

Supramolecular double-networks based on microgels with reversible covalent interactions

ES4: Stefania Traettino

Supervisor: Michel Cloitre



2018 – Master Degree in Chemical Engineering at "Università degli studi di Napoli, Federico II".

2017- Traineeship/master thesis at Université libre de Bruxelles:

Colloidal photonic crystals on soft substrate of sodium alginate for wearable sensors

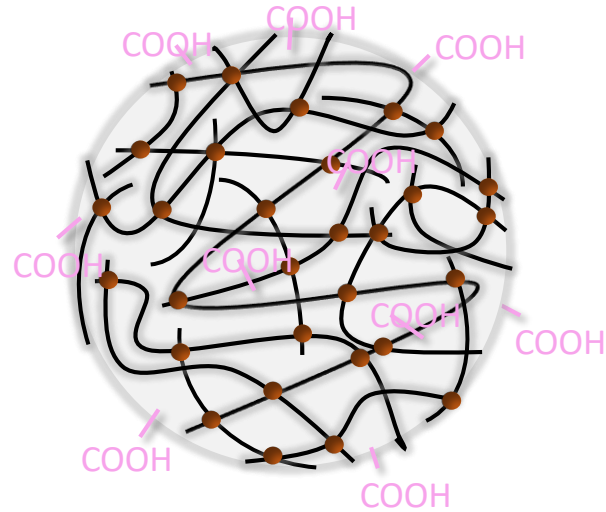


Journal article published:

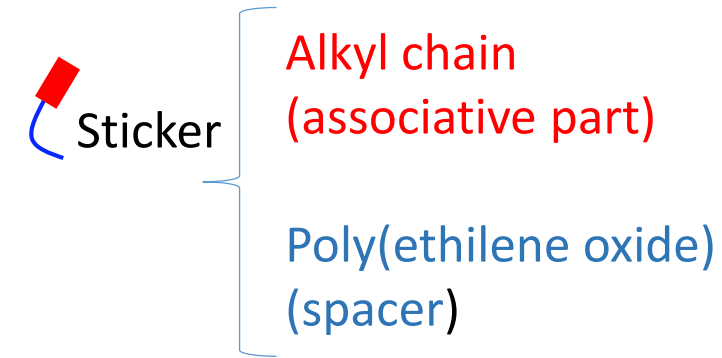
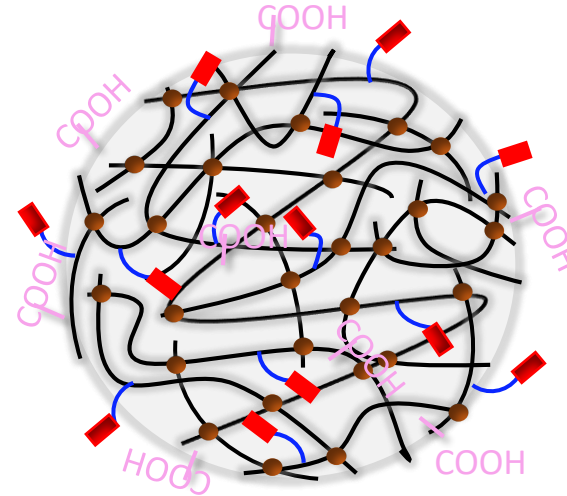
V. Miskovic, S. Traettino, C. Minetti, H. Machrafi, A. Amirfazli, F. Dubois, and C. Iorio, "*Fabrication and Characterization of Polystyrene Colloidal Photonic Crystals on Soft Sodium Alginate Film*", J. Nanoelectron. Optoelectron. 13, 472–478 (2018).

