Electronic Supplementary Material (ESI) for Lab on a Chip.

Speeding up biphasic reactions with surface nanodroplets

Zhengxin Li,[a] Akihito Kiyama,[b] Hongbo Zeng,*[a] Detlef Lohse,*[c] and Xuehua Zhang*[a,b,c]

[a] *Department of Chemical and Materials Engineering, Faculty of Engineering, University of Alberta, Edmonton, Alberta, T6G 1H9, Canada.*

[b] *Institute of Global Innovation Research, Tokyo University of Agriculture and Technology, Nakacho 2-24-16 Koganei, Tokyo, 184-8588, Japan.*

[c] *Physics of Fluids Group, Max Planck Center Twente for Complex Fluid Dynamics, JM Burgers Center for Fluid Dynamics, Mesa+, Department of Science and Technology, University of Twente, Enschede 7522 NB, The Netherlands.*

Supporting information

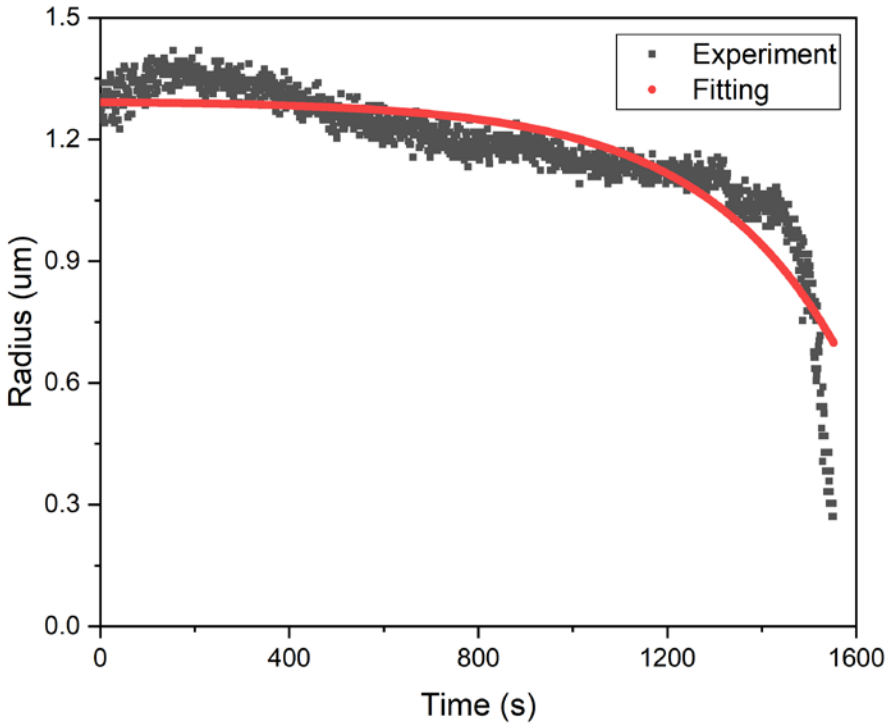

Fig. S1 Fitting of a droplet with the initial radii R_0 = 1.3 μm by a single exponential decay function. The flow rate was 100 μL/min (Corresponding Peclet number Pe was 31). The concentration of NaOH in the flow was 4.0×10^{-4} M. The data in Fig. S1 was obtained fro the analysis of images (d) in Fig. 2.

