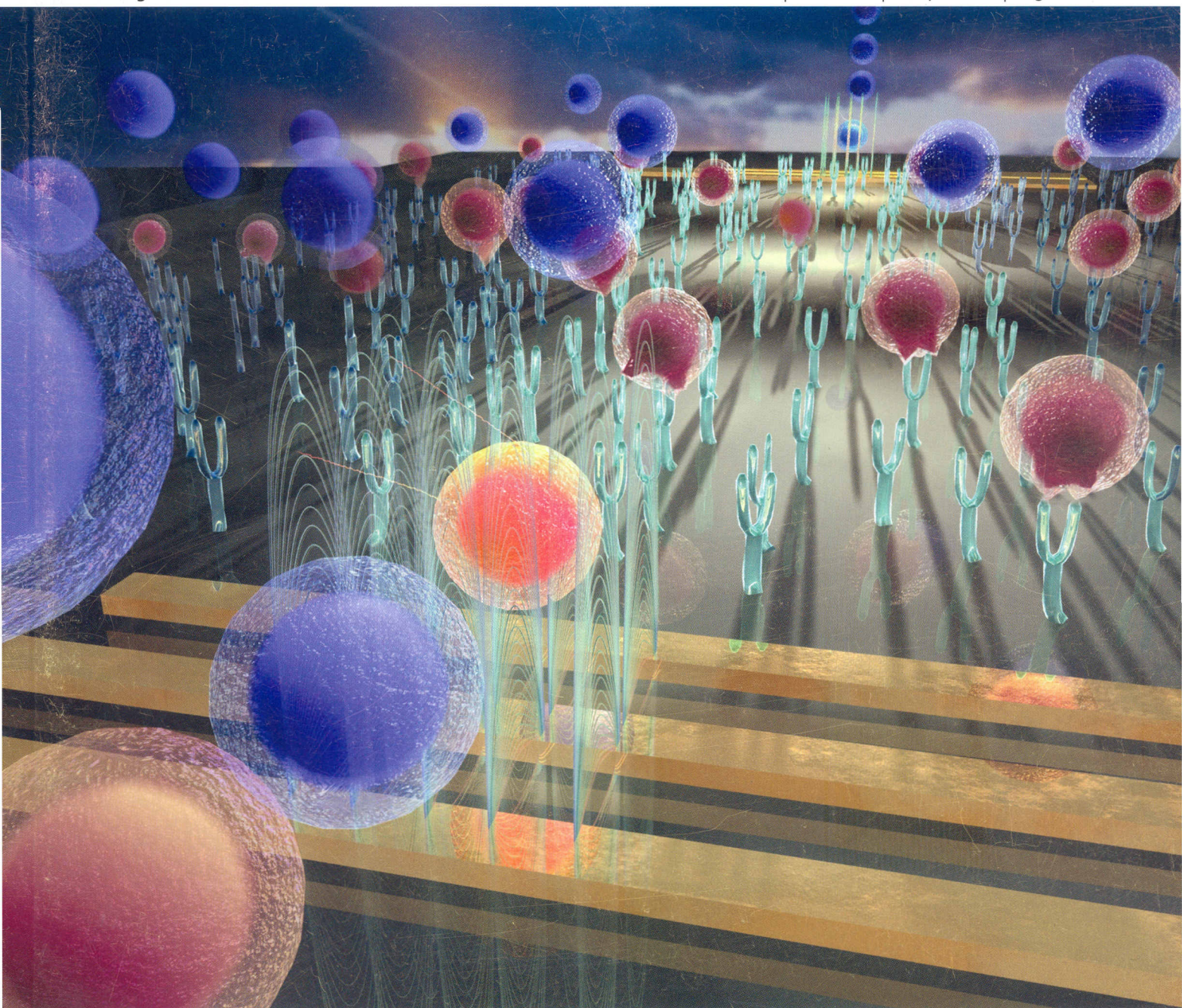


Lab on a Chip

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

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PAPER

Rodriguez and Bashir *et al.*

A microfabricated electrical differential counter for the selective enumeration of CD4+ T lymphocytes



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Cover

See Rodriguez and Bashir *et al.*, pp. 1437–1447.
Image reproduced by permission of Rashid Bashir from *Lab Chip*, 2011, **11**, 1437.



Inside cover

See Marie *et al.*, pp. 1431–1433.
Image reproduced by permission of Rodolphe Marie from *Lab Chip*, 2011, **11**, 1431.