1st step: microgels as building block

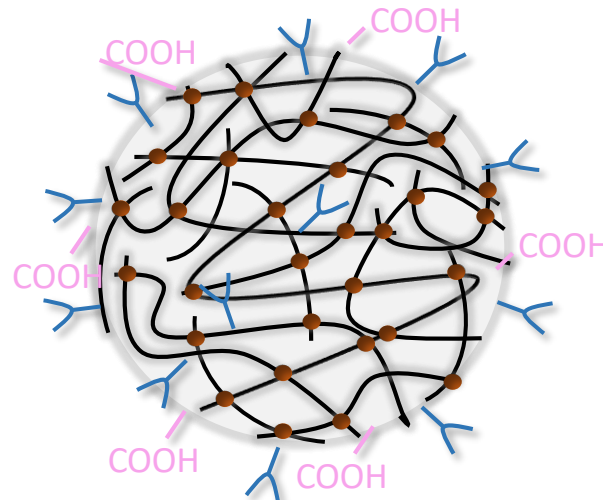
Repulsive microgels



Associative microgels



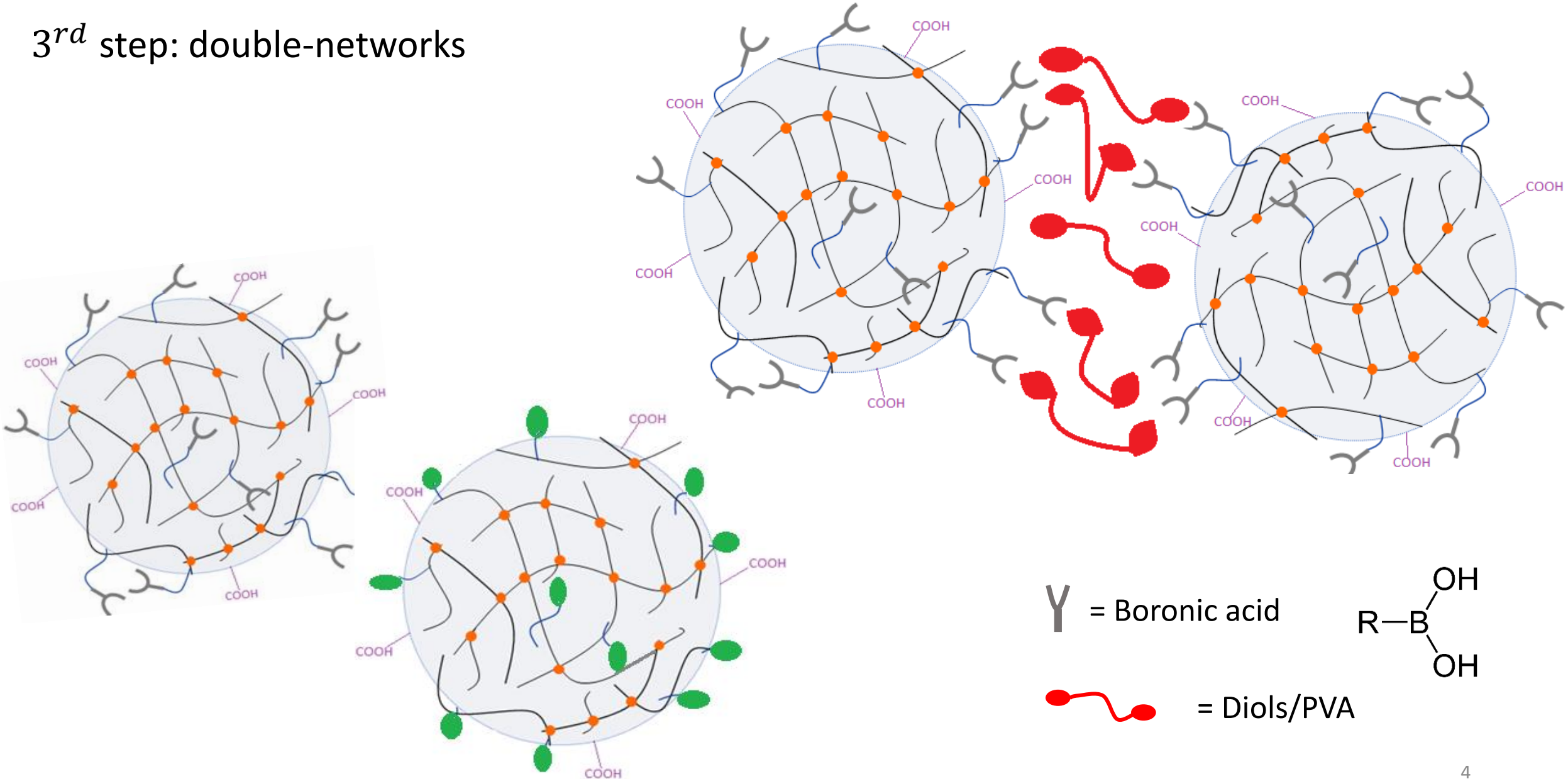
2nd step: Functionalization



Possible reaction:

