Bruker AC-300 spectrometer (300 MHz for $^1$H and 75 MHz for $^{13}$C) and a Bruker AC-400 spectrometer (400 MHz for $^1$H and 100 MHz for $^{13}$C) using CDCl$_3$, DMSO-$d_6$, or CD$_3$OD as solvent and TMS ($\delta = 0.00$ ppm, $^1$H) or CDCl$_3$ ($\delta = 77.0$ ppm, $^{13}$C), DMSO-$d_6$ ($\delta = 2.50$ ppm, $^1$H; $\delta = 39.75$ ppm, $^{13}$C), or CD$_3$OD ($\delta = 4.87$ ppm, $^1$H; $\delta = 49.0$ ppm, $^{13}$C), Fourier
3.2. General procedure for tritylation of alcohols 2. Preparation of ethers 1

A solution of the commercially available alcohol 2 (5.0 mmol) in CH₂Cl₂ (2.5 mL) was added to a solution of trityl chloride (1.55 g, 5.5 mmol), Et₃N (1.25 mL, 8.8 mmol) and DMPA (46 mg, 0.2 mmol) in CH₂Cl₂ (5 mL) at rt and the mixture was stirred overnight. The reaction was then quenched with water (2.5 mL) and extracted with EtOAc (3 × 10 mL) and the combined organic phases were washed with brine (2.5 mL) and dried over sodium sulfate. After evaporation of the solvents (15 Torr), the resulting residue was purified by column chromatography (silica gel, hexane-EtOAc) affording the expected trityl ethers 1. When diols were used (as precursor of ethers 1h-j), a mixture of mono and deprotected products were obtained in variable proportions, which could be easily separated by column chromatography. Physical, spectroscopic and analytical data for the tritylated alcohols 1 follow.

3.2.1. Stearyl trityl ether (1a). White solid; yield 2.45 g (95%); mp: 70 °C; IR (cm⁻¹): 3000, 2950, 2400, 1500, 1450, 1300, 1050, 1010, 650; ¹H NMR (400 MHz, CDCl₃): δ 0.81 (t, 3 H, J = 4.0 Hz, CH₃), 1.18–1.56 [m, 24H, CH₃(C₄H₂)₁₂], 2.20–2.22 (m, 6H, 3 CH₂), 2.49–2.52 (m, 2H, CH₂CO), 2.96 (t, 2H, J = 6.7 Hz, CH₂O), 7.13–7.25 (m, 9H, ArH), 7.36–7.38 (m, 6H, ArH); ¹³C NMR (100 MHz, CDCl₃): δ 14.1 (CH₃), 22.6, 26.2, 29.3, 29.6 (8C), 30.0, 31.9, 39.9, 40.1, 40.3 [CH₃(C₄H₂)₁₆], 63.6 (CH₂O), 86.5 (CO), 126.7 (3C), 127.6 (6C), 128.6 (6C), 144.5 (3C, ArC); MS m/z (%): 435 (M⁺-Ph, 8), 244 (39), 243 (100), 183 (29), 165 (15), 105 (16); Anal. Calcd for C₃₇H₅₂O: C, 86.66; H, 10.22. Found: C, 86.62; H, 10.26.

3.2.2. Hexyl trityl ether (1b). Colorless oil; yield 1.18 g (62%); IR (cm⁻¹): 3166, 3058, 3028, 1593, 1488, 1080, 1068; ¹H NMR (250 MHz, CDCl₃): δ 1.22 (d, 3H, J = 6.1 Hz, CH₃), 1.53–1.81 [m, 6H, CH₃(C₄H₂)₃], 3.08–3.17 (m, 2H, CH₂CH₂O), 3.76–3.88 (m, 2H, CH₂O), 7.23–7.37 (m, 9H, ArH), 7.42–7.50 (m, 6H, ArH); ¹³C NMR (62.5 MHz, CDCl₃): δ 23.6 (CH₃), 26.2, 29.3, 29.6 (8C), 30.0, 31.9, 39.9, 40.1, 40.3 [CH₃(C₄H₂)₄], 68.0 (CH₂O), 86.7 (CO), 126.7 (3C), 127.8 (6C), 128.7 (6C), 144.3 (3C, ArC); MS m/z (%): 243 (M⁺-PhCH₂=CH₂, 100), 183 (30), 167 (11), 166 (7), 165 (21), 105 (31), 77 (20); Anal. Calcd for C₂₅H₂₈O: C, 86.66; H, 10.22. Found: C, 86.62; H, 10.26.

