

# Soft Matter

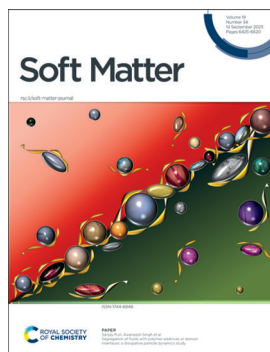
Where physics meets chemistry meets biology for fundamental soft matter research

[rsc.li/soft-matter-journal](https://rsc.li/soft-matter-journal)

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

## IN THIS ISSUE

ISSN 1744-6848 CODEN SMOABF 19(34) 6425-6620 (2023)



### Cover

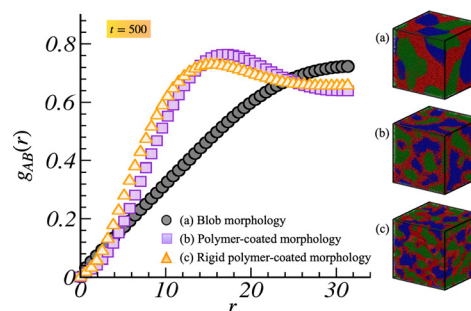
See Sanjay Puri,  
Awaneesh Singh *et al.*,  
pp. 6433–6445.  
Image reproduced  
by permission of  
Awaneesh Singh  
from *Soft Matter*,  
2023, 19, 6433.

## PAPERS

6433

### Segregation of fluids with polymer additives at domain interfaces: a dissipative particle dynamics study

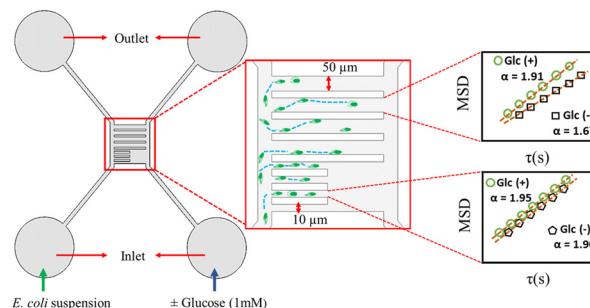
Dorothy Gogoi, Avinash Chauhan, Sanjay Puri\* and Awaneesh Singh\*



6446

### Anomalous diffusion of *E. coli* under microfluidic confinement and chemical gradient

Md Ramiz Raza, Jijo Easo George, Savita Kumari, Mithun K. Mitra\* and Debjani Paul\*



## Editorial Staff

### Executive Editor

Maria Southall

### Deputy Editor

Laura Ghandhi

### Editorial Production Manager

Chris Goodall

### Assistant Editors

Sean Browner, Molly Colgate, Paul Scott, Alison Winder

### Editorial Assistant

Basita Javeed

### Publishing Assistant

Allison Holloway

### Publisher

Sam Keltie

For queries about submitted papers, please contact Emily Skinner Editorial Production Manager in the first instance. E-mail: [softmatter@rsc.org](mailto:softmatter@rsc.org)

For pre-submission queries please contact Maria Southall, Executive Editor. E-mail: [softmatter-rsc@rsc.org](mailto:softmatter-rsc@rsc.org)

Soft Matter (electronic: ISSN 1744-6848)

is published 48 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK

Tel +44 (0)1223 432398; E-mail: [orders@rsc.org](mailto:orders@rsc.org)

2023 Annual (electronic) subscription price: £1641; \$2891.

Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at [www.rsc.org/ip](http://www.rsc.org/ip)

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

### Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017;

E-mail: [advertising@rsc.org](mailto:advertising@rsc.org)

For marketing opportunities relating to this journal, contact [marketing@rsc.org](mailto:marketing@rsc.org)

# Soft Matter

[rsc.li/soft-matter-journal](http://rsc.li/soft-matter-journal)

An interdisciplinary journal focusing on innovative soft matter topics through original research and reviews.

