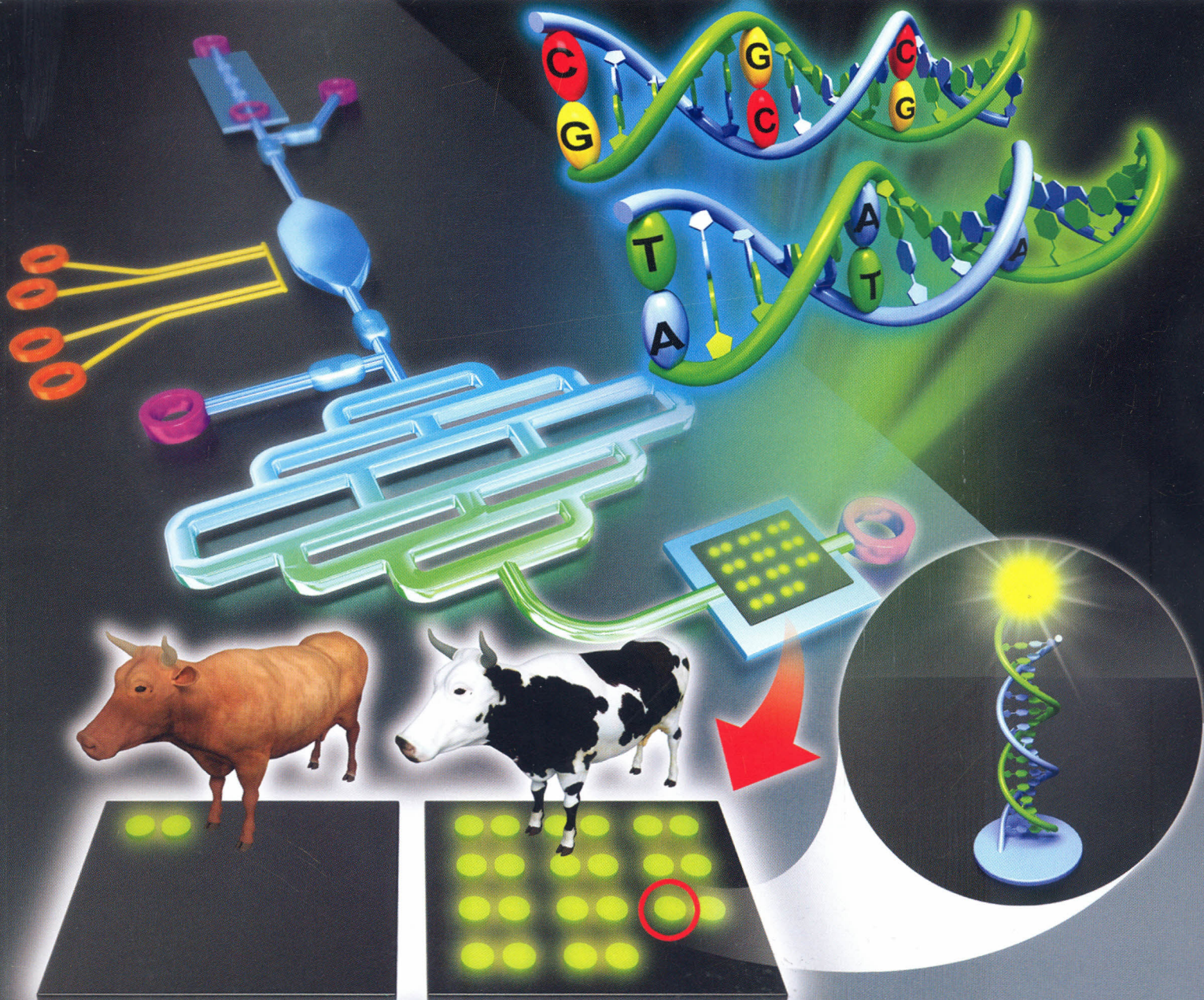


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PAPER

Tae Seok Seo *et al.*

An integrated allele-specific polymerase chain reaction-microarray chip for multiplex single nucleotide polymorphism typing



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See Tae Seok Seo *et al.*, pp. 5146–5154. Image reproduced by permission of Tae Seok Seo from *Lab Chip*, 2012, 12, 5146.



