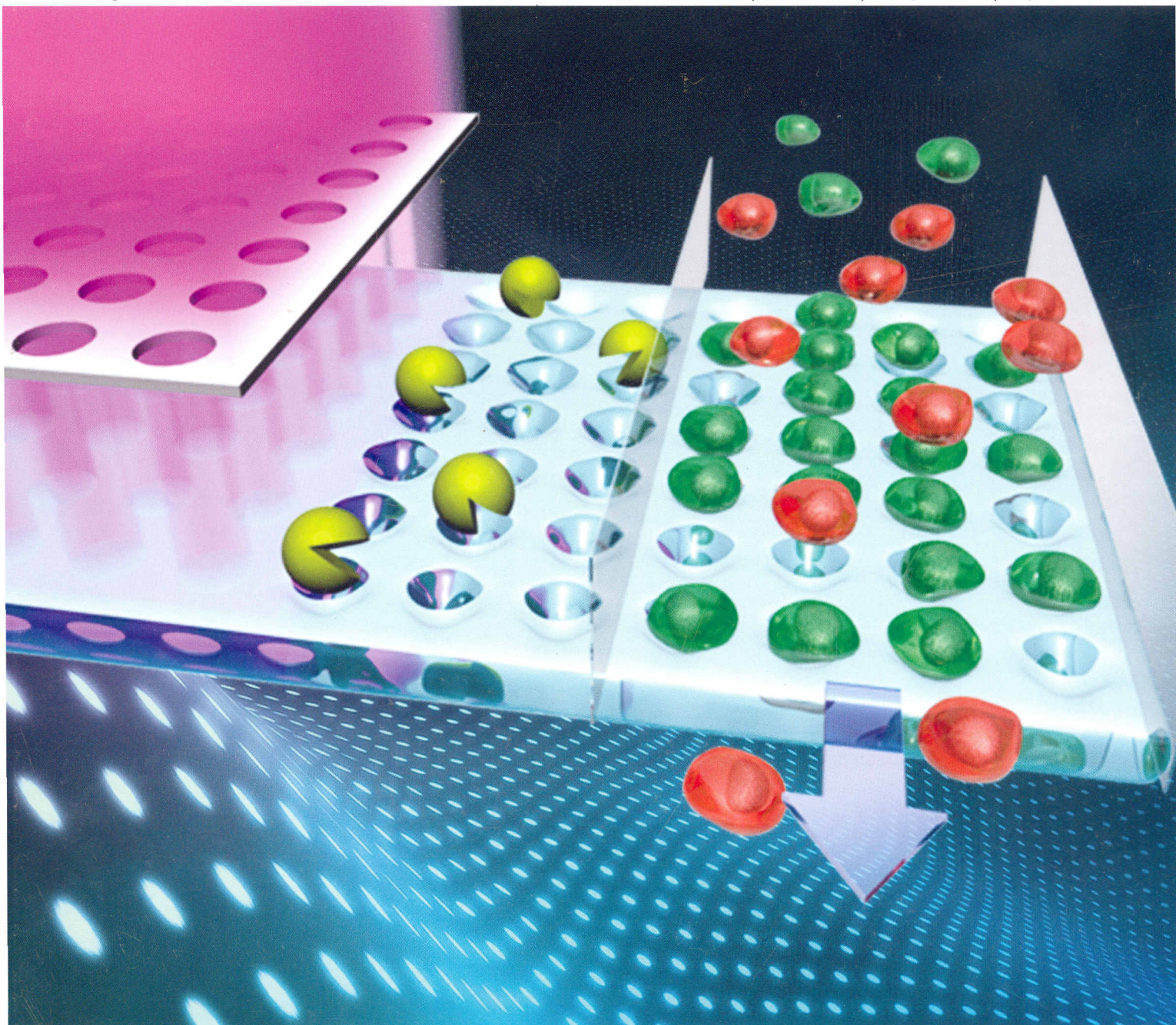


Lab on a Chip

Micro- & nano- fluidic research for chemistry, physics, biology, & bioengineering

