Akshaya Shanmugam, J Biosens Bioelectron 2014, 5:3
http://dx.doi.org/10.4172/2155-6210.S1.019

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Biosensors & Bioelectronics
August 11-13, 2014 Hilton San Antonio Airport, San Antonio, USA

Fabrication of an on-sensor microfluidic device to measure sample flow

Akshaya Shanmugam
University of Massachusetts, USA

Microfluidics systems offer small feature size, high sensitivity, and low cost. So, they are used with many sensors. CMOS integrated circuits have largely been the exception because of making electrical connections to the circuit and liquid connections to the microfluidic network. This paper describes techniques to integrate microfluidic systems with CMOS sensors that can be translated into production. The usefulness of this method is then demonstrated by tracking fluorescent particles flowing through a microfluidic network using an integrated CMOS sensor.

In this work, two fabrication techniques are compared for building microfluidic networks on a CMOS sensor. Conventionally, Poly(dimethylsiloxane) (PDMS) is used to make microfluidic devices on a glass substrates. In such devices, the microfluidic chamber is formed using a master, peeled off, and bonded to the glass using oxygen plasma bonder. This technique was modified by using uncured PDMS as a bonding agent for the microfluidic chamber. For the second technique, pressure sensitive adhesive (PSA) was used to make the device. The tape was patterned using a laser cutter, cleaned, and laid on the CMOS sensor. The device was sealed by placing a slab of cured PDMS on top. The performance of the devices made using these two techniques is explored in this work. After fabrication of the microfluidic on-sensor devices, microparticles were allowed to flow inside the microfluidic chambers and a video was captured by the CMOS sensor. This data was analyzed using Matlab to track the samples and determine the flow rate.

Biography

Akshaya Shanmugam received her bachelor (2009) in Electronics and Communication Engineering from Anna University, Chennai, India and her master's (2012) in Electrical Engineering from University of Massachusetts, Amherst. She is currently pursuing her PhD in electrical engineering and specializes in developing disease screening and health monitoring systems.

shanmugam@ecs.umass.edu