

Abstract Submitted  
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**Electrokinetic Response of Charge-Selective Nanostructured Polymeric Membranes** JARROD SCHIFFBAUER<sup>1</sup>, Colorado Mesa University, DIYA LI, FENG GAO, WILLIAM PHILLIP, HSUEH-CHIA CHANG, University of Notre Dame — Nanostructured polymeric membranes, with a tunable pore size and ease of surface molecular functionalization, are a promising material for separations, filtration, and sensing applications. Recently, such membranes have been fabricated wherein the ion selectivity is imparted by self-assembled functional groups through a two-step process. Amine groups are used to provide a positive surface charge and acid groups are used to yield a negative charge. The membranes can be fabricated as either singly-charged or patterned/mosaic membranes, where there are alternating regions of amine-lined or acid-lined pores. We demonstrate that such membranes, in addition to having many features in common with other charge selective membranes (i.e. AMX or Nafion), display a unique single-membrane rectification behavior. This is due to the asymmetric distribution of charged functional groups during the fabrication process. We demonstrate this rectification effect using both dc current-voltage characteristics as well as dc-biased electrical impedance spectroscopy. Furthermore, surface charge changes due to dc concentration polarization and generation of localized pH shifts are monitored using electrical impedance spectroscopy.

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