Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Migration of DNA on electrically inhomogeneous surfaces ERIC PETERSEN, Harvard College, BINGQUAN LI, VLADIMIR SAMUILOV, XIAOHUA FANG, JONATHAN SOKOLOV, MIRIAM RAFAILOVICH, Dept. of Materials Science and Engineering, Stony Brook University — Surface electrophoresis of kilo-bp DNA on electrically inhomogeneous surfaces was studied. The surfaces were produced by stamping micropatterns of gold strips onto silicon wafers using the Whitesides microcontact printing technique. Simulations of the field distribution on the surface revealed regions of very high field strength localized at the Au/Si interface. As a result, both electrophoretic and dielectrophoretic forces contribute to the movement of DNA on the surface. The mobility of DNA across the patterned surface was measured via laser induced fluorescence detection with an electric field oriented normal to the strips in the plane of the surface. The interaction of DNA with the surface was imaged with a confocal microscope in laser scanning mode with a CCD camera. Results indicate the measured mobility of DNA on a chemically micropatterned surface depends on the period size of the gold striped pattern relative to the contour length of the DNA molecule and the persistence length of the chain relative to the size of the electric field disturbance at the Au/Si interface. Consequentially, surface separation of DNA of different size and flexibility is possible.

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Date submitted: 30 Nov 2005 Electronic form version 1.4