

Scaled Up Microdroplet Organic Synthesis with Solvent Recycling

Track Code: 2020-COOK-68885

Categories:

- Chemistry and Chemical Analysis
- Micro & Nanotechnologies

Keywords:

- Chemical Synthesis
- Chemistry and Chemical Analysis
- Efficiency
- Micro & Nanotechnologies
- Microfluidics
- Research Tools
- Solvent
- Synthesis and Purification

Researchers at Purdue University have developed a new closed system for conducting microdroplet and thin film reactions that also recycles solvents. The microdroplet technique improves reaction yield over traditional bulk methods from 9% yield to 93% yield for Claisen-Schmidt reactions, from 20% to 100% in Schiff-base reactions, from 14% to 86% for Katrizky coupling, and from 17% to 72% for Suzuki coupling. These chemical reactions demonstrate acceleration 15 to 7,700 times that of traditional bulk synthesis. As one example, in a Claisen-Schmidt reaction, the system fine-tuned by Purdue researchers exhibited chemical synthesis at a rate of 3.18 grams/hour with an 87% yield. In addition, the exceptional purity of reaction products has been verified by proton and carbon NMR analysis. This microscale approach can be implemented in applications including pharmaceutical research, chemical research, agrobioscience, and environmental science applications.

Related Publication:

High-yield gram-scale organic synthesis using accelerated microdroplet/thin film reactions with solvent recycling

Chem. Sci., 2020,11, 2356-2361

DOI: 10.1039/C9SC06265C

Advantages

- High Yield
- High Purity
- Highly Efficient

Potential Applications

- Pharmaceuticals
- Agrobiosciences
- Environmental Sciences
- Chemical/Biochemical Research

People:

- Cooks, Robert Graham (Project leader)
- Wei, Zhenwei

Intellectual Property:

Application Date: February 24, 2021

Type: Utility-Gov. Funding

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Application Date: March 25, 2020

Type: Provisional-Gov. Funding

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org