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PH Dependence of Single DNA Molecules Translocation through a Nanopore Device DANIEL FOLOGEA, University of Arkansas, JAMES UPLINGER, University of Arkansas, DAVID MCNABB, University of Arkansas, JENE GOLOVCHENKO, Harvard University, JIALI LI, University of Arkansas — We report here the pH dependence of DNA translocation through a nanopore made in a silicon nitride membrane. We demonstrate that silicon nitride nanopores can tolerate extreme pH conditions of surrounding ionic solution. When an electrically biased nanopore is exposed to DNA in ionic solution, discrete transient electronic signals: current blockages are observed. In our experiment, linear DNA molecules, about 3 and 10 kbp, have been electrophoretically driven through nanopores ranged from 3 to 12 nm in diameter. The translocation experiments are performed from pH=3 to 13. By measuring the amplitude change and dwell time of each current blockage that represents a single molecule translocation event, different behaviors of the DNA molecules are observed following pH changes. An alkaline pH (12.7, for example) denatures the molecules, resulting single stranded DNA. A folded DNA state is favored at low pH (3.7), indicating a reduced charge of the phosphate groups.

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