

# **Ni-DNA Nanowire Device Development and Characterization**

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## **Abstract**

DNA is a one-dimensional nanowire in nature, and its unique self-assembly is often used in the production of biosensors and nano wire templates. However, its poor electrical conductivity limits the potential of DNA in the development and application of molecular components. In this study, we use the DNA chelated by divalent nickel ions ( $\text{Ni}^{2+}$ ) at pH 8.5 to improve the conducting property of DNA.

In the result, we find that the conductances of Ni-DNAs are better than the native DNA by electrochemical analyses by cyclic voltammetry and AC impedance. Meanwhile, when two gold electrodes were connected by Ni-DNA molecules, it exhibits a negative differential resistance (NDR) behavior between each two terminals. This finding provides a highly potential for constructing electrical nano-devices from biological molecules.