Supporting Information

for

Spermine-Induced Hybridisation and Charge Inversion at the Diffuse Layer of a DNA-FET

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Field-effect transistor fabrication and instrumentation.

Starting silicon wafers had 0.8-1.4 ohm•cm resistivity. A 0.4 μm-thick oxide was thermally grown and patterned to open the source and drain areas. The FET channel is, as defined in the fotolithography mask, 5 μm long and 500 μm wide. Phosphor-doped n-type regions were formed by ion implantation. A second patterning of the oxide layer was used to remove the thick oxide from the gate area. Subsequently, a 10 nm oxide layer was grown in O_2 atmosphere at 800 ºC and a 15 nm nitride layer was deposited by LPCVD (Low Pressure Chemical Vapour Deposition). The fabrication was finished with the dry-etch opening of contact areas, deposition of a 0.5 μm aluminum layer and its wet-etch patterning. After wafer dicing, the chips were glued and wire-bonded to a printed circuit board (PCB). Encapsulation was performed by covering the PCB and the chip with a photocurable epoxy resin (Ebecryl 600, UCB Chemicals) and exposing it to UV light through a mask. The uncured polymer on top of the FET gate was removed with ethanol.

A two channel home-made amplifier was used to measure simultaneously the C and NC modified FETs as well as the differential signal. The amplifier keeps the drain current and drain to source voltage constant at 100 μA and 0.5 V, correspondingly. The amplifier output voltage is the voltage drop from the reference electrode to the source terminal. A double junction Ag/AgCl reference electrode was used. The outer solution was filled up with hybridisation buffer, in order to avoid diffusion of ions from the electrode to the solution. A KUSB3116 data acquisition module and a LabView program in a PC were used to record and store the output signals.

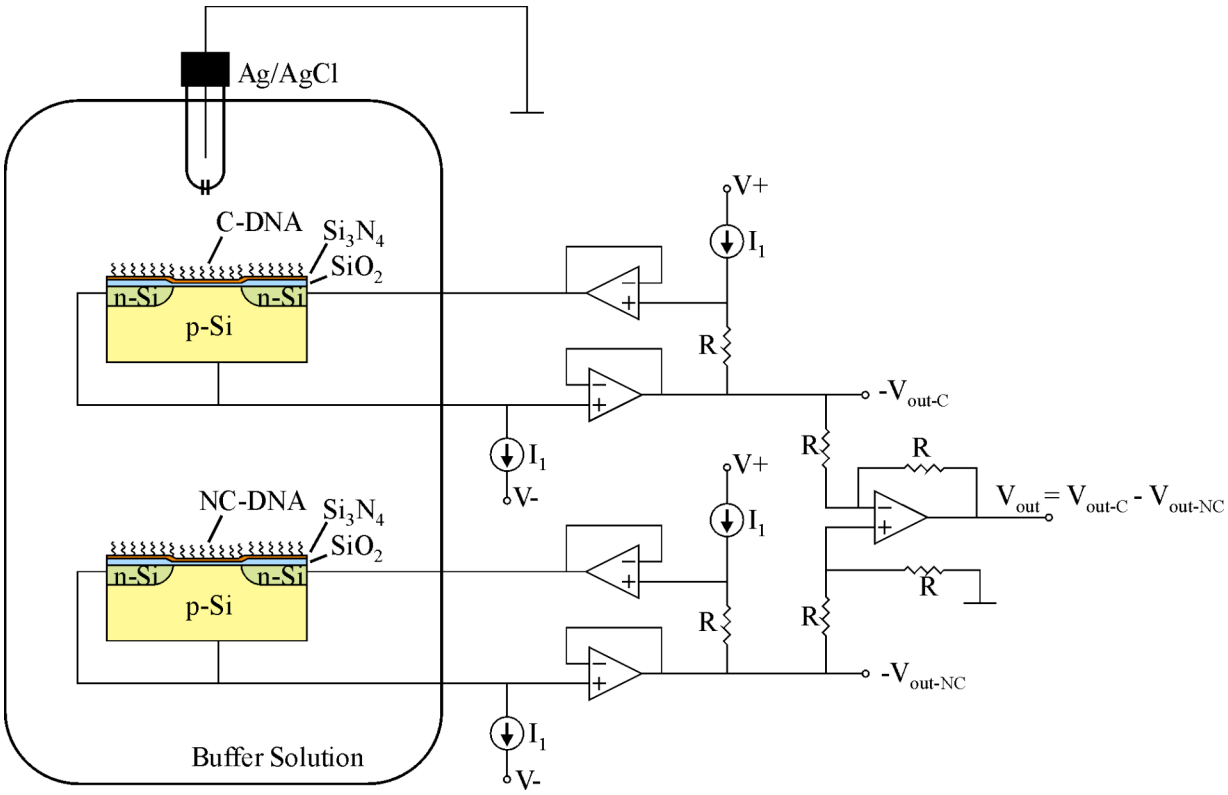

Figure S1. FET cross-section and electrical measurement set-up.