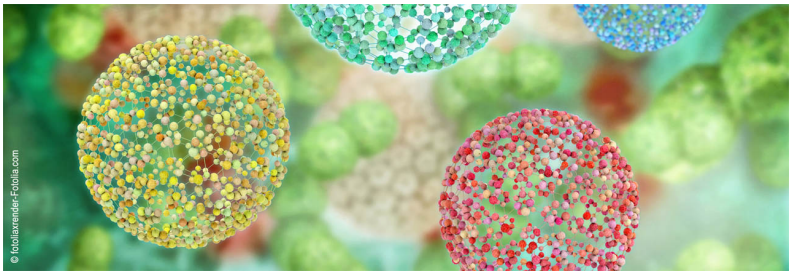

Contribution ID: **17** Type: **Poster**

Complexation Mechanism of Model Polyelectrolytes

To alleviate negative impacts on the environment, polyelectrolyte complexes coacervate system (PCC), based on electrostatic interactions between two oppositely charged polyelectrolytes (PEs) in water, are suggested as an alternative of conventional chemically-linked resins. The reversibility of the interactions in coacervates via the addition of excess salt makes recovery at the end of their service life possible. Furthermore, the phase separation behavior and consequently the mechanical properties of the polymer-rich phase (coacervate) can be tuned by changing the concentrations of PEs and salt. However, the complexation mechanism of PCC is not yet well investigated and it has challenged the scaled-up production. Hence, it is important to understand the relationship between the formulation and mechanical properties of PCC to facilitate the manufacture.

In this work, we study a model system based on negatively charged sodium poly(styrene sulfonate) (PSS) and positively charged poly(diallyl dimethyl ammonium chloride (PDADMAC) coacervates obtained with potassium bromide (KBr). By independently increasing the concentrations of PEs or KBr, the coacervate phase swells until phase separation is suppressed, producing solely one homogeneous phase. The resulting decrease in the linear mechanical properties of the coacervate (upon swelling) is larger when the KBr concentration is increased. We show that the mechanical properties can be maintained by simultaneously increasing the concentration of PEs and decreasing that of KBr. We are currently investigating the complexation mechanism of PSS/PDADMA/KBr coacervates to develop their phase diagram in connection with their mechanical properties.

Primary authors: Ms SHE, Jialin (Saint Gobain Recherche Paris, Institut Charles Sadron); Dr CEDANO, Francisco (Saint Gobain Recherche); Dr CHENAL, Marion (Saint Gobain Recherche Paris); Dr VAHDATI, Mehdi (Institut Charles Sadron); Prof. BOULMEDAIS, Fouzia (Institut Charles Sadron)

Presenter: Ms SHE, Jialin (Saint Gobain Recherche Paris, Institut Charles Sadron)

Session Classification: Poster Session & Discussion with Wine and Cheese