- Boronic acid
- Amine / aldehyde

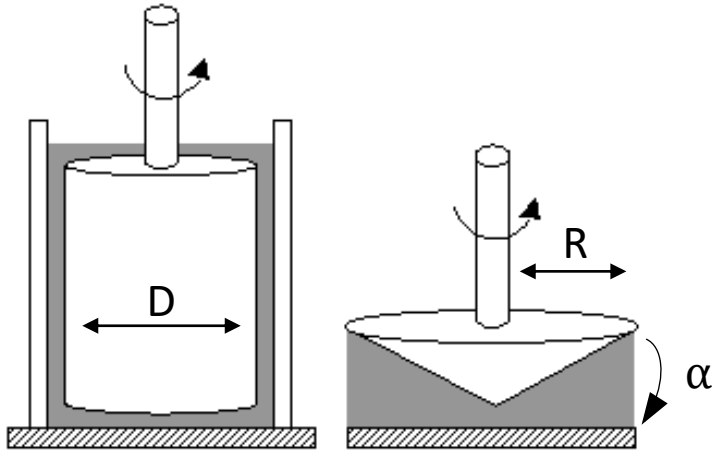
3rd step: double-networks



Rheometer

- ❖ Stress-imposed rheometer
- ❖ Solvent trap to avoid vaporitation

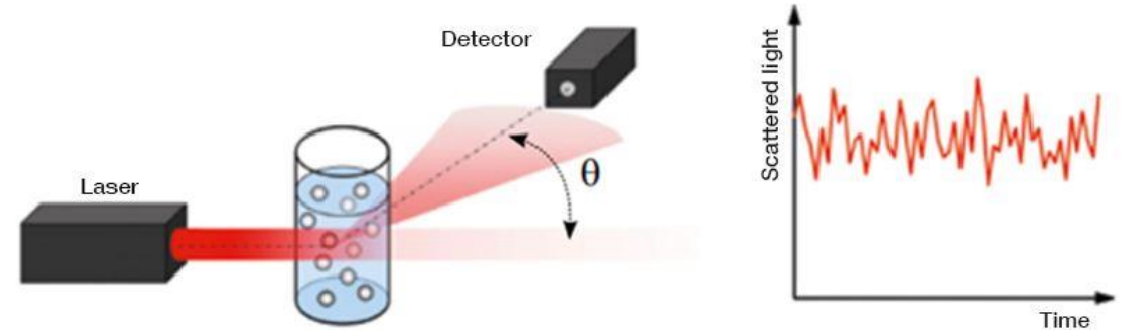
Geometry



Couette cell
 $D=28.7$ mm
