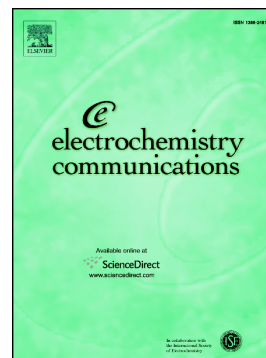


Accepted Manuscript

Electrochemical detection of droplet content in microfluidic devices: Evidence of internal recirculating convection within droplets

Thomas Abadie, Catherine Sella, Laurent Thouin



PII: S1388-2481(17)30138-8
DOI: doi: [10.1016/j.elecom.2017.05.013](https://doi.org/10.1016/j.elecom.2017.05.013)
Reference: ELECOM 5946
To appear in: *Electrochemistry Communications*
Received date: 3 April 2017
Revised date: 17 May 2017
Accepted date: 18 May 2017

Please cite this article as: Thomas Abadie, Catherine Sella, Laurent Thouin , Electrochemical detection of droplet content in microfluidic devices: Evidence of internal recirculating convection within droplets, *Electrochemistry Communications* (2017), doi: [10.1016/j.elecom.2017.05.013](https://doi.org/10.1016/j.elecom.2017.05.013)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Electrochemical detection of droplet content in microfluidic devices: Evidence of internal recirculating convection within droplets

Thomas Abadie,^{1,2} Catherine Sella^{1,2} and Laurent Thouin^{1,2*}

1/ PASTEUR, Département de chimie, École normale supérieure, UPMC Univ. Paris 06, CNRS, PSL Research University, 75005 Paris, France

2/ Sorbonne Universités, UPMC Univ. Paris 06, École normale supérieure, CNRS, PASTEUR, 75005 Paris, France

Abstract

The electrochemical detection of aqueous droplets carried by an immiscible oil-phase was investigated in a rectangular microchannel. Droplets having large aspect ratio as plugs were generated on demand and their electroactive content was detected amperometrically by a channel microband electrode. Under these conditions, electrode responses showed steady-state currents during the passage of droplets. The influence of electrode width and droplet velocity on faradaic current was studied. Results demonstrated that mass transfer to the electrode was controlled by convective flow regimes. Internal recirculating convection was evidenced in comparison to known operating regimes of microchannel electrodes in continuous pressure-driven flow.

Keywords: droplet; microchannel; mass transport; amperometry; microband

* Corresponding author:

E-mail address: laurent.thouin@ens.fr.

Download English Version:

<https://daneshyari.com/en/article/4766435>

Download Persian Version:

<https://daneshyari.com/article/4766435>

[Daneshyari.com](https://daneshyari.com)