

Abstract Submitted
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Electrical Noise Characterization of Noble Gas Ion Beam Fabricated Nanopore Detectors RYAN ROLLINGS, BRADLEY LEDDEN, ERIC KRUEGER, GREG SALAMO, JIALI LI, University of Arkansas, JOHN CHERVINSKY, JENE GOLOVCHENKO, Harvard University — Nanopores fabricated with low energy noble gas ion beams in a silicon nitride membrane can be employed as the fundamental element of single biomolecule detection and characterization devices. The effect of morphology, annealing, and physical surface treatments are systematically studied to determine their effect on the electrical noise characteristics of the nanopore when used as part of a nanofluidic detector. Atomic Force Microscopy (AFM) is used to measure the morphology of the region near the pore, while X-ray Photoelectron Spectroscopy (XPS) and Rutherford Backscattering (RBS) are used to measure the change in the surface composition with annealing as well as initial depth profiles of imbedded ions. We qualitatively discuss the underlying physical processes that contribute to the electrical noise characteristics of the pore in comparison with our measurements and present optimized conditions for fabricating the quietest pores.

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