

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Nanofluidics: Ionic transport through a nanochannel¹ ALESSAN-
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— Nanopore based membranes find nowadays interesting applications such as water
treatment [1] and power energy conversion [2]. We consider a single micrometric
glass channel. We show how surface effect can modify the channel transport prop-
erties. We measure the ionic conductance through the channel as a function of the
electrolyte concentration showing a saturation effect in the very low concentration
regime. Such effect is due to the surface correction to the channel conductance [3].
The effective surface charge obtained by the conductance measurements, is largely
higher than what commonly measured for glass surfaces [4]. Introducing a moderate
hydrodynamic slippage of the fluid at the solid-fluid interface allows us to obtain
surface charge values in agreement with what presented in literature. A quantitative
agreement with independent measurement of electro-osmotic mobility and streaming
current allows us to fully characterize the slippage effect on the channel electrokinetic
properties.

[1] H. Liu et al., 64 (2009)

[2] F.H.J. van der Heyden et al. Nanoletters 7, 4, 1022 (2007)

[3] D. Stein et al. Phys. Rev. Lett. 93, 3, 035901 (2004)

[4] L. Bocquet et al. Chem Soc, Rev. (2010)

¹This work is supported by ANR program MIKADO.

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Date submitted: 07 Jul 2010

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