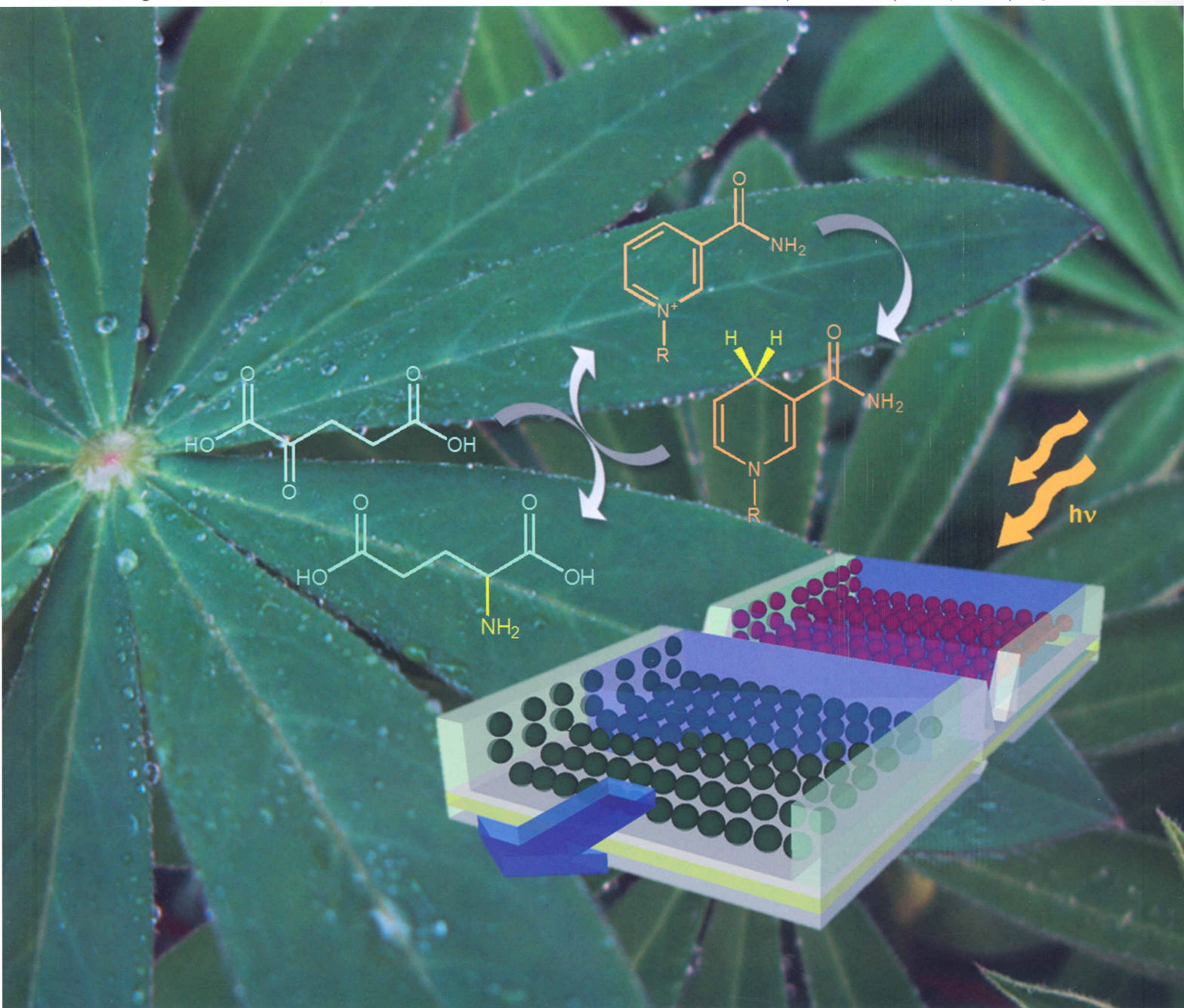


Lab on a Chip

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COMMUNICATION

Chan Beum Park *et al.*

Artificial photosynthesis on a chip: microfluidic cofactor regeneration and photoenzymatic synthesis under visible light



