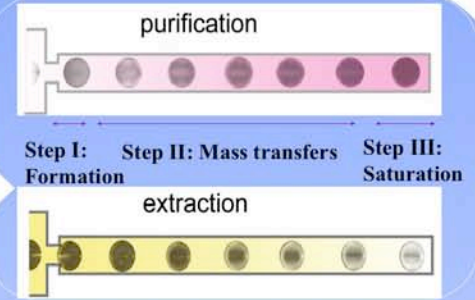
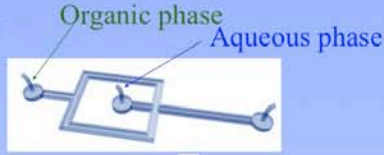


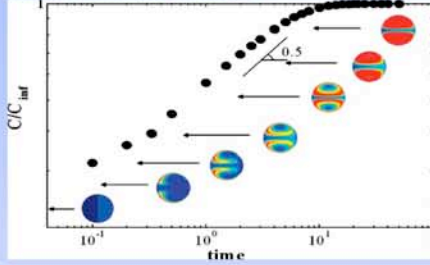
Mass transfers in microdroplets

Materials transferred across the droplet interfaces: fluorescein or rhodamine B.
 Détection by UV-induced fluorescence microscopy.

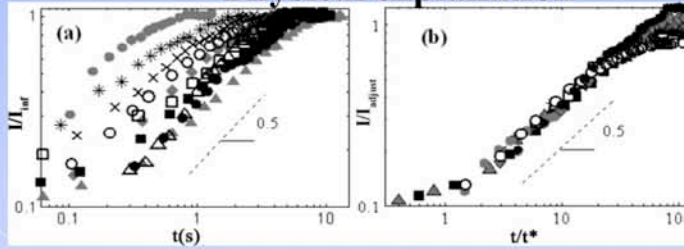


Simulation

Finite element method



Physical explanation

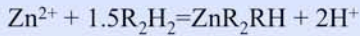


Above $t^* = t_{diffusive} Pe^{-2/3}$ (Pe is the Peclet number), the concentration increases with time as a power law.

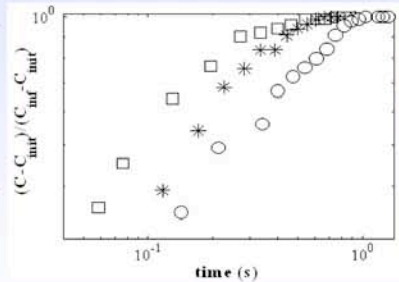
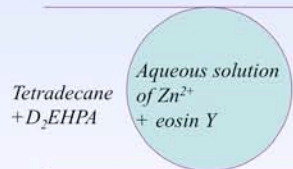
Application (1)

Reactive extraction of Zn^{2+}

Chemical reaction at the interface :



Determination of the amount of extracted Zn^{2+} with a pH sensitive tracer.



Application (2)

First steps of purification of mRNA

Based on a difference of physico-chemical properties of nucleic acids and proteins: differential precipitation.

2-Bromo-3-chloropropane
 Trizol + DNA + proteins

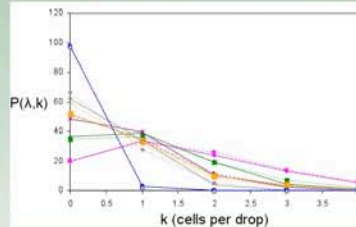
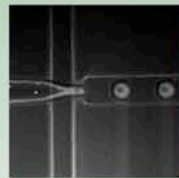
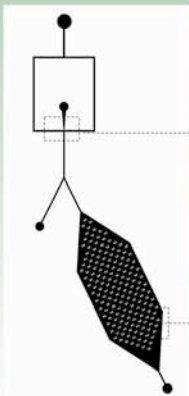
$t=0.2s$ $t=0.5s$
 $t=1s$ $t=3s$

DNA-Cy3 (20bp), concentration = $2 \cdot 10^{-5} M$

Phycobiliproteins, concentration $10^{-4} M$

Encapsulation of cells and RT in the chip

Encapsulation of cells

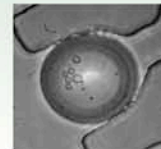


Probability of a drop containing k cells for different average number of cells per drop : $\lambda = 0.04, 0.40, 0.53, 0.80, 1.06, 1.59$
 Dashed lines : experimental values
 Continuous lines : values predicted from Poisson statistics

Trap



Lysis and RT



Collection of droplets and PCR