Inside cover
See Toru Ide, Shoji Takeuchi *et al.*, pp. 5155–5159. Image reproduced by permission of Shoji Takeuchi from *Lab Chip*, 2012, 12, 5155.

HIGHLIGHT

5127

Research Highlights

Šeila Selimović, Mehmet R. Dokmeci and Ali Khademhosseini*

Nanoscale ELISA for TB detection – Managing big data *via* crowd-sourced BioGames – Optically controlled *in vitro* muscles.



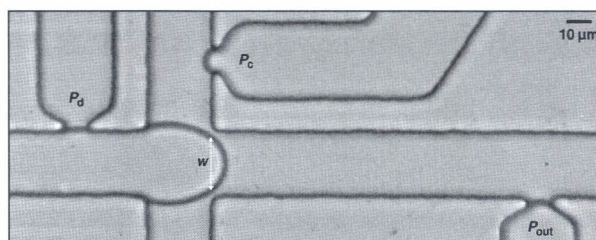
COMMUNICATIONS

5130

Flow focusing geometry generates droplets through a plug and squeeze mechanism

Philip A. Romero and Adam R. Abate*

We experimentally measure the channel pressures in a flow focus drop maker, and show that, for the flow rates that are most commonly used, the drop formation process is dominated by interfacial stresses and proceeds through a plug and squeeze mechanism.

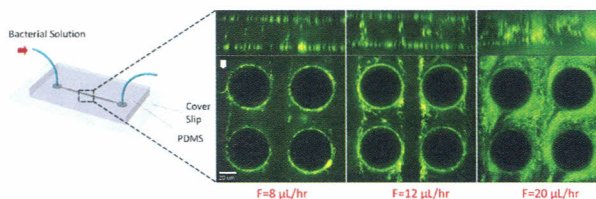


5133

A web of streamers: biofilm formation in a porous microfluidic device

Amin Valiei, Alope Kumar,* Partha P. Mukherjee, Yang Liu and Thomas Thundat*

Microbial streamer formation in a microfluidic porous medium is investigated. We show that hydrodynamics plays an important role in their formation.



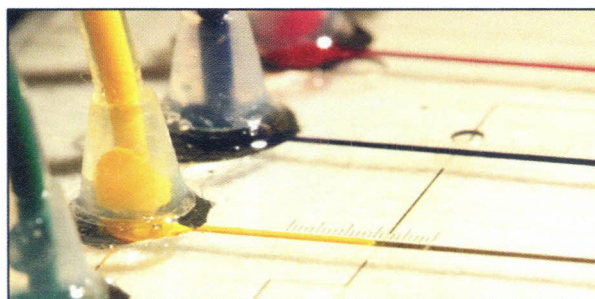
TECHNICAL INNOVATIONS

5138

Deterministic splitting of fluid volumes in electrowetting microfluidics

Ananda Banerjee, Yuguang Liu, Jason Heikenfeld and Ian Papautsky*

We introduce a new approach for accurate dispensing of sample volumes (< 1% variation) in electrowetting microfluidics by ramping potential at the splitting electrode.

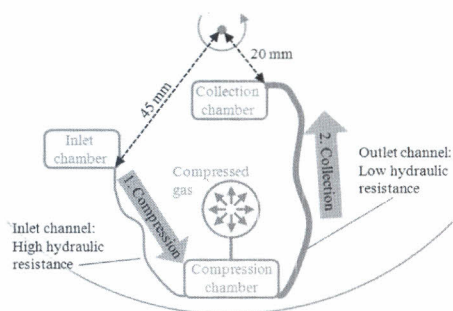


5142

Centrifugo-dynamic inward pumping of liquids on a centrifugal microfluidic platform

Steffen Zehnle,* Frank Schwemmer, Günter Roth, Felix von Stetten, Roland Zengerle and Nils Paust

We present a method to pump liquids radially inwards in a centrifugal microfluidic disk, actuated by centrifugation, only.