3.2.3. n-Decyl trityl ether (1c). Colorless oil; yield 1.85 g (76%); IR (cm⁻¹): 3166, 3058, 3028, 1593, 1488, 1080, 1068; ¹H NMR (400 MHz, CDCl₃): δ 0.87 (t, 3H, J = 8.0 Hz, CH₃), 1.24–1.36 [m, 14H, CH₃(CH₂)₇], 1.51–1.65 (m, 2H, CH₂CO), 3.03 (t, 2H, J = 6.7 Hz, CH₂O), 7.19–7.31 (m, 9H, ArH), 7.43–7.46 (m, 6H, ArH); ¹³C NMR (100 MHz, CDCl₃): δ 14.2 (CH₃), 22.8, 26.4, 29.4, 29.6, 29.7 (2C), 30.2, 32.0 [CH₃(CH₂)₈], 63.8 (CH₂O), 86.3 (CO), 126.9 (3C), 127.8 (6C), 128.7 (6C), 144.6 (3C, ArC); MS m/z (%): 400 (M⁺, 12), 323 (16), 244 (36), 243 (100), 183 (35), 165 (39), 105 (40).
3.2.4. Isoamyl trityl ether (1d). Colorless oil; yield 1.24 g (75%); IR (cm$^{-1}$): 3070, 3024, 2912, 1485, 1446, 1083; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 0.80 (d, 6H, $J = 8.0$ Hz, [m, 1H, CH(CH$_2$)$_2$], 1.47–1.53 (m, 2H, CH$_2$CH$_2$O), 1.72–1.79 (m, 1H, CH(CH$_3$)$_2$), 3.06 (t, 2H, $J = 8.0$ Hz, CH$_2$O), 7.25–7.36 (m, 9H, ArH), 7.49–7.51 (m, 6H, ArH); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 22.8 (2CH$_3$), 25.2 (CH), 39.1 (CH$_2$), 68.2 (CH$_2$O), 86.4 (CO), 126.9 (3C), 127.8 (6C), 128.8 (6C), 144.6 (3C, ArC); MS m/z (%): 330 (M$^+$, 10), 244 (32), 243 (100), 253 (11), 183 (33), 165 (32), 105 (25); Anal. Calcd for C$_{24}$H$_{30}$O: C, 87.23; H, 7.93. Found: C, 87.25; H, 7.90.

3.2.5. 2-Trityloxyoctane (1e). Colorless oil; yield 1.60 g (78%); IR (cm$^{-1}$): 3055, 2925, 1598, 1489, 1075, 1026; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 0.83 (t, 3H, $J = 8.0$ Hz, CH$_3$CH$_2$), 0.86 (d, 3H, $J = 4.0$ Hz, CH$_3$CO), 1.05–1.23 (m, 10H, [CH$_3$]), 3.51–3.58 (m, 1H, CHO), 7.19–7.30 (m, 9H, ArH), 7.49–7.52 (m, 6H, ArH); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 14.2 (CH$_3$CH$_2$), 21.3 (CH$_3$CO), 22.7, 25.0, 29.5, 31.9, 37.6 [CH$_2$], 70.2 (CHO), 86.5 (CO), 126.8 (3C), 127.7 (6C), 129.1 (6C), 145.7 (3C, ArC); MS m/z (%): 372 (M$^+$, 4), 244 (30), 243 (100), 183 (39), 165 (48), 105 (43).

