

## 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

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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

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**Country of Filing:** United States

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