Soft Matter World Newsletter

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Dear Soft Matter colleagues,

Welcome to our September newsletter. This month we are proud to feature Dr. Barbara Frisken's group at the Simon Fraser University in Burnaby, British Colombia and two papers by Longping Zhou et al. and Joseph Tavacoli et al. Have a pleasant read and an exciting September.

Frisken Lab - Structure and Dynamics of Soft Condensed Matter

The Simon Fraser University is a Canadian research institution with a central campus in Vancouver and campuses at Surrey and Burnaby. Simon Fraser is a leading soft matter research center with fifteen research groups investigating biological physics and soft condensed matter. Dr. Barbara Frisken's research group focuses on the structure and dynamics of soft condensed matter through experiments in:

- *Crystallization in colloid-polymer mixtures: Samples that show gas-liquid-crystal coexistence have been prepared by Dr. Frisken's group for BCAT- 5 (Binary Colloidal Alloy Test 5), a NASA experiment on the interaction of crystallization and phase separation without gravity; the samples were installed in the International Space Station in June, 2009.*
- *Polymeric materials for fuel cells: Conductivity in proton conducting polymer membranes depends on the composition of the membrane. The group is studying membranes composed of proton conducting and hydrophobic blocks that maylead to new fuel cell technologies.*
- *Yield-stress fluids: Yield stress fluids are materials that are solid at low stress but viscous above a defined stress threshold. The group is investigating these materialsusing-light scattering and opticalmicroscopy. Probe particles are tracked to shed light on universal aspects of this class of materials.*
- *Lipid vesicles: The group is currently modeling the physical processes underlying vesicle formation via theextrusion technique by systematically measuring lysis tension.*
- *Soft colloidal particles and particle membranes: The group is investigating the heterogeneity of PNIPAM colloidal gels; particles that swell at low temperatures but collapse above a distinct temperature threshold. These systems are interesting for the formation of particle membranes.Proton conducting membranes made of particles with charged shells and hydrophobic cores show higher conductivity than films of the same composition.*

The Frisken Lab belongs to the larger department of Biological Physics and Soft Condensed matter at Simon Fraser, putting the researchers in a diverse, easily assessable scientific network. The Frisken lab collaborates with other research teams at Simon Fraser university on most projects, a great example of the vitality of collaboration in the field of soft matter science.

To read more visit the website.

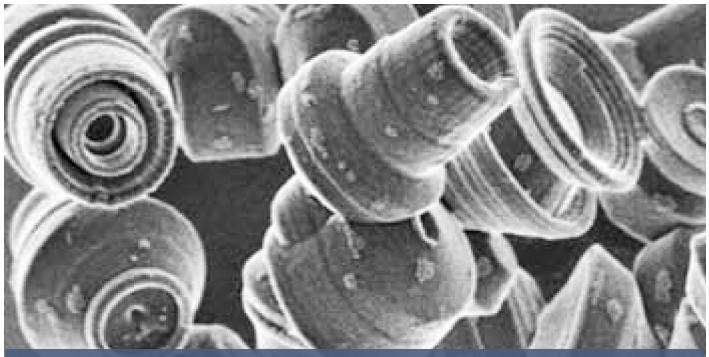
Biomimetic morphogenesis of micropottery: helical coiling of mesostructured silica nanofibers

Longping Zhou, Jianfeng Ye, Guosong Hong and Limin Qi. ***Soft Matter****, 2011, Advance Article. DOI: 10.1039/C1SM05593C*

Beautiful pottery vessels, reminiscent of oriental Asian art except for their microscopic size, were synthesized in a reaction between CTAB, TEOS, HNO3 and water. The oxidation of TEOS forms hexagonal silica nanofibers with cells 3.72nm across. These fibers are capable of forming three-dimensional hierarchical structures depending on the availability of counterions in the solution as they form.

The fast hydrolysis and condensation of TEOS in a concentrated HNO3 solution containing CTAB results in the immediate formation of circular mesostructured gyroids. These seeds lead to the formation of mesostructured nanofibers as well as as their helical coiling into hollow vessels on the flat surface of the gyroidal seeds under non-equilibrium conditions. In addition, many buckling patterns form through self-assembly of the curved compliant vessel wall. Experiments with HBr revealed the formation of curve shaped particles whereas HCl yielded gyroids only, indicating that a strong anion may be responsible for the curvature.

Extremely thorough imaging using high resolution TEM revealed the structure of the nanopottery to be mesoporous hexagonal silica sheets coiled about one another. Based on powder X-ray diffraction and nitrogen absorption/desorption measurements, a helical coiling mechanism has been proposed to explain the formation of these structures.



SEM images of mesostructured silica micropottery vessels.

This novel synthesis process opens avenues for the micro-fabrication of hierarchal 3D architectures with advanced functions.

Read more at RSC Publishing.

