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Scale up of Accelerated Reactions in Solution with Solvent Recycling and Electrostatic Product

A system using microdroplets and pneumatic sprays expedites chemical reactions, reduces solvent waste, and simplifies the production of previously impractical or expensive chemical processes.

Many chemical reactions occur at rates too slow to be of any practical value. Alternate reaction mechanisms are often used, but can be time consuming, produce unwanted byproducts, or involve expensive reagents. In many organic chemical reactions, the solvent used to facilitate the reaction is lost.

Researchers at Purdue University have developed a system to expedite chemical reactions by carrying out the reaction in microdroplets. In this process, microdroplets of reactants are created by pneumatic sprays, the reaction rapidly occurs, and the product microdroplets are collected using an electrostatic precipitator. This system allows the unreacted microdroplets and solvent to be collected and resprayed until the reaction is complete. This system allows reactions that were previously impractical due to reaction times and/or expensive reagents to be quickly, simply, and cleanly carried out.

Advantages:

-Reaction occurs much faster

-Reactant and solvent waste reduced

-Simple process

Potential Applications

-Mass spectrometry

-Chemical analysis

-Laboratory experiments

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Category
Chemicals & Advanced Materials/Green & Bio-Based Chemistry
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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