3.2.6. Cyclopentyl trityl ether (1f). White solid; yield 0.82 g (62%); mp 84 °C; IR (cm$^{-1}$): 3055, 3028, 1596, 1485, 1045; $^1$H NMR (300 MHz, CDCl$_3$): $\delta$ 1.18–1.35 [m, 6H, (CH$_3$CH$_2$)$_2$], 1.50–1.64 [m, 2H, (CH$_2$CHH)$_2$], 3.95–4.07 (m, 1H, CHO), 7.15–7.31 (m, 9H, ArH), 7.45–7.53 (m, 6H, ArH); $^{13}$C NMR (75 MHz, CDCl$_3$): $\delta$ 23.8, 33.7 [CH$_2$], 76.5 (CHO), 86.9 (CO), 126.8 (3C), 127.8 (6C), 129.0 (6C), 145.6 (3C, ArC); MS m/z (%): 251 (M$^+$-Ph, 6), 244 (34), 243 (100), 183 (18), 166 (6), 165 (44), 105 (17); Anal. Calcd for C$_{24}$H$_{30}$O: C, 87.76; H, 7.37. Found: C, 87.73; H, 7.41.

3.2.7. Cyclohexyl trityl ether (1g). White solid; yield 1.58 g (92%); mp 85 °C; IR (cm$^{-1}$): 3000, 3010, 1600, 1450, 1000; $^1$H NMR (400 MHz, CDCl$_3$): $\delta$ 1.01–1.35 [m, 6H, (CH$_3$)$_3$], 1.52–1.61 (m, 4H, 2CH$_2$), 3.46 (m, 1H, CHO), 7.19–7.29 (m, 9H, ArH), 7.55–7.53 (m, 6H, ArH); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 24.4 (2C), 25.9, 33.9 (2C) [CH$_2$], 72.1 (CHO), 86.5 (CO), 126.9 (3C), 127.7 (6C), 129.1 (6C), 145.8 (3C, ArC); MS m/z (%): 342 (M$^+$* 2), 244 (25), 243 (100), 183 (16), 165 (39), 105 (20).

3.2.8. 5-Trityloxy-2-pentanol (1h). White solid; yield 0.82 g (62%); mp 84 °C; IR (cm$^{-1}$): 3024, 2950, 2862, 1593, 1488, 1045; $^1$H NMR (250 MHz, DMSO-d$_6$): $\delta$ 0.87–1.52 [m, 8H, CH$_3$, 2CH$_2$, and OH], 3.47–3.56 (m, 2H, CH$_2$O), 3.92–3.99 (m, 1H, CHO), 7.23–7.37 (m, 9H, ArH), 7.37–7.44 (m, 6H, ArH); $^{13}$C NMR (62.5 MHz, DMSO-d$_6$): $\delta$ 23.1 (CH$_3$), 33.0, 36.1 [CH$_2$], 66.2 (CH$_2$O), 75.8 (CHOH), 86.3 (CO), 126.9 (3C), 127.8 (6C), 128.4 (6C), 145.0 (3C, ArC); MS m/z (%): 244 (M$^+$*, C$_{3}$H$_{10}$O$_2$, 35), 243 (100), 183 (20), 165 (11), 105 (28), 77 (15), 51(7); Anal. Calcd for C$_{24}$H$_{32}$O$_2$: C, 83.20; H, 7.56. Found: C, 83.24; H, 7.55.

