

Abstract Submitted
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Observation of Charge Inversion and Divalent Ion Transport in Nanochannels¹ XIN LI, Department of Physics, Yale University, WEI-HUA GUAN, Department of Electrical Engineering, Penn State University, BEN WEINER, Department of Physics, Yale University, MARK REED, Department of Electrical Engineering, Department of Applied Physics, Yale University — Ion transport in nanochannels has attracted increasing attention in recent years, with potential applications ranging from ionic control and biosensing to energy storage and conversion. Exciting phenomena occur from the nanoscale confinement of fluids and new models are expected. While most of the previous work in the field has focused on simple monovalent electrolytes, we report a systematic study of divalent ion transport in a well-defined nanochannel fabricated via standard semiconductor methods. Inversion of net surface charge at the fluid/solid interface has been observed by a novel method of open potential measurement. Moreover, the relation of this charge inversion phenomena with the strong correlated liquid (SCL) theory has been deeply discussed. Intriguing observations from conductance measurement reveal ion-surface interactions and ion-ion correlations.

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