Docket #: S13-219

Method to regulate pressure driven flow in fluidic passages by sealing junctions via application of a phase change material

Stanford researchers have discovered a way of regulating pressure-driven flow in fluidic passages by utilizing phase change materials to seal fluidic passages. Unwanted small differences in the hydrostatic pressure in reservoirs result in unwanted pressure-driven flows in the channels, and these flows may disturb on-chip processes including chemical and biological separations and analysis. This method controls flow in a microfluidic system by adding a phase-change material at the interface between the local atmosphere and the fluid in a channel. The method does not change the hydrostatic or ionic resistance in the channel, so it does not influence separations and analysis occurring in the channel. The method is also compatible with electrode reactions at the sealed reservoir.

Applications

- Microfluidic devices

Advantages

- Conditions within channels of a microfluidic system are not changed by the presence of the phase change material, and this ensures that separations and/or analyses are unaffected by this approach for preventing pressure driven fluid flow.
- Allows the material introduced to quickly take the shape of the input/output node region prior to phase change.

- Versatile and can accommodate a wide variety of sizes and shapes of input/output nodes.
- Enables rapid and conformal sealing of input/output nodes, including reservoirs integrated with electrodes.
- Process can be reversible.

Patents

- Published Application: 20150037784
- Issued: 11,325,123 (USA)

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