Double thermal oxidation scheme for the fabrication of SiO2 nanochannels - DTU Orbit (11/10/2019)

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We present a planar fabrication scheme for fluidic systems with silicon dioxide nanochannels and assess the waferscale quality and homogeneity of the fabricated devices. The nanochannels have heights \( h \) ranging from 14 to 300 nm and widths \( w \) of 2.5, 5 and 10 \( \mu \)m. Compared to other state-of-the-art fabrication techniques, our double thermal oxidation scheme (DTOS) displays improvements with respect to 4 inch waferscale height variation \( \sigma(h) \) 2500. We test the devices by measuring capillary filling speed in different channel heights, ranging from 14 to 310 nm. These tests reproduce as well as extend the results reported by Tas et al (2004 Appl. Phys. Lett. 85 3274). A systematic deviation from bulk behaviour has been observed for channel heights below 100 nm.