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RSC Publishing

Gu and Tang
Enzyme-assisted photolithography

Battaglia
Continuous production of
polymersomes



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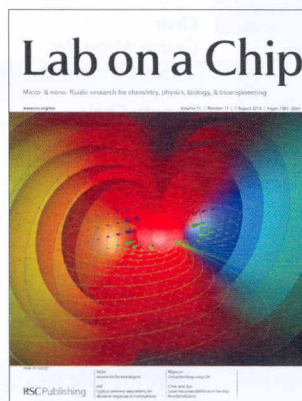
ISSN 1473-0197 CODEN LCAHAM 10(15) 1881–2004 (2010)



Cover

See Gu and Tang, pp. 1946–1951. Enzyme-assisted photolithography can create well-defined topography and desired chemical modifications for hydrogels in a high-throughput fashion.

Image reproduced by permission of Zhen Gu and Yi Tang from *Lab Chip*, 2010, **10**, 1946.



Inside cover

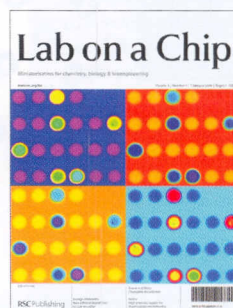
See Hill *et al.*, pp. 1907–1921. Optical tweezers velocimetry furnishes spatially and temporally resolved electro-osmotic flows and micro-sphere dynamics in compliant micro-channels at frequencies up to 50 kHz. Image reproduced by permission of Jan A. van Heiningen, Aliasghar Mohammadi and Reghan J. Hill from *Lab Chip*, 2010, **10**, 1907.

EDITORIAL

1891

Introducing LOC: Art on a Chip

Albert Folch introduces a new LOC website for sharing artistic images and photographs.



HIGHLIGHT

1892

Research Highlights

Petra S. Dittrich*

Petra Dittrich reviews the current literature in miniaturisation and related technologies.



1894

One size fits all?

Holger Becker*

Holger Becker discusses standards and standardization—part of a series of Focus articles on the commercialization of microfluidics.



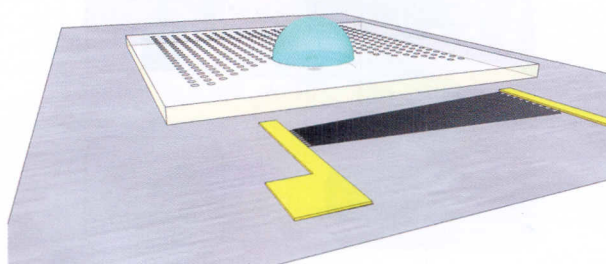
COMMUNICATIONS

1898

Tuneable surface acoustic waves for fluid and particle manipulations on disposable chips

Yannyk Bourquin, Julien Reboud, Rab Wilson and Jonathan M. Cooper*

We establish a powerful new acoustic technique to programme complex fluidic functions such as droplet movement, merging, mixing and concentration, on a disposable superstrate.

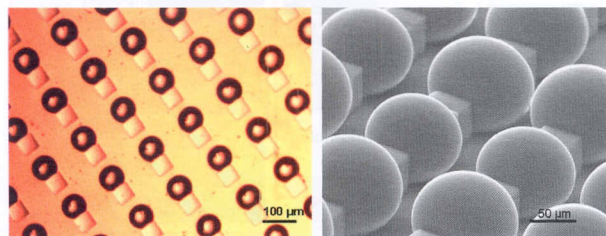


1902

Template assisted highly ordered novel self assembly of micro-reservoirs and its replication

Santosh L. Hire, Manjusha V. Shelke,* Vinayak S. Kale, Elisabeth Galopin, Mohan G. Kulkarni, Rabah Boukherroub and Satishchandra B. Ogale*

A novel method is developed for template assisted fabrication of a regular assembly of microcavity arrays. Simple micropatterns on PDMS mold are used to create complex geometries *via* solvent vapor back pressure in a biodegradable polymer. Cavities are in turn replicated in complimentary PDMS mushroom like microstructures.



