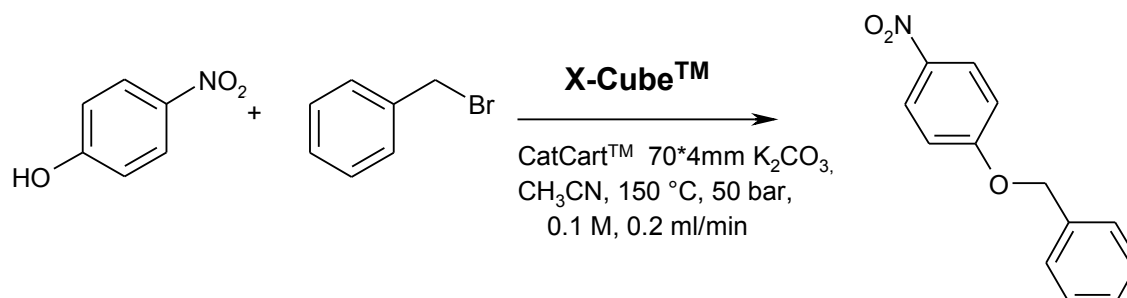


Application notes for the X-Cube™ microfluidic reactor

Alkylation:

1-Benzyloxy-4-nitro-benzene



Conversion: complete
Purity: 95% (LC-MS) without work-up

Batch reference:

(Lee, Jong Chan; Yuk, Jong Yeob; Cho, Sung Hye; *Synth. Commun.*; EN; 25; 9; 1995; 1367-1370)

Parameters: Cs₂CO₃, CH₃CN, 5 hours, 70 °C; Yield: 94%

Esterification:

(4-Nitro-phenyl)-acetic acid ethyl ester



Conversion: complete
Purity: 98% (LC-MS) without work-up

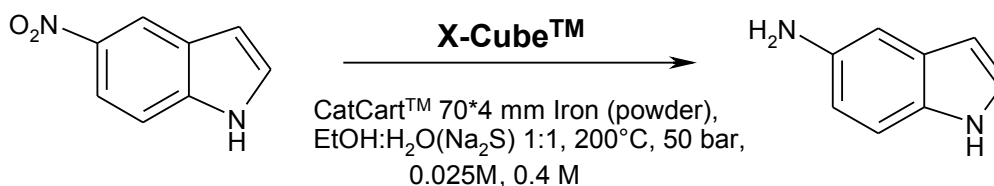
Batch reference:

(Li, Tingyu; Hilton, Susan; Janda, Kim D.; *J. Am. Chem. Soc.*; EN; 117; 8; 1995; 2123-2127)

Parameters: 1-cyclohexyl-3-(2-morpholinoethyl)carbodiimide, DMAP, DCM, 4 hours, RT

Béchamp-reduction:

5-Aminoindole



Conversion: complete

Purity: 98% (LC-MS) without work-up

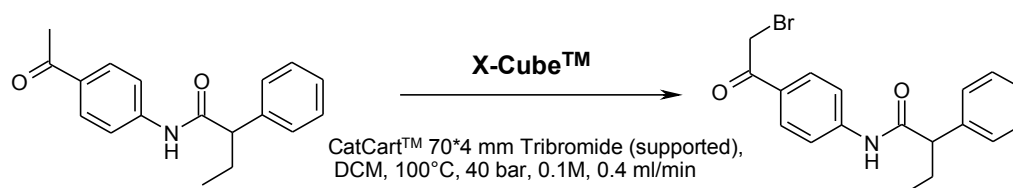
Batch reference:

(Boothroyd, Selena R., Kerr, Michael A. *Tetrahedron Lett.*; EN; 36; 14; 1995; 2411-2414)

Parameters: FeCl₃ * 6 H₂O, N,N-dimethyl hydrazine, MeOH, 44 hours, 85°C; Yield: 29%

Bromination:

N-[4-(2-Bromo-acetyl)-phenyl]-2-phenyl-butyramide



Conversion: complete

Purity: 85% (LC-MS) without work-up

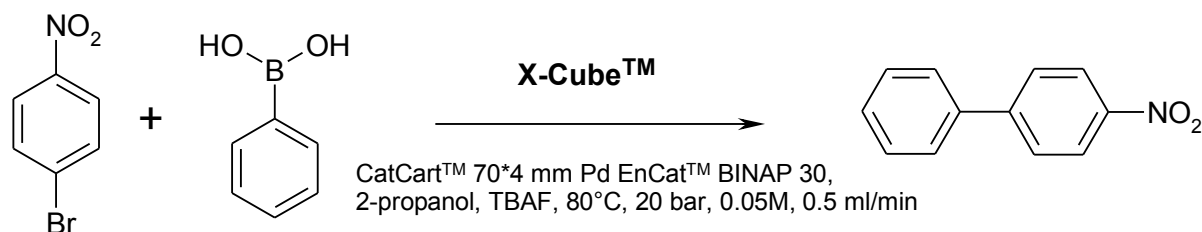
Batch reference:

