

# Accelerated Chemical Reactions and Organic Synthesis in Leidenfrost Droplets

**A novel reaction acceleration method utilizes the Leidenfrost effect to speed up various organic reactions by up to 50 times, offering a scalable solution with neutral, larger droplets.**

Many chemical reactions occur on elongated timelines that are either too impractical or inconvenient to be of any use by industry or academia. Fortunately there are multiple methods to increase the reaction speed. One of the most commonly used methods in small scale reactions is to place the reactants in electrosprayed particles. This method has a few main drawbacks, including its small size and the use of charged particles, leaving considerable room for improvement.

When confronted with this problem, researchers at Purdue University developed a novel approach to reaction acceleration using the Leidenfrost effect. The Leidenfrost effect is a physical phenomenon that occurs when a liquid is brought in close contact with a substance with a temperature that is significantly higher than the liquid's boiling point. This causes an insulating layer of vapor to form, which causes the liquid to levitate and prevents it from rapidly evaporating. This effect, also known as film boiling, accelerates reactions because of interfacial interactions between the heated surface and the reactants. It has the potential to accelerate various organic reactions by a factor of up to 50.

## **Advantages:**

- Can be used in small scale testing
- Easily scaled up
- Optimizes acceleration
- Droplets are neutral vs. charged
- Leidenfrost droplets are larger than electrosprayed particles

Potential Applications

## **Technology ID**

2016-COOK-67573

## **Category**

Chemicals & Advanced  
Materials/Specialty &  
Performance Chemicals  
Materials Science &  
Nanotechnology/Advanced  
Functional Materials

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## **View online**



-Reaction engineering

-Chemistry

-Organic reactions

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**Intellectual Property:**

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