## Editorial Board

### Editor-in-Chief

Alfred Crosby, University of Massachusetts Amherst, USA

### Associate Editors

Roberto Cerbino, University of Vienna, Austria  
Ewa Górecka, Warsaw University, Poland

Sanat Kumar, Columbia University, USA

Guruswamy Kumaraswamy, Indian Institute of Technology Bombay, India

Zhihong Nie, Fudan University, China

Amy Shen, Okinawa Institute of Science and Technology, Japan

Lixin Wu, Jilin University, China

Emanuela Zaccarelli, Sapienza University of Rome, Italy

Xuehua Zhang, University of Alberta, Canada

Editorial Board members

Lorna Dougan, University of Leeds, UK

## Advisory Board

Dave Adams, University of Glasgow, UK

Shaun Ahn, Dow, USA

Tommy Angelini, University of Florida, USA

Markus Antonietti, Max Planck Institute of Colloids and Interfaces, Germany

Omar Azzaroni, UNLP, Argentina

Piero Baglioni, University of Florence, Italy

Anna Balazs, University of Pittsburgh, USA

Arindam Banerjee, Indian Association for the Cultivation of Science, India

Madivala Basavaraj, Indian Institute of Technology Madras, India

Patricia Bassereau, Physico Chimie Curie Lab, France

Jasna Bruijic, New York University, USA

Jacinta Conrad, University of Houston, USA

Vincent Craig, Australian National University, Australia

Emanuela Del Gado, Georgetown University, USA

Jan Dhont, Forschungszentrum Jülich, Germany

Carmen Domene, University of Bath, UK

Zahra Fakhraei, University of Pennsylvania, USA

Glenn Fredrickson, University of California at Santa Barbara, USA

Valeria Garbin, TU Delft, The Netherlands

Jian Ping Gong, Hokkaido University, Japan

Ian Hamley, University of Reading, UK

Jianbin Huang, Peking University, China

Lucio Isa, ETH Zurich, Switzerland

Paul Janmey, University of Pennsylvania, USA

Gijze Koenderink, AMOLF, Netherlands

Daniela Kraft, Leiden University, Netherlands

Eugenia Kumacheva, University of Toronto, Canada

Oleg Lavrentovich, Kent State University, USA

Junbai Li, Institute of Chemistry, Chinese Academy of Sciences, China

Christos Likos, University of Vienna, Austria

Dongsheng Liu, Tsinghua University, China

Tom McLeish, University of York, UK

Bradley Olsen, Massachusetts Institute of Technology, USA

Rossana Pasquino, The University of Naples

Federico Il, Italy

Susan Perkin, University of Oxford, UK

Sarah Perry, University of Massachusetts Amherst, USA

Darrin Pochan, University of Delaware, USA

David Quéré, ESPCI, France

Sriram Ramaswamy, Indian Institute of Science, India

Meital Reches, The Hebrew University of Jerusalem, Israel

Alejandro Rey, McGill University, Canada

Connie Roth, Emory University, USA

Michael Rubinstein, Duke University, USA

Sam Safran, Weizmann Institute of Science, Israel

Takamasa Sakai, The University of Tokyo, Japan

Peter Schurtenburger, Lund University, Sweden

Kathleen Stebe, University of Pennsylvania, USA

Joakim Stenhammar, Lund University, Sweden

Howard Stone, Princeton University, USA

Hajime Tanaka, University of Tokyo, Japan

Evelyn Van Ruymbeke, Université Catholique de Louvain, Belgium

Jan Vermant, ETH Zurich, Switzerland

Petia Vlahovska, Northwestern University, USA

Dimitris Vlassopoulos, University of Crete, Greece

Yilin Wang, Institute of Chemistry, Chinese Academy of Sciences, China

Catherine Whitby, Massey University of New Zealand, New Zealand

Tim White, University of Colorado, USA

Duyang Zang, Northwestern Polytechnical University, China

## Information for Authors

Full details on how to submit material for publication in

Soft Matter are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be made via the journal's homepage: [rsc.li/soft-matter-journal](http://rsc.li/soft-matter-journal). Submissions: The journal welcomes submissions of manuscripts for publication as Full Papers, Communications, Reviews, Perspectives, Tutorial Reviews. Full Papers and Communications should describe original work of high quality and impact.

