

ter integration into a microfluidic cell the latter was utilized to perform the previously described sensing operations.

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**An experimental setup to handle liquids in a nanofluidic device** — ●EVELYN MEYER and HANS-GEORG BRAUN — Leibniz Institute of Polymer Research, Max-Bergmann Center of Biomaterials, D-01069 Dresden, Hohe Strasse 6

The manipulation of fluids of femto- to picoliter volume in micro or nanosized channels is realized by a piezodriven manipulation unit adapted to an inverse fluorescence microscope. A truncated PDMS pyramid with a basal plane of 20 to 400 micrometer is mounted to a piezomotor system and can be controlled in x,y,z direction and enables filling and sealing of an underlying micro- and nanochannel structure. This assembly allows the encapsulation of DNA molecules for dynamic studies in confined geometries. The success of the filling process depends on the wettability of the microstructured surface according to the Wenzel regime for wetting of rough surfaces. Using an adjustable slit geometry between pyramid and substrate fluids entrapped in the slit can be transported along a substrate with controllable velocity to study the behaviour of propagating fluids on chemical and topographical heterogeneous surfaces.

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**Integrated peristaltic pumps tailored for new migration phenomena** — ●STEFAN GERKENS, DARIO ANSELMETTI, and ALEXANDRA ROS — Experimental Biophysics & Applied Nanosciences, Bielefeld University, Department of Physics, Universitaetsstrasse 25, 33615 Bielefeld, Germany

Peristaltic pumps based on PDMS can be used as fluidic driving-mechanism for a fully-integrated lab-on-a-chip evading difficulties involved with electrokinetic approaches. The characteristics of such a device are well suited for a large variety of microfluidic applications, for example the transport of biological compounds or colloidal particles. The fabrication is possible by soft lithography requiring only two PDMS moulds. External control is performed by an array of digitally assessable microvalves providing the necessary pressure for actuation. Both the lithography process (e.g. channel geometry) and the parameters controlling the external microvalves (e.g. actuation pressure and valve sequence) yield a large possibility to optimize the micropump for different problems. In this contribution, the application of a fully PDMS based peristaltic pump for the driving of colloidal particles in microfluidic networks is presented. Characterisation of this setup will be carried out in terms of flow rates, periodic driving amplitudes and single pumping-cycle analysis. This microfluidic pump will be used for the development of new migration phenomena in tailored microfluidic devices.

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**Simple Method for the Stretching and Alignment of Single Adsorbed Synthetic Polycations** — ●VERA BOCHAROVA<sup>1</sup>, ANTON KIRIY<sup>1</sup>, MANFRED STAMM<sup>1</sup>, FRANCOIS STOFFELBACH<sup>2</sup>, ROBERT JÉRÔME<sup>2</sup>, and CHRISTOPHE DETREMBLEUR<sup>2</sup> — <sup>1</sup>Leibniz Institute of Polymer Research Dresden, D-01069 Dresden (Germany) — <sup>2</sup>Center for Education and Research on Macromolecules (CERM), University of Liege, Sart-Tilman, B6, 4000 Liege, Belgium

It was found that positively charged macromolecules co-deposited with octylamine (OA) onto mica appear in a considerably more stretched conformation compared to adsorption onto untreated mica. Furthermore, the molecular thickness is considerably larger whenever the macromolecules are co-deposited with OA, which indicates a change in the local conformations of the chains and the orientation of their side-groups with respect to the substrate. These observations can be explained by the formation of an ultra-thin liquid-like film of OA onto mica that decreases the surface energy, weakens the interactions of the macromolecules with the surface and allows them to be stretched. The contour length and molar mass for the stretched macromolecules can be directly measured. The increase in the molecular height in case of co-deposition with OA drastically improves the molecular resolution, makes even ultra-thin polycations detectable and thus extends significantly the range of objects, which can be involved in single-molecule experiments.

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**Adsorption and desorption of solvents by periodic mesoporous organosilica of different pore sizes** — ●M.A. SCHREIBER<sup>1</sup>, M. GÜNGERICH<sup>1</sup>, P.J. KLAR<sup>1</sup>, W. HEIMBRODT<sup>1</sup>, J. MORELL<sup>2</sup>, V. REBBIN<sup>2</sup>, M. FRÖBA<sup>2</sup>, T. HENNING<sup>3</sup>, L. EICHHORN<sup>3</sup>, J.J. BRANDNER<sup>3</sup>, and K. SCHUBERT<sup>3</sup> — <sup>1</sup>Dept. Physics and WZMW, Philipps-University of Marburg, Germany — <sup>2</sup>Institute of Inorganic and Analytical Chemistry, Justus-Liebig-University, Gießen, Germany — <sup>3</sup>Forschungszentrum Karlsruhe, IMVT, Eggenstein-Leopoldshafen, Germany

Periodic mesoporous silica (PMOs) are organic-inorganic hybrid materials with regular pore systems and well defined pore sizes in the range of 3 to 15 nm yielding inner surfaces of about 1000 m<sup>2</sup>/g. The organic units in the pore walls are two-point attached within the silica matrix through covalent bonds and therefore are homogeneously distributed and a genuine part of the 3D pore wall framework. The choice of the organic functionalisation is very versatile making these hybrids interesting for applications in catalysis and micro-reactor technology. Here we study the adsorption and desorption behaviour of the solvents ethanol and benzene by benzene-functionalized and ethane-functionalized PMOs with different pore sizes in the temperature range between 20 and 140 °C by Raman spectroscopy. We find significant differences in the adsorption-desorption behaviour for different solvents as well as for different pore sizes suggesting that PMOs make a selective separation of solvent vapours possible.