

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Fast diffusiophoretic mixing of colloids in microchannels CECILE COTTIN-BIZONNE, BENJAMIN ABECASSIS, CHRISTOPHE YBERT, CNRS - Universite Lyon 1, ARMAND AJDARI, CNRS - ESPCI , LYDERIC BOCQUET, CNRS - Universite Lyon 1 — Diffusio-phoresis is the movement of a colloid particle induced by a gradient of concentration of a molecular solute. This form of transport originates at the colloid surface, within a nanometric layer where the interaction of the solute with the colloid surface differs from that of the solvent, *e.g.* the electric Debye layer for a charged solute. The solute concentration gradient induces a pressure drop within the interfacial layer along the surface, hence propelling the particle in a direction which depends on the interaction potential between the solute and the particle's surface. Using this effect we have realized enhanced mixing of colloids in microfluidic devices. We have shown experimentally that, as predicted by theory, in presence of a gradient of concentration of salt the colloids obey a diffusive like behaviour but with an effective diffusion coefficient which is orders of magnitude greater than the colloid's one. Depending on the solute nature and the particle's zeta potential, the amplitude of the phenomenon can be finely tuned. This provides a very simple and efficient way of mixing macromolecules in microfluidic devices.

Cecile Cottin-Bizonne
CNRS - Universite Lyon 1

Date submitted: 08 Aug 2007

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