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In-Situ Creation of Solid State Nanopores KYLE BRIGGS, HAROLD KWOK, VINCENT TABARD-COSSA, University of Ottawa — Recent advances in nanopore technology have demonstrated that they are a powerful tool for single biomolecule analysis, and great progress has been made toward the promise of nanopore-based DNA sequencing devices. A limiting factor in solid-state nanopore science is the complexity, throughput and cost of current fabrication methods, based on focused ion or election beam drilling, which require sophisticated equipment and highly trained personnel. Our laboratory at the University of Ottawa has demonstrated a simple and extremely low cost method to fabricate individual nanopores on thin solid-state membranes. By controlling an applied voltage across the membrane in aqueous salt solution, we are able to routinely create sub-5nm pores in dielectric membranes. In addition, the method can easily be extended to tune nanopore size with sub-nm precision. We will describe the fabrication method in detail, and present the effects of electric field strength, membrane material, solution salt composition, concentration and pH on the pore creation time and size distribution. These results allow us to elucidate the physical mechanisms responsible for nanopore formation.

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