Supporting Information

The Power of Microdroplet Photochemistry

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The time for the microdroplet to travel to the inlet of the mass spectrometer is varied by simply changing the distance between the sprayer and the mass spectrometer inlet. The velocity has been previously measured to be about 80 m/s [1]. The following data were obtained: For the bulk reaction and that for the sprayed droplets we measure in that order:

Time (sec)	Substrate *m/z* 281.2535	Product *m/z* 339.29	Yield (%)
2	2.04E+06	1.07E+03	0.04926
7	1.55E+06	2.83E+03	0.15705
17	8.07E+05	3.02E+03	0.254
47	7.90E+05	1.51E+04	0.80749
107	3.21E+05	2.53E+04	1.07614

time (µsec)	distance (mm)	Substrate m/z 281.253	Product m/z 339.29	Yield (%)
125	10	1.57E+05	9.85	0.01
250	20	5.71E+04	3.15E+01	0.06
375	30	7.10E+04	6.69E+01	0.09
500	40	4.62E+04	6.65E+01	0.14
750	60	3.45E+04	1.12E+02	0.32

We compared the reaction time for about the same yield to determine the rate of acceleration:

Bulk: 7 sec (0.16%)

Microdroplet: 500 µsec (0.14%)

REFERENCE

[1] Lee, J.K., Kim, S., Nam, H.G. and Zare, R.N., 2015. Microdroplet fusion mass spectrometry for fast reaction kinetics. *Proceedings of the National Academy of Sciences*, 112, 3898-3903.