

Imaging ingredient distribution & dermal absorption of formulated products

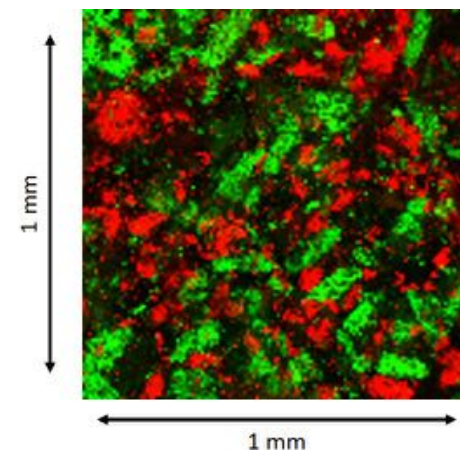
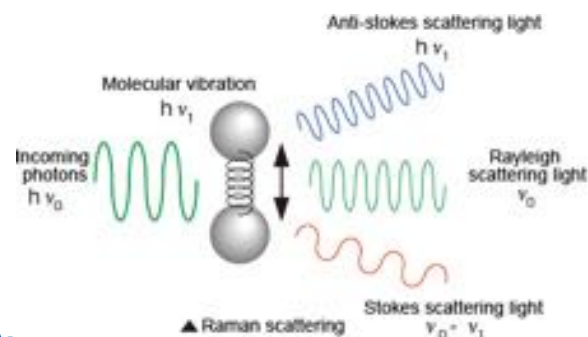
Natalie A. Belsey

Confocal Raman:

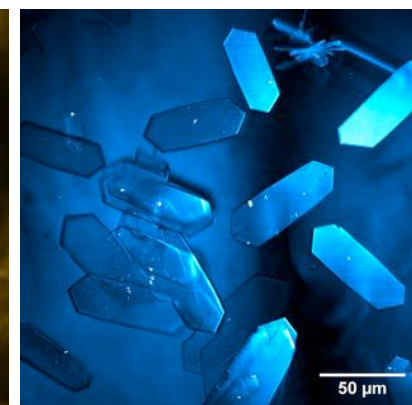
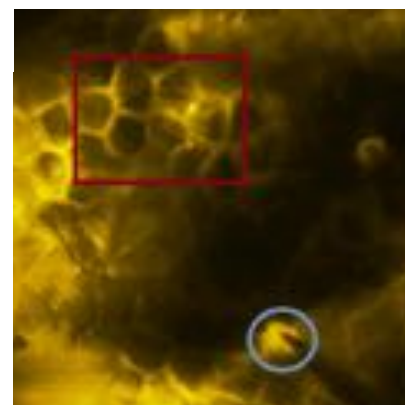
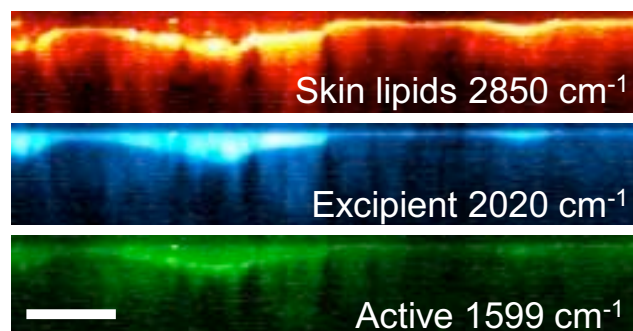
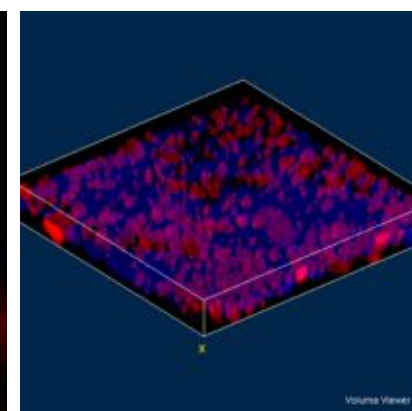
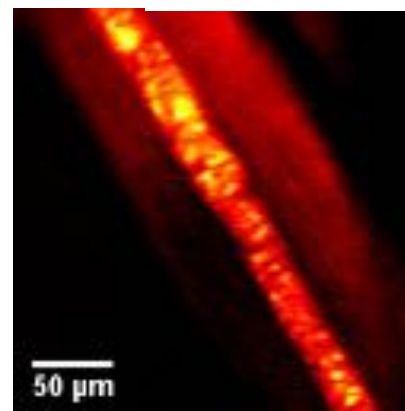
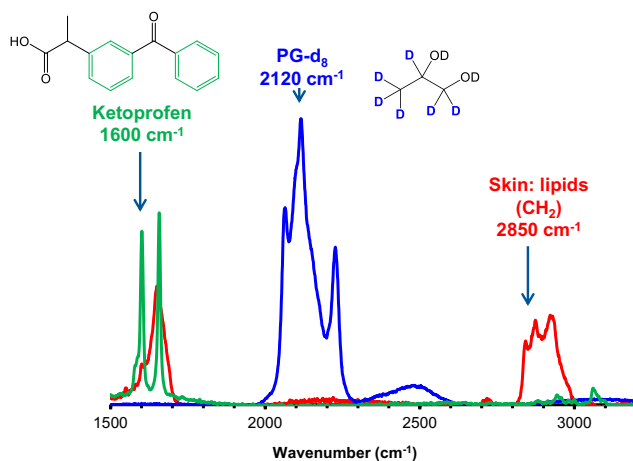
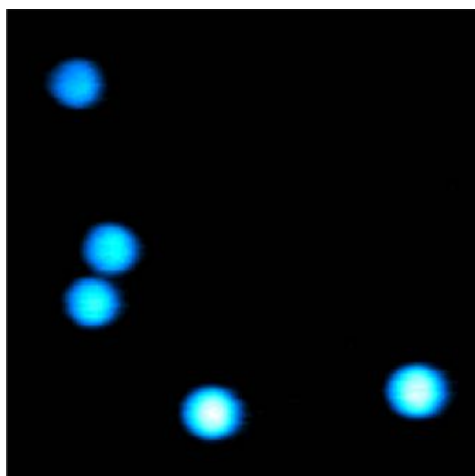
Non-destructive
label-free chemical mapping

