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Observation of DNA dynamics near silicon nanopores by controlling the ultraviolet light spot HIROHITO YAMAZAKI, SHINTARO ITO, KEIKO ESASHIKA, TOSHIHARU SAIKI, Keio University — Biopolymer translocation through a nanopore is an attractive phenomenon in the field of biophysics. When the voltage is applied through a nanopore, DNA coils thread into a nanopore by deforming its coil structure and recoil after translocation through a nanopore. Because DNA coil structure is relative with DNA translocation, DNA dynamics near a nanopore have a correlation with DNA translocation. To investigate DNA dynamics, we developed the optical nanopore detection system, which has a capability to observe DNA dynamics near nanopore at sub-100-nm and sub-millisecond resolutions. Here, we report our experimental results of DNA dynamics near nanopores by controlling position of light spots. Because silicon have high refractive index and extinction coefficient at ultraviolet light, the ultraviolet light creates z- and x-polarized light spot, which locate on nanopores and 50 nm apart from nanopores, respectively. By controlling light polarization, we observed different fluorescence intensity traces between z- and x-polarized light spot. The experimental results showed that fluorescence intensity trance of z-polarized light spot decayed faster than that of x-polarized light spot, which explain DNA dynamics near nanopores change by position from nanopores.

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