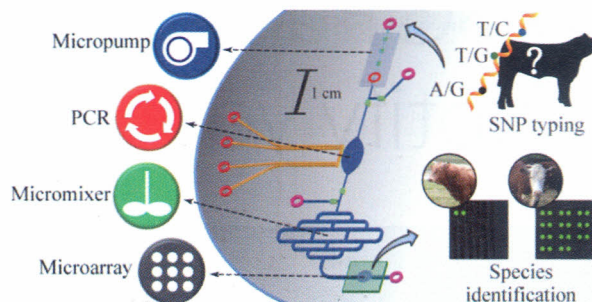
PAPERS

5146

An integrated allele-specific polymerase chain reaction-microarray chip for multiplex single nucleotide polymorphism typing

Jong Young Choi, Yong Tae Kim, Ju-Young Byun, Jinwoo Ahn, Soyi Chung, Dae-Gab Gweon, Min-Gon Kim and Tae Seok Seo*

A portable integrated allele-specific polymerase chain reaction and microarray device has been developed for multiplex single nucleotide polymorphism genotyping to identify animal species.

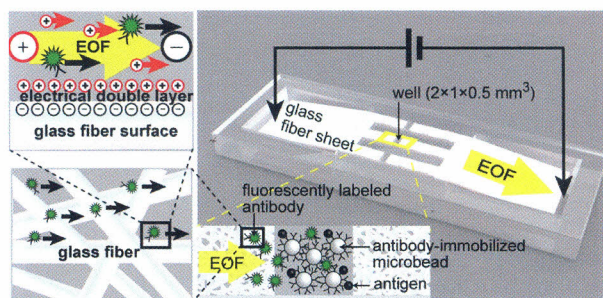


5155

A glass fiber sheet-based electroosmotic lateral flow immunoassay for point-of-care testing

Yuriko Oyama, Toshihisa Osaki, Koki Kamiya, Ryuji Kawano, Tsutomu Honjoh, Haruki Shibata, Toru Ide* and Shoji Takeuchi*

We have developed a quantitative immunoassay chip targeting point-of-care testing. Bound/free separation functionality was introduced by an electroosmotic flow moving through the matrix of a glass fiber sheet.

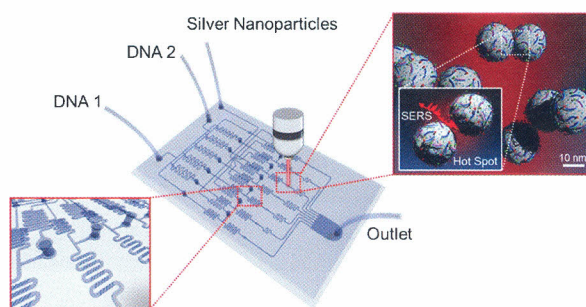


5160

Simultaneous detection of duplex DNA oligonucleotides using a SERS-based micro-network gradient chip

Namhyun Choi, Kangsun Lee, Dong Woo Lim, Eun Kyu Lee, Soo-Ik Chang, Kwang W. Oh* and Jaebum Choo*

We report a programmable SERS-based micro-network gradient platform to simultaneously detect two different DNA oligomer mixtures.

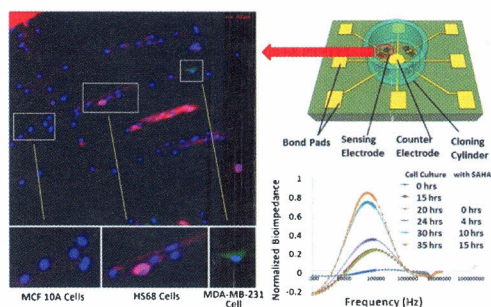


5168

Bioimpedance rise in response to histone deacetylase inhibitor is a marker of mammary cancer cells within a mixed culture of normal breast cells

Vaishnavi Srinivasaraghavan, Jeannine Strobl and Masoud Agah*

Detection of breast cancer cells in a background of normal epithelial and fibroblast cells using bioimpedance spectroscopy.

