

Accepted Manuscript

Title: Analytical model for surface-charge-governed
nanochannel conductance

Authors: Yu Ma, Yen-Shao Su, Shizhi Qian, Li-Hsien Yeh

PII: S0925-4005(17)30497-5
DOI: <http://dx.doi.org/doi:10.1016/j.snb.2017.03.080>
Reference: SNB 21992

To appear in: *Sensors and Actuators B*

Received date: 22-1-2017
Revised date: 28-2-2017
Accepted date: 16-3-2017

Please cite this article as: {<http://dx.doi.org/>

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.



Analytical Model for Surface-Charge-Governed Nanochannel Conductance

Yu Ma,¹ Yen-Shao Su,² Shizhi Qian,³ Li-Hsien Yeh,^{2,*}

¹School of Energy Science and Engineering, Harbin Institute of Technology

Harbin 150001, P. R. China

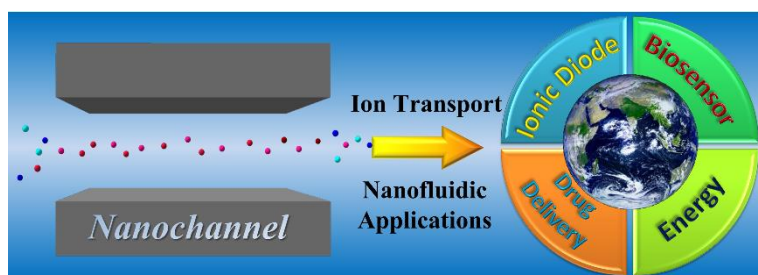
²Department of Chemical and Materials Engineering, National Yunlin University of Science and Technology, Yunlin 64002, Taiwan

³Department of Mechanical and Aerospace Engineering, Old Dominion University

Norfolk, VA 23529, USA

* Corresponding author: Fax: +886-5-5312071; E-mail: lhyeh@yuntech.edu.tw (Li-Hsien Yeh),

Graphic Abstract



Research Highlights

- Exact analytical solution is derived for estimating the surface-charge-governed nanochannel conductance.
- The model takes into account the Stern layer, surface chemistry reactions, presence of protons, EOF, and EDL overlap.
- The model is valid at high pH, low salt concentration, and small nanoscale channel height.

Abstract

It is known that when the electric double layers (EDLs) overlap, the ionic conductance in a nanochannel depends substantially on its surface charge property. Considering growing modern

Download English Version:

<https://daneshyari.com/en/article/5009425>

Download Persian Version:

<https://daneshyari.com/article/5009425>

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