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Development of Active DNA Control Technique for DNA Sequencer With a Solid-state Nanopore RENA AKAHORI, KUNIO HARADA, YUSUKE GOTO, ITARU YANAGI, TAKAHIDE YOKOI, Hitachi ltd., TAKESHI OURA, Hitachi High-Technologies, MASASHI SHIBAHARA, KEN-ICHI TAKEDA, Hitachi ltd. — We have developed a technique that can control the arbitrary speeds of DNA passing through a solid-state nanopore of a DNA sequencer. For this active DNA control technique, we used a DNA-immobilized Si probe, larger than the membrane with a nanopore, and used a piezoelectric actuator and stepper motor to drive the probe. This probe enables a user to adjust the relative position between the nanopore and DNA immobilized on the probe without the need for precise lateral control. In this presentation, we demonstrate how DNA (block copolymer ([(dT)25-(dC)25-(dA)50]m)), immobilized on the probe, slid through a nanopore and was pulled out using the active DNA control technique. As the DNA-immobilized probe was being pulled out, we obtained various ion-current signal levels corresponding to the number of different nucleotides in a single strand of DNA.

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