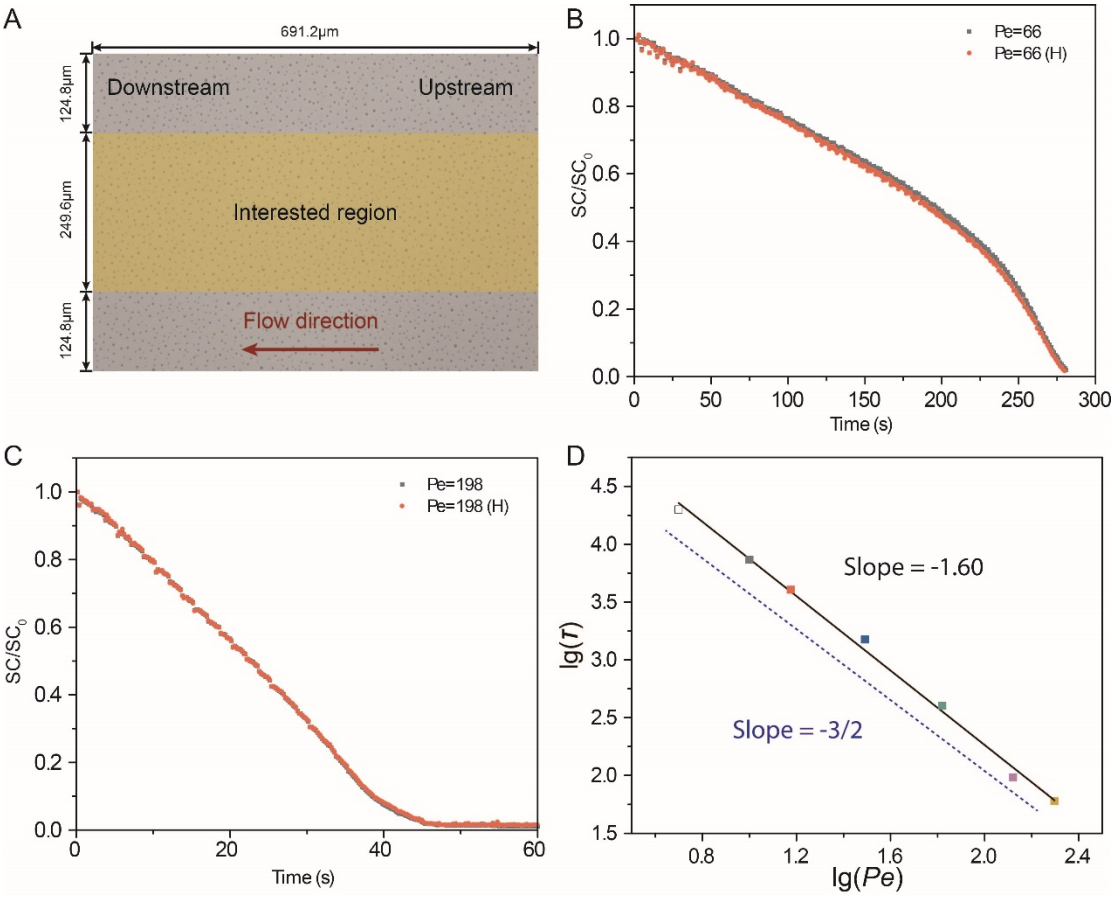

Fig. S2 Data analysis of half of the original region (around 1000 droplets) in Fig. 3. (A) An optical image showing the definition of half of the original region. A region crossing upstream and downstream in the original region was selected to avoid the hindering effect. (B)&(C) Comparing the normalized surface coverage evolution of droplets from half of the original region with original results in Fig. 3a. (D) Droplet lifetime τ as function of Peclet number. τ on the x-axis is the time required for normalized surface coverage (SC/SC_0) of the half region to reach 0.1.

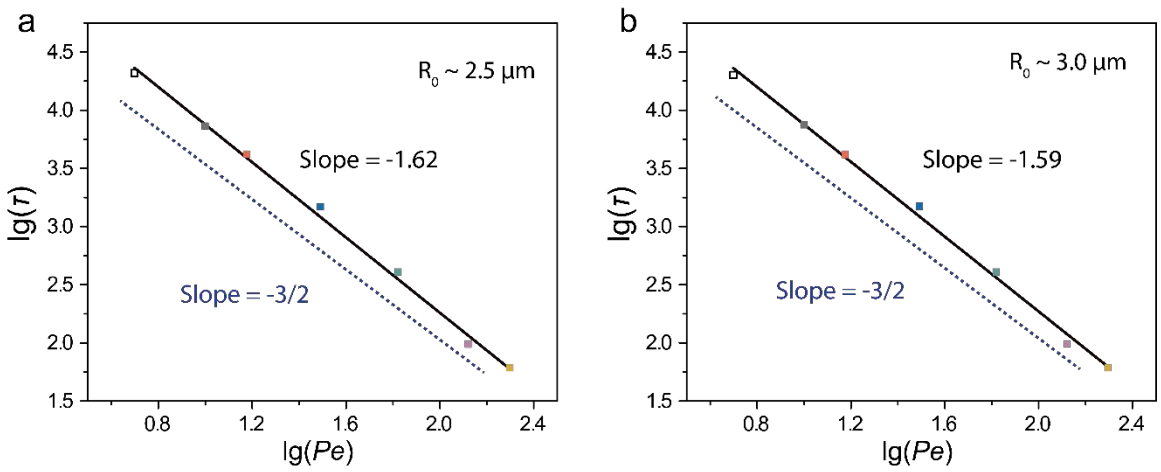

Fig. S3 Droplet lifetime τ based on the droplet radius as function of Peclet number. The initial radii of droplets in (a) and (b) were around 2.5 and 3.0 μm, respectively. The black lines were obtained by fitting the experimental data, while the blue dashed lines represent the result from the scaling analysis.