FOCUS

1417

Affinity reagents for lab on chips

Mathias Uhlen and Helene Andersson Svahn

Helene Andersson-Svahn and Mathias Uhlen discuss affinity reagents for lab on chips – Part of a series of Focus articles elucidating bio-related issues that impact on lab on a chip and microfluidic research.



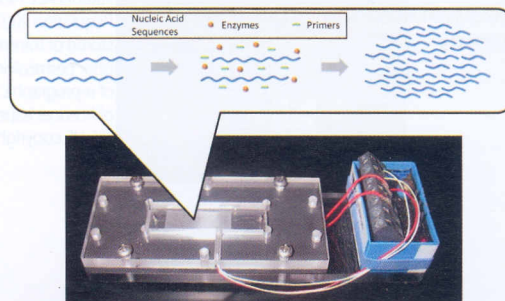
CRITICAL REVIEW

1420

Miniaturized isothermal nucleic acid amplification, a review

Peter J. Asiello and Antje J. Baeumner*

This critical review provides an overview of miniaturized nucleic acid analysis systems using alternatives to PCR, specifically isothermal amplification reactions.

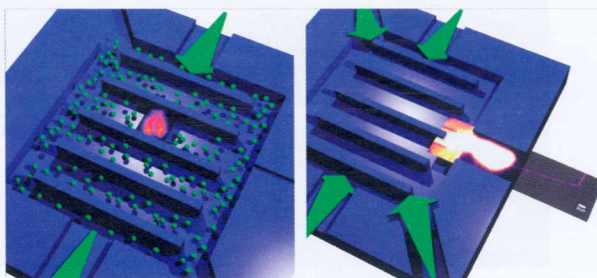


1431

A device for extraction, manipulation and stretching of DNA from single human chromosomes

Kristian H. Rasmussen, Rodolphe Marie,* Jacob M. Lange, Winnie E. Svendsen, Anders Kristensen and Kalim U. Mir

DNA was extracted by proteolysis of individual metaphase chromosomes in a microfluidic trap and then elongated in a nanoslit.

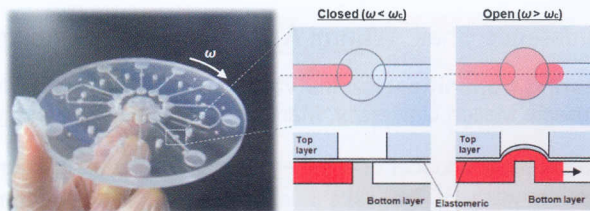


1434

Elastomeric membrane valves in a disc

Hyundoo Hwang, Hak-Hyeon Kim and Yoon-Kyoung Cho*

We present elastomeric membrane valves integrated into a centrifugal microfluidic platform for precise control of fluid on a disc.



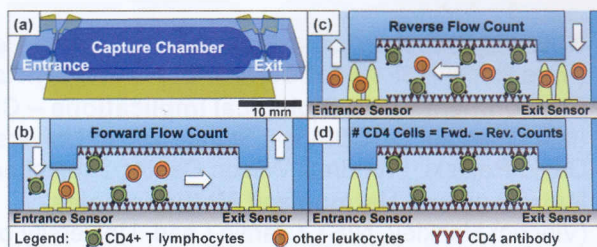
PAPERS

1437

A microfabricated electrical differential counter for the selective enumeration of CD4+ T lymphocytes

Nicholas N. Watkins, Supriya Sridhar, Xuanhong Cheng, Grace D. Chen, Mehmet Toner, William Rodriguez* and Rashid Bashir*

Selective enumeration of CD4+ T lymphocytes for point-of-care HIV/AIDS analysis is feasible using a microfluidic chip that implements differential electrical impedance analysis, cell immunoaffinity methods, and a reverse-flow technique.

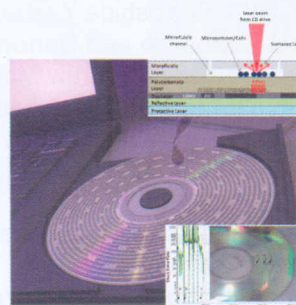


1448

Microparticle and cell counting with digital microfluidic compact disc using standard CD drive

Syed M. Imaad, Nathan Lord, Gulsim Kulsharova and Gang Logan Liu*

The direct integration of microfluidics into a music CD permits the counting of living cells using a personal computer.