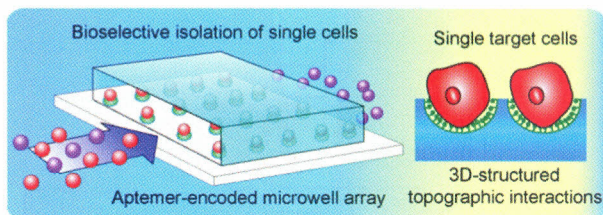


5180

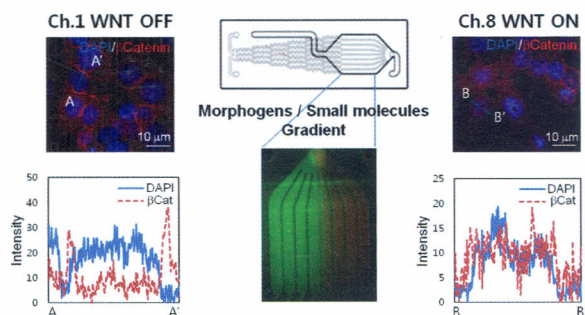
Targeted isolation and analysis of single tumor cells with aptamer-encoded microwell array on microfluidic device

Qiushui Chen, Jing Wu, Yandong Zhang, Zhen Lin and Jin-Ming Lin*

A novel microfluidic platform integrated with cell-recognizable aptamer-encoded microwells was specifically developed for single cells analysis with unique bioselectivity.



5186

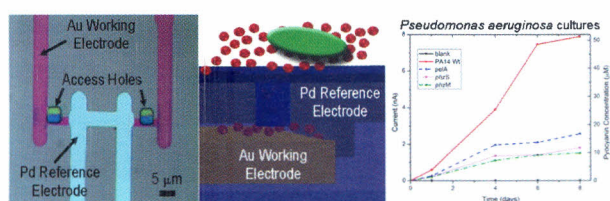


Diffusion- and convection-based activation of Wnt/ β -catenin signaling in a gradient generating microfluidic chip

Chorong Kim, Kristina Kreppenhof, Jubin Kashef, Dietmar Gradl, Dirk Herrmann, Marc Schneider, Ralf Ahrens, Andreas Guber and Doris Wedlich*

A highly flexible two-chambered microfluidic chip design, which allows simultaneous application and switching of two opposite morphogen gradients, and conversion from convection to diffusion mode, is presented.

5195

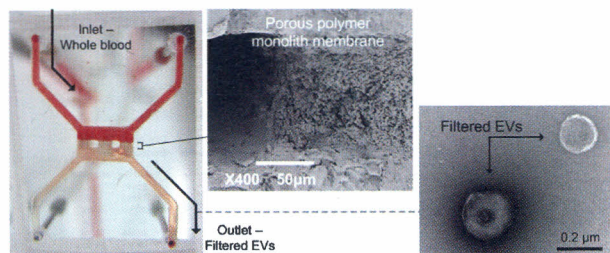


Electrochemical detection of pyocyanin in nanochannels with integrated palladium hydride reference electrodes

Thaddaeus A. Webster and Edgar D. Goluch*

A microfabricated palladium hydride reference electrode was integrated with a working electrode inside of a nanofluidic cavity. The reliability and applicability of the sensor was demonstrated by monitoring the production of a toxin, pyocyanin, by *Pseudomonas aeruginosa* cultures over the course of several days.

5202

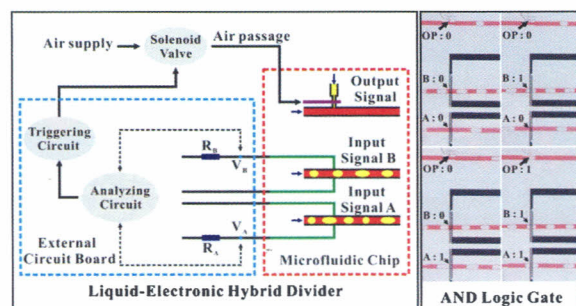


Microfluidic filtration system to isolate extracellular vesicles from blood

Ryan T. Davies, Junho Kim, Su Chul Jang, Eun-Jeong Choi, Yong Song Gho and Jaesung Park*

We introduce a microfluidic filtration approach to purify extracellular vesicles directly from whole blood rapidly and without using a centrifuge.

