

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Electrode-based detection technique for microfluidic devices EV-GENIYA MOISEEVA, ADRIAN FLETCHER, CINDY HARNETT, University of Louisville — We report on a droplet-producing microfluidic device with electrode-based detection techniques. The microfluidic devices are made of polydimethylsiloxane (PDMS) and glass. Immiscible fluids containing the hydrophobic and hydrophilic phases are injected into the microfluidic device using syringe pumps. When a particle passes between a pair of electrodes in a medium having different electrical conductivity, the resulting impedance change signals the presence of the particle for closed-loop feedback during processing. The circuit produces a digital pulse for input into a computer control system. The detected signal can be used for evaluating droplet size, droplet shape, and droplet formation frequency. The detector also allows estimation of a droplet's arrival time at the microfluidic chip outlet for dispensing applications. Electronic feedback provides the ability to count, sort, and direct microfluidic droplets. Microelectrode-based techniques should find several applications in digital microfluidics and in three-dimensional printing technology for rapid prototyping and biotechnology.

Evgeniya Moiseeva
University of Louisville

Date submitted: 18 Nov 2009

Electronic form version 1.4