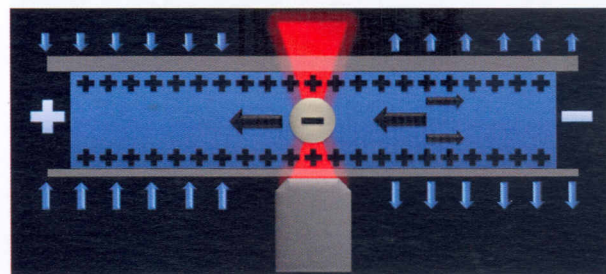
PAPERS

1907

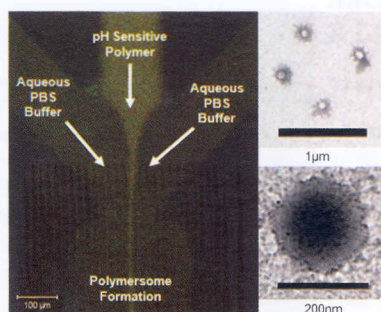
Dynamic electrical response of colloidal micro-spheres in compliant micro-channels from optical tweezers velocimetry

Jan A. van Heiningen, Aliasghar Mohammadi and Reghan J. Hill*

Using optical tweezers, we measure the dynamic electrical response of silica micro-spheres in parallel-plate micro-channels at frequencies up to 50 kHz. Anomalous dynamics are resolved by integrating a single complex-valued micro-channel compliance parameter into the classical theory of electro-osmotic flow.



1922

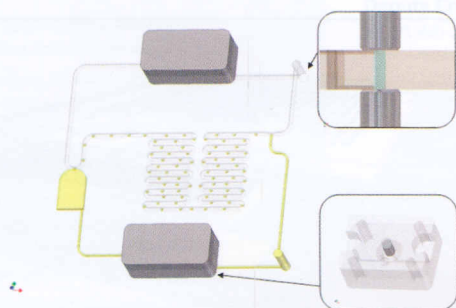


Polymersome production on a microfluidic platform using pH sensitive block copolymers

Luke Brown, Sally L. McArthur, Phillip C. Wright, Andrew Lewis and Giuseppe Battaglia*

Polymersomes suitable for biological applications, such as intracellular delivery vehicles for drugs or DNA, have been continuously produced on a microfluidic device without the use of organic solvents through the self-assembly of pH sensitive block copolymers.

1929

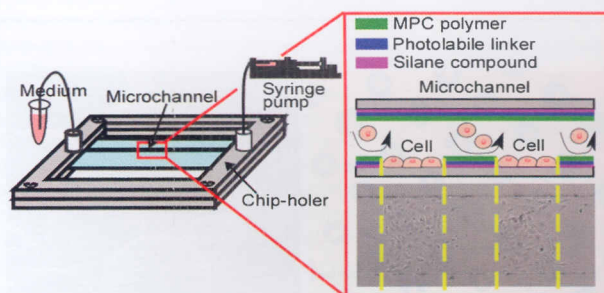


Continuous two-phase flow miniaturised bioreactor for monitoring anaerobic biocatalysis by pentaerythritol tetranitrate reductase

Stephan Mohr,* Karl Fisher, Nigel S. Scrutton, Nick J. Goddard and Peter R. Fielden

A recirculating two-phase flow miniaturised bioreactor was developed for biocatalytic transformations using a novel phase separation technique that uses electrostatic attraction, thus allowing the monitoring of both reaction phases during enzymatic turnover.

1937

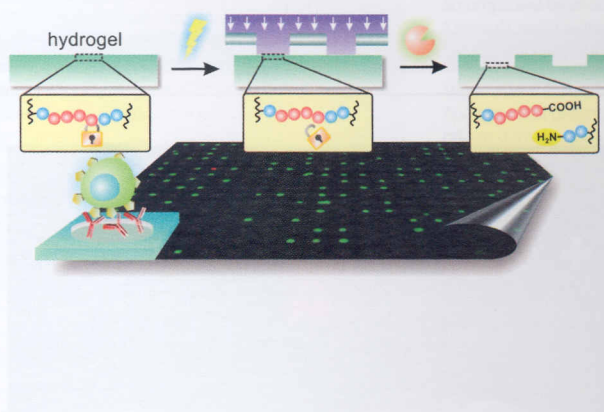


An efficient surface modification using 2-methacryloyloxyethyl phosphorylcholine to control cell attachment *via* photochemical reaction in a microchannel

Kihoon Jang, Kae Sato, Yo Tanaka, Yan Xu, Moritoshi Sato, Takahiro Nakajima, Kazuma Mawatari, Tomohiro Konno, Kazuhiko Ishihara and Takehiko Kitamori

A simple and direct approach for cell patterning inside the microchannel using photochemical reaction.

