Multiplexed DNA-Modified Electrodes

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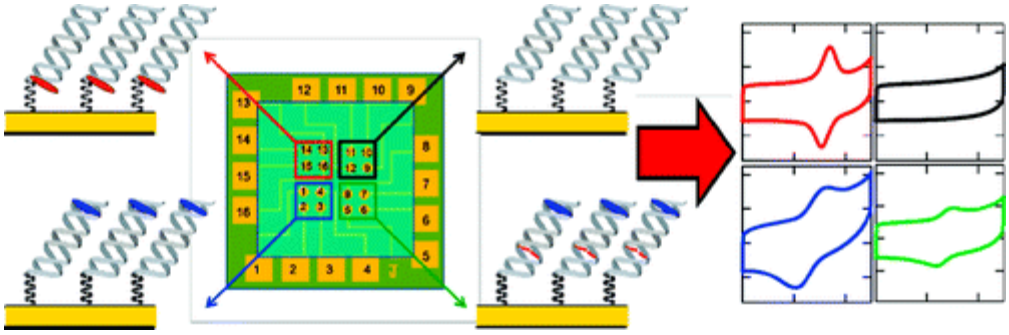
Abstract



We report the use of silicon chips with 16 DNA-modified electrodes (DME chips) utilizing DNA-mediated charge transport for multiplexed detection of DNA and DNA-binding protein targets. Four DNA sequences were simultaneously distinguished on a single DME chip with 4-fold redundancy, including one incorporating a single base mismatch. These chips also enabled investigation of the sequence-specific activity of the restriction enzyme *Alu*1. DME chips supported dense DNA monolayer formation with high reproducibility, as confirmed by statistical comparison to commercially available rod electrodes. The working electrode areas on the chips were reduced to 10 μm in diameter, revealing microelectrode behavior that is beneficial for high sensitivity and rapid kinetic analysis. These results illustrate how DME chips facilitate sensitive and selective detection of DNA and DNA-binding protein targets in a robust and internally standardized multiplexed format.

Full text (subscription may be required):
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