Stimulated Raman scattering (SRS):

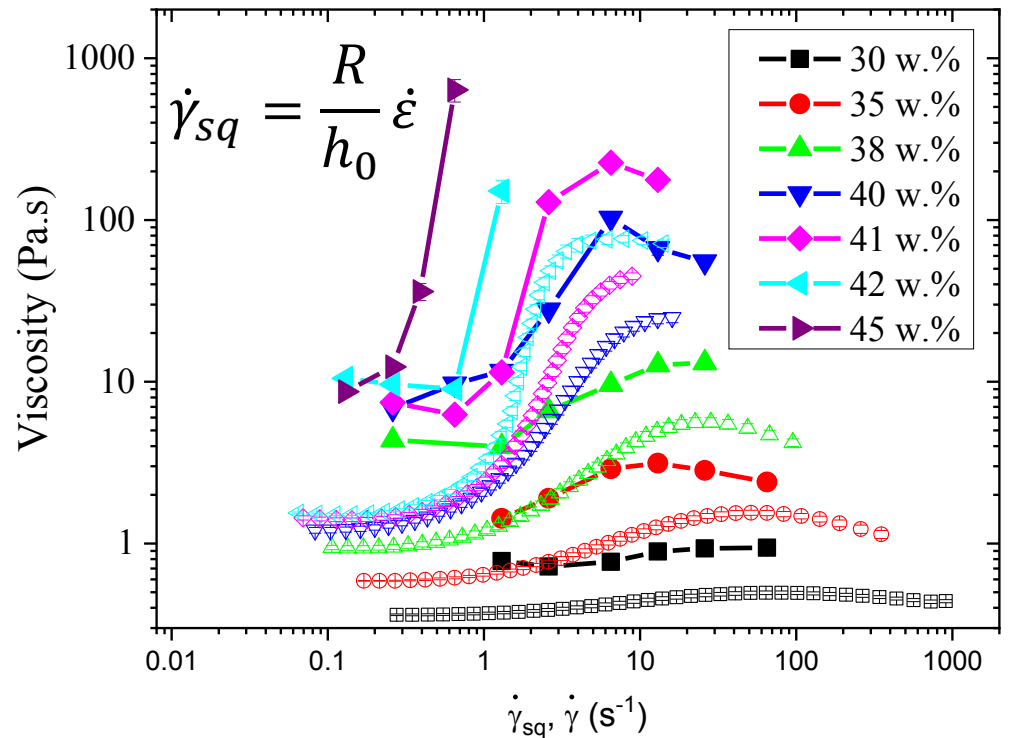
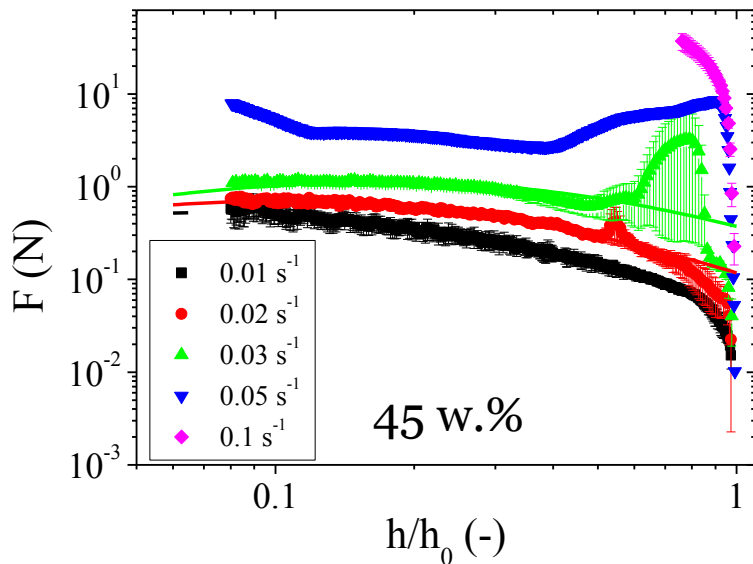
