Supporting Information for "Tribological Effects on DNA Translocation in a SAM-Coated Nanochannel".

Arrangement of each molecule in a SAM coated inside a solid-state nanopore

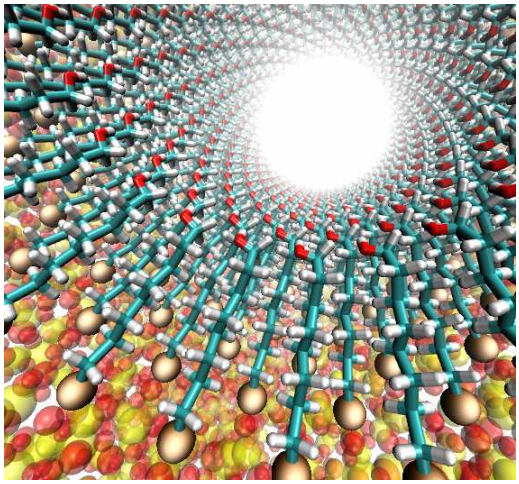

Figure S1. Simulation set-up for an octanol-SAM coated inside the solid-state nanochannel. Each Si atom in an organosilane molecule is highlighted as an orange ball, while other atoms in the solid are shown transparently. Note that all highlighted Si atoms in organosilane molecules are embedded in (not on top of) the SiO2 solid and are part of the solid (see top view in Fig. 1a). The resulting cylindrical solid surface is atomically smooth.

Movie captions:

Movie 1 (freediff-octane.mpg): DNA moves freely in an octane-SAM-coated nanochannel (cf. Figure 2 in the main text). Atoms of the DNA, ion, octane-SAM and SiO_2 solid-state channel are shown as van der Waals spheres. Water molecules are not shown.

Movie 2 (freediff-octanol.mpg): DNA moves from the center to the surface in an octanol-SAM-coated nanochannel (cf. Figure 2 in the main text). Atoms of the DNA, ion, octane-SAM and SiO_2 solid-state channel are shown as van der Waals spheres. Water molecules are not shown.

Electrically driven motion of DNA in a SAM-coated nanochannel

Figure S1 shows the radial motion of DNA in octane-SAM- and octanol-SAM-coated nanochannel. The radial motion of DNA Shown in Figure S1a and S1b reveals that in all cases DNA is near the center of the octane-SAM-coated channel but moves towards the surface of the octanol-SAM-coated channel. Consequently, DNA can be electrically driven through the octane-SAM-coated channel and be stuck on the octanol-SAM-coated channel even when $E \sim 25$ mV/Å.

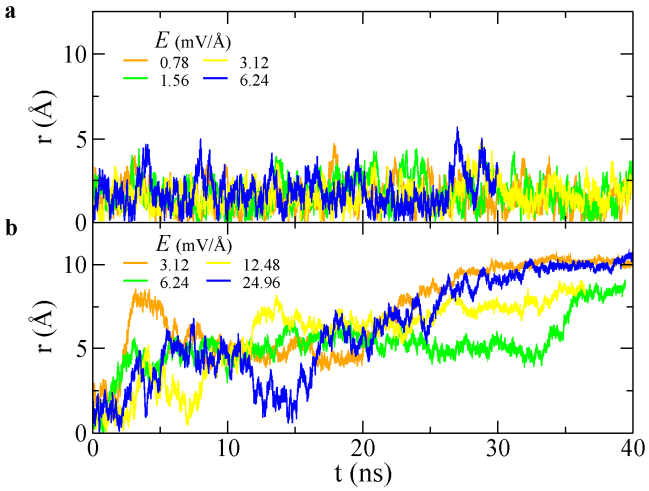

Figure S2. Radial-motion of DNA in SAM-coated nanochannels, when DNA is driven by an electric field *E*. (a) Radial motion of DNA in an octane-SAM-coated nanochannel. (b) Radial motion of DNA in an octanol-SAM-coated nanochannel.