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See Chan Beum Park *et al.*, pp. 2309–2311.
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Inside cover

See Tony Jun Huang *et al.*, pp. 2319–2324.
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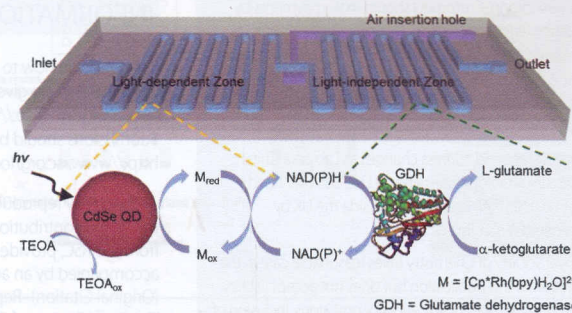
COMMUNICATIONS

2309

Artificial photosynthesis on a chip: microfluidic cofactor regeneration and photoenzymatic synthesis under visible light

Joon Seok Lee, Sahng Ha Lee, Jae Hong Kim and Chan Beum Park*

We present a microfluidic artificial photosynthetic platform that incorporates quantum dots and redox enzymes for photoenzymatic synthesis of fine chemicals under visible light.

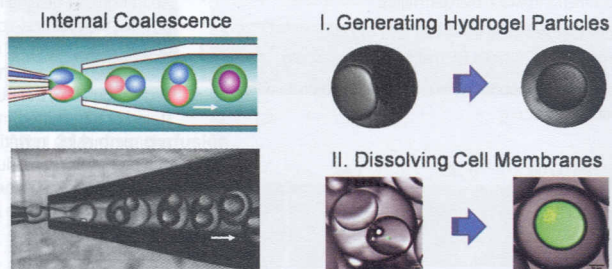


2312

Reactions in double emulsions by flow-controlled coalescence of encapsulated drops

Haosheng Chen, Yuanjin Zhao, Jiang Li,* Ming Guo, Jiandi Wan, David A. Weitz and Howard A. Stone*

We present flow-controlled coalescence inside double emulsion droplets, and demonstrate applications of such drops as reactors by (i) fabricating hydrogel particles and (ii) dissolving cell membranes.

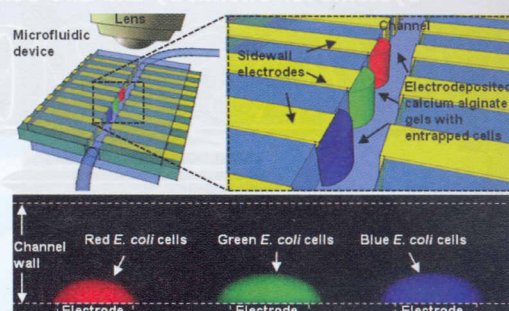


2316

Biocompatible multi-address 3D cell assembly in microfluidic devices using spatially programmable gel formation

Yi Cheng, Xiaolong Luo, Chen-Yu Tsao, Hsuan-Chen Wu, Jordan Betz, Gregory F. Payne, William E. Bentley and Gary W. Rubloff*

We report biocompatible, electroaddressable 3D cell assembly in microfluidic devices using spatially programmable gel formation.



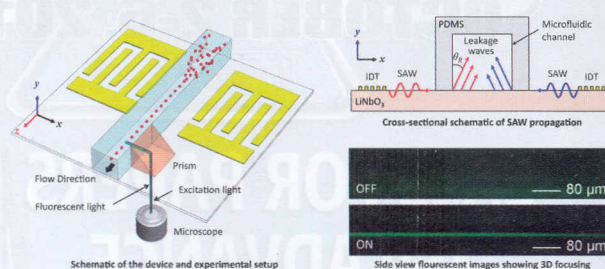
PAPERS

2319

Three-dimensional continuous particle focusing in a microfluidic channel *via* standing surface acoustic waves (SSAW)

Jinjie Shi, Shahrzad Yazdi, Sz-Chin Steven Lin, Xiaoyun Ding, I-Kao Chiang, Kendra Sharp and Tony Jun Huang*

A standing surface acoustic wave (SSAW) based particle manipulation technique enables the three-dimensional (3D) continuous microparticle focusing in a single-layer planar microfluidic channel.