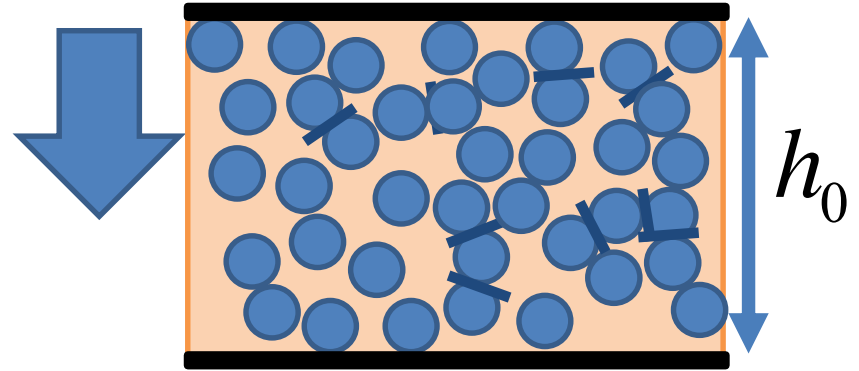
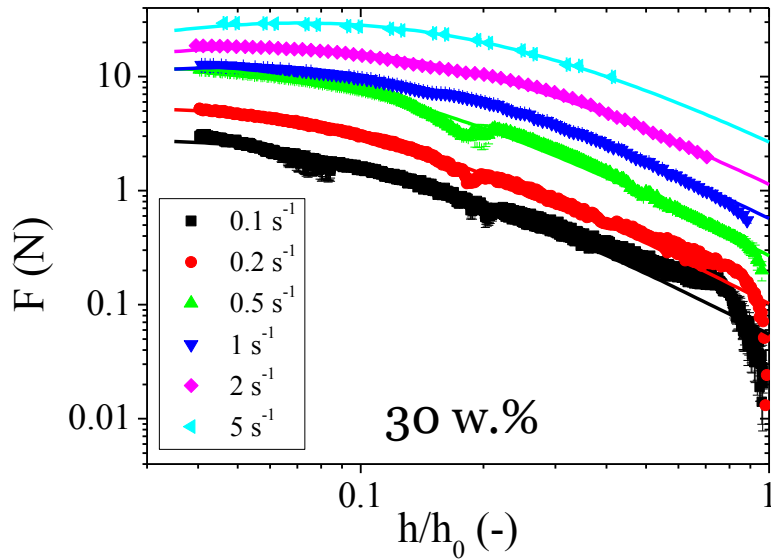
Rapid imaging at a single Raman frequency
Ideal for dynamic studies