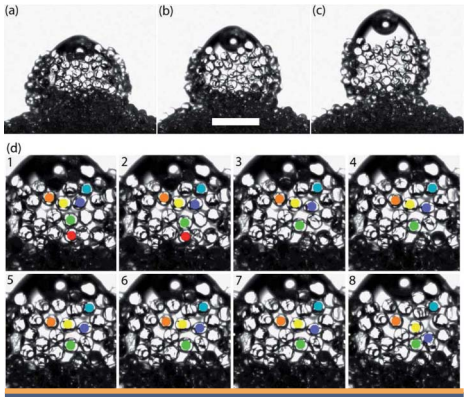
Particle-stabilized oscillating diver: a self-assembled responsive capsule

Joseph W. Tavacoli, Job H. J. Thijssen and Paul S. Clegg. ***Soft Matter****, 2011, Advance Article. DOI: 10.1039/C1SM05850A*

A particle- stabilized oscillating diver (POD) that responds to temperature through vertical motion and volume change has been created by pouring glass beads into a vial containing a lower liquid (ethanediol) and an overlying volatile liquid (pentane). Adjusting bead size and liquid types may lead to capsules with different behaviors. Similar composites featuring interfacial particles and multiple compartments could help solve a variety of challenges in triggered delivery.

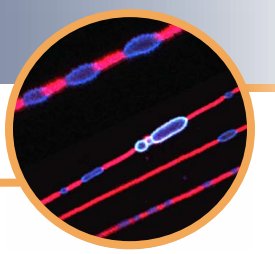
A capsule of pentene with an air bubble in ethanediol was made by pouring glass beads into a vial, with the majority of the beads falling through the liquid interfaces to the base of the vial. As they do so they entrain both pentane and air, out of which the capsule forms. The POD rotates at the bottom of the vial before beginning to rise. Relating temperature to density is one of many measurements that may be performed on the capsule.

Adjusting parameters for pressure and temperature at different heights in a vessel could be used to address emulsion creaming/sedimentation problems.



The emergence of a buoyant particle stabilizing oscillating driver (POD) at the base of the vial. (a-c) Frames from a movie (6.0s/frame). Scale bar 2 mm. (d) Zoomed images every 0.25 s from a segment between the frames shown in (a) and (b) with selected beads in color.

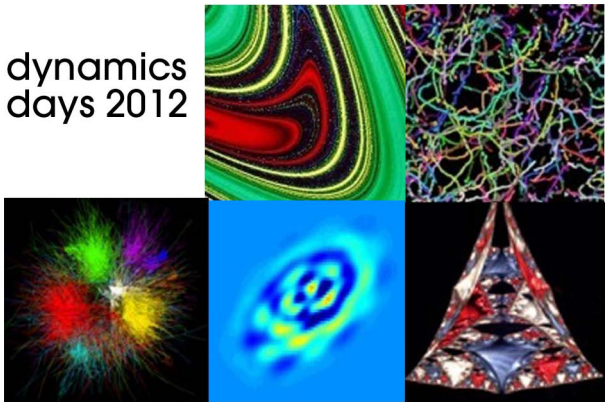
Read more at RSC publishing.



Dynamics Days 2012

Dynamics Days is an annual conference on topics in nonlinear dynamics. It is being held January 4-7, 2012. This year's conference will include sessions in pattern forming systems, characterization and control of nonlinear systems, synchronization of nonlinear systems, and complex biological systems, as well as a celebration of Ed Ott's 70th birthday and his seminal contributions to the field of nonlinear dynamics. The abstract submission *deadline is November 7th, 2012*.

Visit the website to read more.

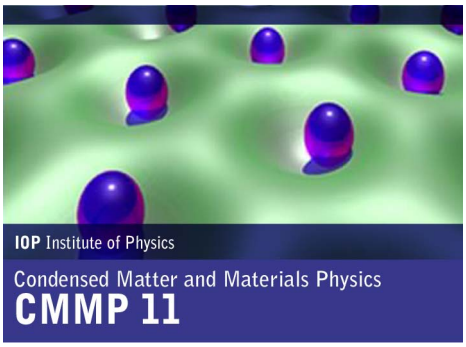


IOP Presents:

CMMP 11

The CMMP11 will be taking place on the 13-15 of December in Manchester, UK. The conference has a wide range of symposia and will reflect the breadth of condensed matter and materials physics - this series of conferences attracts the highest quality invited and plenary talks, and offers a forum for student presentations. The conference includes:

- Plenary lectures, given by internationally recognised speakers.
- A wide range of symposia with both invited and contributed talks. The final programme will include symposia reflecting your contributions.
- Poster sessions enabling scientists to present their work in an informal and convivial setting.
- A wide variety of plenary and invited speakers attending CMMP. A member of our Global Research Network, Andrei Zvelindovsky along with Paola Carbone are organizing a symposium "Computer simulation in soft matter."



The full confirmed list of speakers, including their photos and biographies, can be found under the Plenary and invited speakers page. To read more visit the conference website.

We hope you enjoy browsing softmatterworld.org and come back soon

Linda S. Hirst, Adam Ossowski and Dmitri Medvedko

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