Additional details are available from the Editorial Office or <http://www.rsc.org/authors>

Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of Chemistry, provided that any such republication is accompanied by an acknowledgement in the form: (Original Citation)–Reproduced by permission of the Royal Society of Chemistry.

This journal is © The Royal Society of Chemistry 2023.

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

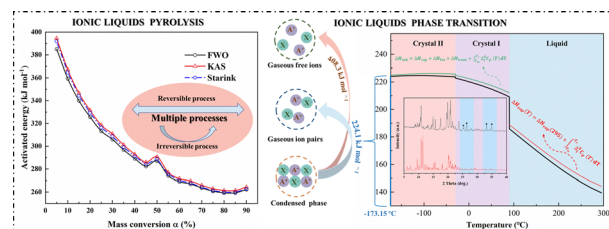
Registered charity number: 207890



6458

## The cohesive properties and pyrolysis mechanism of an aprotic ionic liquid tetrabutylammonium bis(trifluoromethanesulfonyl)imide

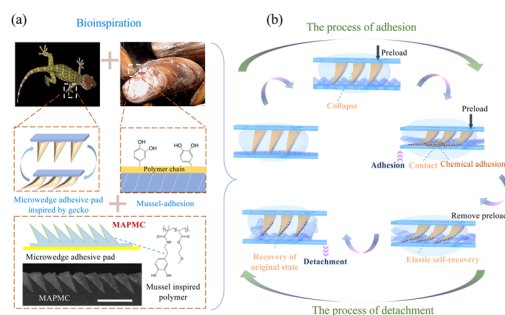
Shijie Liu, Runhong Wei, Guangjun Ma, Ailin Li, Olaf Conrad and Jiangshui Luo\*



6468

## Controllable adhesion behavior in underwater environments

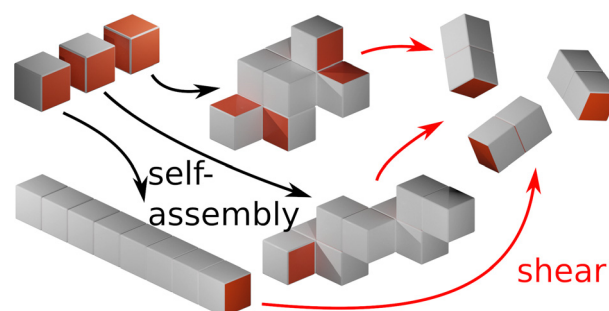
Hongyue Wu, Bolun Zhang, Xiaochen Liu, Yuzhou Liu, Jing Cui and Zhongyi Chu\*



6480

## Aggregation of amphiphilic nanocubes in equilibrium and under shear

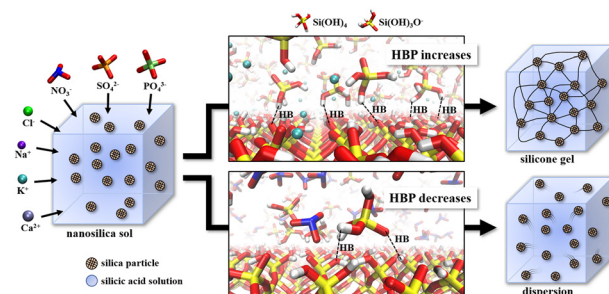
Takahiro Yokoyama, Yusei Kobayashi, Noriyoshi Arai and Arash Nikoubashman\*



6490

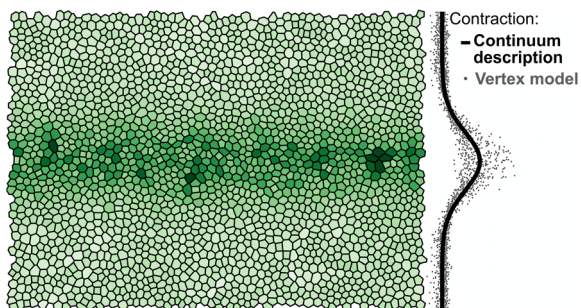
## Effects and mechanisms of anion and cation on the gelation of nanosilica sol by all-atom molecular dynamics simulation: promotion or inhibition?