1946



Enzyme-assisted photolithography for spatial functionalization of hydrogels

Zhen Gu* and Yi Tang*

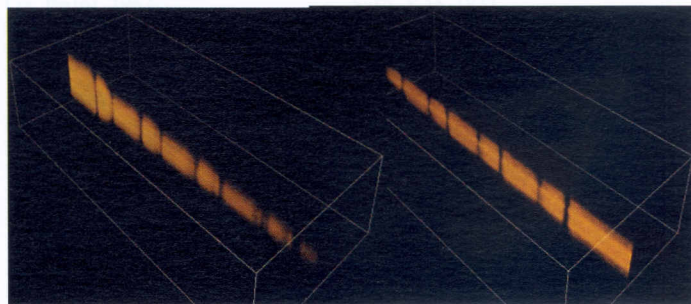
A new patterning strategy: enzyme-assisted photolithography (EAPL) has been developed. By synergistic actions of UV irradiation and enzyme digestion, EAPL can create hydrogels with well-defined topography and desired chemical modifications.

1952

Dynamic reversibility of hydrodynamic focusing for recycling sheath fluid

Nastaran Hashemi, Peter B. Howell, Jr., Jeffrey S. Erickson, Joel P. Golden and Frances S. Ligler*

The reversibility of hydrodynamic focusing adds additional capabilities to an analytical device. Hydrodynamic focusing is utilized to encircle a sample stream completely with a sheath fluid, reduce the diameter of the sample stream (as for cytometry), and then reverse the process both to recapture sample components with minimal dilution and to recycle the sheath fluid.

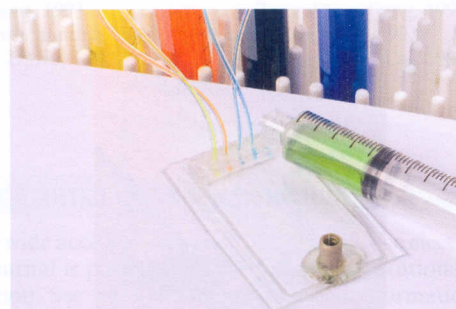


1960

A simple method for the evaluation of microfluidic architecture using flow quantitation via a multiplexed fluidic resistance measurement

Daniel C. Leslie, Brett A. Melnikoff, Daniel J. Marchiarullo, Devin R. Cash, Jerome P. Ferrance and James P. Landers*

We present a multiplexed flow measurement method using visible dyes to rapidly determine post-fabrication device quality.

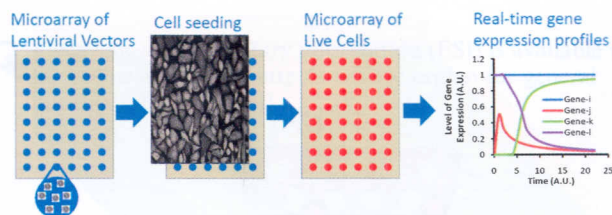


1967

Lentiviral microarrays for real-time monitoring of gene expression dynamics

Jun Tian, Stella Alimperti, Pedro Lei and Stelios T. Andreadis*

Using lentiviral microarrays (LVA) to monitor real-time gene expression.

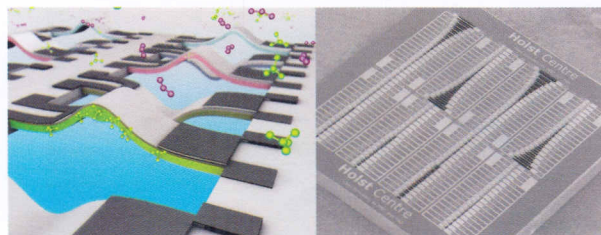


1976

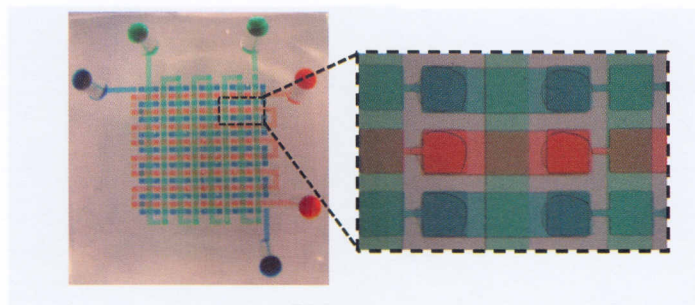
Enhanced sensitivity volatile detection with low power integrated micromechanical resonators

