Abstract Submitted
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Electrothermal micromixing in 96 well plate PAUL KAUFFMANN, SOPHIE LOIRE, IGOR MEZIC, UCSB — Diagnostic and pharmacology processes could be greatly accelerated by appropriate mixing. Here electrothermal flows are explored to provide mixing of conductive physiological solutions (=1.6 S/m) in a 96 well plate. Three interdigitated electrodes provide an electric field (< 15Vpp, 1MHz) beneath each well. Polarization and conduction phenomenon of the fluid in a well will be first modeled numerically and compared to an electrical circuit model. Due to high conductivity and permittivity of the fluid, the impedance of the array of filled wells collapse dramatically (96 wells: R = 1Ohm, C=250nF). The power supply challenges accordingly raised by arrays of electrothermal micromixers will be then analyzed. The efficiency of different methods of mixing in those wells will be also compared: the addition of low frequency signal leading to AC electro-osmotic perturbations, a blinking vortices method. The experimental results will be compared to simulations.

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