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Modification of DNA towards high conductance and transport measurements with mechanically controllable break junction electrodes SHOUPENG LIU, Department of Physics, University of Konstanz, Germany, BENJAMIN BORNEMANN, SAMUEL WEISBROD, ZHUO TANG, ANDREAS MARX, Department of Chemistry, University of Konstanz, Germany, ARTUR ERBE, ELKE SCHEER, Department of Physics, University of Konstanz, Germany, DEPARTMENT OF PHYSICS, UNIVERSITY OF KONSTANZ, GERMANY TEAM, DEPARTMENT OF CHEMISTRY, UNIVERSITY OF KONSTANZ, GERMANY TEAM — The DNA molecule is proposed to be used as building block for molecular electronic devices by virtue of its unique recognition and self-assembling properties. However, electron transport properties of DNA are still not well established mainly because poor binding between DNA and gold electrodes. Here, we synthesized new DNA samples with terminal bases modified with a thiol group on its C5 atom and protected with Me3Si for better binding with gold electrodes and better conductivity because of better electron overlap. Its transport properties were measured with mechanically controlled break junction. Conductance with a current of 700 nA in 0.25V were obtained, which is higher than most of the former reports. We also measured conductance through DNA G-quadruple instead of double-stranded structure., which shows a more stable conductance when the distance between electrodes reversibly varied over a several nm.

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