- Aspirin
- Paracetamol



Squeeze flow of cornstarch suspensions



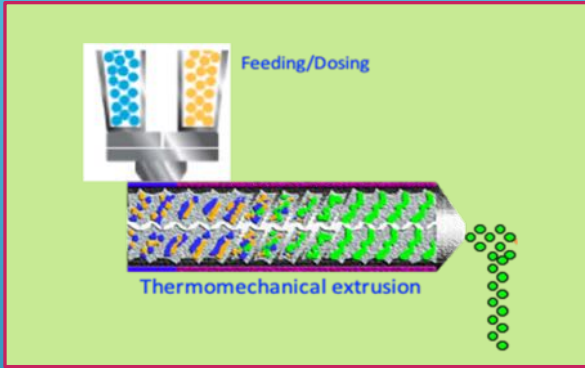
Preparation of high quality pharmaceutical salt by twin screw extrusion processing

Md Mithu, University of Greenwich.

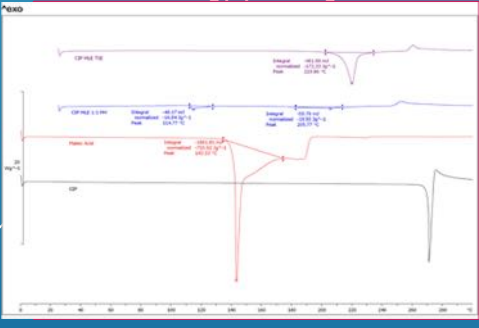
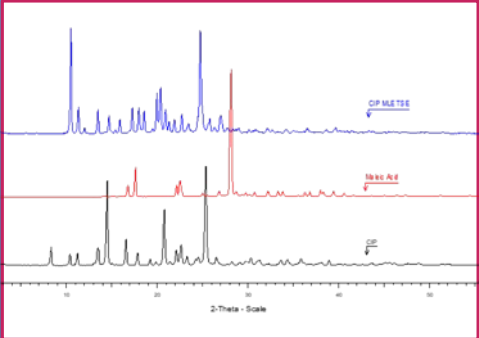
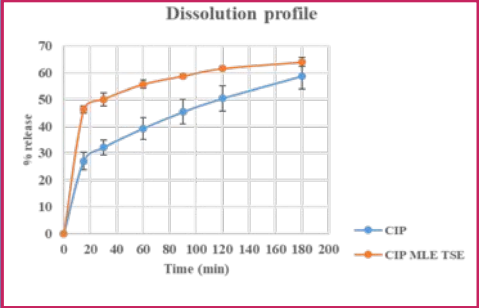
Pharmaceutical salt is formed with an API and a salt former. Normally solvent mediated methods are used¹.

Twin screw extrusion was being used in plastic and food industries as continuous manufacturing process¹.

API (Ciprofloxacin) and salt former (Maleic acid)
pKa difference ≥ 3



Twin screw extruder



Blending
Feed rate
Screw speed
Thermal profile
Torque

Analysing techniques
DSC
PXRD
FTIR
Dissolution profile

¹ Moradiya et al. 2016, *Crystal Growth and Design*, 16(6), 3425–3434.



Centre for Doctoral Training
in Complex Particulate Products & Processes



The bending stress of elongated particles in DEM shear cell

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^b Pharmaceutical Development, AstraZeneca, Hulley Road, Macclesfield SK11 2NA, U.K.

EPSRC

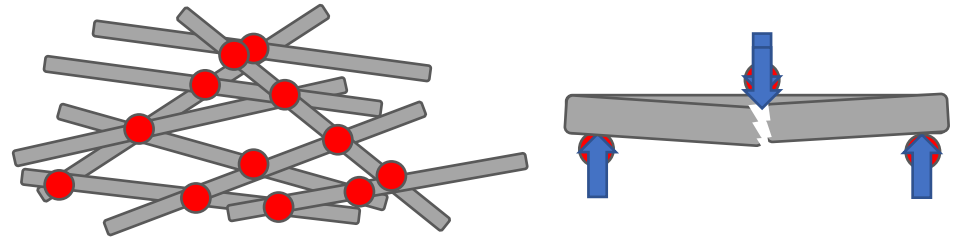
Engineering and Physical Sciences
Research Council