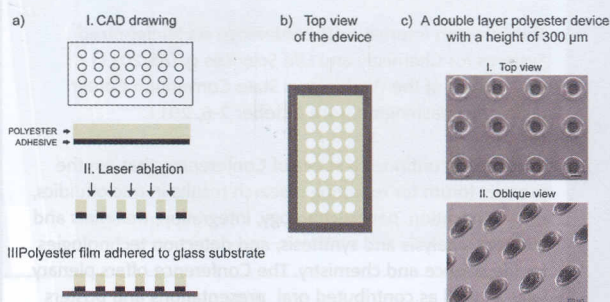


2325

Microfabricated polyester conical microwells for cell culture applications

Šeila Selimović, Francesco Piraino, Hojae Bae, Marco Rasponi, Alberto Redaelli and Ali Khademhosseini*

Simple and inexpensive fabrication of a polyester microwell platform *via* laser ablation.

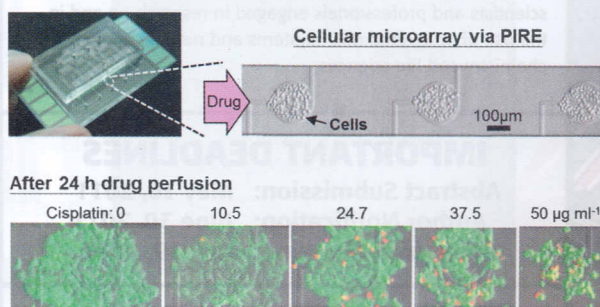


2333

Dielectrophoresis-based cellular microarray chip for anticancer drug screening in perfusion microenvironments

Lo-Chang Hsiung, Chi-Ling Chiang, Chen-Ho Wang, Yu-Hsu Huang, Ching-Te Kuo, Ji-Yen Cheng, Ching-Hung Lin, Victoria Wu, Hsien-Yeh Chou, De-Shien Jong, Hsin-yu Lee* and Andrew M. Wo*

Anticancer drug screening *via* planar interdigitated ring electrodes and valve-assisted flow stabilization in cellular microarray chip.

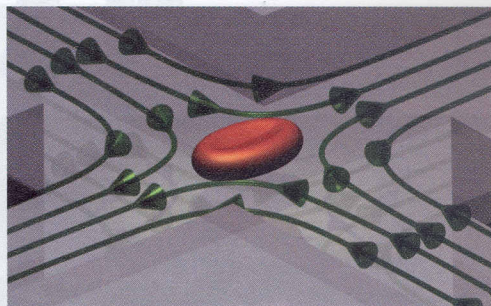


2343

Feedback control system simulator for the control of biological cells in microfluidic cross slots and integrated microfluidic systems

Michael D. Curtis, Gregory J. Sheard and Andreas Fouras*

We have developed a fast, efficient simulation method for modelling the control of cells in microfluidic devices. Using this method, control systems can be developed for new kinds of sophisticated microfluidic devices with active feedback.

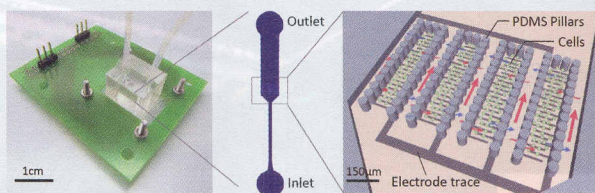


2352

Distinguishing drug-induced minor morphological changes from major cellular damage via label-free impedimetric toxicity screening

Robert Meissner, * Bilge Eker, Harsha Kasi, Arnaud Bertsch and Philippe Renaud

We present a novel perfusion-based microfluidic platform for label-free drug toxicity screening which can single out non-lethal morphological changes from cellular death via electrical impedance spectroscopy.