Zhuqin Zhang, Liyang Wen, Fusheng Zhang, Zhi Dang and Lijuan Zhang\*



## PAPERS

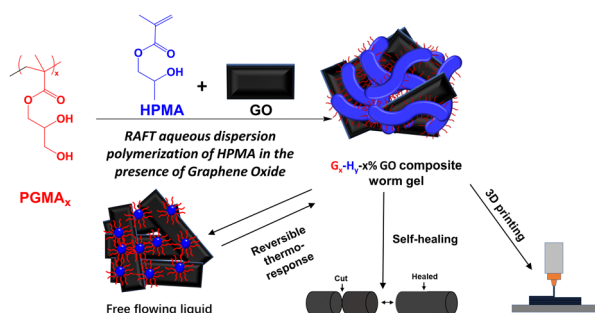
6501



## Continuum description of confluent tissues with spatial heterogeneous activity

Fernanda Pérez-Verdugo\* and Rodrigo Soto

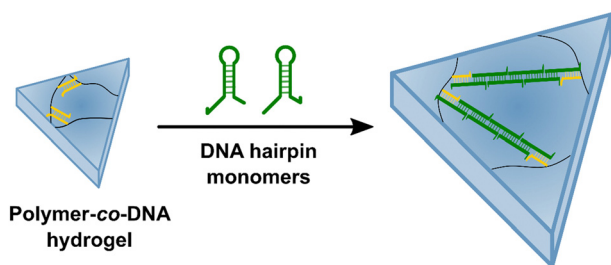
6513



## 3D printable, thermo-responsive, self-healing, graphene oxide containing self-assembled hydrogels formed from block copolymer wormlike micelles

Qi Yue, Zhidong Luo, Xueyuan Li and Lee A. Fielding\*

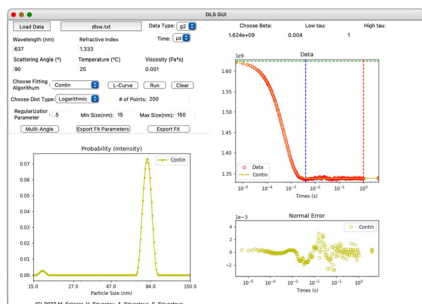
6525



## Swelling characteristics of DNA polymerization gels

Joshua Fern, Ruohong Shi, Yixin Liu, Yan Xiong, David H. Gracias\* and Rebecca Schulman\*

6535



## A user-friendly graphical user interface for dynamic light scattering data analysis

Matthew Salazar, Harsh Srivastav, Abhishek Srivastava and Samanvaya Srivastava\*

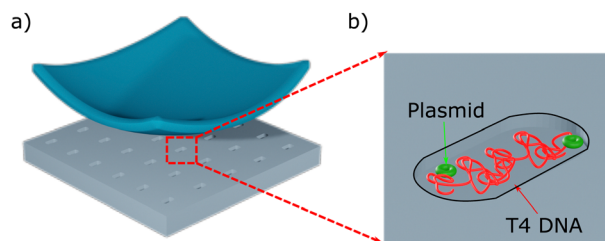


## PAPERS

6545

### Characterizing interaction of multiple nanocavity confined plasmids in presence of large DNA model nucleoid

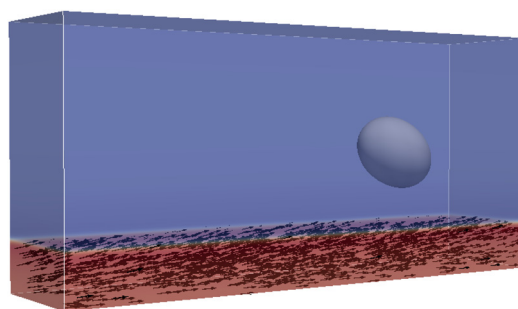
Ze Zhou Liu, Sarah M. Christensen, Xavier Capaldi, Seyed Imman Hosseini, Lili Zeng, Yuning Zhang, Rodrigo Reyes-Lamothe and Walter Reisner\*