Gap= 0.099 mm

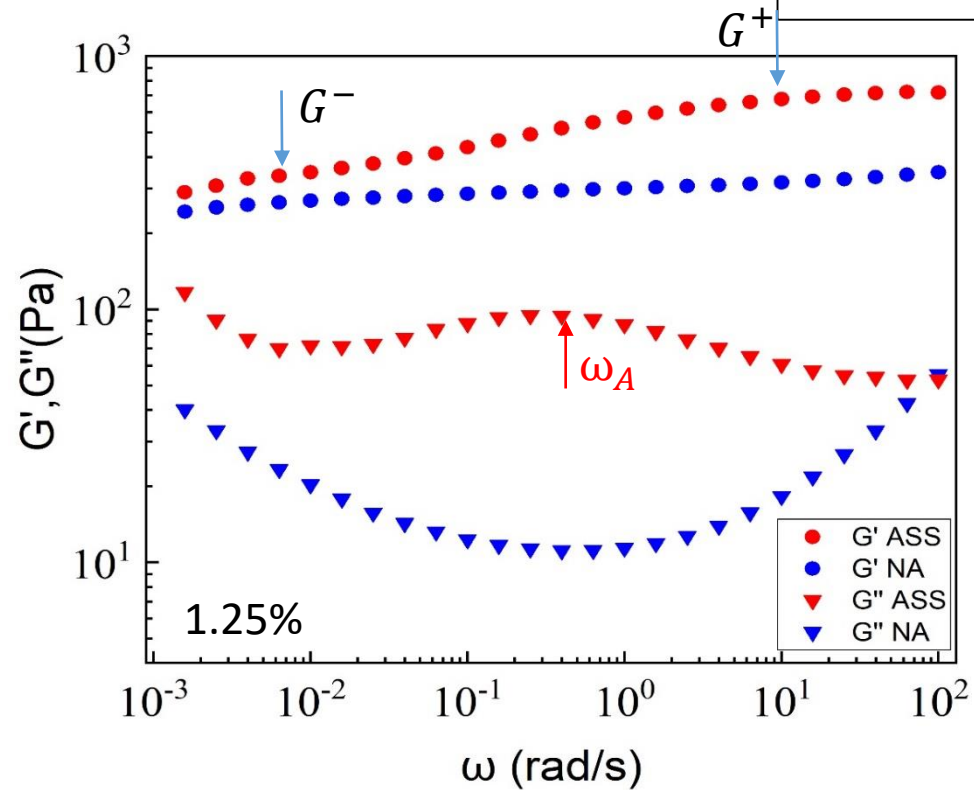
Cone-plate
 $R=25$ mm
 $\alpha=2^\circ$

Dynamic light scattering

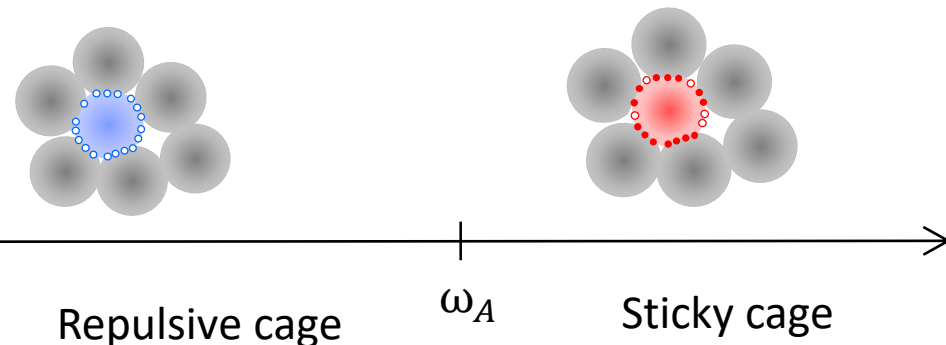


- ❖ Oscillatory rheology at small amplitude (**SAOS**)
- ❖ Oscillatory rheology at large amplitude (**LAOS**)