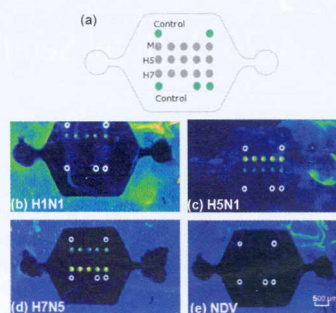


1457

A lab-on-a-chip device for rapid identification of avian influenza viral RNA by solid-phase PCR

Yi Sun, Raghuram Dhumpa, Dang Duong Bang, Jonas Høgberg, Kurt Handberg and Anders Wolff*

This paper describes a lab-on-a-chip device for fast AIV screening by integrating DNA microarray-based solid-phase PCR on a microfluidic chip.

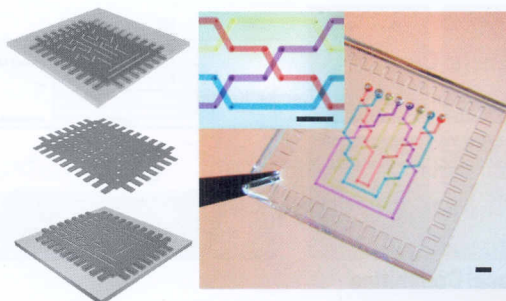


1464

Capillary-driven automatic packaging

Yuzhe Ding, Lingfei Hong, Baoqing Nie, Kit S. Lam and Tingrui Pan*

We present a universal packaging process, referred to as Capillary-driven Automatic Packaging (CAP), which utilizes the interfacial capillary interactions to establish both bottom-to-top self-alignment and self-engagement in a single facile step.

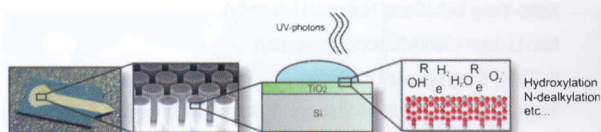


1470

Integrated photocatalytic micropillar nanoreactor electro spray ionization chip for mimicking phase I metabolic reactions

Teemu Nissilä, Lauri Sainiemi, Mika-Matti Karikko, Marianna Kemell, Mikko Ritala, Sami Franssila, Risto Kostianen and Raimo A. Ketola*

A TiO_2 -nanoreactor/electrospray microchip combined with mass spectrometry was constructed and used for mimicking phase I metabolic reactions of selected drugs.

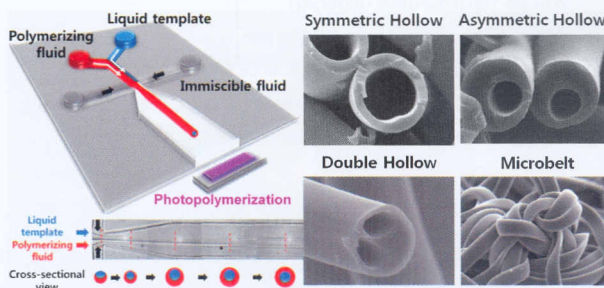


1477

Microfluidic fabrication of complex-shaped microfibers by liquid template-aided multiphase microflow

Chang-Hyung Choi, Hyunmin Yi, Sora Hwang, David A. Weitz and Chang-Soo Lee*

This study presents a simple microfluidic approach to the rapid fabrication of complex-shaped microfibers with highly uniform structures, based on a combination of the spontaneous formation of polymeric jet streams and *in situ* photopolymerization.

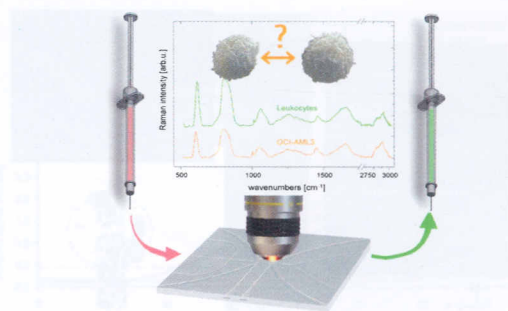


1484

Tumour cell identification by means of Raman spectroscopy in combination with optical traps and microfluidic environments

Sebastian Dochow, Christoph Krafft, Ute Neugebauer, Thomas Bocklitz, Thomas Henkel, Günter Mayer, Jens Albert and Jürgen Popp*

Normal blood cells and three tumour cell lines are classified using two devices that demonstrate the feasibility of Raman activated cell sorting.

