Hydrosilylation

**Introduction**

Rhodium-catalyzed hydrosilylation on... (Diagram)

First-row transition metals

Pt, Rh, Ir → Co, Fe

Low cost! Low toxicity!

**Investigation of the reaction conditions**

<table>
<thead>
<tr>
<th>Entry</th>
<th>Solvent</th>
<th>DPE</th>
<th>Yield %</th>
<th>2a (% recovery)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCE</td>
<td>5</td>
<td>75 (90)</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Toluene</td>
<td>5</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Toluene</td>
<td>5</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Toluene</td>
<td>1</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Toluene</td>
<td>1</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Toluene</td>
<td>1</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Toluene</td>
<td>3</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>Toluene</td>
<td>3</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Toluene</td>
<td>3</td>
<td>quant.</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Toluene</td>
<td>3</td>
<td>quant.</td>
<td>0</td>
</tr>
</tbody>
</table>

**Hydrosilylation of various fluorine-containing ketones**

<table>
<thead>
<tr>
<th>Entry</th>
<th>Product</th>
<th>Yield %</th>
<th>2a % recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C-CH=CH&lt;sub&gt;2&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>9</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
<tr>
<td>10</td>
<td>F&lt;sub&gt;3&lt;/sub&gt;C&lt;sub&gt;6&lt;/sub&gt;H&lt;sub&gt;4&lt;/sub&gt;-SiH</td>
<td>79</td>
<td>18</td>
</tr>
</tbody>
</table>

**Investigation of the reaction mechanism**

(Co(CO)₃ + 2Et₃SiH) → 2Et₃SiCo(CO)₂ + H₂

**Summary**

Various types of fluorinated ketones

CO₂(CO)₃(1-1.6 mol%) Et₃SiH (1.2-1.5 eq.) 3 h

Excellent yields!