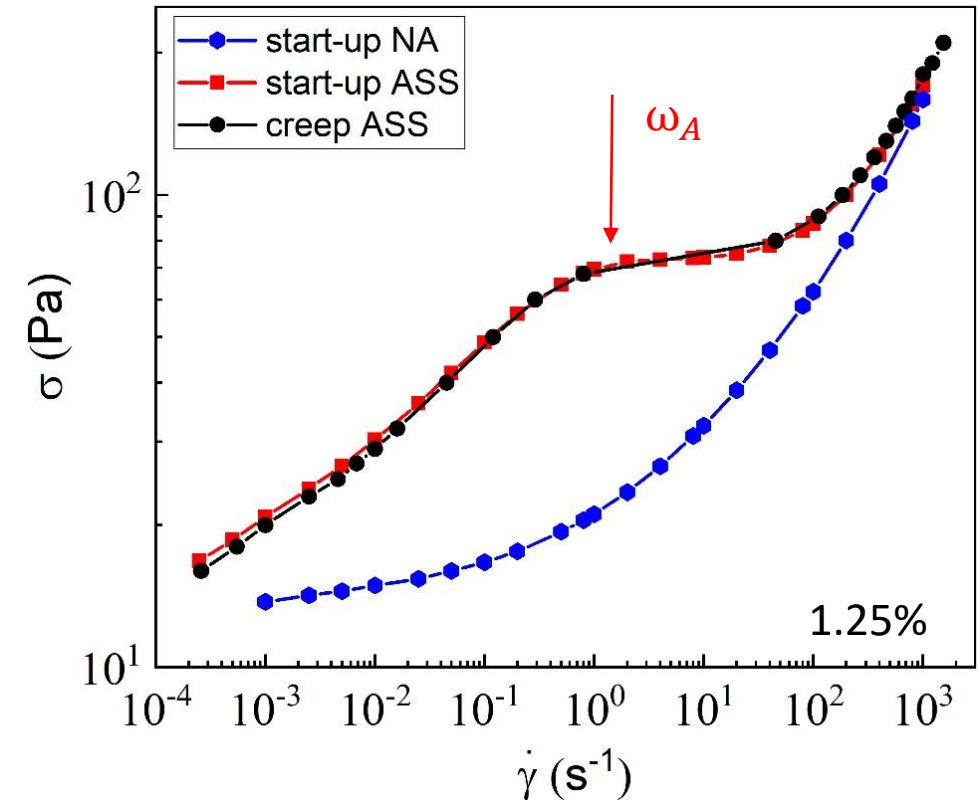
Linear rheology



Association contributes to elasticity
at high frequency

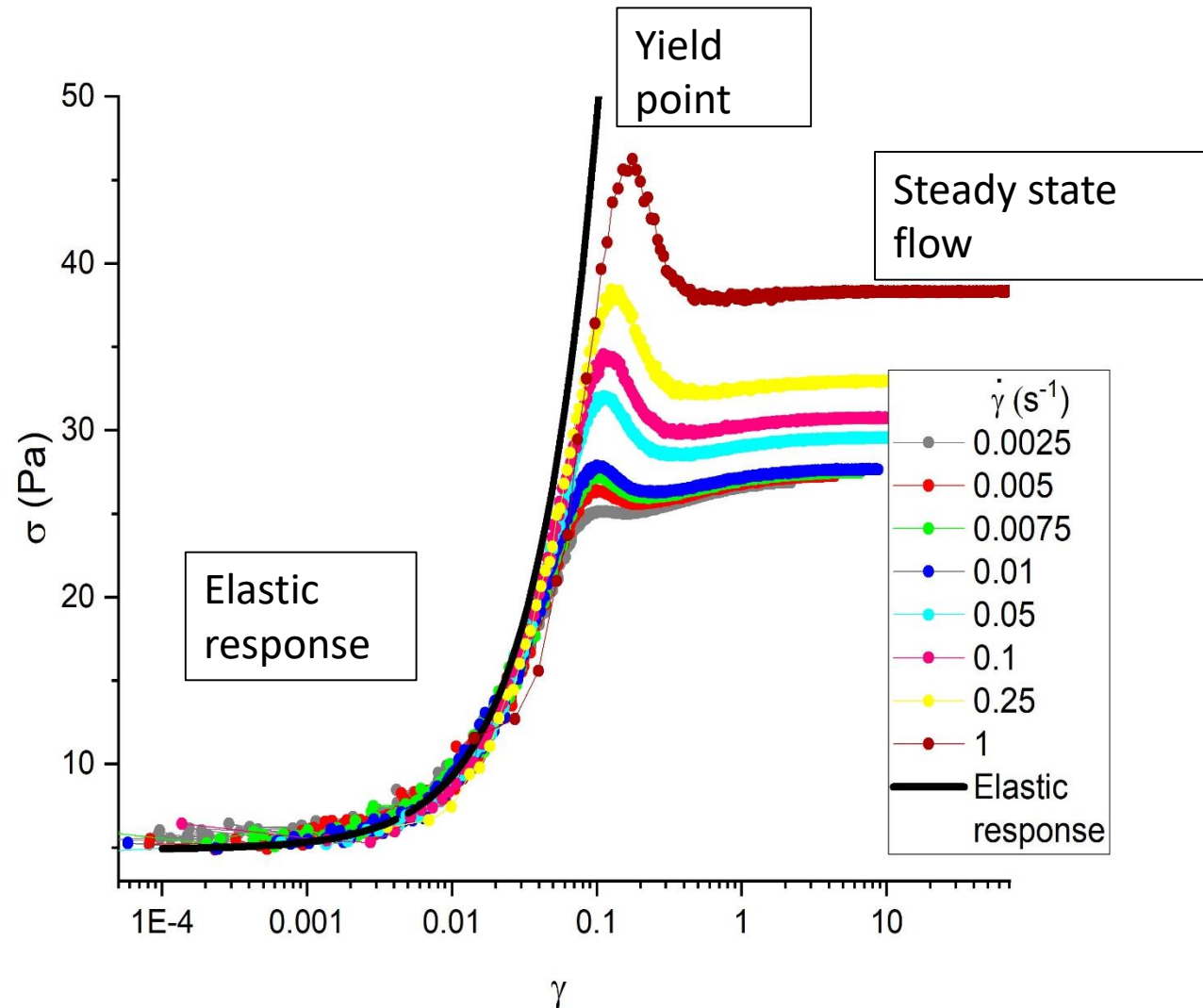


Non linear rheology

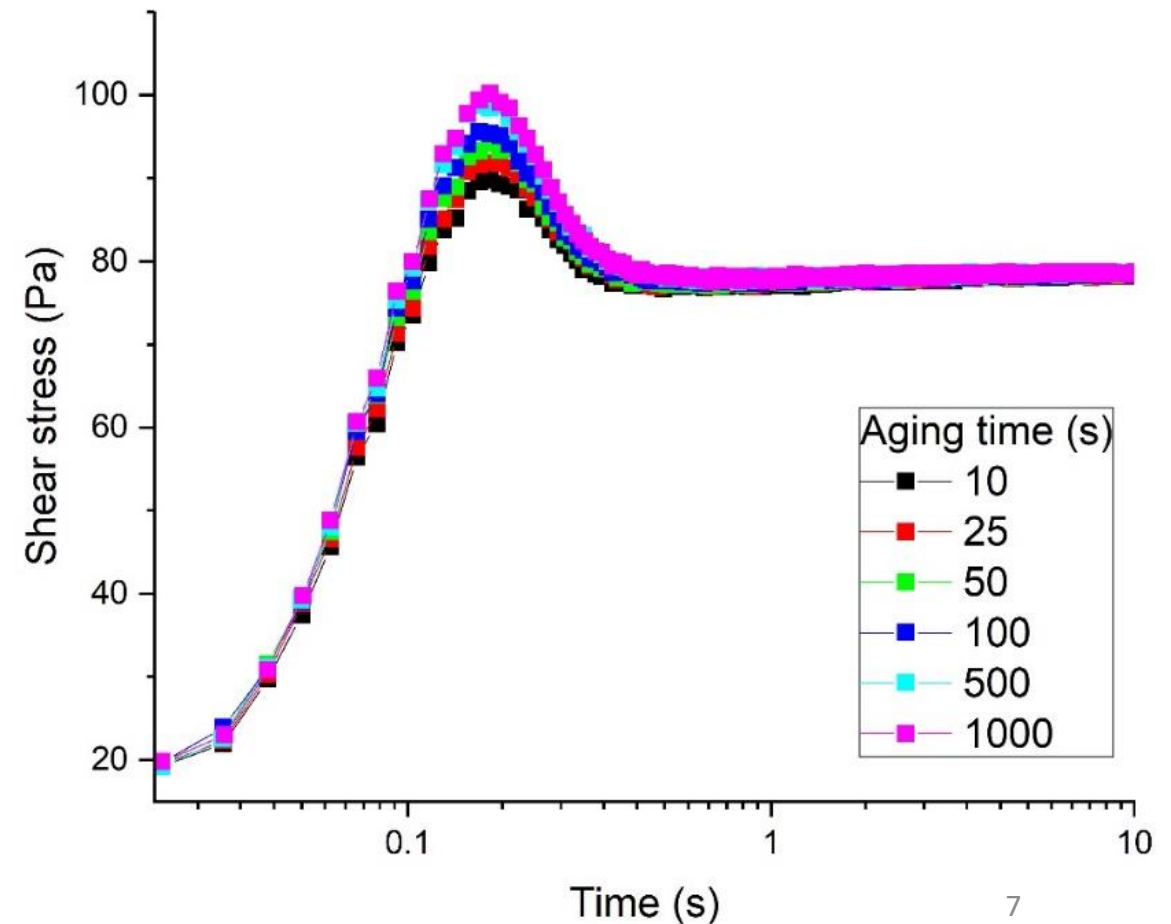


- Presence of plateau region
- Shear banding
- Association causes flow heterogeneous

How do microgels yield?



Stress overshoots which increase
with shear rate and with time





Rheology class by Prof.
Michel Cloitre



Workshop on:
***“Correlated disorder and
hyperuniformity in soft matter and
photonics”***



Evening French course :
*Fondation Robert de Sorbon - Cours de
civilisation française de la Sorbonne*



Weekly group meeting
and internal seminars



Welcome Day for PhD
students



Co-author of two
abstract submitted at the
AIChE (USA)



Instagram
dissemination
“ESR Dodynet”



Thank you for your
attention!