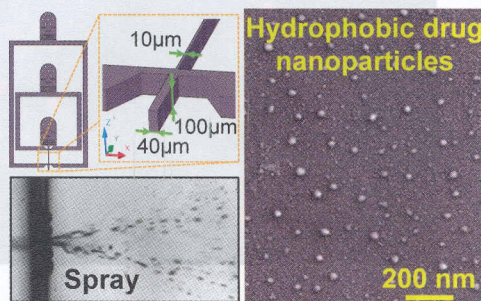


2362

Early development drug formulation on a chip: Fabrication of nanoparticles using a microfluidic spray dryer

Julian Thiele, Maike Windbergs, Adam R. Abate, Martin Trebbin, Ho Cheung Shum, Stephan Förster and David A. Weitz*

A novel microfluidic spray dryer for early development drug formulation on a microfluidic chip is described. Nanoparticles are formed without additives at room temperature and with low mean particle size.

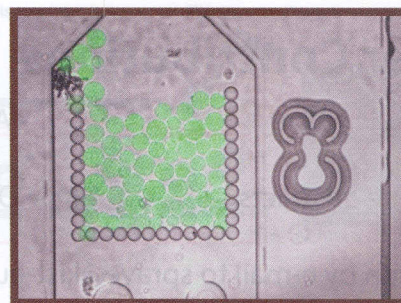


2369

Development of a microfluidics biosensor for agarose-bead immobilized *Escherichia coli* bioreporter cells for arsenite detection in aqueous samples

Nina Buffi, Davide Merulla, Julien Beutier, Fanny Barbaud, Siham Beggah, Harald van Lintel, Philippe Renaud and Jan Roelof van der Meer*

A storable microfluidics sensor holding bead-embedded *Escherichia coli* bioreporter cells to detect arsenic in aqueous samples.

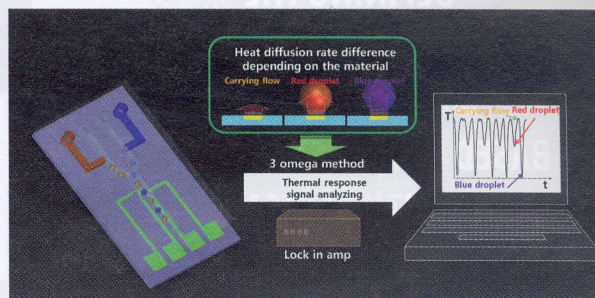


2378

Micro-droplet detection and characterization using thermal responses

Namwo Yi, Byoung Kyoo Park, Dongsik Kim and Jaesung Park*

Using 3ω method, droplets are able to be detected and distinguished in real time by different thermal response depending on droplet material.

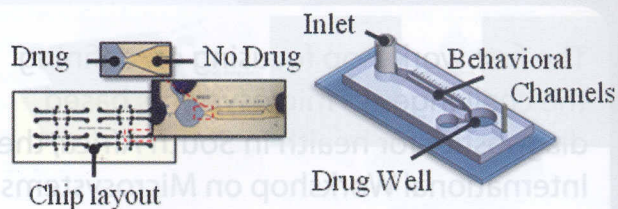


2385

A microfluidic platform for high-sensitivity, real-time drug screening on *C. elegans* and parasitic nematodes

John A. Carr, Archana Parashar, Richard Gibson, Alan P. Robertson, Richard J. Martin and Santosh Pandey*

A new tool for high-sensitivity, real-time screening of anthelmintic drugs on nematode worms is presented.

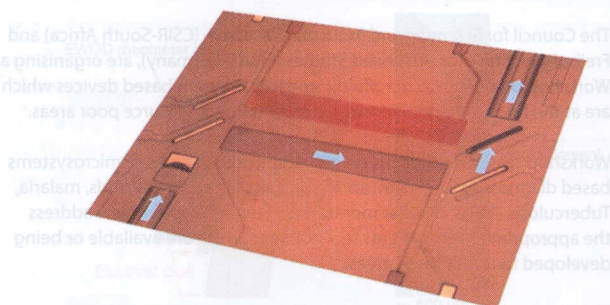


2397

Pneumatically tunable optofluidic 2×2 switch for reconfigurable optical circuit

Wuzhou Song* and Demetri Psaltis

We presented a reconfigurable optical circuit on PDMS chip with integrated optofluidic switch controlled by compressed air.