3.2.9. 1,6-Di(trityloxy)hexane (1i). White solid; yield 1.60 g (53%); mp 160 °C; IR (cm$^{-1}$): 3000, 3010, 2950, 1450, 1000, 1010; $^1$H NMR (400 MHz, MeOD-d$_4$): $\delta$ 1.30–1.33 [m, 4H, (CH$_3$CH$_2$O)$_2$], 1.53–1.62 [m, 4H, (CH$_3$CH$_2$CH$_2$O)$_2$], 3.00 [t, 4H, $J = 6.6$ Hz, (CH$_3$CH$_2$CH$_2$O)$_2$], 7.19–7.29 (m, 18H, ArH), 7.41–7.44 (m, 12H, ArH); $^{13}$C NMR (100 MHz, CDCl$_3$): $\delta$ 26.2 (2C), 30.1 (2C) [CH$_2$], 63.6 (2CH$_2$O), 86.3 (2CO), 126.9 (6C), 127.8 (12C), 128.8 (12C), 144.6 (6C, ArC); MS m/z (%): 259 (3), 245 (4), 244 (31), 243 (100), 241 (2), 183 (4), 165 (20), 105 (13); Anal. Calcd for C$_{44}$H$_{52}$O$_2$: C, 87.67; H, 7.02. Found: C, 87.63; H, 7.03.
3.2.10. 1,4-Di(trityloxy)pentane (1j).\textsuperscript{9a} White solid; yield 1.62 g (55%); mp 160 °C; IR (cm\textsuperscript{-1}): 3083, 3052, 3022, 1598, 1500, 1081, 1075; \textsuperscript{1}H NMR (300 MHz, CDCl\textsubscript{3}): \(\delta\) 0.88 (d, 3H, \(J = 6.1\) Hz, CH\textsubscript{3}), 1.04–1.24 (m, 2H, CH\textsubscript{2}CH\textsubscript{3}), 1.38–1.69 (m, 2H, CH\textsubscript{2}CHO), 2.73–2.95 (m, 2H, CH\textsubscript{2}O), 3.49–3.62 (m, 1H, CHO), 7.08–7.58 (m, 30H, ArH); \textsuperscript{13}C NMR (75 MHz, CDCl\textsubscript{3}): \(\delta\) 21.2 (CH\textsubscript{3}), 25.5, 34.0 ([(CH\textsubscript{2})\textsubscript{2}], 64.0 (CH\textsubscript{2}O), 69.8 (CHO), 86.4 (CO), 86.6 (CO), 126.9 (3C), 127.7 (3C), 127.8 (6C), 128.0 (6C), 128.8 (6C), 129.1 (6C), 144.6 (3C, ArC); MS: m/z (%): 588 (M\textsuperscript{+}, 0.5), 244 (70), 243 (100), 165 (56), 105 (28); Anal. Calcd for C\textsubscript{43}H\textsubscript{40}O\textsubscript{2}: C, 87.72; H, 6.85. Found: C, 87.70; H, 6.81.

3.2.11. Geranyl trityl ether (1k).\textsuperscript{9a} Colorless oil; yield 1.75 g (88%); IR (cm\textsuperscript{-1}): 3043, 2920, 2866, 1670, 1596, 1446, 1049; \textsuperscript{1}H NMR (300 MHz, CDCl\textsubscript{3}): \(\delta\) 1.52 (s, 3H, CH\textsubscript{3}), 1.67 (s, 3H, CH\textsubscript{3}), 1.75 (s, 3H, CH\textsubscript{3}), 2.04–2.21 (m, 4H, CH\textsubscript{2}CH\textsubscript{2}), 3.67 (d, 2H, \(J = 6.4\) Hz, CH\textsubscript{2}O), 5.17 [t, 1H, \(J = 6.4\) Hz C=C(CH\textsubscript{3})\textsubscript{2}], 5.46–5.55 (m, 1H, C\textsubscript{H}=CCH\textsubscript{2}O), 7.23–7.39 (m, 9H, ArH), 7.50–7.56 (m, 6H, ArH); \textsuperscript{13}C NMR (75 MHz, CDCl\textsubscript{3}): \(\delta\) 16.6, 17.8, 25.8 (3CH\textsubscript{3}), 26.5, 39.7 ([(CH\textsubscript{2})\textsubscript{2}], 61.4 (CH\textsubscript{2}O), 86.7 (CO), 121.5, 124.2 (2C\textsubscript{H}=C), 126.9 (3C), 127.8 (6C), 127.8 (6C), 131.6, 138.6 (2C=CH), 144.5 (3C, ArC); MS: m/z (%): 319 (M\textsuperscript{+}-Ph, 0.5), 244 (39), 243 (100), 165 (34), 105 (11), 69 (11).

3.2.12. Benzyl trityl ether (1l).\textsuperscript{9a} White solid; yield 1.60 g (92%); mp 95 °C; IR (cm\textsuperscript{-1}): 3163, 3031, 2896, 2866, 1593, 1488, 1076; \textsuperscript{1}H NMR (400 MHz, CDCl\textsubscript{3}): \(\delta\) 3.51 (s, 2H, CH\textsubscript{2}), 7.22–7.34 (m, 14H, ArH), 7.54–7.58 (m, 6H, ArH); \textsuperscript{13}C NMR (100 MHz, CDCl\textsubscript{3}): \(\delta\) 72.1 (CH\textsubscript{2}), 86.5 (CO), 126.8 (2C), 127.3 (3C), 127.6, 127.8 (6C), 128.0 (2C), 129.1 (6C), 146.7, 146.9 (3C, ArC); MS: m/z (%): 273 (M\textsuperscript{+}-Ph, 3), 245 (18), 244 (100), 243 (85), 167 (11), 166 (16), 165 (68), 105 (51), 91 (88), 77 (27).

