Colloidal structure and thermodiffusion of magnetic-nanoparticle dispersions in ionic liquids

Régine PERZYNSKI - *Sorbonne Université, France*

Magnetic nanoparticles (NPs) bearing a superficial electrostatic charge can be dispersed in various polar media but also more complex ones such as Room Temperature Ionic Liquids (ILs) only constituted of ions, which are liquid at room temperature. This class of solvents is interesting due to their very low volatility, versatility, large electrochemical domain, wide temperature range. They could be operational up to a few 100°C, in particular for thermoelectric applications.

Stable colloidal NP's dispersions in ILs are obtained at various concentrations (c) and temperatures (T). A well-adapted NP's coating is necessary, chosen and controlled during the preparation through key parameters. Two kinds of interactions are of paramount importance, namely the interaction NP/solvent and the NP/NP interaction.

The colloidal stability and the NP/NP interaction are probed by Small Angle Scattering of x-rays and/or neutrons. The parameters of NP/solvent interaction are provided by the evolution of thermodiffusion with c and T by Forced Rayleigh Scattering, where applying T-gradients at the microscale produces c-gradients thanks to Soret effect.