5211



Universal logic gates via liquid-electronic hybrid divider

Bingpu Zhou, Limu Wang, Shunbo Li, Xiang Wang, Yu Sanna Hui and Weijia Wen*

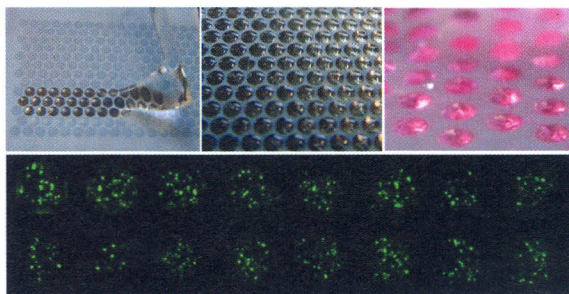
We present 16 functional universal logic gates constructed using a simple structure with a liquid-electronic hybrid divider serving as a building block.

5218

DropletMicroarray: facile formation of arrays of microdroplets and hydrogel micropads for cell screening applications

Erica Ueda, Florian L. Geyer, Victoria Nedashkivska and Pavel A. Levkin*

Facile formation of high-density arrays of separated microdroplets or hydrogel micropads on superhydrophilic–superhydrophobic patterned surfaces for high-throughput screening applications.

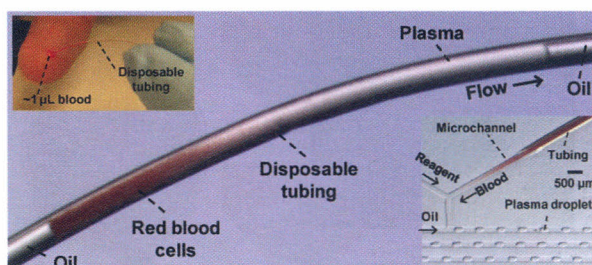


5225

Blood plasma separation in a long two-phase plug flowing through disposable tubing

Meng Sun, Zeina S. Khan and Siva A. Vanapalli*

We report a simple technique to separate plasma in a flowing blood plug for point-of-care (POC) diagnostic testing of biomarkers.

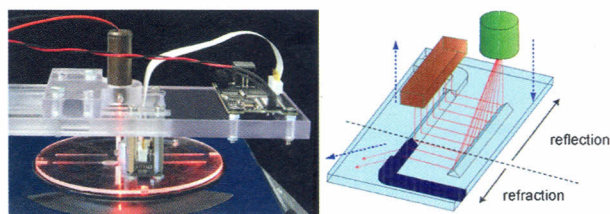


5231

Optical non-contact localization of liquid-gas interfaces on disk during rotation for measuring flow rates and viscosities

Jochen Hoffmann, Lutz Riegger,* Frederik Bundgaard, Daniel Mark, Roland Zengerle and Jens Dürer

By a novel TIR-based measurement system, bubbles, flow-rates, and viscosities are monitored on a rotating microfluidic platform.

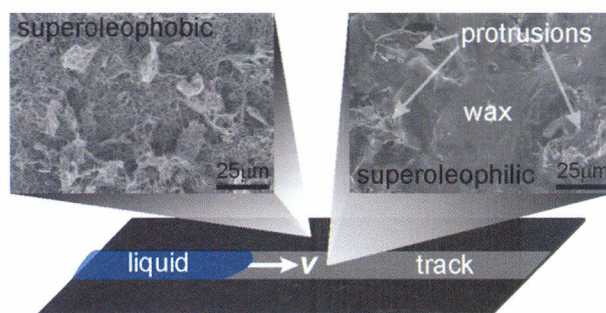


5237

Surface tension confined (STC) tracks for capillary-driven transport of low surface tension liquids

Thomas M. Schutzius, Mohamed Elsharkawy, Manish K. Tiwari and Constantine M. Megaridis*

Superoleophilic tracks on superoleophobic surfaces transported low-surface tension liquids with capillary speeds up to 3.1 cm s^{-1} .

