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Dielectrophoretic collection of λ-DNA using quadruple electrodes

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Study on Deoxyribonucleic acid (DNA) using dielectrophoresis (DEP) has increased tremendously since Washizu and Asbury demonstrated the properties of DNA can be characterized using similar technique. The frequency response and increase of medium conductivities can be used to characterize the DNA molecules. In order to harness the conductivity of Lambda DNA (λ-DNA), the conduction of DNA molecules needs to be determined by DEP trapping experiments. The electrical properties of DNA molecules have been characterized by crossover frequency method. In this work a YOYO®-1 Iodide (purchased from Invitrogen Ltd UK) shows a thousand-fold increase in its green fluorescence when bound to λ-DNA. The double stranded λ-DNA with 48.5 kbp trapped at the high-field region of gold quadruple-electrodes and acting as negative DEP. To ensure the correct system functionalities the simulation of electric fields were performed. The results demonstrate positively behaved particles would be pulled to electrode tips, while negatively behaved particles push away to the regions between the electrodes.

Biography

Ahmad Sabry Mohamad is the Head of Medical Engineering Technology Department at Universiti Kuala Lumpur, Malaysia. He has completed his Ph.D. from Surrey University Centre for Biomedical Engineering in 2012. He has published in reputed journals and proceeding papers. He serves as member for IEEE Transactions on Nanobioscience and Institute of Nanotechnology (MIoN UK).

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