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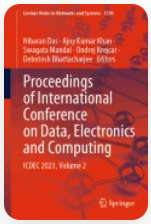

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Abstract

Paper-based Digital MicroFluidic Biochips (P-DMFBs) have proven themselves as a trustable, low-cost, and very prompt-responsive platform for different biochemical and biomedical assays. On a P-DMFB chip, patterned electrode array and control lines are printed by CNT ink on a paper with dielectric parylene-C film and hydrophobic teflon film. Here the droplets are controlled by electrowetting technology. Manufacturing of P-DMFBs is efficient and less expensive in contrast to traditional DMFBs since both the control lines and electrodes are printed on same paper with an ink-jet printer. However, the dependability of P-DMFBs can be affected by physical defects of the chip. It can become even worse due to the presence of electrodes, conductive wires, and droplet routing on the same layer, which may introduce multiple faults simultaneously. Correctness of the outcome can be directly affected if the faults are not reported in time. This may cause wastage of human resource and costly samples. Moreover, testing imposes a time-overhead on the assay completion time. In this paper, we propose a testable design to carry out online testing along with the regular operations for ensuring the reliability of subsequent operations.

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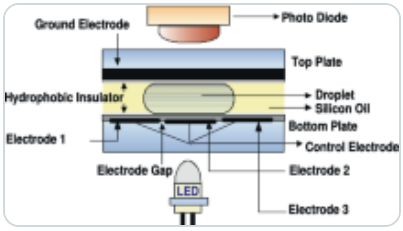

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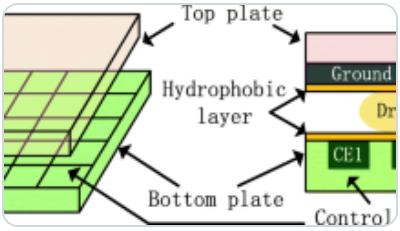

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