

Abstract Submitted
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Integrated Nanopore Detectors in a Standard Complementary Metal-Oxide-Semiconductor Process¹ ASHFAQUE UDDIN, CHINHSUAN CHEN, SUKRU YEMENICIOGLU, KAVEH MILANINIA, ELLIE CORIGLIANO, Dept. of Electrical and Computer Engineering, UCSB, MADOO VARMA, Integrated Biosystems Lab, Intel Corporation, LUKE THEOGARAJAN, Dept. of Electrical and Computer Engineering, UCSB — High-bandwidth and low-noise nanopore sensor and detection electronics are crucial in achieving single-DNA base resolution. A potential way to accomplish this goal is to integrate solid-state nanopores within a CMOS platform, in close proximity to the biasing electrodes and custom-designed amplifier electronics. Here we report the development of solid-state nanopore devices in a commercial CMOS potentiostat chip implemented in On-Semiconductor's 0.5 micron technology. By using post-CMOS micromachining, a free-standing oxide membrane and electrodes are fabricated utilizing the N+ polysilicon/oxide/N+ polysilicon capacitor structure available in the aforementioned process. Nanopores with sub-5 nm diameter are drilled in the membrane using a Transmission Electron Microscope. The integrity of pores is validated by measuring current-voltage and noise characteristics. DNA translocation experiments are also performed utilizing these on-chip pores. In addition, electrical tests performed on the CMOS potentiostat circuitry show that the post-CMOS micromachining process does not have any detrimental effect on the CMOS circuitry.

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