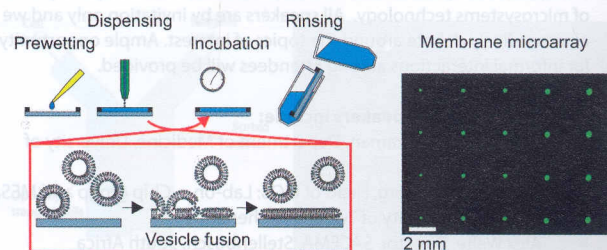


2403

Supported lipid bilayer microarrays created by non-contact printing

Stefan Kaufmann, Jens Sobek, Marcus Textor and Erik Reimhult*

A novel way to produce microarrays of fluid supported lipid bilayers (SLBs) is presented, based on non-contact dispensing of vesicles to a substrate through a thin surface confined water film.

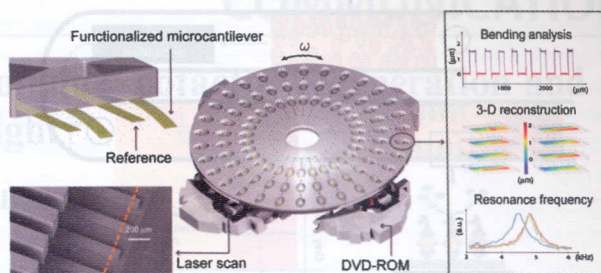


2411

High throughput label-free platform for statistical bio-molecular sensing

Filippo G. Bosco,* En-Te Hwu, Ching-Hsiu Chen, Stephan Keller, Michael Bache, Mogens H. Jakobsen, Ing-Shouh Hwang and Anja Boisen

We demonstrate a high throughput label-free screening system, where statistical analysis over multiple biosensors enhances reliability, reproducibility and significance of the output data.



2417

The construction of an individually addressable cell array for selective patterning and electroporation

Youchun Xu, Huanfen Yao, Lei Wang, Wanli Xing* and Jing Cheng*

The present cell arraying-assisted electroporation chip integrates a pDEP-assisted cell positioning function with selective electroporation to provide a simple and efficient method for gene transfer.

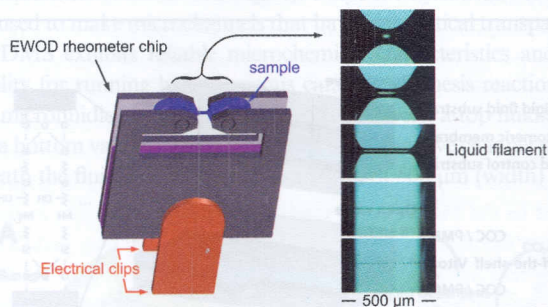


2424

A miniature capillary breakup extensional rheometer by electrostatically assisted generation of liquid filaments

Wyatt C. Nelson,* H. Pirouz Kavehpour and Chang-Jin "CJ" Kim

A micromachined electrowetting-on-dielectric (EWOD) chip generates liquid microfilaments for a miniature version of the Capillary Breakup Extensional Rheometer (CaBER®).

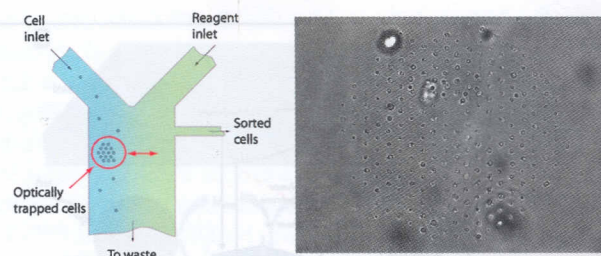


2432

Microfluidic array cytometer based on refractive optical tweezers for parallel trapping, imaging and sorting of individual cells

Michael Werner, Fabrice Merenda, Joachim Piguet, René-Paul Salathé and Horst Vogel*

The biochip is capable to trap more than 200 living yeast cells, monitor physiological responses of each trapped cell, and select individual cells from the array for further investigations.

