

Simplifying industrial dispersions

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1 Introduction

The goal of this work is threefold: First, design and characterize model system with new design handles, exploiting shape & roughness. Second, develop advanced characterization methods. Third compare to selected simplified industrial systems

2 Roughness as a design parameter in gels

- Key result** : designed and characterized effect of roughness on a thermoreversible gel.

Solution:

- Thermoreversible system
- Induce gelation inside measurement cell

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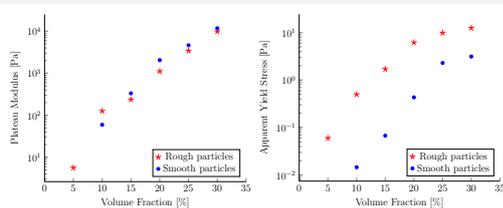
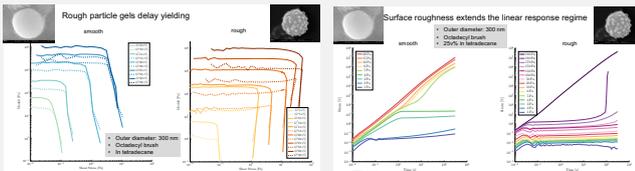
- Comparable attractive interactions
- "Rejuvenate" the structure between measurements

Model system

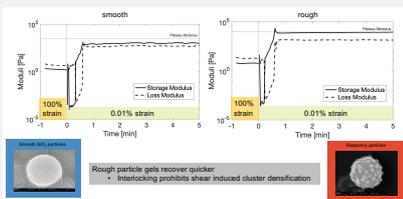
- SiO₂ particle
- Octadecyl brush (C₁₈)
- Suspended in tetradecane (C₁₄)
- Impart **different roughnesses** on the SiO₂ particles
- Maintain **comparable hydrodynamic radii**

- 1. Reproducible, Scalable and versatile synthesis of thermoreversible gels composed of particles with controlled roughness

- 2 : Rheology results –decoupling modulus and yield point



- 3. Reducing thixotropy

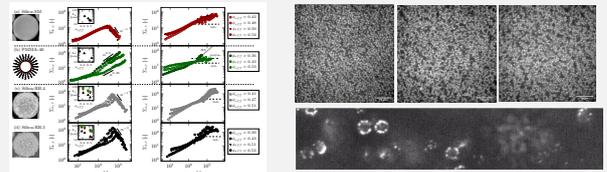
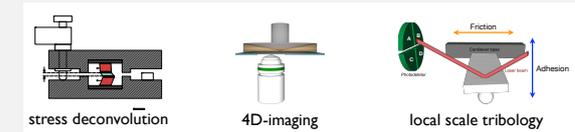


Further work

- Roughness var.
- Applications
- Visualization

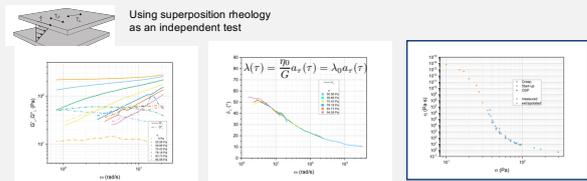
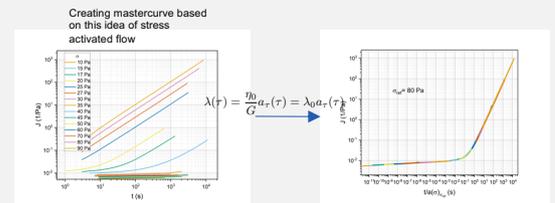
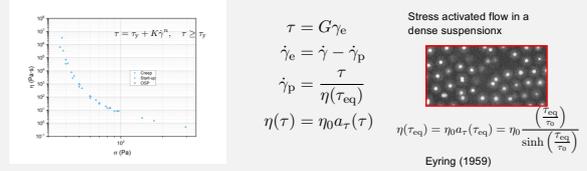
3 Techniques

- Deconvoluting contributions to the rheology

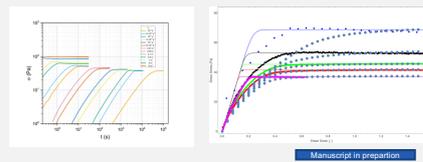


4 One example of a SID : Carbopol

- A non-yield stress model for a yield stress material...



Conclusion : classical plasticity model - Two parameter model, extended to 3D, tested in startup flows



Conclusions and further work:

Model systems work, now onto imaging, HF and parameter exploration
 Techniques operational, now onto more industrial systems.