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## A DNA Biosensor Based Interface States of a Metal-Insulator-Semiconductor Diode for Biotechnology Applications

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### Abstract

We studied how a DNA sensor based on the interface states of a conventional metal-insulator-semiconductor diode can be prepared for biotechnology applications. For this purpose, the p-type silicon/metal diodes were prepared using SiO<sub>2</sub> and DNA layers. The obtained results were analyzed and compared with interfaces of DNA and SiO<sub>2</sub>. It is seen that the ideality factor (1.82) of the Al/p-Si/SiO<sub>2</sub>/DNA/Ag diode is lower than that (3.31) of the Al/p-Si/SiO<sub>2</sub>/Ag diode. This indicates that the electronic performance of DNA/Si junction was better than that of SiO<sub>2</sub>/Si junction. The interface states of the Al/p-Si/SiO<sub>2</sub>/DNA/Ag and Al/p-Si/SiO<sub>2</sub>/Ag junctions were analyzed by conductance technique. The obtained D-it values indicate that the DNA layer is an effective parameter to control the interface states of the conventional Si based on metal/semiconductor contacts. Results exhibited that DNA based metal-insulator-semiconductor diode could be used as DNA sensor for biotechnology applications.

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