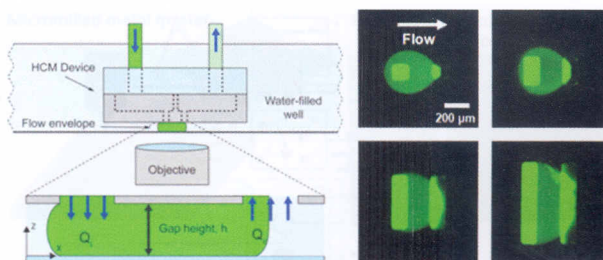


1491

Design of hydrodynamically confined microfluidics: controlling flow envelope and pressure

Kevin V. Christ and Kevin T. Turner*

Hydrodynamic confinement allows microfluidic flows to be created in open environments, such as dishes and well plates, for cell biology applications. Here, we present a combined experimental and modeling study that maps the design space for hydrodynamic confinement devices.

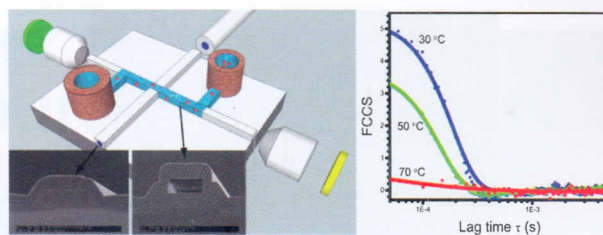


1502

Dual-color fluorescence cross-correlation spectroscopy on a planar optofluidic chip

A. Chen, M. M. Eberle, E. J. Lunt, S. Liu, K. Leake, M. I. Rudenko, A. R. Hawkins and H. Schmidt*

Dual-color fluorescence cross-correlation spectroscopy was implemented on a planar optofluidic chip for detecting particle colocalization and DNA denaturation.

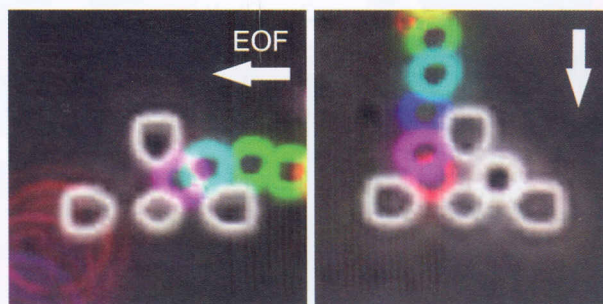


1507

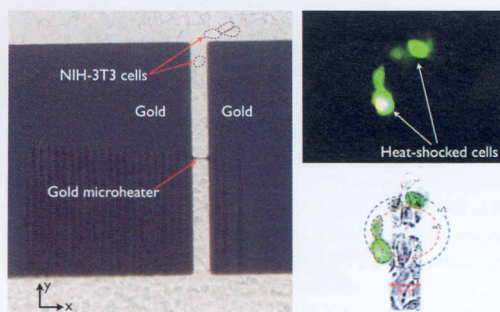
Open-access and multi-directional electroosmotic flow chip for positioning heterotypic cells

Kyohei Terao,* Yuko Kitazawa, Ryuji Yokokawa, Atsuhito Okonogi and Hidetoshi Kotera

We demonstrate a novel method for heterotypic single-cell positioning using electroosmotic flow (EOF), with easy access for cell measurement probes.



1513

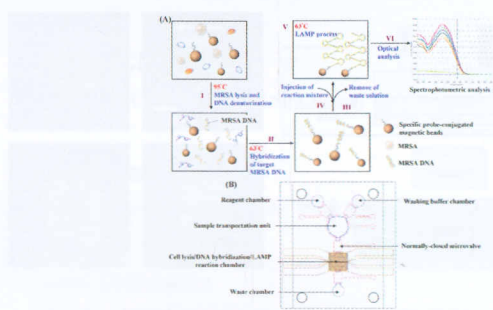


Towards single cell heat shock response by accurate control on thermal confinement with an on-chip microwire electrode

Patrick Ginet, Kevin Montagne, Sho Akiyama, Ali Rajabpour, Akiyoshi Taniguchi, Teruo Fujii, Yasuyuki Sakai, Beomjoon Kim, Dominique Fourmy and Sebastian Volz*

We have developed a microwire electrode-based device able to induce heat-shock response with almost single cell resolution.