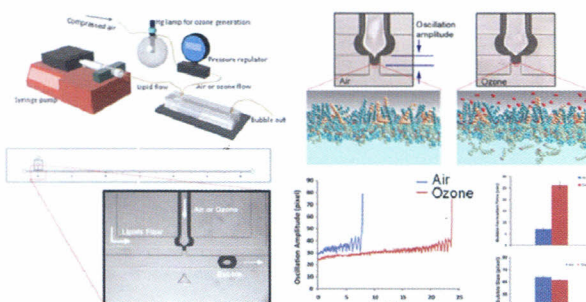


5243

A microfluidic-based bubble generation platform enables analysis of physical property change in phospholipid surfactant layers by interfacial ozone reaction

Young Shik Shin, Tae Su Choi, Hyungjun Kim,
J. L. Beauchamp, James R. Heath and Hugh I. Kim*

The pulmonary surfactant system, a representative biological system with an air–liquid interface, is studied under oxidative stress through the oscillatory behavior of the monolayer, as well as the size and formation time of microbubbles generated in a microfluidic device.

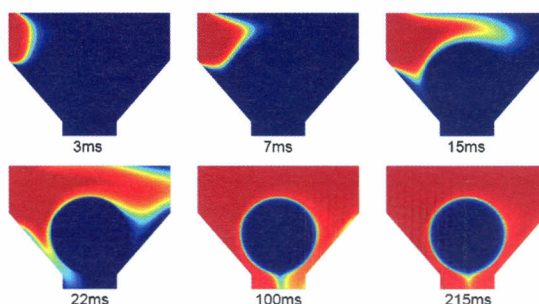


5249

Effects of sample delivery on analyte capture in porous bead sensors

Jie Chou, Luanyi E. Li, Eliona Kulla,
Nicolao Christodoulides, Pierre N. Floriano and
John T. McDevitt

This work investigates the parameters of transport, such as rate, volume, and time in sample delivery for porous, bead-based assays.

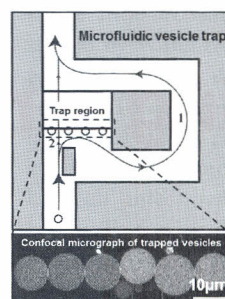


5257

Microfluidic trap-and-release system for lab-on-a-chip-based studies on giant vesicles

Hermann Nuss, Corinne Chevillard, Patrick Guenoun and
Florent Malloggi

We present a microfluidic array that allows lab-on-a-chip-based studies on hundreds of giant vesicles through immobilization, engineering and release of the vesicles. Real-time observations of the vesicular response are reported. This trap-and-release system is also used to efficiently narrow the size distribution of the vesicle population. In addition, it can be applied to a wide range of deformable objects.

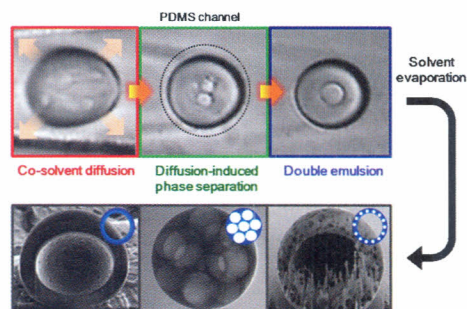


5262

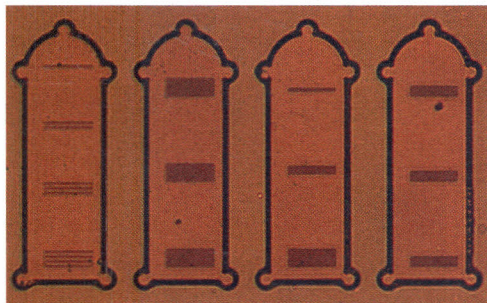
Microfluidic synthesis of atto-liter scale double emulsions toward ultrafine hollow silica spheres with hierarchical pore networks

Woong-Chan Jeong, Minkee Choi, Che Ho Lim and
Seung-Man Yang*

We demonstrate the generation of submicrometer-scale double emulsions and hollow mesoporous silica particles through the diffusive phase separation of single emulsions.



5272



Magnetically labelled gold and epoxy bi-functional microcarriers for suspension based bioassay technologies

Kunal N. Vyas,* Justin J. Palfreyman, David M. Love, Thanos Mitrelias and Crispin H. W. Barnes

We present the fabrication of rewritable labelled microcarriers showing independent functionalization of two surfaces and magnetic detection of the label.

ADDITIONS AND CORRECTIONS

5279

Additions and corrections for 2012

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