UNIVERSITY OF LEEDS

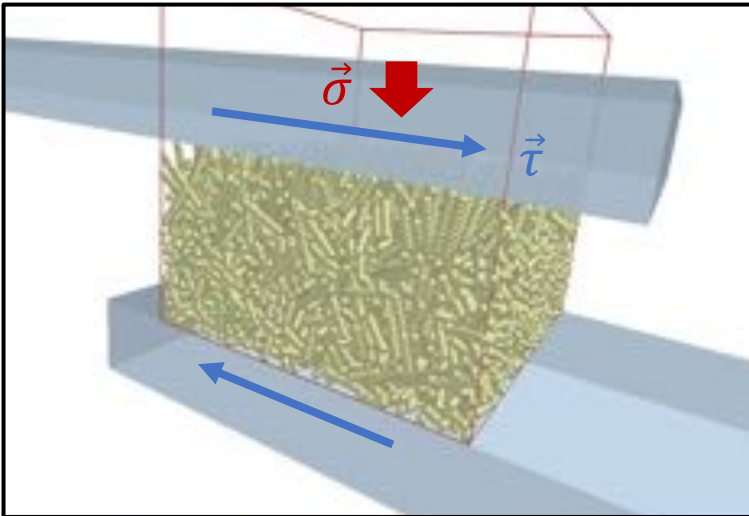
CONTEXT

- Pharma industry faces **particle breakage issue**.
- Most APIs are elongated crystals.
- Main breakage mechanism is bending stress.



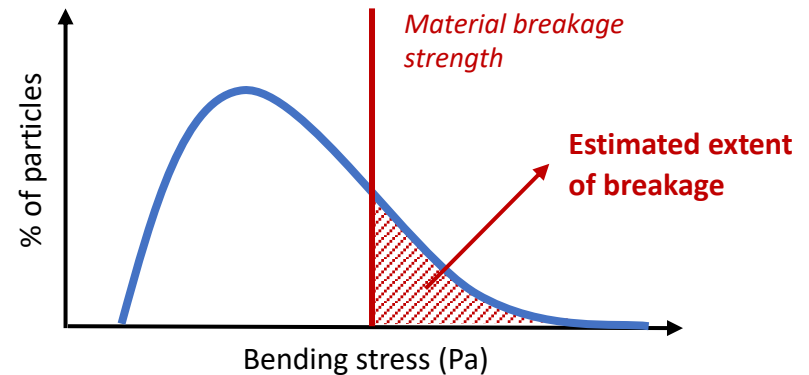
DEM SIMULATIONS

- Shear cell with two moving parallel plates.
- Periodic boundaries: Infinite shear plane.
- Rigid particles built with clamped spheres.



RESULTS

- Variation of normal and shear stresses.
- Bending stress calculated for individual particles with Euler-Bernoulli beam theory.
- Bending stress distribution output and combined with materials breakage strength.



OBJECTIVES OF PhD:

Prediction of particle breakage for pharma drying process conditions.



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Thank You

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FORMULATING PERSONAL CARE PRODUCTS THAT ARE SYMPATHETIC WITH SKIN MICROBIOTA: FACTORS THAT MUST BE CONSIDERED

Barbara Brockway PhD. Past President Society of Cosmetic Scientists. Consultant Scientist



Skin Microbiome/Microbiota – *Elephant in the room*

The skin microbiome is our invisible outer shield, which has been *under-considered* by generations of cosmetic formulators.

- Very little is known about the effects of cosmetics on the skin microbiome.
- Healthy microbiomes resist dysbiosis
- Dysbiosis is being linked to inflammatory skin conditions including rosacea, psoriasis and atopic dermatitis.