1521

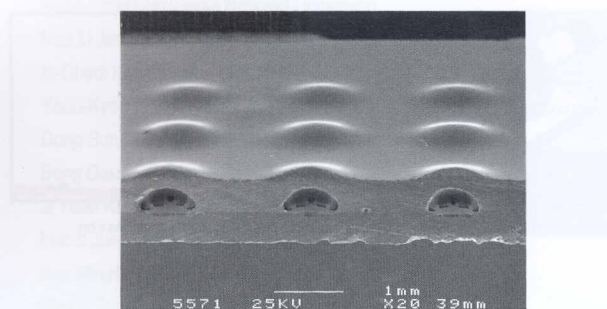


A magnetic bead-based assay for the rapid detection of methicillin-resistant *Staphylococcus aureus* by using a microfluidic system with integrated loop-mediated isothermal amplification

Chih-Hung Wang, Kang-Yi Lien, Jiunn-Jong Wu and Gwo-Bin Lee*

A novel automatic assay for targeted DNA extraction and loop-mediated isothermal amplification (LAMP) process for rapid detection of antibiotic resistance bacteria (MRSA) utilizing an integrated microfluidic system.

1532



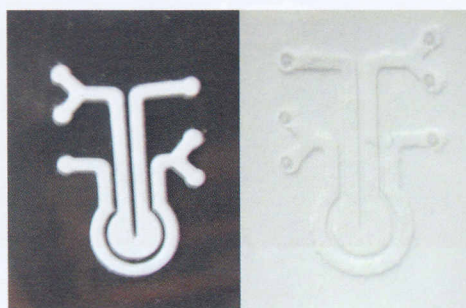
Preparation of wafer-level glass cavities by a low-cost chemical foaming process (CFP)

Jintang Shang,* Boyin Chen, Wei Lin, Ching-Ping Wu, Di Zhang, Chao Xu, Junwen Liu and Qing-An Huan

A low cost chemical foaming process to fabricate wafer-level micro glass cavities including channels and bubbles was investigated.

TECHNICAL NOTES

1541



Three-dimensional interconnected microporous poly(dimethylsiloxane) microfluidic devices

Po Ki Yuen,* Hui Su, Vasily N. Goral and Katherine A. Fink

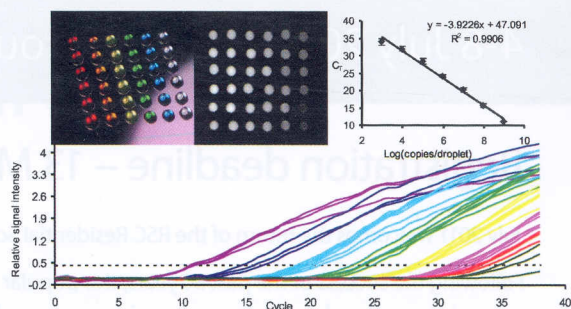
We present a fabrication method and applications of three-dimensional (3D) interconnected microporous poly(dimethylsiloxane) (PDMS) microfluidic devices.

1545

Nanolitre droplet array for real time reverse transcription polymerase chain reaction

Yunxia Zhang, Ying Zhu, Bo Yao* and Qun Fang*

We developed a low density (6×6) nanolitre droplet array for miniaturizing the routinely low multiplex qPCR assay in ordinary molecular laboratory with lower sample and reagent consumption.

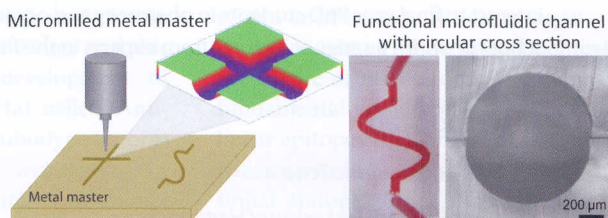


1550

Fabrication of circular microfluidic channels by combining mechanical micromilling and soft lithography

Mary E. Wilson, Nithyanand Kota, YongTae Kim, Yadong Wang, Donna B. Stolz, Philip R. LeDuc* and O. Burak Ozdoganlar*

In this paper, we demonstrate the use of mechanical micromilling in combination with soft lithography micromolding to fabricate microfluidic channels with complex cross-sectional geometries.



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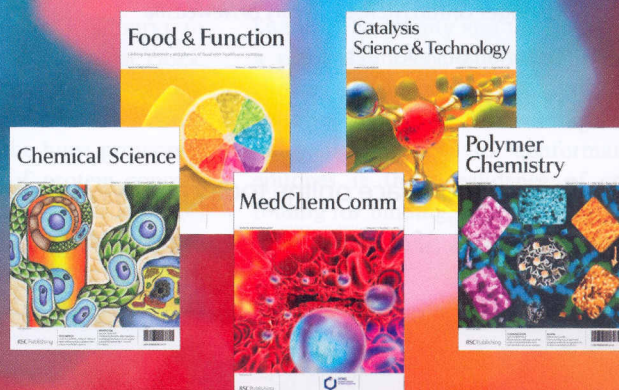
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