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Prevention of Initial Defect of Low-Noise Solid-State-Nanopore Device KAZUMA MATSUI, ITARU YANAGI, KENICHI TAKEDA, Hitachi Ltd
— To achieve DNA sequencing using solid-state-nanopore, it is necessary to reduce an electric noise current. In this study, the noise was decreased by reducing the capacitance(C) of the nanopore device. We coated an insulating material near a nanopore on a membrane of the device, and confirmed that the capacitance of the device needs to be decreased down to 100 pF in order to reduce the noise. However, electric-charge difference(ΔQ) between electrolyte in the one and the other chamber occurred high voltage ($\Delta V = \Delta Q/C$) to the membrane because the capacitance(C) was reduced. The electric-charge difference defected the membrane when pouring the electrolyte onto the both sides of the membrane. In order to prevent the initial defects, we established new procedures to reduce the electric-charge difference using electric bypass between the one and the other chamber. Then, we confirmed that there were no defects on the membrane with this procedure.

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