6556

### Spontaneous motion of a passive fluid droplet in an active microchannel

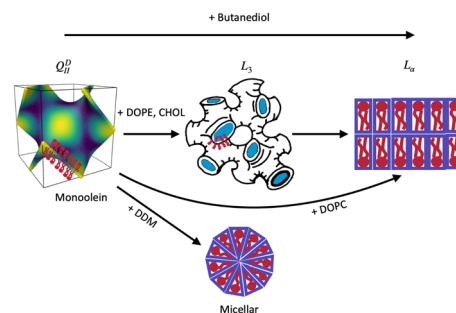
Adriano Tiribocchi,\* Mihir Durve, Marco Lauricella, Andrea Montessori and Sauro Succi



6569

### Lipid doping of the sponge ( $L_3$ ) mesophase

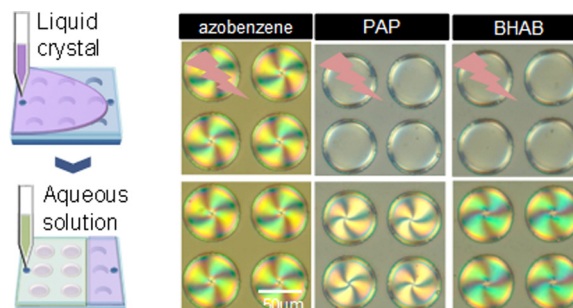
Christopher Brasnett, Adam M. Squires, Andrew J. Smith and Annela M. Seddon\*



6578

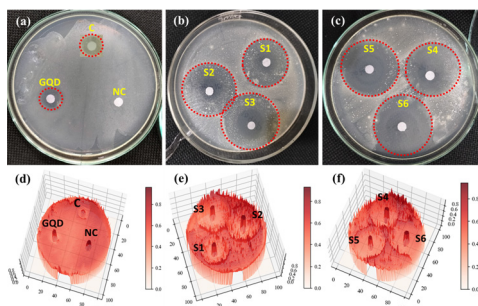
### Formation of topological defects at liquid/liquid crystal interfaces in micro-wells controlled by surfactants and light

Kenji Katayama,\* Takuro Yoshimura, Saki Yamashita, Hiroto Teratani, Tomoki Murakami, Hiroaki Suzuki and Jun-ichi Fukuda





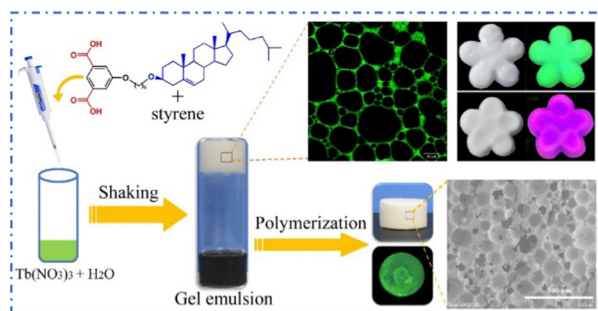
6589



## Graphene quantum dot doped viscoelastic lyotropic liquid crystal nanocolloids for antibacterial applications

Prayas Singh, Farheen, Surbhi Sachdev, Samta Manori, Sumit Bhardwaj, Havagiray Chitme, Ashish Sharma, Kuldeep Kumar Raina and Ravi K. Shukla\*

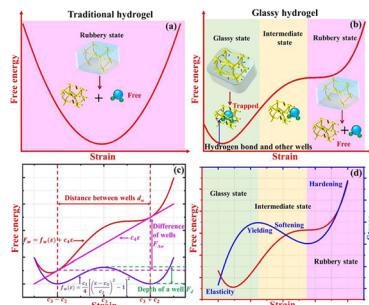
6604



## A new method for fabrication of gel emulsions and their application in preparation of novel porous materials

Min Xue,\* Gang Wang, Enrui Lin, Ping Sun, Beibei Li, Pengna Li and Shiyong Hua

6612



## A double-well potential model for glass transition in a glassy hydrogel undergoing bi-stable interactions with water

Ziyu Xing and Haibao Lu\*