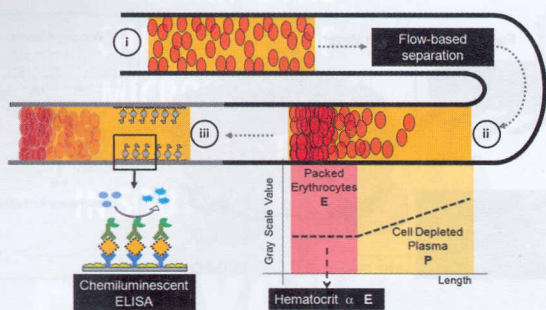


*Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST), 335 Science Road, Poojeon, 305-701, Korea. E-mail: parkch@kaist.ac.kr; Fax: +82 42 350 3340

Electronic supplementary information (ESI) available. See DOI: 10.1039/c1cc20379g

2440

DEFINING THE

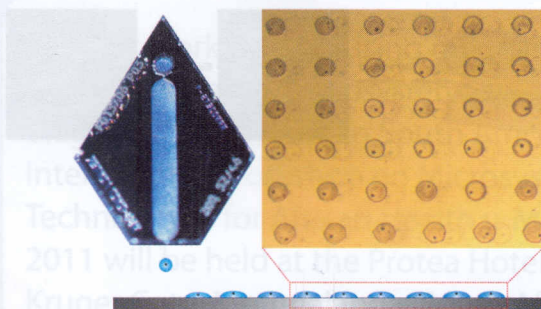


A lab-on-a-chip for rapid blood separation and quantification of hematocrit and serum analytes

Andrew W. Browne,* Lakshminarayanan Ramasamy, Timothy P. Cripe and Chong H. Ahn

A new lab-on-a-chip for rapid analysis of low volume blood samples was designed, fabricated and demonstrated for integration of serum separation, hematocrit evaluation, and protein quantitation.

2447



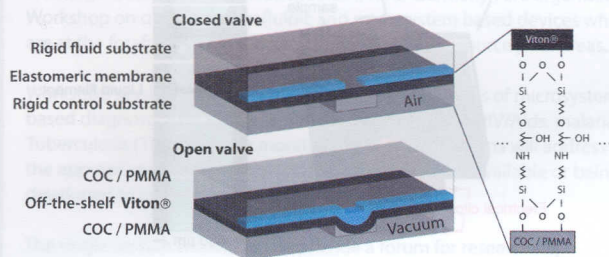
Inkjet-like printing of single-cells

Azmi Yusof, Helen Keegan, Cathy D. Spillane, Orla M. Sheils, Cara M. Martin, John J. O'Leary, Roland Zengerle and Peter Koltay*

A method for printing single living cells on substrates using a microdispenser coupled with automated image recognition is presented.

TECHNICAL NOTES

2455

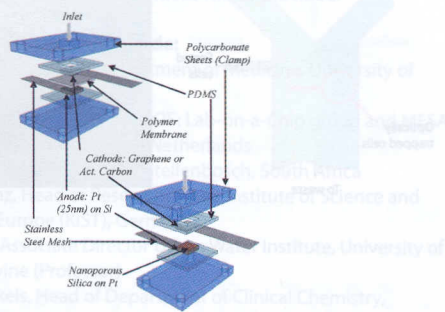


Chemically resistant microfluidic valves from Viton® membranes bonded to COC and PMMA

I. R. G. Ogilvie,* V. J. Sieben, B. Cortese, M. C. Mowlem and H. Morgan

We present a reliable technique for irreversibly bonding chemically inert Viton® membranes to PMMA and COC substrates to produce microfluidic devices with integrated elastomeric structures.

2460



Mesoporous silica as a membrane for ultra-thin implantable direct glucose fuel cells

Tushar Sharma, Ye Hu, Meryl Stoller, Marc Feldman, Rodney S. Ruoff, Mauro Ferrari and Xiaojing Zhang*

Use of an inorganic membrane to miniaturize and boost the power output of a direct glucose fuel cell for implantable application.