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Heat Treatment to Shrink Solid-State Nanopores[1] JOSEPH BILLO, WASEEM ASGHAR, SAMIR M. IQBAL, Department of Electrical Engineering, Nanotechnology Research and Teaching Facility, University of Texas at Arlington — Solid-state nanopores have a promising application in the area of selective sensing of DNA. Therefore, it is imperative to have a simple and repeatable method for nano-fabrication of pores. This paper focuses on solid-state nanopore fabrication in a silicon-dioxide membrane with heat treatment. A 375 μm thick pre-oxidized silicon wafer with approximately 1 μm oxide is used. Photolithography followed by BHF etching, with well-cured photo-resist covering the back-side to preserve its oxide layer, was performed on the wafer in order to open square windows in the front-side oxide layer. Using the front-side oxide layer as a mask and the back-side oxide layer as an etch-stop, the silicon substrate underwent anisotropic etching to create SiO_2 membranes. The wafer was then cut into small squares approximately 1 cm on a side with each containing one membrane. A focused ion beam was used to open an initial pore in each membrane. Finally, a method for causing SiO_2 membranes to diffuse was used to shrink the pores to the desired diameter.

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