(Park, Chan-Ho; Givens, Richard S.; *J. Am. Chem. Soc.*; EN; 119; 10; 1997; 2453-2463)

Parameters: AlCl₃, Br₂, THF, 40 hours, 0°C; Yield: 89%

C-C Coupling:

4-Nitro-biphenyl



Conversion: 90-95% (TLC)

Purity: 70% (LC-MS) without work-up

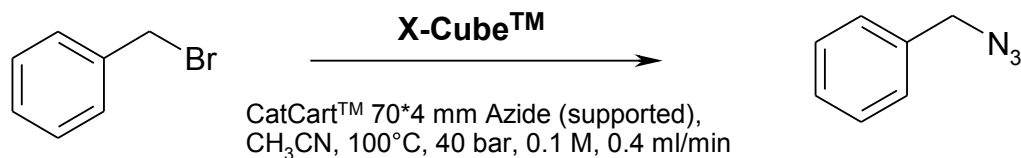
Batch reference:

(Zim, Danilo; Monteiro, Adriano L.; Dupont, Jairton; *Tetrahedron Lett.*; EN; 41; 43; 2000; 8199-8202)

Parameters: K₃PO₄, TBA-Br, Pd(OAc)₂, DMF, 2 hours, 130 °C

In situ organic azide reagent synthesis:

Benzyl azide



Conversion: complete

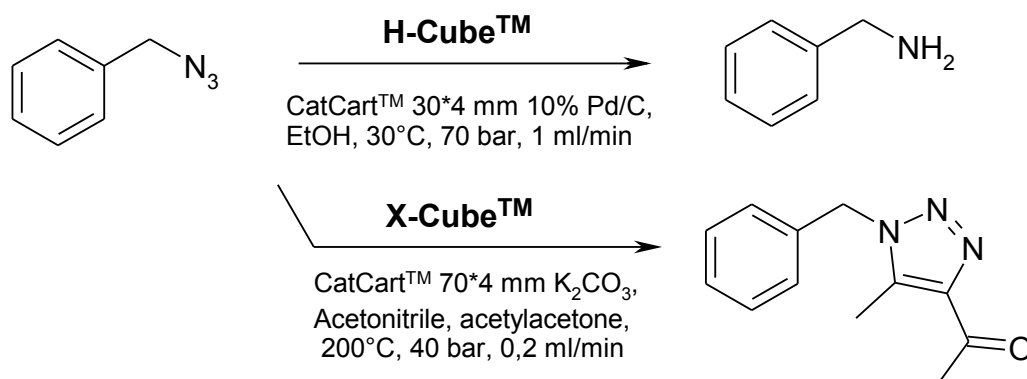
Purity (crude azide product): 95-100% (TLC)

Batch reference:

(Saxon, Eliana; Luckansky, Sarah J.; Hang, Howard C.; Yu, Chong; Lee, Sandy C.; Bertoyyi, Carolyn R.; *J. Am. Chem. Soc. EN*; 124; 5; 2002; 14893-14902)

Parameters: NaN₃, DMF, 12 hours, 20°C; Yield: 91%

Benzyl amine and triazole synthesis from crude azide product



Conversion: complete

Purity of benzylamine: 90% (LC-MS) without work-up

Batch reference:

(Soai, Kenso; Yokohama, Shuyi; Ookawa, Atsuhiko; *Synthesis; EN*; 1; 1987; 48-49)

Parameters: NaBH₄, MeOH, THF, 2 hours, heating; Yield: 84%

Conversion: complete

Purity of triazole: 82% (LC-MS) without work-up

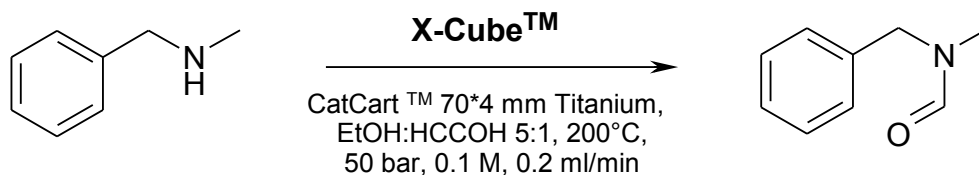
Batch reference:

(Cottrell, Ian F.; Hands, David; Houghton, Peter G.; Humphrez, Guy R.; Wright, Stanley H. B.; *J. Heterocycl. Chem.; EN*; 28; 2; 1991; 301-304)

Parameters: K₂CO₃, DMSO, 48 hours; Yield: 82%

N-formylation:

