

# Microsecond Time-Resolved Mass Spectrometry

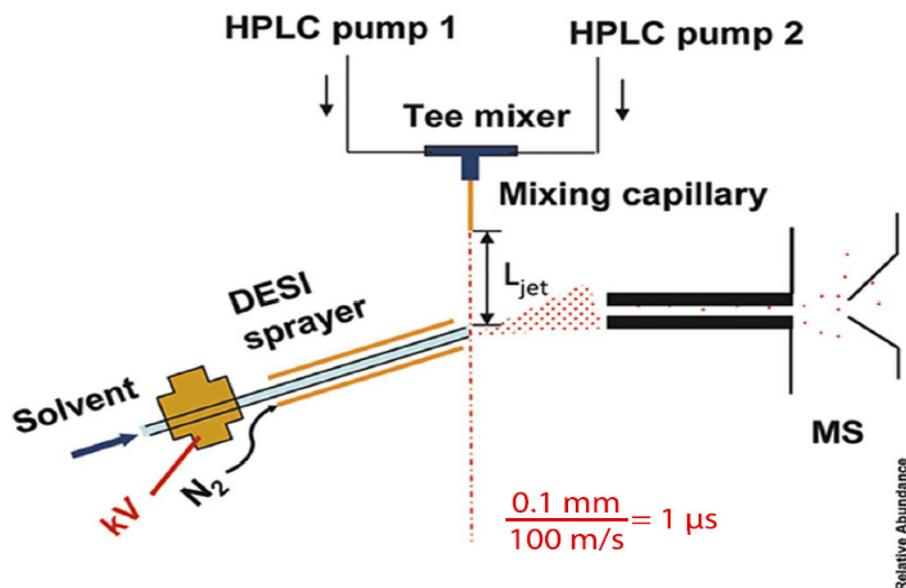
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## Overview

At this time the predominant method for a pharmaceutical chemist to characterize reaction kinetics is to employ spectroscopy. The main issue with this technique is that spectroscopy produces an absorption/emission spectrum and it is possible for multiple different compounds to have the same spectrum peak, making it difficult to differentiate. Microsecond Time-Resolved Mass Spectrometry was developed to collect high time resolution and chemical specificity for analysis of biochemical reactions. A T-mixer allows two separate chemicals in solution to be mixed together to form a free high-speed jet stream. Along the liquid jet, DESI spray ionizes the stream and the resulting ions are then monitored by the MS. The distance the jet travels is indicative of reaction time, so this technology is capable of collecting mass spectra at different time points in the reaction.

## Commercial Application

This technology is best suited for analyzing biochemical reactions by companies that specialize in pharmaceutical development. Mass Spectrometry is a very large market that is continuing to grow. Totalling \$3 billion/year in revenues, this industry consists of end-users in a vast array of industries and applications.



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## Benefits

- Mass Spectrometry is used as the detector, which provides superior chemical specificity compared to spectroscopy techniques
- Jet sample is being ionized, which provides high time resolution for the study of fast reaction kinetics
- Helps to clarify the mechanisms of biochemical reactions

## Inventor

Hao Chen, Ph.D. received his doctoral degree in Chemistry from Purdue University in 2005. He is an associate professor in chemistry at Ohio University. Dr. Chen performs research on organic and biological mass spectrometry for bioanalysis and instrument development. He has received over \$800,000 in research funding and has published over 60 journal papers.

## Development

A working prototype of this technology has been developed. A higher time resolution in microsecond timescale is thought to be possible and is currently being tested. Also, other chemical and biological reactions are being explored for kinetics investigation. A provisional patent application has been filed; licensing opportunities are available.

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