SUPPORTING INFORMATION

DNA base-specific modulation of μA transverse edge currents through a metallic graphene nanoribbon with a nanopore

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The Supporting Information presents additional results in Figures S1 and S2 which illustrate how the presence of sugar and phosphate components of the DNA backbone affects the transverse edge current in two-terminal 14-ZGNR with ≈ 1.2 nm diameter nanopore whose edge carbon atoms are passivated by nitrogen (N-pore). The third additional Figure S3 shows changes in the conductance of ZGNR+N-pore biosensor when Adenine is displaced in small steps along the z-axis (which is orthogonal to the plane of the device, see Figure 1) above and below the nanopore. The DNA backbone is comprised of the sugar 2'-deoxyribose and a neutral phosphate group, where their structure illustrated in Figure S1 uses the same color scheme (C-blue, H-yellow, N-green, O-red, P-orange) as in Figure 1.

The Figures S1, S2, and S3 suggest that these effects can change the linear-response conductance associated with individual nucleobases (Figures 2 and 3), but only by a very small amount ($\lesssim 10\%$). Thus, all fluctuations of this type in the measured signal are already encompassed by the boundaries of intervals in Figure 3(a) set by the position of the nucleobases themselves with respect to the nanopore.

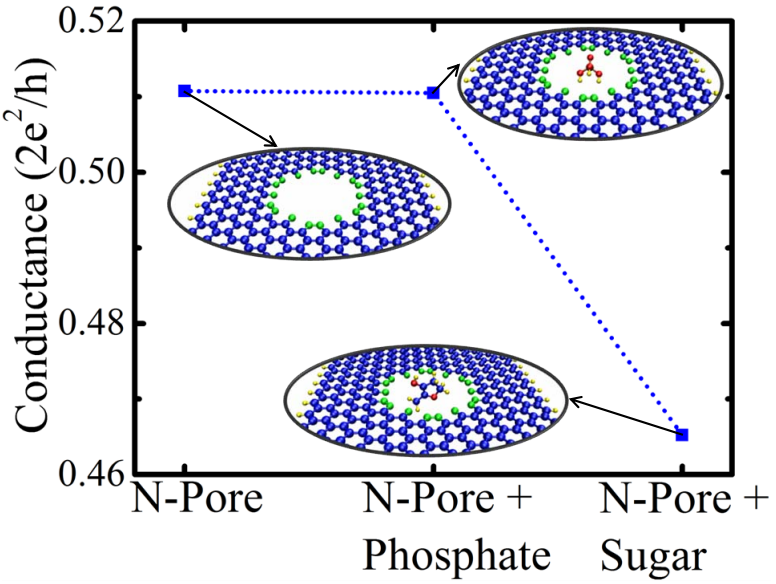

FIGURE S1. The room temperature conductance of the two-terminal 14-ZGNRs with ≈ 1.2 nm diameter N-pore which is empty, or contains isolated neutral phosphate or sugar group. All dangling bonds in the illustration of these two groups in the insets have been terminated with hydrogen atoms.

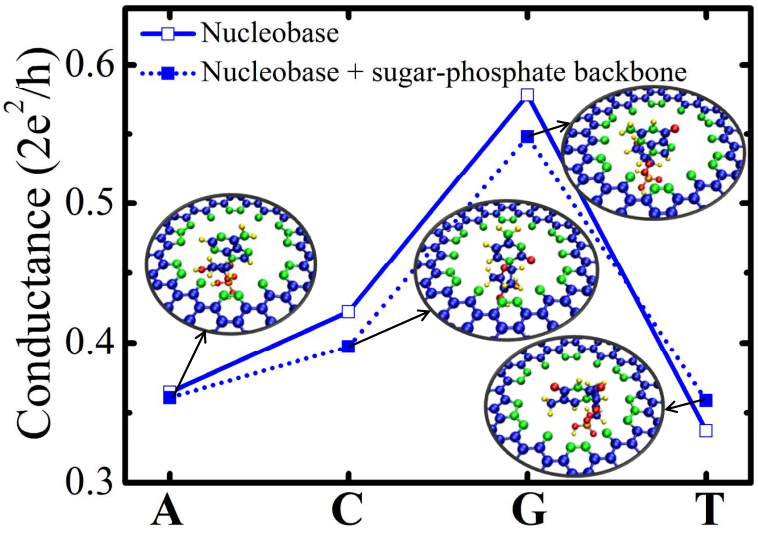

FIGURE S2. Comparison of the room temperature conductance (open squares) presented in Fig. 2(b) for DNA nucleobases inserted into the N-pore [within the yz-plane, see Figure 1 and Figure 3(e)] to the conductance (filled squares) of the nucleobases in the same orientation with respect to the nanpore after they are attached to sugar-phosphate backbone.

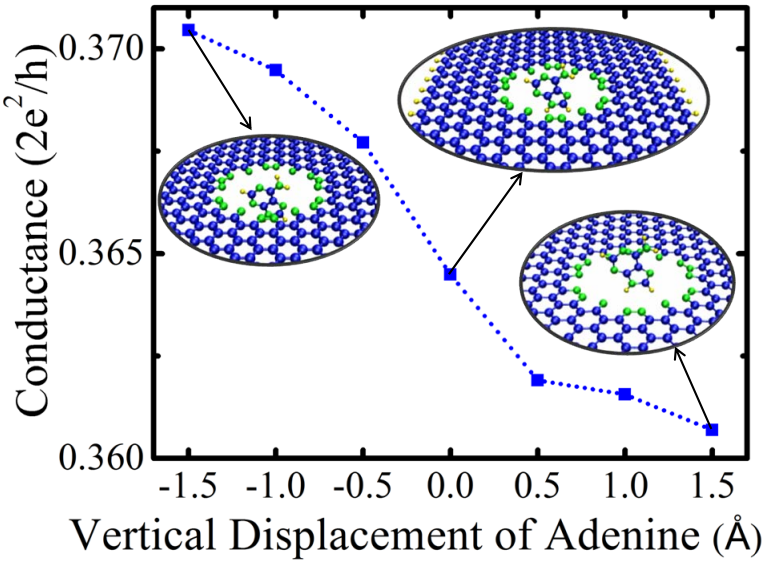

FIGURE S3. Change in the room temperature conductance of ZGNR+N-pore device caused by the Adenine nucleobase moving along the perpendicular direction (z-axis in Figure 1). The insets illustrate three (out of seven) investigated positions of Adenine which is translated both above and below the nanopore while remaining within the yz-plane (see Figure 1). The asymmetry in the conductance trace is due to the asymmetry of the structure of Adenine molecule.