News & Analysis

Lab-on-a-chip tech goes reconfigurable

Lab-on-a-chip tech goes reconfigurable

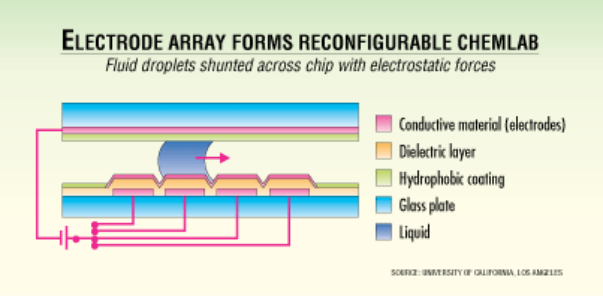
Chappell Brown
4/7/2003 02:59 PM EDT
Post a comment

NO RATINGS
LOGIN TO RATE

Hancock, N.H. - A programmable-array approach to microfluidics that promises to simplify the fast-growing area of lab-on-a-chip technology has been demonstrated at the mechanical and aerospace engineering department of the University of California, Los Angeles. Rather than carve intricate channels designed to pipe chemical solutions to reaction centers on a silicon chip, the approach being developed by Chang-Jin Kim and his colleagues at UCLA uses an electrostatic method that routes droplets through a regular array of electrodes.

The system consists of two glass plates. The top plate contains a reference conduction layer similar to a ground plane in integrated circuits. The bottom plate supports linear arrays of electrodes at right angles to one another and separated by a dielectric layer. The electrode system is then coated with a hydrophobic layer of Teflon, which causes a droplet to bunch into a discrete unit that can be shunted across the chip with a sequence of voltages.

The mechanical force driving the droplets is surface tension, which can be varied by changing the voltage on the electrode array. The UCLA team has found a way to cleave droplets from reservoirs on the edge of the chip, move them in digital increments in both east-west and north-south directions, and merge them at any given intersection on the array. The result is a software-reconfigurable microfluidics system. The desired configuration of reaction sites can be downloaded from a computer to implement a wide variety of chemical-reaction sequences.



Fluids and their chemistry pose two significant problems for

Most Recent Comments

BinaryJudy Bernard, inconspicuously sitting at his desk acting awfully innocent, went all Office Space on the printer earlier in a new kind of way. Fortunately Bob discovered it just in...

1/8/2015 8:56:11 PM

microelectromechanical-systems (MEMS) development: Surface tension becomes an overwhelming force as size scales down, and semiconductor materials such as silicon can be reactive with chemical substances. Electro-wetting-on-dielectric is one method that can solve those problems. Surface tension is used as a motive force, which turns it into a positive advantage, and the dielectric layer can take many chemically neutral forms-including UCLA's Teflon.

Kim's team will demonstrate the reconfigurable microfluidic array at the upcoming BioMEMS 2003 conference, to be held June 15-17 in San Jose, Calif. In their proposed demonstration the UCLA researchers will show how a fluidic system can be downloaded from a wireless PDA using a portable reconfigurable microfluidic system they devised.

http://www.eet.com

EMAIL THIS PRINT COMMENT

Comments

VIEW COMMENTS: **NEWEST FIRST** | OLDEST FIRST | THREADED VIEW

Be the first to post a comment regarding this story.

Cartoon Contest

November 2014 Cartoon Caption Contest: We Have a Winner!

"Herman's primping in anticipation of getting probed later. Let's just hope he uses ESD protection."

3 comments

ALL CARTOONS

Most Commented Most Popular

- 111 Just Call Me 'King of the Salad People'
- 79 How Do You Scale/Score a Scoville?
- 65 The 10 Commandments of Electronics
- 65 Mega-Cool Sound Effects Shield for Arduino
- 65 What's the Best T-Shirt for an Engineer?
- 60 Sound Effects Shield for Arduino: The ...
- 54 Startup to Open Source Parallel CPU
- 51 Tired Old iPad 2 vs. Shiny New iPad Air 2
- 44 Recommended Reads From the Engineer's ...
- 42 My Tower Computer Is Dead -- Long Live My ...