Contributions to Green Chemistry

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Graphical Abstracts of Publications (2008-present)


![Diagram of trifluoromethylation reaction]


![Diagram of nitroaromatic reduction]


![Diagram of micellar effect]


![Diagram of phytosterol]

3rd Generation: "Nok" (SPGS-550-M; n = 12-13)


\[
\begin{align*}
\text{B(MIDA)} &+ X \rightarrow \text{cat. Pd, base} \\
\text{(1.0 equiv)} &\quad \text{(1.0 equiv)} \\
\text{surfactant/H}_2\text{O, RT} &\quad \text{no organic solvent} \\
\text{E Factor} &\approx 0
\end{align*}
\]


See *Chemical & Engineering News, 2013, 91, 22* (dated April 15, 2013)

<table>
<thead>
<tr>
<th>reactions</th>
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<td>Suzuki-Miyaura</td>
<td>16-50</td>
<td>2-4</td>
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<td>Heck</td>
<td>31-137; including water work up</td>
<td>7-10; including water</td>
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<td>Sonogashira</td>
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<td>asymmetric 1,4-additions</td>
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“Pharmacologically-accessible water-solubilizing lipophilic "solvent"”

“A = cat. PQS-BINAP-Rh, ArB(OH)_2 water, rt ee’s 79 to >99%”


```
Ar—Br
3 mol % Pd(t-Bu3P)2
1.1 equiv B2pin2
3 equiv KOAc
2 wt. % TPGS-750-M/H2O
room temp
Ar—B
```

“Asymmetric CuH-Catalyzed 1,4-Reductions in Water @ RT”, S. Huang, K. Voigtritter, J. B. Unger, B. H. Lipshutz, *Synlett* Cluster on Green Chemistry (invited) 2010, 2041.

```
EWG
R1
R2
cat CuH, cat ligand (L*)
PMHS
surfactant, H2O, rt
EWG
R1
R2
* 
```


```
X
NHAc
H — CO2R
X
NHAc
```


```
X
NHAc
H — CO2R
X
NHAc
```


```
GH-2 catalyst
```

water-solubilizing M-PEG

saturated 50-carbon polyprenoidal side-chain


*See: Chemical & Engineering News, February 16, 2009*


*See: Chemical & Engineering News, October 26, 2009*