Devrez M. Karabacak,* Sywert H. Brongersma and Mercedes Crego-Calama

Polymer coated, very high aspect ratio doubly clamped beam resonators with integrated transducers are demonstrated for ultra-low power, high sensitivity detection of volatile compounds.



1983

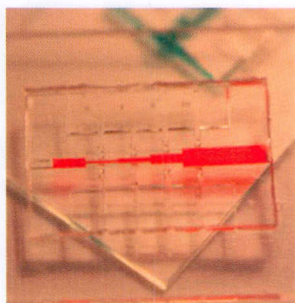


Simultaneous fabrication of PDMS through-holes for three-dimensional microfluidic applications

Bobak Mosadegh, Mayank Agarwal, Yu-suke Torisawa and Shuichi Takayama*

We describe a simple yet efficient approach to simultaneously make through-holes of various sizes in a bound polydimethylsiloxane membrane for use in 3D microfluidic applications.

1987

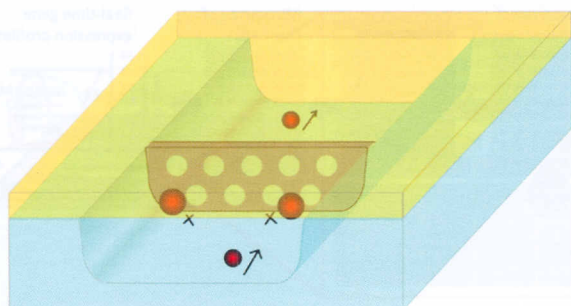


Monolithic PDMS passband filters for fluorescence detection

Andreu Llobera, Stefanie Demming, Haakan N. Joensson, J. Vila-Planas, Helene Andersson-Svahn and Stephanus Büttgenbach

Low-cost monolithically integrated ink dyed poly(dimethylsiloxane) (PDMS) filters without showing either temporal ageing or autofluorescence, are presented. The fabrication process based on capillary forces allows PDMS coloration of arbitrary shapes.

1993

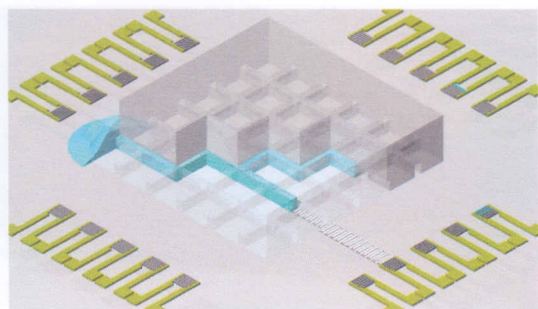


Embellishment of microfluidic devices *via* femtosecond laser micromanofabrication for chip functionalization

Juan Wang, Yan He, Hong Xia, Li-Gang Niu, Ran Zhang, Qi-Dai Chen,* Yong-Lai Zhang, Yan-Feng Li, Shao-Jiang Zeng, Jian-Hua Qin, Bing-Cheng Lin and Hong-Bo Sun*

We demonstrate a novel post-embellishment strategy for appending extra functions on traditional microfluidic channels *via* femtosecond laser micromanofabrications.

1997



Surface-acoustic-wave counterflow micropumps for on-chip liquid motion control in two-dimensional microchannel arrays

Luca Masini, Marco Cecchini,* Salvatore Girardo, Roberto Cingolani, Dario Pisignano and Fabio Beltram

Fully controlled liquid injection and flow in hydrophobic polydimethylsiloxane (PDMS) two-dimensional microchannel arrays based on on-chip integrated, low-voltage-driven micropumps are demonstrated. Our architecture exploits the surface-acoustic-wave (SAW) induced counterflow mechanism.