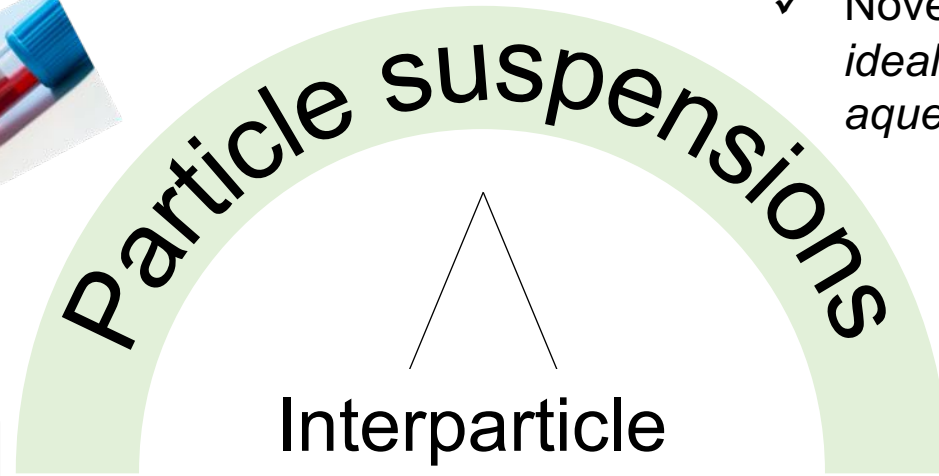
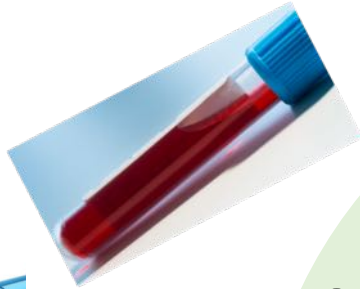
This poster reports the effects on facial microbiome of a commercial cream applied to the faces of 40 volunteers and discusses the factors that must be considered when formulating cosmetics sympathetic to maintaining a healthy microbiome

Rheology & Microstructure of Particle Suspensions in Oral Health Formulations

Anastasia Papadopoulou, Manish K. Tiwari, Stavroula Balabani
 University College London, Mechanical Engineering Department, WC1E 7JE, London, UK

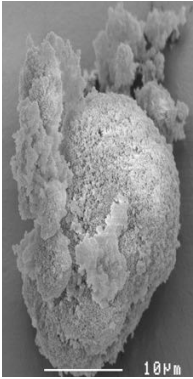


Particle suspensions are ubiquitous in everyday life.



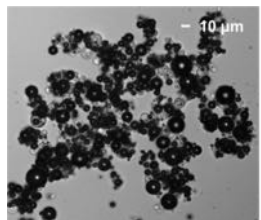
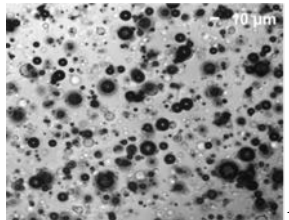
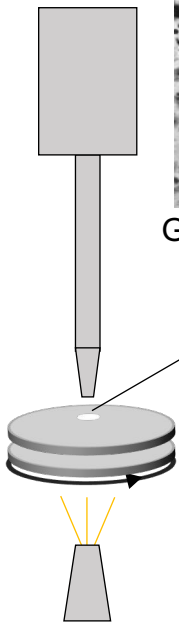
Motivation:

- ✓ Novel toothpastes involve *non-idealised silica* particles in *non-aqueous media*.



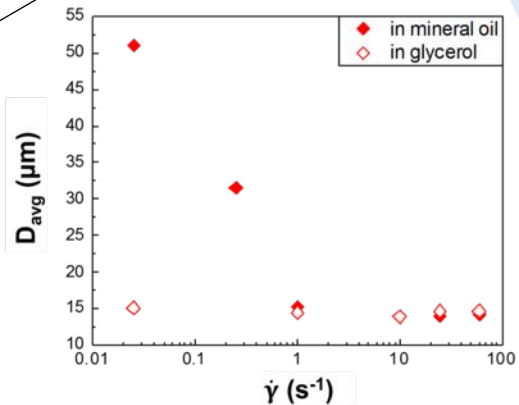
Objective:

- Link the bulk rheology & microstructure of those complex systems to address manufacturing challenges.

