UCL Université catholique de Louvain

IMCN Institut de la matière condensée et des nanosciences

Prof. Michel CLOITRE

Matière Molle et Chimie – ESPCI Paris (France)

https://www.mmc.espci.fr/spip.php?rubrique79

IMCN SEMINAR

« Microscopic design of soft colloidal materials »

Friday 1 June 2018 – 11:00 am
Auditorium Jean-Baptiste CARNOY (B.059)
Croix du Sud 4, Louvain-La-Neuve

More information : Sophie HERMANS (sophie.hermans@uclouvain.be)
Evelyne VAN RUYMBEKE (evelyne.vanruymbeke@uclouvain.be)

UCL Université catholique de Louvain

IMCN Institut de la matière condensée et des nanosciences

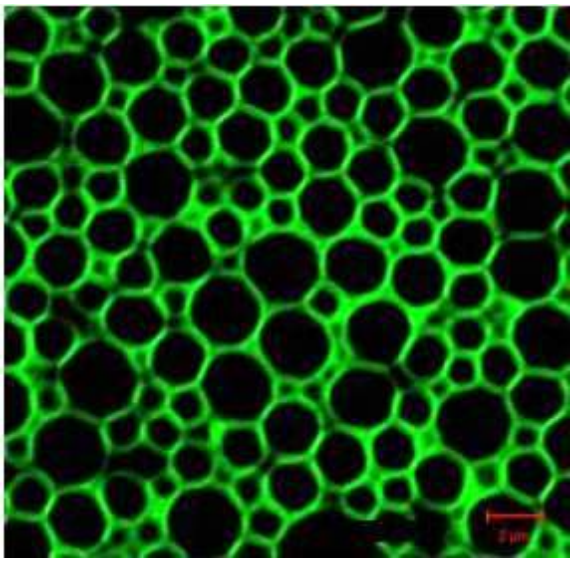
Professor Michel CLOITRE

Matière Molle et Chimie, ESPCI Paris

10 Rue Vauquelin, 75005 Paris, France

ABSTRACT

At high concentration, dispersions of deformable particles such as emulsions, microgels, micelles and star polymers jam into glassy materials that behave like weak elastic solids at rest but yield and flow at high stresses. These materials are basic components of viscoplastic formulations used as high-performance coatings, solid inks, ceramic pastes, textured food, or personal care products. The packed amorphous microstructure of soft particle glasses lies at the heart of their rheological behaviour. Individual particles are trapped in cages and can only move past one another appreciably if the local stress exceeds the strength of the contact interactions. Interestingly, chemistry offers a panel of strategies to tune the internal architecture of particles, the local elasticity, and the contact interactions, which can involve elastic repulsion and attractive forces. We will review recent experimental and theoretical advances that bridge the gap between particle scale properties and macroscopic rheology, thereby opening new routes towards the rational design of soft colloidal materials.



BIOGRAPHY

Michel Cloitre is a research director at the Centre National de la Recherche Scientifique in France and is currently affiliated to the Soft Matter and Chemistry laboratory at ESPCI Paris. He develops a methodology at the interface between chemistry, physics, and mechanics to connect the macroscopic properties of materials to their structure and dynamics at the molecular scale. He is known for the advances he made on the linear and nonlinear rheology of colloidal glasses and composites, pastes and emulsions, physical gels, binary associative polymers based on reversible covalent bonds, and water-soluble polymers with complex architectures. Important applications in collaboration with industrial partners include liquid-liquid encapsulation, enhanced oil recovery and the development of hydrocolloids for water-borne formulations. He teaches undergraduate and graduate courses on soft matter, molecular rheology, and material design.

Websites: https://www.mmc.espci.fr/spip.php?rubrique79