



## Magnetic-field stimulated DNA oxidation

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### Abstract

A reversible and cyclic magnetic-field stimulated DNA oxidation is described. Positioning an external magnet below the electrode attracts the DNA-functionalized magnetic particles to the surface, and stimulates the oxidation of the guanine nucleobases. Using a dual carbon-paste electrode assembly we demonstrate a spatially controlled DNA oxidation, with an 'ON/OFF' switching of the electron-transfer reaction upon relocating the external magnetic field. The process can be reversed and repeated upon switching the position of the magnet, with and without oxidation signals in the presence and absence of the magnetic field, respectively. We also demonstrate a 'magnetic' carbon-paste electrode, with an internal magnet, that collects the DNA-modified beads and stimulates the DNA oxidation process. The site-specific activation of the DNA oxidation holds promise for new DNA arrays and other genoelectronic applications. © 2002 Elsevier Science B.V. All rights reserved.

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