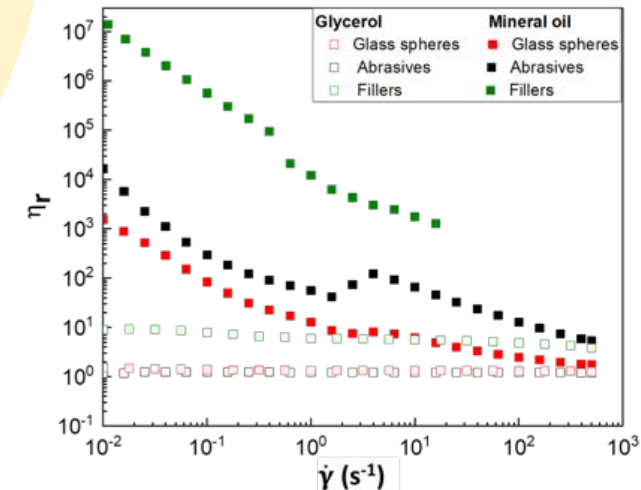


Glycerol ($C_3H_5(OH)_3$)

Mineral oil (C_nH_{2n})



Steady state relative viscosity



$\phi = 0.10$
(20°C)

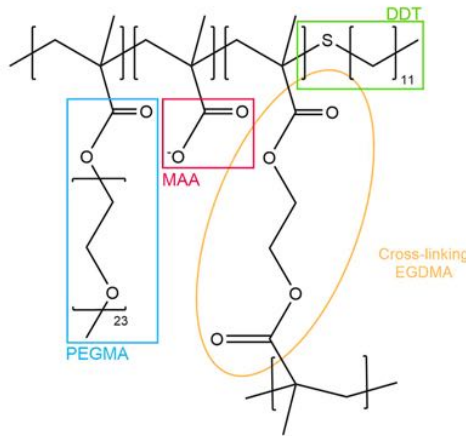
The Leverhulme Research Centre
for Functional Materials Design

Tuning the Rheology of Hydrophobic Materials in Aqueous Systems Using Responsive Surfactants

Emma Jones

Tuñón Group, Materials Innovation Factory, University of Liverpool

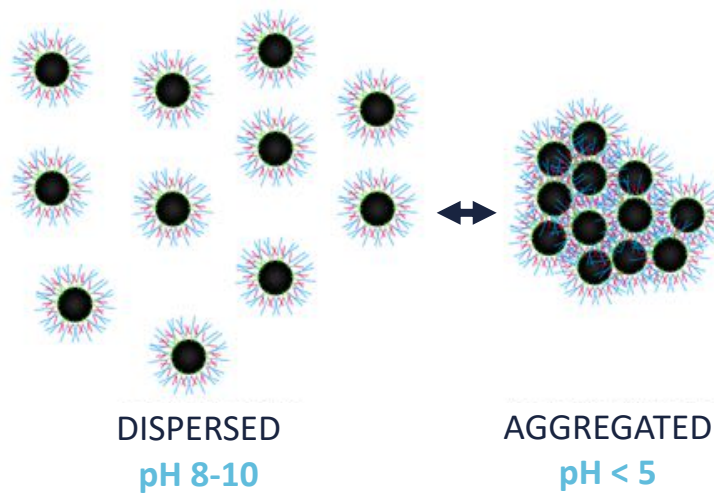
SYNTHESIS / FORMULATION / RHEOLOGY



BRANCHED COPOLYMER SURFACTANT (BCS)

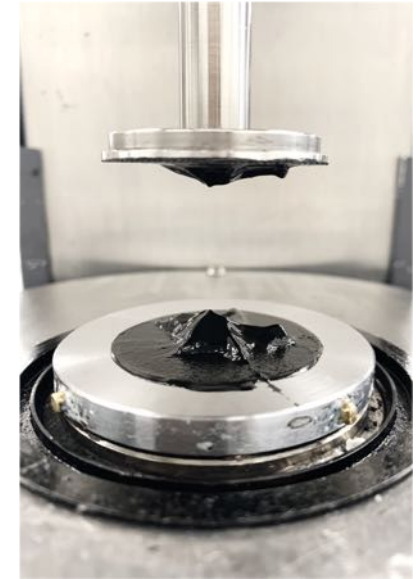
POLYMER SYNTHESIS

Thiol mediated free-radical polymerization of PEGMA, MAA, EGDMA and DDT.



INK FORMULATION

Powder processing of activated charcoal, formulation of inks with various charcoal, BCS wt/v%, triggering aggregation.



RHEOLOGICAL TESTING

Applying “printability protocol” to determine stiffness (G_{LVR}) and brittleness ($FTI, \sigma_f/\sigma_y$).