3.2.13. Phenyl trityl ether (1m).\textsuperscript{13} Colorless oil; yield 1.62 g (38%); IR (cm\textsuperscript{-1}): 3166, 3055, 2947, 1593, 1485, 1076; \textsuperscript{1}H NMR: (250MHz, CDCl\textsubscript{3}): \(\delta\) 6.63-6.79 (m, 3H, ArH), 6.94-7.03 (m, 2H, ArH), 7.22–7.31 (m, 9H, ArH), 7.33–7.44 (m, 6H, ArH); \textsuperscript{13}C NMR (62.5 MHz, CDCl\textsubscript{3}): \(\delta\) 86.5 (CO), 122.1 (2C), 122.4 (2C), 128.2 (3C), 128.6 (6C), 129.3 (6C), 145.3 (3C), 146.6 (ArC); MS: m/z (%): 274 (20), 243 (55), 198 (14), 197 (100), 167 (20), 166 (16), 165 (65), 152 (9), 105 (35), 77 (26), 51 (5); Anal. Calcd for C\textsubscript{25}H\textsubscript{20}O: C, 89.25; H, 5.99. Found: C, 89.23; H, 5.96.

3.3. General procedure for the detritylation of ethers 1.

Indium powder (0.02 g, 1.7 mmol) was added to a solution of the substrate (0.1 mmol) in methanol (3 mL) and a saturated ammonium chloride solution (1 mL), and the mixture was heated at reflux. After the time indicated in table 2, the cooled reaction mixture was then quenched with water (2.5 mL) and extracted with EtOAc (3 \(\times\) 5 mL) and the combined organic phases were washed with brine (2.5 mL) and dried over sodium sulfate. After evaporation of the solvents, the resulting residue was purified by column chromatography (silica gel, hexane–EtOAc) affording the expected alcohols 2, which were characterized by comparison of their chromatographic and spectroscopic data (NMR) with commercially available authentic samples. Mass and yields for compounds 2, as well as for trityl chloride, follow.

3.3.1. 1-Octadecanol (2a). Yield 21.5 mg (80%); Trityl chloride. Yield 18.1 mg (65%).

3.3.2. 1-Hexanol (2b). Yield 7.2 mg (70%).
3.3.3. 1-Decanol (2c). Yield 11.3 mg (71%).

3.3.4. 3-Methyl-1-butanol (2d). Yield 5.5 mg (62%).

3.3.5. 2-Octanol (2e). Yield 8.9 mg (68%).

3.3.6. Cyclopentanol (2f). Yield 6.5 mg (75%).

3.3.7. Cyclohexanol (2g). Yield 7.0 mg (70%).

3.3.8. 1,4-Pentanediol (2h). Yield 5.8 mg (56%).

3.3.9. 1,6-Hexanediol (2i). Yield 7.1 mg (60%).

3.3.10. 1,4-Pentanediol (2j = 2h). Yield 6.0 mg (58%).

3.3.11. Geraniol (2k). Yield 9.6 mg (62%).

3.3.12. Benzyl alcohols (2l). Yield 8.9 mg (81%).

3.3.13. Phenol (2m). Yield 6.4 mg (68%).

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References and notes


13. We have also studied the use of metallic salts, such as lithium chloride for the detritylation of trityl ethers: Behloul, C.; Chouti, A.; Chabour, I.; Benglíz, B.; Guijarro, D.; Foubelo, F.; Nájera, C.; Yus, M. *Tetrahedron Lett.* **2016**, 57, 3526.

14. For other detritylation methodologies, involving triethylsilane, low-valent titanium reagents, cerium(IV) ammonium nitrate on silica gel, protic and Lewis acids or bases, electrolytic processes, catalytic hydrogenation or reduction with sodium in liquid ammonia see, for instance: (a) Imagawa, H.; Tsuchihashi, T.; Sing, R. K.; Yamamoto, H.;