N-Benzyl-N-methyl-formamide



Conversion: complete
Purity: 98% (LC-MS) without work-up

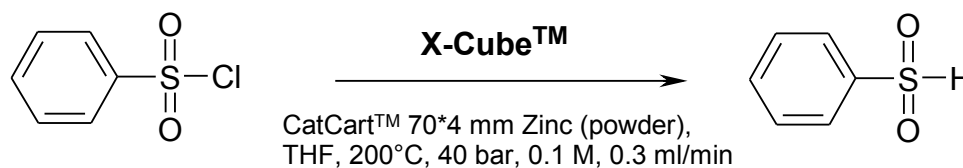
Batch reference:

(Freundreich, Charles; Samama, Jean-Pierre; Biellmann, Jean-Francois; J. AM. Chem. Soc.; EN; 106; 11; 1984; 3344-3353)

Parameters: Formic acid, 10 hours, 100°C; Yield: not given

Dehalogenation:

Benzenesulfinic acid



Conversion: complete
Purity: 90-95% (TLC and MS)

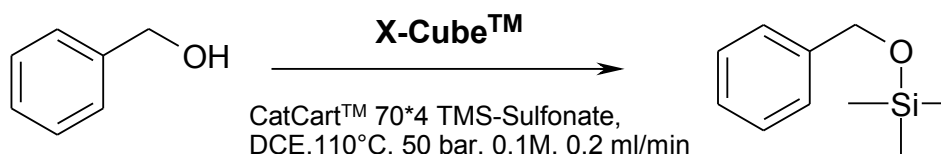
Batch reference:

(Nose, Atsuko; Kudo, Tadahiro; Chem. Pharm. Bull.; EN; 35; 5; 1987; 1770-1776)

Parameters: NaBH₄, THF, 1 hour, 0 °C; Yield: 78.6%

Trimethylsilylation:

Benzyloxy-trimethyl-silane



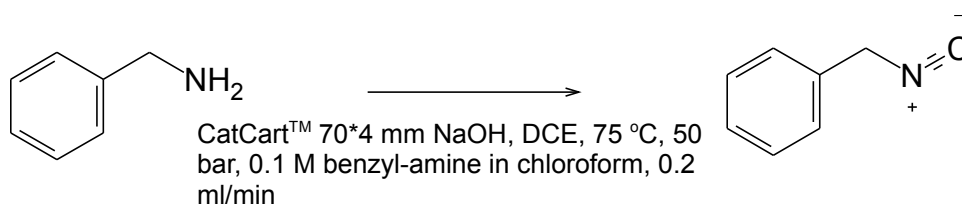
Conversion: complete
Purity: 98-100% (TLC)

Batch reference:

(Olah, George A.; Klumpp, Douglas A.; Synthesis; EN; 7; 1997; 744-746)

Parameters: DCM, N-trimethylsilylpyridinium trifluoromethanesulfonate; Yield: 86%

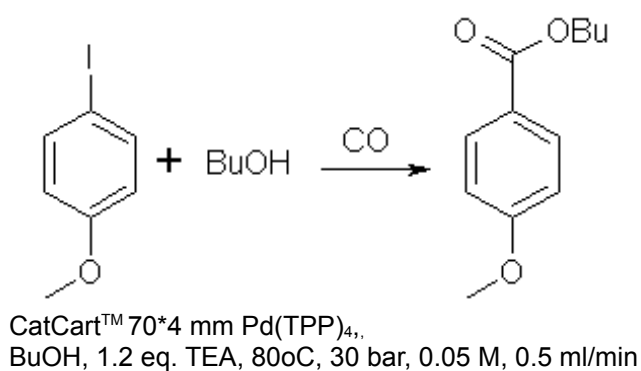
Isonitrile formation:



Conversion: Complete
Purity:95%

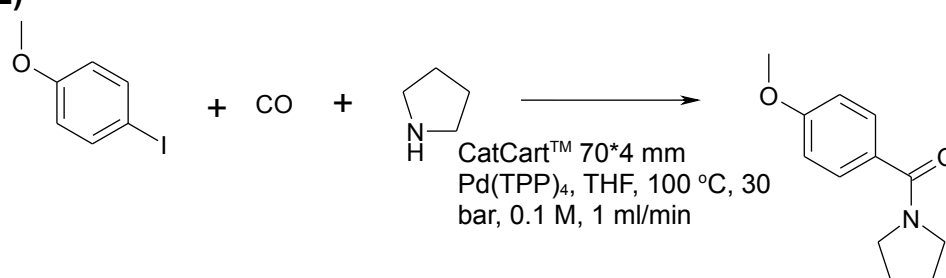
Reactions with CO:

1)



Conversion: complete
By TLC

2)



Conversion: Complete
Purity: 97% (LC-MS) after work-up