

Abstract Submitted
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Threading Synthetic Polyelectrolytes through Protein Pores

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— We have measured the ionic current signatures of sodium poly(styrene sulfonate) as its single molecules translocate through an alpha-hemolysin pore embedded into a bilayer in a salty aqueous medium under an externally applied electric field. As in the previous experiments involving DNA and RNA, the pore current, which is a measure of the ionic conductivity of the low molar mass electrolyte ions, is significantly reduced when the polymer molecule translocates through the pore. By studying thousands of single molecule events, we have constructed distribution functions for the extent of the reduced current and for the translocation time. By investigating over two orders of magnitude in the molecular weight of the polymer, the average translocation time is found to be proportional to the molecular weight and inversely proportional to the applied voltage. Our experiments open up many opportunities to systematically explore the fundamental physical principles behind translocation of single macromolecules, by resorting to the wide variety of synthetically available polymers.

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